THINLINX

TLXOS-4.11.1 Required, TMS-8.4.1 optional but highly recommended

ThinLinX Operating System (TLXOS)

Digital Signage Howto

12th February 2023

1   Introduction

This User Manual assumes that you have installed TLXOS-4.11.1 on your device and optionally TMS-8.4.1 on your Windows / Linux Desktop or Virtual Machine. At the time of writing both the above are the latest versions of TLXOS and TMS and are the recommended versions required for our new Digital Signage Solutions

If you are still using TLXOS-4.11.0 please upgrade to TLXOS-4.11.1 or use TMS to download the Hotfix for 4.11.0 - New Signage periodic sync fix and then install to selected TLXOS devices using TMS -> Device -> Update -> Install Hotfix. This Hotfix is required to fix a DSI synchronization bug in TLXOS. This won't be necessary after TLXOS-4.11.1 has been released

Up until this release our Digital Signage has had a number of limitations, these being

   (1) Only able to play one type of content (images or Video or Web) on each of the displays

   (2) The content also had to be pushed to the TLXOS device using TMS, the content could be blocked by firewalls

   (3) The local Tlxconfig dialog when used for configuration instead of TMS had a number of limitations

The new Digital Signage retains an option to continue to use an enhanced version of the old Legacy Signage above or switch to our new Digital Signage. Any TLXOS device can be configured using either Legacy or the new Signage mode

The new Digital Signage has the following improvements over the old Legacy Signage

   (1) A new mixed mode supports the playing of any combination of Images, Videos, PDF or Web content on each display. Web mode uses web shortcut text ".url" files to point the browser to the Web content, any number of .url files can be included in the Playlist files directory. There are a couple of different ways to create Internet Shortcuts using Windows Explorer. You can either right click and use the New-> Shortcut option, or you can drag URLs from a web browser into an Explorer folder window. You can also use a text editor to create a file with an .url filename extension, which must contain "[InternetShortcut]" as the first line, followed by a "URL=<your-url-here>" line, e.g. URL=https://thinlinx.com. Name the text file with any name you like as long as it has the .url extension. e.g. mywebpage.url Always use best practice for your filenames by sticking to A-Z, a-z, 0-9, dot, comma, hyphen and underscore.

      Also remember that no matter if the content is Video, Images, PDF's or .url's the filenames themselves determine the position in the playlist, in accordance with the sort order for whatever locale (language) you are using on the client. A good idea would be to prepend numbers to the filenames, the same way that you would for mp3 files in an

album folder, e.g. 01-first_item.jpg, 02-second_item.mp4, 03-third_item.url, etc.

(2) The content is now pulled by the TLXOS device using rsync which allows the content to traverse multiple firewalls on the journey from the rsync server to the device. Rsync is a vastly superior file transfer method compared to our Legacy file transfer method

(3) We have integrated a rsync Server into the latest TMS-8.4.1 which allows for easy configuration of remote Digital Signage Content by selecting directories of single or mixed content on the Desktop running TMS. We recommend that you use the built in TMS rsync Server initially, you can switch to a remote rsync server later if you wish to

(4) We have added support for a remote Linux rsync Server which can be located anywhere in the world, this could be a Virtual Machine in a Datacenter. Our testing was carried out using a TLXOS RePC virtual machine running on our local Network's VMware ESXi Server. This is a standard RePC VM installation to which we added rsync using apt-get

(5) We have released a standalone rsync Server for Windows (rsync-3.1.3-setup.exe) for users that don't have access to a Linux rsync Server or the ThinLinX Management Software (TMS). You can download this from the ThinLinX Downloads page. To install just double click on the .exe file and follow the prompts, this will install rsync as a Windows Service which runs in the background. After installation you will need to edit the rsyncd.conf file to define which directory (or directories in the case of setting up multiple DSI Devices) is to be used for your Digital Signage content. This is an incredibly useful feature as it allows anybody to easily manage their own Digital Signage content on one or many Digital Signage devices. The Network Administrator running TMS would remotely configure your device or devices to point to an Rsync Server (Your PC in this case) and the content directory on your Windows Desktop for each device, this would normally be a different directory for each Digital Signage device. In the case of Dual screens connected to each device a different content directory for each screen would be configured. Once the devices are configured by the Administrator you have total control of the content of each Display by simply adding or removing content from each content directory on your PC. You will find more information on how to configure rsyncd.conf in section **4** further below

Rsync's description is copied below from the Linux man page.

"Rsync is a fast and extraordinarily versatile file copying tool. It can copy locally, to/from another host over any remote shell, or to/from a remote rsync daemon. It offers a large number of options that control every aspect of its behavior and permit very flexible specification of the set of files to be copied. It is famous for its delta-transfer algorithm, which reduces the amount of data sent over the network by sending only the differences between the source files and the existing files in the destination. Rsync is widely used for backups and mirroring and as an improved copy command for everyday use"

2   Using TMS for Digital Signage configuration

The new digital signage modes can be configured remotely using TMS or locally on the TLXOS device. We recommend that you use TMS to remotely configure the new Digital Signage mode or the old Digital Signage (Legacy) mode. The TMS console will show the Mode as either "SIGNAGE" for the new Digital Signage mode or "DSI" for Digital Signage (Legacy)

The first example below describes how to configure the new Digital Signage using TMS's built in Rsync Server, this is the easiest way to configure your TLXOS devices

The first step is to create one or more content directories on the system running TMS. Once the directories are created add your signage content which can be any combination of images (png or jpeg), Videos, PDF's and Website shortcuts (.url files).

We call this mixed content, whereas when using the old Legacy Signage mode (single content) each directory can only have one type of content which can be either images or Videos, for Legacy mode Web content you can enter one or more URL's separated by spaces, PDF files can also be played by entering the full Website path to the PDF file.

The Minimum hardware to play PDF or Web Content is an RPi4 with 1GB RAM, whereas Images and Video will easily be played on hardware as low as a US$5 RPi Zero 1

Step one is to highlight a device on the TMS console by clicking on the TLXOS device that you want to configure as Digital Signage, then click on the TMS Mode Icon, the Application Dialog Box will appear, select Digital Signage from the Mode drop down list, and then click on OK. This will set the selected device to Digital Signage.

Application   ?   ×

Mode	Digital Signage ▼	☐ Kiosk Mode
Submode	▼
Exit Behavior	Prompt ▼
Graphics Quality	▼
Audio Quality	▼
Redirect Audio	▼
Redirect Microphone	▼
Redirect USB	▼
Redirect Serial	▼
Latency	▼
Security	▼
Window Size	▼
Server/Broker[:Port]	
Gateway/Proxy[:Port]	
Command Line Args	
Username		☐ Auto Login
Password		☐ Show Password

[Set default values]   [Get application help]

[OK]   [Cancel]

Step two is to configure the device by clicking on the TMS Displays Icon, the dialog box below will then appear
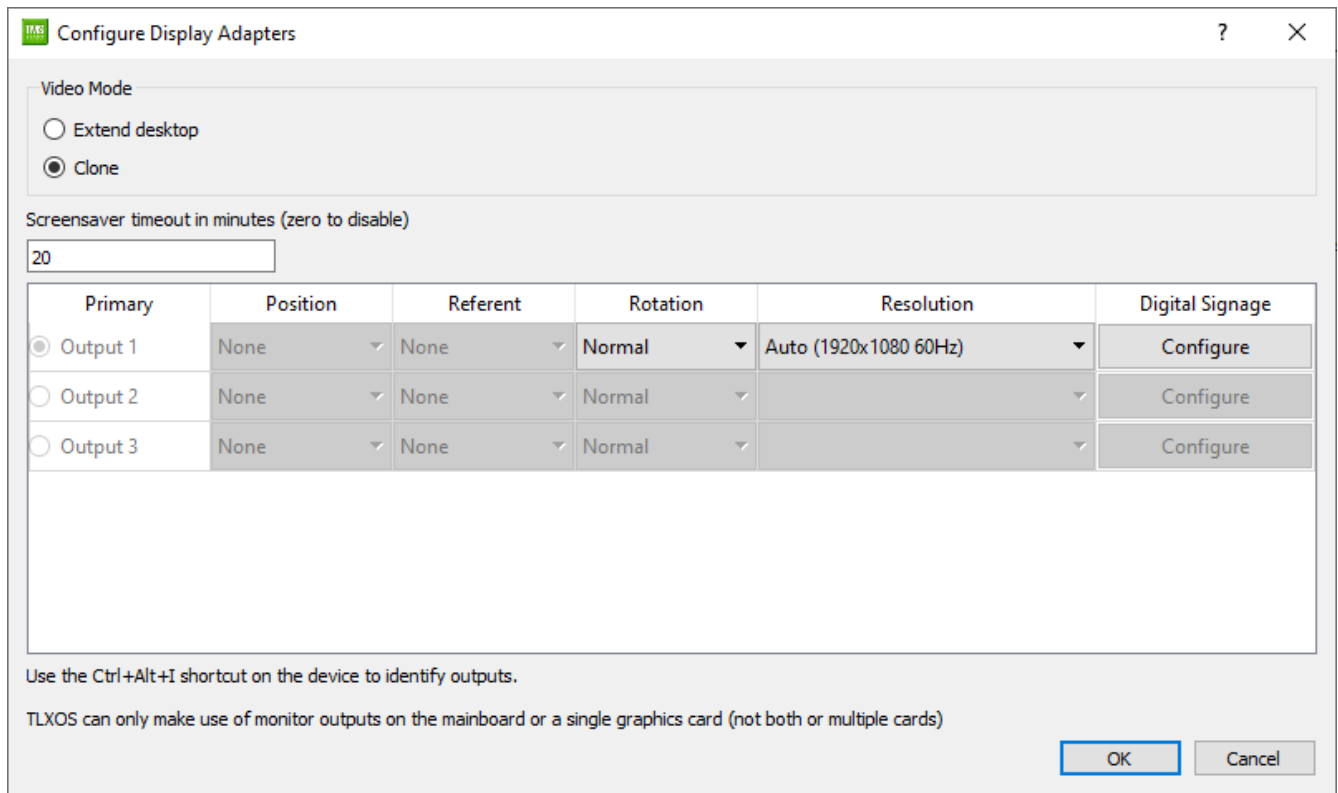

Note in the image above, the words "Digital Signage" on the far right with the word "Configure" directly below it. If you have more than one display already set up in "Extend Desktop" Video mode you will see another highlighted Configure button for each display, which enables you to configure Signage for each individual Display. Click on the Configure button for the Output which you want to Configure, you would normally Configure Output1 first, followed by Output2, then Output3 if it exists.
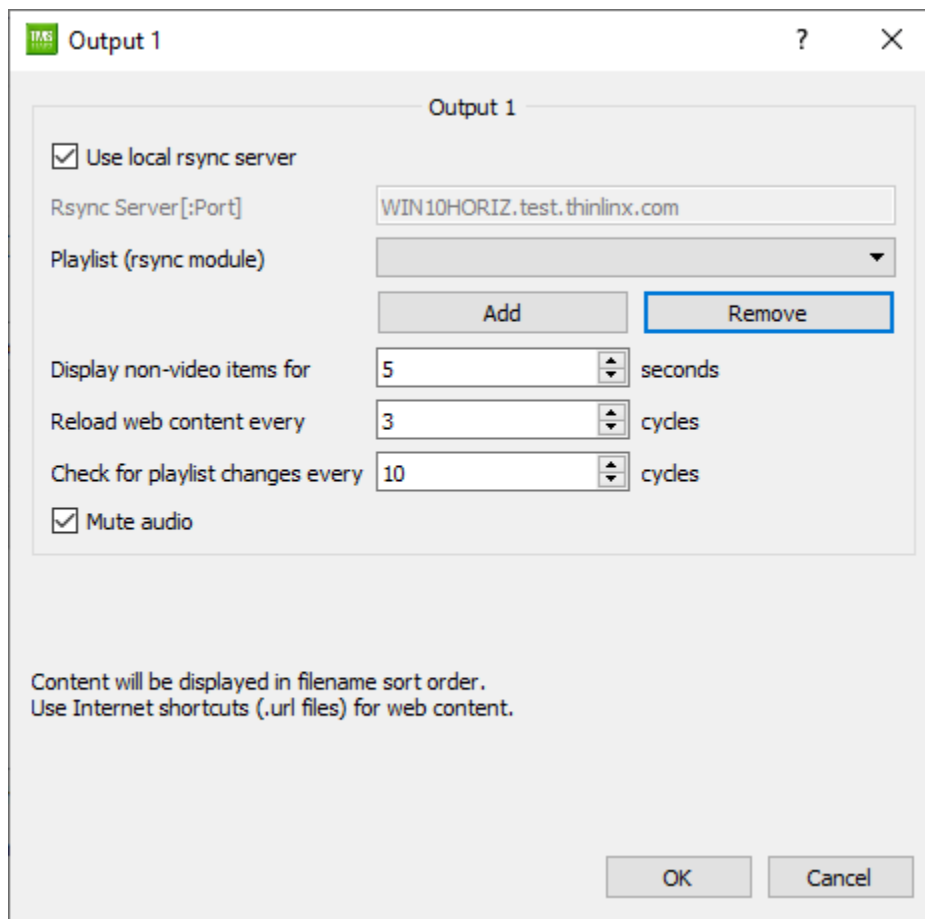
As shown in the image above ensure that the "Use local rsync server" is selected with a tick, you will see the Rsync Server [:Port] Line is greyed out with the hostname of the system running TMS also greyed out

The next step is to add your playlists which you do by clicking on the "Add" button, if you see the Warning Dialog shown below you will need to close TMS and Open TMS as Administrator
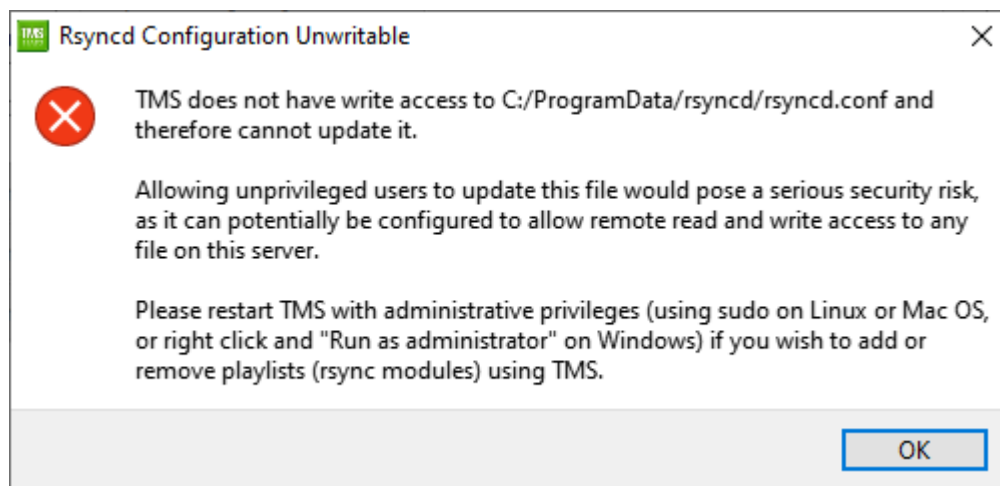
When you click on "Add" a directory listing appears
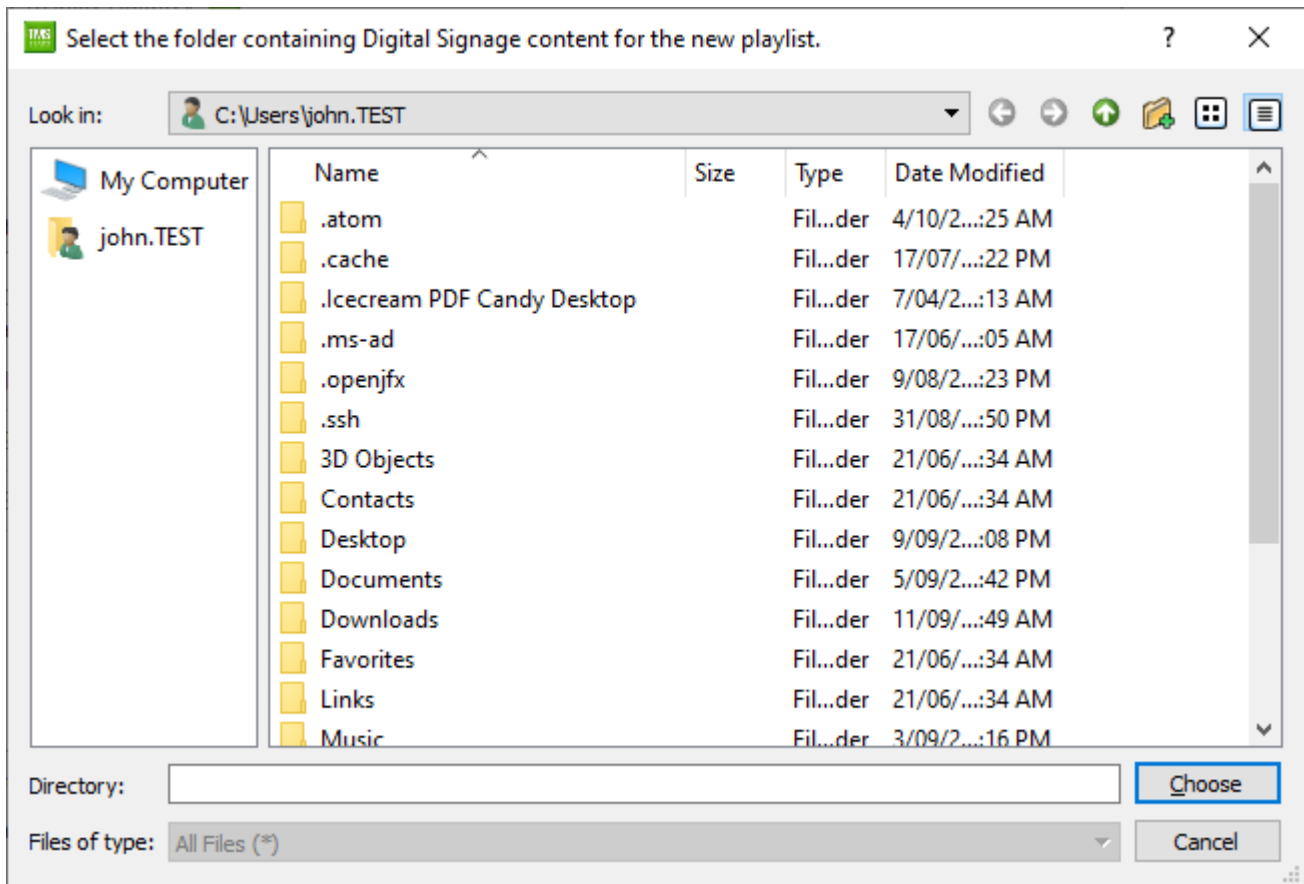
Select the directory with your Digital Signage files, in my case my directory contains images of a house for sale, a Video of the House, a PDF and a Website shortcut .url file to point to the Real Estate Website containing further information on the house. You can call the Playlist anything you want as long as it is meaningful to you. I called mine, Realestate1
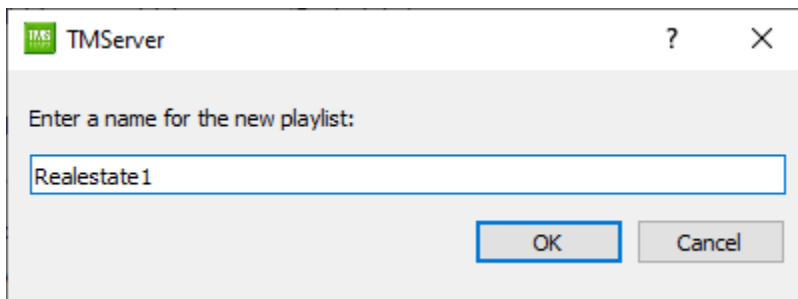
Click on OK
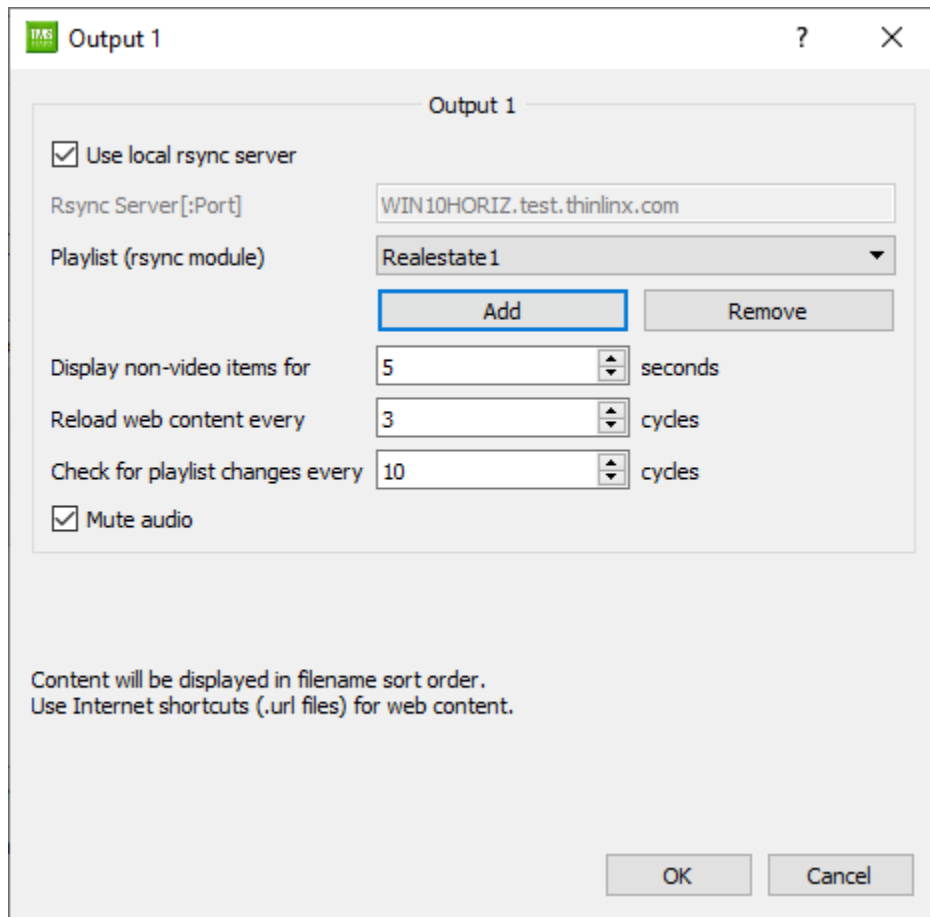
You can adjust the three default settings below the Add button which are

  (1) Display non-video items for
  (2) Reload web content every
  (3) Check for playlist changes every

Item (1) above refers to the time an Image, PDF or Website is displayed before the next item in the Playlist appears

Item (2) above refers to how many complete cycles of the Playlist to run through before reloading the web content

Item (3) above refers to how many complete cycles of the Playlist to run through before checking for new content. If new content is found it is copied to the appropriate output1, 2 or 3. If you are using TMS-4.11.0 you must install the Hotfix for 4.11.0 - New Signage periodic sync fix as mentioned in the introduction above

If you have finished adding Playlists, click on OK, then click OK on The Configure Display Adapters Dialog, this runs rsync on your TLXOS device connecting to the rsync server which is

built into TMS, then after the copy of the files to your device is complete, Digital Signage will start playing the files. This may take a few minutes depending on how many files you have and how large they are.

3   Adding or removing Digital Signage content

After Digital Signage has started playing you can add or remove content from or to the playlist with minimal to no disruption to the playing content. Simply add or remove content from the directory which is associated with your playlist. The changes will occur after the "Check for playlist changes every 10 cycles or whatever number of cycles you have configured. After the copy is complete the signage will continue playing but with the new content in the playlist, this all happens transparently in the background with the transition generally not noticeable at all.

If you are using TMS you can manually sync the content by using TMS -> Device -> Commands -> Synchronize Digital Signage Folders but you would only do this if for some reason you did not want to wait for the automatic sync mentioned above. The transition to the new content is much smoother if you allow the automatic sync to occur after "X" number of cycles which you have previously configured

4   Using a remote Rsync Server instead of Rsync built into TMS

There may be times that you wish to use a remotely based Rsync Server instead of the one built into TMS. This would be a good option if your customers wanted to easily manage their own Digital Signage content or you had users in your organization who wanted to manage their own content. In this example an organization has an employee who wants to create content and add or delete items in that content. The user creates the content for two TLXOS devices each connected to a single Display, this is a mix of images, pdf, Web and Video in a directory named mixture and Video content in a directory named m4v. The user then downloads and installs the Windows Rsync Server from the ThinLinX Website, Downloads page. The next step is to configure the Rsync Server with the names and locations of the two content directories, this is done by editing the rsyncd.conf text file which in a default install will be located in the Local Disk (C:) > ProgramData > Rsyncd directory. (see image below)
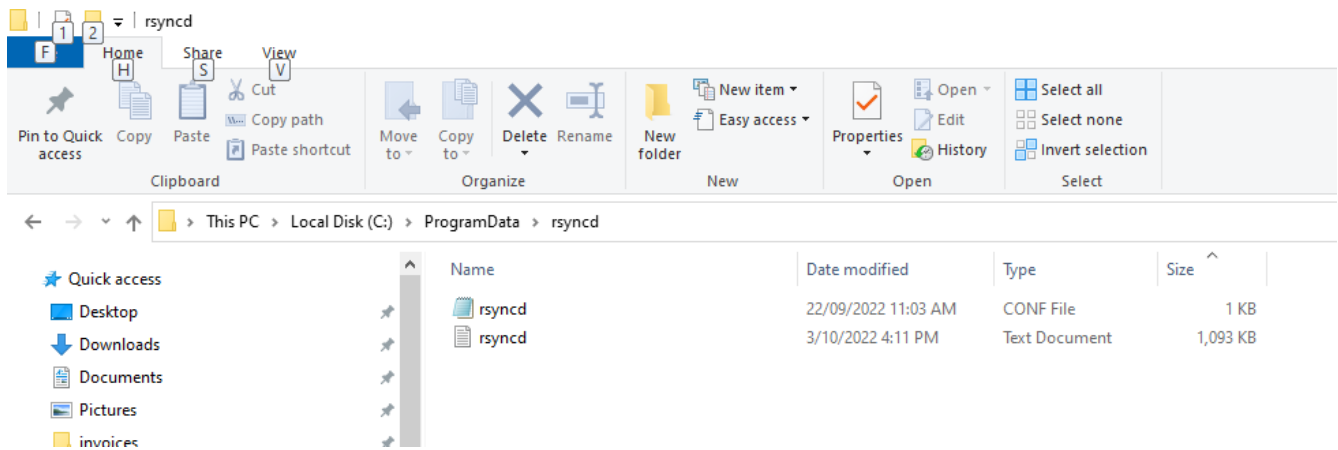
You need to use Notepad which you must open as Administrator to edit the rsyncd.conf file. In the file comments are prepended with a semicolon. I have defined two "shares", I have named both after the Signage content directory names. You can see how to edit the file by looking at the example image below, you can see that you must use the following format for each share


[your share name]
Path = /cygdrive/C/Users/john.TEST/Desktop/m4v

[your other share name]
Path = /cygdrive/C/Users/john.TEST/Desktop/Mixture

In this example I am logged into my Windows network using the user name john and Domain TEST. The signage directories m4v and Mixture and located on my Desktop, I can add or remove content to these Directories anytime, this content will automatically appear on the Digital Signage Display after the number of playlist cycles configured by the TMS Administrator. (See Output 1 image further below)

Now that you have configured rsyncd.conf, the rsync Server will read the details and run in the background as a Service.
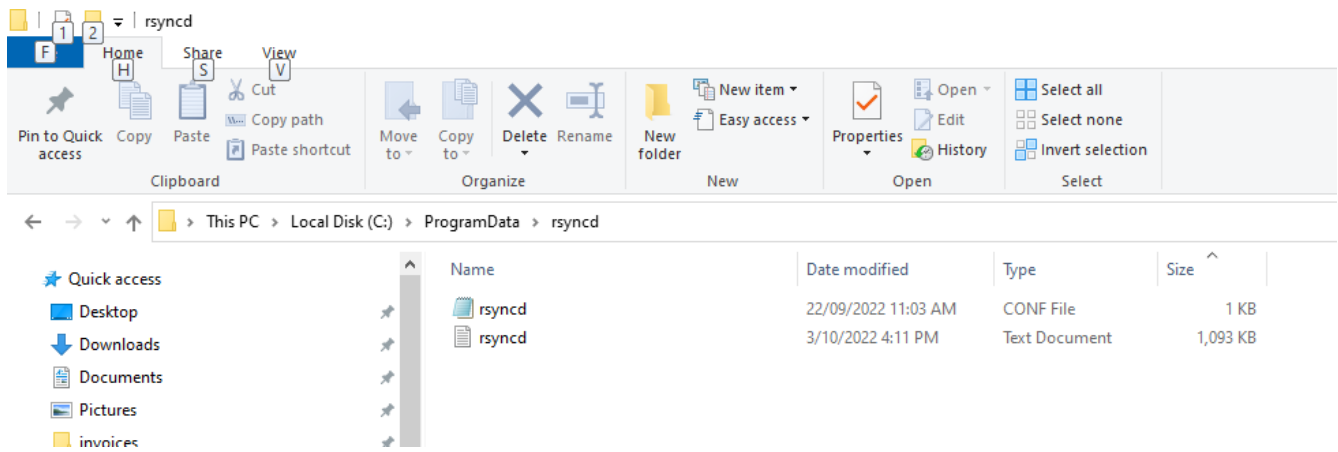
rsyncd.conf - Notepad

File Edit Format View Help

```
[global]
port = 873
log file = C:\ProgramData\rsyncd\rsyncd.log
use chroot = no
read only = yes
list = yes


; Please note that as rsync.exe runs under POSIX emulation, paths specified in
; module sections must include a /cygdrive/<drive-letter> prefix.   UNC paths
; (//server/share) and drive letter prefixes (C:) will not be understood.
; Pathnames are not case-sensitive.

; Example:

[m4v]
path = /cygdrive/C/Users/john.TEST/Desktop/m4v


[Mixture]
path = /cygdrive/C/Users/john.TEST/Desktop/Mixture
```

Ln 1, Col 1   100%   Windows (CRLF)   UTF-8

You contact the ThinLinX Management Software (TMS) Administrator and request that he uses TMS to configure your two displays connected to two devices running TLXOS

The TMS Administrator highlights the Line on TMS associated with your first TLXOS device, then selects Digital Signage using TMS -> Mode -> Digital Signage. Click on TMS -> Displays, click on Configure for the display that you want to Configure, you will see the dialog box below, untick "Use local rsync server", then enter the IP Address or Hostname of the remote Rsync Server in the Rsync Server[:Port] box

After entering the IP Address or Hostname press on the List button, this will command the remote Rsync Server to send the Playlists which have been configured on the Rsync Server
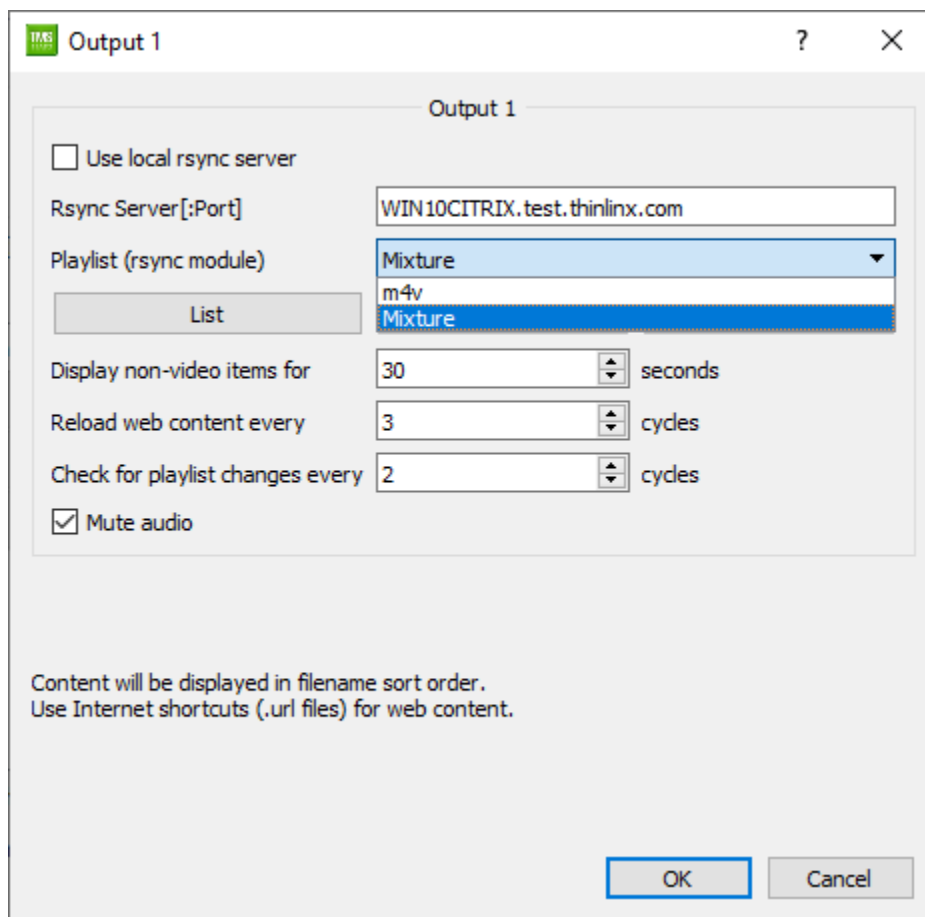
You can see in the image above that I have configured two Playlists on the remote Rsync Server, any one of these Playlists can be copied using TMS via Rsync to any device you have highlighted on TMS. Select the Playlist you want to play, click on OK. On the dialog box check

the settings are OK, untick Mute audio if you want HDMI Audio output, click on OK, click on OK on the Configure Display Adapters dialog, Digital Signage will start.
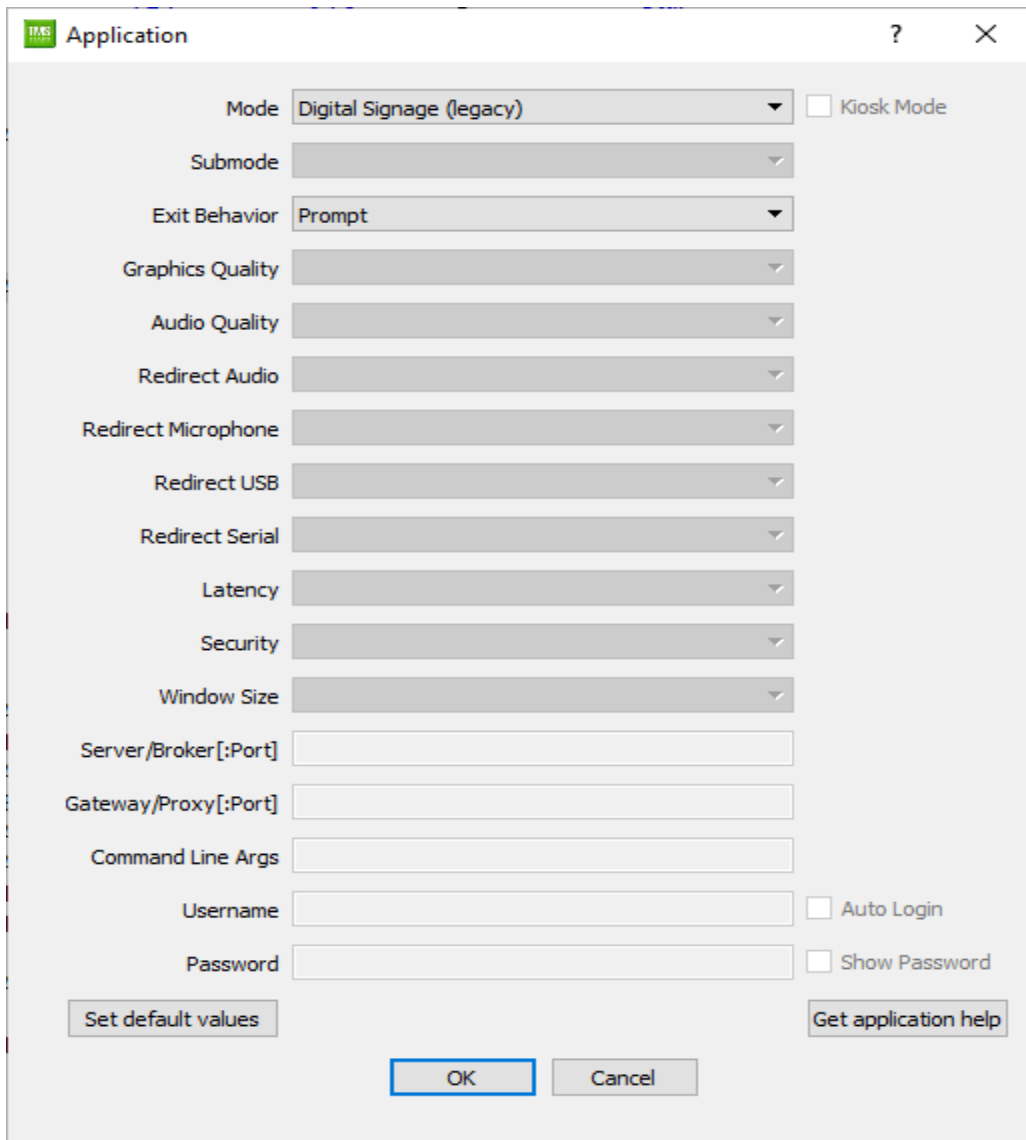
The content playing on the configured TLXOS device can now be changed by the end user adding or deleting new files on their PC in the specified directories

You can now probably see the possibilities of using remote Rsync Servers, one for each customer to deliver any number of customized Playlists to that customer for any number of TLXOS devices they have which could be located anywhere in the World. While something similar can be done using the built in TMS Rsync Server it is nowhere near as scalable as using a remote Rsync Server.

5   Configuring Digital Signage (Legacy) Mode

The example image below describes how to configure Digital Signage (Legacy) mode using TMS, the first step is to create one or more content directories on the system running TMS. Once the directories are created add your signage content to each directory which must be either images (png or jpeg) or Videos. You cannot mix the content in any directory, each directory must have either images only or Videos only. To play Web content you must manually add Website URL's separated by a space, to play a PDF you must add the full path to the PDF. You cannot have a mix of Images, Videos, PDF's and Web content on a single display

Step one is to highlight a device by clicking on the TLXOS device that you want to configure as Digital Signage, then click on the TMS Mode Icon, the Application Dialog Box will appear, select Digital Signage (Legacy) from the Mode drop down list, and then click on OK. This will set the selected device to Digital Signage (Legacy) mode

TMS Application	? ✕
Mode	Digital Signage (legacy) ▼ ☐ Kiosk Mode
Submode	▼
Exit Behavior	Prompt ▼
Graphics Quality	▼
Audio Quality	▼
Redirect Audio	▼
Redirect Microphone	▼
Redirect USB	▼
Redirect Serial	▼
Latency	▼
Security	▼
Window Size	▼
Server/Broker[:Port]	
Gateway/Proxy[:Port]	
Command Line Args	
Username	☐ Auto Login
Password	☐ Show Password
Set default values	Get application help
	OK Cancel

Step two is to configure the device by clicking on the TMS Displays Icon, then click on the Configure button. You can see in the example below I have selected Images, you can set the Cycle Time to the number of seconds to display the image before playing the next image in the images directory that you have created. In the case that you have selected Video instead of Images the Cycle Time is greyed out as it is not required.
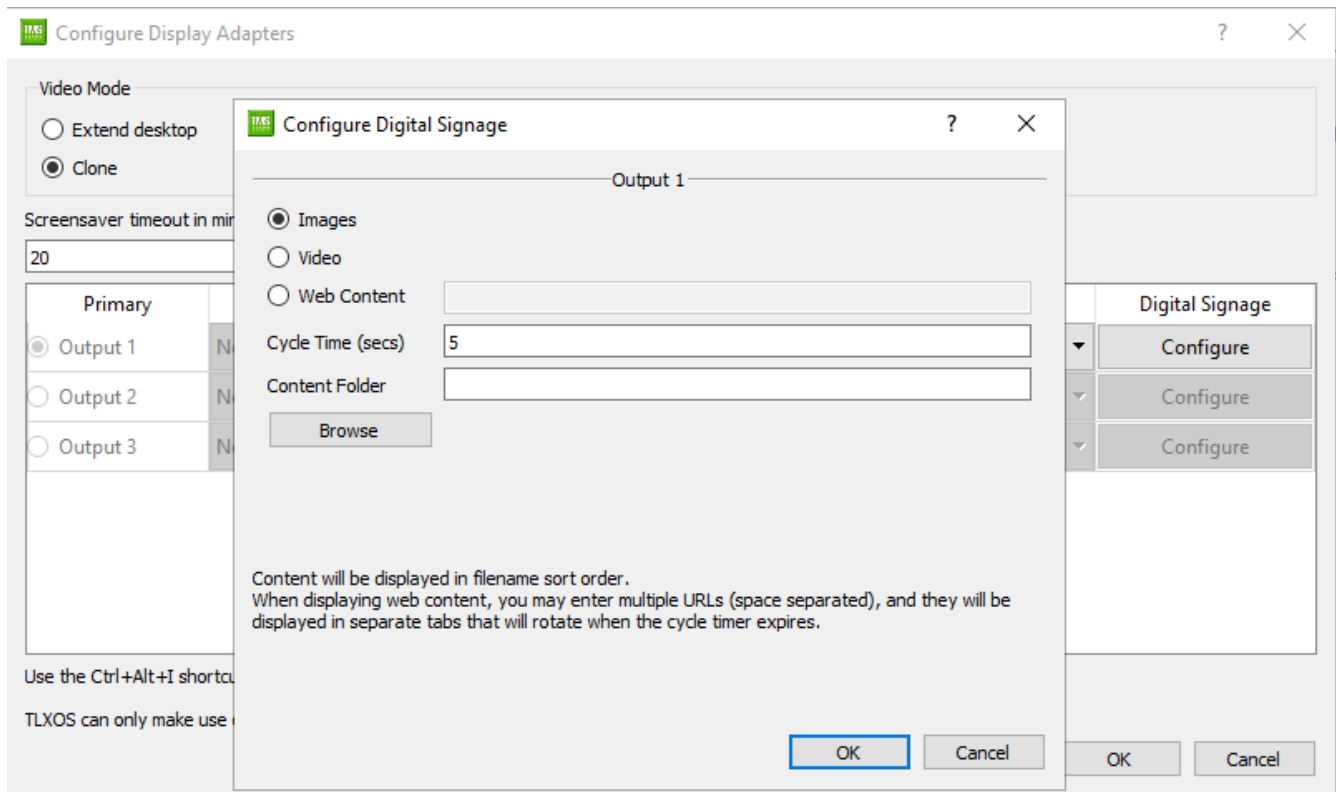
Click on the Browse button, select your Images directory and click on OK
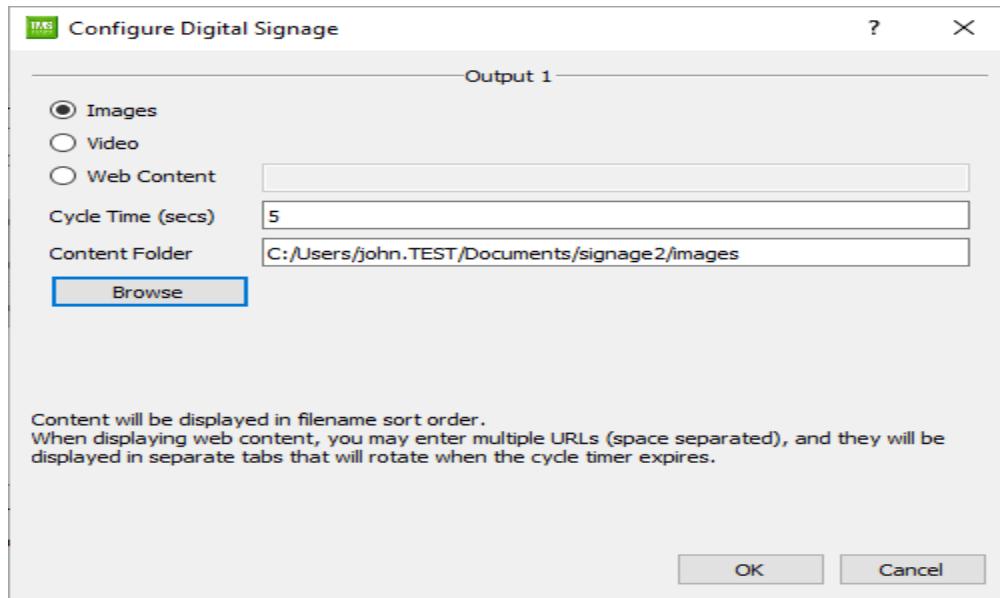
The Content Folder now contains the full path to your image directory, click on OK and also on OK in the Configure Display Adapters, you will see messages in the TMS Status column "Downloading File" and a percentage of how much of the file has been downloaded for each file in your Image or Video directory as they are downloaded. When downloading of the files is completed the message "Sync Folder: OP1=Success" appears, the downloaded files will now start playing on your selected TLXOS device. If your device has more than one display you can

use this method to plays Images on one Display and Video on the other Display.

You can also configure Web content to play on the Display instead of Images or Video, in the example below I have entered a number of Websites that I want to display separated by a space, you can add many websites using this mode. If you want to display a PDF file you need the full Website path to the PDF file. You can also enter the Cycle Time in seconds, this determines how long each website is displayed
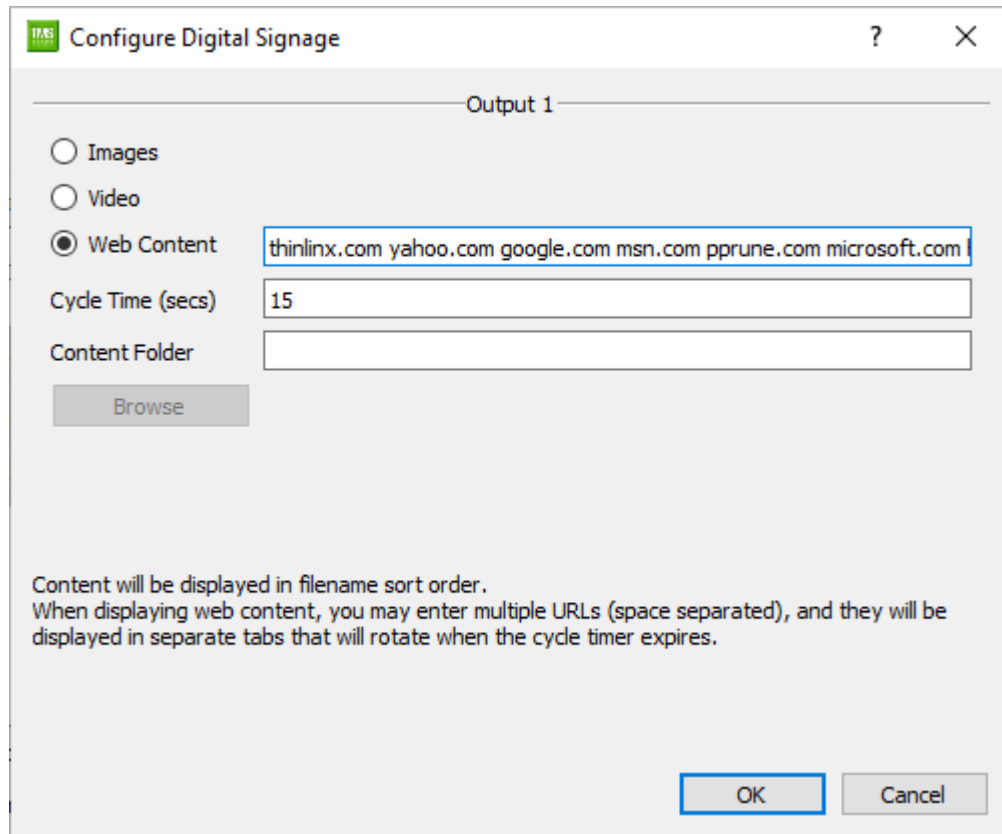

6   Configuring Digital Signage without TMS

We do recommend using TMS to configure both the new Digital Signage and the older Legacy Signage as you can manage and upgrade the devices remotely, but it is possible to remotely
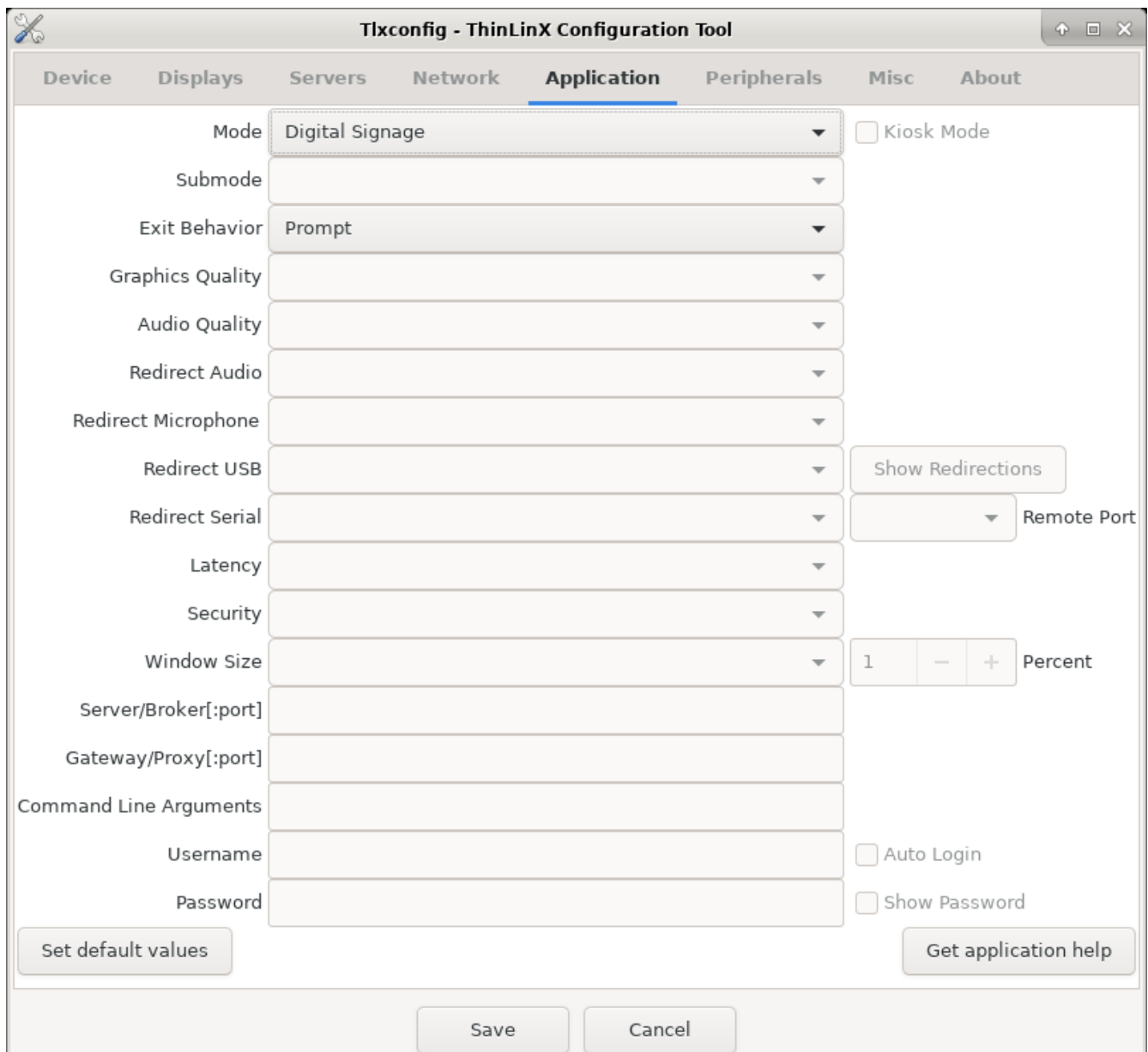
update DSI without using TMS if you have set up a remote Rsync Server and use the Tlxconfig Local configuration menu. Once you have configured the TLXOS device using this technique you can deploy it and then update the Signage content by updating the files on the remote Rsync Server. The biggest problem with this technique is you can't update the TLXOS firmware without using TMS, but you can apply Hotfixes by physically visiting the device and inserting a USB stick with the hotfix file.

You can also use Tlxconfig to configure Legacy DSI by inserting a USB stick into the device and then configuring Legacy signage which will copy the files from the USB stick to the TLXOS device. The limitations of this technique is that you need to physically visit the device to update the Signage content using a USB stick and the local Tlxconfig menu

We will discuss the Remote Rsync method of configuring Digital Signage using Tlxconfig. Step one is to boot up the device, you will see the see either the session manager dialog or the Tlxconfig menu depending on what you have previously configured. If you need to kill a running previously configured session of some other protocol you can press Alt F4
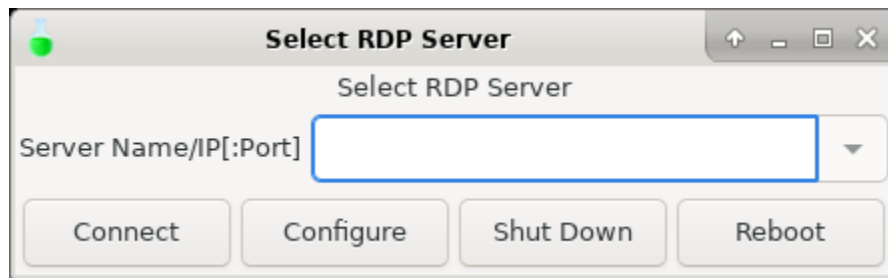

If you see the Dialog box above you need to click on the Configure button which launches the Tlxconfig Dialog box shown below. Click on the Application Tab, then click on the Mode button to select Digital Signage from the drop down list. Do NOT press the Save button as you must Configure the Signage first by clicking on the Displays Tab.

As the device that I am configuring has only one display connected only one display is available to configure and this is shown as Output1. If you have previously configured Dual displays using the Extend desktop mode and have two monitors connected, Output2 would also have a highlighted Configure button

The next step is to click on the Configure button shown under the Digital Signage heading on the far right
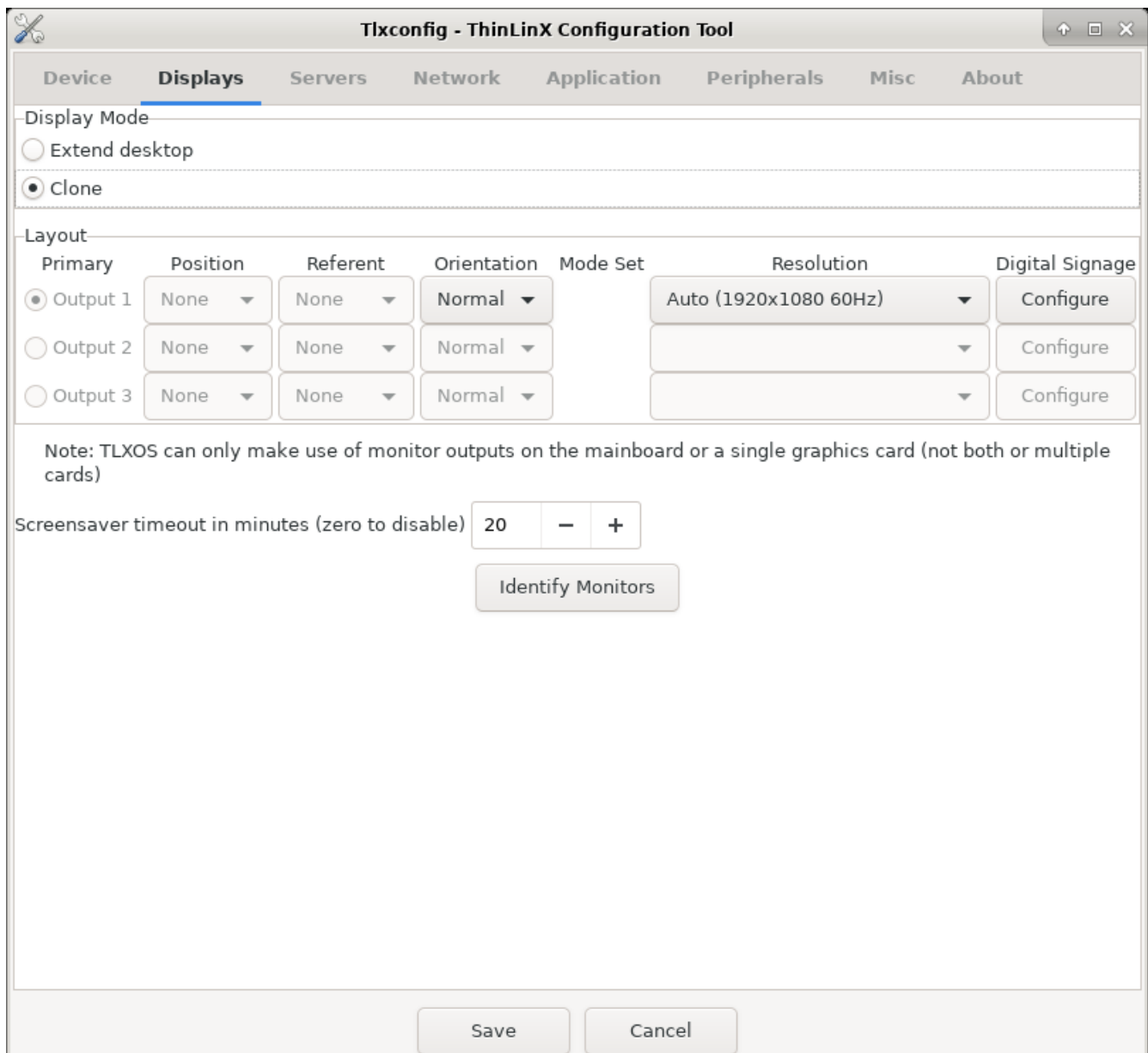
After pressing Configure, the Digital Signage Output1 dialog appears as shown below, you enter the IP Address or Hostname of the remote Rsync Server, this assumes that you have already configured the Rsync Server with on or more playlists containing you Digital Signage content, each Playlist can contain a mixture of Images, Videos, PDF's and Website .url shortcut files.

After entering the IP Address or Hostname click on the Update button, this will use the local Rsync client to connect to the remote Rsync server to request the configured Playlists, in the example below I have selected a Playlist which I named john when I configured the remote Rsync Server

Adjust the other settings in the dialog below to meet your requirements, click on OK, click on Save, the Tlxconfig dialog will disappear. There will be a delay as the Playlist files are copied from the remote Rsync server to your Tlxos device. The length of the delay will depend on the how many files are being copied, how big the files are and the network speed. After the files are copied the Digital Signage content will start playing.
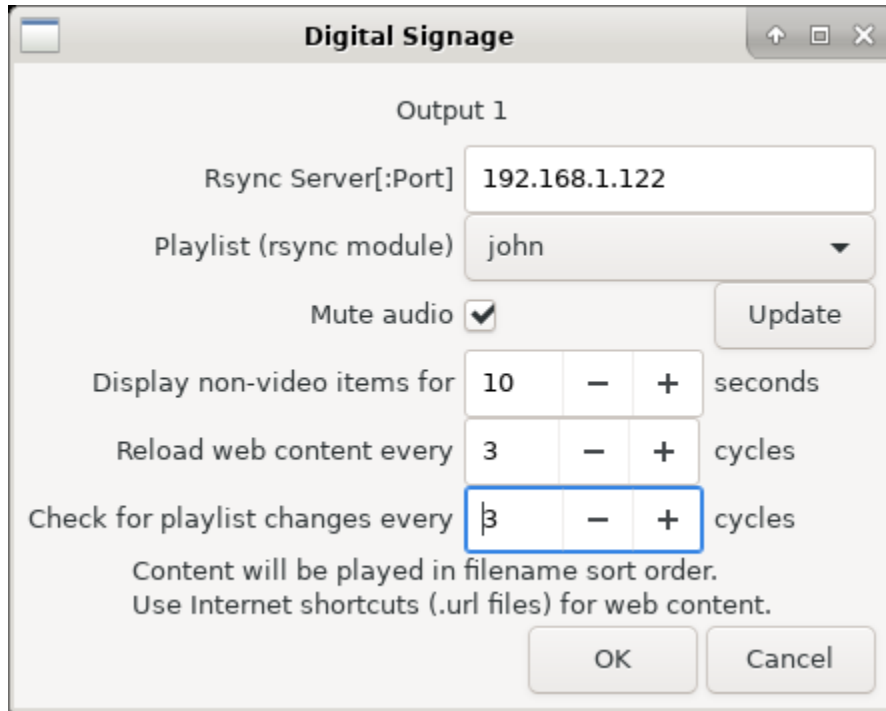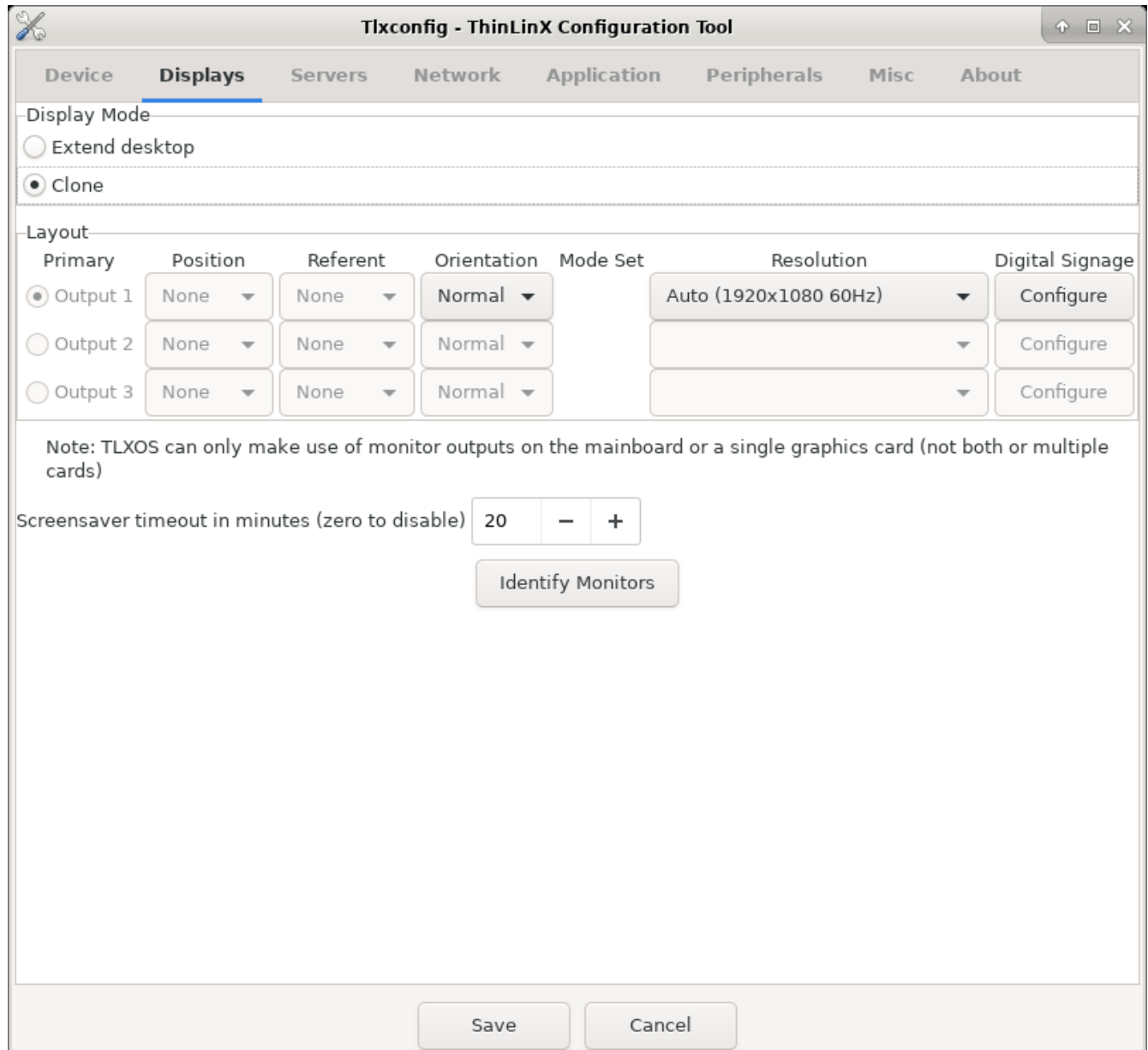

You can add or remove files at any time from the Playlist on the remote Rsync server, the changes to the Playlist will be copied to the device after the Playlist number of Cycles as set in the Dialog above are reached. This is shown as "Check for playlist changes every"

7 Configuring Digital Signage (Legacy) without TMS

Step one is to boot up the device, you will see the see either the session manager dialog or the Tlxconfig menu depend on what you have previously configured. If you need to kill a running previously configured session of some other protocol you can press Alt F4, Click on Configure
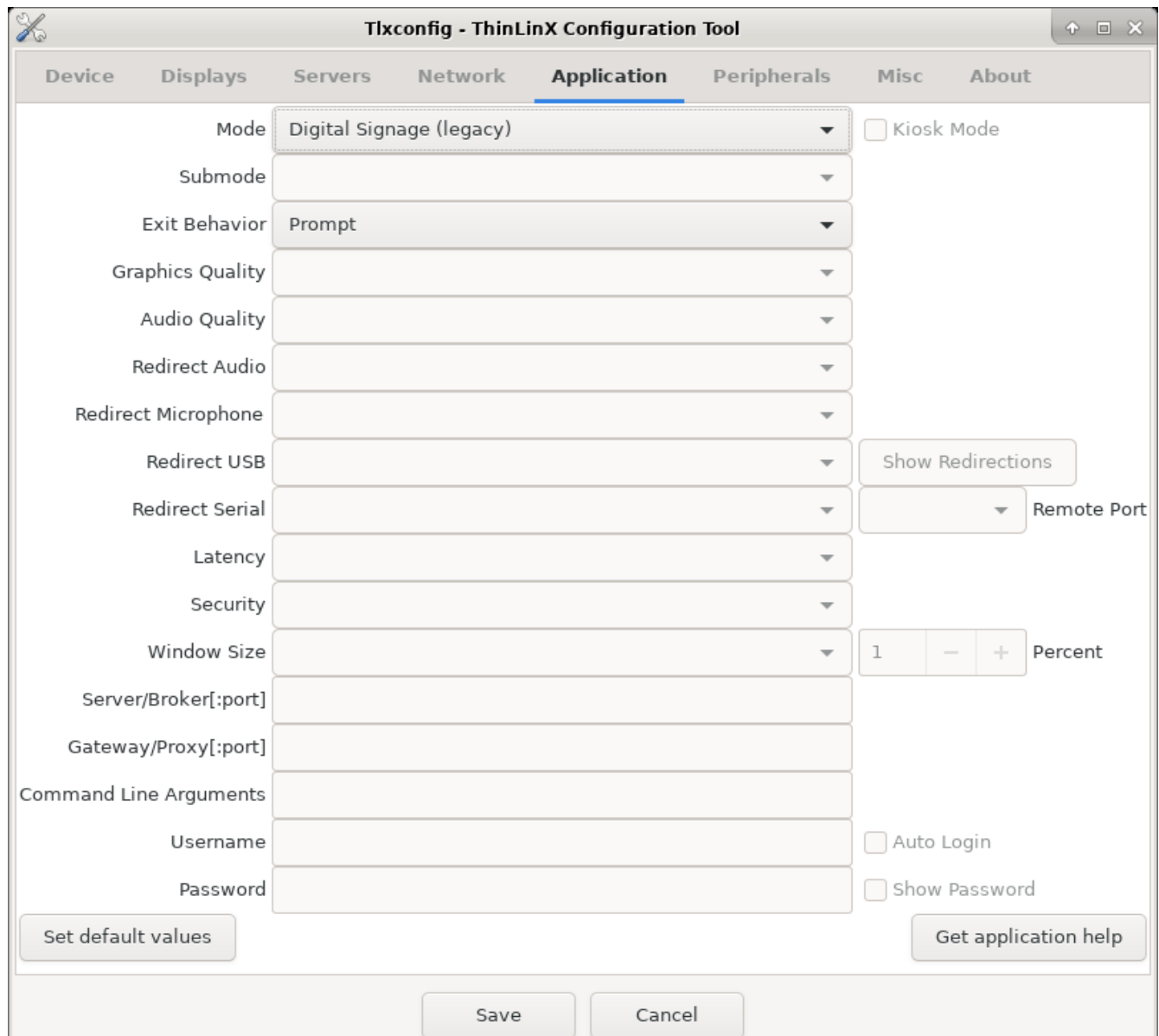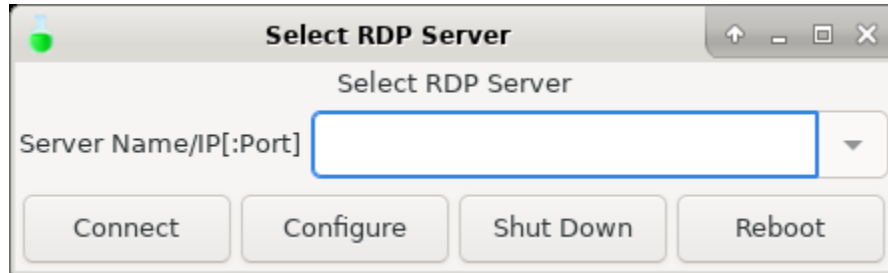
After Clicking on the session manager Configure button the Tlxconfig Dialog box shown above appears. Click on the Application Tab, then click on the Mode button to select Digital Signage (Legacy) from the drop down list. Do NOT press the Save button as you must configure the Signage first by Clicking on the Displays Tab

As the device that I am configuring has only one display connected only one display is available to configure and this is shown as Output1. If you have previously configured Dual displays using the Extend desktop mode and have two monitors connected, Output2 would also have a highlighted Configure button

The next step is to click on the Configure button shown under the Digital Signage heading on the far right in the image above

After pressing Configure, the Digital Signage Output1 dialog appears as shown below, if you wish to play Images or Video you must insert a USB stick that has at least one directory, either containing Images only or containing Video only. Wait around 30 seconds after inserting the USB stick for the USB stick to be detected and be available for browsing
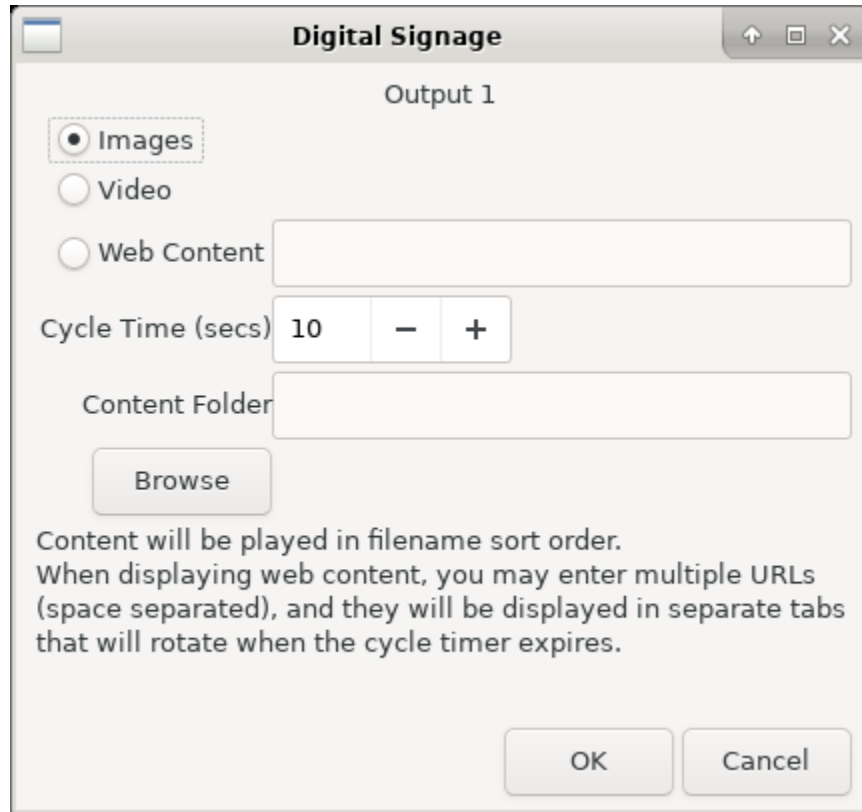
I have selected Images for the content, remember in Legacy Signage mode you cannot mix the content in a directory. Click on the Browse button, the USB stick will appear as the /media/sda1 or /media/sda directory depending on how your USB stick has been partitioned

In the example below my USB stick has a Signage directory with a number of subdirectories including Images, Videos etc. I click on Signage, then Images, you can see the images files in that directory listed below
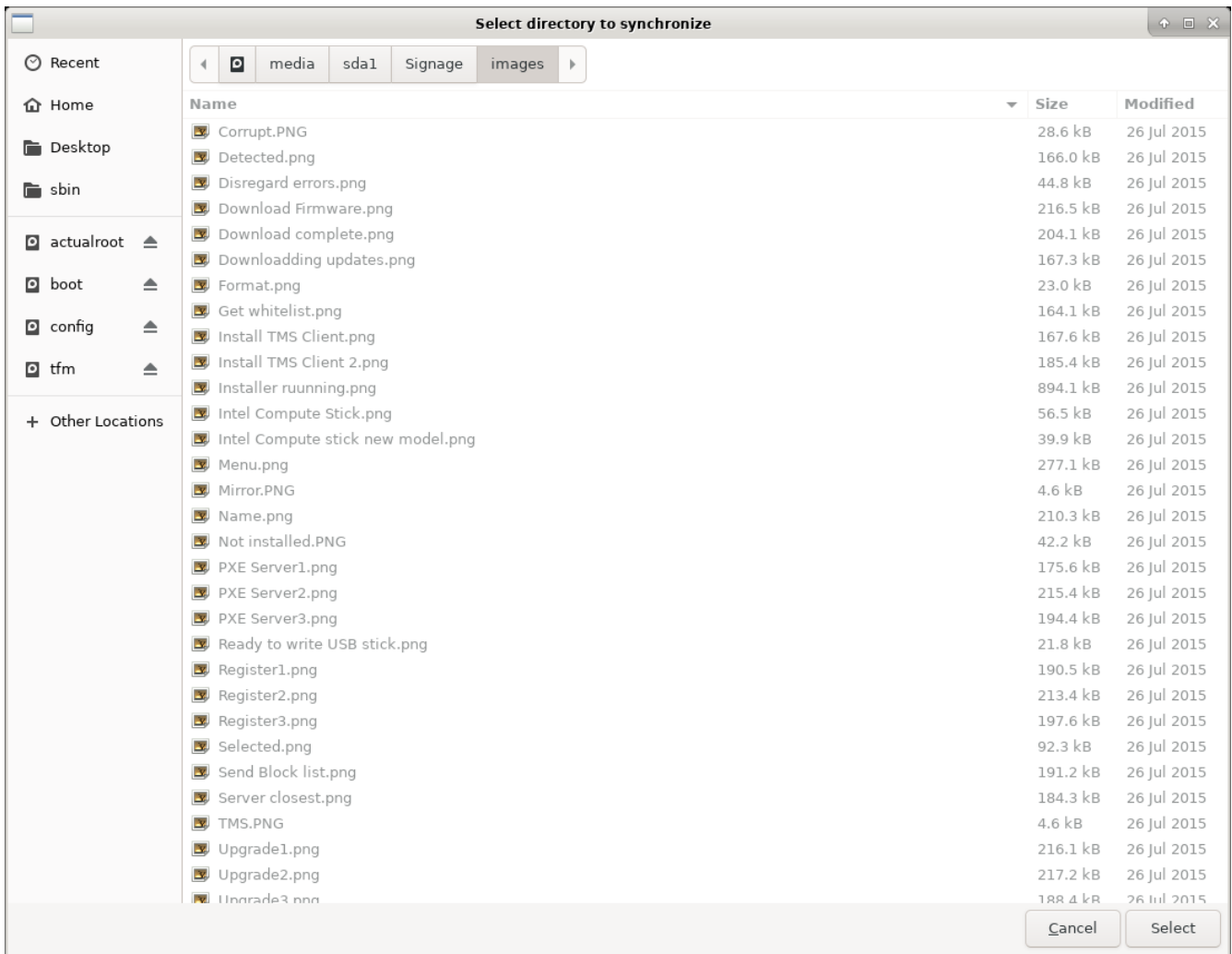
Click on the Select button. In the dialog that appears, set the Cycle time in Seconds, click on OK

After a few seconds the dialog box below will appear, click on OK
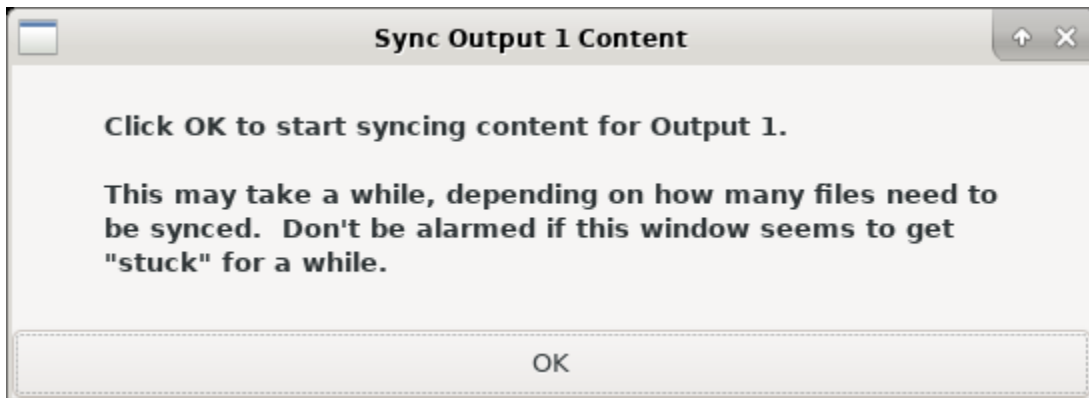
After the files have been copied from the USB stick to your TLXOS device Digital Signage will start playing the files in a continuous loop. You configure Video in exactly the same way as Images. To play Web content you don't need a USB stick, you click on the Web Content button, then enter the Websites that you want displayed. To play a PDF you must enter the full Web URL to the file. Each URL must be separated by a space, you can also enter the Cycle Time in seconds to display each website before displaying the next website, click on OK, the Web Browser will load and start playing the Website content
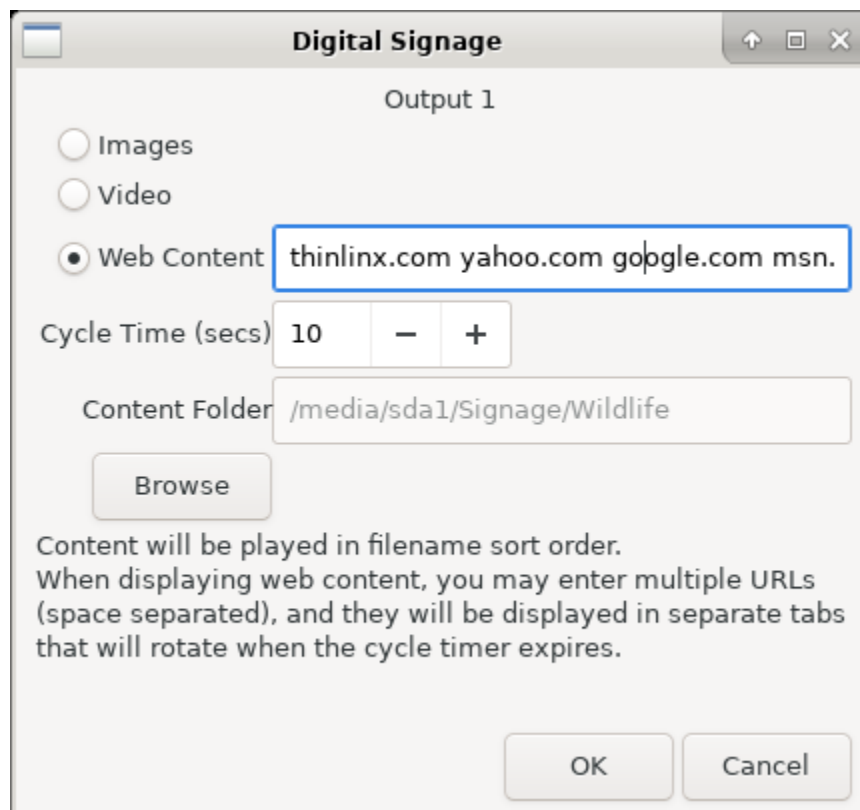
If you have used Tlxconfig on the local device desktop to configure Digital Signage you may need to interrupt the Signage to reconfigure it. Obviously this is very easy to do if you have used TMS instead as you can just switch the mode to something else such as RDP.

However on a locally configured device you will need to ensure you have a keyboard plugged in and then use one of the following key combinations to interrupt the Signage and return to Tlxconfig

Use the "Esc" key if Images are playing, Ctrl-C if Video is playing and Alt-F4 if Web or PDF files are playing

8   Minimum Hardware required for Digital Signage

The minimum supported hardware for Digital Signage devices running TLXOS-4.11.0 or above is a Raspberry Pi Zero Version 1 W which can be purchased for US$10. This is adequate for playing Images or Videos or a mixture of both. It is not suitable for any Web or PDF content due to its very low powered single core Processor and low RAM memory of just 512MB. It is possible to use the US$5 RPi 1 Zero which has no built in network capability but it can still be configured using a USB stick in Legacy mode to play Images or Videos. Another possibility is to use TMS if temporary network capability is provided by inserting a USB to Ethernet Adapter. Once it has been configured the USB to Ethernet Adapter can be unplugged until further configuration is needed. TLXOS for these devices is only US$5 which when combined with a US$5 RPi Zero 1 will provide the lowest cost Digital Signage solution available anywhere in the World. TLXOS for all other versions of the RPi is US$10

The next lowest cost option for Digital Signage is the recently released Raspberry Pi 2 W which is available for US$15, after that any RPi will be OK also but if you want Dual Displays you need a Raspberry Pi 4 which is available for as low as US$35 for the 1GB Ram model which is sufficient for Dual Display and is capable of displaying Web and PDF Content

TLXOS also supports X86 Small form factor devices and the ability to repurpose old hardware using our RePC version of TLXOS. In our opinion the most cost effective option for Dual Display Digital Signage is a Raspberry Pi Model 4B with 1GB Ram

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"Rsync is a fast and extraordinarily versatile file copying tool. It can copy locally, to/from another host over any remote shell, or to/from a remote rsync daemon. It offers a large number of options that control every aspect of its behavior and permit very flexible specification of the set of files to be copied. It is famous for its delta-transfer algorithm, which reduces the amount of data sent over the network by sending only the differences between the source files and the existing files in the destination. Rsync is widely used for backups and mirroring and as an improved copy command for everyday use"