



MP90 MANUAL

Ultra-High Definition Media Player



Version – 1.02

Please visit our web site at www.celabs.net for the latest version of this manual.

Preliminary Version

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IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that product heat.
9. Do not defeat the purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where the exit from the apparatus.
11. Only use the attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



WARNING: To Reduce the Risk of Fire or Electric Shock, Do Not Expose
This Apparatus to Rain or Moisture

Figure 17 DU- Portable cart warning

CAUTION: To reduce the risk of electric shock, do not remove cover or back. No
user serviceable parts inside. Refer servicing to qualified personnel.



Chapter 1 – INTRODUCTION

Introduction to the MP90 UHD Media Player

The MP90 is a high quality advertising solution that allows users to play SD, HD and UHD content from internal memory, or USB or standard micro SD cards. It has an extremely effective performance versus cost ratio and provides a great return on investment.

The MP90 is a commercial grade, application specific graphics processor, specifically designed for driving digital signage. Do not let the small size fool you; the powerful internal video processor rivals the performance of a PC costing many times more. The graphics capability is on par with a UHD BluRay player and higher but with much greater reliability because there are no moving parts.

Package Contents

The packing box should contain the following items:

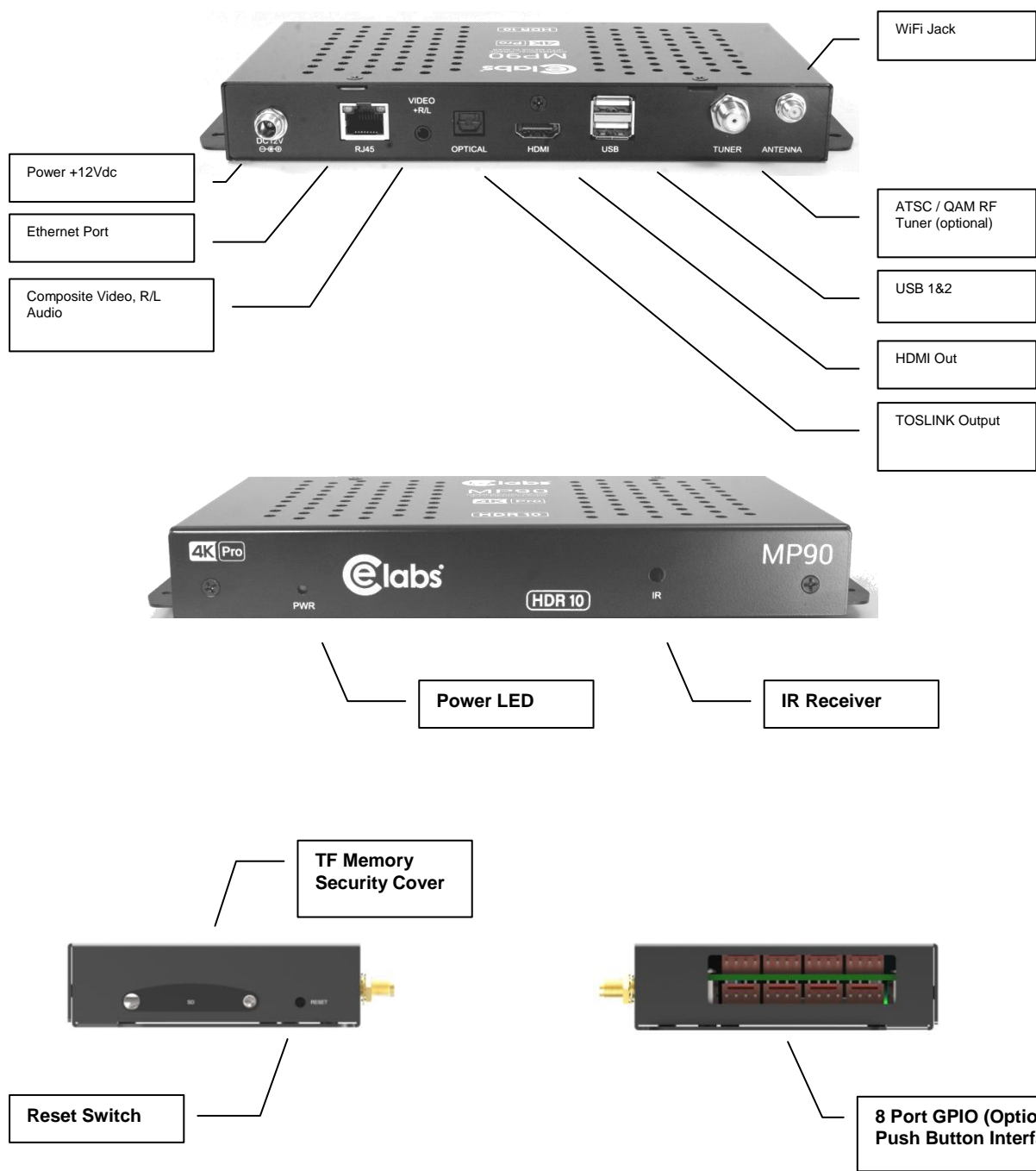
- MP90 Media Player
- 12 Volt DC Universal Input Power Supply
- HDMI cable
- (optional) 3.5mm Video / L/R Stereo Audio Cable
- Quick Start Guide

NOTICE:

We try to include the latest up to date information, but this document will require periodic updates. We recommend you check at our web site, www.celabs.net, for the latest information available.

Chapter 2 – INSTALLATION

Detailed Player View



The MP90 may be ordered with or without the GPIO Interface. See the GPIO section in this document for a description of the connector pin out. There are also options for POE and a RF Tuner Module.

MP90 Connections

The MP90 is capable of driving a wide variety of displays at up to 2160P resolution at bit rates up to 50 Mbps. Depending upon your application, connect the following cables to operate the unit.

- **Display cable** – The preferred connection between the MP90 and the display monitor is a high quality HDMI cable of no longer than 15 feet. Depending on the application, plug in the cable from the media player to the display, switch, or first distribution amplifier. The MP90 does support Composite video and analog audio output via the 3.5mm jack on the rear panel.
 - The R/L Video port is a 3.5mm combination jack that requires a 4 conductor 3.5mm TRRS plug.

Note: Video output resolution has been pre-set at the factory for automatic negotiations. The media player should select the highest resolution reported available from the Display. The output and resolution can be specified at time of order and pre-set to your requirements.

- **Audio cable** – The analog audio output is via the 3.5mm jack labeled R/L Video. You should only use the proper cable for this output.

Note: The analog R/L audio will not be synchronized with the Digital Audio routed to the HDMI output. Simultaneous use of Analog and Digital Audio is discouraged as there is noticeable delay between the two.

Note: If HDMI cable is being used, a separate audio cable is not required as long as the monitor has internal speakers.

- **Toslink** – Digital Multi-channel audio is available on the optical connector. This may be configured by accessing the Android setup screen via USB mouse control. Select Sound Manager and set as desired.
- **Power** – The MP90 uses a 12VDC, 1.5A or 2A power supply. Total power consumption is approximately 6 Watts which leaves a large reserve in the power supply. Insert the power supply 12 VDC plug into the MP90 power jack and screw it down snug. Insert the AC Plug of the power supply into an electrical outlet. The green power LED will be illuminated and the unit will boot up within 1 minute.
- **Ethernet** – If this is a networked installation, connect the Ethernet Port to a Switch or Router via an Ethernet cable. The unit will automatically obtain an IP address as long as unit's DHCP is selected as ON and there is a DHCP server somewhere on the local subnet.
 - **Please wait for approximately 1 minute** until the unit completes the boot-up process. The media player can be configured to have a default start-up item such as a video file or photo playback. If the default application is the CE labs MP75 Emulator, Video should start playing automatically when the unit has completed its boot-up process. Most applications will use the QS Player as the default startup application. This allows communication with the QuickSign local and QuickSign Cloud PC control applications.
- **IR Remote** –Optional.
- **GPIO** – Optional -These ports are generally used to interface with pushbuttons that can be used to trigger certain videos. Refer to the GPIO section later in this manual for a full description of the eight GPIO ports.
- **IR Receiver** – There is an internal IR receiver just to the right of the IR input jack. This is for use with an optional IR remote.
- **WiFi Antenna Jack**– The MP90 may be ordered with an optional WiFi module which includes an external antenna.
- **Reset**– There is a recessed Reset button just to the right of the SD security door. Use a paper clip to reset.
- **RF Tuner**– Optional – The MP90 may be ordered with a Tuner that is capable of using ATSC and QAM 256 signals.

Mounting

The media player should be located in a well ventilated air conditioned space for best operation. The overall dimensions of the units are 3.2" x 6.2" x 1.0". It is recommended to reserve 3 inches to the rear of the unit for routing cables. The mounting dimensions given below are measured from center to center of the mounting holes. The mounting holes will accommodate a #6 screw.



The unit has ventilation holes all along the top. These should remain uncovered during operation. There are no ventilation openings on the bottom of the chassis, so it may be bolted directly to a shelf or monitor.

Chapter 3 – CONTROL SOFTWARE

Hardware and Software Requirements

Hardware

- | | |
|--------------------|---|
| • Platform | i3 2.0GHz Class Processor or better |
| • Operating System | Windows XP Pro / Vista Premium, Windows 7, 8, or 10 |
| • RAM | 1 GB or more |
| • Ports | Ethernet 10/100 |
| • Communications | Players use port 80 for HTTP
Ports 12889, 12881, & 12885 may be used for extended controls |

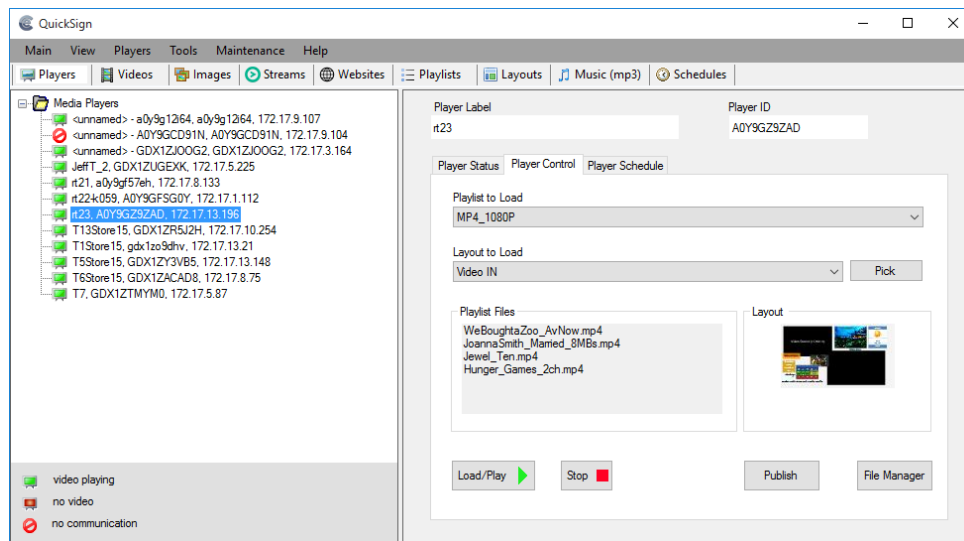
Software

There are two methods to control the MP90:

1. Local LAN control via QuickSign PC application (free).
2. Internet based control via QuickSign Cloud (paid subscription).

CE Labs QuickSign for MP90

The MP90 can be remotely controlled from within a LAN (restricted to local sub-net) via the CE labs QuickSign PC control software if the unit has our CE labs QS Player application installed. QuickSign allows you to scan your network to discover installed players or you can manually add them. Once the player is discovered, the software may be used to check status, set up the GPIO ports, add or delete content, create playlists, etc.



Please refer to the Help tab in QuickSign for a complete reference of available command options.

The QuickSign software is available at no cost with the media player. It may be downloaded from our website Support Section at <http://www.celabs.net>. Click on the Digital Signage Solutions site, then RESOURCES and then DOWNLOAD. If you need assistance in acquiring QuickSign, please contact CE sales dept. The help tab in QuickSign will show you how to use the software and get started controlling your players.

Getting Started with QuickSign

How do I put my video on the player?

Good Question. There are only 3 simple steps needed to get your video playing. After QuickSign is launched and finds your player on the network, you will need to let QuickSign know where your media files are located on your PC and create a playlist to send to the player.

Let's use loading videos as an example.

1. Click on the **Videos** Tab at the top and then select **Add Videos**. Navigate to the folder where your videos are located. Select the video(s) you want to add and click on **Open**.
2. Select Playlists Tab and then **New Playlist**. Give your Playlist a Name you like and then drag the desired video from the left box to the right box. You can use the **SORT / MOVE** buttons to change the order in which the videos will play. Click on Save.
3. Select the Players Tab (just to the left of the Videos). If you have more than one player, highlight the one you want in the left column. On the right side of the screen, select Player Control. Under Playlist to Load, select the Playlist you just created. Near the bottom of this screen, click on Load/Play and the media plus playlist will be sent to the media player and the content will begin to play a few seconds after the transfer is complete.

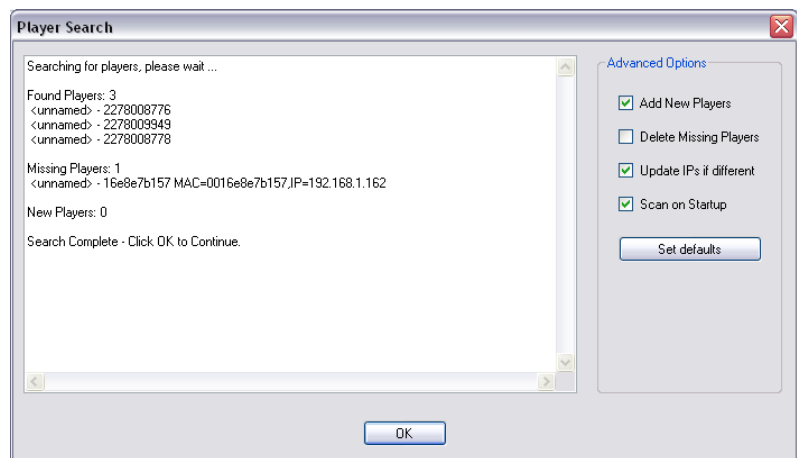
This will load a full screen video to play back continuously on your sign. If you wish to scale down, position, and wrap your video with additional information, see the upcoming section on the Layout Designer.

First Steps

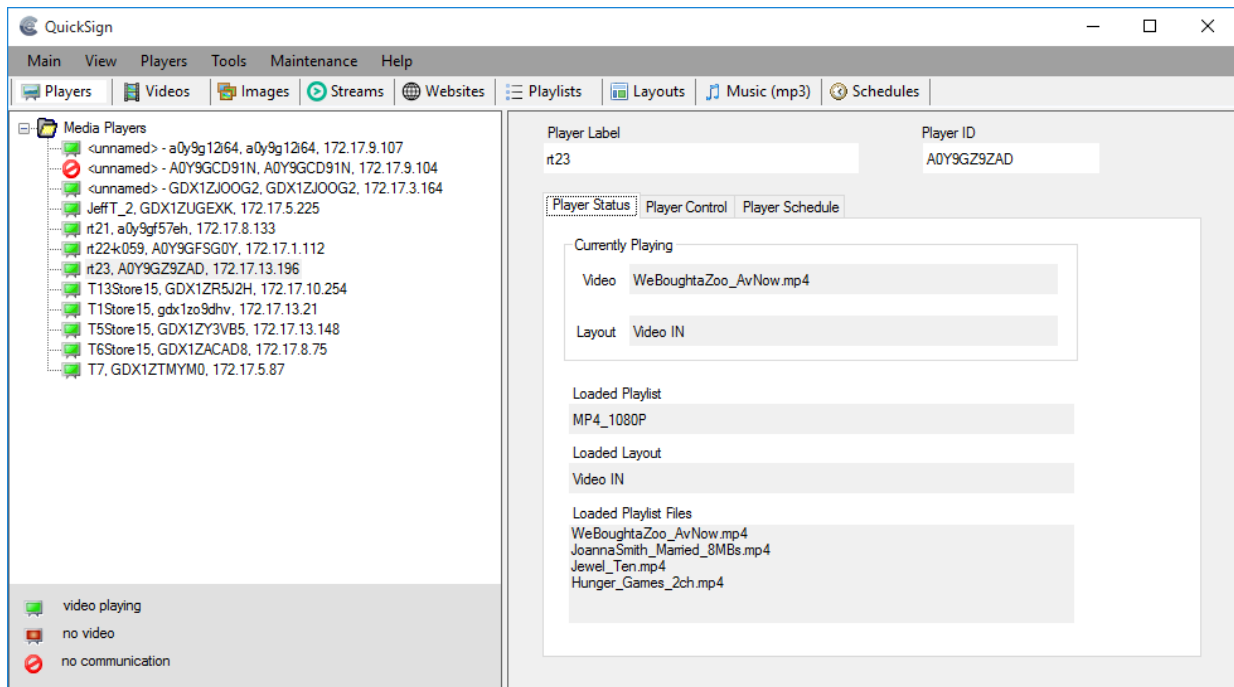
When QuickSign is launched, it will scan the local LAN to find any available players and will automatically populate the Media Players column in the left window.

The first screen you see on QuickSign is Player Search. Click OK to add the discovered players to the Media Player database.

This screen also allows you to set options regarding if the scan runs every time the program starts, updating IP address, etc..



The main screen is displayed when you select the Players Tab. In the right side of the screen, select Player Status and this will show you what is loaded and playing on the selected media player. The TV symbol in the left column will be green when content is playing. If you see the RED cross/circle, that unit is not communicating with the control software.



Loading New Content

Pre-requisites:

You have the QuickSign software loaded, the MP90 is all connected and communicating, so now how do we get our new content on the TV screen? This software is very flexible and allows many avenues for digital signage content creation. There are some basic steps to follow:

Procedure:

1. Load Media into QuickSign
2. Create Media Playlist
3. Optional – Configure GPIO push buttons
4. Create Layout (if desired to have signage around Video/Playlist Region)
5. Send Content to the player

Which do I use, Media or Content?

If you are new to digital signage, you might ask, “What is the difference between Media and Content”? It is open to interpretation, but we refer to the individual files (video, picture, music, etc.) as media. You will be “loading” your media into QuickSign. It doesn’t go anywhere, but is merely being linked so QuickSign knows where to find it.

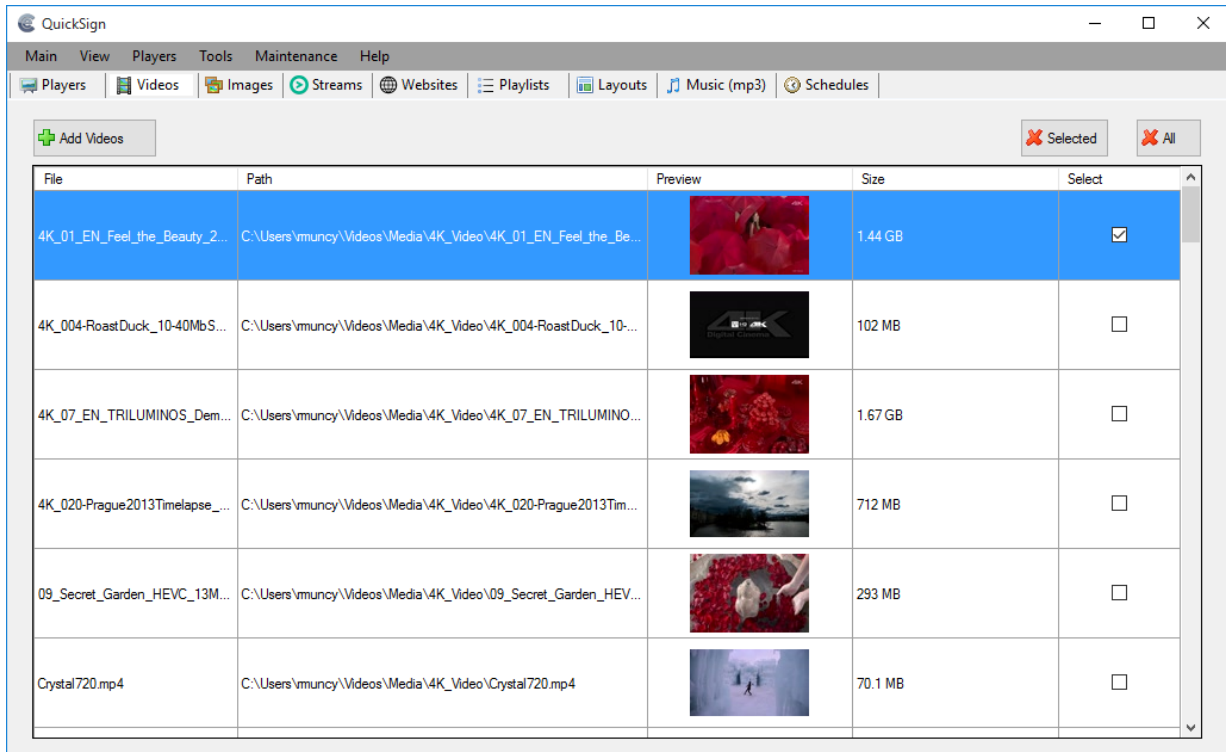
When you create a playlist of several media items, we call this the content package. The content package may also be used in conjunction with a layout which is regions of graphic elements that can be placed around the media playlist zone. The Layout may be created within the QuickSign software using the supplied Layout Editor.

If you only have a Playlist of several media items, you will use Playlist to Load and Load/Play. If you also have created a Layout with graphical elements and a content Playlist zone, then you will select both Playlist to Load and Layout to Load before clicking on the Load/Play button in Player Control.

Load Media into QuickSign

Click on the Videos tab and select Add Videos. Navigate to the folder that contains the videos that you wish to load on the MP90. The files should be encoded according to MP90 Encoding Specification. Make certain that the file names do not contain any spaces or unusual punctuation marks (such as @, %, &, *, etc.). Add all the video files you wish to use in your content package.

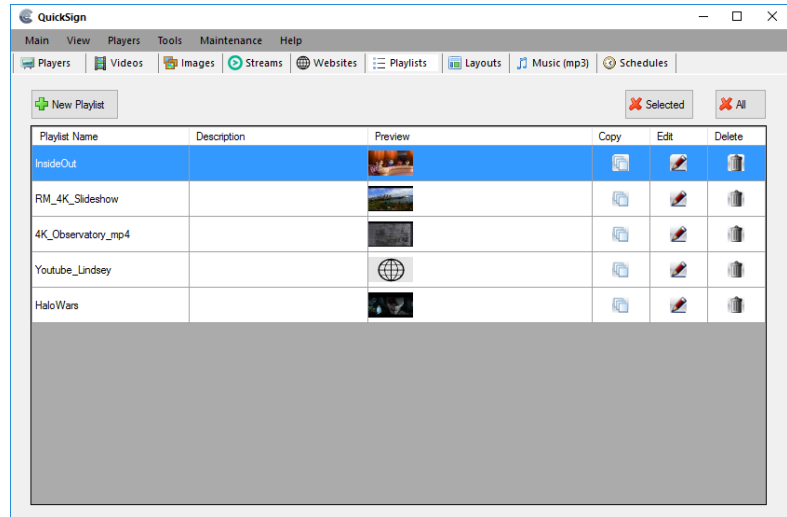
The CE labs media players support many file types and codecs, but QuickTime and Flash Video may not be loaded directly. In order to use these file types, they will need to be converted to something such as mpeg2, mpeg4, mkv, etc.



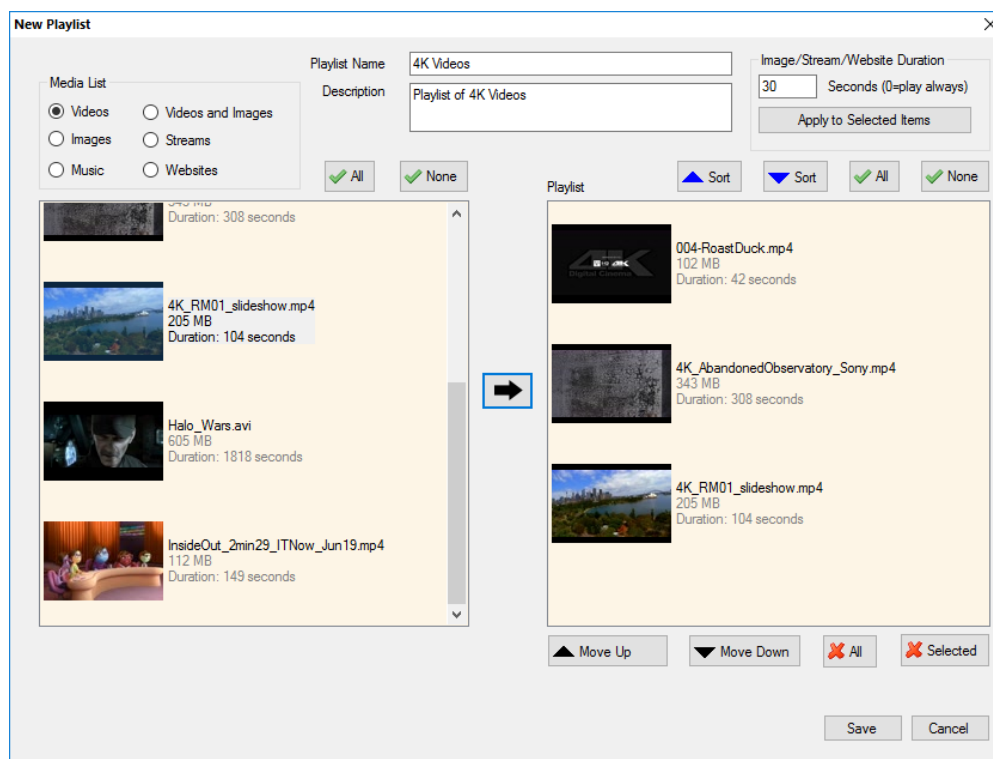
You may also load other media types into the QuickSign database. Just select one of the other Tabs across the top of the screen (Images, Streams, Websites, or Music).

Create Media Playlist

1. Click on the Playlists tab and select New Playlist (you may edit an existing one if desired).



2. Give the Playlist a distinctive name (and description if desired).
3. You may filter the media by selecting the appropriate button in the Media List box.
4. Select the desired media in the left box, press the arrow button, and the media file icon will appear in the right box.
5. You may also drag and drop the file icons in the left box to the right box.
6. To change the playback order, simply highlight the file in the right Playlist box and use the Move UP/Move Down arrow keys to park the files in the desired order.
7. If you add images to the playlist, you set the Image/Stream/Website Duration to show the media for the desired time before moving to the next item in the playlist.
8. A loop command is added to the end of the list so the Playlist will play continuously until stopped.
9. Save the playlist. It is now available to send to the MP90.



GPIO Interface Programming - Optional

The MP90 can be ordered with a GPIO interface to allow customer interaction with the player using push buttons or sensors. This allows the player to play a video or playlist upon receiving a button press from the GPIO inputs of a MP90 media player. Up to eight button inputs are supported. One can easily configure a wide variety of media to play for each button. An 'idle loop' video is played when the video triggered by the button is not playing.

The actions associated with each GPIO port may be assigned by using the Tools, Button Setup menu in QuickSign Pro MP90.

Creating the Push Button configuration files with QuickSign:

Start QuickSign on a PC that resides on the same network as the target media player, select the correct player, click on TOOLS and then click BUTTON SETUP. Assign content via the drop down windows and then click Load Button Setup to send the media and configuration files over the network to the player. This may take quite some time depending upon the size of the assigned media.

If you do not have network visibility to the player, the complete configuration and media can be sent to a SD card plugged into your PC by pressing the Publish button. This copies all necessary configuration files, videos, pictures, layouts, etc. and places them in the proper folders on the SD card. Simply take the newly loaded SD card and plug it into the player and the unit will begin to play the files. Sometimes a reboot may be necessary.

Button Setup

Button Configuration: Open Save

Enable	Item	Type	Source	Play Mode	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 1	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 2	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 3	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 4	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 5	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 6	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 7	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Button 8	<not set>	<not set>	play once	Video	Playlist	Playlist+Layout	Reset
<input checked="" type="checkbox"/>	Inactivity Loop	<not set>	<not set>	loop	Video	Playlist	Playlist+Layout	Reset

Player Name: t22-k059, 172.17.1.112 Load Button Setup to Player Publish

Help Exit

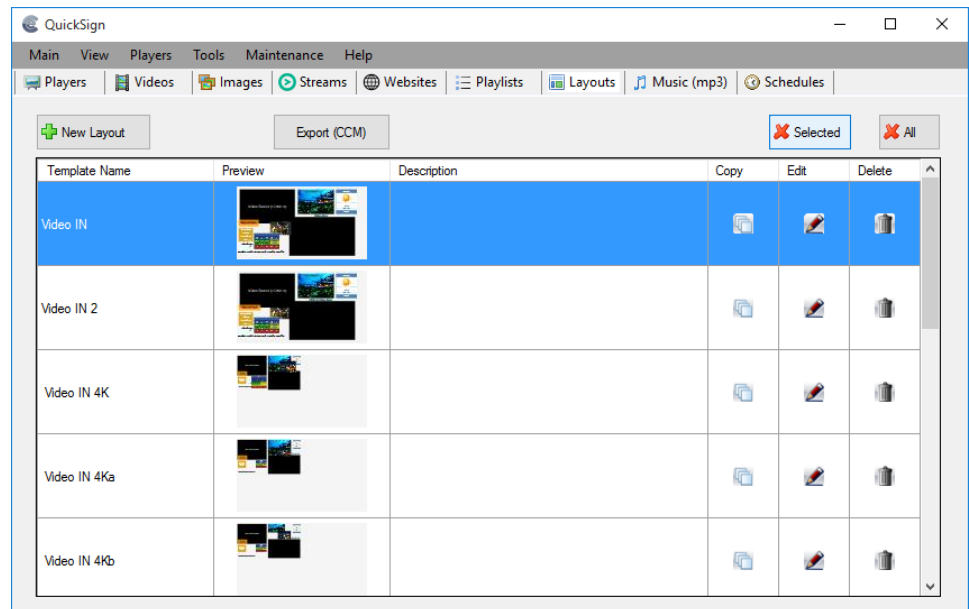
Note:

If you load the player with the GPIO pushbutton configuration, this replaces the standard Playlist.

Create Layouts and Templates

QuickSign has the ability to create and manage multi-zone screens via Layouts that you create.

Select Layouts from the toolbar. You may create a very media rich layout using the included tools.

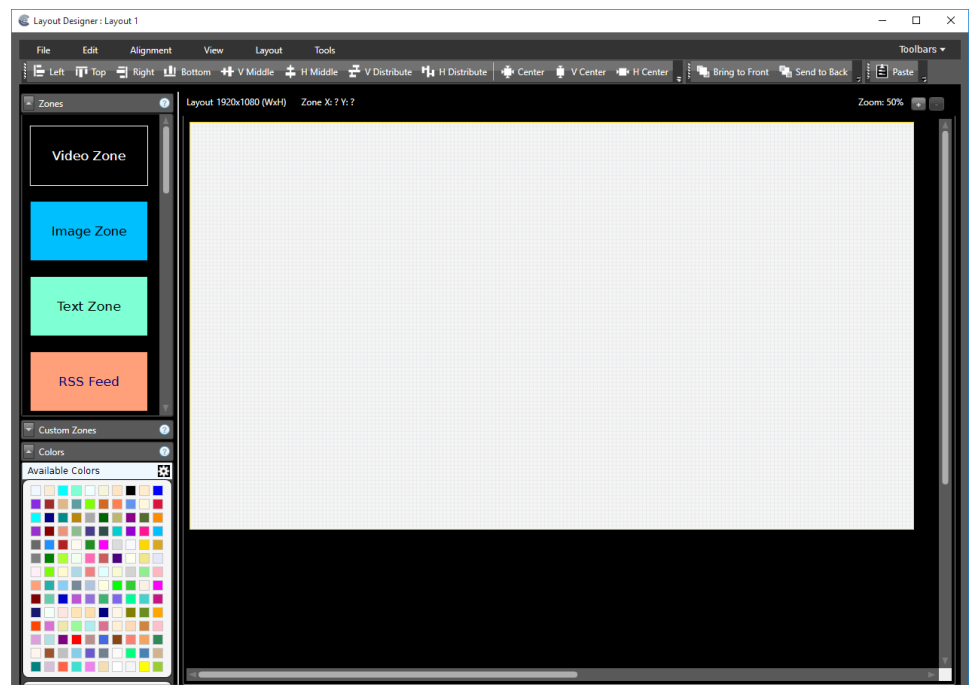


The image to the right is showing the Layout creation screen. The Zones in the left column may be dragged into the Layout area.

Important: Set the desired Layout resolution before you begin placing zones. This can be set under “View” and “Resolution”. The most common is 1920 x 1080.

If your digital sign is mounted vertically, select Portrait Mode under View.

The 1080P layout will be scaled to fit the screen should the HDMI output resolution be set to 4K. Testing has verified that this will result in the best looking screen.



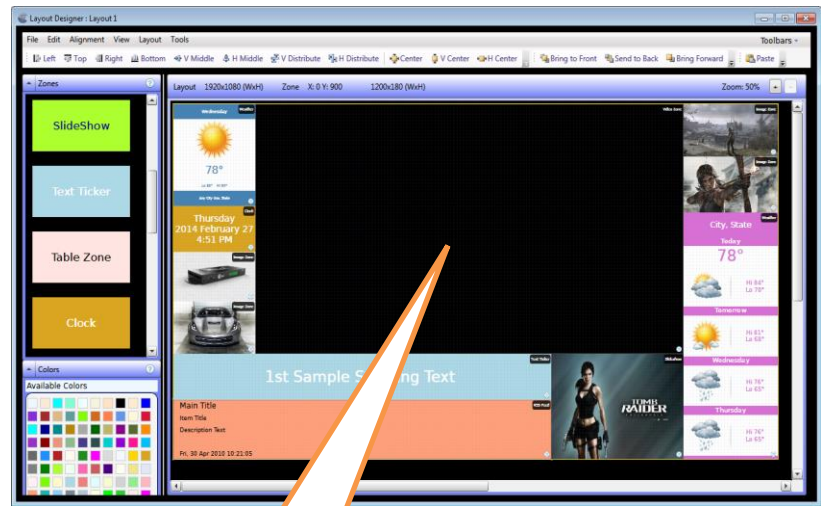
Layouts

Position and size the zones in the Layout area where you need them.
Drag the pictures you want into the image zones.

If you placed a SlideShow zone, right click on it and add the desired images to the box that opens.

If there is a RSS feed in the layout, right click and setup the needed RSS url parameters.

A Weather zone will need the City, State, and Zip Code in order to find the correct information. For international weather feeds outside the US, contact CE labs sales for this paid service.



PLAYLIST ZONE

NOTE:

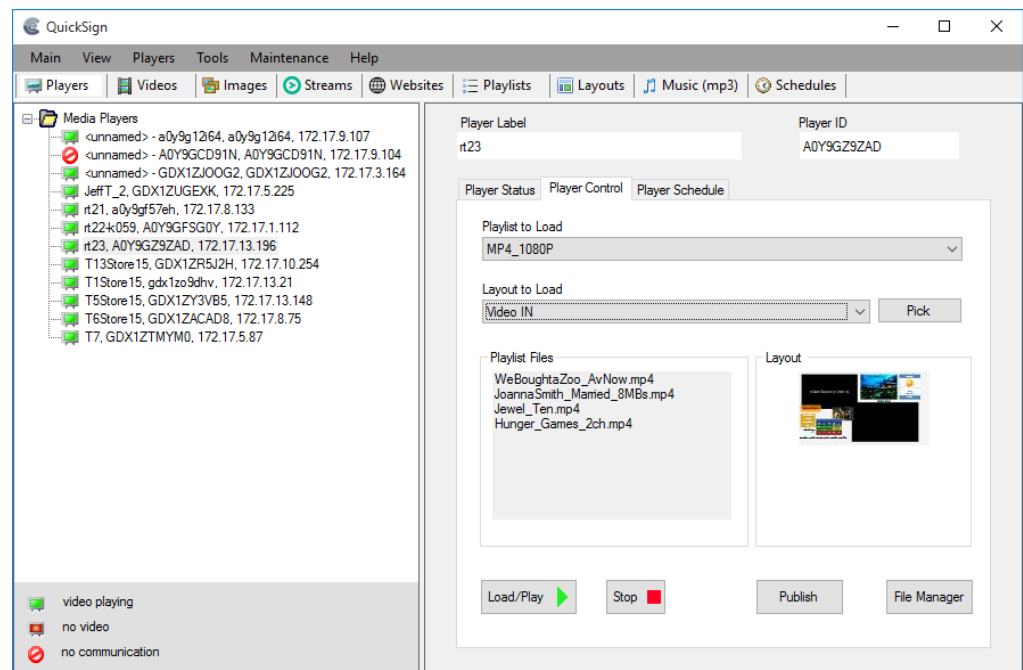
The Video / Playlist Zone will always be blank at this level. It is a placeholder for when we merge the Layout with a Video Playlist later in the Load/Play procedure on the main application window.

Send Content to the Player

1. Once the layout is created and saved, click on the X to exit back to QuickSign main page.
2. Click on Players to see the available players and select the one you wish to load in the left column.
3. Select "Player Control" in the right column and select the desired Playlist to load (this will fill in the video/playlist zone in your layout) and Layout to Load (the layout you just created).
4. Click on the Load/Play button to send the complete content package to the MP90.

If you wish to display full screen video only, select "Full Screen (no Layout)" from the Layout to Load drop down.

For additional information on operation of QuickSign software, please see the comprehensive help files in QuickSign or contact your CE labs salesperson for more information.



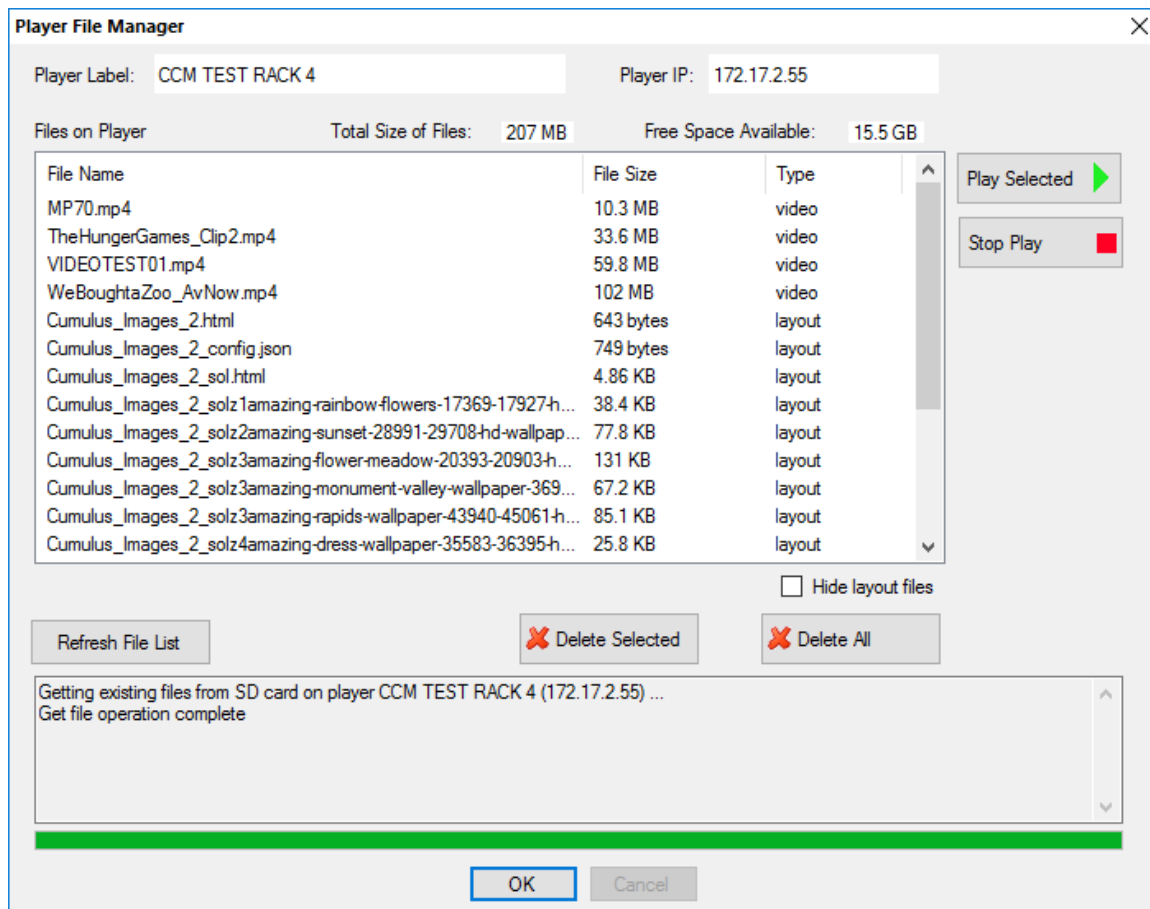
Quick Control

While displaying the Player Control Tab on QuickSign, you may select the File Manager button in the lower right hand corner to launch the Player File Manager window.

This page will let you see the files on the players SD card and how much space is still available for loading new content. You may also highlight a video file in the window and click on Play Selected. This sends an immediate playlist to the player with the selected file.

Note:

Only video files may be played directly. You may select the Hide Layout Files box to make it easier to find the desired file.



Software (continued)

Firewall Issues

Quick Sign uses HTTP protocol when downloading files to the media players. If Quick Sign fails to download files to the players, a PC firewall or a firewall in the router may be blocking this operation. Virus protection programs may block this operation also. Make certain you have allowed a firewall exception for QuickSign when you installed the software. Check with your IT department to work through these issues.

Unblocking the Computer Firewall

When Quick Sign is first started, you will be prompted to unblock the firewall for Quick Sign. Please accept to unblock. This does not pose much of security issue due to the fact that you are only unblocking the Quick Sign application as opposed to the whole computer and it will only download video files that you have specified.

Usually no further action will be needed and Quick Sign will function properly.

Manually Unblocking the Computer Firewall

If video files fail to download, you may need to verify that the firewall is indeed off for Quick Sign.

You can temporarily turn the firewall completely off to test if this resolves the file transfer issue.

Windows7 / VISTA Operating System

To turn firewall completely off (not recommended):

1. Control Panel->Security->Windows Firewall-> Turn Windows Firewall on or Off
2. Select Off
3. Click OK

To allow just Quick Sign through the Firewall:

1. Control Panel->Security-Windows Firewall-> All a program through Windows Firewall
2. Click Add Program
3. Browse to C:\Program Files\CE labs\QuickSign\QuickSignPro.exe for QuickSign
(Typical, may be different location on some PCs)
4. Click OK

Now add port 7898 TCP

1. Click Add Port
2. Set Name: http port:7898 TCP.
3. Click OK

XP Operating System

To turn firewall completely off (not recommended):

1. Control Panel-> Security Center->Windows Firewall-> Turn Windows Firewall on or Off
2. Select Off
3. Click OK

To allow just Quick Sign through the Firewall:

1. Control Panel-> Security Center->Windows Firewall
2. Click Exceptions Tab
3. Click Add Program
4. Browse to C:\Program Files\CE labs\QuickSign\QuickSignPro.exe for QuickSign
(Typical, may be different location on some PCs)
5. Click OK

Now add port 7898 TCP

1. Click Add Port
2. Set Name: http port:7898 TCP.
3. Click OK

Virus Protection Programs

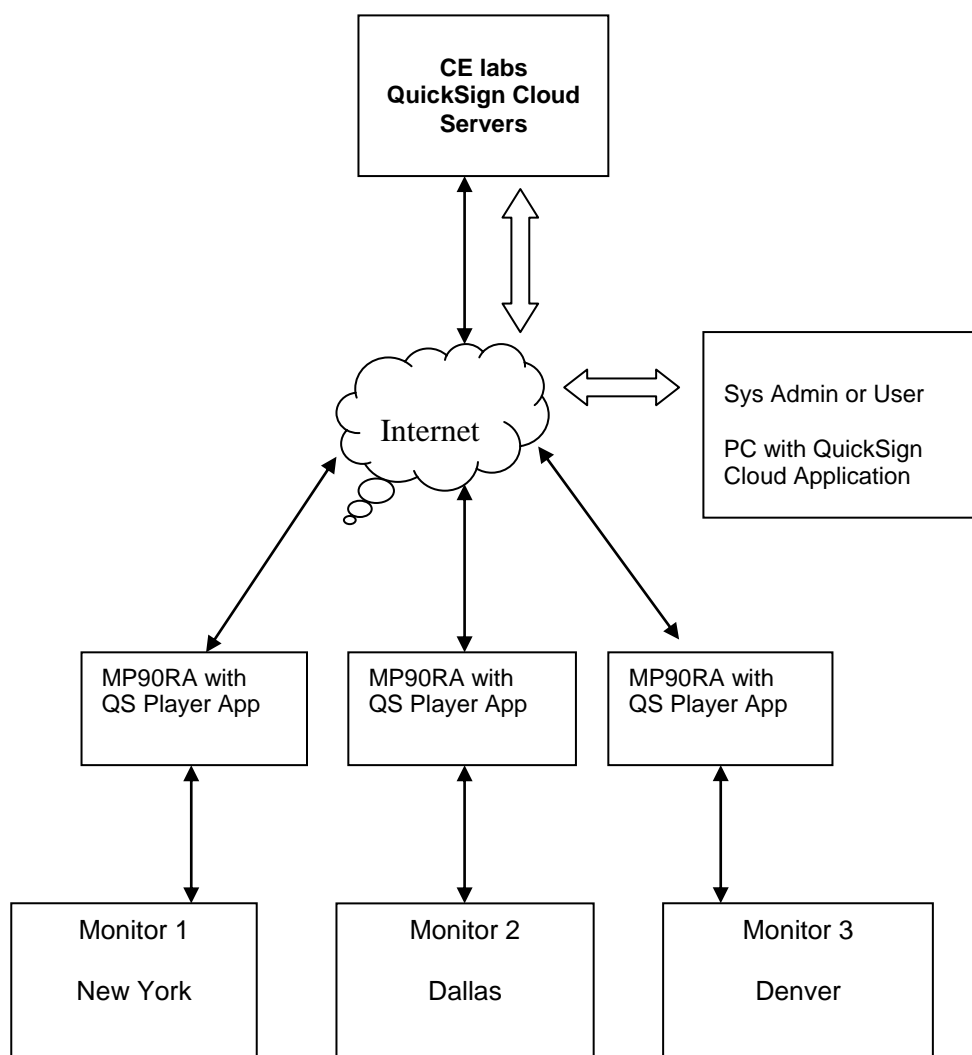
If you are running a virus protection program, the settings may need to be altered to allow Quick Sign to use the HTTP protocol (TCP/IP). Virus protection programs vary widely so no details are provided here.

CE Labs QuickSign CLOUD for MP90

If you have a widely dispersed signage network, you may be interested in the CE labs QuickSign Cloud subscription service. In the CE QuickSign Cloud system, the players are configured with the server address for your account. The MP90 will contact the Cloud Server and negotiate for any pending content assigned by the QuickSign Cloud application.

While logged into QuickSign Cloud, users have visibility of what the players are currently playing. Players can be operated from any PC that has the QuickSign Cloud application loaded.

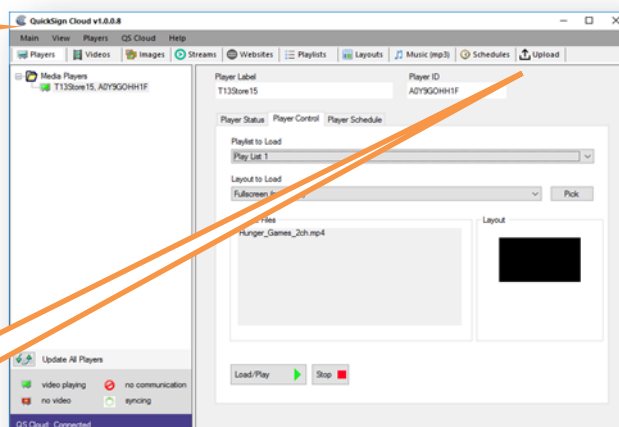
Typical QuickSign Cloud Application



Prerequisites:

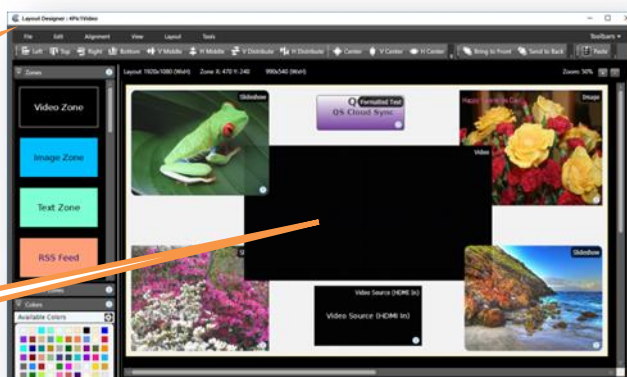
The authorization key has been loaded on the player via USB from the file that was emailed to me.

I downloaded the QuickSign Cloud application on my PC.



UPLOAD MEDIA

Select the **UPLOAD** tab and select the local media to load into your cloud media database. This will allow access to your desired media from any PC that you log in to. Please wait for the media to complete the upload.

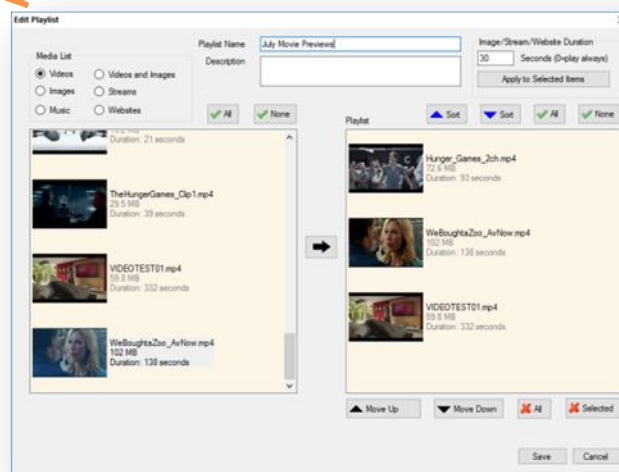


If you desire to have a Layout (Digital Signage Information around your media / Playlist zone), enter the Layout editor and create your screen using the drag and drop zones in the layout editor. You may edit the zones with your own content or messaging. Saving this layout will upload information automatically to your cloud account.



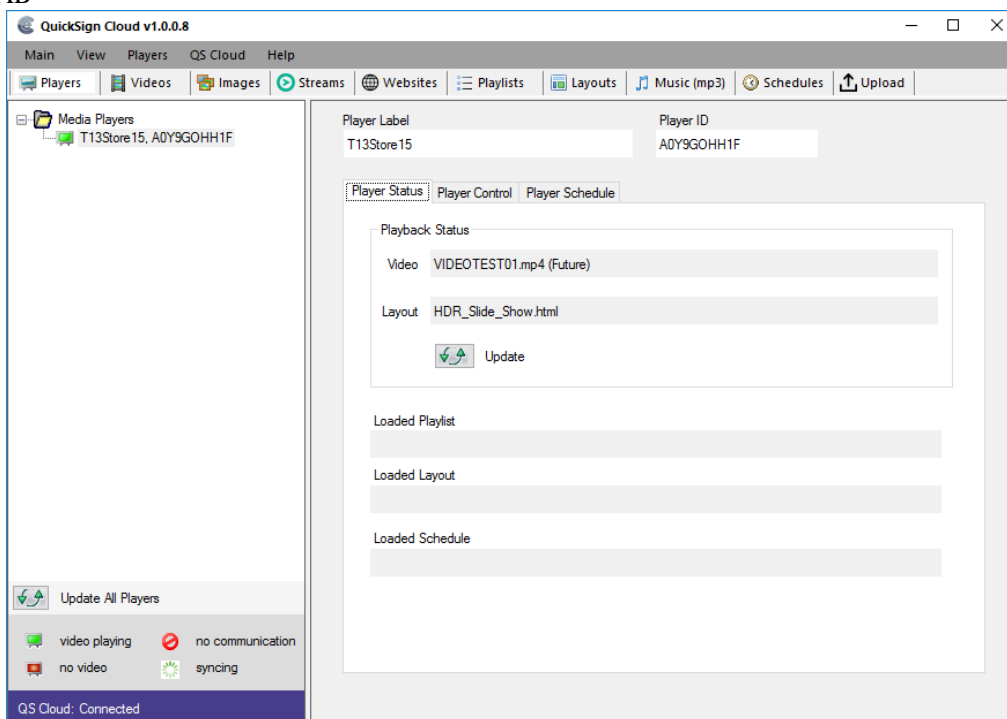
Go back to the QuickSign main application and create a Playlist that contains the media (Video, Pictures, or Channels) that will play either full screen or in the Playlist Zone if you have a layout.

- Go to the QuickSign start page and select PLAYERS tab.
- Select your player in the left player column.
- Select Player Control Tab in the right column.
- Inside the Player Control Box, select the desired Playlist and Layout.
- Press Load/Play and the Media Player will download your Layout and media in the Playlist and begin to play.

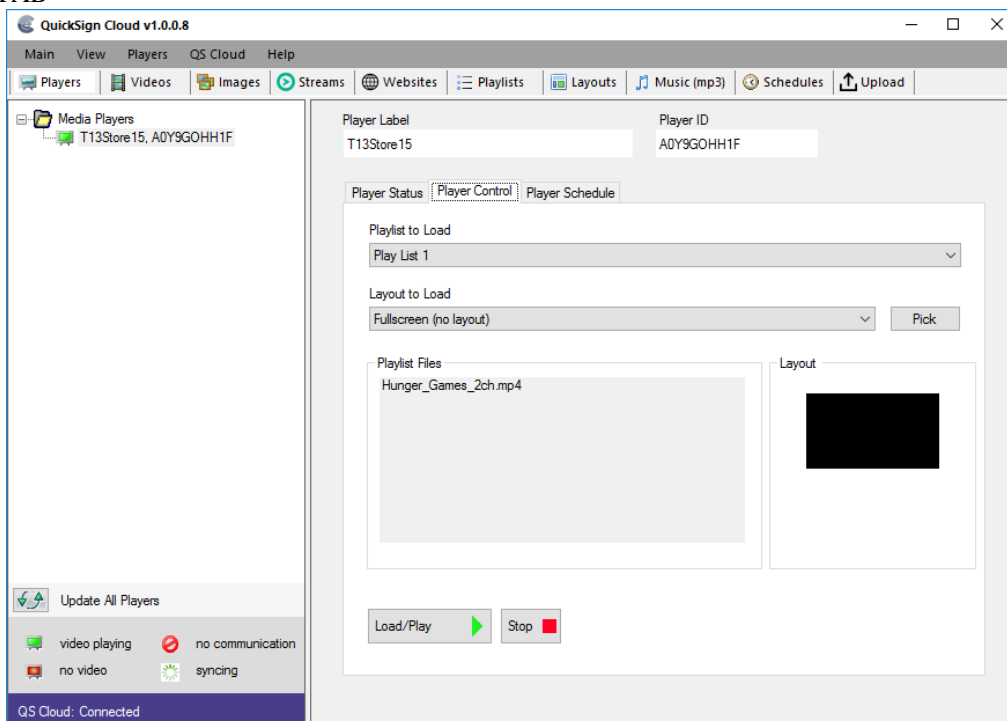


QuickSign Cloud for Windows

QS Cloud Status TAB



QS Cloud Control TAB



For more information on the operation of QuickSign Cloud software, please go to:

<http://www.celabs-qsccloud.net/qsccloudhelp/>

Chapter 4 – MP90 OPERATION

Initial Startup Procedure

Once the unit has been mounted and configured with the appropriate memory card and cabling, connect the power supply to a suitable AC outlet. Verify that the locking ring is snug on the player DC jack. The power LED on the front of unit will illuminate. The media player may take about 30 seconds to fully boot to the operational state depending upon the startup configuration.

Operation

The MP90 is capable of driving a wide variety of displays at up to 4K resolution at bit rates up to 40 Mbps. You should have a micro-SD card installed in the unit to enable playback of local content. Once connected, powered on, and fully booted, the unit is ready to use. The MP90 can be configured with different applications to perform different functions. The main application that will be loaded on most players is the CE labs QS Player application. This allows communication with QuickSign and QuickSign Cloud control software.

Create the desired content package using QuickSign or QuickSign Cloud and send to the player. If you do not have a network connection, the content may be published to a SD card at your local PC and then inserted into the MP90. You will need a Phillips screwdriver to access the micro-SD card.

The unit will play this content until instructed to play something else. If no startup item has been defined, the screen may only show the CE labs logo and then a black screen.

The player works well with a variety of media files at high bit rates, but please adhere to the media creation standards in the appendix at the end of this document. Also, be aware of the bit rate versus the speed of the SD card if you are using local storage. If the video experiences freeze frames or stuttering, the bit rate may be too fast for the card installed in the player.

The media player can play content from many sources:

- Real Time Source
 - Web Page
 - Ethernet RTP IP Stream
- Local Storage Source
 - Internal micro-SD Card (with external access) (optional)
 - External USB Drive (optional)

The MP90 may be used as a stand-alone UHD / High Definition source (once content is loaded on the internal storage device) or greater versatility is allowed when the player is connected to a network. The primary focus of the MP90 is media playback and control device that is part of a network of media players. The network interface is a powerful tool in managing from one to thousands of players. The GPIO interface allows for local interaction through push buttons or external sensors. The GPIO interface is programmed within the QuickSign Software.

HOME Screen Display menu

The MP90 will generally be configured to auto-start the QS Player application. If you stop the player application, the Home screen shown below will appear. You may also get to the HOME page by clicking the mouse at the bottom of the QS Player screen and selecting the HOME icon. The QS Player application may be set to auto-start by connecting a USB mouse and selecting the QS Player icon. Press the left mouse button and hold it for several seconds on the icon. The player will give you the option to set the application as the start up or remove it if it was already set.



If installed, the MP75 Emulator application will allow the MP90 to function much the same as the CE labs MP75 Media player. This means it will automatically begin playing any content in the top level of the SD card. Any videos that are stored in numbered folders (1 to 8) on the SD card will be played when the corresponding GPIO pushbutton is pressed. If the MP75 Emulator is desired to start each time on power up, simply click and hold on the icon with the left mouse button until the option is displayed to make it the default start application.

NOTE:

- ***You must use QS Player application on the MP90 in order to communicate with QuickSign or QuickSign Cloud.***
- ***The MP75 Emulator application should only be used for stand-alone installations with no connection to a network.***

Wi-Fi

If you purchased the WiFi option and have the external antenna installed, you may click on Settings while on the HOME page as shown above and access the Wireless settings. Turn ON the Wi-Fi option. Select the desired access point found by the player. Press Connect and enter the Password. If there are additional access points that are not to be used or Out of Range, it is a good idea to select them and instruct the player to Forget these unwanted items. Click the right mouse button to return to the HOME page and relaunch the QS Player application.

NOTE:

- ***If the player is operating in a highly congested Wi-Fi environment, it is suggested to use an Ethernet cable for the most reliable performance.***

RF Tuner Option

The MP90 can be ordered with a RF tuner that can be used to access ATSC and QAM256 encoded signals. The tuner accepts standard frequencies and RF levels. Optional RF input is around +10dBmV with a range of +/- 20 dB.

POE Option

The MP90 can be ordered with an internal Power Over ETHERNET power module that allows the unit to be powered from the remote POE enabled ETHERNET switch. When the POE option is installed, there is no need to supply local power to the DC jack on the back of the media player.

MP90 SPECIFICATIONS



SPECIFICATIONS:

Video Output:	v2.0 HDMI™ up to 4k/60Hz Composite 480i (3.5mm jack)
Indicators:	Status, LAN, Power LED
Audio Output:	Digital: Embedded in HDMI™ Digital/TOSLINK: Optical R/L Analog (3.5mm jack)
Control I/O:	USB 2.0 • Host x 2, USB Mouse (optional) IR Sensor • Remote Control (optional)
Network Connection:	LAN: 10/100/1000 BASE-T, RJ-45 WiFi: 802.11 b/g/n (optional antenna)
Video Format Support:	H.265, HEVC MPEG2: MP@HL MPEG4.2: ASP@L5 MPEG4.10 (H.264): MP@L4.0 VC-1: AP@L3 WMV9
Graphics Layer Format:	JPEG: Baseline, Progressive, GIF, PNG Recommended resolution 1920x1080 full screen
Audio Format:	MPEG1: Layers I, II, III (MP3)2.0 MPEG4: AAC-LC 5.1, HE-AAC 5.1 WMA9: w2.0
Storage Format:	Optional: 8, 16, 32 or 64 GB microSD Card USB Thumb Drive: 2 to 32 GB
Network Protocol:	IP•TCP•UDP•ICMP•ARP•DHCP•HTTP•FTP IGMP•RTP•SNMP•NTP•DNS
Power:	Input voltage: 12VDC Power dissipation: 6 watts (max) AC/DC Adapter: 100-240 V 50/60Hz
Environmental:	Operating Temp: 0 – 40°C Operating Humidity: 80% max, relative humidity, non-condensing
General:	Dimensions: 1" H x 8.0" W x 4.0" D Unit Weight: 1.4 lbs
Accessories:	Quick Start Guide, HDMI Cable



Troubleshooting Tips:

The MP90 has been pre-configured at the factory. After boot-up, if no video appears, please check the following:

- Is the monitor used capable of UHD? The MP90 may be set to a resolution too high for the monitor.
- Verify that the TV/Monitor is set to the correct input.
- Is the green LCD on? If not, please check the power connection. Also check the switch on any power strip into which the unit may be plugged. Be patient as the unit starts from boot up, this may take almost 1 minute.
- Reboot the unit by disconnecting and reapplying the power connector. This will set the unit back to the default startup item.
- If the green LCD is ON, but there is no video, please check all the video cables and make sure that they are connected properly to the first distribution amplifier or to the correct input on the TV. Check to see that the HDMI cable is firmly seated in the HDMI OUT port.

I cannot communicate over the network.

- Verify that the Ethernet cable is securely connected at both ends.
- Verify that the Ethernet connector LED is lighted to indicate presence of signal.
- Press Menu on the remote control and browse to player network setup. Verify that DHCP is turned on and do a "Save and Exit". Now go to the info screen on the OSD and record the IP address. Verify this address is within the Sub-Net range required on your network.
- The computer firewall may be blocking the needed ports. Try to communicate with the firewall temporarily disabled.

The video is playing, but it stops or stutters occasionally.

- This can occur if the video content bit rate exceeds the capability of the installed SD memory card. As a general rule, you are safe up to 20 Mb/S per second with a Class6 speed card. At bit rates over 20 Mb/S and up to 40 Mb/S, a Class10 speed or better SD card may be required. It is not recommended to exceed 40 Mb/S bit rate as spikes in data rate may exceed data transfer capacity of the storage device.

My Video Files do not play properly.

- The player runs on a version of the Android operating system. Try to avoid unusual punctuation marks in file names as this could cause unexpected behavior.
- Verify that the file is encoded properly. See the MP90 Media Encoding guide for more information.

Wi-Fi communications is intermittent.

- There may be another Wi-Fi access point on the same carrier. Try changing the desired access point to another carrier.
- Try using an alternate access point that is closer to the MP90.

Warranty

CE labs, LLC. warrants this product to be free from defects in material and workmanship, under normal use and service, for a period of one year from the purchase by the original purchaser. If this product is defective or malfunctions, CE labs, LLC. will replace or repair this unit (at our option) within a reasonable time. No expressed or implied warranty is made for any defects or damage caused by immersion or exposure to liquids, abuse, neglect, improper operation of unit, harsh environmental stresses (lightning or ESD), excess wear and tear and or defects resulting from unauthorized disassembly and or modification.

CE labs, LLC.

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CE labs, LLC
3209 Wood Drive
Garland, TX 75041
Attn: Open Source Licensing Administrator

APPENDIX

General Purpose Input/Output (GPIO) Options

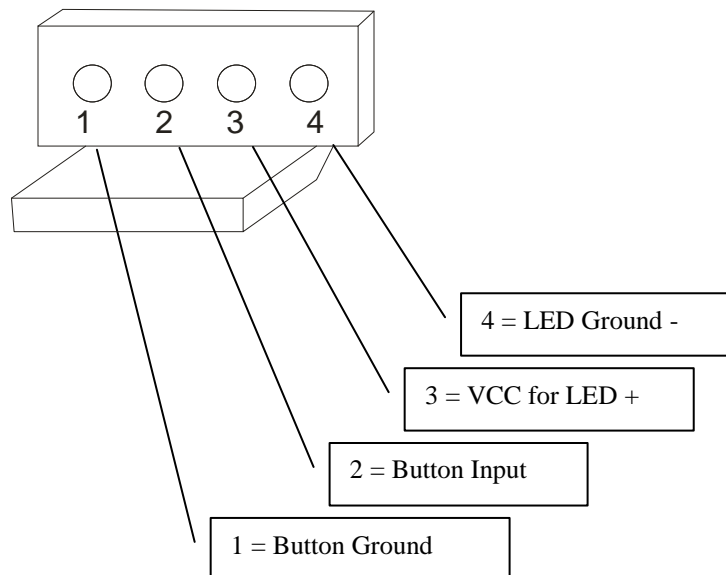
The MP90 may be ordered with a GPIO interface board to allow pushbuttons to trigger actions on the media player.

GPIO PINOUT

- The eight Button INPUT pins (pin 2) have internal 10 K ohm pull-up resistors to +5V. Pull the line to ground (pin 1) to trigger input. There is a brief lockout after trigger to de-bounce the input.
- The LED interface has a ground and a positive VCC that is driven by a transistor. When activated, the LED is illuminated. Normal condition is off. Current draw on this port should not exceed 20 mA. Use of a current limited LED illuminated button is recommended.
- Reaction to a particular button press can be assigned by using the TOOLS, Button Setup option in our QuickSign software. Each GPIO port may be assigned a Video, Playlist, or a Playlist with Layout.

Note:

The GPIO interface on the MP90 is a double stack with buttons 1 to 4 on the bottom and buttons 5 to 8 on the top. The four pin interface is keyed, so the button will only insert with the correct orientation. Use care when inserting the button harness in order to prevent bending the GPIO interface pins. The image below is inverted for clarity compared to the actual connector on the unit.



MP90 4K Media Player

Media Encoding Preferences



MP90 Standard Media Encoding Guide

Description:

The purpose of this document is to provide information on encoding media for the CE labs MP90 players. The MP90 supports several formats: Windows Media 9, MPEG-4 part 10 (h.264), MPEG-2, and HEVC. Windows Media 9 can take the form of a WMV/WMA or VC-1. MPEG-2 or -4 can take the form of a program stream or transport stream. HDR10 playback is supported.

Video Decoding Format Support

*HEVC/h.265, Main and Main10 Profile	up to 3840x2160 @ 60FPS
*MPEG2, Main Profile,	up to 3840x2160 @ 24FPS
*MPEG4.2 ASP@L5	up to 1920x1080 @ 60FPS
*MPEG4.10 (H.264) MP@L4.0	up to 3840x2160 @ 24FPS
*WMV9 (VC-1), Advanced Profile @ L3	up to 1920x1080 @ 30FPS

While the player supports much higher bit rates, it is best to average 40Mb/s or less to allow for peak excursions.

Audio Decoding Format Support

*MPEG1 Layers I and II	*MPEG4 AAC-LC 5.1
*WMA	*FLAC
*AC3 / E-AC3	*MP3
*WAV	

For optimum 4K playback, we suggest using the HEVC codec in a MKV container, which is specified below. MP4 is acceptable

Best Format Recommendation:

MP90 Video/Audio Encoding Settings for HEVC (h.265 Codec)

Video Settings:

File Format (Container):	MKV
Frame rate:	23.97 or 29.97
Codec:	h.265, Main or Main10 Profile
Max Resolution:	3840 x 2160
Color-Space:	YUV420p10le, 4:2:0 (bt709)
Aspect Ratio (DAR):	16:9
CU Size:	64
GOP:	No open frames
Bit Depth:	10 bit color (minimizes color gradient transition banding)
Bit rate:	Variable bit rate = Target: 30 - 40 Mb/s - Maximum: 60 Mb/S (Maintain a minimum of 500 Kb/s). <i>For minimum file size, a target bit rate of 15Mb/s may be desirable.</i> <i>If using a fixed bit rate, 20 Mb/s produces an excellent picture with manageable file sizes.</i>

Audio Settings:

Codec:	AAC (Mpeg 4)
Output Channels:	Stereo
Frequency:	44.1 kHz or 48 kHz
Bit rate:	192 kbps
Volume level:	Target: -12 dB

Note: Frame rate and frequency will need to be the same as the source video being encoded

Suggested programs for encoding content:

The primary use of the MP90 will be playback of 4K video media. Good results have been achieved in using "ffmpeg" for encoding HEVC 4K files to use with this player. When processing already compressed files, use a CRF factor of 20 or smaller.

Note: All media processing should be performed at a minimum of 10 bits. Truncating color depth to 8 bits to reduce file size can cause objectionable bands to become visible in areas of gradient color transitions. If 8 bit color is mandatory, use less aggressive compression.

Browser Layer Design Guidelines

1. This browser is standards-compliant and should correctly interpret all but most exotic CSS and JavaScript syntax.
2. Try keeping the total uncompressed size of images including those that are not visible at the moment, or downloaded using JavaScript under 2 MB. Avoid complicated page structures (deeply nested tables, etc.), and keep formatting simple.
3. Avoid resizing images in HTML, CSS or JavaScript by specifying width and height. This will increase memory usage. Specifying width/height is OK only if the dimensions are exactly equal to the natural dimensions of the image.
4. When designing dynamic effects, keep in mind performance limitations. We found that moving large bitmaps or text across the screen (marquee) may slow page response. However, image and text rotators seem to work fine.
5. When manipulating objects (especially images) in JavaScript, release the buffer (`MyImg.src=""`) or make sure that the object goes out of scope when no longer needed. Some techniques, like preloading images one at a time in image rotators shortly before use, and releasing shortly afterwards may be helpful.
6. When developing playlists, allow enough time to load websites, especially when video is being played concurrently. When navigating from a web page to another web page, allow some time for the previous page to unload. For large, complicated pages both loading and unloading may take several seconds each. Recommended time between page changes is 10 minutes depending on the complexity of the page being displayed.
7. Page dimensions should not exceed displayed dimensions (typically 1920x1080, 1366x768, 1024x768, etc).
8. Pages should be developed specifically for the MP90 family as the browser limitations make displaying generic web pages unpredictable.
9. When using active JavaScript, try not to change to other pages. As the JavaScript is running and is asynchronous to running playlists, information may be loaded/unloaded at any time; therefore, a playlist should not change the actively displayed web page. This can however be handled in the JavaScript since it controls loading/unloading of objects, etc.
10. When using a multilayer display, video bandwidth may need to be reduced. The recommendation currently is H.264 running at 20Mbps or lower.
11. When spawning a Video, or picture from the Browser JavaScript always use “?internal=1” as an option in the video execution line.
12. Macromedia Flash and QuickTime Movie are **not** supported.

MP90 Network Communications Protocol

Command Structure

Local MP90 network control

MP90 Network Control:

- The MP90 is controlled with simple text network commands using TCP/IP. The commands are sent to the player's TCP/IP server on the command port.
- Files are sent to the player using an "easy to implement" TCP/IP based protocol.
- Players can be found on a local network by using a UDP broadcast command.

The following ports are used by MP90:

12889: TCP/IP command port

12881: TCP/IP send file port

12885: player search port (UDP broadcast)

Example of a typical MP90 command (all ASCII Text):

qsCommand:PLAY_FILE(typeIndex,filename)

Play file of given type.

typeIndex = file type index =

HTML(1),

IMAGE(2),

MUSIC(3),

PLAYLIST(4),

VIDEO(5);

filename = name of file

qsCommand:PLAY_FILE(4,Play List 3)

qsCommand:PLAY_FILE(5,07_BB_TradeIn.mp4)

Commands return a simple "OK" for success, "INVALID" for bad command, or "ERROR" if error occurs.

Note: A simple method to test commands is to use Packet Sender to send commands to the player.

<https://packetsender.com/>

Network Command List:

```
*****
qsCommand:NEXT
*****
qsCommand:PREVIOUS
*****
qsCommand:PAUSE
*****
qsCommand:STATUS
returns current status
videoState,videoFileType,videoItem,webBaseState,webBaseItem,webOverlayState,webOverlayItem
file types:
FILE_TYPE_NONE = 0;
FILE_TYPE_VIDEO = 1;
FILE_TYPE_STREAM = 2;
FILE_TYPE_IMAGE = 3;
states:
STATE_IDLE = 0;
STATE_ACTIVE = 1;
STATE_ERROR = 2;
STATE_PAUSED = 3; // apply to vi
ex:
1,1,/mnt/extsd/QSPlayer/Video/05_BB_Recycled_GiftCard.mp4,0,,0,
*****
qsCommand:PLAY_FILE(typeIndex,filename)
Play file of given type.
typeIndex = file type index =
HTML(1),
IMAGE(2),
MUSIC(3),
PLAYLIST(4),
VIDEO(5);
filename = name of file
qsCommand:PLAY_FILE(4,Play List 3)
qsCommand:PLAY_FILE(5,07_BB_TradeIn.mp4)
*****
qsCommand:PLAY_QS_PLAYLIST(playlist_name)
Start the given playlist
*****
qsCommand:CLEAR_STARTUP_ITEM()
set the start up item to nothing - start with blank screen
*****

qsCommand:SET_STARTUP_ITEM(startupType,startupItem)
set the start up item to nothing - start with blank screen
startupType = type of item to startup
QS_LAYOUT(0);
QS_PLAYLIST(1);
QS_SCHEDULE(2);
QS_NONE(3);
WEB_PAGE(4);
QS_KIOSK(5)
startupItem
if type = QS_LAYOUT(0), then startupItem = layout_config_file (QS Layouts only)
if type = QS_PLAYLIST(1), then startupItem = QS playlist name
if type = QS_SCHEDULE(2), then startupItem = QS schedule name
if type = QS_NONE(3), then startupItem is ignored and blank screen is started
if type = WEB_PAGE(4), then startupItem = URL to start
if type = QS_KIOSK(5), then startupItem = QS kiosk configuration filename
*****
```

Network Commands Continued:

```
qsCommand:PLAY_QS_LAYOUT(layout_config_filename);
Play a layout designed by Quick Sign.
layout_config_filename - the json file that describes the
layout, mainly needed for video field location.
*****

qsCommand:PLAY_LAYER(layerTypeIndex,typeIndex,filename,duration);
Play the item on the selected layer type -does not affect
other layers. Usually need to set layer area first
layerTypeIndex - index number of the layer type
LAYER_BASE_HTML(0)
LAYER_OVERLAY_HTML(1)
LAYER_VIDEO(2)
LAYER_CAMERA(3) (typeIndex ignored if set to LAYER_CAMERA)
typeIndex = file type index =
HTML(1),
IMAGE(2),
MUSIC(3), valid for VIDEO_LAYER Only!
PLAYLIST(4), playlist must be valid type for assigned layer or will fail
VIDEO(5); valid for VIDEO_LAYER Only!
filename = name of file
*****

qsCommand:PLAY_WEB_PAGE(url)
*****

qsCommand:GET_FILE_LIST
parameters: none;
{"files":[
{"typeIndex":0,"fileName":"myVideo1.mp4", "fileSize":876234 },
{"typeIndex":1, "fileName":"myVideo1.mp4", "fileSize":23876234},
{"typeIndex":2, "fileName":"myVideo1.mp4", "fileSize":12876234}
],
"freeSpace":23898594
}
*****

qsCommand:DELETE_FILE(mediaDevice,fileType,fileName)
mediaDevice - not used
fileType = "config";
"html";
"picture";
"music";
"playlist";
"video";
fileName = name of file;
*****

qsCommand:SET_NAME(name)
Sets the name of the player
name = desired name of the player
*****

qsCommand:GET_NAME
Get the name of the player as assigned by SET_NAME
*****

qsCommand:SET_DESCRIPTION(text)
Set a description for the player
text = brief description
*****

qsCommand:GET_DESCRIPTION
Gets the description of the player as set by GET_DESCRIPTION
*****

qsCommand:SET_OPERATING_MODE(mode)
modes
mp75emulator, qsplayer, ccm, or qscloud
*****
```


Network Commands Continued:

qsCommand:GET_OPERATING_MODE

returns mode

mp75emulator, qsplayer, ccm, or qscloud

qsCommand:SET_CCM_SERVER(address)

set the http address to be used for CCM or empty string

qsCommand:GET_CCM_SERVER

returns the currently set http address to be used for CCM

qsCommand:MUTE() (or unmute)

qsCommand:VOLUME_UP()

qsCommand:VOLUME_DOWN()

qsCommand:SET_VOLUME(val)

qsCommand:GET_VOLUME_MAX()

qsCommand:GET_VOLUME()
