USER MANUAL

Picturall Series Media Servers (V3.5)

References: MST02-R1, MSTC02-R1, MSQ04-R1, MSQC04-R1, MSP16-R1,
MST02-R2, MSTC02-R2, MSQ04-R2, MSQC04-R2, MSP16-R2,
MSTC02-MkII, MSQ04-MkII, MSQC04-MkII, MSP16-MkII

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Pioneer in Analog, Leader in Digital

Contents

1 Disclaimer

The information in this document is subject to change without notice, while every effort is made to be accurate. Analog Way cannot be held liable for any kind of loss whatsoever that may be caused by the use of or reliance in this manual.

1.1 Copyrights

The Software installed in the Picturall Series Media Server remains the sole property of Analog Way unless stated otherwise in a separate licensing agreement. Any attempt to copy or alter the software is prohibited and will render any warranties void.

1.2 Media

Analog Way may have supplied video libraries pre-installed on the media server. If you have any questions regarding them, please contact us. These videos have been licensed exclusively for use within the Picturall Series Media Servers. Any copying or other usage without proper rights clearance is forbidden. Analog Way will not accept any liability or claims from third parties.

1.3 Warranty

The Picturall Series Media Server has been tested in various applications and is deemed to be suitable for uses described in this manual. This product is provided “as is”, including all or any ‘perceived’ or possible faults. The Licensor grants no warranty regarding the utility or contents of the software. Analog Way will warrant the hardware for three years from the date of purchase. The method of warranty is Return to Base (transport costs from and to us are the owner’s responsibility). In case of hardware fault please contact your local distributor or us (www.analogway.com).
While not an exhaustive list, the following are provided for guidance. Warranty claims will be invalidated in these circumstances:

- A hardware failure is caused by inappropriate handling of hardware such as dropping the media server, using the media server without proper ventilation, exposing the media server to water, other liquids or dust.
- The software has been loaded or there has been an attempt to load software onto the media server in any way other than described in the manual or recommended by Analog Way.
- The hardware has been modified by someone other than a certified Analog Way dealer.

1.4 Liability

Analog Way shall not be liable for any loss or damage, be it direct or indirect in regards to the utility or contents of the software or hardware, except to the extent provided by law. Notwithstanding the above, liability for indirect, special, incidental, or consequential loss or damage that may arise in respect of the software or hardware, is expressly excluded.

1.5 Force Majeure

Liability of Analog Way is excluded in all cases that constitute Force Majeure circumstances, namely, circumstances beyond the control of Analog Way.

2 Hardware Specifications

2.1 General safety instructions

2.1.1 English

All the safety and operating instructions should be read before the product is operated and should be maintained for further reference. Please follow all the warnings on this product and its operating instructions.

• **WARNING**: Not suitable for children. To prevent the risk of electric shock and fire, do not expose this device to rain, humidity or intense heat sources (such as heaters and direct sunlight). This equipment is not suitable for use in locations where children are likely to be present.

• **INSTALLATION**: Slots and openings in the device are provided for ventilation and to avoid overheating. Make sure the device is never placed near a textile surface that could block the openings. Also keep away from excessive dust, vibrations and shocks.

• **POWER**: Only use the power supply indicated on the device of the power source. Devices equipped with a grounding plug should only be used with a grounding type outlet. In no way should this grounding be modified, avoided or suppressed. Connection of equipment to main supply must be after branch circuit breaker of the building installation.

For equipment identified with the symbols above, grounding is mandatory before plug connection.
Use a grounding cable to connect a screw on the unit chassis to ground.

• **POWER CORD**: The device is equipped with one or multiple detachable power cords.

A device identified with the symbol above indicates that the equipment has multiple power cords. To remove mains, disconnect all power cords at appliance coupler.

Caution: The power cords constitute the only mean to completely disconnect the equipment from the main power.

Use the following guidelines:

- The equipment connected to the network must have a release system easily accessible and located outside the unit.
- Unplug the power from mains if the device will not be used for a few days or more.
- To unplug the power cords; do not pull on the power cords but always on the plug itself.
- The outlet should always be near the device and easily accessible.
- Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them.

If one of the power supply cords is damaged, unplug the device. Using the device with a damaged power supply cord may expose your device to electric shocks or other hazards. Verify the condition of the power supply cords periodically. Contact your dealer or service center for replacement if damaged.

• **CONNECTIONS**: All inputs and outputs (except for the power input) are Electrical energy source class 1 (ES1) as defined in IEC/UL 62368-1 edition 2.
ES1 limits: 60Vdc or 30V rms/ 42.4V peak.

• **SERVICING**: Disconnect all power supply cords from main before servicing.
According to IEC 62368-1 standard, an ordinary person is authorized to:
- Open the front panel cabinet and clean the air filter (depending on the model)
- Change a removable power supply (depending on the model)
The fuse(s) present in the unit have not been designed to be replaceable.

Do not attempt to service this product yourself by opening or removing covers and screws since it may expose your device to electric shocks or other hazards. The internal Lithium cell battery is not replaceable. In case of problem, contact your supplier or Analog Way.

• **OPENINGS**: Never push objects of any kind into this product through the openings. If liquids have been spilled or objects have fallen into the device, unplug it immediately and have it checked by a qualified technician.

2.1.2 French

Afin de mieux comprendre le fonctionnement de cet appareil nous vous conseillons de bien lire toutes les consignes de sécurité et de fonctionnement avant utilisation. Conservez les instructions de sécurité et de fonctionnement afin de pouvoir les consulter ultérieurement. Respectez toutes les consignes marquées dans la documentation, sur le produit et sur ce document.

• **ATTENTION** : Ne convient pas aux enfants. Afin de prévenir tout risque de choc électrique et d'incendie, ne pas exposer cet appareil à la pluie, à l'humidité ou à des sources de chaleur intense. Cet équipement ne convient pas pour une utilisation dans des endroits où des enfants sont susceptibles d'être présents.

• **INSTALLATION** : Veillez à assurer une circulation d'air suffisante pour éviter toute surchauffe à l'intérieur de l'appareil. Ne placez pas l'appareil sur ou à proximité d'une surface textile susceptible d'obstruer les orifices de ventilation. N'installez pas l'appareil à proximité de sources de chaleur comme un radiateur ou une poche d'air chaud, ni dans un endroit exposé au rayonnement solaire direct, à des poussières excessives, à des vibrations ou à des chocs mécaniques. Ceci pourrait provoquer un mauvais fonctionnement et un accident.

• **ALIMENTATION** : Ne faire fonctionner l'appareil qu'avec la source d'alimentation indiquée sur l'appareil. Les appareils doivent être obligatoirement connectés sur une source équipée d'une mise à la terre efficace. En aucun cas cette liaison de terre ne devra être modifiée, contournée ou supprimée. Raccordement des équipements à l'alimentation principale doit être postérieur au disjoncteur de branchement de l'installation électrique du bâtiment.

Pour les équipements identifiés avec les symboles ci-dessus, une mise à la terre est obligatoire avant branchement. Utiliser un câble de terre pour relier une vis du châssis de l'appareil à la terre.

• **CORDON D'ALIMENTATION** : L'appareil est équipé d'un ou plusieurs cordons d'alimentation détachables.

Un appareil identifié avec le symbole ci-dessus indique que l'équipement possède plusieurs cordons secteurs. La mise hors tension se fait en débranchant tous les cordons de l'appareil.

Attention : Les cordons d'alimentation constituent le seul moyen de débrancher l'appareil totalement de l'alimentation secteur.

Appliquer les consignes suivantes :

- Le matériel relié à demeure au réseau, doit avoir un dispositif de sectionnement facilement accessible qui doit être incorporé à l'extérieur de l'appareil.
- Débrancher les cordons d'alimentation de la prise murale si vous prévoyez de ne pas utiliser l'appareil pendant quelques jours ou plus.
- Pour débrancher les cordons, tirez-les par la fiche. Ne tirez jamais sur les cordons proprement dit.
- La prise d'alimentation doit se trouver à proximité de l'appareil et être aisément accessible.
- Ne laissez pas tomber le cordon d'alimentation et ne posez pas d'objets lourds dessus.

Si un des cordons d'alimentation est endommagé, débranchez-le immédiatement de la prise murale. Il est dangereux de faire fonctionner un appareil avec un cordon endommagé ; un câble abîmé peut provoquer un

risque d'incendie ou un choc électrique. Vérifiez les câbles d'alimentation de temps en temps. Contactez votre revendeur ou le service après-vente pour un remplacement.

• **CONNEXIONS** : Toutes les entrées et sorties (exceptée l'entrée d'alimentation) sont des sources d'énergie électrique de classe 1 (ES1) tel que défini dans IEC/UL 62368-1 édition 2.

ES1: Electrical energy source class 1 (limites : 60Vdc ou 30V rms/ 42.4V peak).

• **RÉPARATION ET MAINTENANCE** : Débrancher les cordons d'alimentation avant toute maintenance.

Selon la norme IEC 62368-1, une personne ordinaire est autorisée à :

- Ouvrir la face avant pour nettoyer le filtre à air (dépend du modèle)
- Changer un bloc d'alimentation accessible de l'extérieur (dépend du modèle)

Le ou les fusibles présents dans l'appareil n'ont pas été conçus pour être remplaçables.

L'utilisateur ne doit en aucun cas essayer de procéder aux opérations de dépannage, car l'ouverture des appareils par retrait des capots ou de toutes autres pièces constituant les boîtiers ainsi que le dévissage des vis apparentes à l'extérieur, risquent d'exposer l'utilisateur à des chocs électriques ou autres dangers.

La pile bouton au Lithium présente à l'intérieur de la machine n'est pas remplaçable. En cas de problème, contactez le service après-vente, votre revendeur ou adressez-vous à un personnel qualifié uniquement.

• **OUVERTURES ET ORIFICES** : Les appareils peuvent comporter des ouvertures (aération, fentes, etc.), veuillez ne jamais y introduire d'objets et ne jamais obstruer ses ouvertures. Si un liquide ou un objet pénètre à l'intérieur de l'appareil, débranchez immédiatement l'appareil et faites-le contrôler par un personnel qualifié avant de le remettre en service.

2.1.3 Italian

Allo scopo di capire meglio il funzionamento di questa apparecchiatura vi consigliamo di leggere bene tutti i consigli di sicurezza e di funzionamento prima dell'utilizzo. Conservare le istruzioni di sicurezza e di funzionamento al fine di poterle consultare ulteriormente. Seguire tutti i consigli indicati su questo manuale e sull'apparecchiatura.

• **ATTENZIONE**: Questo apparecchio non e' adatto all'utilizzo da parte di bambini. Al fine di prevenire qualsiasi rischio di shock elettrico e d'incendio, non esporre l'apparecchiatura a pioggia, umidità e a sorgenti di eccessivo calore. Questo apparato non e' adatto all'utilizzo in luoghi dove ci siano presenti bambini.

• **INSTALLAZIONE**: Assicuratevi che vi sia una sufficiente circolazione d'aria per evitare qualsiasi surriscaldamento all'interno dell'apparecchiatura. Non collocare l'apparecchiatura in prossimità o su superfici tessili suscettibili di ostruire il funzionamento della ventilazione. Non installate l'apparecchiatura in prossimità di sorgenti di calore come un radiatore o una fuoruscita d'aria calda, né in un posto esposto direttamente ai raggi del sole, a polvere eccessiva, a vibrazioni o a shock meccanici. Ció potrebbe provocare un erroneo funzionamento e un incidente.

• **ALIMENTAZIONE**: Far funzionare l'apparecchiatura solo con la sorgente d'alimentazione indicata sull'apparecchiatura. Le apparecchiature queste devono essere obbligatoriamente collegate su una sorgente fornita di una efficiente messa a terra. In nessun caso questo collegamento potrà essere modificato, sostituito o eliminato. Connessione delle apparecchiature alla rete elettrica deve essere successiva interruttore di circuito dell'impianto dell'edificio.

Per apparecchiature identificate con i simboli sopra, collegare la terra prima di collegarla all'alimentazione. Utilizzare un cavo di terra per mettere a terra la vite del telaio dell'unità.

• **CAVO DI ALIMENTAZIONE**: Il dispositivo è dotato di uno o più cavi di alimentazione removibile.

Un dispositivo identificato con il simbolo sopra indica che l'apparecchiatura dispone di più cavi di alimentazione. Per rimuovere le alimentazioni scollegare i cavi dalla Presa.

Attenzione: i cavi di alimentazione sono l'unico di disconnettere l'apparecchio all'alimentazione.

Seguire le instruzioni seguenti:

- Il materiale collegato a residenza alla rete, deve avere un dispositivo di sezionamento facile da raggiungere e che deve essere inserito all'esterno del apparecchio.
- Scollegare l'apparecchiatura dalla presa a muro se si prevede di non utilizzarla per qualche giorno.
- Per disconnettere i cavi, tirare facendo forza sul connettore.
- La prese d'alimentazione deve trovarsi a prossimità dell'apparecchiatura ed essere facilmente accessibile.
- Non far cadere il cavo di alimentazione né appoggiarci sopra degli oggetti pesanti.

Se uno dei cavi di alimentazione é danneggiato, spegnere immediatamente l'apparecchiatura. E' pericoloso far funzionare questa apparecchiatura con un cavo di alimentazione danneggiati, un cavo graffiato puó provocare un rischio di incendio o uno shock elettrico. Verificare i cavi di alimentazione spesso. Contattare il vostro rivenditore o il servizio assistenza per una sostituzione.

• **CONNESSIONE**: Tutti gli ingressi e le uscite (ad eccezione per l'ingresso di alimentazione) sono sorgenti di energia in classe 1 (ES1) come definito nelle normative IEC/UL 62368-1 edizione 2. Limiti ES1: 60Vdc or 30V rms/ 42.4V di picco.

• **RIPARAZIONI E ASSISTENZA**: Scollegare tutti i cavi di alimentazione dalle prese prima di fare manutenzione. In accordo alle normative IEC 62368-1, no addetti alla manutenzione possono effettuare le seguenti operazioni :

- Aprire il pannello frontale e effettuare la pulizia dei filtri (dipende dal modello)
- Sostituire un alimentatore rimuovibile (dipende dal modello)

I fusibili presenti nel dispositivo non sono stati progettati per essere sostituibili.

L'utilizzatore non deve in nessun caso cercare di riparare l'apparecchiatura, poiché con l'apertura del coperchio metallico o di qualsiasi altro pezzo costituente la scatola metallica, nonché svitare le viti che appaiono esteriormente, poiché ció puó provocare all'utilizzatore un rischio di shock elettrico o altri rischi. La batteria al litio all'interno dell'apparato non e' sostituibile. In caso di problemi contattare il fornitore o Analog Way.

• **APERTURE DI VENTILAZIONE**: Le apparecchiature possono comportare delle aperture di ventilazione, si prega di non introdurre mai oggetti o ostruire le sue fessure. Se un liquido o un oggetto penetra all'interno dell'apparecchiatura, disconnetterla e farla controllare da personale qualificato prima di rimetterla in servizio.

2.1.4 German

Um den Betrieb dieses Geräts zu verstehen, raten wir Ihnen vor der Inbetriebnahme alle Sicherheits und Betriebsanweisungen genau zu lesen. Diese Sicherheits- und Betriebsanweisungen für einen späteren Gebrauch sicher aufbewahren. Alle in den Unterlagen, an dem Gerät und hier angegebenen Sicherheitsanweisungen einhalten.

• **ACHTUNG**: Nicht für Kinder geeignet. Um jegliches Risiko eines Stromschlags oder Feuers zu vermeiden, das Gerät nicht Regen, Feuchtigkeit oder intensiven Wärmequellen aussetzen. Dieses Gerät ist nicht geeignet, um in der Nähe von Kindern betrieben zu werden. Lassen Sie Kinder in der Nähe des Geräts nicht unbeaufsichtigt.

• **EINBAU**: Eine ausreichende Luftzufuhr sicherstellen, um jegliche Überhitzung im Gerät zu vermeiden. Das Gerät nicht auf und in Nähe von Textiloberflächen, die Belüftungsöffnungen verschließen können, aufstellen. Das Gerät nicht in Nähe von Wärmequellen, wie z.B. Heizkörper oder Warmluftkappe, aufstellen und es nicht dem direkten Sonnenlicht, übermäßigem Staub, Vibrationen oder mechanischen Stößen aussetzen. Dies kann zu Betriebsstörungen und Unfällen führen.

• **STROMVERSORGUNG**: Das Gerät nur mit der auf dem Gerät bezeichnete Stromquelle betreiben. Gerät mit geerdeter Hauptstromversorgung muss an eine Stromquelle mit effizienter Erdung angeschlossen werden. Diese Erdung darf auf keinen Fall geändert, umgangen oder entfernt werden. Anschluss von Geräten ans Stromnetz muss nach Abzweigschalter des Gebäudes Installation.

Für Geräte, die mit den obigen Symbolen gekennzeichnet sind, Zuerst das Gerät erden bevor die Spannungsversorgung hergestellt wird. Verwenden Sie Erdungskabel und eine Schraube auf der Rückseite des Gehäuses, um das Gerät zu erden.

NETZKABEL: Das Gerät ist mit ein oder mehrere lösbaren Netzkabel ausgestattet.

Ein mit dem obigen Symbol gekennzeichnetes Gerät weist darauf hin, dass das Gerät über mehrere Netzkabel verfügt. Um es völlig vom Netz zu trennen, ziehen Sie bitte die Netzkabel aus der Kaltgerätebuchse.

Achtung: Die Netzkabel stellt die einzige Möglichkeit dar, das Gerät vollständig vom Netzanschluss zu trennen.

Bitte beachten Sie die folgenden Hinweise:

- Wenn Geräte dauerhaft am Netz bleiben, müssen sie über eine leicht zugängliche Trennvorrichtung verfügen, die außen am Gerät angebracht sein muss.
- Trennen Sie das Gerät vom Stromnetz, wenn es einige Tage oder länger nicht benutzt wird.
- Die Kabel mittels des Steckers herausziehen. Niemals am Stromkabel selbst ziehen.
- Die Steckdose muss sich in der Nähe des Geräts befinden und leicht zugänglich sein.
- Das Stromkabel nicht fallen lassen und keine schweren Gegenstände darauf stellen.

Wenn eines der Netzkabel beschädigt ist, das Gerät sofort abschalten. Es ist gefährlich das Gerät mit einem beschädigten Stromkabel zu betreiben; ein abgenutztes Kabel kann zu einem Feuer oder Stromschlag führen. Die Stromkabel regelmäßig untersuchen. Für Ersatz wenden Sie sich an Ihren Verkäufer oder eine Kundendienststelle.

• **ANSCHLÜSSE**: Alle Eingänge und Ausgänge (ausgenommen der Stromversorgung) entsprechen der der ES1 Klassifizierung entsprechend der IEC/UL 62368-1 Edition 2. ES1 max. Auslegung: 60Vdc oder 20V rms / 42,4V Spitze.

• **REPARATUR UND WARTUNG**: Trennen sie alle Netzkabel vom Strom, bevor Sie eine Wartung oder andere Arbeiten am Gerät durchführen.

Gemäß der IEC 62368-1 Norm ist ein gewöhnlicher Nutzer autorisiert, gemäß der Betriebsanleitung folgendes am Gerät durchzuführen:

- Öffnen der vorderen Gehäuseabdeckung und Reinigung des Luftfilters (hängt vom Modell ab)
- Austauschen der herausnehmbaren Netzteile (hängt vom Modell ab)

Die im Gerät vorhandene(n) Sicherung(en) ist/sind nicht dafür ausgelegt, austauschbar zu sein.

Der Benutzer darf keinesfalls versuchen das Gerät selbst zu reparieren, die Öffnung des Geräts durch Abnahme der Abdeckhaube oder jeglichen anderen Teils des Gehäusessowie die Entfernung von außen sichtbaren Schrauben zu Stromschlägen oder anderen Gefahren für den Benutzer führen kann. Die im Gerät eingebaute Lithium Batterie ist nicht austauschbar. Im Falle eines Problems nehmen Sie Kontakt mit Ihrem Lieferanten auf oden au Analog Way.

• **ÖFFNUNGEN UND MUNDUNGEN**: Die Geräte können über Öffnungen verfügen (Belüftung, Schlitze, usw.). Niemals Gegenstände in die Öffnungen einführen oder die Öffnungen verschließen. Wenn eine Flüssigkeit oder ein Gegenstand in das Gerät gelangt, den Stecker herausziehen und es vor einer neuen Inbetriebnahme von qualifiziertem Fachpersonal überprüfen lassen.

2.1.5 Spanish

Para comprender mejor el funcionamiento de este aparato, le recomendamos que le acuidadosamente todas las consignas de seguridad y de funcionamiento del aparato antes de usarlo. Conserve las instrucciones de seguridad y de funcionamiento para que pueda consultarlas posteriormente. Respete todas las consignas indicadas en la documentación, relacionadas con el producto y este documento.

• **CUIDADO**: No recomendado para niños. Para prevenir cualquier riesgo de choque eléctrico y de incendio, no exponga este aparato a la lluvia, a la humedad ni a fuentes de calorintensas. Este equipo no es adecuado para su utilización en lugares donde haya niños.

• **INSTALACIÓN**: Cerciórese de que haya una circulación de aire suficiente para evitar cualquier sobrecalentamiento al interior del aparato. No coloque el aparato cerca ni sobre una superficie textil que pudiera obstruir los orificios de ventilación. No instale el aparato cerca de fuentes de calor como radiador o boca de aire caliente, ni en un lugar expuesto a los rayos solares directos o al polvo excesivo, a las vibraciones o a los choques mecánicos. Esto podría provocar su mal funcionamiento o un accidente.

• **ALIMENTACIÓN**: Ponga a funcionar el aparato únicamente con la fuente de alimentación que se indica en el aparato. Los aparatos deben estar conectados obligatoriamente a una fuente equipada con una puesta a tierra eficaz. Por ningún motivo este enlace de tierra deberá ser modificado, cambiado o suprimido. Conexión del equipo a la red eléctrica debe ser posterior del interruptor de circuitos derivados de la instalación del edificio.

Para equipos identificados con los símbolos anteriores, conecte la toma de tierra antes de conectar el equipo al suministro eléctrico. Utilize un cable para conecta cualquier tornillo del chasis, con la toma de tierra de la instalación.

• **CABLE DE ALIMENTACION**: El equipo se suministra con uno o más cables de alimentación.

Un dispositivo identificado con el símbolo anterior indica que el equipo tiene más de un cable de alimentación. Si desconectamos el cable dejamos al equipo sin alimentación.

Atención: Los cables de alimentación constituyen el único medio de desconectar el aparato totalmente de la red eléctrica.

Aplicar las siguientes consignas:

- El material conectado a residencia a la red informática, debe de tener un dispositivo de seccionamiento fácilmente accesible que debe de ser incorporado al exterior del aparato.
- Desconectar el aparato del enchufe mural si no piensa utilizarlo durante varios días.
- Para desconectar los cables, tire de la clavija. No tire nunca de los cables propiamente dichos.
- El enchufes de alimentación debe estar cerca del aparato y ser de fácil acceso.
- No deje caer el cable de alimentación ni coloque objetos pesados encima de ellos.

Si uno de cables de alimentación sufriera algún daño, ponga el aparato inmediatamente fuera de tensión. Es peligroso hacer funcionar este aparato con un cable averiado, ya que un cable dañado puede provocar un incendio o un choque eléctrico. Verifique el estado los cables de alimentación de vez en cuando. Póngase en contacto con su distribuidor o con el servicio de posventa si necesita cambiarlo.

• **CONEXIONES**: Todas las entradas y salidas (excepto la entrada de corriente) son de nivel eléctrico clase 1 (ES1) tal como se define en la norma IEC / UL 62368-1 2. Límites de ES1 60 VCC ó 30 V rms / 42,4 V de pico.

• **REPARACIÓN Y MANTENIMIENTO**: Desconecte todos los cables de alimentación de la red eléctrica antes de realizar el mantenimiento.

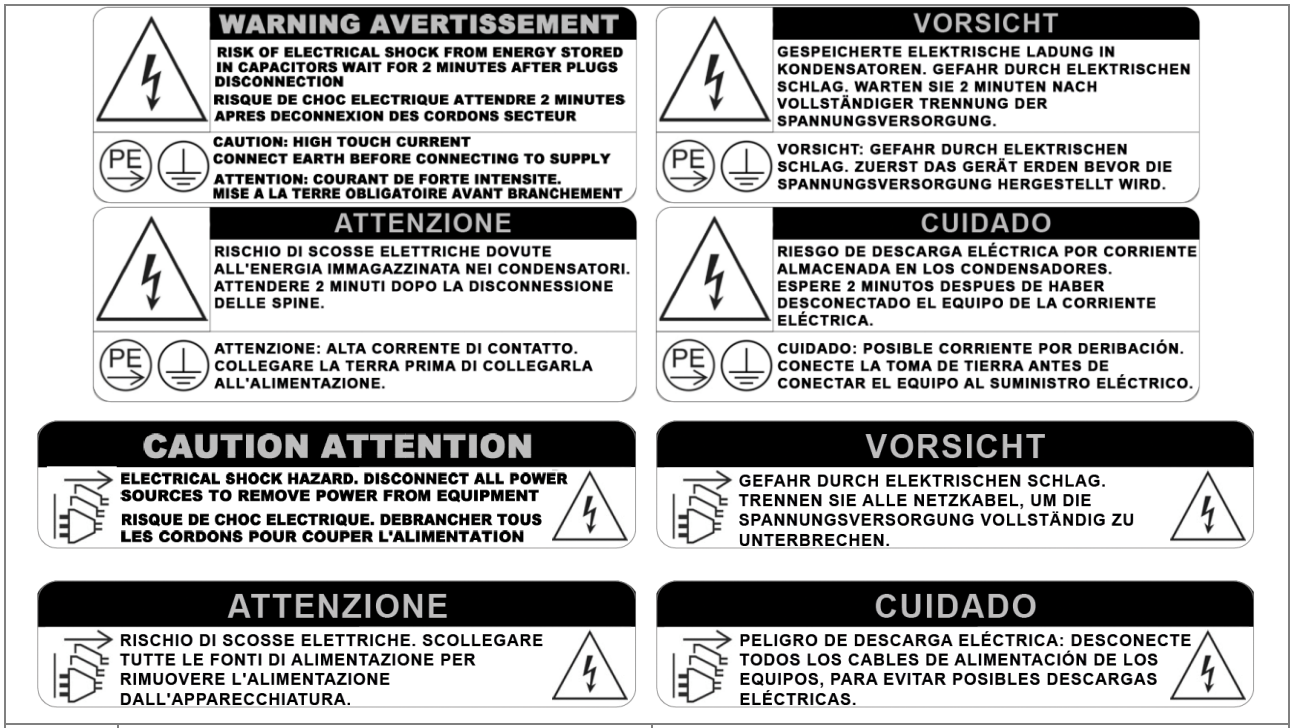
De acuerdo con la norma IEC 62368-1, solo una persona autorizada puede realizar esta operación:

- Abra el frente del equipo y limpie el filtro del aire (depende del modelo)
- Cambie la fuente de alimentación extraíble (depende del modelo)

Los fusibles presentes en el dispositivo no han sido diseñados para ser reemplazables.
Por ningún motivo, el usuario deberá tratar de efectuar operaciones de reparación, ya que si abre los aparatos retirando el capó o cualquier otra pieza que forma parte de las cajas o si destornilla los tornillos aparentes exteriores, existe el riesgo de producirse una explosión,choques eléctricos o cualquier otro incidente. La batería interna de litio no es reemplazable. En caso de problema, contacte con su proveedor o Analog Way.

• **ABERTURAS Y ORIFICIOS**: Los aparatos pueden contener aberturas (aireación, ranuras, etc.). Nointroduzca allí ningún objeto ni obstruya nunca estas aberturas. Si un líquido o un objeto penetra al interior del aparato, desconéctelo y hágalo revisar por personal cualificado antes de ponerlo nuevamente en servicio.

2.1.6 Symbols on product identification and warning labels



	Caution, risk of electric shock	All power sources shall be disconnected before servicing to avoid shock hazard.
PE	Connect protective earth before connection to mains	The protective conductor (PE) should be connected first to main protective earthing terminal before connecting the line and neutral.
	Protective earth	Connect an earth terminal to the ground.
	Disconnection, all power plugs	All power sources shall be disconnected before servicing to avoid shock hazard.
	Alternating current	The equipment is suitable for alternating current only.
	Caution	The current situation needs operator awareness or operator action in order to avoid undesirable consequences.
	Caution, moving fan blades	Keep away from moving fan blades.

Waste Electrical and Electronic Equipment (WEEE) Directive

In the European Union, this label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

Directive sur la mise au rebut des appareils électriques et électroniques (Waste Electrical and Electronic Equipment - WEEE)

Dans l'Union européenne, cette étiquette indique que ce produit ne doit pas être jeté avec les déchets ménagers. Il doit être déposé à un site de récupération et de recyclage.

Richtlinie über Elektro- und Elektronik-Altgeräte (WEEE)

In der Europäischen Union wird mit diesem Etikett darauf hingewiesen, dass dieses Produkt nicht mit dem Hausmüll entsorgt werden darf. Es muss bei einer entsprechenden Einrichtung zum Recycling abgegeben werden.

Direttiva Rifiuti di apparecchiature elettriche ed elettroniche (RAEE)

Nell'Unione Europea, questa etichetta indica che il presente prodotto non deve essere smaltito insieme ai rifiuti domestici. Deve essere depositato in un impianto adeguato per consentirne il recupero e il riciclaggio.

Waste Electrical and Electronic Equipment Directive (Directiva sobre Residuos de aparatos eléctricos y electrónicos - WEEE)

En la Unión Europea, esta etiqueta indica que la eliminación de este producto no se puede hacer junto con el desecho doméstico. Debe depositarse en instalaciones adecuadas para permitir la recuperación y el reciclaje.

2.1.7 Environmental specifications for all Picturall models

Picturall Twin Compact Mark II and Quad Compact Mark II:
- Dimensions without rack mount and handles: W 440 x H 88 x D 640 mm
- Dimensions with rack mount and handles: W 482 x H 88 x D 680 mm
- Product Weight: 17,5kg

Picturall Quad Mark II and Pro Mark II
- Dimensions without rack mount and handles: W 440 x H 177 x D 645 mm
- Dimensions with rack mount and handles: W 482 x H 177 x D 694 mm
- Product Weight: **Quad Mark II**: 20,8g – **Pro Mark II** (fully loaded): 24,5kg

General:
- Cooling air flows from front side to rear.
- Max ambient operating temperature: < 40°C (< 104°F).
- Operating temperature: 0 to +40°C / +32°F to +104°F
- Storage temperature: -10 to +60°C / +14°F to +140°F
- Operating humidity: 10 to 80% (non condensing)
- Input voltage range: 100-240 VAC autosensing, 50/60 Hz 7A
- Max consumption: 660W

Safety standard:
- IEC/EN/UL 62368-1
- CSA C22.2#62368-1

Electromagnetic compatibility:
- EN55032
- EN55024
- EN61000-3-2
- EN61000-3-3
- CFR47 Part 15
- ICES-003

Environment:
- RoHS
- WEEE

Caution: Should the unit lose power unexpectedly; unsaved settings may be lost.

3 Introducing Picturall Series Media Servers

Thank you for choosing Picturall Series Media Servers! The one that combines cutting-edge technology with ease-of-use and unrivalled efficiency.
Picturall Series Media Servers are powerful real time multi-output media servers. They can manage multiple inputs (media files, live feeds or network streams) with various features and effects. Then output them to multiple displays.
Control the server with **Picturall Commander**, a dedicated software designed exclusively for Picturall Series Media Servers. Alternatively, Picturall Series Media Servers can also be controlled with External controllers such as Lighting consoles.

Picturall Series Media Servers are 19" wide and 4 rack units (4U) high, following the industrial rack mounting standard. The Twin and Quad are also available in Compact versions (2U) with the same number of outputs and the same efficiency as their 4U counterparts.

3.1 Picturall Series Media Servers

The Picturall Series Media Servers product range includes 3 models: Twin, Quad, and Pro.
The following table illustrates the differences between the units.

Picturall Series Media Servers	Outputs	Description
Twin, Twin Compact & Twin Compact Mark II	2	Heavy-duty dual-output 4K Series Media Server. Designed for medium-sized events and installations requiring high levels of performance and reliability.
Quad, Quad Mark II, Quad Compact & Quad Compact Mark II	4	Heavy-duty quad-output 4K Series Media Server. Designed for large scale events and installations requiring high levels of performance and stability.
Pro & Pro Mark II	Up to 16	Mission critical 8K modular Series Media Server. Engineered to support massive events and installations from one single server unit.

Table 1 - Picturall Series Media Servers family

3.2 Package Contents

The Picturall Series Media Server sales package includes:

- One Picturall Series Media Server
- One or Two Power cords
- One Rackmount kit
- One Ethernet cross cable

A USB keyboard is needed for configuring the server and a remote computer for running **Picturall Commander**.

3.3 Rack mount information

All units are equipped with 4 handy anti-slip rubber feet and can be used directly on a table.
For rack mount installation, see document *Picturall - Rack mount.pdf* attached to this manual.

3.4 Front panel

All the Media Servers have the same front panel. It is composed of one OLED display, two USB ports, a Power button and a Next/Status button.

*Fig. 1 - **Front panel***

3.4.1 Display screen

The front panel displays information such as device IP address, firmware version, or CPU.

- Press the **Next/Status button** to wake the display and show server information.
- Press again to cycle through the next pages.

The display automatically goes off after 3 minutes of inactivity.

3.4.2 Power off

Tip: The following procedure is the recommended method to safely turn off the Media Server.

To turn off the media server, press the Power button then press the Next/Status button to confirm.

3.4.3 Forced shutdown

If the Media Server crashed, turn off the power by Forced shutdown.

- Press and hold the Power button until shutdown.

Caution: Using Forced shutdown regularly is not recommended. Use Forced shutdown only if the Media Server has crashed.

3.5 Rear panels and Connections

The Media Server chassis and the hardware are designed to produce the best possible performance in a sleek, rack-mountable unit.

3.5.1 Picturall Twin rear panel

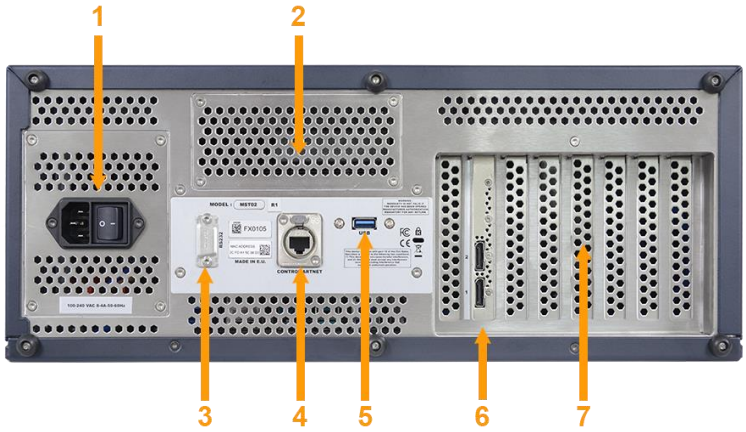


*Fig. 2 - **Picturall Twin rear panel***

1. Power supply (optional redundant and hot-swappable power supplies)
2. Two-channel audio interface with balanced XLR outputs (optional)
3. RS232 plug (optional)
4. Ethernet plug
5. USB plug
6. Two DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. Two slots for additional input cards

3.5.2 Picturall Twin Compact rear panel

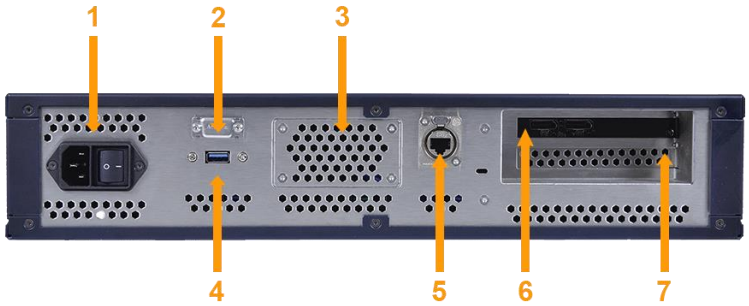


*Fig. 3 - **Picturall Twin Compact rear panel***

1. Power supply
2. RS232 plug (optional)
3. Two-channel audio interface with balanced XLR outputs (optional)
4. USB plug
5. Ethernet plug
6. Two DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. One slot for additional input card

3.5.3 Picturall Twin Compact Mark II rear panel

*Fig. 4 - **Picturall Twin Compact Mark II rear panel***

1. Power supply
2. Two USB ports and two 10Gb/s Ethernet plugs
3. Two balanced XLR inputs (for timecode LTC) and 2x balanced XLR outputs (optional audio interface)
4. Slot 1 – Fixed card with two DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
5. Slot 2 for additional input card
6. Slot 3 for additional input or network card

3.5.4 Picturall Quad rear panel

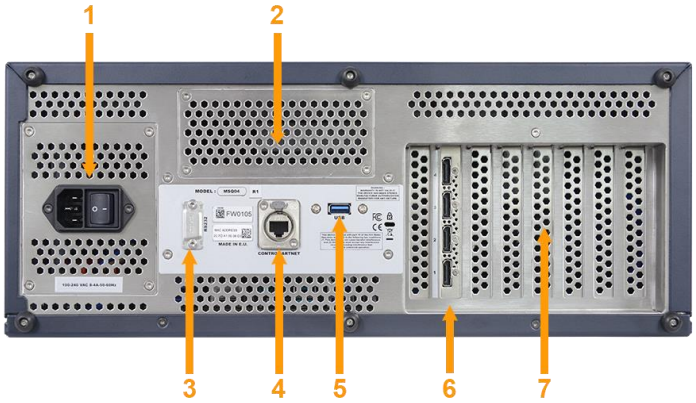


*Fig. 5 - **Picturall Quad rear panel***

1. Power supply (optional redundant and hot-swappable power supplies)
2. Two-channel audio interface with balanced XLR outputs (optional)
3. RS232 plug (optional)
4. Ethernet plug
5. USB plug
6. Four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. Two slots for additional input cards

3.5.5 Picturall Quad Mark II rear panel

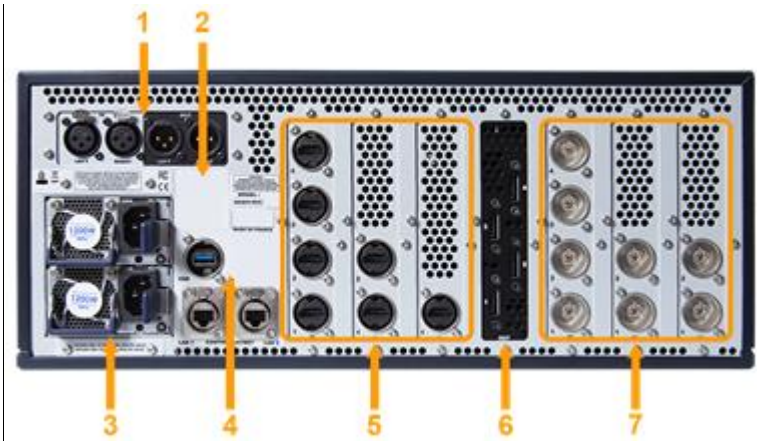


*Fig. 6 - **Picturall Quad Mark II rear panel***

1. Two balanced XLR inputs (for timecode LTC) and 2x balanced XLR outputs (optional audio interface)
2. Genlock (optional)
3. Power supply (optional redundant and hot-swappable power supplies)
4. One USB port and two 10Gb/s Ethernet plugs
5. Slots 1, 2 and 3 for additional input or network cards
6. Slot 4 - Fixed card with four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. Slots 5, 6 and 7 for additional input cards

3.5.6 Picturall Quad Compact rear panel

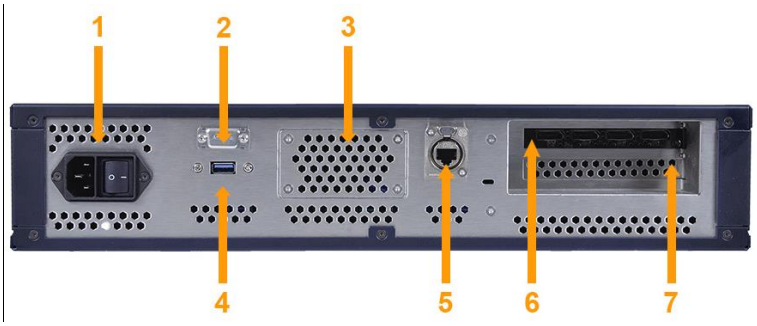


*Fig. 7 - **Picturall Quad Compact rear panel***

1. Power supply
2. RS232 plug (optional)
3. Two-channel audio interface with balanced XLR outputs (optional)
4. USB plug
5. Ethernet plug
6. Four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. One slot for additional input card

3.5.7 Picturall Quad Compact Mark II rear panel

*Fig. 8 - **Picturall Quad Compact Mark II rear panel***

1. Power supply
2. One USB port and two 10Gb/s Ethernet plugs
3. Two balanced XLR inputs (for timecode LTC) and 2x balanced XLR outputs (optional audio interface)
4. Slot 1 – Fixed card with four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
5. Slot 2 for additional input card
6. Slot 3 for additional input or network card

3.5.8 Picturall Pro rear panel

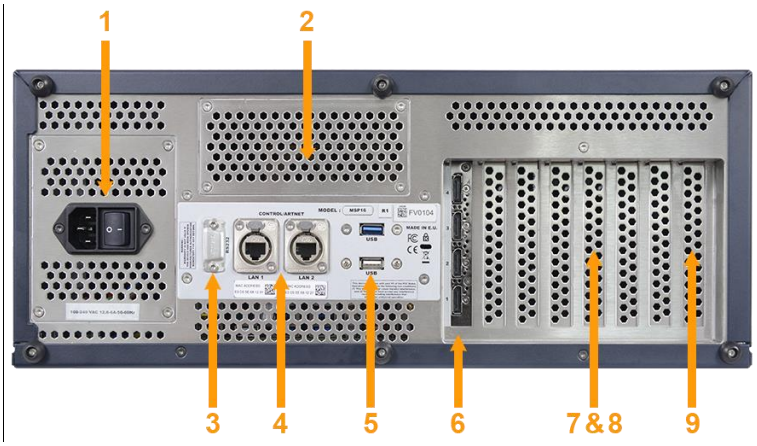


*Fig. 9 - **Picturall Pro rear panel***

1. Power supply (optional redundant and hot-swappable power supplies)
2. Two-channel audio interface with balanced XLR outputs (optional)
3. RS232 plug (optional)
4. Primary Ethernet plug (left), secondary Ethernet plug (right)
5. Two USB plugs
6. Four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. Three slots for additional output cards or input cards
8. One slot for additional input card only
9. One slot for optional sync card

3.5.9 Picturall Pro Mark II rear panel

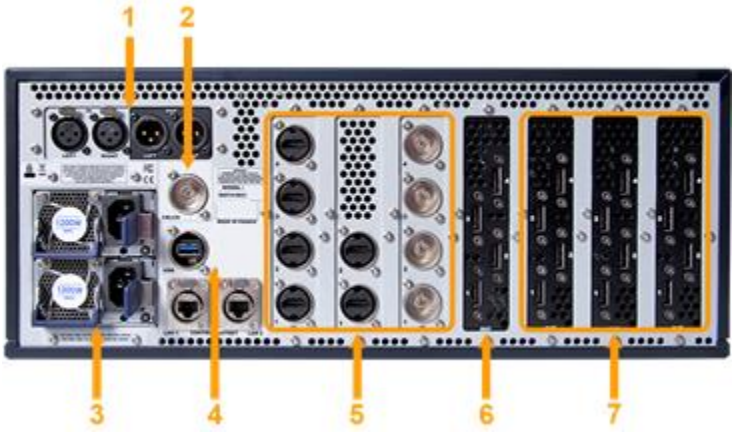


*Fig. 10 - **Picturall Pro Mark II rear panel***

1. Two balanced XLR inputs (for timecode LTC) and 2x balanced XLR outputs (Optional audio interface)
2. Genlock (optional)
3. Power supply (optional redundant and hot-swappable power supplies)
4. One USB port and two 10Gb/s Ethernet plugs
5. Slots 1, 2 and 3 for additional input or network cards
6. Slot 4 - Fixed card with four DisplayPort 1.2 outputs (4K@60Hz 10-bit 4:4:4)
7. Slots 5, 6 and 7 for additional input or output cards

3.5.10 Hardware and license options

The Picturall Series Media Servers can be equipped with various options. These options are available depending on the model.

Option	Description
Dual Power supply unit	Redundant, hot-swappable power supplies
Audio XLR output/input	Two-channel audio interface with balanced XLR outputs and inputs
Storage device options	Replaces the default storage device configuration with more storage capacity and performance options.
Output card	4 x DisplayPort 1.2
Input cards	2 x HDMI 1.4
	4 x HDMI 1.4
	1 x HDMI 2.0
	2 x HDMI 2.0
	2 x 3G-SDI
	4 x 3G-SDI
Sync card	Add Genlock feature to the Media Server
10GB Network card	Add a 10GB RJ45 port to the Media Server
2 x 1GB Network card	Add a 2 x 1GB RJ45 ports to the Media Server
Dante audio	License for 32 channels of Dante over-ip audio
Vioso autocalibration	License for camera-based autocalibration option

Table 2 - Picturall Series Media Servers optional hardware and licenses

For more information on optional hardware, visit www.analogway.com or contact Analog Way support.

3.5.11 Audio support (optional)

Caution: Disconnecting the sound card may freeze all layers with audio playback.

The Picturall Series Media Servers support various audio interfaces: external USB audio cards, inbuilt XLR options and audio over IP network (Dante audio, NDI with audio).
Audio support lets the media server adjust audio settings for media files, input sources and network streams with embedded audio.

Note: Audio is enabled by default for all audio sources. Mute unwanted audio channels via Picturall Commander (see *8.6 Audio (optional)* page 101) or from external input source.

For more information, see document *Picturall Servers Audio Options* available on www.analogway.com or contact your reseller or Analog Way support.

4 Getting Started

4.1 Precautions when Mounting Picturall Series Media Server

Caution: Follow these precautions to avoid risks for products and users.

When mounting the server, ensure proper air flow and consider the following points on safe use.

- Always use at least two people when moving a unit (expect for Compact models).
- Always use the handles built on the sides of the chassis for easy mounting into any standard rack or flight case.
- Remove the front and back panels of the flight case during operation to provide sufficient air flow through the unit and prevent overheating.
- Place the server preferably in a cool and dry environment.
- The fans inside the server expel the heat through the front and rear panels. Therefore, it is crucial that both the front and the rear are always unobstructed. A minimum of 50 cm (20 in.) of clear space at the front and rear of the unit is recommended.
- Do not block the ventilation.
- Do not place any fluid above or near the server.
- Do not apply any pressure against the chassis or the connectors.

4.2 Start the Picturall Series Media Server

Caution: Mark II media servers require 1GB network to maintain a stable connection. Network will not work with 100Mb connection.

When starting the media server for the first time, a test image with server IP address and display number is sent to every connected display. This helps identifying displays and checking the setup is correct.

Tip: Connect all displays before starting the media server for the first time.

To start the Picturall Series Media Server safely and correctly:

1. Connect the power cable to the server and then plug it into a mains socket.
2. Connect displays to the media server (at least one display to the first connector).
3. If configuration is needed, connect a USB keyboard to the USB port on the server front panel.
4. Press the power button.

Tip: - If the media server is restarted, close and restart Picturall Commander as well.
- If a new display is connected, restart the server and Picturall Commander.

5 Configuration

The server can be configured from the **Web configurator** or by booting the server in **Configuration mode**. Configuration is needed for DMX / Art-Net, display, network and media storage settings.

5.1 Web configurator

Caution: Mark II media servers require at least 1GB network to maintain a stable connection. Network will not work with 100Mb connection.

The web configurator allows the user to configure the server from a computer connected to same network without installing a separate control software.
To access the web configurator, launch a web browser and enter the server IP address in the address bar.

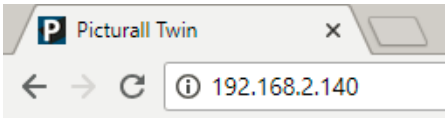


*Fig. 11 - **Web configurator connection***

All devices default IP addresses are **192.168.2.140**.

Note: The Picturall Series Media Server and the computer must be connected to the same network to run the Web configurator.

5.1.1 Dashboard

*Fig. 12 - **Web configurator Dashboard***

The Dashboard is the home page of the Web configurator. It shows general information about the media server.

- Click **Configure server** or **Configurator** to access server configuration.
- Click on a link in the left tab to open the corresponding menu.

5.1.2 Server configuration

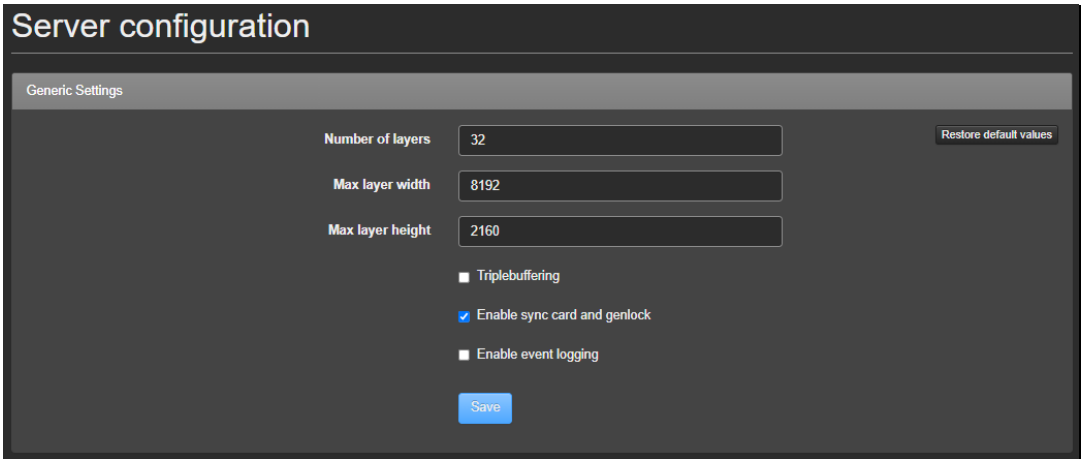


*Fig. 13 - **Server configuration***

Set server settings from the **Server configuration**:

- **Number of layers:** Set the number of layers to use and patch to Art-Net (max 200). This affects the number of available layers in Picturall Commander.
- **Max layer width and height:** Set the maximum resolution to be processed by the media server.

Caution: Media with a larger resolution than the max layer size might not be displayed correctly. This does not apply to media files encoded in AWX and PRKL.

- **Triplebuffering:** check to enable Triplebuffering.
- **Enable sync card and genlock** (Picturall Pro only)**:** check to enable Genlock (checked by default if the sync card is installed).
- **Enable event logging:** the system gathers logs from playback events. The log file can be downloaded from the **Tools** > **Event Log** page.

5.1.3 LTC configuration

Set the Linear timecode (LTC) sources for playback. Configured LTC sources can be used as timecode providers in Picturall Commander (see *9.6.6 Linear timecode (LTC)* page 124).

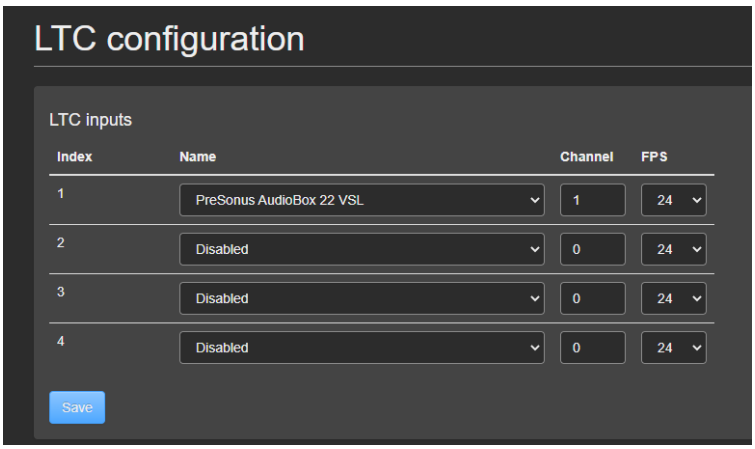


*Fig. 14 - **LTC configuration***

Note: Audio device with input channel is required for LTC. Different audio input channels can be defined for different incoming Timecodes. The system does not automatically recognize the incoming LTC format FPS (Frames per second). The incoming timecode FPS needs to be defined from the drop-down menu on the LTC configuration page for the timecode to synchronize correctly.

5.1.4 Display configuration

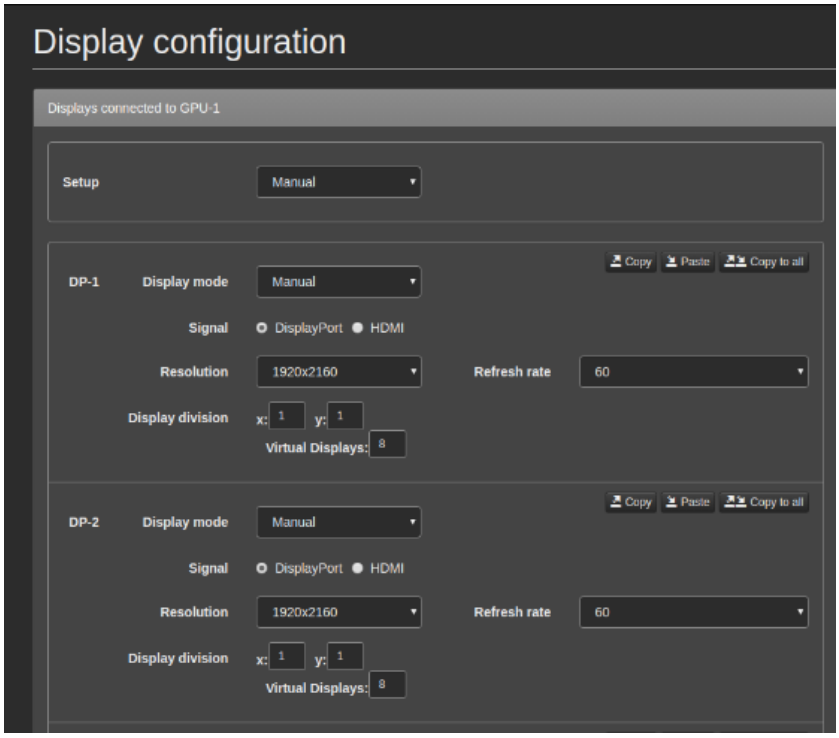


*Fig. 15 - **Display configuration***

In the **Display configuration** menu, set Auto mode for the whole output card or Manual display mode per output plug:

Tip: Use the buttons **Copy**, **Paste** and **Copy to all** for Displays using identical settings.

5.1.4.1 Set Auto mode for the whole output card

In Auto mode, sets all plugs of the same output card (GPU) to follow EDID.

Tip: In Auto mode, connect and power all the relevant displays before booting the media server.

1. In **Setup**, select Auto.
2. Per output plug, select Auto to follow EDID (or Disable the output if needed).
3. If needed, select **Signal: HDMI** to force the HDMI signal on any DisplayPort output (adapter needed).

5.1.4.2 Set Manual mode per output plug

In Manual mode, set each output plug manually.

1. In **Setup**, select Manual.
2. Per output plug, select the Display mode:
   - **Disabled**: disable the output
   - **Manual**: set the output resolution and refresh rate manually
   - **Custom**: select a custom display configuration
   - **Special**: select a preset mode for display signal splitters (Analog Way DPH104, Matrox TH2GO and DH2GO)
3. If needed, select **Signal: HDMI** to force the HDMI signal on any DisplayPort output (adapter needed).

5.1.4.3 Display division

Displays can be divided into grids of virtual displays with **Display division**. This separates all Displays into independent displays. These displays are affected independently (Keystone, Angle, Crop). This is very useful for complex screens and Led walls. Display division can also be used for setting up display signal splitters such as Datapath X4 and FX4.

5.1.4.4 Virtual displays

Use Virtual displays when multiple logical displays are connected to one physical output, but the split is not even. For example: multiple physical LED screens connected to one LED processor driven by one output from a Picturall Media Server.

In the **Display configuration** menu, select the number of virtual displays used in an output. The virtual display will appear as an independent display in Commander. The area where the display content is drawn in the display output signal is controlled by the Commander GUI Display cropping controls (*see 7.9 Crop display size* page 94).

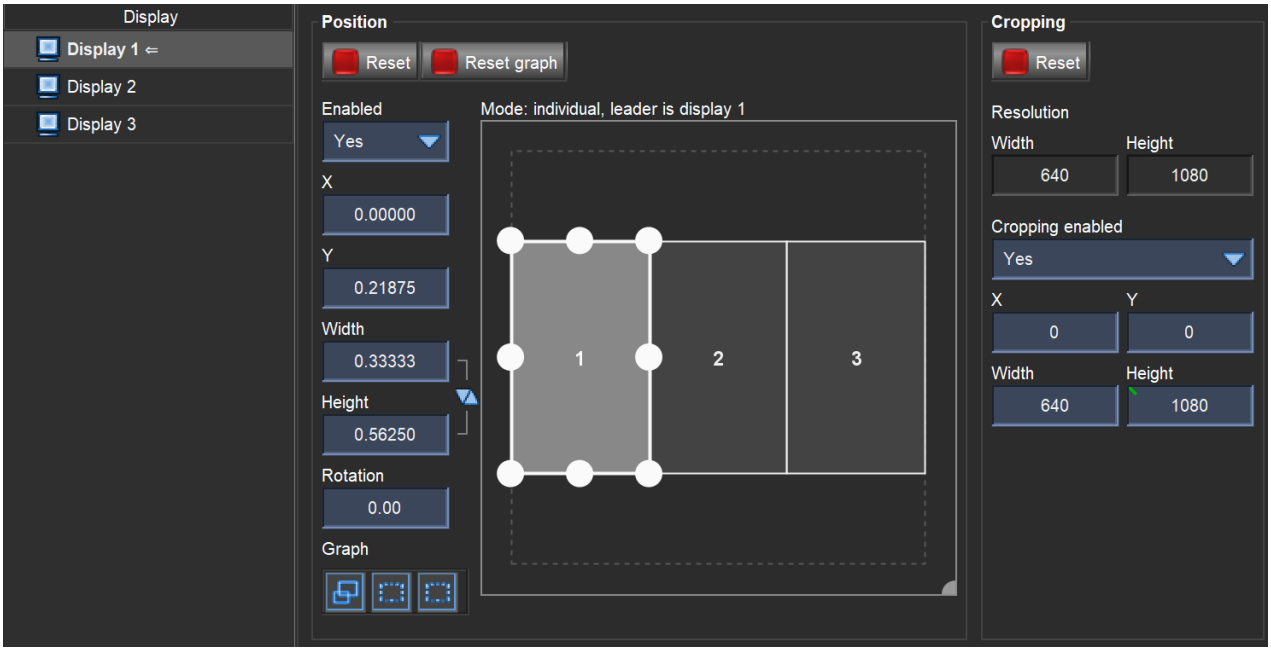


*Fig. 16 - **Three virtual displays in one 1980x1080 output in Picturall Commander***

5.1.4.5 Streaming displays

Streaming displays can be added to the display configuration. If more than one output card is installed on the server, streaming outputs can be added to each output card individually.

Note: - Streaming displays affect the playback performance.

- Current version only supports NDI™ destinations. NDI™ is a trademark of NewTek, Inc. For more information on network configuration for NDI™, please refer to NewTek **documentation**.

A streaming display is composed of a virtual display and audio device, which is sent to a network destination instead of physical display connector. One output card can have multiple streams. One stream can have multiple destination with the same configuration. The stream refresh rate is the same as the refresh rate of the connected physical displays. Destinations have destination specific configuration, such as destination protocol. For each destination defined, the system will generate one display and audio device (if destination is configured with audio channels).

1. In the Streaming display menu, click **+ Add new stream**.
    a. Select a resolution.
    b. Select the NDI stream destination.
    c. Set the number of audio channels.
    d. Enable/disable alpha channel.
2. Click ***Add new destination*** to add another destination to the same stream.
3. If needed, click **Delete stream** in the upper right corner of a created stream.
4. Click **Apply** to save the Streaming displays.

Tip: After applying the streaming configuration, the streaming displays appear in the Picturall Commander as new displays.

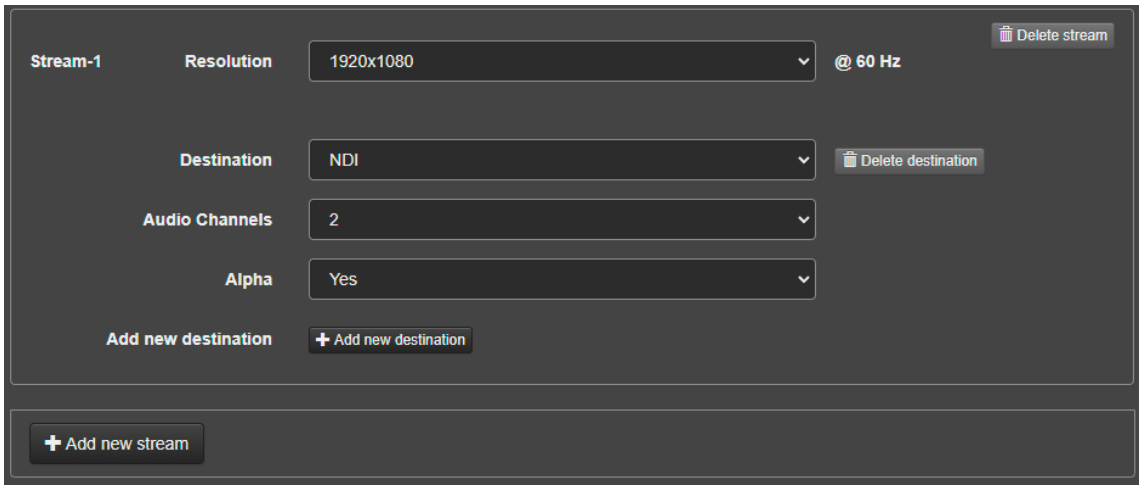


*Fig. 17 - **Adding a new streaming output***

Streaming display work as any display listed in the Commander.
Streaming displays are detected with the name **PICTURALL (stream-number).** They can be detected by Picturall media servers and other devices or applications that can detect NDI™ streams within a network.

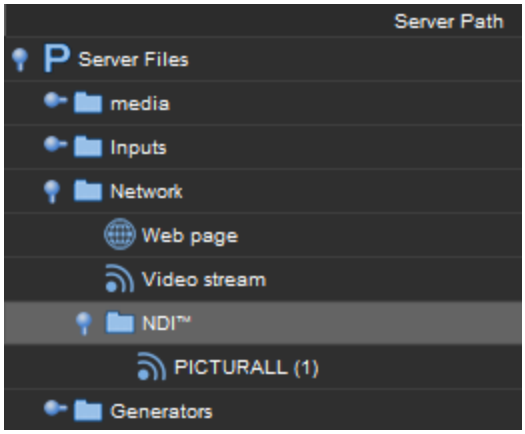


*Fig. 18 - **Streaming Display detected as an NDI™ stream in a network***

5.1.5 Custom display resolutions

Create and manage custom display resolutions to use in Display configuration.

1. Click **New simple resolution**.
2. Enter the settings of the custom resolution (width, height, rate, etc.)
3. Click **Add custom display resolution** to save it.
4. If needed, use Edit, Duplicate or Delete.
5. If needed, use New advanced resolution or New raw modeline for advanced custom resolutions.

The custom display resolution is ready to be used in the Display configuration menu.

5.1.6 DMX Configuration

Picturall Series Media Servers have three fixture profiles for Art-Net / DMX control.

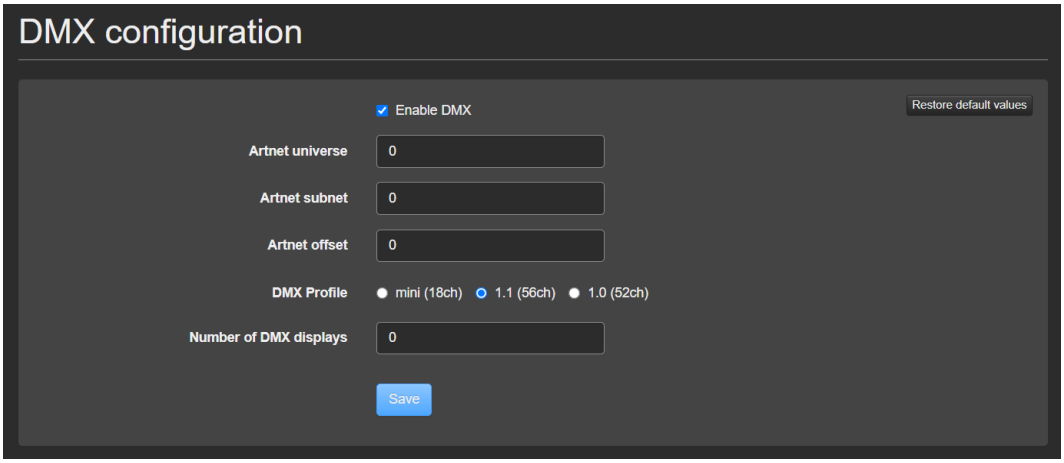


*Fig. 19 - **DMX configuration***

1. **Art-Net universe:** Set the first universe and the rest of the layers will be patched to next universes. If patching more than 9 layers, the server will use several Art-Net universes.
2. **Art-Net subnet:** Set the Art-Net subnet value (between 0 and 15).
3. **Art-Net offset:** Set the first channel of the first universe for layer 1.
4. **DMX profile:** Set the preferred DMX fixture profile (1.1, 1.0 or mini).
5. **Number of DMX displays:** Enter the number of the displays controlled with DMX

DMX control for the Picturall Series Media Server consists of two elements: layers and master block. The master block controls general functions that are not specific to any layer such as choosing display preset (for more information, see *APPENDICES* page 141).

Layers are patched first starting from a given offset on a given universe. Layers are patched so that they do not split at the universe border. The following table shows the patching for 32 layers (default).
Master block is patched immediately after the layers.

Universe	DMX	Layer
1	1	Layer 1
	57	Layer 2
	113	Layer 3
	168	Layer 4
	225	Layer 5
	281	Layer 6
	337	Layer 7
	393	Layer 8
	449	Layer 9
2	1	Layer 10
	57	Layer 11
	113	Layer 12
	168	Layer 13
	225	Layer 14
	281	Layer 15
	337	Layer 16
	393	Layer 17
	449	Layer 18

Universe	DMX	Layer
3	1	Layer 19
	57	Layer 20
	113	Layer 21
	168	Layer 22
	225	Layer 23
	281	Layer 24
	337	Layer 25
	393	Layer 26
	449	Layer 27
4	1	Layer 28
	57	Layer 29
	113	Layer 30
	168	Layer 31
	225	Layer 32
	281	Master Block

Table 3 - Example patch of 32 layers using 56ch DMX profile

5.1.7 Audio configuration (optional)

Audio configuration is based on a mixer concept. The media server has an audio mixer, common to all layers, to which audio interface channels can be connected. Each mixer channel is connected to an audio source channel. For example, channel 1 on an audio interface is connected to the mixer channel 2. Media file with two audio tracks is played on a layer 3. The audio track 2 on the media can be heard from the audio interface channel 1. If the same media is also played on layer 10, that layer also has the same mixer configuration, but mixer volume can be adjusted independently of the mixer on each other layer.

To allow more flexibility with the audio configuration, audio interface and audio device concepts are used. Audio device plays audio, whereas audio interface is an abstract audio device, which can be connected to a specific audio device. The connected audio devices can be changed later without having to reconfigure the audio interface channel routing. Audio interface without audio device can be connected and used in the mixer, but this simply mutes the mixer channel.

Multiple audio interfaces can be routed to the server audio mixer.

5.1.7.1 Automatic channel routing

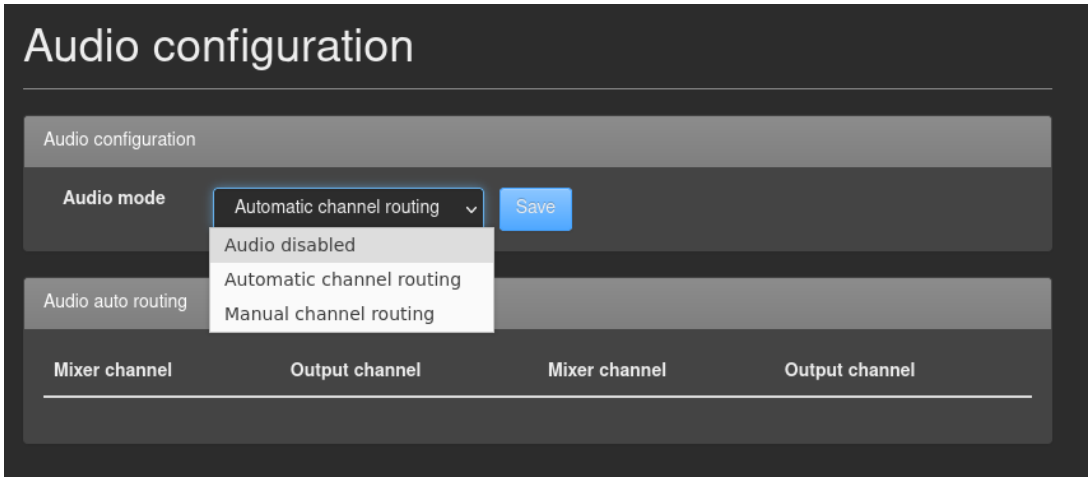


*Fig. 20 - **Audio settings in web configurator***

By default, audio is configured with **Automatic channel routing**. The audio device channels will be automatically connected to mixer channels when they are available (according to audio device priority list available below). Automatically routed audio channels will appear below the audio mode selection (if available).

Priority	Audio device
1	Internal XLR audio option (2ch out or 2ch in/out)
2	Dante license
3	Dante USB
4	RME USB audio cards
5	Other supported USB audio cards
6	Configured NDI™ streaming displays with audio enabled
7	Other detected audio devices

Table 4 - Automatic audio mode: audio device priorities

The two audio interfaces with highest priority will be routed until the audio mixer runs out of channels. Highest priority audio interface channel 1 will be routed to server audio mixer channel 1, audio interface channel 2 to mixer channel 2 and so on until all the channels have been connected. If there are channels available in server audio mixer, second highest priority audio interface channels will be routed to the remaining audio mixer channels.

Note: In Automatic channel routing mode, if there are more than two audio interfaces connected to the server, the routing will only route two audio cards to the server audio mixer.

Tip: Use manual channel routing when more than one audio device is connected to the media server.

5.1.7.2 Manual audio channel routing

Use **Manual channel routing mode** to manually configure the server audio output channels for different audio devices and sources.

1. Select **Manual channel routing** mode then **Save**.
2. In Audio interfaces, click **+ Add new** to add new audio interface.
   a. Enter a name.
   b. In Audio device, select a detected audio device in the list or select None to mute any mixer channel it is connected to.
   c. In Output and Input channels, set the number of channels for the interface. Any channel missing in the connected audio device will be set to mute.
3. Click **Save**.

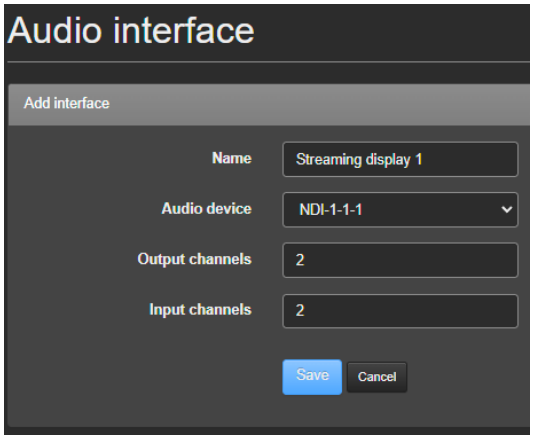


*Fig. 21 - **Add new audio interface***

4. Route the configured audio interface to any channel of the channel mixer from each audio output channel's drop-down menu.
5. Click **Apply** below the Channel mixer.

In the following example, an NDI™ Streaming display is configured with two audio channels which are routed to audio mixer channels 17 and 18.

Tip: After applying the audio configuration, the audio interfaces also appear in the Picturall Commander Audio Channel Mixer (see *9.6 Audio channel mixer (optional)* page 101).

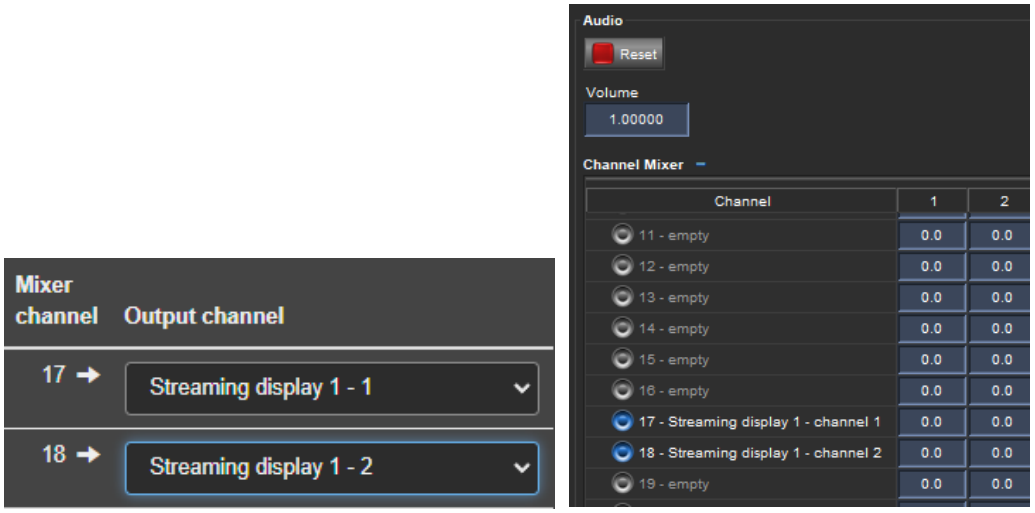


*Fig. 22 - **Manual audio channel routing example***

5.1.7.3 Dante audio configuration

If the server has been licensed with Dante (optional), the Dante audio device will be present in the Audio device drop-down menu. Configure the Dante audio interface as needed. For configuring the network interfaces see *5.1.7 Audio configuration (optional)* page 33.

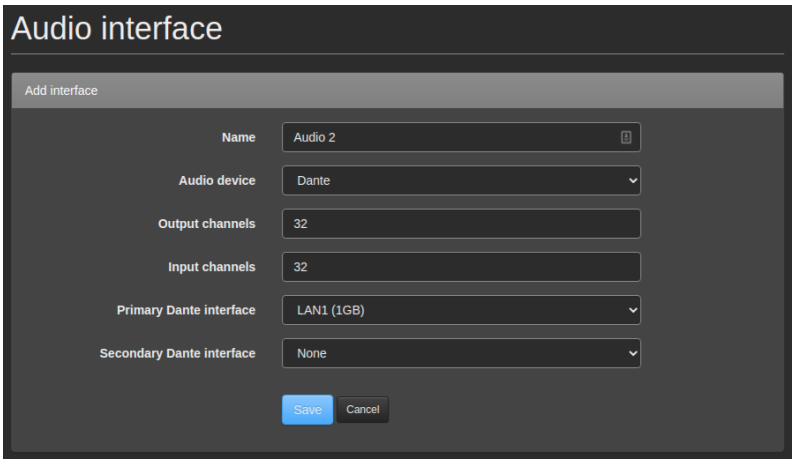


*Fig. 23 - **Dante audio configuration***

Tip: For more extended Dante audio control, download Dante Controller from the Audinate and for network configuring see the documentation from Audinate website.

5.1.8 Network configuration

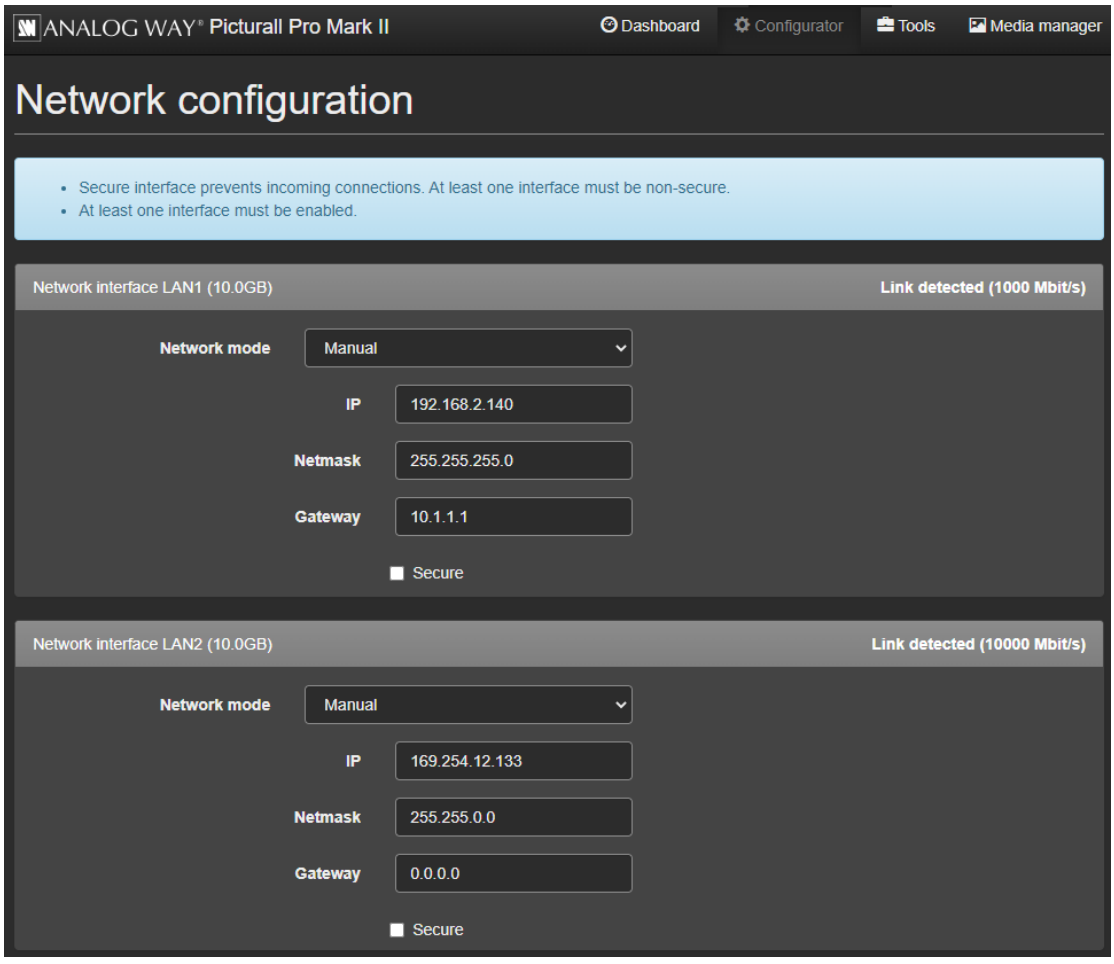


*Fig. 24 - **Network configuration***

There are three ways to set the IP addresses for the server:

- **Automatic (DHCP):** The server gets IP address from DHCP server in the same local network. If no DHCP lease can be acquired, the server will self-assign Link-Local address from 169.254.0.0/16 address range. Self-assigned address will be replaced with DHCP assigned if such becomes later available.
- **Manual:** Set the IP address and netmask manually
- Disabled: The interface is not used (at least one interface needs to be enabled)

On network Common options the default Network interface and DNS servers can be defined.

Note: Only IPv4 addresses are supported.

5.1.8.1 Network configuration with two or more network interfaces

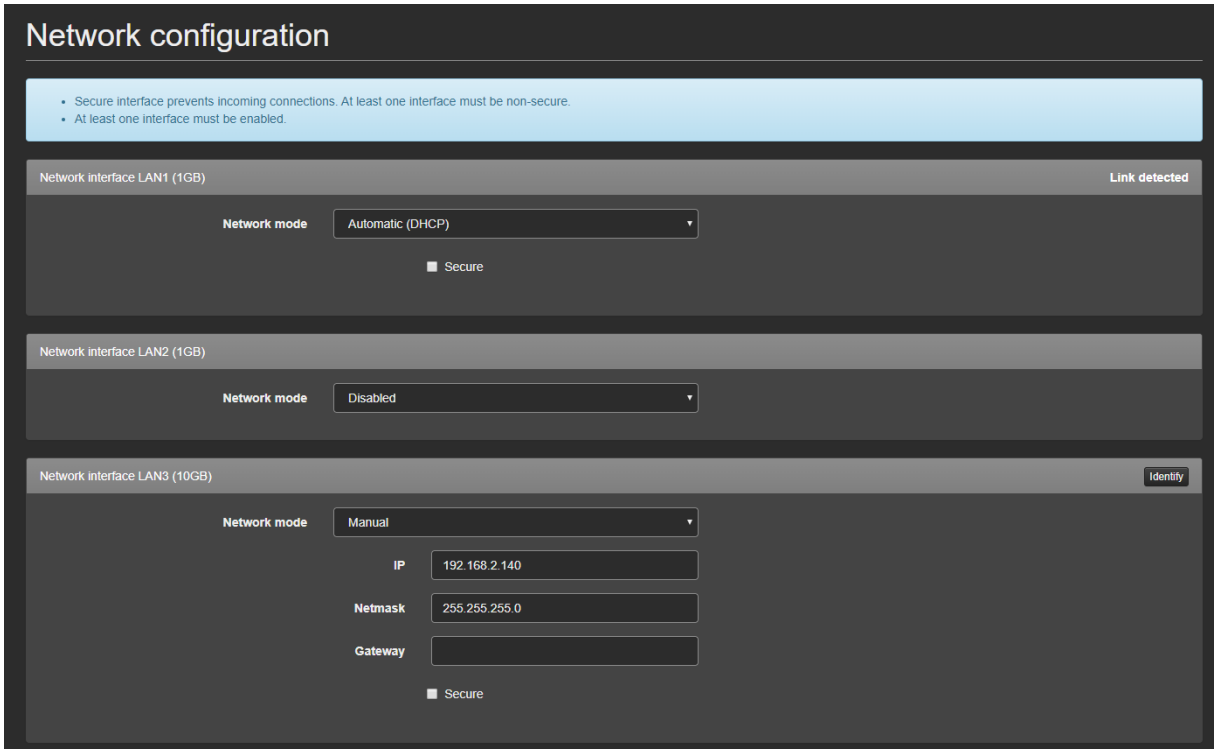


*Fig. 25 - **Picturall Pro with dual network interface and 10GB option***

Picturall Mark II servers and 1st generation Picturall Pro servers support two different networks with separate network connectors. Additional 10GB and dual 1GB network ethernet interfaces are available as options for Picturall Mark II servers. The optional network cards can be set either to secure or non-secure network. Enable the Secure mode to prevent incoming connections.

Note: - At least one interface must be enabled and at least one interface must be non-secure.
- When using dedicated network interface with Dante audio without a DHCP server, the controller network interface must be configured as default network interface to avoid delays/connection interruptions. For more detailed instructions for configuring network for Dante, see the network instructions from Audinate website.

5.1.8.2 NDI™ network options

NDI supports several different connection protocols and for a protocol to be used, both the sender and the receiver must support it.

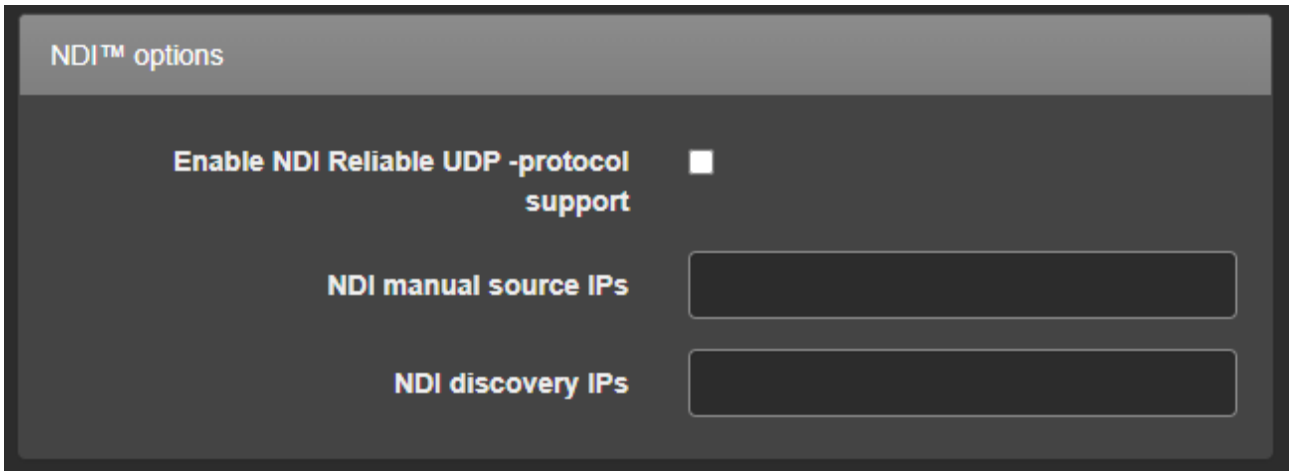


*Fig. 26 - **NDI network options***

NDI uses TCP connection is by default, which provides good performance in most cases. If UDP based connection is preferred, NDI Reliable UDP -protocol can be enabled. It can be used only if both the sender and the receiver have it enabled.

Manual source IPs can be entered for NDI sources which are not discoverable on a local network, but which are known to be accessible from the server. Multiple IPs can be entered as comma separated.

The server discovers NDI sources from local network(s) and broadcasts its presence when sending NDI stream to a local network(s). If discovery IPs are configured:

- when sending an NDI stream(s), this server will only send the stream information(s) to the discovery IPs.
- when discovering available NDI streams, both local network(s) and discovery servers are used.
- New VIOSO calibration cannot be performed (existing calibrations can be used)

5.1.9 Time configuration

The system time and date can be set manually, or the server can be configured to acquire time and date from a NTP server. Time zone must be configured manually. These time settings are used for Wallclock timecode provider and cue scheduling features (See *9.6 Triggering cues with Timecode* page 119 and *9.7 Scheduling cues and playback* page 125)

Note: Cue scheduling occurs in server time, date and time zone.

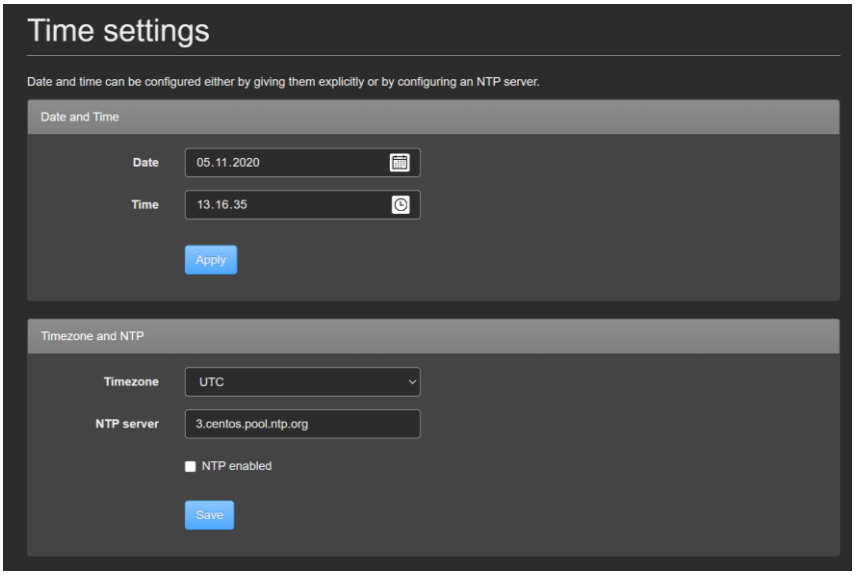


*Fig. 27 - **Server time settings configuration***

Note: By default, the system is set to UTC Time zone. If unchanged, the default scheduling will occur based on UTC time

5.1.10 Synchronization settings

Use synchronization to clone media files, media library and cue data to other Picturall media servers. Picturall media server can be configured to synchronization client or a synchronization server role. After configuring the synchronization, the selected data on synchronization server will be cloned to registered synchronization clients.

Note: Synchronization requires each client to be compatible with the server. When changes to synchronization are applied, each client is validated and registered for this synchronization server. Any client that fails the validation or registration is rejected and removed from the saved clients. To pass the validation, a client must be:

1. Online and reachable.
2. Running identical firmware version.
3. Configured with client role in synchronization configuration.
4. Not registered to any other synchronization server.
5. User management is not enabled. Restricting web access with User management also blocks use of the server as synchronization client.

If all conditions pass, the client is registered to the synchronization server, and cannot be used with any other synchronization server until the original server removes the client or client removes the registration manually (on client server, the registered client displays remove registration form in Synchronization status page. Note that registration removal should only be used when the synchronization server is no longer available.)

5.1.10.1 Set a server synchronization

The role of the server can be set either as a **Client** or a **Server**. Each server is by default a client.

1. On the Web configurator of the Picturall media server to use as the source of the synchronization, set the system role to **Server**.
2. Enter the IP addresses of one or more Picturall servers as synchronization client and save settings. It is also possible to select a detected server and click **Add located server**.
3. Select the settings to synchronize:
    a. Media files
    b. Media libraries
    c. Cue data (cues, cue stacks, cue stack entries, cue schedules, cue parameters, cue macros)
    d. Exported show (when this synchronization is enabled, the exported show on the sync server is copied to all client servers, and when exported show on sync server changes, it is copied to all client servers).
4. Click **Save**.

Each client is registered to the synchronization server when synchronization configuration is applied.
The status of the synchronization is displayed in the **Synchronization status** menu.

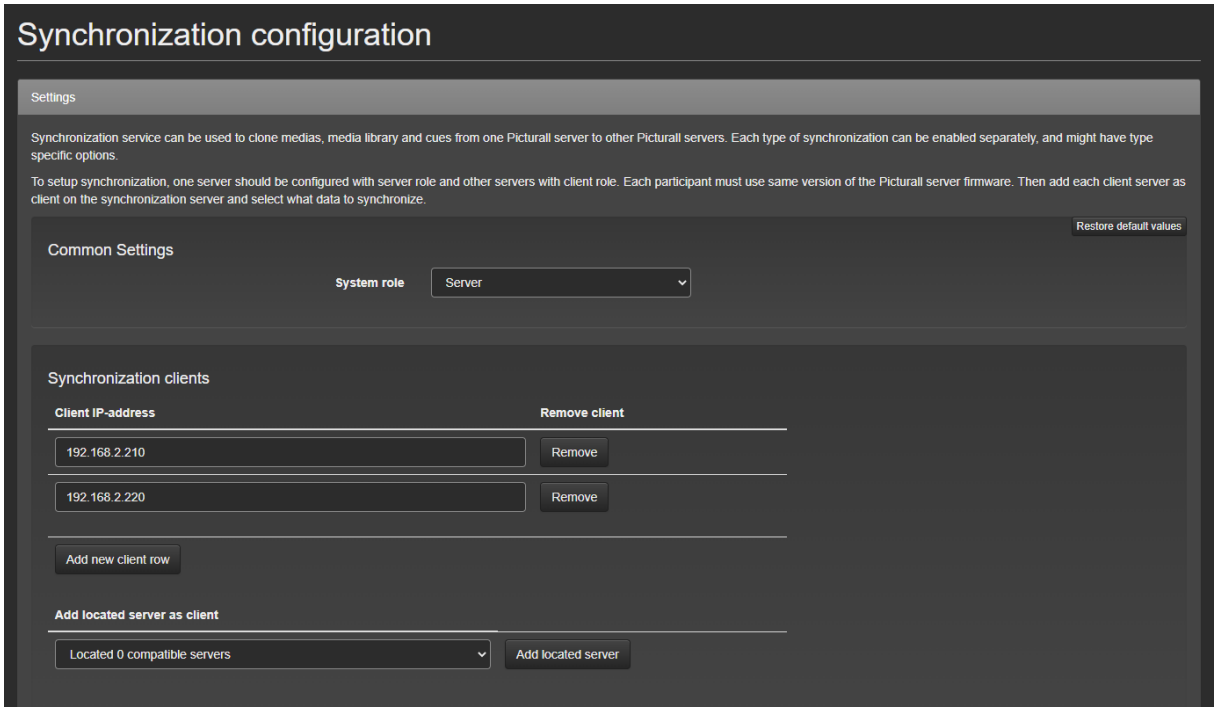


*Fig. 28 - **Synchronization settings***

Note: - If a synchronized media file is removed from the synchronization server, the media file synchronization will not remove the file from synchronization client servers.
- If a file with same name and path already exists on the synchronization client server, the media file synchronization will overwrite them with the corresponding file located on the synchronization server.
- Media library synchronization will overwrite any existing media library on the synchronization client. Any changes made on the client servers will be lost.
- Cue data will overwrite cue data and any further changes to the clients
- Current state and any changes made to the media files, media library or cue data (if they are enabled) in the synchronization server will automatically be cloned on all the synchronization client servers.
- Network speed, load and amount of changed data affect the duration of the synchronization. For best results, dedicated synchronization network with dedicated network interfaces is recommended.

5.1.10.2 Legacy backup tool

To clone all media files from the media server to another Picturall media server without continuous synchronization, the legacy backup tool can be used.

The following example shows how to back from a Server A to a Server B.

1. On the Web configurator of the Picturall media server to use as the source of the synchronization, set the system role to **Server**.
2. Make sure the two servers have the same software version (latest if possible).
3. Make sure the two servers have Picturall Commander installed in same version (latest if possible).
4. Create a show and transfer some media files on Server A.
5. Make sure that Server B is up and running.
6. On a web browser, enter the IP address of Server A in the address bar.
7. Go to **Tools** / **Backup**.
8. Select Server B in the dropdown list or enter the IP address of server B then click **Save**.
   Server A sends all media files and shows to Server B (configuration settings are not duplicated and existing media files on server B are not deleted).
9. After the transfer is complete, restart Server B and make sure that it has the same shows and media data as Server A.

Note: The Legacy backup tool will be removed in a future version.

5.1.11 Import and Export configuration

Import and backup server configuration is only possible for media servers with same capabilities.
It is also support between First generation and Mark II media servers.

5.1.11.1 Export configuration (save)

Tip: Export server configuration before updating the Server Software as this deletes Configuration options.

To save the current configuration:

1. On a web browser, enter the media server IP address in the address bar.
2. Go to **Configurator** or **Configure Server**.
3. Go to **Export configuration**.
4. Choose the configuration parameters to be saved.
5. Click **Export configuration.**

The Configuration is saved in a **PSC** file.

5.1.11.2 Import configuration (load)

1. On a web browser, enter the media server IP address in the address bar.
2. Go to **Configurator** or **Configure Server**.
3. Go to **Import configuration**.
4. Choose the PSC file to import.
5. Choose the configuration parameters to load.
6. Click **Import configuration.**

5.1.12 Format Media Drives - Storage configuration

In **Tools / Format media drives**, set the media drives formatting method.
In the following example, a Picturall Series Media Server has two media drives of 1TB capacity.

- **RAID 0** (striped): 2TB of storage with fastest writing speed. Media drive failure loses all media files.
- **RAID 1** (mirrored): 1TB of total storage, media files are stored identically on both media drives. If one media drive fails, the show continues using the other media drive. Best reliability but performance is halved.

Recommendation: Use **RAID 0** for optimal performance.

Note: If the formatting method is modified, all media on hard drives will be deleted.

Note: Two media drive configuration is a hardware option for Twin and Quad servers. Contact Analog Way support for more details.

5.1.13 Conflicting Settings

Sometimes settings may conflict with each other. For example: the same Display resolution cannot be set to 1920x1080 and to automatic. In case of conflict, the most recent value is kept and the previous value is discarded.

Settings that easily conflict in the display settings:

Settings	Conflicts with
Auto	A connector, a resolution, a refresh rate and a special mode
A special mode	**Auto**, or a connector, setting a resolution, a refresh rate
A connector, a resolution or a refresh rate	**Auto** and a special mode

Settings that easily conflict in the network settings:

Settings	Conflicts with
An IP address and a netmask	DHCP client
DHCP client	DHCP server, an IP address and a netmask
NDI discovery IPs	New VIOSO calibration cannot be performed

5.2 SPX graphics

SPX is a graphics overlay that can be used to display and control animated lower thirds, countdowns, headlines, titles, and other animated graphics. SPX is developed especially for professional broadcast and streaming video workflows.

Enabling or disabling the SPX graphics from the server can be done with the web configurator <server ip>/config/spx/.

*Fig. 29 - **Enable SPX graphics***

SPX user can opt in to collect and post anonymous user statistics from SPX. The function gathers information for example how many times play, stop, continue buttons have been pressed within a 24h period. The data is collected anonymously and stored to smartpx.fi server for future service and software development.

5.2.1 Adding new SPX templates and SPX content

The server installation comes with some default SPX graphics templates. To install more SPX graphics templates or other SPX content, go to <server ip>/tools/spxgraphics/ to browse and upload template files from local computer, or to delete existing templates from the server.

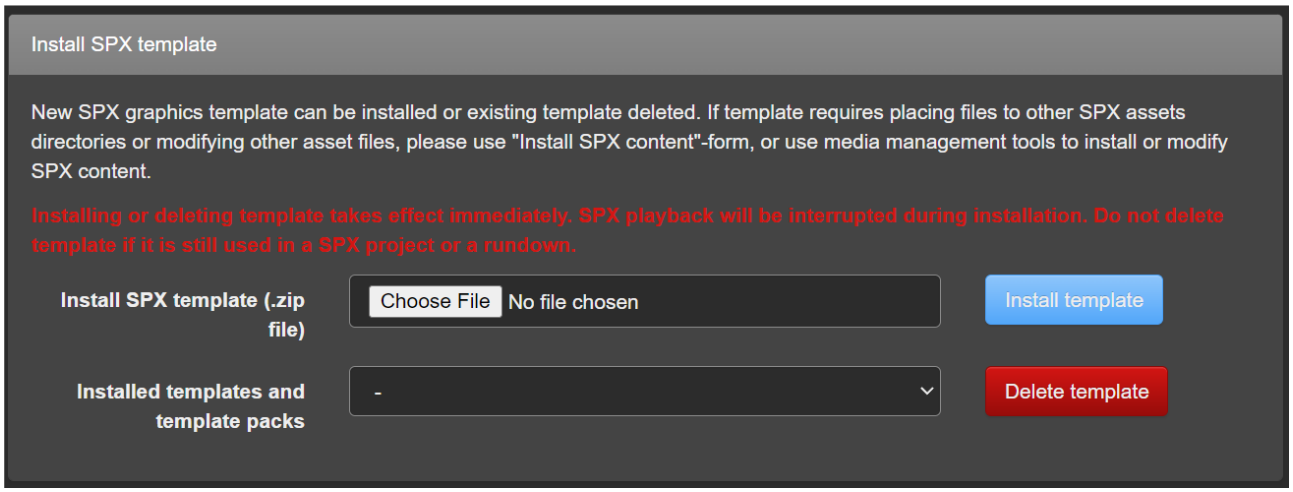


*Fig. 30 - **Install/delete SPX templates***

If an SPX template requires placing files to other SPX assets directories or modifying other asset files, please use "Install SPX content" form found below the install SPX templates form. To reset the modifications made with the installed SPX content, press the Reset SPX content button from the bottom of the SPX configurator page.

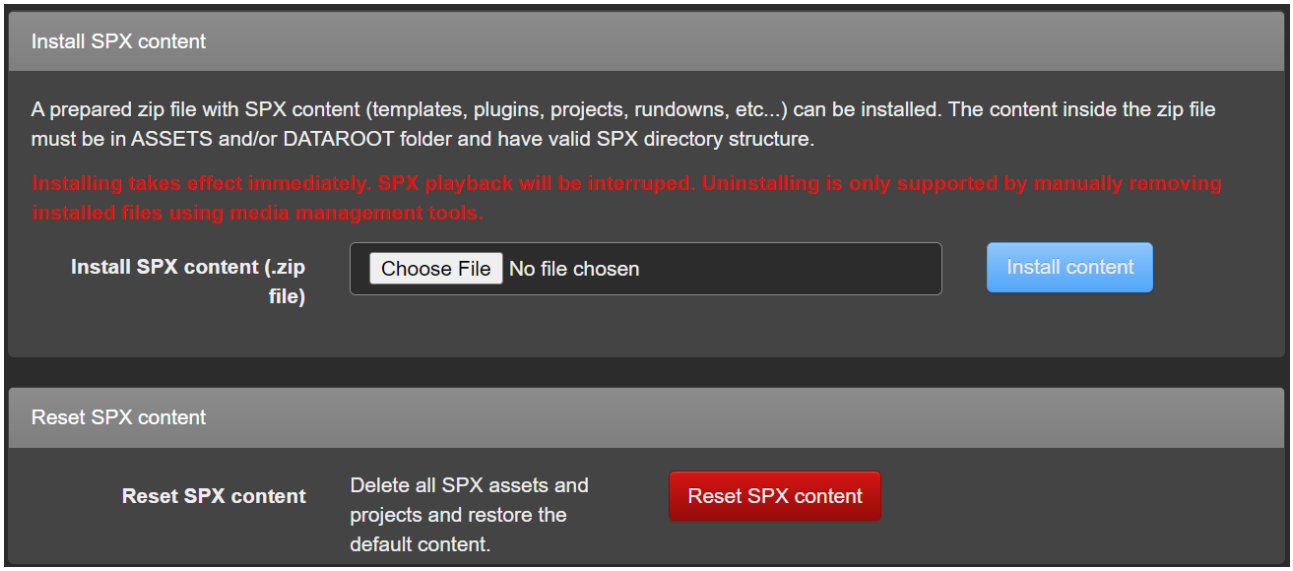


*Fig. 31 - **Install/delete SPX content***

TIP: New SPX graphics templates can be purchased from the SPX Store and fully customized templates can be designed with the SPX team. Template customization is a paid service provided by Softpix Ltd. Contact Analog Way sales to get more information.

5.2.2 Adding SPX graphics to playback

Using SPX graphics in playback requires creating a graphics rundown with the SPX graphics controller and adding a SPX graphics layer to Commander GUI.

In this chapter SPX graphics rundown will be set up. For the SPX graphics layers to be used on playback, the SPX graphics layer needs to be set up in Commander and the layer play state set to PLAY first. Do this before you start playing SPX graphics rundown.

SPX rundown state is stored only within single layers, so when any rundown action happens, it will affect only those SPX layers that are in PLAY state at the time. Also note, that if you stop the layer or change the media, SPX will also lose the state and revert to a default state with no rundowns active.

Setting up the Commander SPX layer is explained in chapter 5.2.2.4**.**

5.2.2.1 Creating a graphics rundown with SPX graphics controller

Open the SPX graphics controller from

- the Web configurator/Tools/SPX graphics and click on the link
- Commander GUI right click on SPX media in a collection and select “Open SPX controller”
- With a web browser, go directly to <server ip>:5656

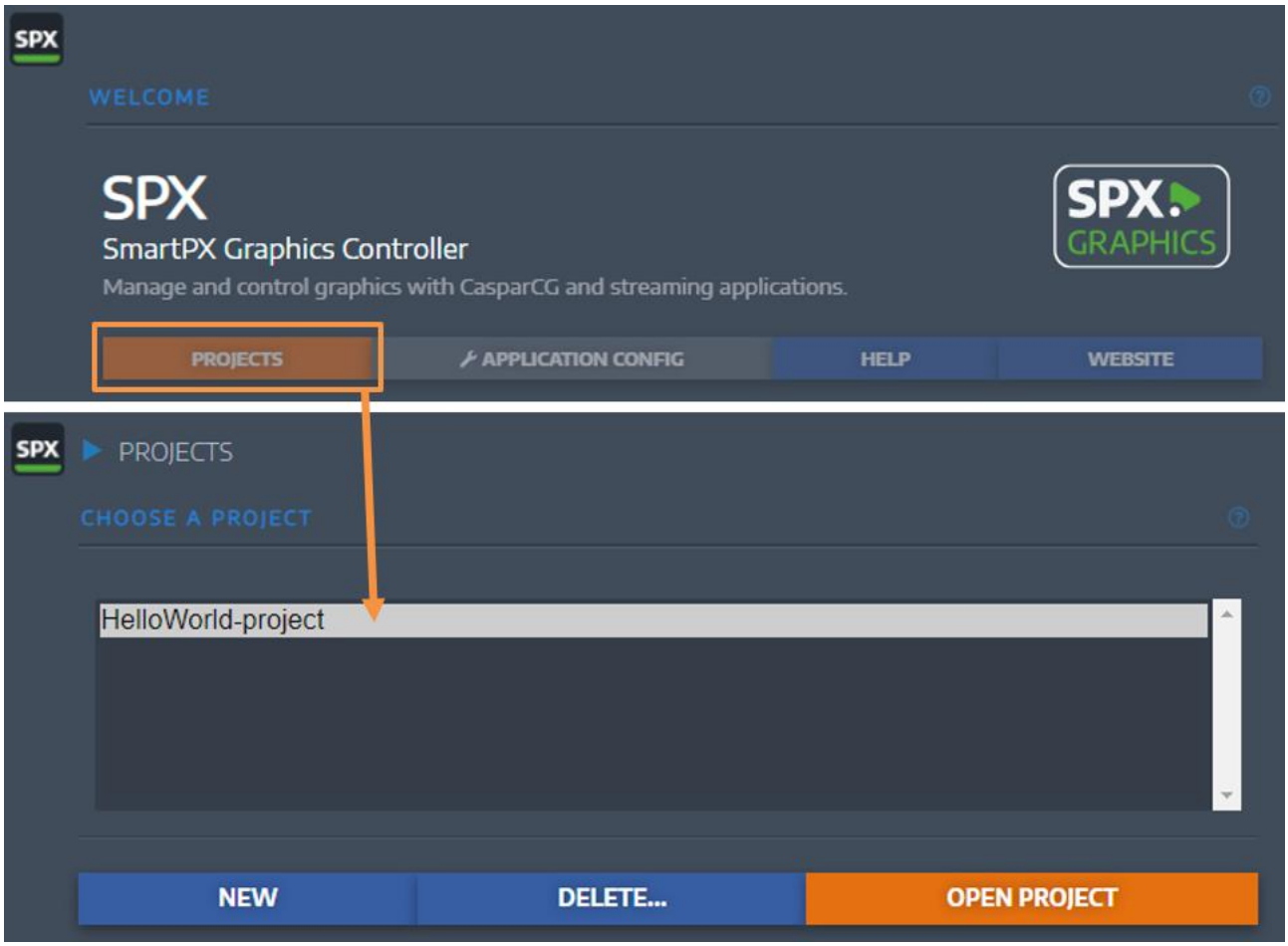


*Fig. 32 - **SPX graphics controller***

To create a new project or to access already created projects click on projects to open a projects list. The list contains a default example HelloWorld-project and the user made projects.

To create a new click on the *New* -button and a prompt will request a name for a new project.

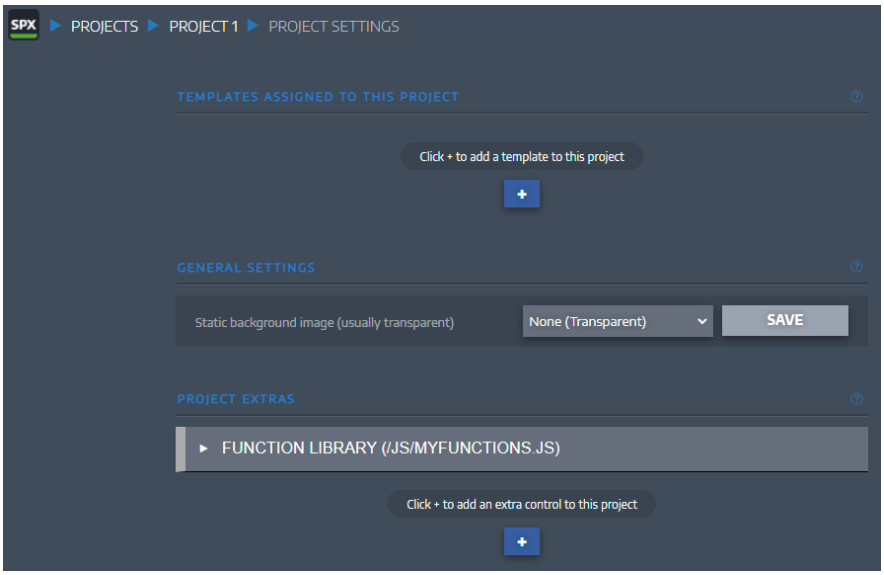


*Fig. 33 - **SPX new project setup***

Click  to browse installed templates from the server and to select required templates. Pressing this button will bring up a file browser containing folders with SPX templates. The selected templates will be listed under the project.

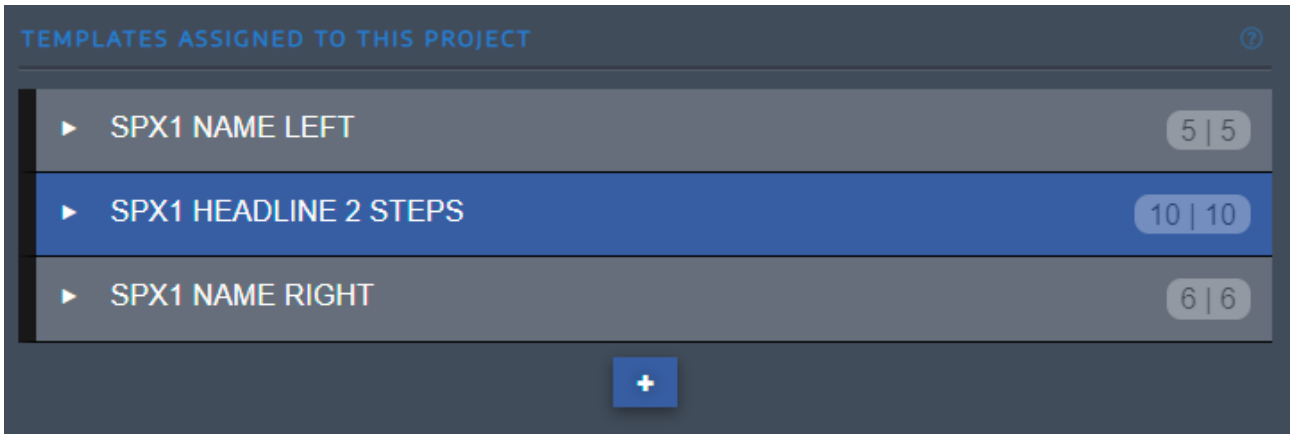


*Fig. 34 - **Templates assigned to the new project***

After adding templates to the new Project, each template can be edited to a point, depending on what kind of functionality the template offers. The usual edit points include the color scheme, animation stop method, timing etc.

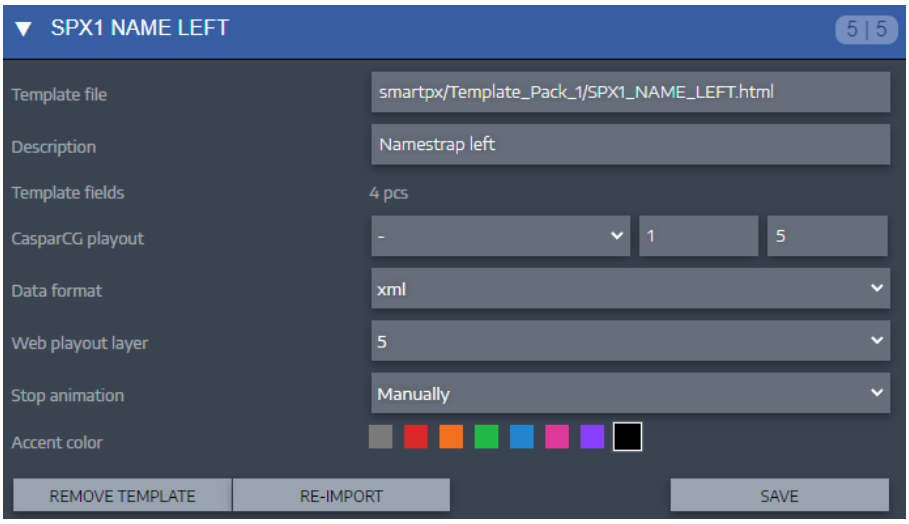


*Fig. 35 - **SPX template edit options***

These edit options only include the overall appearance of the templates, but the actual presented content will be available for modifying in the project rundown (see **5.2.2.3**). All the templates that will be required in a project or a show can be selected here. To sort the selected templates to specific situations rundowns can be created to the project.

Note: Please refer to SPX controller for SPX layers used by SPX templates. In most cases, default setting of all SPX layers is recommended.

5.2.2.2 Creating a rundown to a project

Select and open the created project, and after opening the project, select Add rundown.

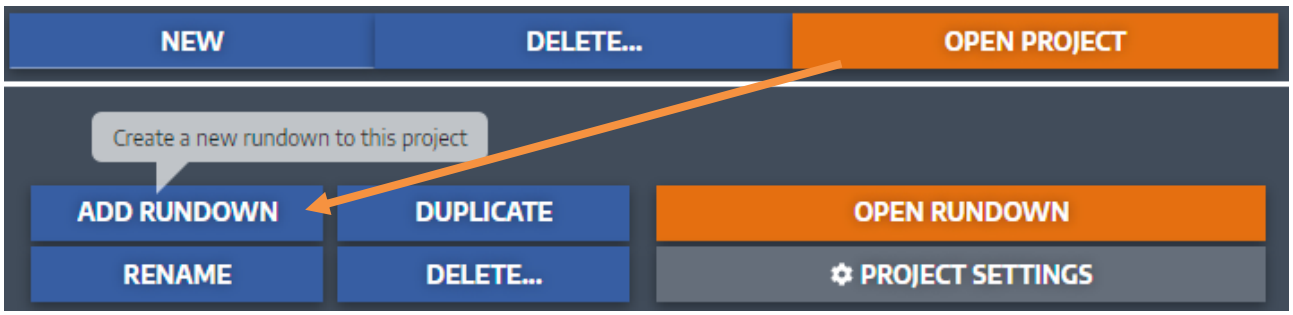
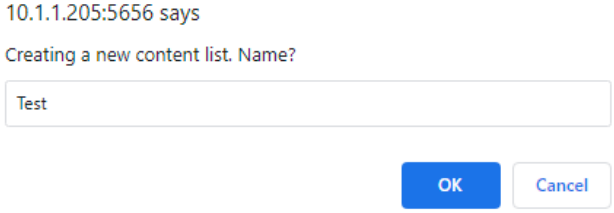


*Fig. 36 - **Create a rundown to a project***

A prompt will open to ask a name for the new rundown. Add a name and press OK.



A new rundown will open a new page, where the templates that were selected for the project can be added to this specific rundown. Pressing the + will open the list of selected SPX templates.

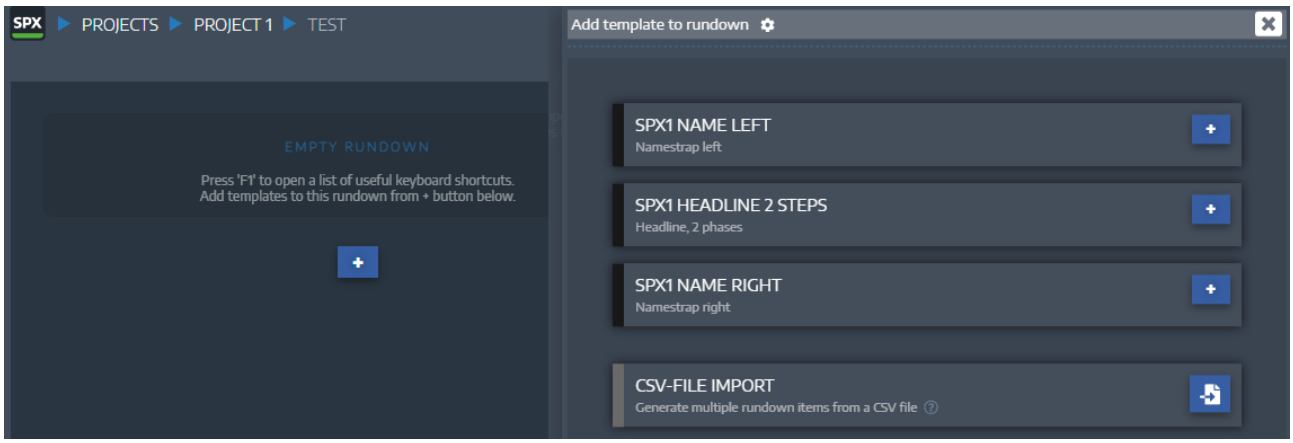


*Fig. 37 - **Adding templates to a project rundown***

Select all or some of the templates to the rundown.

5.2.2.3 Modifying template content and template playback

After selecting the required templates, the presented content with these templates can be modified. Double click on the template to open the modifying options. Add the required changes and press save.

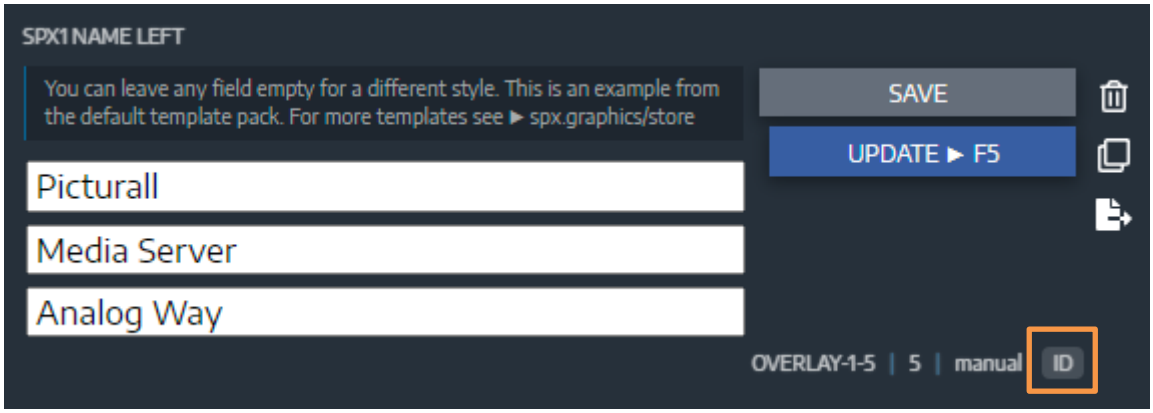
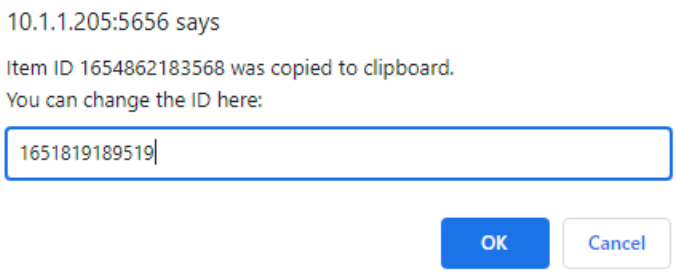


*Fig. 38 - **Modifying the template content***

Clicking on the ID button at the bottom-right corner opens the item ID, which is needed for controlling the template with cue macros with the Picturall Commander. Item ID is automatically generated, and it can be changed manually. Clicking the ID button will automatically copy the generated id to computer clipboard. Keep or manually change the ID and press ok.



See the instructions for using cue macros to control SPX from **chapter 5.2.3**.

After modifying the content and pressing save, the template can be activated either by pressing spacebar from the keyboard, or by pressing the green Play button from the bottom of the screen. If the template has more than one phases, the continue button will be used to trigger the following phases.

After pressing the play button/space bar, the template will appear on the screen (see configuring the SPX layer in the Commander from chapter 5.2.2.4) and the preview will appear on the SPX UI.

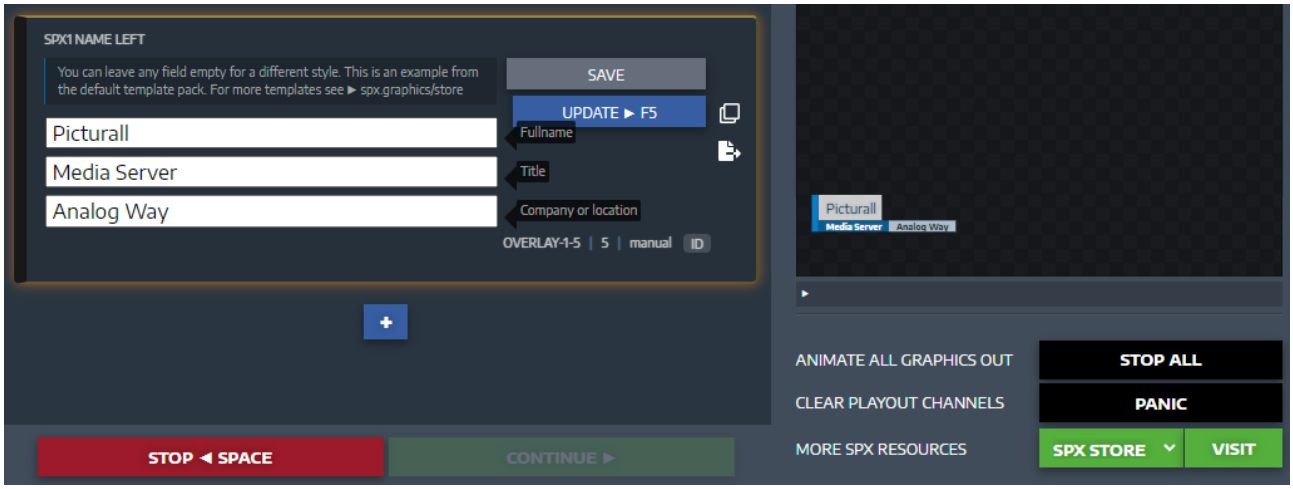
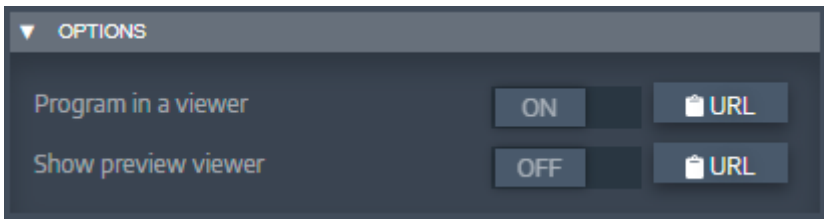


*Fig. 39 - **Template playback preview on SPX UI***

Stop the template playback by pressing the red Stop button or by pressing the Space bar from the keyboard again.

To preview the templates before triggering them to the playback, press the options button  below the UI preview screen. This enables opening the preview to separate window or to another browser.



Below the preview options there are buttons to stop all SPX layers or a Panic button for clearing all playback SPX channels.

"Panic button" can be used to clear out all SPX layers without running any stop animations defined in playing SPX templates. Please note that as the panic button clears all SPX layers immediately, the playing status on SPX controller is not updated and will display playing, even if they have been cleared.

5.2.2.4 Commander GUI: SPX graphics layer

With the Picturall Commander (3.5.0 or newer), go to Server files and select Generators. From there select SPX graphics and drag and drop it to a free media collection slot.

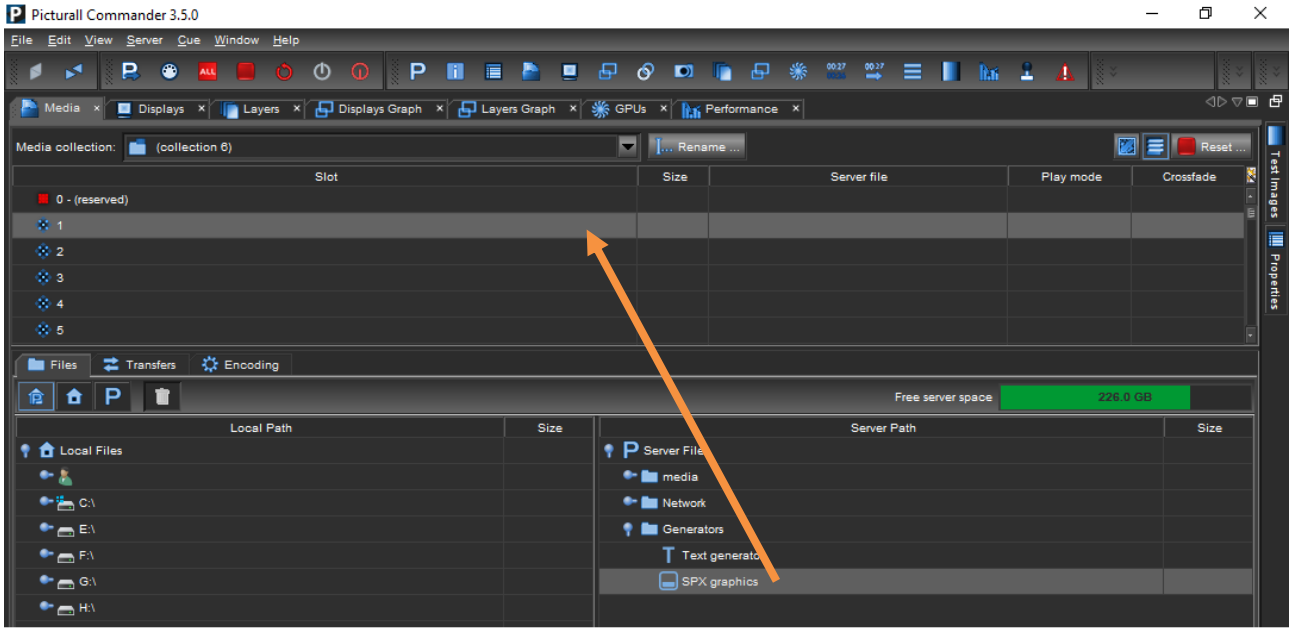


*Fig. 40 - **Adding SPX graphics media to a media collection***

After adding the SPX graphics to a media collection, a following dialog will open automatically where the more detailed parameters for the graphics layer can be set.

- Set the resolution of the SPX layer

NOTE: If you are using custom SPX templates make sure that the template scales correctly to your target resolution.

- Define the SPX layers that will be displayed on this SPX graphics (default All)
- Set the SPX layer to display either Program or Preview (default Program)
- Click **OK** to confirm the selected values.

Tip: SPX web playout layers setting can be used to display only specific SPX layers.
For example:

- Picturall layer 4 could have SPX media which would play only SPX layers 1 to 10
- Picturall layer 5 would have SPX media with only SPX layers 11 to 12.

A layer configuration like this can be useful for optimizing playback performance, as the SPX media files can be configured to only cover small part of the underlying media, instead of matching underlying media resolution.

- For example: one SPX media playing 100x4320 banner at bottom over an 8K media, and another SPX media playing 256x256 animated logo at top right corner. Instead of single 8K SPX media.

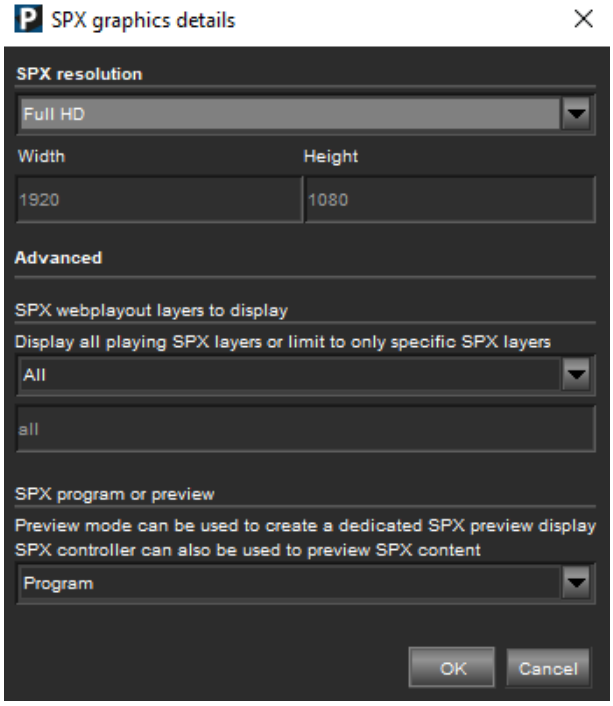


*Fig. 41 - **Setting up the SPX graphics layer***

After adding a SPX graphics to a media collection proceed to Picturall Commander Layers tab. For this example, we have a simple display setup of one 1080p display. First layer will be playing a media file and the second layer will be appointed with the SPX graphics layer.

The display setup can have multiple displays with different resolutions and multiple layers of media can be played. When using the SPX graphics, it is important that the SPX graphics layer is on top of any other media layers.

There can be more than one SPX graphics layers for example in a situation, where a different rundown is being used, SPX is being used more than one display surface, or the layer requires different graphical parameters. Up to 20 SPX graphics layers can be displayed on one Picturall media layer.

NOTE: Setup SPX graphics layer in Commander and set the layer play state to PLAY first before you start playing SPX graphics rundown

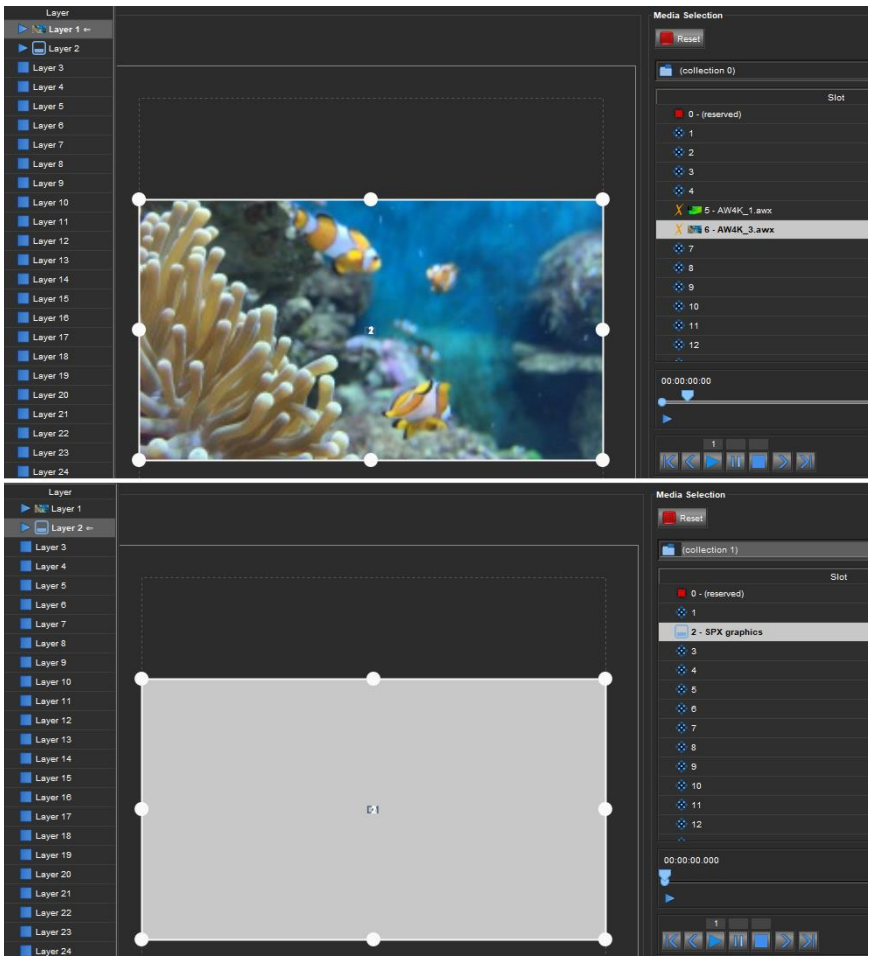


*Fig. 42 - **Commander: media layer and SPX layer in use***

NOTE: SPX graphics layers can't be synchronized with Commander UI

5.2.3 Controlling SPX graphics with cues

SPX graphics can be controlled with cues. Create a cue for triggering an SPX event. This cue can be an empty cue or related to something else. Right click on the created cue and select "Edit macro…" from the dropdown menu. In the Enter Cue Macro menu, select the SPX tab to enable required event.

In this menu, define the Project and the Rundown. Copy the Item ID within that Project and Rundown from the SPX controller (see chapter **5.2.2.3**) and define the command that will be triggered with this cue (Play, Stop or Continue).

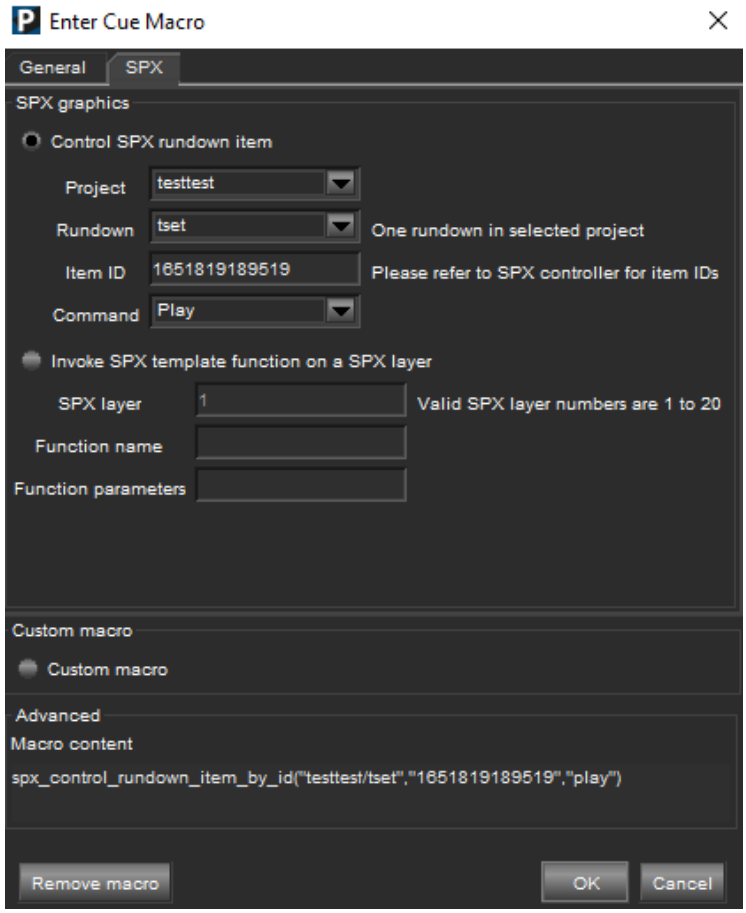


*Fig. 43 - **Cue Macro to control SPX graphics***

"Invoke SPX template function on a SPX layer" can be used to invoke a custom javascript function on a SPX template. Instead of project and rundown, web playout layer in which the SPX template is running on must be specified. Only one function argument can be used, but custom format can be used to combine multiple values into single string.

5.3 User management

In **Tools > User management**, create admin user accounts to prevent other users from accessing server configuration settings, server tools and media manager using the web configurator.

Note: - By default and when there is no admin user account created, the access to the server settings has no password restriction.
- After adding an admin user account, logging in becomes required immediately.
- If all usernames or passwords are forgotten, it is possible to run a factory reset via Configuration mode, see page 60.

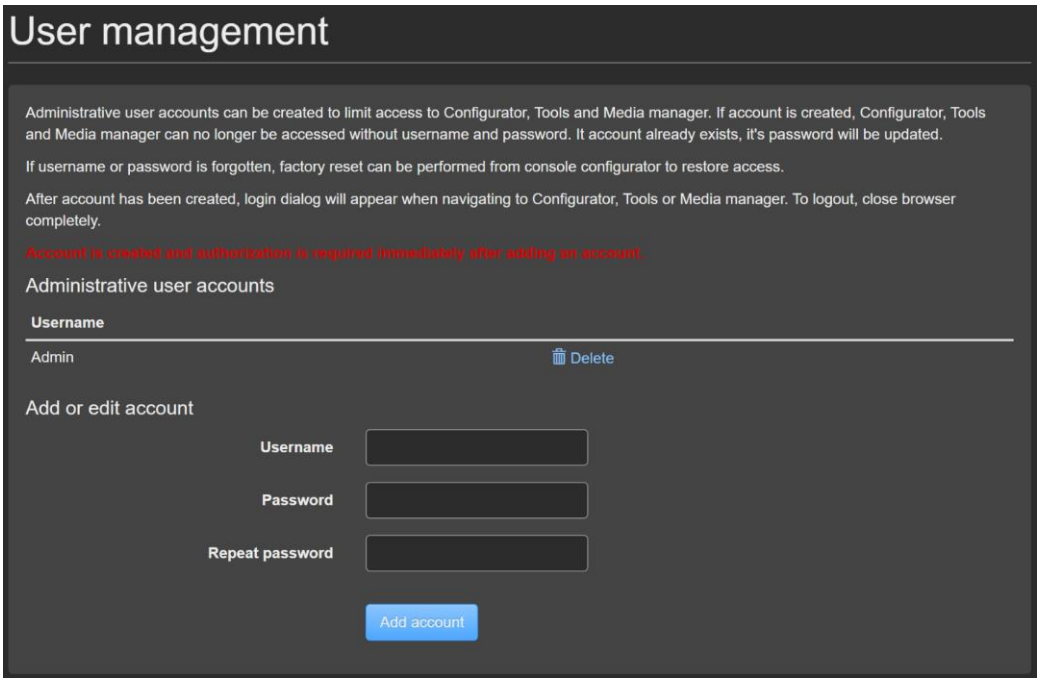


*Fig. 44 - **User management page***

Note: Picturall media servers with User management enabled cannot be registered as synchronization clients (see chapter 5.1.10)

5.3.1 Create an admin user account

1. Open the web configurator and go to **Tools > User management**.
2. Enter a Username and passwords.
3. Click **Add account**.
   The admin user account is created.
4. If needed, repeat steps 1 to 3 to create more admin user accounts.

After creating an admin user account, accessing menu titles visible on the front page and on the top of the page requires to log in with an administrative account.

5.3.2 Log out - Close an admin user session

To log out an admin user account, close the browser.
Depending on the browser, it might be needed to clear the browser history or check that the browser is not active in the background.

Tip: Use web browser's incognito mode to make sure that the admin account is logged out when browser is closed.

5.3.3 Delete an admin user account

1. Open the web configurator and go to **Tools > User management**.
2. Click **Delete** on the corresponding user account in the users list.

5.4 Manage firmware

The server comes fully installed with the latest server firmware. In **Tools > Firmware** the server can be updated to use new firmware versions.

Caution: Picturall Commander must always be in the same version as the Server firmware. Update Picturall Commander together with Server firmware for best compatibility and performance. A message is displayed in Picturall Commander if the versions do not match.

Caution: The firmware update resets both server configuration and show. If needed, save the configuration before updating the server software and Commander UI.

- To save configurations in the Configurator, see *5.1.11 Import and Export configuration page 41*.
- To save the show in Commander UI, see *10.1 Save a show* page 134.

5.4.1 Firmware update

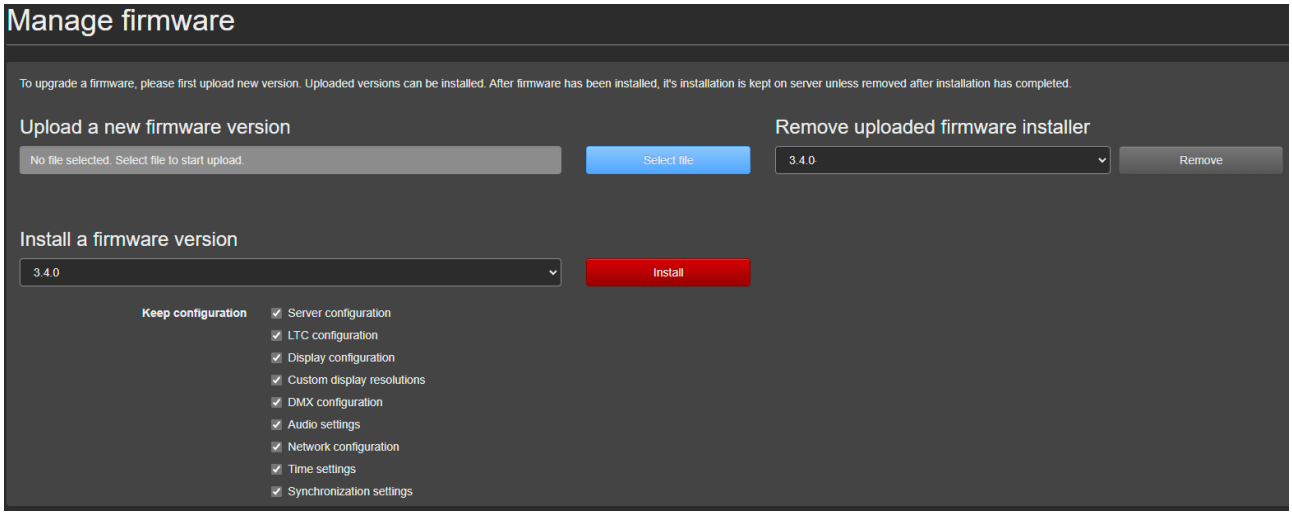


*Fig. 45 - **Manage firmware configuration page***

1. Download the latest firmware update image from the Analog Way website.
2. After downloading the firmware updater image file, click **Select file** and select the file on your computer.
3. Check the uploaded firmware version.
4. In Keep configurations, select the configurations to maintain.
5. Click **Install**.

The update will take 5-6 minutes. The web configurator window indicates when the update is complete.

Tip: Remember to update the Picturall Commander to the same firmware version as the server is using.

5.4.2 Remove uploaded firmware installer

The uploaded firmware images will remain saved until they are removed manually from the server hard drive. Select the firmware version to remove from the drop-down menu on the right side of the menu and click **Remove**.

5.4.3 Updating the Server Firmware with an USB drive

If there are issues with updating the server with the web configurator, or for example the server cannot be connected to the network, the firmware can also be updated with a USB drive.
Find all installation files for the Media servers on www.analogway.com

5.4.3.1 Picturall series (first generation)

The following procedures are applicable to first-generation Analog Way Picturall media servers, product references: MST02-R1, MSTC02-R1, MSQ04-R1, MSQC04-R1, MST02-R2, MSTC02-R2, MSQ04-R2, MSQC04-R2, MSP16-R1, MSP16-R2.

5.4.3.1.1. Creating an installation USB drive

Tip: Use a high-quality USB memory stick, a low-quality USB memory might cause problems when installing the software.

Note: The Picturall Series Media Server installer for legacy products (before Picturall Mark II) runs only on Windows.

On a computer:

1. Connect an empty, FAT32 formatted USB drive with at least 2GB of free space.
2. Go to www.analogway.com and download the Picturall installer.
3. Run the installer.
4. In the **Distribution** menu, select the latest version (non-beta).
5. Make sure the selected **Drive** is the USB drive.
6. Click OK to write the installer onto the USB drive.

The USB drive is now ready for installation.

5.4.3.1.2. Installing the server software from a USB drive

Caution: Make sure the installation USB drive contains the installer for first generation Picturall series media servers.

1. Connect a USB keyboard and the installation USB drive to the server.
2. (Re)boot the server.
3. When booting, enter Boot menu by pressing the following key:
    a. **F8** for Twin and Quad R1 models (MST02-R1, MSTC02-R1, MSQ04-R1, MSQC04-R1)
    b. **F11** for Twin, Quad and Pro R2 models (MST02-R2, MSTC02-R2, MSQ04-R2, MSQC04-R2, MSP16-R2)
    c. **F12** for Pro R1 model (MSP16-R1)
4. Select the **non-UEFI version** of the USB drive. The installer starts.
5. Follow the instructions displayed on the screen.

After the installation, the server reboots and sends a test image with server IP address and display number is sent to every connected display.

6. If needed, go to the Network configuration > Manual and set new **IP address**.
7. If needed, import saved Configuration and show file.

5.4.3.2 Picturall Mark II series

The following procedures are applicable to Analog Way Picturall Mark II media servers, product references: MSTC02-MkII, MSQ04-MkII, MSQC04-MkII and MSP16-MkII.

5.4.3.2.1. Creating an installation USB drive

Tip: Use a high-quality USB memory stick, a low-quality USB memory might cause problems when installing the software.

Note: Picturall Series Media Server installer for Mark 2 products is available for both Windows and Mac.

Caution: During the installation, a window prompt will ask to Format or to Reconnect the USB drive. Click **Cancel**. Do not confirm the format or the installation will fail.

On a computer:

1. Connect an empty, FAT32 formatted USB drive with at least 4GB of free space.
2. Go to www.analogway.com and download the Picturall Mark II installer and latest update image file.
3. Run the installer.
4. Click “Select the update file” and select the downloaded update file.

   Or use drag and drop from the desktop browser.
5. Click “Select target USB” and select the USB drive connected in step 1.
6. Click “Create USB installer” to start the installation.
7. When Picturall Installer displays **Flash Complete**, safely remove the USB drive from the computer.

The USB drive is now ready for installation.

*Fig. 46 - **Analog Way Picturall Installer (for Picturall Mark II series)***

5.4.3.2.2. Installing the server software from a USB drive

Caution: Make sure the installation USB drive contains the installer for Picturall Mark II series media servers.

1. Connect a USB keyboard and the installation USB drive to the server.
2. (Re)boot the server.
3. When booting up, enter Boot menu by pressing the following key:
   a. F8 for Twin Mark II (MSTC02-MkII)
   b. F11 for Quad and Pro Mark II models (MSQ04-MkII, MSQC04-MkII and MSP16-MkII)
4. Select the **UEFI version** of the USB drive. The installer starts.
5. Follow the instructions displayed on the screen. After the installation, the server reboots and sends a test image with server IP address and display number is sent to every connected display.
6. If needed, go to the Network configuration > Manual and set new IP address.
7. If needed, import saved Configuration / show file.

5.5 Media manager

Tip: To limit the access to server configuration and tools, use the address (server ip)/mediamanager/fullscreen/ to view the media manager without the web configurator navigation bar.

Use Media manager to access media collections and media files via the web configurator. Media manager is available in the Dashboard page and in the top bar. Use Media manager to:

- Create media collections with media files located in the media server local storage
- Upload media files to the media server media drive and directly to the media collections
- Add input sources and web content to the collections
- Add a generated text to a collection
- Encode media to AWX
- Adjust media fading settings and end actions (Play mode)

Note: - Media manager web page does not contain show control user interface. Use Picturall Commander for playback settings.
- Media manager is supported in the following web browsers: Chrome, Firefox, Safari and Edge (version 79 or newer)

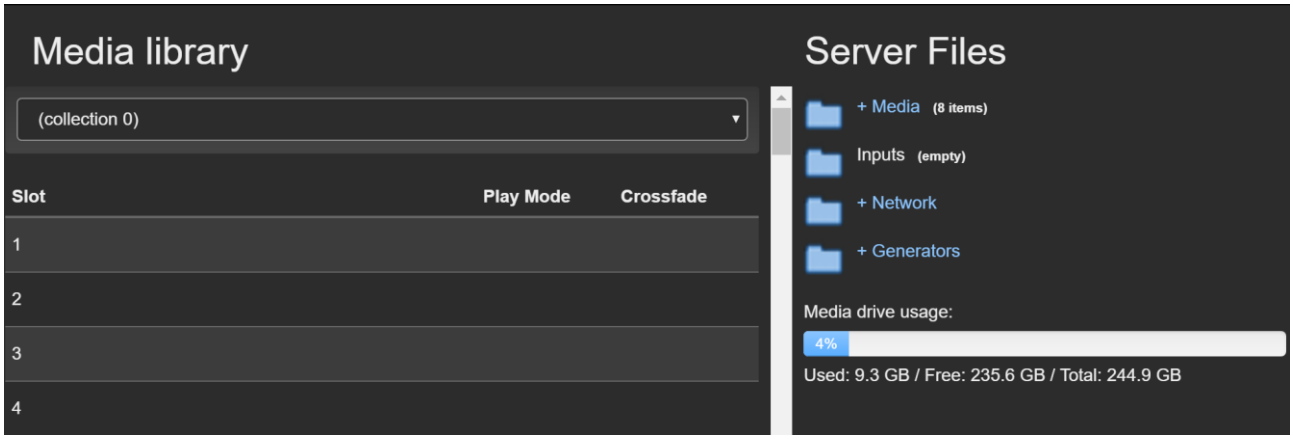


*Fig. 47 - **Web configurator – Media manager***

Media collections are displayed on the left side. Server Media files, Inputs, Network sources and Generators are displayed on the right side.
Changes made in Media manager and in Picturall Commander are synchronized. Media collections and Server files are avaible in both pages with same fading parameters, playback order and folder structure.

5.5.1 Adding media files

- Adding media to a media collection can be done by dragging media files from the server files to the media collections.
- A single file, group of files or directories can be dragged into media slot or server files folders can be uploaded directly to the media collection by clicking an empty slot in the media collection, or dragging and dropping content from the computer to a collection slot.
- Adding an input source, URL video stream, a web page source or custom generated text to the collection is done by draggin the source to the target collection media slot.

Note: The Media manager is very similar to the Media menu of Picturall Commander. For more information, see *6 Media* page 64.

5.5.2 Upload media files to specific folders

Uploading a file directly to the collection will save the file to the Media root folder.
To upload a media file to a specific folder:

1. Click the Media folder to expand the folder tree.
2. Click **Upload a file or directory** under the target server folder.

It is also possible to drag and drop a file or folder on the **Upload a file or a directory** button.

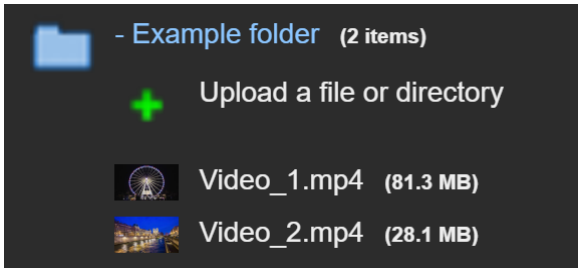


*Fig. 48 - **Upload content to the server folder***

A transfer dialogue will appear after the files have been selected for upload.

3. Select to maintain the original encoding or to encode the content to AWX formats. After confirming the upload, a transfer progress bar will appear above the Media library indicating the transfer status.

Note: - Leaving the media manager or closing the browser during a media transfer will interrupt the transfer progress. Resume the transfer by restarting the transfer process to the same media folder.
- Server reboot will remove interrupted media transfer files

Tip: Replace the default error message (red X) displayed when source has been disconnected
- Create a custom error image and name It custom_error_background.png
- create a folder called errors and paste the image to this folder
- upload the errors -folder containing the custom_error_background.png to server path /picturall/media/

5.5.3 Contextual menus

Right click a media file on the Server files side to open a contextual menu with larger media thumbnail and options to move (cut, copy, paste), encode, delete or download a file to the connected local computer.

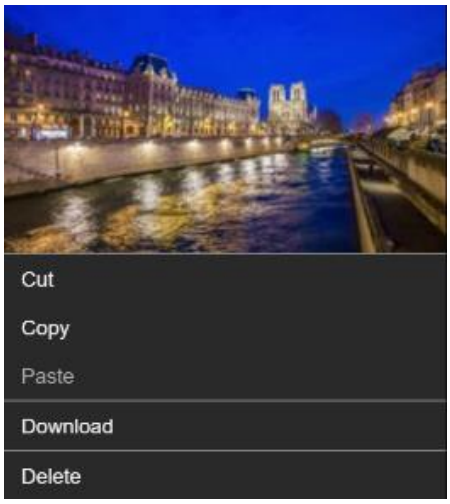


*Fig. 49 - **Media contextual menu***

Right click a media in a collection will bring up options to move (cut, copy, paste), rename, edit fading settings or remove the media from the collection.

5.5.4 Fading settings

Fading settings can be defined for each media file on the collection. Either set the fading settings directly on the collection or right click a media and select **Edit media fading settings** for more precise fading controls.

Note: For more information about media end actions (play mode) and fading settings, see *6 Media* page 64.

5.6 Configuration mode

The **Configuration mode** allows the user to configure directly on the media server using a connected keyboard. This mode includes all the functionality of **Web configurator**.
To enter the **Configuration mode**:

1. Make sure a USB Keyboard is connected to the media server.
2. Start the server and press any key when the startup screen displays.
3. Use the arrow keys in the start menu to select **Configuration mode**. The Configurator menu is displayed.

Configurator has three main sections: Server configuration, Display configuration, and Network configuration. Use arrow keys to navigate menus and use enter to select. Use the **Tab** button to move between different sections.

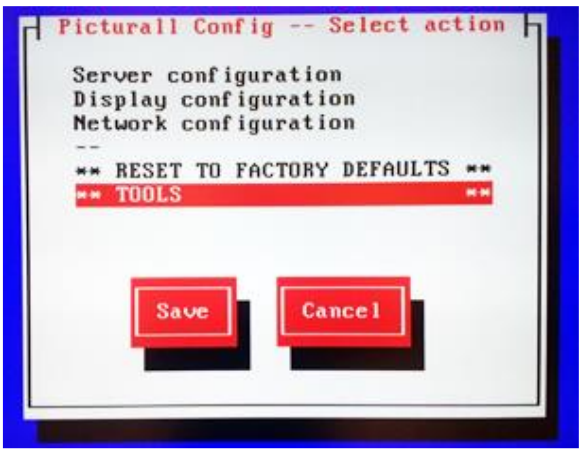


*Fig. 50 - **Configuration mode***

6 Configure Picturall Commander

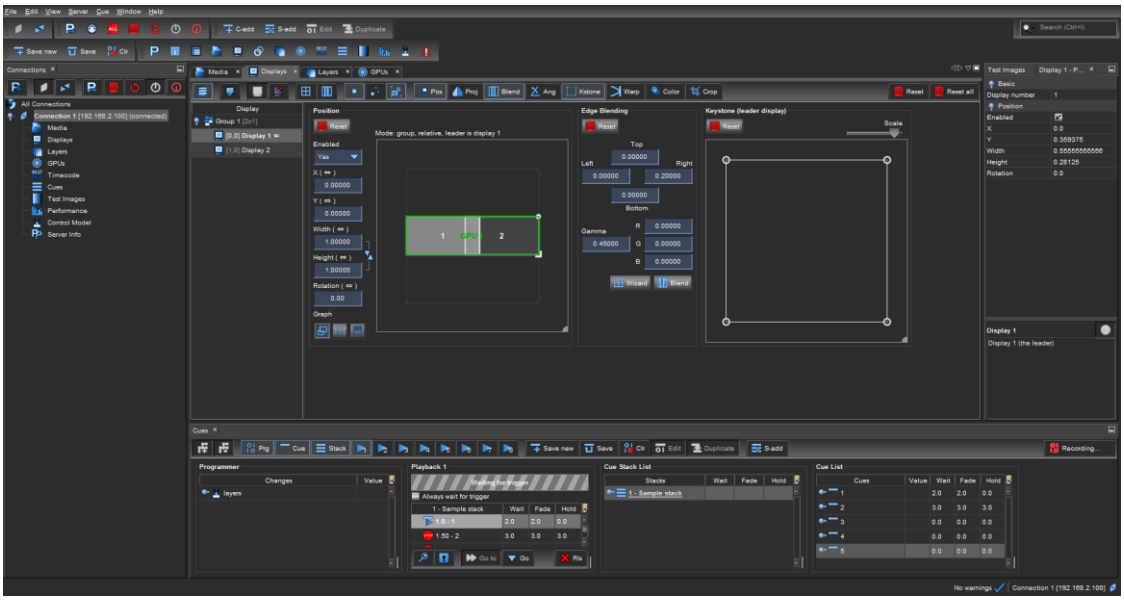


*Fig. 51 - **Picturall Commander***

Picturall Commander is the software used to control the Picturall Series Media Server. This chapter describes the installation and the top-level parts of the Picturall Commander user interface.

6.1 Installing / Updating Picturall Commander

Caution: Picturall Commander must always be in the same version as the Server software. Update Picturall Commander together with Server software for best compatibility and performance. A message is displayed in Picturall Commander if the versions do not match.

Tip: Use a dedicated computer for running Picturall Commander. This ensures that the show files are safe at all times.

The software is on the USB drive delivered with the server. The latest version of Picturall Commander for Windows, OSX and Linux can be downloaded from www.analogway.com.

To install Picturall Commander, follow these steps:

1. On the computer, insert the USB drive delivered with the media server.
2. Copy the installer file matching the operating system from the USB drive to the computer.
3. Run the installer file and follow the instructions to complete the installation process.
4. If needed, open Picturall Commander and go to **File / Load show** to load previous configuration.

Note: For Commander versions prior to 2.8.0, the operating systems must support **Java version 8** for Picturall Commander to be installed. Make sure **Java version 8** is installed on the computer before installing Picturall Commander or use the latest version of Picturall Commander.

6.2 Connecting to Picturall Series Media Server

Caution: - If the computer goes into a standby mode, the connection to the server is lost after the computer resumes.
- Mark II media servers require 1GB network to maintain a stable connection. Network will not work with 100Mb connection.

Tip: If the media server is restarted, close and restart Picturall Commander as well.

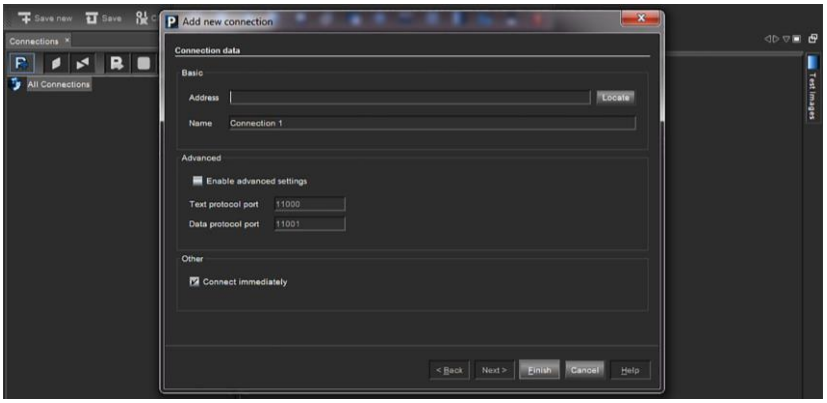


*Fig. 52 - **Add new connection dialog***

1. Connect the computer and the Picturall Series Media Server to the same network.
2. Use same netmask in the server and the computer if not using **DHCP server**. If **DHCP server** is enabled in the server, use automatic network settings in the computer.
3. Run Picturall Commander and click  **Add new connection** on the **Connections** tab.
4. Type the IP address of the server in the **Address** field or click **Locate** to automatically find the servers in the same network and view the server versions before connecting.
5. In the **Name** field, enter a name for the connection.
6. Under **Advanced**, change the values for Text protocol port and Data protocol port if needed.
7. If needed, uncheck **Connect immediately**.
8. Click **Finish** to Create the Connection. A message confirms the connection to the Picturall Series Media Server.

6.3 User Interface

The Picturall Commander user interface consists of a few basic elements:

- The main Commander toolbar.
- The control tabs.
- The control panels within the tabs.

The control tabs are positioned in the right, middle, left or bottom depending on their function.

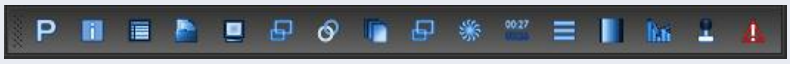
6.4 Control Tabs

Click **Window** then click any menu to open the corresponding control panel.

- **Connections:** Connect and reconnect to a server pressing Reconnect button. The main control tabs are available in the **Connections** tab.
- **Media:** Transfer media files to the Picturall Series Media Server and arrange the media library. For more information, see *Media* page 64.
- **Displays:** Configure the display setup. For more information, see *Displays* page 73.
- **Displays Graph:** Open the Display Graph in a whole tab for precise adjustment, see *Displays* page 73.
- **Genlock** (only for Picturall Pro equipped with optional sync card)**:** Check / Resync the genlock.

- **Layers:** Control all layer parameters. This is the main menu for controlling the Picturall Series Media Server with Picturall Commander. For more information, see *Layers* page 95.
- **Layers Graph:** Open the Layers Graph in a whole tab for precise adjustment, see *Layers* page 95.
- **GPUs:** Optimize the use of the GPUs.
- **Timecode:** Set the timecode format and offset.
- **Cues:** Program and time cues for the show.
- **Test images:** Configure test images to help when setting up the show.
- **Performance:** Check the performance and temperature of the server. For more information, see *10.3 Performance* page 135.
- **Control model:** Shows a tree structure of all the parameter information on the server.
- **Server info:** Opens a window with all server information.
- **Properties:** Shows additional information on a given selected item. Located in **Window > Properties**.

Tip: Open these menus in one click from the menu icons toolbar:



6.4.1 Arrange windows

Once a panel is opened, drag and drop a tab to customize the layout.
All tabs can be placed anywhere in the layout (top, bottom, left or right).

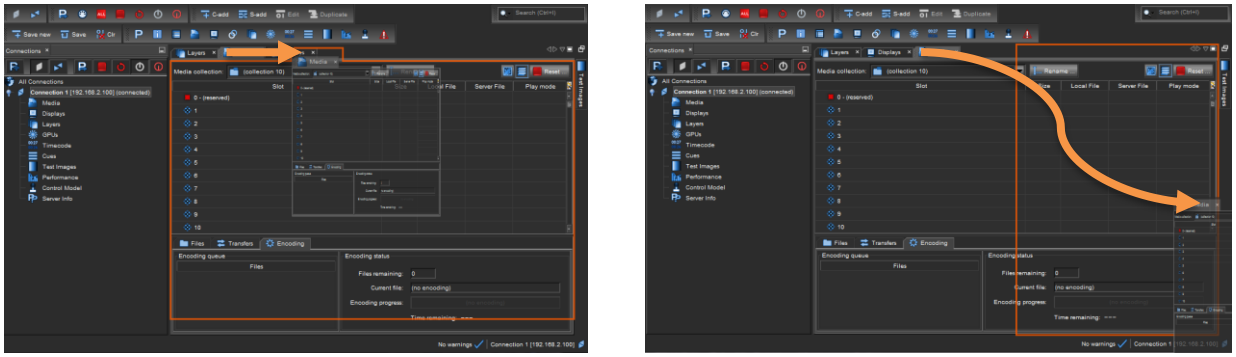


*Fig. 53 - **Windows arrangement***

6.4.2 Reset windows

If needed, reset the default layout by clicking **Window/ Reset windows**.

6.5 Preferences

Go to **Edit > Options** to set user preferences (**General**, **Media**, **Layer**, **Cue**, **Keymap** and **Logging**).

6.6 Hotkeys

Hotkeys can be set to several actions in Picturall Commander. Go to **Edit > Options > Keymap** to set custom hotkeys. Here is a list of common features using default hotkeys:

- Hold **Shift** while adjusting values to make fine adjustments to numerical sliders and control.
- Hold **Alt** and click parameter values or other settings to record or unrecord it in the Programmer. The value turns green if it is recorded. For more information, see *Program a Show - Cue* page 112.
- Hold **Ctrl** and click a parameter to reset it to default value. (Use **cmd** on Mac OS).
- Use **Alt** + arrow keys on the keyboard to change the selected control point on the **Warp** and **Keystone** tabs.
- Use **Ctrl** and click to reset a single control point on the Warp and Keystone tabs.

7 Media

In the **Media** menu, manage all contents that will be played during the show:

- import files to the server,
- encode media files,
- add web pages and video streams,
- organize server files and inputs in collections to be used in layers.

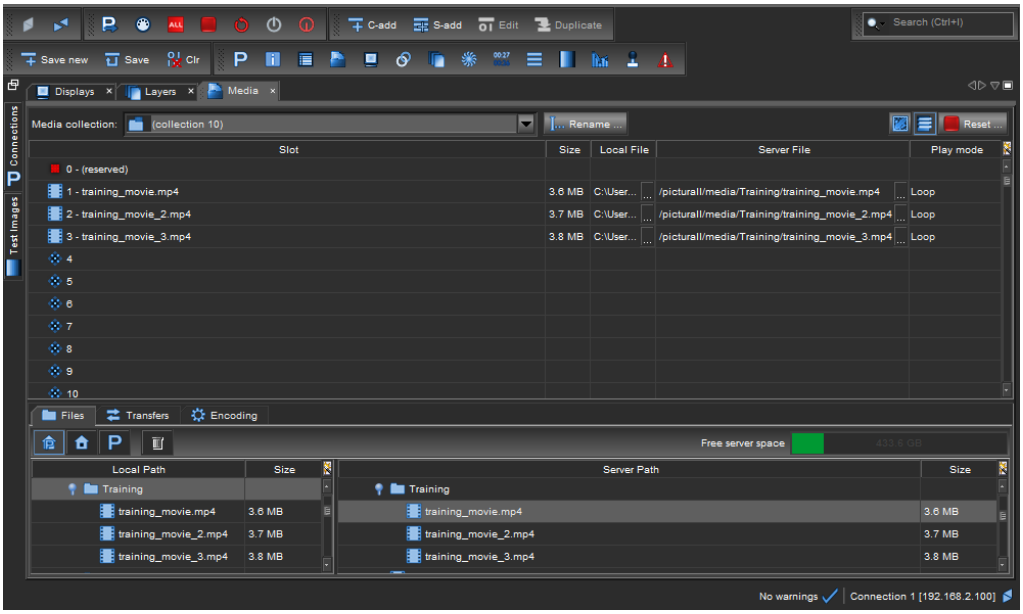


*Fig. 54 - **Picturall Commander Media menu***

The Media menu can be customized to show the media columns as needed. Right click a media library column name and select which columns to display or hide.

Tip: Media manager can also be found from the web configurator (see chapter 6.9)

7.1 Media types

Picturall Series Media Servers support the following codecs:

- AWX (also with alpha channel)
- HAP
- NotchLC
- ProRes
- MPEG1
- MPEG2
- MPEG4
- MJPEG
- H.264
- H.265
- PRKL (also with alpha channel)
- JPEG
- PNG (also with alpha channel)
- DPX (also as sequences)
- TGA (also as sequences)

AWX is a format designed by Analog Way specifically for the Picturall Series Media Servers. Encoding high resolution files (4K and higher) to AWX format is recommended for optimal performance.

All codecs can be played with nearly any frame rate and bit rate within the server performance limits.
Audio is supported in PCM, WAV and AAC formats (up to 24 output channels). Picturall media server also supports audio input from network streams, Chromium sources, and live input sources (with optional input card).
Web media is supported with VP8, VP9 and Theora.

7.2 Importing and encoding media files

Tip: If running Picturall Commander on Windows, it may be needed to disable the firewall to transfer files smoothly.

Note: The amount of free space on the server is displayed in the Free server space bar.

7.2.1 Import a local media file

To import a local media file to the server:

1. Select a media file in the **Local path** list or computer file browser. Hold **Ctrl** or **Shift** to select multiple files.
2. Drag and drop it on the media collection slot to use.

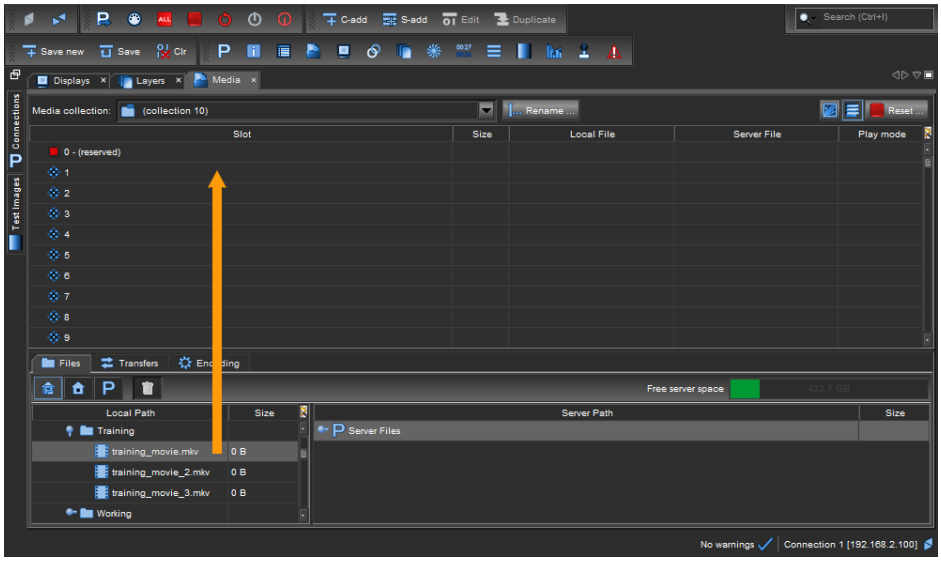
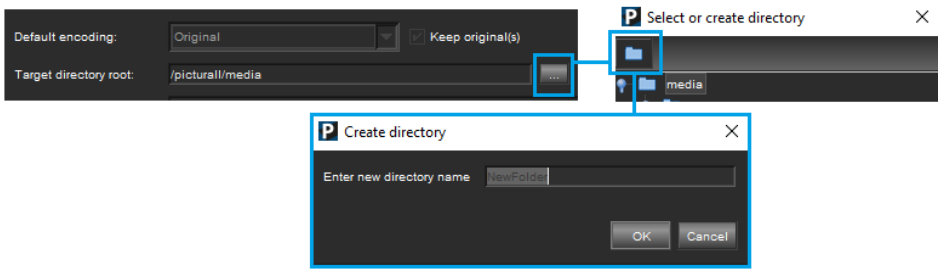


*Fig. 55 - **Importing a media file***

3. The **Local files to be transferred** window opens with a list of the importing files. If needed, set target directory and filename.
    a. To create a new folder during a media transfer, from the transfer dialogue click the … icon then the folder icon.



4. Click **OK**. The current transfer and encoding process bars are displayed on the Transfers subtab.

Note: After a file is imported on the server, it is impossible to change its filename and location.

If importing multiple folders, Picturall Commander puts all folders into their own media collections.

5. If needed, use **Cancel** buttons for canceling file transfer.

Media files added to the server are displayed in the Media collection and are available in **Server path** files.

7.2.2 Import and encode a file to AWX format

Tip: For optimal performance, encode 4K and higher files to **AWX** format (and **AWX Alpha** if alpha channel).

Note: Encoding is only applicable for original video files (no image and no PRKL or AWX file).

1. Select a media file in the **Local path** list or computer file browser. Hold **Ctrl** or **Shift** to select multiple files.
2. Drag and drop it on the media collection slot to use.
3. The **Local files to be transferred** window opens with a list of the importing files. If needed, set target directory and filename. Then click **OK**.
4. In the **Default encoding** dropdown, select **AWX** format (or **AWX** Alpha).
5. Click **OK**. The current transfer and encoding process bars are displayed on the **Transfers** subtab.
6. If needed, use **Cancel** buttons for canceling file transfer.

Media files added to the server are displayed in the Media collection and are available in **Server path** files.

7.2.3 Import an image sequence

With Picturall Commander it is possible to convert images and create an image sequence as one media object with uncompressed image quality.

Tip: - An image sequence must have at least 49 frames.
- Images must have the same filename ending in 000, 001, 002, etc. to be detected as a sequence.

To import an image sequence, follow these steps:

1. Select the images files in the **Local path** list or computer file browser. Hold **Ctrl** or **Shift** to select multiple files.
2. Drag and drop it on the media collection slot to use.

   Tip: Group the images in one folder then drag and drop the whole folder.

   The **Local files to be transferred** window opens with a list of the importing files.
3. Enter the number of Frames per second (FPS).
4. If needed, select the encoding format and choose to keep the original images on the server as individual files.
5. If needed, set target directory and filename.

   Note: After a file is imported on the server, it is impossible to change its filename and location.
6. Click **OK**. The current transfer and encoding process bars are displayed on the Transfers subtab.

7.2.4 Import a media using FTP

Caution (Risk of server crashing): Do not overwrite files that are playing on the server through an FTP connection.

Tip: Importing media using FTP can slow down the media server. Avoid transferring large files during a show or while making changes to the configuration.

To import media through FTP connection, follow these steps:

1. Open an FTP connection to the Picturall Series Media Server.
2. Log in:
   - **Username:** picmedia
   - **Password:** aidemcip
3. Import the media files to the server. The media are located in */picturall/media*.

7.2.5 Reuse imported media files – Add server files to a media collection

To add media files already present on the server to a media collection, follow these steps:

1. Select a media file in the **Server path** list. Hold **Ctrl** or **Shift** to select multiple files.
2. Drag and drop it on the media collection slot to use.

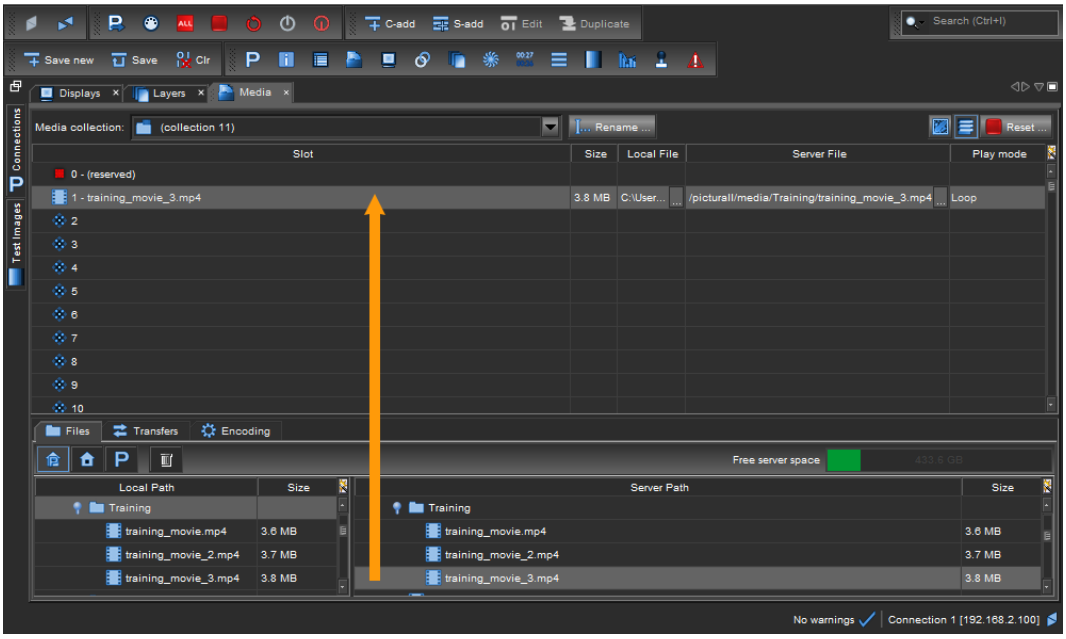


*Fig. 56 - **Add a server file to a media collection***

3. If adding multiple folders, Picturall Commander will automatically put all folders into their own media collections.

7.2.6 Encode a media file present on the server

Tip: For optimal performance, encode 4K and higher files to **AWX** format (and **AWX Alpha** if alpha channel).

Note: Encoding is only applicable for original video files (no image and no PRKL or AWX file).

1. Right-click a media file in the **Server path** list. Hold **Ctrl** or **Shift** to select multiple files.
2. Click **Encode files…**
3. The **Remote files to be encoded** window opens with a list of the encoding files.
4. In the **Default encoding** dropdown, select **AWX** format (or **AWX** Alpha).
5. If needed, set target directory and filename. Then click **OK**.
6. Click **OK**. The current encoding process bars are displayed on the **Transfers** subtab.
7. If needed, use **Cancel** buttons.

Tip: Right-click a media file and click **Encode to > Encode to AWX** to quickly encode to the same location and with the same filename.

7.2.7 Encoding media to AWX format without a Picturall Series Media Server

Using Adobe Creative Cloud with AWX plugin, media files can be encoded into AWX, AWX HQ and AWX Alpha format without using a Picturall Series Media Server.
The free AWX encoder plugin for Adobe CC suite is available for download on www.analogway.com.

Note: - AWX plugin is available for Adobe Media Encoder and Adobe Premiere.
- An active license for Adobe CC is needed. Visit https://www.adobe.com/creativecloud.html or refer to Adobe website.

7.2.7.1 Install AWX plugin

Download the installer for Windows or MAC and install the plugin to your system. The applicable Adobe products must be installed before installing the plugin. Start the install process and Install the plugin in the Adobe plugins folder.

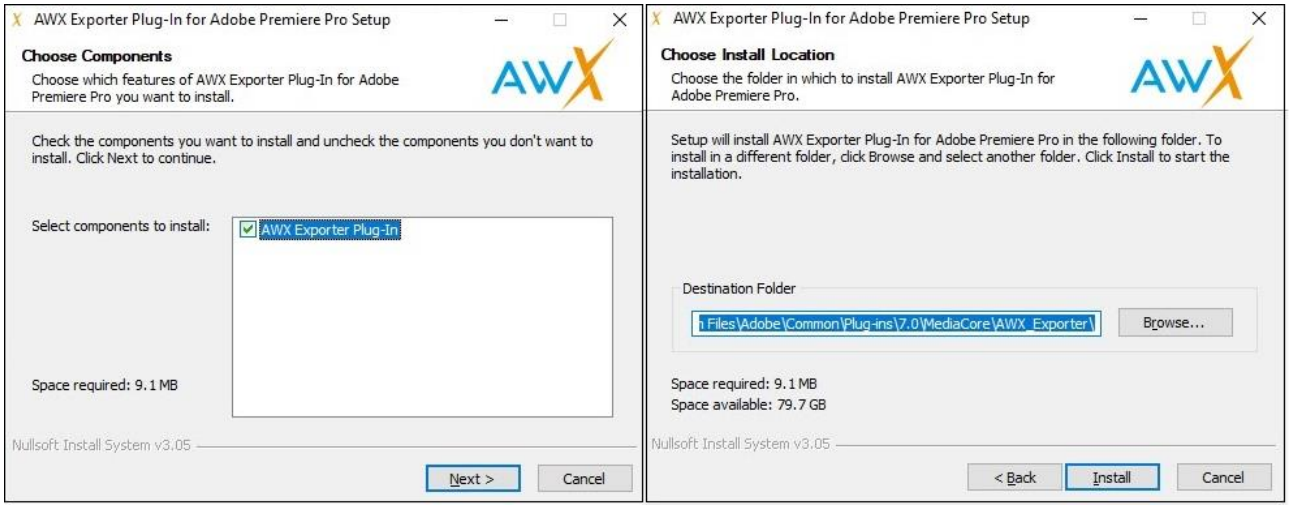


*Fig. 57 - **AWX plugin installation (Windows)***

7.2.7.2 Export a video in AWX format

1. After the installing the AWX plugin, run Adobe CC Media encoder.
2. In **Export Settings**, select AWX format.
3. In the Video tab, set video settings and select which AWX codec to use in the **Codec** dropdown menu.

Files encoded to AWX format is ready to be uploaded to a Picturall Series Media Server for playback.

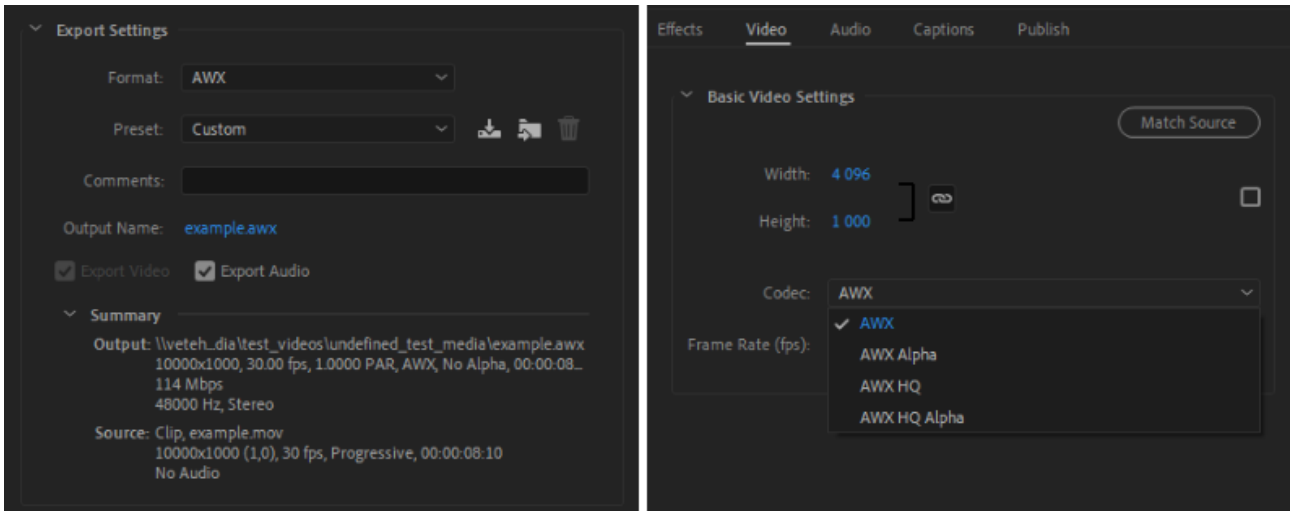


*Fig. 58 - **AWX plugin encoding options***

7.3 Edit server filenames and location

Editing server filenames and location is only possible when using an FTP client.

1. Open an FTP connection to the Picturall Series Media Server.
2. Log in:
   - **Username:** picmedia
   - **Password:** aidemcip
3. Go to */picturall/media*. The Server files are displayed.
4. Edit the media filenames and location

7.4 Add inputs to a media collection

Note: Inputs are only available for Media Servers equipped with optional input cards.

An input is available as a **Server File** if it is connected to the media server.
To add an input to a media collection, follow these steps:

1. Select an input in the **Server path** list. Hold **Ctrl** or **Shift** to select multiple inputs.
2. Drag and drop it on the media collection slot to use.

7.5 Add web pages and video streams

7.5.1 Add a web page to a media collection

Picturall Series Media Servers connected to the internet support web page playback. Multiple web pages can be played at the same time and background transparency is supported.

Note: Web page sound and interaction are not supported in Picturall Commander. For more information see *Appendix F* page 166.

To add a web page to a media collection, follow these steps:

1. In the **Server path** list, under **Network**, select **Web page**.
2. Drag and drop it on the media collection slot to use.

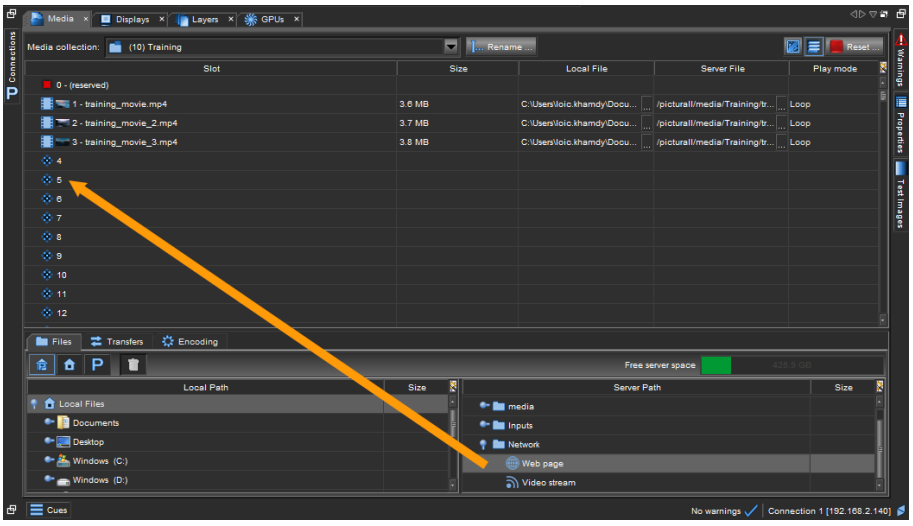


*Fig. 59 - **Add a web page to a media collection***

3. A window opens, enter the Web page address (URL), the reload timing and the browser window width and height in pixels.
4. Click **OK**.

Note: After a web page is added to a collection, it is impossible to change its URL.

7.5.2 Import a web page using FTP

Caution (Risk of server crashing): Do not overwrite files that are playing on the server through an FTP connection.

To import a web page through FTP connection, follow these steps:

1. Open an FTP connection to the Picturall Series Media Server.
2. Log in:
   - **Username:** picmedia
   - **Password:** aidemcip
3. Import the files to the server.

The imported files are located in */picturall/media/.webpages/*.

7.5.3 Add FTP imported web page to a media collection

To add an FTP imported web page:

1. In the **Server path** list, under **Network**, select **Web page**.
2. Drag and drop it on the media collection slot to use.
3. A window opens, enter the URL to the html file starting with **http://localhost/webpages/**
4. Enter the browser window width and height in pixels.
5. Click **OK**.

Note: After a web page is added to a collection, it is impossible to change its URL.

7.5.4 Add a URL video stream to the server

Picturall Media Servers connected to the internet support video stream playback (URL):

- RTSP (rtsp://)
- RTMP (rtmp://)
- SRT (srt://)
- UDP (udp://)

To add a video stream to a media collection, follow these steps:

1. In the **Server path** list, under **Network**, select **Video stream**.
2. Drag and drop it on the media collection slot to use.
3. A window opens, enter the Video stream URL.
4. If using RTSP, set transport parameters.
5. Click **OK**.

Note: After a video stream is added to a collection, it is impossible to change its URL.

7.5.5 Add an NDI video stream to the server

Note: - NDI™ is a trademark of NewTek, Inc. For more information, see **https://ndi.tv/**

- NDI™ streams connected on the network are available in the **Server path**.

To add an NDI video stream to a media collection, follow these steps:

1. In the **Server path** list, under **Network** > **NDI**, select and available NDI video stream.
2. Drag and drop it on the media collection slot to use.
   A window opens with the URL already entered.
3. Click **OK**.

7.6 Add a custom text

Create a text with custom settings (font, style, size, color and resolution).

To add a custom text to a media collection, follow these steps:

1. In the **Server path** list, under **Generators**, select **Text generator**.
2. Drag and drop it on the media collection slot to use.
3. A window opens, enter a text and set the parameters.
4. Click **OK**.

To edit a custom text, right-click it in the **Media tab** or in the **Layers tab** in **Media selection** then choose **Edit**.

7.7 Add SPX graphics

To add a SPX graphics to a media collection, follow these steps:

1. In the **Server path** list, under **Generators**, select **SPX graphics**
2. Drag and drop it on the media collection slot to use.
3. A window opens, enter the graphics details:
    a. Set the resolution of the SPX layer

NOTE: If you are using custom SPX templates make sure that the template scales correctly to your target resolution.

    b. Define the SPX layers that will be displayed on this SPX graphics (default All)
    c. Set the SPX layer to display either Program or Preview (default Program)
4. Click **OK**.

For more detailed instructions to use SPX graphics see ch. 5.2.

TIP: All the SPX layers will have the same default name “SPX graphics” in the Media collection. If you are using more than one SPX rundowns or graphics settings in your show with separate SPX layers, rename the SPX media accordingly.

7.8 Manage Media Collections

- Select a media collection in the Media collection dropdown on the top part of the Media tab.
- Rename the media collection using the **Rename…** button.
- To delete a media from a collection, right-click it and select Delete.
- To delete all media files from all collections, click the **Reset…** button.

7.9 Default Media transition

Define a default media transition from the Media collection.

Note: Media transition can also be set in the **Layers** menu.

7.9.1 End action (Media)

To define the default action at end of the playback of one media, click the dropdown in the **Play mode** column and select an end action.

End action	Description (at the end of the media)
Loop	Loop the media file.
Loop collection	Play the next media in collection and loop. At the end of the last media, replay the collection from the first media.
Next	Play the next media in collection. At the end of the last media, stop the playback.
Pause	Pause the playback (still frame).
Stop	Stop the playback (no frame).

7.9.2 Media Crossfade

During a Crossfade, the Media Server starts to play the next media at the same time as the end of the current one for a smooth crossfade.

To define the default crossfade setting for one media, click the dropdown in the **Crossfade** column and select a Crossfade style or right-click a media and select **Edit media fading settings**.

*Fig. 60 - **Media Crossfade settings***

Crossfade setting	Description
Crossfade type	Select a transition between the available Crossfades styles.
Duration	Set the crossfade duration in seconds.
Smoothing	Set the smoothness of the fade from 0 to 1. 0 is sharper and 1 is smoother.

Note: - If the two media files have different frame rates, the transition uses the highest frame rate.
- Audio crossfade is always linear.

7.9.3 Media Fade in / Fade out

Media can be set to fade in at the beginning of the playback and/or fade out at the end. Default values for fade in and fade out can be set with a right-click on a media and select **Edit media fading settings.**

Tip: Enable **Fade at loop point** to automatically fade when looping.

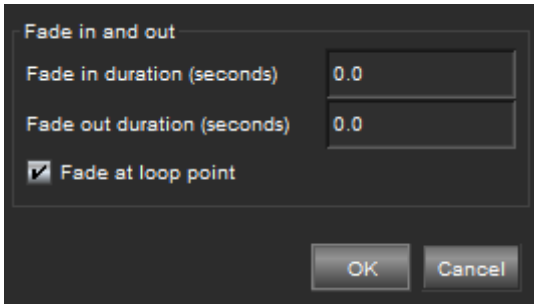


*Fig. 61 - **Media Fade in/Fade out settings***

8 Displays

In the **Displays** menu, configure the displays of the show. Default display name includes display resolution and refresh rate when available.

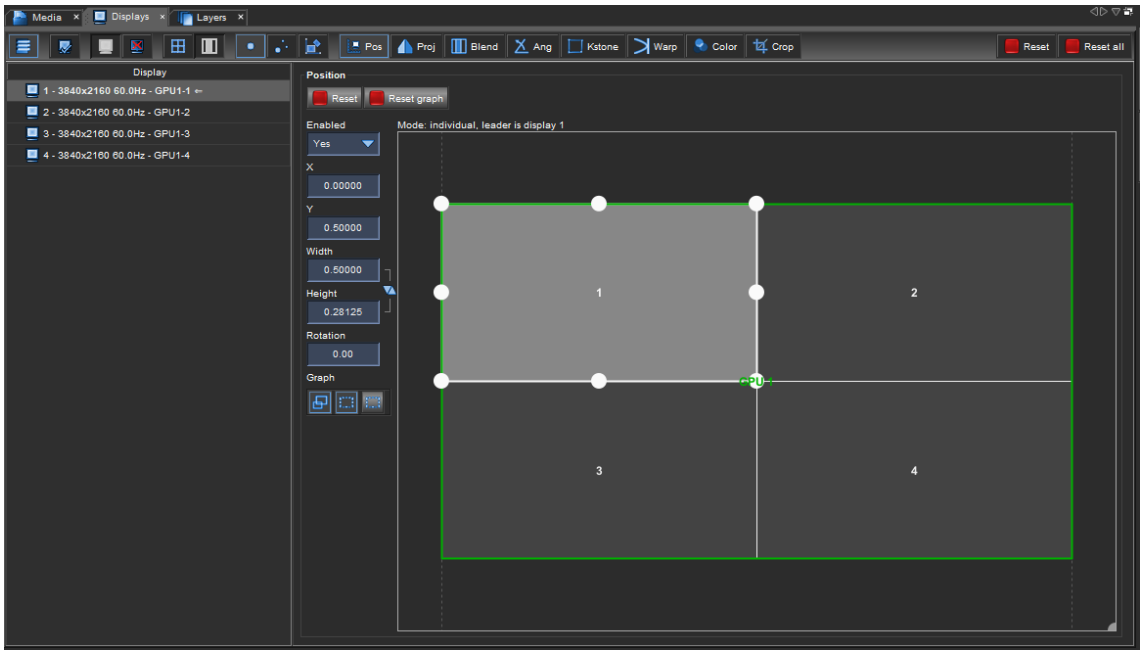
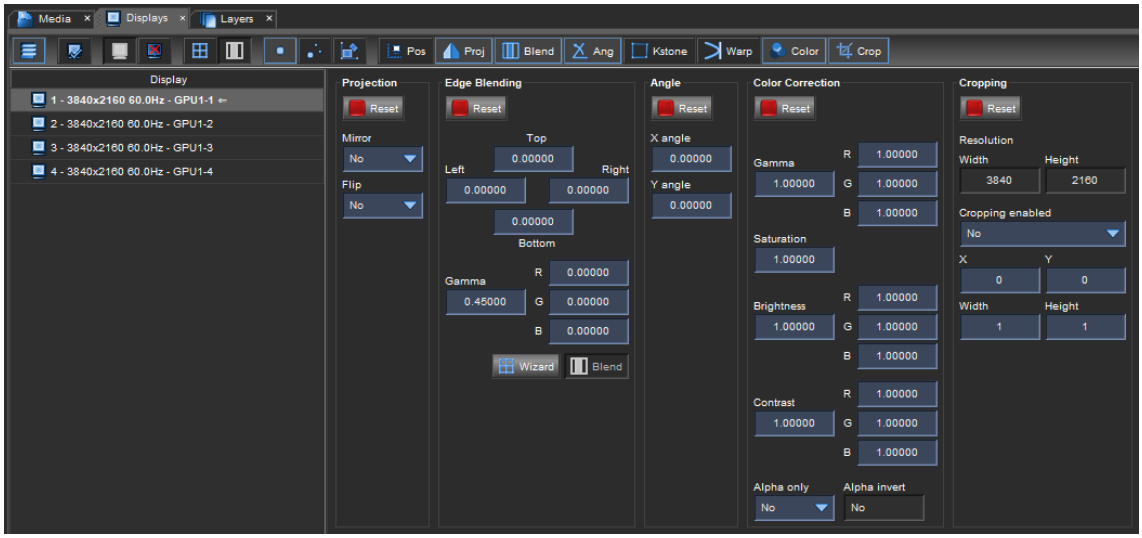


*Fig. 62 - **Picturall Commander Display Menu***

1. Select a display from the **Display** list.
2. At the right of the **Display** list, there are control panels to adjust the display. Click the tabs (Pos, Proj, etc.) to show or hide the corresponding panels.



Tip: To rename the display, right-click a display and select Rename.

8.1 Display menu icons

Icon	Description
	Show / hide the display list.
	Select all enabled displays.
	Enable selected displays.
	Disable selected displays.
	Opens the Display wizard to create a group of displays (see *Multi-display screen - Display wizard* page 76).
	Blend the selected group of displays (see *Multi-display screen - Display wizard* page 76).
	Enable/disable adjusting selected displays as a group.
	Enable/disable adjusting single display as a group.
	Set current state as a default, adjustments become relative to this state.

8.2 Display adjustment tabs

Adjustment tab	Description
Positioning	Place, transform, and enable/disable displays
Projection	Flip and mirror
Edge blending	Edge blending functions
Angle	Distortion (for example to correct a projection onto a screen from an angle)
Keystone	Keystone
Warp	Curved surface projection
Color correction	Display color correction
Cropping	Crop the display

8.3 Test images

Picturall Commander provides test images to help setup.

- Double-click the **Test images** button on the **Connections** tab (or click the icon in the menu toolbar) to open the **Test images** tab on the right side.
- Select the test images to be displayed.

Test image	Description
Line width	Adjust the line width in a test image using the slide bar.
Blue background	Show display areas that are not drawn in blue. Use when adjusting Keystone or curved surface correction.
Canvas grid	Show white continuous grid across the composition. Also shows yellow X in the middle of composition. Use for final adjustments.
Canvas lines	Show multicolored lines in selected angle. Use the checkboxes for defining the line orientation. Use when adjusting display positions and bezel corrections.
Blend areas	Show display borders, edge blend area and edge blend center. Use when adjusting edge blends.
Display borders	Show display borders with white lines. Use when adjusting keystone.
Display numbers	Show the display number of each display. Use to identify displays and make sure they are properly connected.
(Selected) Display grid	Show grid and middle point of selected display. Use when adjusting angle and curved surface corrections.
Control points	Show selected control points on the output. The selected control point turns from green to red on the output. If selecting multiple points, only one point turns red.
Layer borders / Layer numbers	Show layer borders and/or numbers. Use to identify layers and help position them in the show.
System info	Show server IP address, display number, output resolution and system runtime. This test image is enabled on first boot, and after Media Server update.

Table 5 - Test images

8.4 Positioning and Grouping Displays

1. Select the display to control in the Display list.
2. Open the **Positioning** panel and adjust the position, size, aspect ratio and rotation for the display. Drag or scroll to adjust the values (hold **Shift** for precise adjustments).

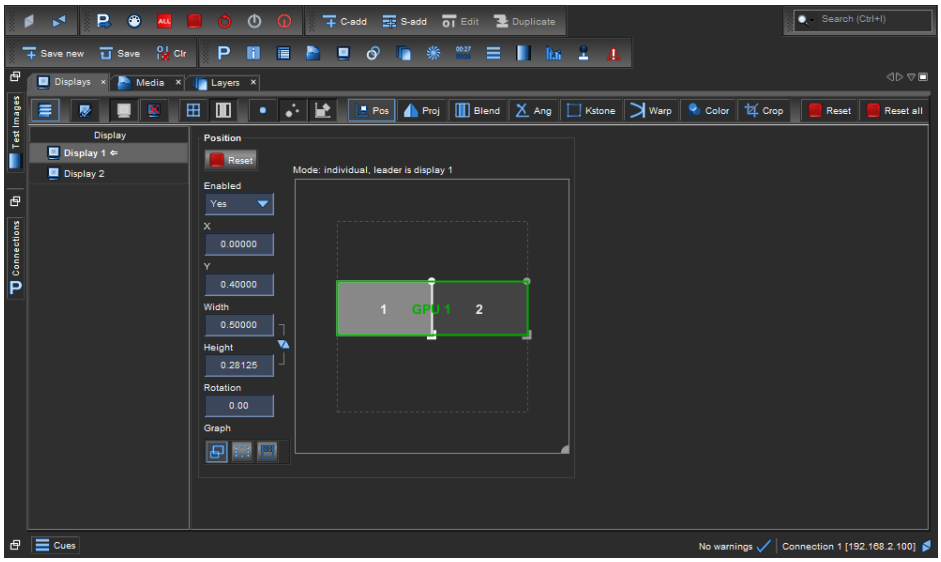


*Fig. 63 - **Positioning panel***

3. If needed, open the **Projection** panel to mirror and flip the image.

Tips: - Right-click a parameter and select Edit to enter numerical values.

- Position the displays from the same graphics card close to each other to avoid performance loss.
- For best performance, disable displays when they are not used.
- Copy and paste settings from one display to the other by selecting displays and clicking Copy and Paste buttons. It is possible to copy and paste one object over several objects and vice versa.

- Go to **Windows / Displays Graph** to open the display graph in a separate tab.

8.4.1 Multi-display screen – Display wizard

Displays can be arranged in groups to allow control of multiple displays at once. The Display wizard helps creating screens made with multiple displays.

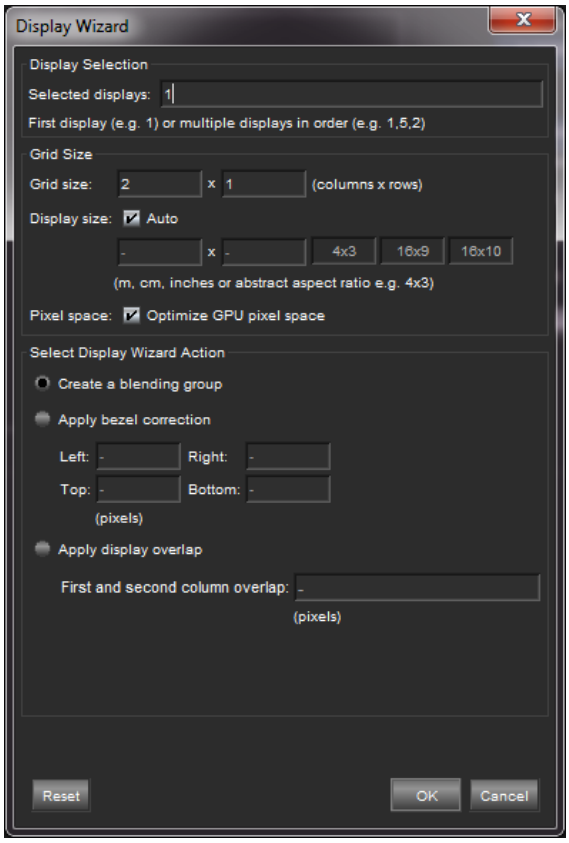


*Fig. 64 - **Display wizard***

1. Click the **Display Wizard** button  in the Edge blending panel, or in the **Displays** tab toolbar. If displays are selected, they are automatically added to the **Selected displays** field.

Preselected displays appear in order of selection.

2. In the **Selected displays** field, enter the displays in order (1,2,4,8) or just the first one if they are ordered logically.
3. Enter the **Grid size** and display aspect ratio.
4. If needed, create a **Blending** and set the blending size (see Edge Blending page 77).
5. If needed, use **Bezel correction** to correct video wall bezels. Enter the display total dimensions and bezel width and height.
6. Click **OK** to create the display group.

8.4.2 Reset Display

- Hold **Ctrl** and click a field to reset the value.
- Use the Adjustment tab **Reset** button to reset the corresponding parameter for the selected display.
- Use the Upper right **Reset** button to reset all parameters from the selected display.
- Use the **Reset all** button to reset all displays.

8.5 Optimize pixel space – GPUs tab

Pixel space optimization is a calculation that optimizes graphic card performance with the current display setup. It ensures best performance and sharpest image.
By default, automatic pixel space optimization is triggered every 5 seconds.
To change it to 1 second or to disable it, go to **Edit > Options**.

If auto optimization is disabled, it is still possible to trigger an optimization manually:
- Open the **GPUs** menu and click **Optimize**.

Note: For more information about GPU optimization, see Optimize GPU resolution and drawing performance page 150.

8.6 Edge Blending

Edge blending is a feature that gradually fades out the overlapping area from both projectors to create a seamless projection.

8.6.1 Keystone and Angle Correction

The Keystone correction tool moved the picture corners on the display. Use Keystone when the projection angle is not optimal.

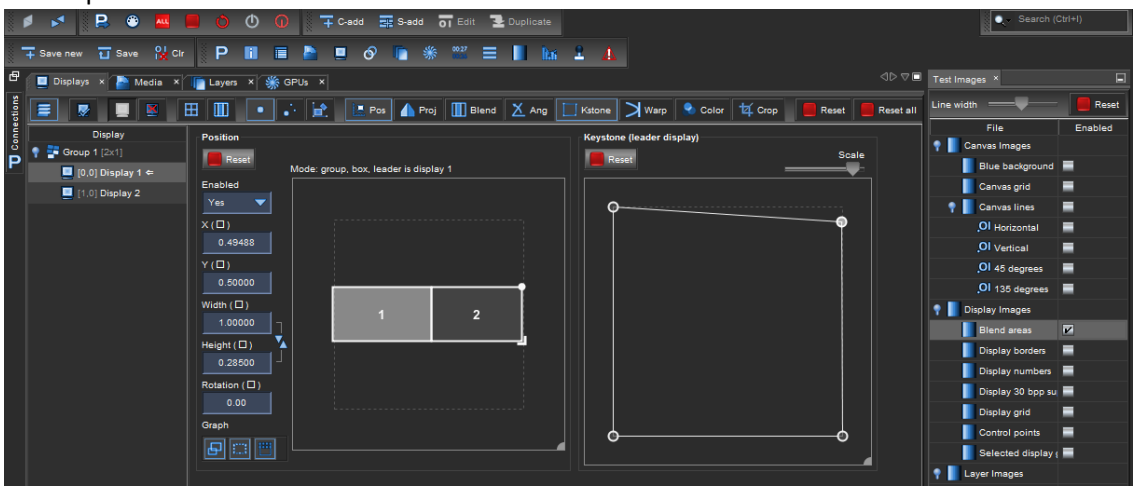


*Fig. 65 - **Keystone and Angle correction***

1. Open the **Test images** tab and enable the **Display borders** test image.
2. Go to **Displays** and select the display to control in the Display list.
3. Open the **Keystone** panel.
4. Click and drag the corners to correct the position or click the corner and use arrow keys to move it. It is possible to select multiple points. Hold the **Shift** key for more precise adjustments.
5. If needed, open the **Angle** panel to correct the image with Angle controls.
6. Enable the **Display grid** test image.
7. Adjust X angle and Y angle controls until the red cross is in the middle of the projection.

8.6.2 Edge Blending panel

1. Open the **Test images** side panel and enable the **Blend areas** test image.
2. Open the **Edge Blending** panel, then click the **Display Wizard** button  to create a display grid.
3. Check the **Create blending group** box to group the displays and click **OK** to create the group.
4. In the **Displays list**, select the first display of the group.
5. In the **Edge blending** control panel, use the **Left**, **Right**, **Top** and **Bottom** controls to set edge blending size. Hold **Shift** for precise adjustment or right-click to enter a value.
6. Adjust the value until the red line overlaps with the border of the adjacent display.
7. Select the other displays of the group and repeat the adjustment step (red line overlap).
8. When all overlaps are done, click the **Blend** button to enable edge blend.
9. Open the **GPUs** menu, click **Optimize** for best performance.

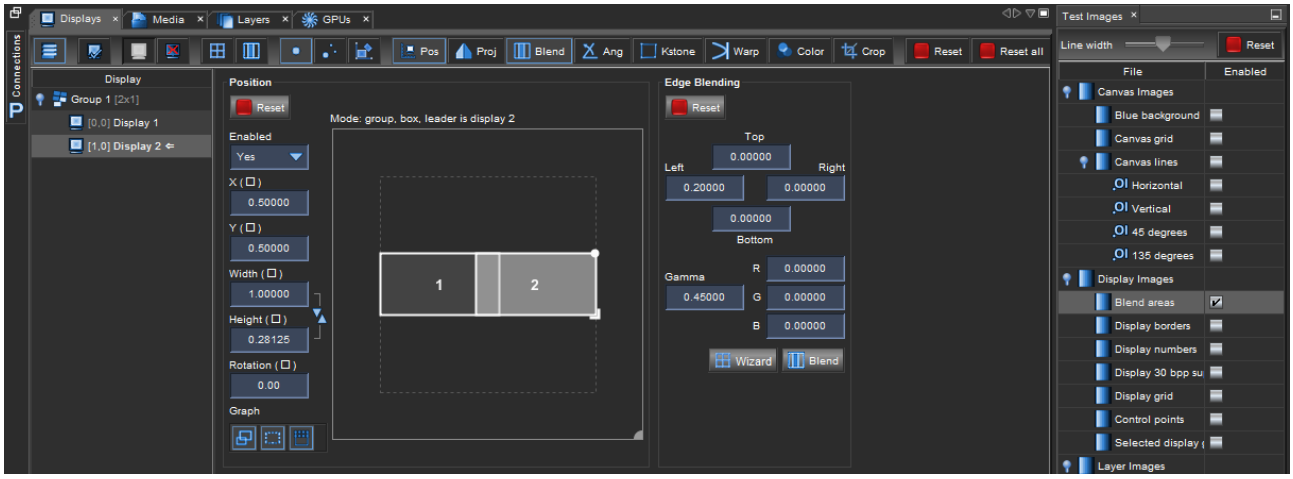


*Fig. 66 - **Edge blending panel***

Tip: If blend area is brighter or dimmer than rest of the picture, use the Gamma setting to correct the image. The color correction is also possible with the RGB controls.

Note: When clicking Blend, the displays overlap and sizes are automatically calculated from blend values. The result is displayed on the Positioning area.

8.6.3 Edge blending example

The following is an example for making a three-projector blend of displays 1, 2 and 3:

1. Open the **Test images** side panel and enable the **Blend areas** test image.
2. Open the **Edge Blending** panel, click the **Display Wizard** button  to create a display grid.
3. Enter Display number (1), Grid size (3x1) and Aspect ratio (16:9).
4. Check the **Create blending group** box to group the displays and click **OK** to create the group.
5. In the **Displays list**, select Display 1 and open the **Edge blending** control panel.
6. Adjust the **Right** value until the red line overlaps with the left border of Display 2.
7. Select Display 2 and adjust **Left** and **Right** until overlap.
8. Select Display 3 and adjust **Left** until overlap.
9. Click **Blend** to enable the edge blend.
10. If needed, correct the Gamma and RGB.
11. Open the **GPUs** menu, click **Optimize** for best performance.

8.7 Adjust curved surface projection – Warp correction

Warp correction transforms the display for curved surface projection or projector lens distortion. There are 16 control points.

Tip: Use the **Display borders**, **Display grid** and **Canvas grid** test images.

1. Go to **Displays** and select the display to control in the Display list.
2. Open the **Warp** panel.
3. Click and drag a point to correct the position or use arrow keys to move it. It is possible to select multiple points. Hold the **Shift** key for more precise adjustments.

Use **Alt** + arrow keys to change the selected control point, and **Ctrl** + click to reset a point.

8.8 Vioso Autocalibration

NOTE: VIOSO Autocalibration in Picturall requires an autocalibration license for all the projectors used in the setup.

Picturall Media servers support camera based autocalibration by Vioso. Any Picturall server which is compatible with firmware version 3.5.0 or newer can be used with Vioso calibration tools.

Key benefit with using autocalibration is that it makes multi projector setups easy and reliable with automatic geometric adjustments, automatic warping and blending and color matching. Compared to tools offered with Picturall Commander UI, the autocalibration makes possible to create 360-degree projections, dome projections and projection mapping among others.

Autocalibration requirements:

- Analog Way Picturall Media server (compatible with firmware 3.5.0 or newer)
- Analog Way Vioso tools (for Windows only / downloadable from AW website)
- Projectors (connected to the AW Picturall server)
- Camera (connected to a Windows pc running the AW Vioso tools)
    - One or more, depending on the scale of the projection
    - Multi-camera calibration requires a license that supports more than one camera

8.8.1 Autocalibration example for two projectors on a curved surface

For a general use-case of camera based autocalibration tool, here is a quick process rundown how to setup a projection using the Vioso tools. The setup here is created with

- Analog Way Picturall Pro
- Two projectors
- One camera
- A curved surface made from two separate parts (upper and lower half)

For more Vioso autocalibration examples, see the video tutorials from the Vioso help-desk website.

Start by setting up the projectors so that the combined projection area covers the whole target area. Use for example the server planned to run the show to play some content from the projectors to show the projection areas. Then place the camera to a position where it sees the whole projection surface. Make sure that the projectors and the camera are secured so that they don’t move during the calibration process.

Install the Analog Way Vioso tools from the AW website to the Windows 10 or 11 PC which has the camera connected.

NOTE: Vioso calibration tools and the Picturall server **communicate over the network via NDI signals** (to send test images and patterns).

Check your network settings to verify that NDI signals can connect. See more how to add NDI into your network from Newtek **website**.

8.8.1.1 Picturall Display Configuration software

After installing the Analog Way Vioso tools begin with starting up the Picturall display configurator. With this program a new project is created for the calibration.

NOTE: Vioso autocalibration tools require Windows 10 or 11 (64-bit) to work properly.

- Set the Project name and Project path in the installation folder.
- Available network adapter is auto filled.
- Set the address of the target server and click Configure.
    - It will get the information on available displays/projectors from the server.

After setting up the project name and defining the ip of the server the program scans the server resources (outputs) that are available for the projection mapping. After this process, the program then pushes the information to Projector and display setup.

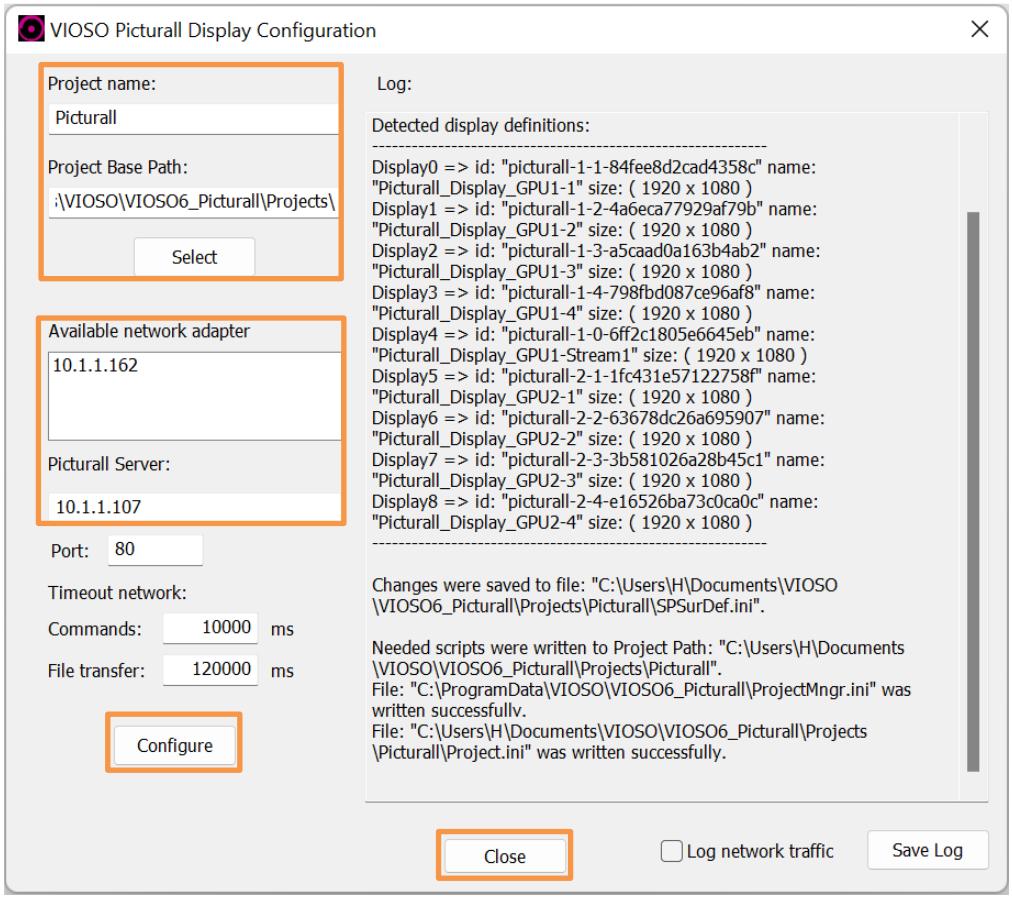
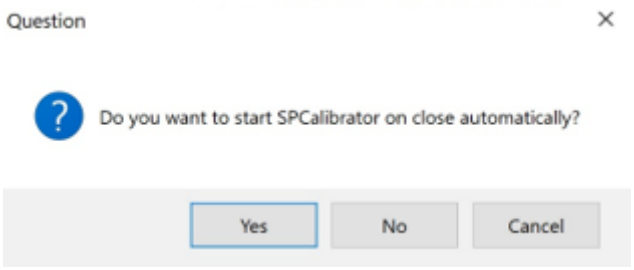


*Fig. 67 - **Vioso Picturall display configurator***

Once these settings are done, you can click close. The software will prompt you to start the calibrator application. Clicking Yes will open the Projector and display setup tool.



8.8.1.2 Projector and Display setup

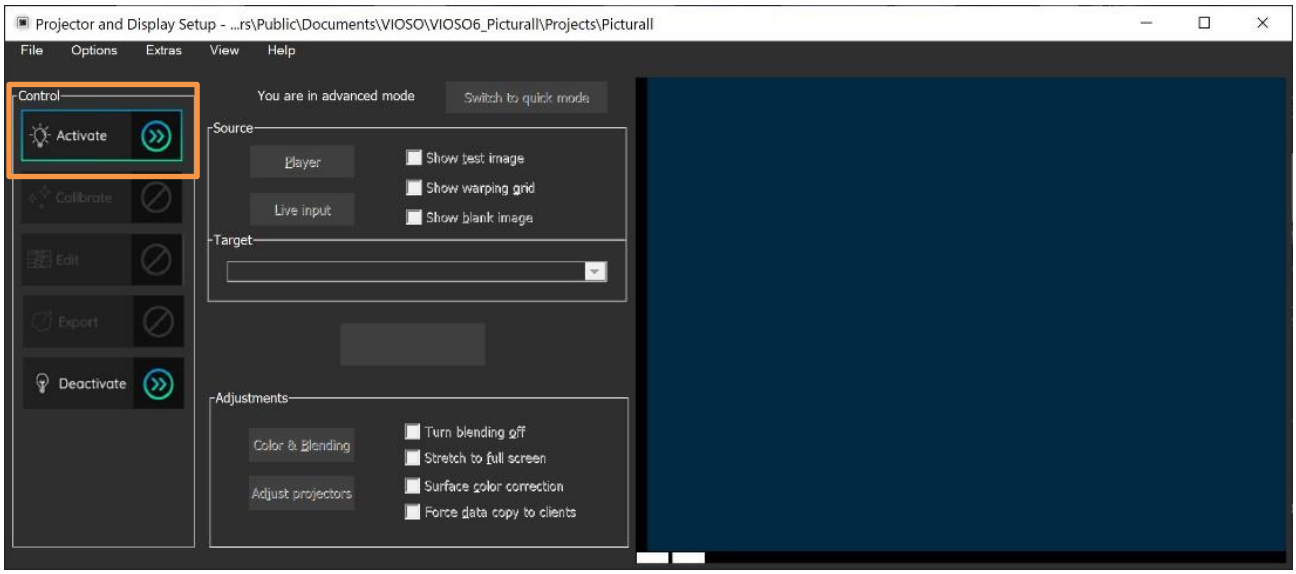


*Fig. 68 - **Autocalibration Projector and Display setup***

After the configuration with the Display configuration, continue the process with the Projector and Display setup software. Start by clicking Activate. If the setup with the Display configuration was done correctly, the Vioso calibration test image should now be output from all connected display devices and projectors. This will turn any ongoing show off in the server and make it possible to start the calibration.

Fig. 69 - ***Autocalibration process begins***

Select the server outputs connected to the displays/projectors you wish to calibrate, and the camera. In this example we are doing a curved screen with two projectors. Then define how the projectors are mounted. Projectors are selected to be in an arbitrary grid for the how the projectors are placed. Pressing the Next-button at the bottom-right corner will proceed with the process. Pressing the Back-button will return to the previous setup phase.

> Note: Vioso autocalibration cannot be started from the Picturall Commander, but if the calibration is running, it can be stopped with the Commander.

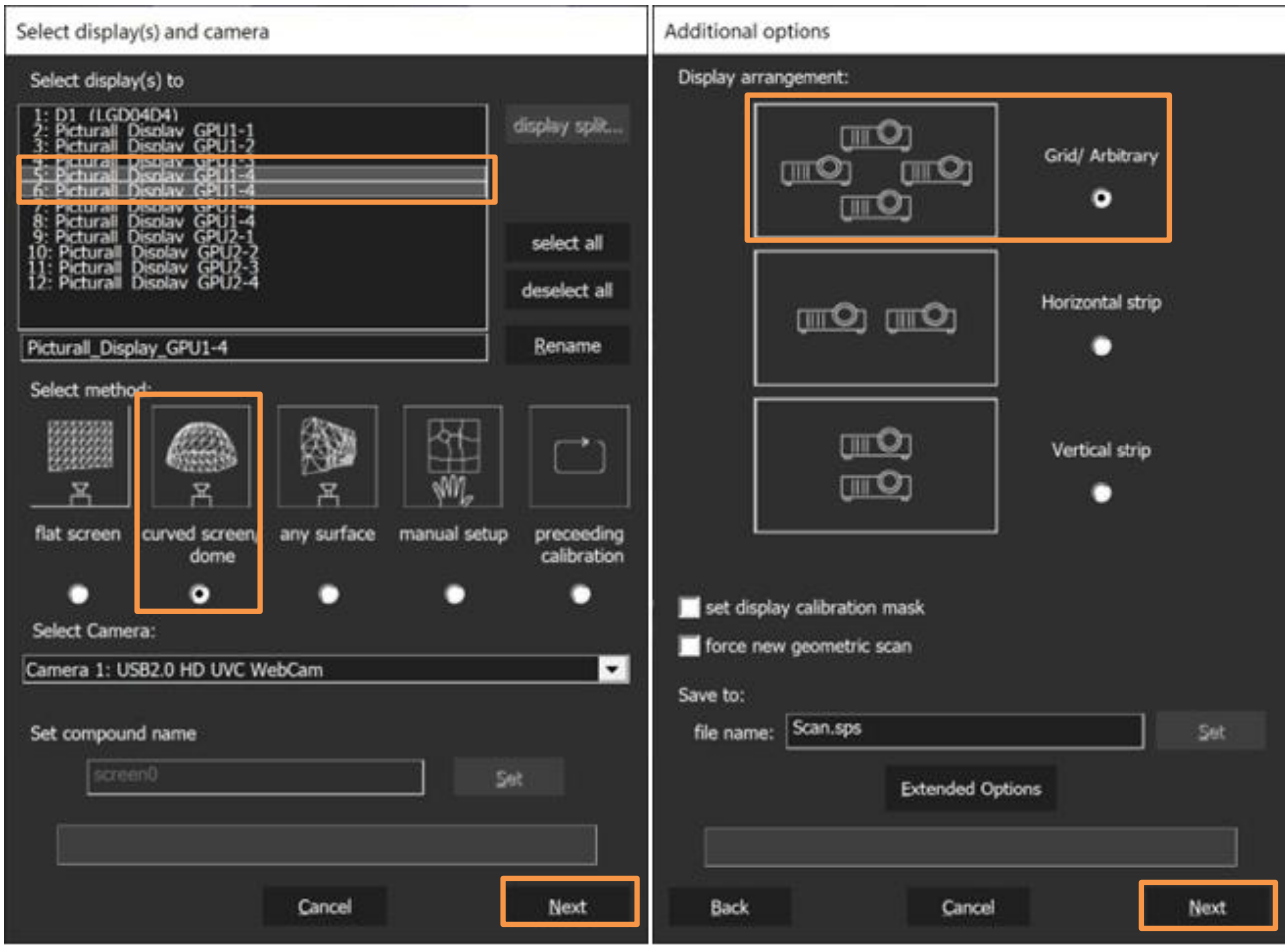


*Fig. 70 - **Autocalibration: outputs, camera, and projector arrangement***

Next, we adjust the camera and its options. If the color is clearly off, you can test to set the white balance to automatic. Adjust other camera properties if required.

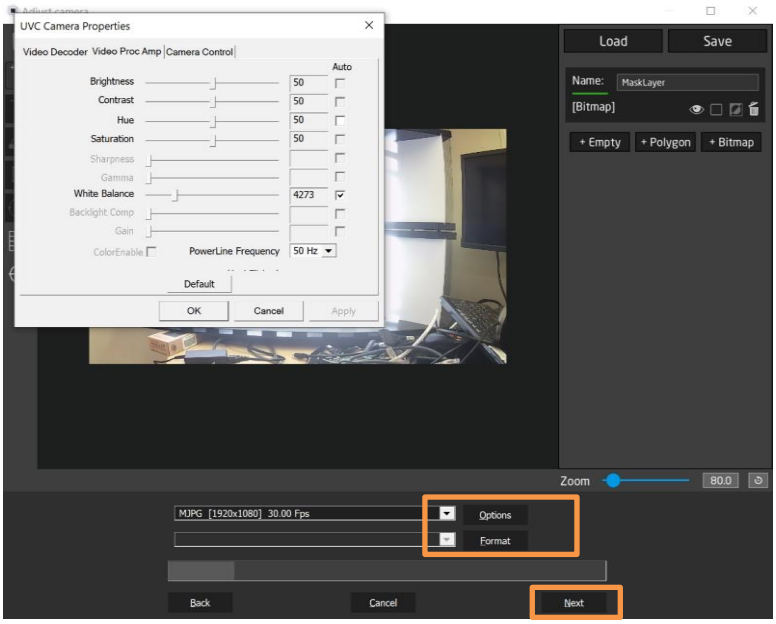


*Fig. 71 - **Autocalibration: adjust camera colors***

Next, create a mask for what the camera sees. This is not to limit where the projection will go, but to tell the calibrator which portions of what the camera sees it can ignore. The tools to draw the required masked areas are located on the left-hand side tool bar and can be made to any shape and size (within the camera view). Create as many masks as needed. The created masks will be listed and be available for later editing on a list at the right-hand side.

In this example, a mask to block out the middle stripe, and another to let in the full area of the curved surface was created. The middle bit is set to inverse. Now if the camera sees bright spots anywhere that is covered by red in this image, it will ignore them for the purpose of the calibration later.

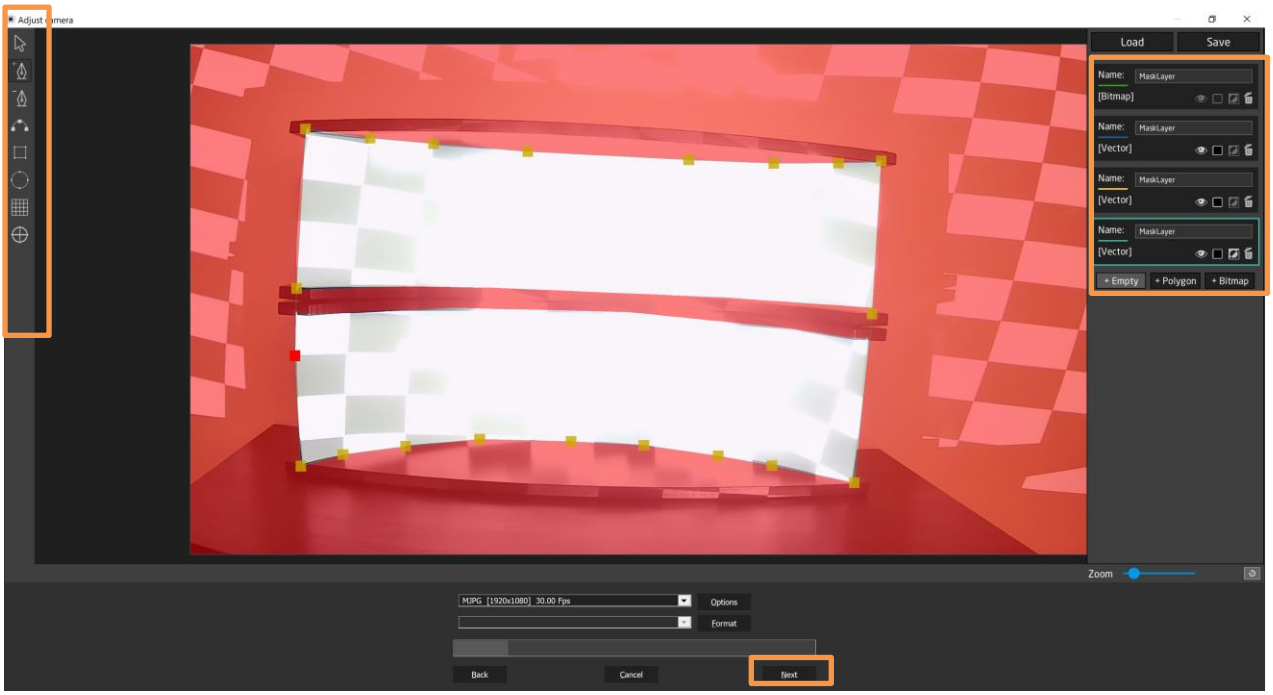


*Fig. 72 - **Autocalibration: mask out unwanted projection areas***

Next, adjust the brightness of the projector until the edges of the projection are a nice sharp line.

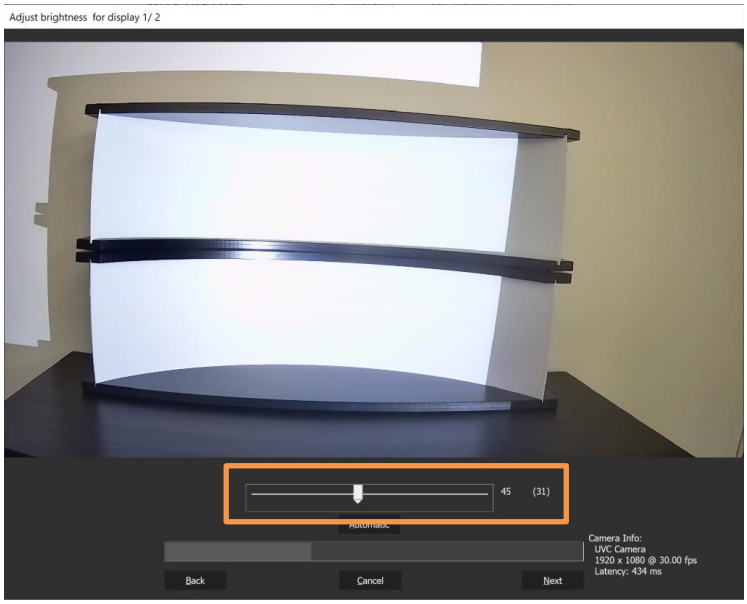


*Fig. 73 - **Autocalibration: adjust the projector brightness***

Next, we are ready to start scanning and calibrating the first projector. The previous configuration steps will be done to each projector defined for the project. If a scan was previously done, it can be reused, but it will only be valid if the projectors or the camera have not moved. Click Perform new scan to begin.

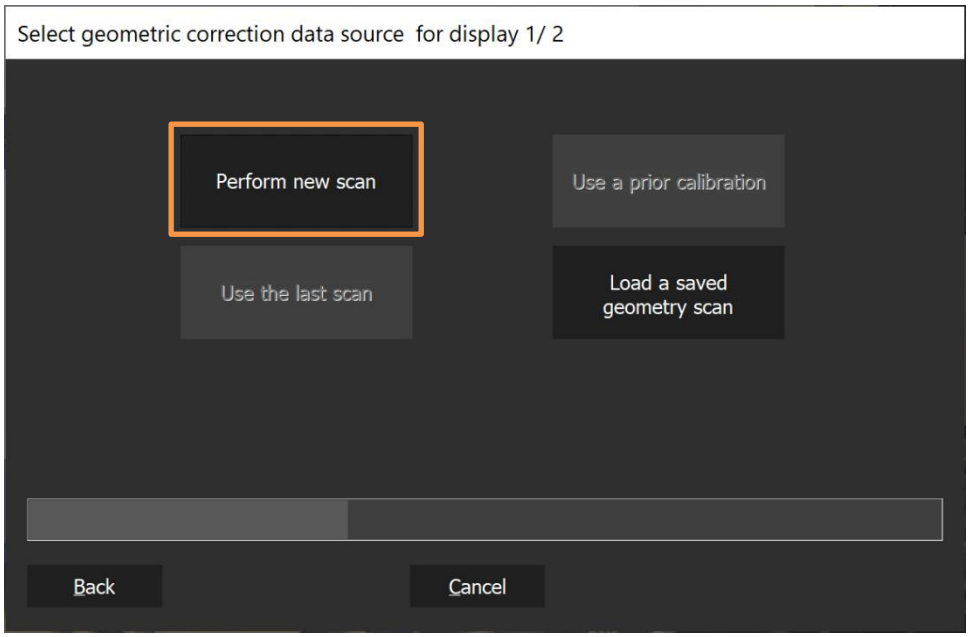


*Fig. 74 - **Autocalibration: start scanning the projection surface***

The projected dots indicate how well the calibrator can make out the surface. Green is good. If the lighting was worse or there was more noise in the image, the dots will be more red. If there are more red dots than green dots, adjust the size and margin of the green dots to create more precise projection surface mapping. Clicking the threshold button at the bottom of the menu will bring up different view from the camera to reveal areas which the camera has problems to detect.

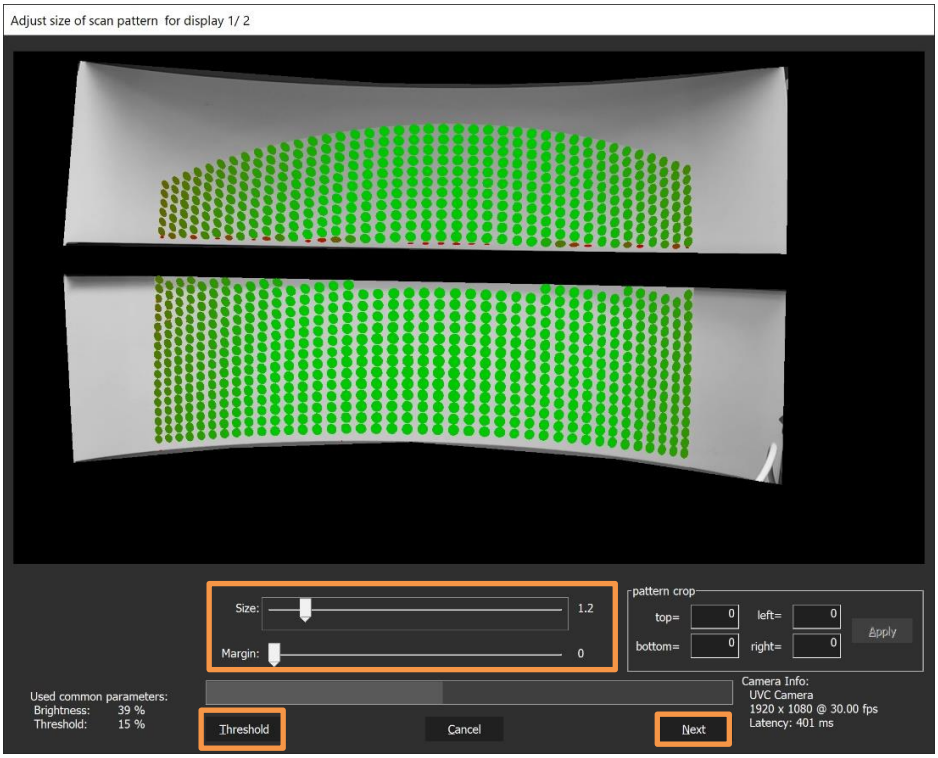


*Fig. 75 - **Autocalibration: projection surface detecting***

Dial the threshold to get just clean lines with as little of additional distortion around and with no blackouts in the middle.

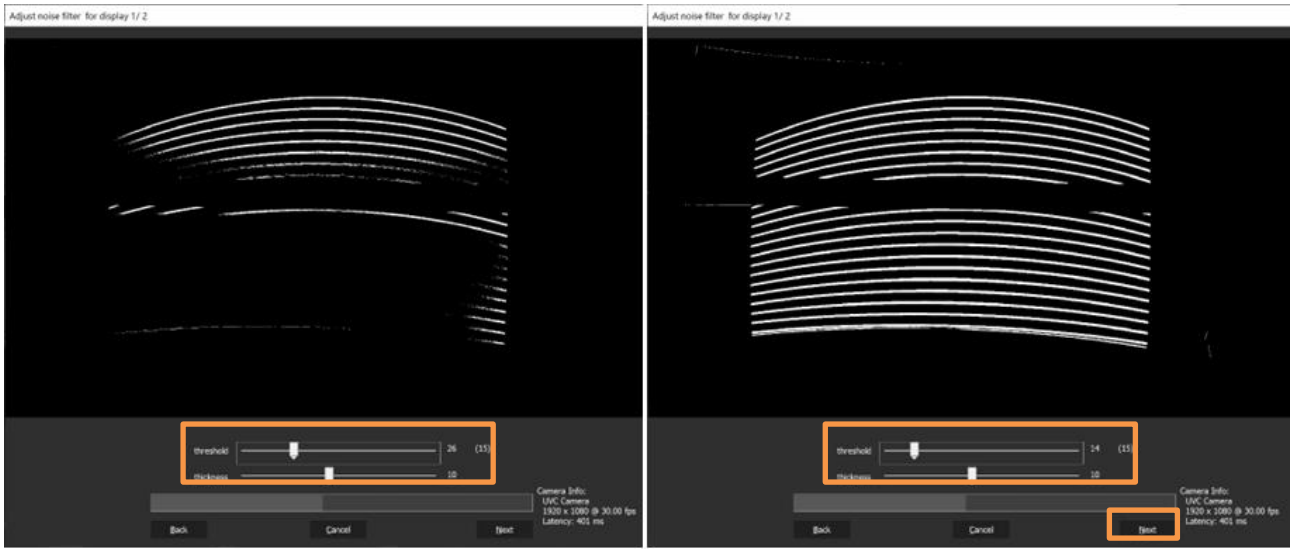


Fig. 76 - ***Autocalibration: Adjusting projection thresholds***

when you have a good plate of green dots, you click next, and the automatic calibration will start. Various test patterns will be projected on the projection surface. Any disruption of the camera or the projectors at this point will affect the end result.

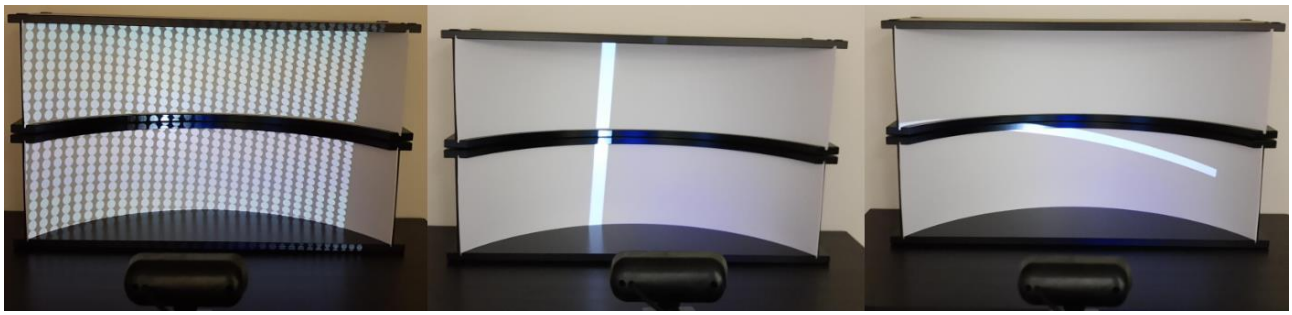


Fig. 77 - ***Autocalibration: scanning and calibrating the projection surface***

After the calibration, you will see this inspection page, and the projector will show a test image.

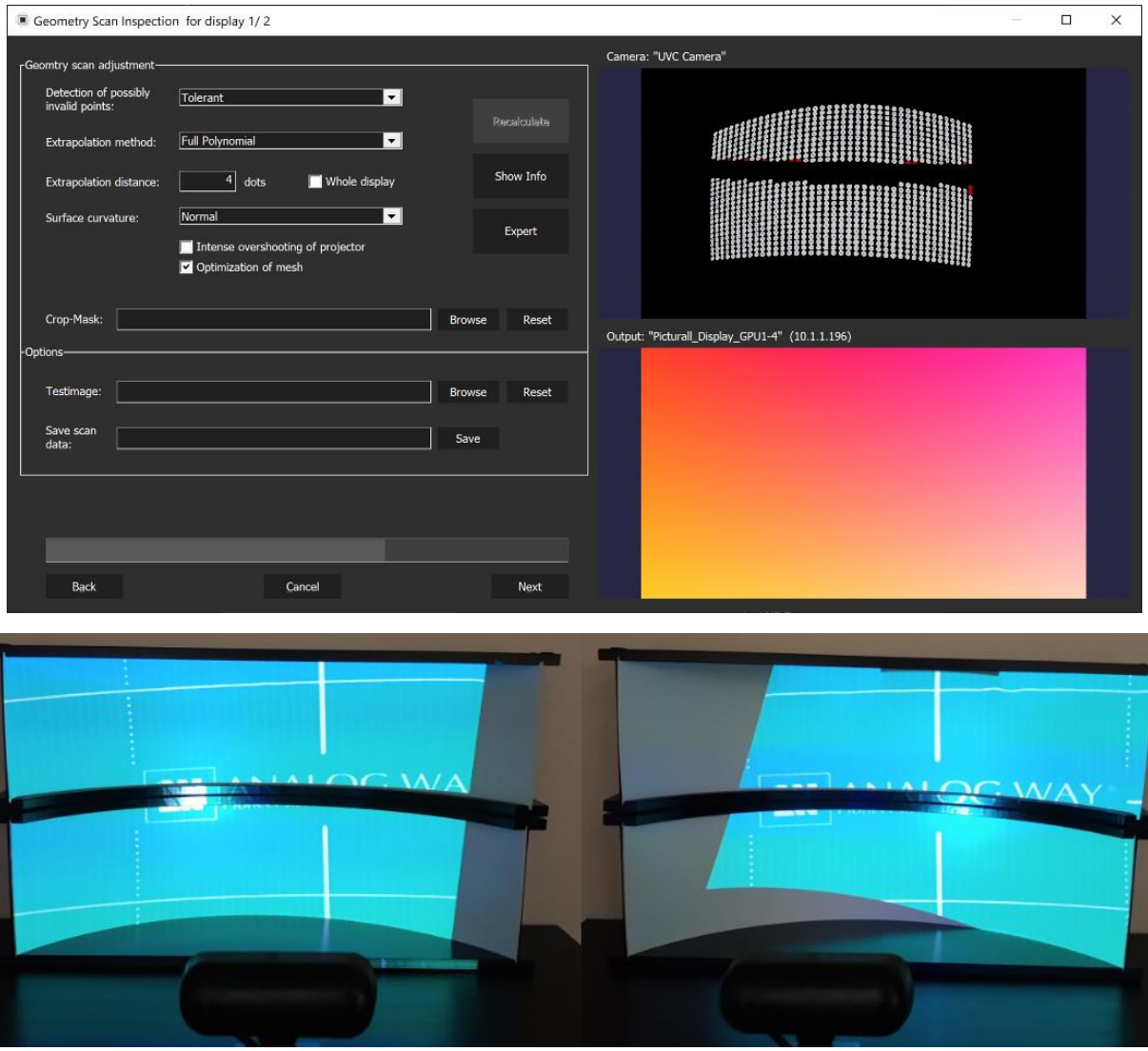


*Fig. 78 - **Autocalibration: test images after the initial calibration process (2 projectors)***

The calibration process is repeated for all the displays or projectors that were defined in the calibration first phase. After all the defined outputs have been calibrated, the projection is now from the straight perspective of the camera. This will require some additional tuning.

*Fig. 79 - **Autocalibration: The projection test image after the initial calibration***

The projection is now calibrated based on the camera view, so it will require some adjusting to be sharp and clear. This can be done by selecting Edit from the first page of the Projector and Display setup and enabling the show test image

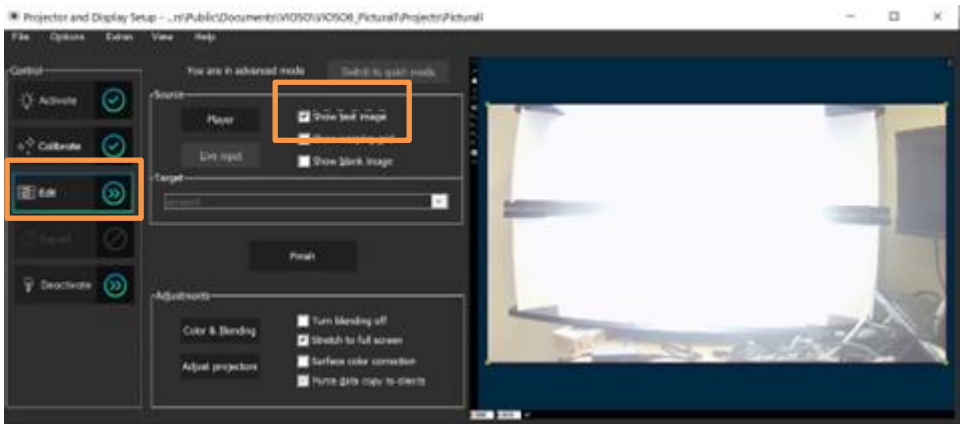


*Fig. 80 - **Autocalibration: opening a virtual canvas to warp the outputs***

Go to virtual canvas. Next, we're going to warp the output so that it contours the curved surface.

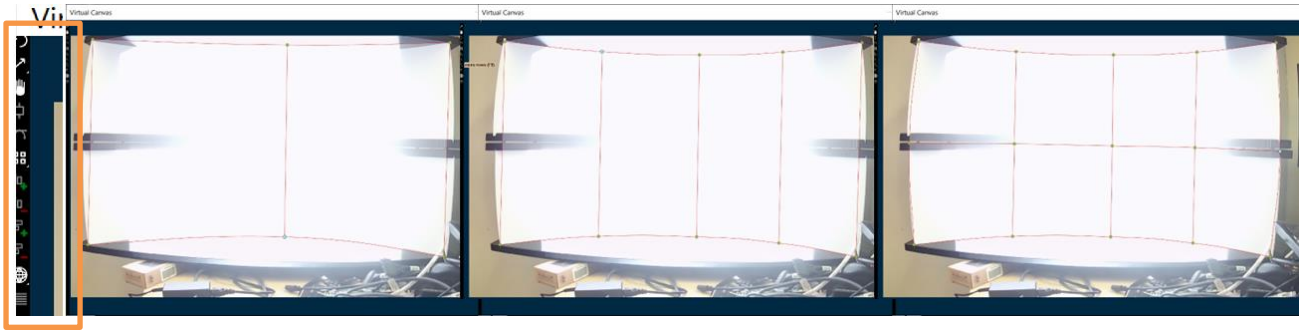


*Fig. 81 - **Autocalibration: warping the outputs***

The tools to create output warping are located on the left-hand side of the virtual canvas. The tools are magnified in the image above. In this example, following was done:

1. Drag the corners to the corners of the projection surface.
2. On the left, click add more columns. Drag the ends of the columns to match the curve at the top and bottom. Add as many as needed.
3. Then add rows to match the edges.

With these adjustments, the lens distortion caused by the camera has been compensated, but the projection still isn't tidy around the edges. Next, we'll set masks. From the front page of the Projector and Display setup select Adjust projectors.

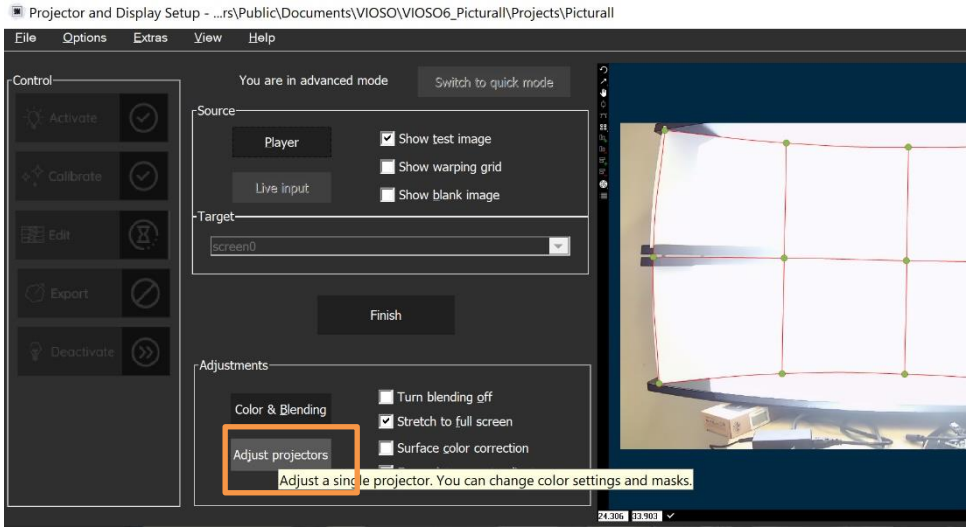


*Fig. 82 - **Autocalibration: mask projection edges***

Select new/edit mask, and for this example, we'll be adding a polygon mask and drag it to full size. Tools to edit the mask are available on the left-hand side and the list of created masks are on the right-hand side. Here you can also do some additional color and brightness adjustments for calibrated outputs/projectors.

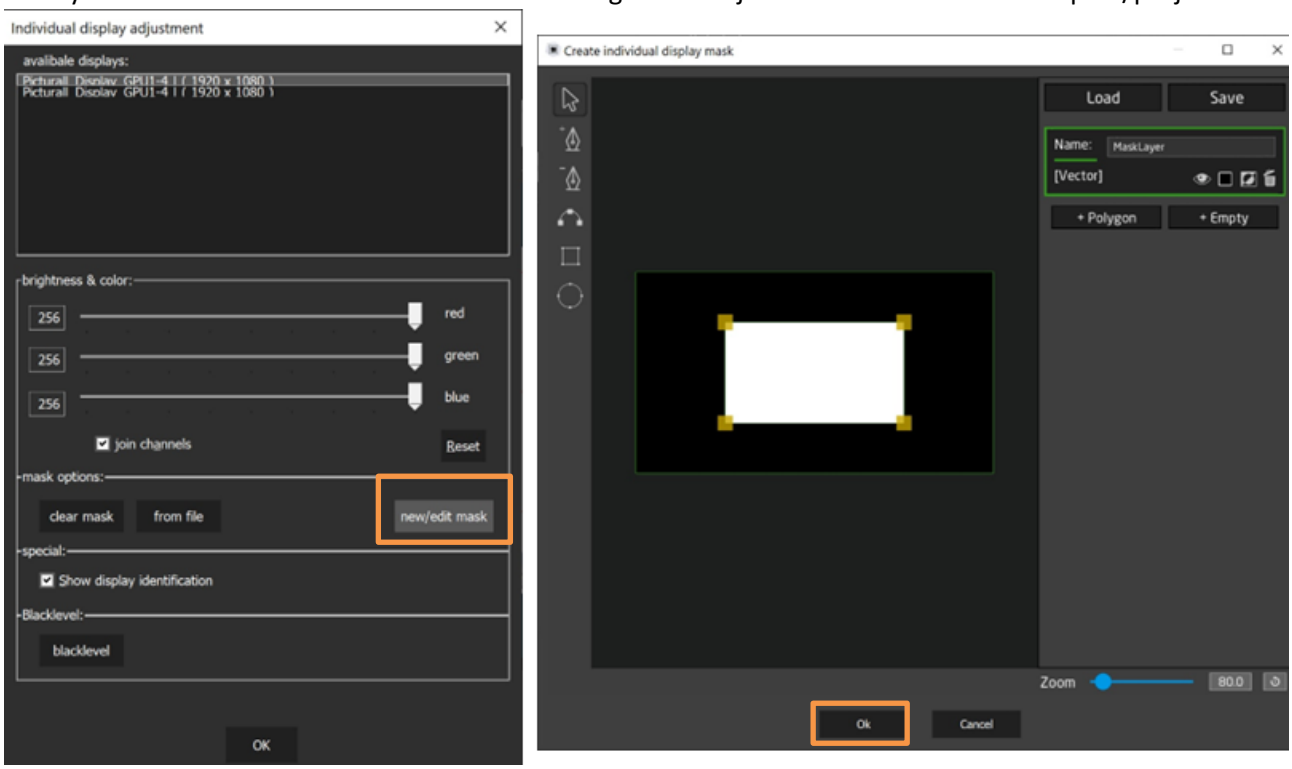


*Fig. 83 - **Autocalibration: creating a mask***

Created mask will now appear also in the test image projection. Tweak the corners or add new control points until it lines up and doesn't overshoot the surface. You can click on a point and then move it with arrow keys for finer control. Once that is done, you can click Ok.

When the projection looks good, select Finish to return to Projector and display setup front page and then select Export.

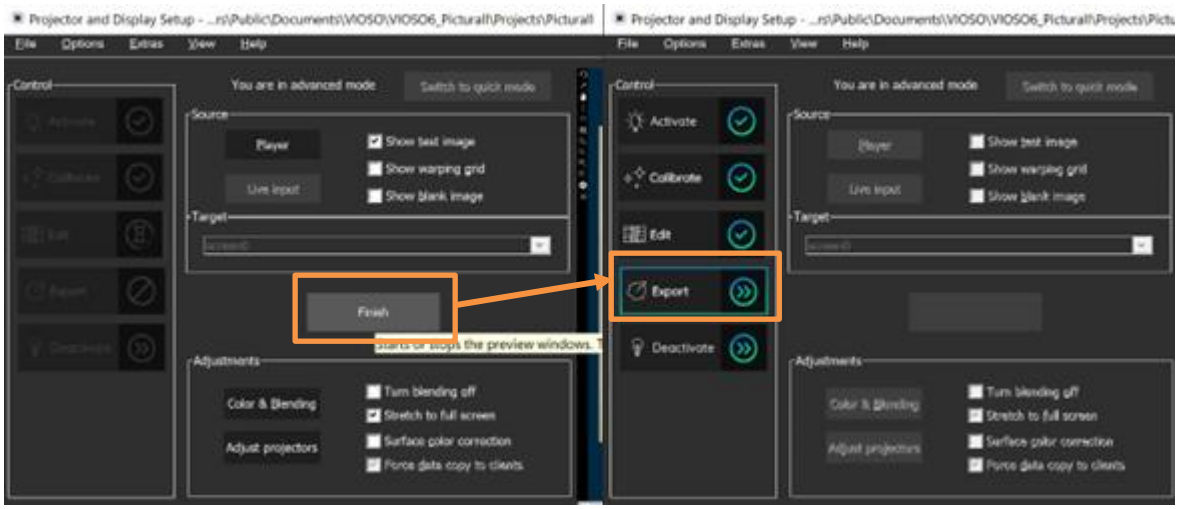


Fig. 84 - ***Autocalibration: Exporting the calibration to the server***

This will begin the export of the calibration to the defined Picturall server. The process will be presented with following progress bar. The exported output calibration will be automatically applied to Picturall display configuration.

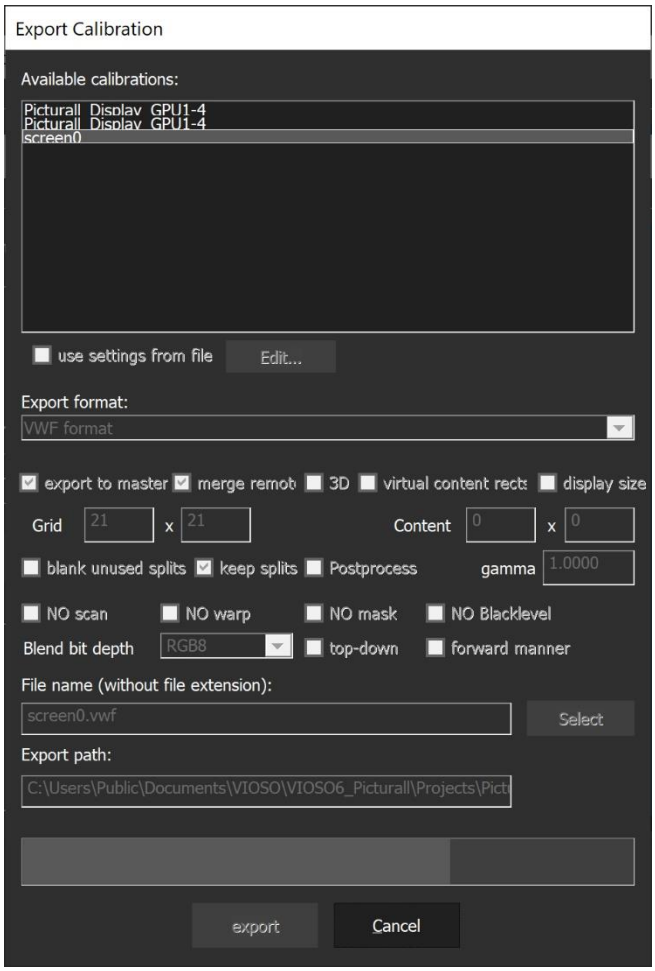


Fig. 85 - ***Autocalibration: Exporting the calibration to the server***

After the export has been completed, click Deactivate to turn off the calibration process and it will return the server to normal operation with the calibration in use.

Warning: The calibration mode will prevent the normal use of the Picturall server until the calibration mode is deactivated.

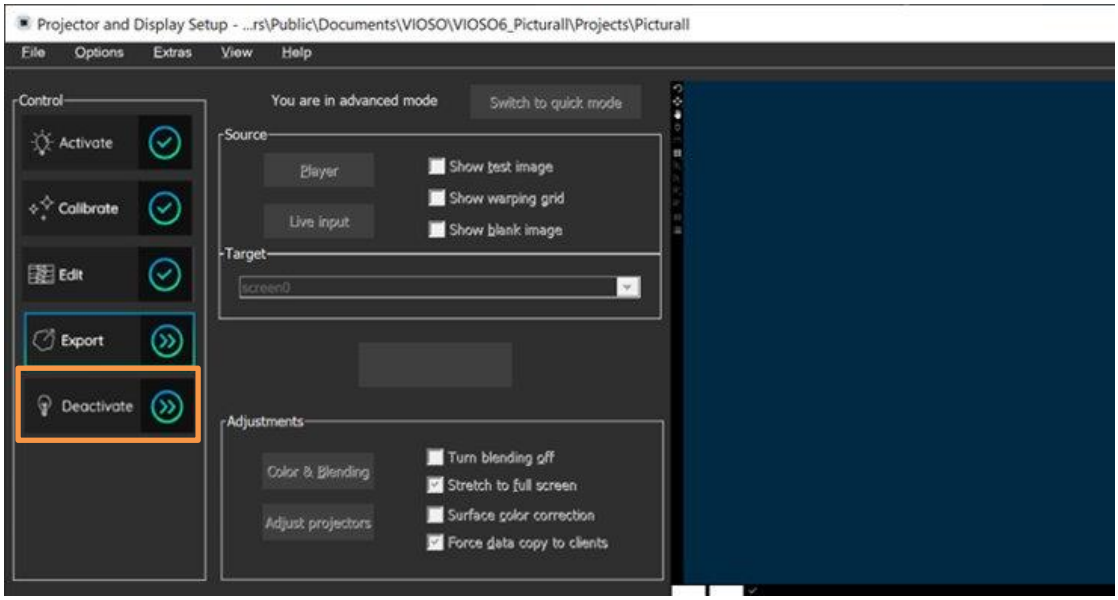


*Fig. 86 - **Autocalibration: Deactivate the calibration process***

Now the calibrated outputs can be used as any displays connected to Picturall media server. Test the created projection with some media content.

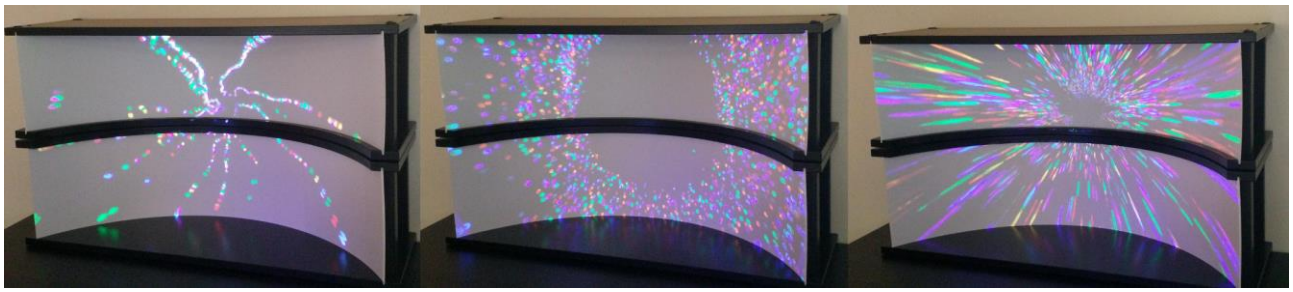


*Fig. 87 - **Autocalibration completed***

For more complex projection setups, see the instructions and documentation from the Vioso website or contact Analog way support.

8.8.2 Vioso autocalibrated outputs in Picturall Commander

The calibration will be enabled automatically to defined outputs. In the Picturall Commander UI the calibration can be enabled and disabled from Window → VIOSO calibration. From this menu, an existing Vioso calibration file can also be downloaded or uploaded to a connected server.

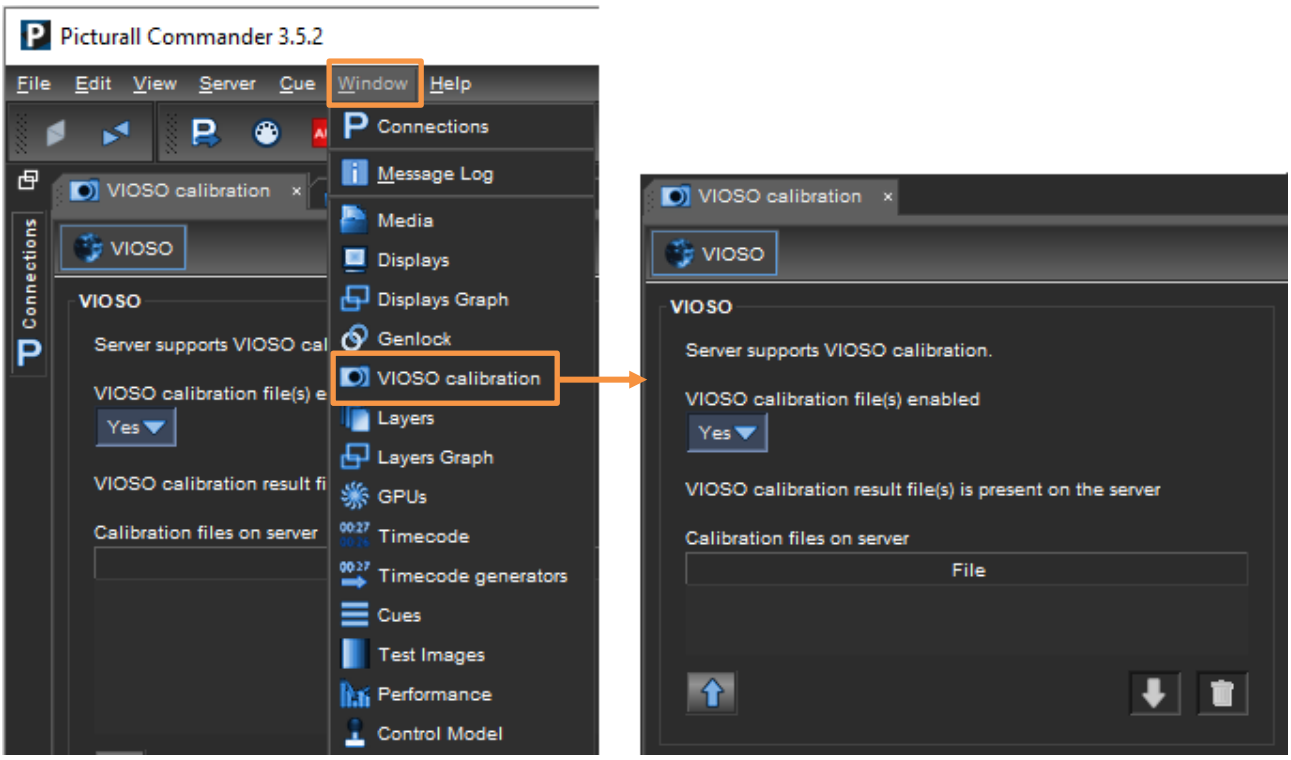


*Fig. 88 - **Vioso calibration controls in Picturall Commnader UI***

If a display is calibrated and the calibration enabled, the display will use special icon in display list and (VIOSO)-prefix to indicate that the display is using Vioso-calibration. Special care should be taken when adjusting display position values, as adjusting only single display on multi-display calibration can lead to calibration results being applied to unexpected position. Display position adjustments should be done only to all calibrated displays together.

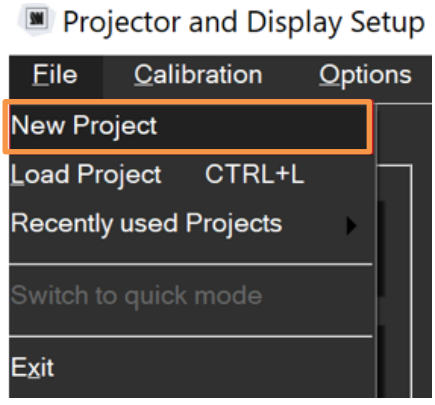
Warning: Using display wizard to create a display group from the Vioso calibrated outputs will break the Vioso calibration

Tip: Resetting the display setup will return the Vioso calibration (if Vioso calibration is enabled from the settings)

Note: When loading a showfile, the calibration data will be restored to the server. This can be skipped by unselecting the VIOSO calibration in the "Parts to load" -sidebar. Vioso calibration files can be large in size.

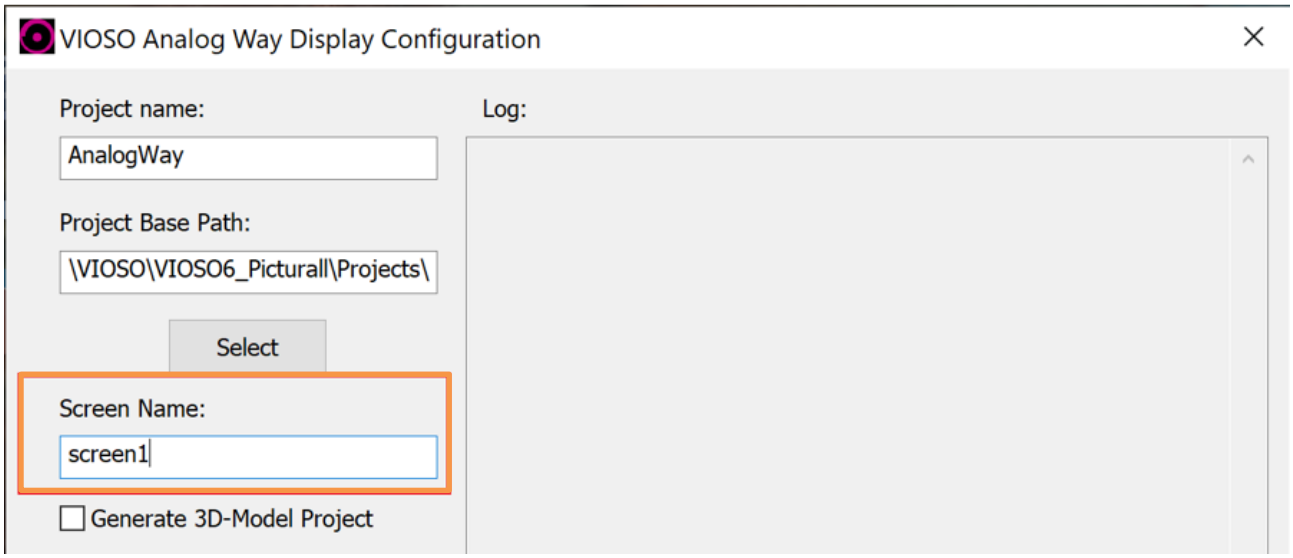
8.8.3 Using multiple Vioso calibration files simultaneously

It is possible to use multiple separate calibrations simultaneously. Begin by creating a new project in Vioso tools Projector and Display Setup. Go to File→New Project.



NOTE: Firmware version 3.5.2 or newer is required for multi calibration file support

With the new project, Vioso autocalibration needs to be done again. Start the Vioso Analog Way Display configuration program again and set the name for the screen which is different from the first one. The default name of the first configured screen is *screen0*.



After this, run the calibrator normally. This will generate a new Vioso calibration file under a different screen name. Once the ne calibration files have been exported, the Commander UI will show the calibration files in the Vioso Calibration tab.

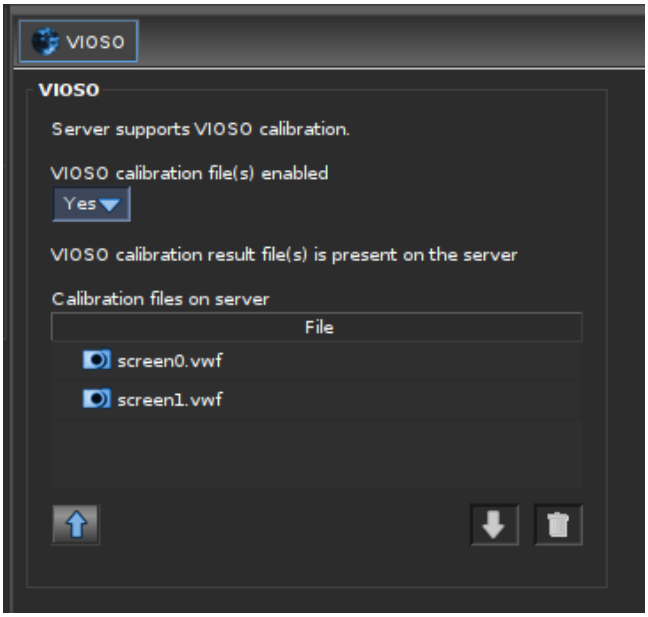


*Fig. 89 - **Vioso configuration with multiple calibration files in Commander UI***

The server will use all calibration files when calibration files are enabled. Individual files can be deleted if they are not needed.

Display list will not differentiate which outputs are behind which calibration file.

8.9 Color correction (Display)

8.9.1 Adjust display color

Adjust color correction independently for each display.

1. Go to **Displays** and select one or more displays in the Display list.
2. Open the **Color Correction** panel to set the Gamma, Saturation, Contrast and Brightness levels for each display.
3. Red (R), Green (G), and Blue (B) values can be adjusted for contrast and brightness separately.

8.9.2 Alpha display

Force a display to Alpha drawing mode.

1. Go to **Displays** and select one or more displays in the Display list.
2. Open the **Color Correction** panel and enable **Alpha only**.
3. If needed, enable **Alpha invert**.

8.10 Crop display size

Use Cropping to limit the size of the display. With cropping tool the area of interest can be set for a virtual displays set in the display configuration.

Tip: Use Cropping with LED walls with non-scaling processors and custom resolution.

1. Go to **Displays** and select the display to control in the Display list.
2. Open the **Cropping** panel. The values in **Resolution** gives the original width and height of the display.
3. Set **Cropping enabled** to **Yes**. Adjust the cropping values even if cropping is disabled.

Note: Cropping is enabled by default with virtual displays.

4. Set the **X** and **Y** position values for the display and limit its size in **Height** and **Width** to make the display smaller than its normal size.

9 Layers

In the **Layers** menu, control and program layers. Layers are the elements containing the media, one layer contains one media file.

Note: - The Layer menu is not needed if using external controller (lighting consoles or show control systems).

- Playing back too many large resolution files may cause playback issues or even a unit crash.

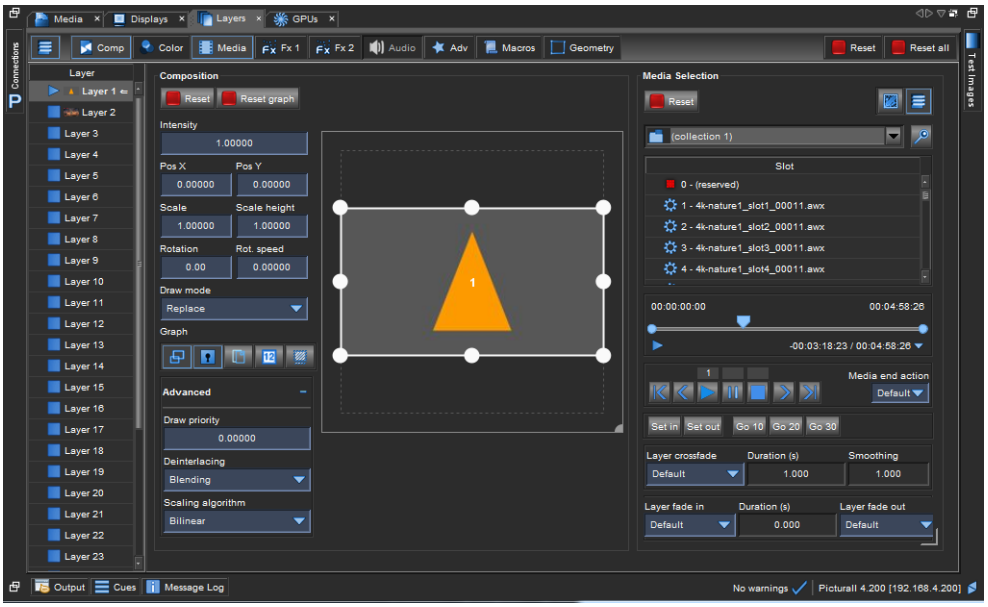


*Fig. 90 - **Picturall Commander Layers menu***

9.1 Layers tab

9.1.1 Layer List

The layers are listed on the left panel. Right click a layer to show quick interactions (Rename, Play, etc.)

Tip: Rename the layers for easier use.

9.1.2 Layer Priority

The layers a listed from 1 to 32. By default, the layer number defines its priority. If layers overlap on the composition, the layer with the highest number is displayed on the overlap area. It is possible to override the layer priority with **Advanced** settings, see *Advanced* page 100.

Tip: Use the layers wisely and create the layers from background to foreground.

9.1.3 Layers adjustments

Adjustment panel	Description
Composition	Preview the media and set position, rotation, intensity for each layer
Color correction	Layer color correction
Media Selection	Browse media collection, assign media to layer, play back and end action
Effect 1 and 2	Select layer effects
Advanced	FPS and layer synchronization settings
Macros	Save layer settings
Geometry	Warp, Keystone and Edge Blending for each layer

9.2 Select and play a media – Media selection

In **Media Selection**, assign a media to a layer and choose playback mode.

1. Go to **Layers** and select the layer to control in the Layer list.
2. Open the **Media** panel.
3. Select a collection in the dropdown.
4. Double-click a media to select it.
5. Click the **Play** button. The Media is displayed.
6. In **Media end action**, select the action at the end of playback.

Tip: - Click the Pin button to go to current Media location.
- Click the Toggle view button to toggle between List and Thumbnail.

9.2.1 Playback control

Playback button	Description
Play	Play/Resume video from the current frame.
Pause	Pause the video and leaves a still image of current visible frame.
Stop	Stop media playback and returns to the media start point.
Set in and **Set out** points	Use current position as start and end points for the media. It is possible to set the **In** and **Out** points on the playback bar by dragging the points or right-clicking on the bar.
Go 10 (20 or 30)	Set the current playback position to X seconds before the end.

9.2.2 End action (Layer)

Select what the player does when the playback reaches the end of a media. The end action set in Layer overrides the one set in the **Media** menu.

End action	Description (at the end of the media)
Default	Follow the media file **Play mode** set in the media collection.
Loop	Loop the media file.
Loop collection	Play the next media in collection and loop. At the end of the last media, replay the collection from the first media.
Random	Loop the collection in random order.
Next	Play the next media in collection. At the end of the last media, stop the playback.
Pause	Pause the playback (still frame).
Stop	Stop the playback (no frame).

9.2.3 Layer fading settings

Layer fading settings are located under the Playback controls in the Media selection. The fading set in Layer overrides the one set in the **Media** menu. To open the settings for one media (and not the layer), right-click a media then click **Edit media fading settings**.

9.2.3.1 Layer Crossfade

Select the transition between two media played in the same layer. The Media Server starts to play the next media at the same time as the end of the current one for a smooth crossfade.

Crossfade setting	Description
Layer Crossfade	Select a transition between the available Crossfades styles. (**Default** follows the crossfade set in the media collection)
Duration	Set the crossfade duration in seconds.
Smoothing	Set the smoothness of the fade from 0 to 1. 0 is sharper and 1 is smoother.

9.2.3.2 Layer Fade in / Fade out

Set the fade in and fade out settings for all media files in one layer (or a selection of layers).

Fade setting	Description
Layer fade in	Select **Layer** to enable a fade in at the start of every media played on this layer. (**Default** follows the fade in set in the media collection).
Duration	Set the fade in duration in seconds (the fade out duration is always 1 second).
Layer fade out	Select **Layer** to enable a fade out at the end of every media played on this layer. (**Default** follows the fade in set in the media collection).

9.3 Composition

In **Composition**, adjust the layer position, scale, and rotation on the display.
Click then drag or scroll to adjust the values (hold **Shift** for precise adjustments).

1. Go to **Layers** and select the layer to control in the Layer list.
2. Open the **Composition** panel. If a media is playing, its thumbnail is shown in the Graph.
3. Use the adjustments to control the layer.

Tips: - Right-click a parameter and select Edit to enter numerical values.
- Copy and paste settings from one layer to the other by selecting layers and clicking Copy and Paste buttons.
It is possible to copy and paste one object over several objects and vice versa.

- Go to **Windows / Layers Graph** to open the layers graph in a separate tab.

Adjustment	Description
Intensity	Transparency (opacity) of the layer
Pos X and Y	Horizontal and Vertical position of the layer. **0** is the center of the composition.
Scale	Size of the layer scaled on the full composition. **1** fills the composition horizontally.
Scale height	Height of the layer scaled on the **Scale** value. **1** keeps the original aspect ratio.
Rotation	Rotate the layer (360 degrees).
Rot. speed	Enable a continuous rotation of the layer. Set the speed of the rotation (set negative value to rotate clockwise).
Draw mode	Set how this layer is drawn compared to other layers.

Note: For more information on position coordinates, see Canvas and coordinates page 150.

9.3.1 Draw modes

Draw mode determines how a layer is drawn and how it affects the layers beneath it.
The following table describes the different draw modes:

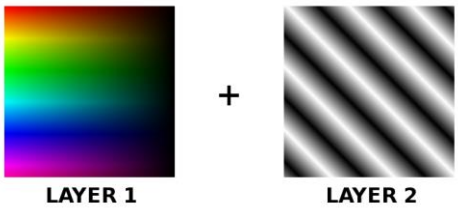
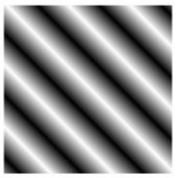
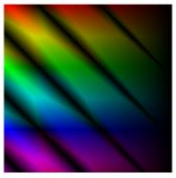
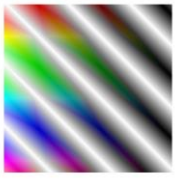
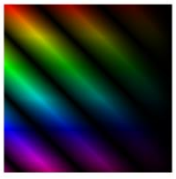


*Fig. 91 - **Draw mode example images***

- **Layer 2 (L2)** is always on top of **Layer 1 (L1)**.
- The **Draw mode** of **L1** does not affect **L2** (**L1** is set to **Replace** in the following examples).
- Changing the **Draw mode** of **Layer 2** gives different results.

Effect	Image	Description
Replace		**Equation: L2** Default mode. Draw the layer on top of layers below. The layers below the drawn layer are not visible (except alpha channel).
Additive		**Equation: L1+L2** Add the pixel values of the drawn layer to layers below it (brighter image). White areas in either layer stay white.
Subtract		**Equation: L1-L2** Subtract the pixel values of the drawn layer from layers below it (darker image). Black areas on L2 leaves L1 unmodified. White areas on L2 become black areas.
Darken		**Equation: min(L1,L2)** Compare the drawn layer to layers below it. The darker pixels of the result are drawn.
Lighten		**Equation: max(L1,L2)** Compare the drawn layer to layers below it. The brighter pixels of the result are drawn.
Multiply		**Equation: L1xL2** Multiply drawn layer pixel values with layer below it (darker image). Black areas on either layer will result black areas. This mode is useful when creating masks.

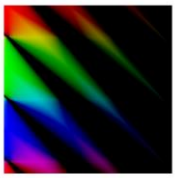
Linear burn		**Equation: L1+L2-1** Variant of the Subtract mode. The result is a darker image.
Screen		**Equation: 1-(1-L1)x(1-L2)** Opposite of the multiply mode. The result is a brighter image.

Table 6 - Draw modes

9.3.2 Graph

Icon	Description
	Show / hide the layers graph.
	Show / hide all layer numbers on the graph.
	Show / hide all enabled display numbers on the graph.
	Show / hide all enabled displays on the graph.

Adjust the layer from the graph:

- Drag the layer to set Position.
- Use the handles in the right corners to scale and rotate the layers.

9.3.3 Composition Advanced settings

Under **Advanced** (in Composition), set the layer Draw priority, Deinterlacing and Scaling algorithm.

- **Draw priority:** Set a number to override the layer number priority system (see Layer Priority page 95). By default, all layers have a Draw priority at 0. Draw priority values goes from -5 to 5.

For example: a layer with draw priority set at 1 is displayed on top of all layers with draw priority under 1, no matter the Layer number. If layers have same Draw priority, the Layer number defines the priority.

Tip: Use draw priority wisely to have a clear configuration. Prioritize using layer numbers and use draw priority for rare exceptions (force layer on foreground or background).

- **Deinterlacing:** Select the Deinterlacing mode (**No deinterlacing**, **Line doubling** or **Blending**).
- **Scaling algorithm**: Select the Scaling technology (**Bilinear**, **Cubic weighted**, **Quintic weighted**, **Sinus weighted** or **Bicubic**).

9.4 Color correction (layer)

Adjust color correction independently for each layer.

1. Go to **Layers** and select one or more layers to control in the Layer list.
2. Open the **Color Correction** panel to set the Gamma, Saturation, Contrast and Brightness levels for each display.
3. Red (R), Green (G), and Blue (B) values can be adjusted for contrast and brightness separately.

9.5 Advanced

In **Advanced**, set the frame rate values and synchronize the layers.

Note: Frame rate can be modified only if no audio track is embedded to the media.

9.5.1 Synchronize to another layer

This feature makes one layer follow the framerate of another layer or a MIDI timecode (MTC).

1. Go to **Layers** and select one or more layers to control in the Layer list.
2. Click **Sync selected**
3. Select the layer or MTC to be the source for the current layer.

Note: By default, the layers do not synchronize to any source.

9.5.2 Set layer Frame rate

Note: Frame rate can only be set if:

- the layer is not part of synchronization.
- the media file doesn't have audio track (even if audio is disabled).
- and media is not a stream video or input.

Modified frame rate (or FPS) can be defined or relative to original frame rate.

Adjustment	Description
Effective FPS	Current effective FPS of the playback with the following settings applied.
FPS controllable	**Yes** or **No**. Displays if the frame rate can be modified.
FPS mode	Select **Media** to use media original frame rate or **Defined** to use manual value.
Defined FPS	Set absolute frame rate (number of frames per second).
Relative FPS	Set a frame rate relative to the original frame rate (from 0.10 to 2.00).
Frame blending	Set to **Enabled** or **Disabled**. This uses a crossfade between frames and displays a smoother playback when frame rate is lower than original.

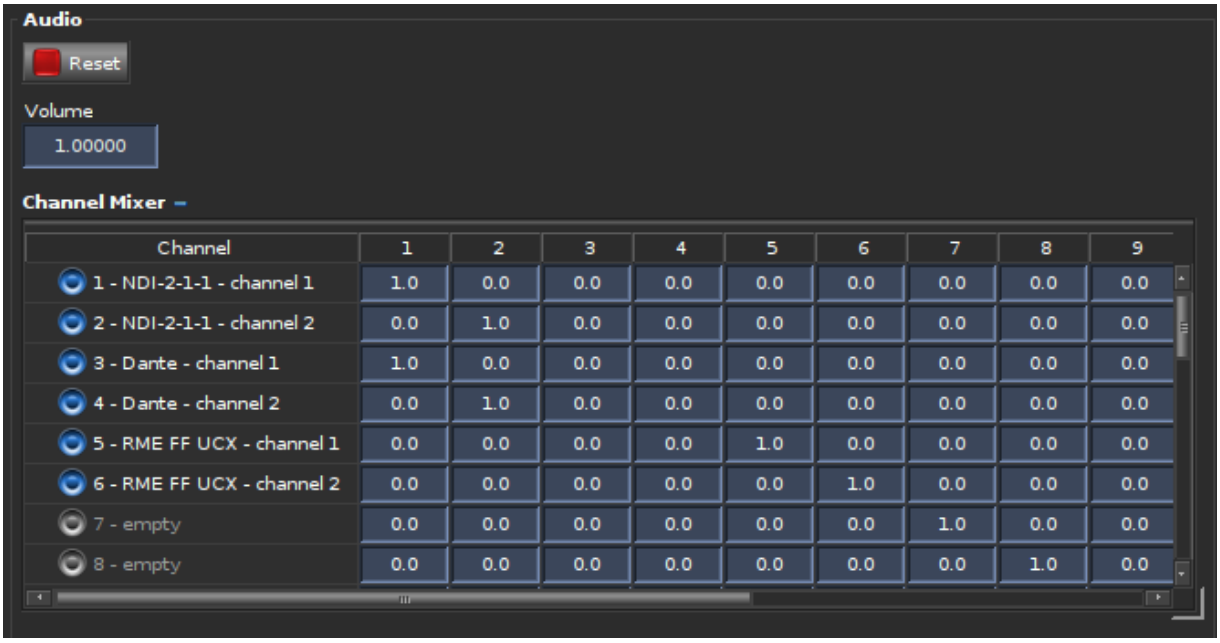
9.6 Audio channel mixer (optional)

Note: - **Audio** is grayed-out if **Audio configuration** is not enabled in Configuration mode.
- If the audio mode is set to **Automatic audio channel routing,** the audio card channels are listed based on the audio card prioritization. (see *5.1.7 Audio configuration (optional)* page 33).

In **Audio**, control the volume for the selected layer and assign audio channel to output. Picturall Media Server supports multiple audio interfaces simultaneously. These audio interfaces can be automatically or manually configured in the Web configurator (see chapter *5.1.7 Audio configuration (optional)* page 33).

Use the **Channel mixer** to assign an output and volume for each audio channel. Use values from 0.0 to 1.0 for the channel volume. The audio interfaces that were configured and routed to mixer channels are listed on the left side of the channel mixer. Next to these mixer channels are the audio channels in the media on the selected layer.

For example, when a media file with stereo audio track is played on a layer, the audio channel mixer column 1 corresponds to the first audio channel on the media file and the column 2 corresponds to the second audio channel on the media file.



Channel	1	2	3	4	5	6	7	8	9
1 - NDI-2-1-1 - channel 1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 - NDI-2-1-1 - channel 2	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 - Dante - channel 1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 - Dante - channel 2	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 - RME FF UCX - channel 1	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
6 - RME FF UCX - channel 2	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
7 - empty	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
8 - empty	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0

*Fig. 92 - **Commander Audio Channel Mixer***

9.7 Using Effects

In **Effect1(Fx1)** and **Effect2(Fx2)**, use effects on the media in the layers (keying, blur, waves, glow, etc.). Two effects per layer can be used at the same time and both panels are identical.

Note: **Effect1** is applied on the layer before **Effect2**. If **Fx1 = Pixelize** and **Fx2 = 3D Cube**, the media is pixelized then rotated with cube effect and vice versa if **Fx1 = 3D Cube** and **Fx2 = Pixelize**.

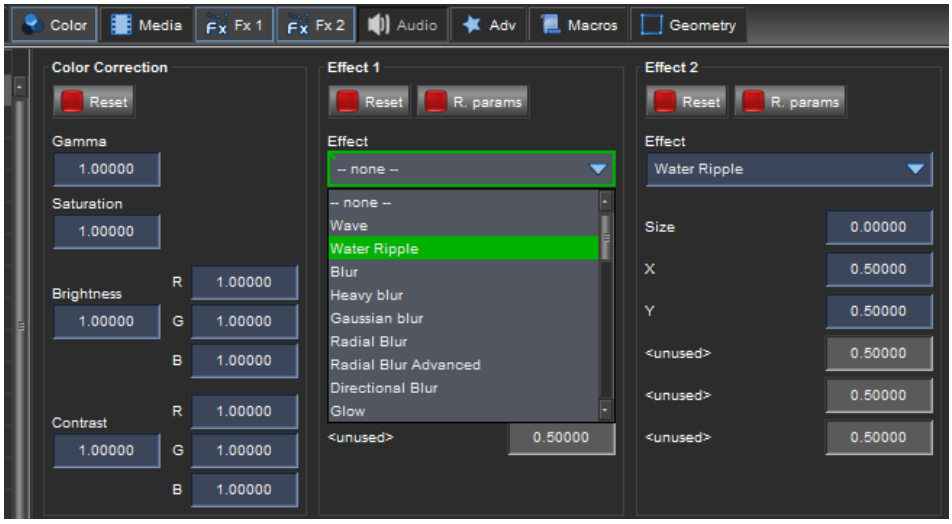
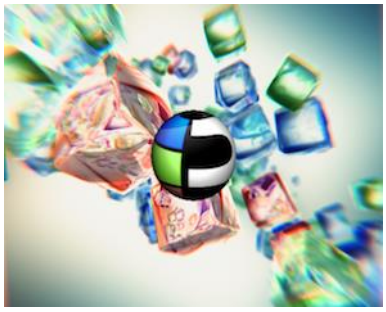
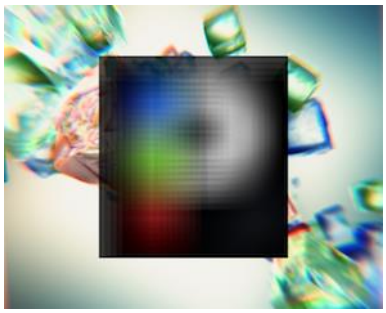


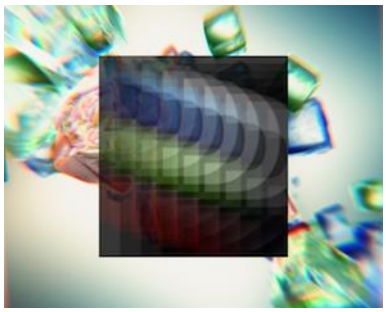
*Fig. 93 - **Effects***

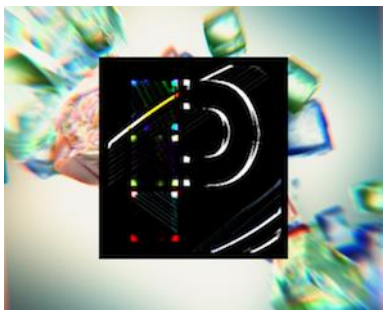
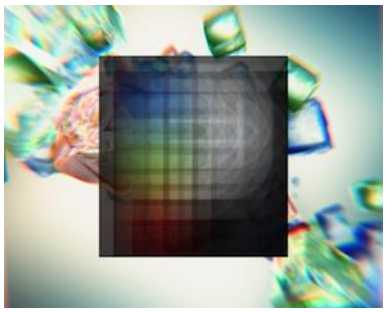
- To apply an effect, select one effect in the dropdown list, and adjust the effect-specific parameters to see the result.
- Click the **Reset** button to reset the current effect panel and cancel the effect.
- Click the **R. params** button to reset the parameters and keep the effect selected.

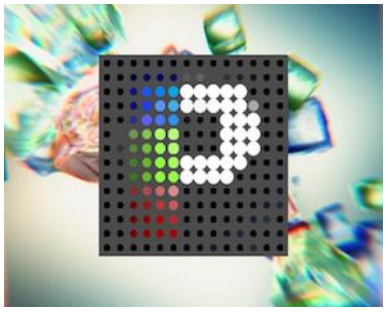
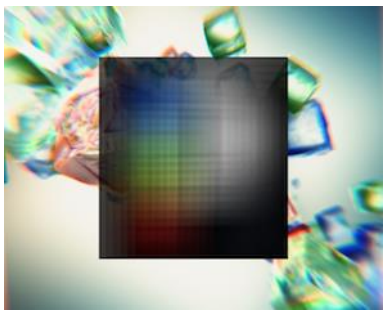
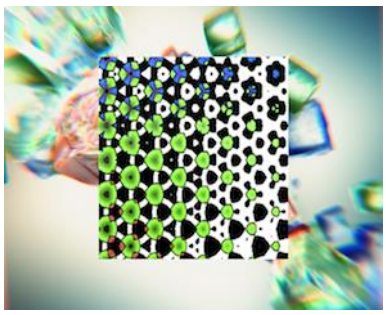
The following table describes the various effects:

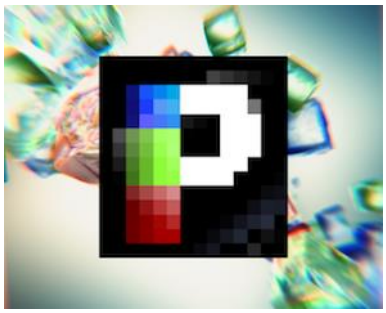
Effect	Image	Description
3D Cube		Reshape the layer into a cube shaped object. Adjust rotation speed and axes.
3D Plane		Reshape the layer into a 3D plane. Adjust rotation speed and axes.

Effect	Image	Description
3D Sphere		Reshape the layer into a 3D sphere. Adjust rotation speed and axes.
Alpha Fill		Uses this layer as the Fill Layer for alpha keying when using the Alpha Key effect (see Alpha Fill and Alpha Key – Cut & Fill page 110).
Alpha Key		Uses this layer as the Alpha Key layer for the previous layer (see Alpha Fill and Alpha Key – Cut & Fill page 110).
Blur		Add blur to the layer by comparing surrounding pixels, making outlines less distinct.
Cartoon		Simplify the colors and smooths the shading in the layer, increasing the difference between low and high contrast areas.
Chromakey		Create a color key compositing function. Adjust Red, Green and Blue value parameters to set transparency.

Effect	Image	Description
Chromakey inverse		Create a color key compositing function with inverse values to the Chromakey effect.
Comic		Reduce the number of colors and hues used in the layer, creating a comic book-like effect.
Directional blur		Smear the pixels of the layer into a given direction.
Drop shadow		Create a background shadow to the layer, giving the impression that the layer is situated above the layer behind it.
Edge blur		Blur the outer borders of the layer.

Effect	Image	Description
Edge Laplace		Detect edges in the layer by adding blur and subtract the result from the original layer image gradually using the mixing parameter.
Edge Laplace add		Detect edges in the layer by adding blur and subtracts the result from the original layer image.
Gaussian blur		Add blur to the layer using the Gaussian function. The result is a very smooth blur, as if looking through a translucent glass.
Glow		Make bright areas in the layer appear brighter, adding the impression of glow.
Halftone		Modify the layer from continuous colors to single-colored dots. Adjust dots size.

Effect	Image	Description
Halftone advanced		Modify the layer from continuous colors to single-colored dots. Adjust dots size, background color and alpha channel.
Heavy blur		Add a large amount of blur by comparing surrounding pixels with a large radius.
Inverse		Invert the color values of the layer.
Kaleidoscope		Create uniform hyperbolic tiling on the layer, resembling the view through a kaleidoscope.
Keystone		Modify the layer using the keystone corner points.

Effect	Image	Description
Lumakey		Create a luminance key compositing function for the layer, making the bright areas transparent.
Lumakey inverse		Create a luminance key compositing function with inverse values to the Lumakey effect.
Mask		Mask out or crop the layer so only part of it is displayed.
Pencil sketch		Color the outlines black and the background white, creating the impression of a pencil sketch.
Pixelize		Blur the layer by substantially reducing its apparent resolution.

Effect	Image	Description
Quick border		Blur and color the outer border of the layer. Similar to the Edge blur effect with more parameters.
Radial blur		Blur the layer by smearing pixels around the center point.
Radial blur advanced		Blur the layer by smearing pixels around the center point and adjust the position of the center point.
Sepia		Recolor the layer with a reddish-brown sepia color.
Sharpen		Increase the contrast where color changes occur, resulting in a sharper layer image.

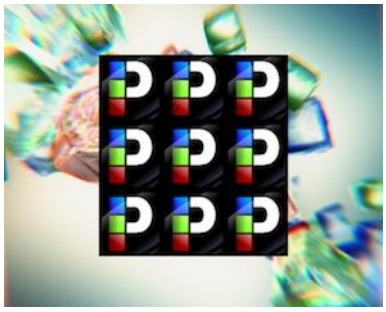
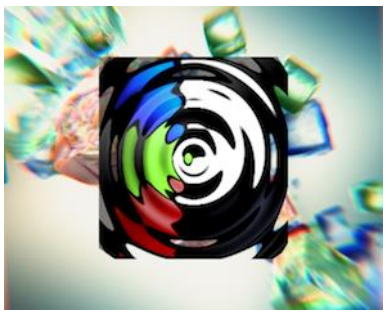
Effect	Image	Description
Tiles		Create scaled-down, tiled copies of the layer.
Water ripple		Add a distortion on the layer resembling a ripple on water.
Wave		Add distortion to the layer to create the impression of waves.

Table 7 - Effects descriptions

9.7.1 Alpha Fill and Alpha Key – Cut & Fill

Create a Cut & Fill effect using Alpha keying to limit the way the fill layer is displayed.

Note: The lower layer is always the Alpha Fill layer and the upper layer is always the Alpha Key layer.

Tip: To use Cut & Fill, prepare media files to be the “Cut media”. Cut media files are preferably black and white with the black area being the “displayed” part.

1. Select a Layer in the Layer list.
2. In the **Media** panel, select a media and play it.
3. In the **Effect 1(Fx1)** panel, select the **Alpha Fill** effect in the dropdown list.

This layer is now the Alpha Fill layer.

4. Select the next layer in the Layer list.
5. In the Media panel, select the “Cut media” and play it.
6. In the **Effect 1(Fx1)** panel, select the **Alpha Key** effect in the dropdown list.

This layer is now the Alpha Key layer.

The content of the Alpha Fill layer is now displayed in the black areas of the Alpha Key layer.

Note: - Alpha Fill is only effective if the next layer has the Alpha Key effect.

- Alpha Key is only effective if the previous layer has the Alpha Fill effect.
- The Alpha Key layer only contain the contents from actual media or input. Other effects, composition or color correction are not applied.

Tip: Use the Alpha Fill Inverse effect on the Alpha Fill layer to display the its content in the white areas instead of the black ones.

9.8 Layer macro

Tip: Go to **Edit > Options > Layer > Layer Macros** to define the number of available macros (save slots).

Use **Macro** to save and load the state of one layer.

9.8.1 Create a layer macro

1. Select a layer in the Layer list to save as a macro.
2. Right-click a macro slot and select the layer parameters to save.
3. Click **Save**.

The layer macro is saved with the selected parameters.

Tip: Name the macro for a clear configuration. Right-click the macro and click **Rename** to label the macro. Use only alphanumeric characters.

9.8.2 Load a layer macro

1. Select one or more layers in the Layer list.
2. Click a macro slot.

The macro is loaded on the selected layers.

Tip: Right-click a saved macro and click **Reset** to empty the macro.

9.9 Geometry

Use **Geometry** to use **Warp**, **Keystone** and **Edge Blending** features at layer level.
For more information, see Edge Blending page 77.

9.10 Set default show on server boot – Export show

Use **Export** to set the current show as a default show. This show will be loaded every time the Picturall Series Media Server is turned on. When starting with exported show, Playback 1 automatically starts playing assigned cue stack if any is assigned.

- Click **Server** then **Export** to save the current show as a default show.

Exporting erases the previous export. The last exported show is loaded automatically at startup.

> **Note**: The active values on the Layers tab are also exported at the time of the export, they will be the media state where the first cue starts playing.

10 Program a Show - Cue

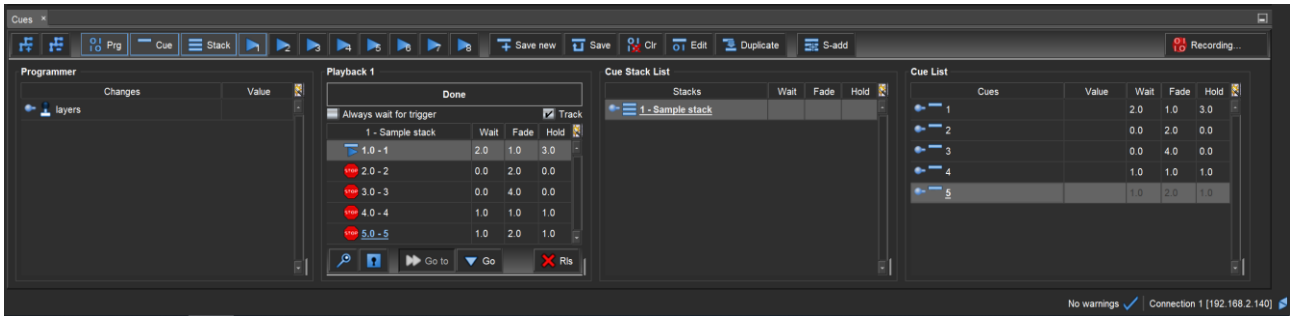


*Fig. 94 - **Cues panel***

In the **Cue** menu, create presets of **Layers** (with their parameters) and order them with **timing** settings. A cue holds visual and non-visual information about the state of one or more layers. A cue is a preset with layers settings to create a specific view on the displays. For example, cues can change layer position or change a playback state. Cues are organized in **Cue Stacks**.

10.1 Presentation

10.1.1 How cues work

By default, the **Recording** button in the Cue tab is enabled and any modification in the **Layers tab** is marked in Green, which indicates that it is recorded in the programmer. The programmer records the last assigned value for a parameter (not always the default parameter value). It is possible to record unchanged or default values into a programmer manually. When the desired parameters are recorded in the programmer the programmer content can be saved to a new cue or added to an existing cue.

When running a cue the change in the server state depends on difference between the output from the previous cue and the current cue. A parameter only changes if it is defined in the cue.

Cue	Parameter 1	Parameter 2	Parameter 3
Call Cue 1	10	20	30
Call Cue 2	20	no change (keep 20)	35
Call Cue 3	no change (keep 20)	25	40
Call Cue 2	20	no change (keep 25)	35

Table 8 - Cue logic example

In the example above, parameter 2 remains at value 20 when cue 3 is played after cue 2, because no change is recorded for it. And parameter 2 remains at value 25 when cue 2 is played after cue 3.

10.1.2 Timings (Wait, Fade and Hold)

A cue is associated with timing settings: Wait, Fade and Hold.

- **Wait** – Time before executing the content
- **Fade** – Time of the execution of the content
- **Hold** – Time before the next Cue (for **Automatic** trigger)

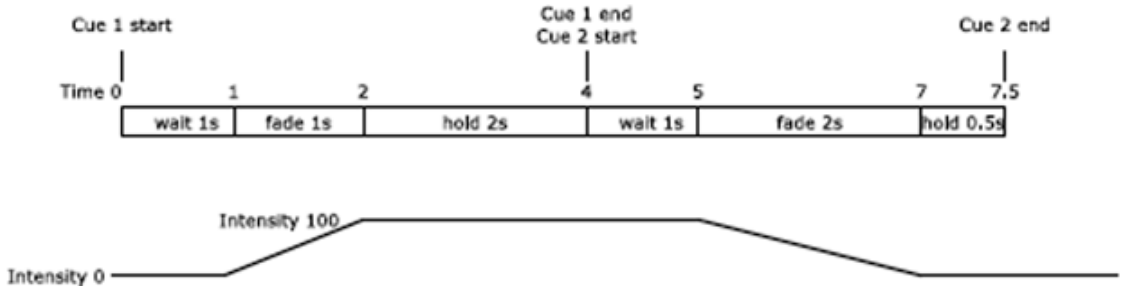


*Fig. 95 - **Cue timing example***

The previous example shows two cues: Cue 1 and Cue 2.

- Cue 1 has an intensity value of 100.
- Cue 2 has an intensity value of 0.
- The intensity starts at 0 and progressively increases to 100 at the fade of Cue 1.
- After the end of Cue 1, Cue 2 starts.
- The intensity progressively decreases to 0 at the fade of Cue 2.

It is possible to set Default Cue timings for all parameters and custom wait and fade times for specific parameters. In case of conflict, the custom timings prevail. Otherwise a cue is complete when the cue hold time is finished.

Note: Cues can run for a longer time than the timing values indicated in the Cues panels.

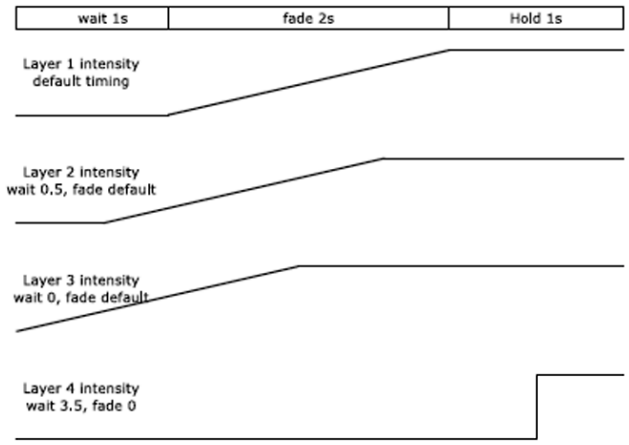


*Fig. 96 - **Timing parameters for layers 2, 3 and 4 override default cue timings***

Fade exceptions

The following parameters do not fade but will take the new value at start of fade:

- Media selection / FX selection
- Deinterlacing type
- Draw mode / Play mode
- Scaling algorithm
- Timecode settings
- Layer synchronization
- Media end action
- Frame blending
- FPS mode

10.1.3 Trigger

A trigger is the transition from one cue to the next inside a cue stack. These are the different types of triggers:

- **Manual:** The user must click the Go button to trigger the next cue.
- **Automatic:** The next cue is triggered after the previous cue has been completed (wait + fade + hold).
- **End of media:** The next cue is triggered at the end of one media playback. This can be set for a specific layer or for any layer.
- **Timecode**: Timecode trigger is used for both timecoded and schedules cues. The next cue is triggered :
    - when the selected timecode provider reaches the set time.
    - or when scheduling conditions are met.

Note: The addition of timecode-controlled cues with the 3.1.1 update changed how a manually triggered cue that follows an automatically triggered cue works:

- Before 3.1.1 – After an automatically triggered cue, a manually triggered cue was also played and left to wait for the trigger **at the end of the manually triggered cue.**

- Before 3.1.1 – An automatically triggered cue following a manually triggered cue **requires a trigger to start** when the manually triggered cue ends.

- After 3.1.1 – Only the automatically triggered cue is played to the end, and the manually triggered cue will wait for trigger **at the beginning of the cue.**

- After 3.1.1 – An automatically triggered cue following a manually triggered cue will now **play without a trigger** after the manually triggered cue has ended.

10.2 Creating Cues

10.2.1 Create the first Cue

1. Make sure the Layers menu, Cue menu and cue panels are opened.
2. On the Layers menu, click **Reset all** to have default settings in all the layer controls.
3. On the Cues panel, click the **S-add** button to create a new Cue stack. The new stack is activated, new Cues are automatically added to this Cue stack.
4. Click the **Clr** button to clear the Programmer.
5. Set desired parameters on the layer controls. Values turn green to indicate the change has been recorded to the Programmer.
6. Hold **Alt** and click a parameter to manually select or deselect it from the Recorded selection.
7. Click **Save new** to save the Cue. The new cue item appears in the **Cue list** and the **Programmer** gets cleared.

Saving a cue empties the Programmer and makes it ready for the next one.
If a cue stack is active, newly created cue will also be appended to an active cue stack.

Note: The cue stack entry will be assigned with the first valid timecode or the current timecode if programming timecode provider is selected.

Tips:
- Name the cues to have a clear list using right-click then Rename.
- Check the parameters recorded in the Programmer before saving a Cue.
- Clear the Programmer before creating a Cue.

10.2.2 Edit a Cue

All the created cues are available in the Cue List. To edit a cue:

- Select a cue in the Cue list, Cue stack or Playback.
- Click **Edit.** The Cue content is copied to the **Programmer.**
- Make adjustments on the layer controls. Values turn green to indicate the change has been recorded to the Programmer.
- Click **Save**.

Tips: - Right-click a cue and select Run to test it.
- Click the **Recording...** button to disable / enable recording on layer controls.

10.3 Cue Stacks

A cue stack is a sequence that runs the cues in ascending order. Create as many stacks as needed.
For example, a media show in a music concert might have a cue stack for each song.

10.3.1 Create a cue stack

1. Click **S-add** to create a cue stack.
2. Create cues or select cues in the Cue List and drag and drop them in the stack.
3. Order the cues inside the stack.
4. Create cue stacks as needed for the show.
5. Each cue in a cue stack is a reference to the original cue in the Cue list. This reference is called Cue Stack Entry or CSE).

10.3.2 Remove a cue from a cue stack

Right-click a cue in a stack and select **Remove** to remove it from the stack. This only removes it from the cue stack and does not delete the cue. The CSE is removed but the cue is still present in the Cue List.

10.3.3 Change trigger type

Right-click a cue in the stack to change trigger type. Choose between **Manual** and **Automatic** depending on whether to trigger the cue manually or want it to run automatically after the previous cue. This can be done either in the Cue Stack List or in the Playback list.

10.3.4 Order cues in the stack – Index number

Order cues in the stack by using drag and drop or custom index number.

- Drag and drop a cue in a stack to change its position in the sequence.

Index number

Each Cue Stack Entry (CSE) has a Major index number and a Minor index number. CSEs are ordered by Major index number in ascending order. The Minor index number is used in case of equal Major index number.

- Right-click a cue in a stack and select **Move**, then enter the index numbers.

For example, to move a cue between cues numbered 5.0 and 6.0, enter a major index number 5 and a minor index number 1.

10.4 Timing and Running Cues in Playback

Picturall Series Media Servers can run up to eight cue stacks simultaneously using the eight different playback areas in the cue system. Separate playbacks are useful for example to play different sequences of media on different displays.
To run a cue stack in playback:

1. Click  to open **Playback 1**.
2. Drag a cue stack to **Playback 1**. One playback can only play one stack at a time.
3. Click **Go** at the bottom of the Playback area to run the playback. Select a cue and click **Go to** to skip to a specific cue.
4. Enter timings for the cues in the **Wait**, **Fade** and **Hold** columns.
5. Click **Rls** to release the cue stack from the playback. This only removes the cues from playback, not from the cue stack list or the cue list.

Note: If a show is exported with cue stacks in one of the Playback areas, rebooting the server will automatically start playing the cues in the stack.

10.5 Cue tracking

By default, jumping to a cue in the same stack skips all other cues and only applies the parameters of the target cue. Cue tracking allows jumping to a cue while applying parameters of all cues between the current cue and the target cue. Cue tracking can be enabled on any playback.
- Check the **Track** box in a Playback to enable cue tracking.

*Fig. 97 - **Enable cue tracking***

For example, here is a stack with 4 cues:

- The first cue has 3 parameters saved: x position, y position and scaling.
- The second cue changes the y position.
- Third cue changes the scale.
- And the fourth cue changes the x position.

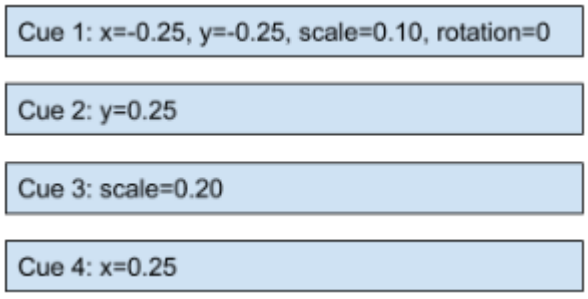


*Fig. 98 - **Example of a cue stack***

Here is a representation of these cues in sequence (the result is the same with or without tracking enabled):

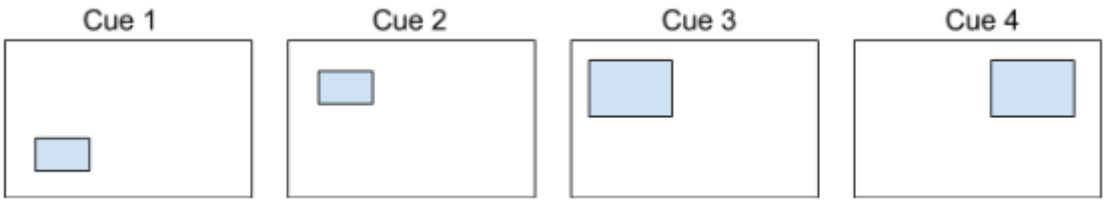


*Fig. 99 - **Cue stack example played in sequence***

10.5.1 Example without cue tracking

Without cue tracking, jumping from Cue 1 to Cue 4 only executes Cue 4 and ignores Cues 2 and 3.
The only parameter that changes is the x position.

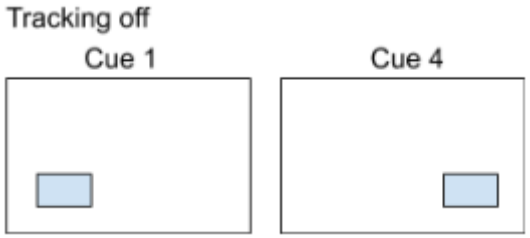


*Fig. 100 - **Jump from Cue 1 to Cue 4 without cue tracking***

10.5.2 Example with cue tracking enabled

With cue tracking enabled, when jumping from Cue 1 to Cue 4 the server checks all the changes in between Cue 1 and Cue 4. In this case, the succession of parameters of Cue 2, Cue 3, and Cue 4 are added to the result. The playback jumps to Cue 4 as if all cues were run in a sequence.

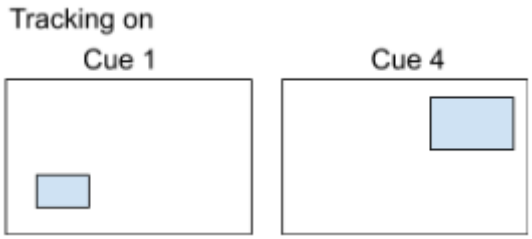


*Fig. 101 - **Jump from Cue 1 to Cue 4 with cue tracking***

10.5.3 Forward tracking

By default, the server only checks the changes between the current cue of the playback and the target cue of the jump. This default tracking is called forward tracking.

Let's take another example with the same cue stack:

1. Load Cue 1.
2. Manually rotate the layer.
3. Jump to Cue 4 with cue tracking.

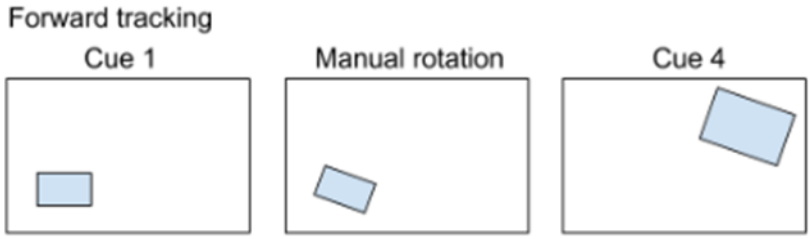


*Fig. 102 - **Forward tracking example***

In this example, the rotation is kept and the jump from Cue 1 to Cue 4 adds all changes between the cues (new y position + new scale + new x position).

10.5.4 Full tracking

With full tracking, the server resets the show to the beginning of the playback and jumps to the target cue while applying all changes from the first cue to the target cue of the jump. Full tracking ignores and removes all manual changes that happened during the playback.
To perform a full tracking jump, hold the **Shift** key and click the **Go** or **Go To** buttons.

Same example with full tracking:

1. Load Cue 1.
2. Manually rotate the layer.
3. Jump to Cue 4 with full cue tracking.

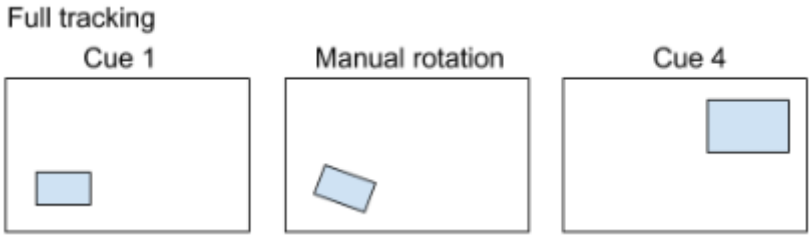


*Fig. 103 - **Full tracking example***

In this example, the rotation is reset as the jump from Cue 1 to Cue 4 resets the show before adding all cues up to Cue 4.

Note: When jumping backwards in a cue stack (for example from Cue 4 to Cue 2), the server always performs full tracking.

Tip: Use hotkeys Shift + F9 to 12 for Playback 1 to 4 to performs a Go with forward tracking.

10.6 Triggering cues with Timecode

The Picturall media server supports many kinds of timecode providers, which can be used timecode, schedule and synchronize several different server functionalities. Supported timecode providers include:

- Server internal wallclock
- Media layer
- Cue playback
- Timecode generator
- MTC (audio option required)
- LTC (audio option required)
- Synchronizing layer timecode over network

A timecode provider can be selected for each playback. One timecode provider can be connected/selected to many timecode targets. Most timecode providers can also be used as a provider for another provider. This allows constructing more complex shows and for example practicing a show. For example, a playback can be timecoded to the server wallclock but practiced using a timecode generator. The system will detect and prevent circular provider connections.

10.6.1 Cue programming with timecode

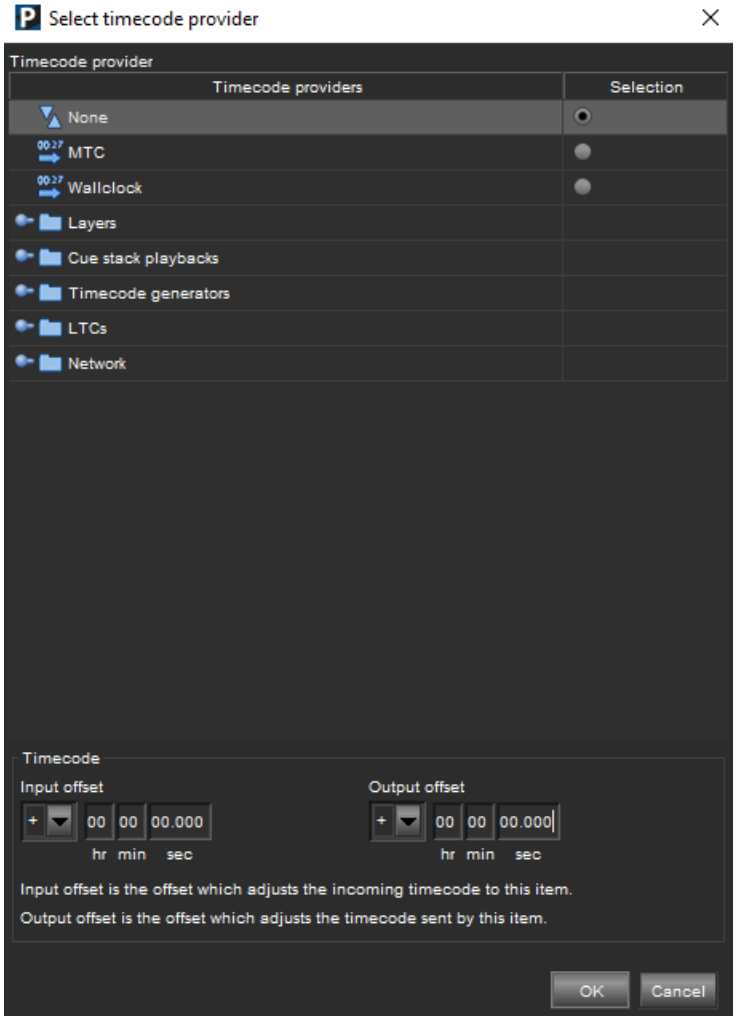


*Fig. 104 - **Timecode Provider selection menu***

- The Input offset adjusts the offset applied to incoming timecode to this playback.
- The Output offset adjusts the offset which is applied to timecode signal outgoing from this playback.
- Network items can be connected to a remote timecode provider on a different Picturall media server. To connect or disconnect network item, right-click the item.

1. Load a Cue Stack in a playback, then click  to open the Timecode provider menu.
2. Select the timecode provider for a cue stack playback.
   The selected timecode provider appears at the bottom of the playback.
3. Right-click a CSE and select **Trigger type** > **Timecode**.
4. In the CSE Timecode setting, enter the timecode in HH:MM:SS.SSS format. By default, Wait, Fade and Hold settings work similar as with any other trigger type.

Note: Bypass the set timecode trigger by enabling Manual triggering for the cue.

Tip: - The Timecode provider can be selected for the programmer. Its value will be used as the default timecode value for any cue added to a cue stack.
- Right-click an item to adjust timecode specific options, such as timecode offset.

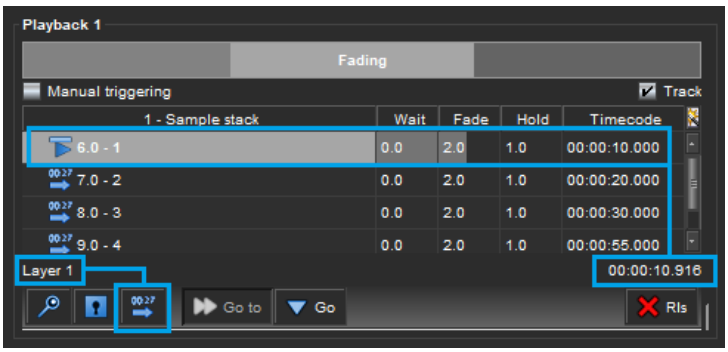


*Fig. 105 - **A cue triggered by selected timecode provider***

Note: Adjusting address of a cue in cue stack or playback can cause adjustments of timecode or vice versa. This is to ensure that the order of cues remains in the same execution order.

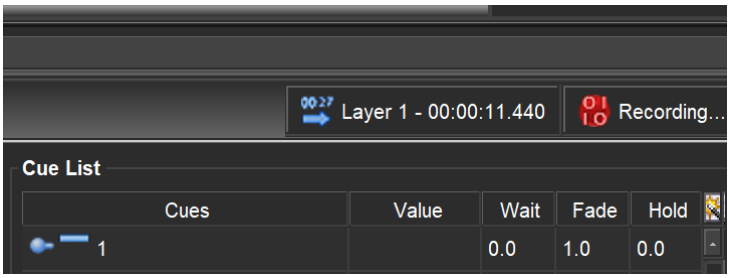


*Fig. 106 - **Timecode on display on Cues menu***

10.6.2 Set trigger timecoded with System Wallclock

The Wallclock timecode provider emits the server time and date. It can be used to run cues at set times or even more complex scheduling patterns.

- Select a cue stack playback and select Wallclock as timecode provider.
- Set the trigger type to Timecode for the required cues and define the trigger times to Timecode column.

Set the input and output offsets for wallclock timecode if required.

Note: The server wallclock may differ from the time on the computer which runs Commander.

- Set the server wallclock time with web configurator (see *4.1.8 Time Settings* page 38).
- The Wallclock timecode is based on 24-hour clock (HH:MM:SS), cue trigger values between 00:00:00:000 and 23:59:59:999

Note: Wallclock timecode also contains date data. This may cause unexpected behavior with cue triggering if the current date differs from the scheduled date (see more 9.7.)

Tip: The current Wallclock time will be displayed at the bottom of the Playback window.

- If cues need to be scheduled to repeat more than once a day, see more information on cue scheduling for repeating events daily, weekly or on certain dates from chapter 9.7.

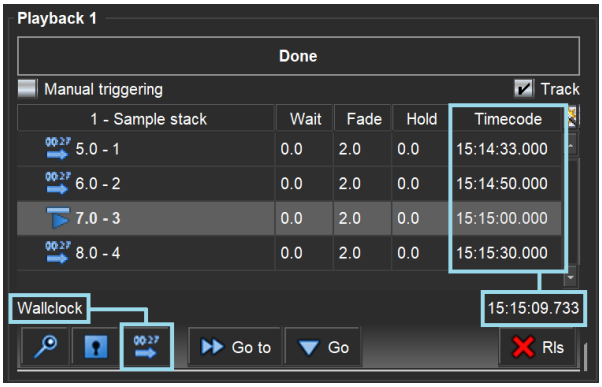


*Fig. 107 - **Triggering cues with system wallclock***

10.6.3 Media layer & Cue stack playback as timecode providers

Media layers can be used as timecode providers for cue stack playbacks. The layers carry the timecode of the currently playing media. If no media is playing, the timecode provider value does not update, and no timecoded trigger can occur.

Cue stack playbacks can be used as timecode providers for other cue stack playbacks. The timecode emitted is simply the same timecode the playback receives, adjusted by optional output and input offsets.

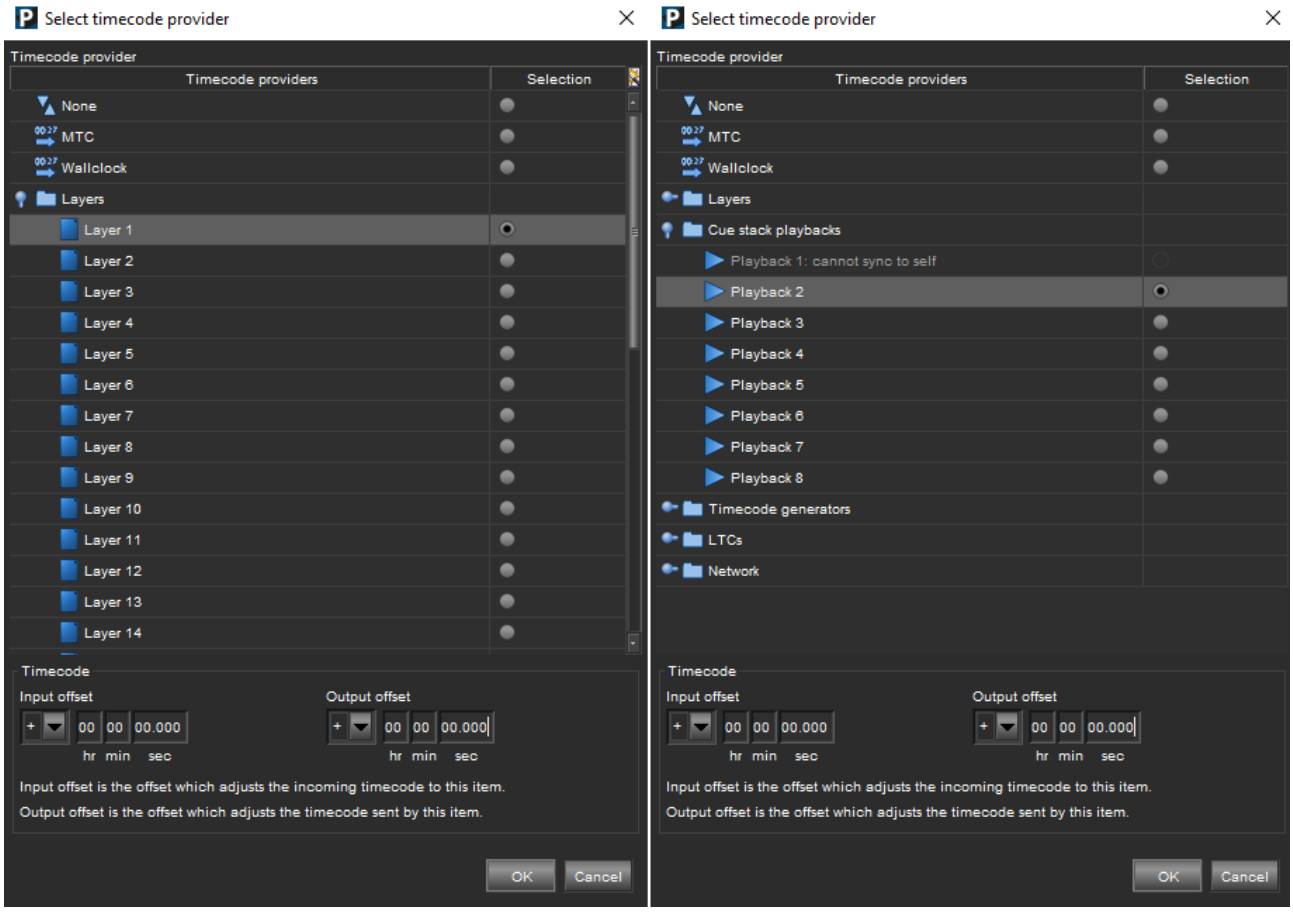


*Fig. 108 - **Selecting a Layer or a Playback as timecode provider***

When using media layer as a timecode provider the timecode follows the media playing on the layer.

Note: If media end action is defined as loop, then timecode will return to the beginning value (00:00:00.000) when the media loops.

- If media end action is defined to play more than one media files in the collection (loop collection, random and next) the timecode follows each played media accordingly.
- If the collection contains different length media files, please note that timecode triggers outside the media timeframe will not be triggered.

10.6.4 Timecode generator

Timecode generators can be used to generate timecode and emit it to connected timecode targets. Set the timecode generator by opening the menu below the cues or from the top icon row.

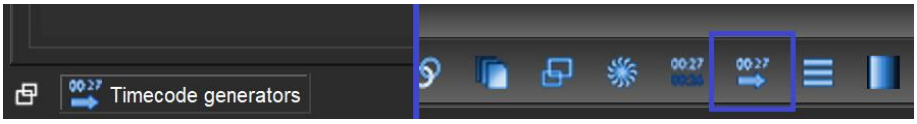


*Fig. 109 - **Timecode generator menu locations***

A timecode generator can also act as a proxy for another timecode provider. Synchronizing a timecode generator to another timecode provider disables timecode generator controls. To enable controls again, select “None” as the selected timecode provider.

Timecode generator supports basic controls and actions such as *Play*, *Pause*, *Stop*, *Seek* To and End Action. Inpoint and outpoint can also be adjusted. Up to eight simultaneous timecode generators are supported.

Tip: If a Timecode generator menu does not appear properly (content is hidden), enlarge the menu by stretching the menu from the top.

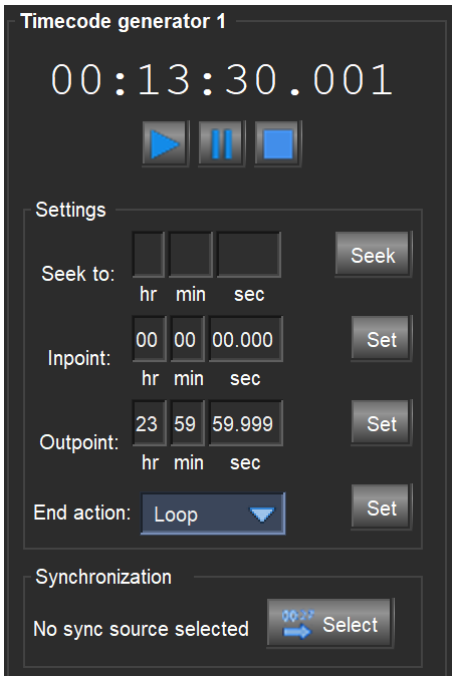


*Fig. 110 - **Timecode generator settings***

10.6.5 Midi Timecode (MTC)

Incoming MTC signal can be used as a timecode provider. Output offset can be applied to MTC signal, but please note that the same output offset is used for both MTC timecode provider and MTC timecode out. See *10.4 Timecode out* page 136 for details on how to set MTC out offset.

Note: The optional audio card is required for MTC.

10.6.6 Linear timecode (LTC)

Linear Timecode (LTC) is an encoding of SMPTE timecode data in an audio signal. LTC inputs can be configured from the web configurator in C*onfiguration > LTC configuration* (see *4.1.4 LTC configuration* page 28).

The defined LTC inputs can be set as timecode provider from the Picturall Commander timecode menu. Different audio channels from one or more audio cards can be configured to receive different LTC signals with different LTC configurations.

Select configured LTC sources from the Timecode provider menu. The LTC offsets can be set from the same menu. Input and output offsets can be defined separately.

Note: The optional audio card is required for LTC

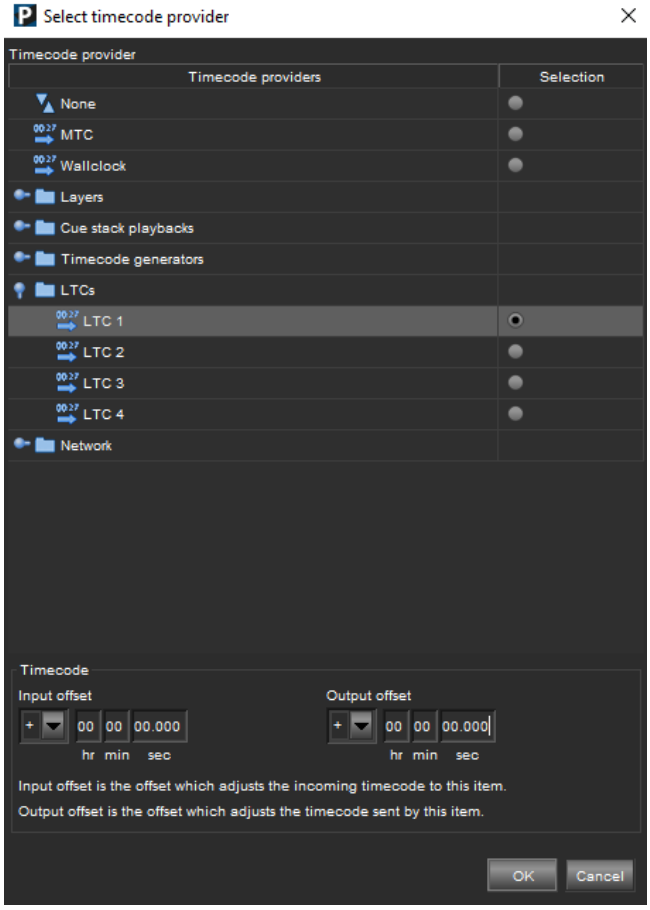


*Fig. 111 - **Select an LTC source as timecode provider***

10.6.7 Synchronizing layer timecode over network

Synchronize layer timecode between two Picturall media servers from the Picturall Commander timecode menu. Up to four network timecode synchronization sources can be configured under the Network timecode provider list.

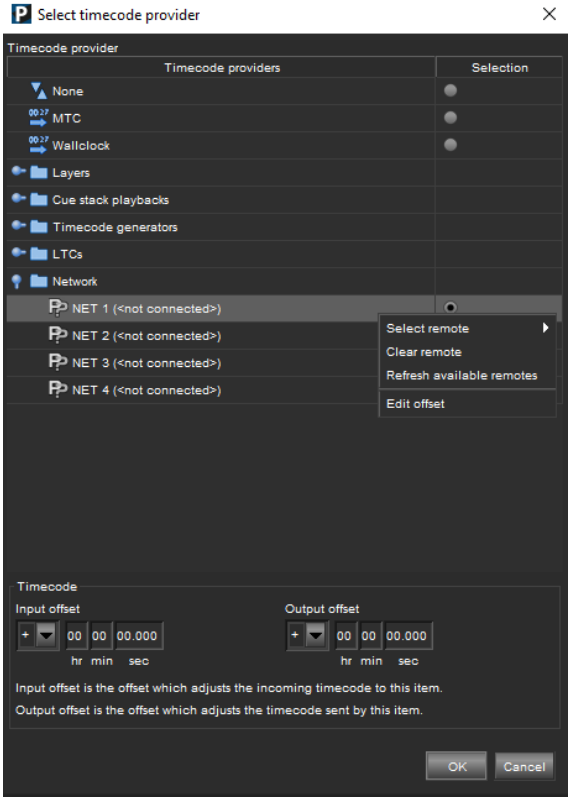


*Fig. 112 - **Network timecode source***

- Right-click one network item and select a timecode provider server IP from the **Select remote** list. All available Picturall media servers are displayed in the list. After selecting the server IP, a following list will provide all the available time code sources the selected server can provide.

Note: - One server can be a time code provider for more than one server with one or more time code sources (wallclock, layer, LTC etc.). - Right-clicking the network item will also bring up options to clear previously configured time code sources, refresh the source list and edit time code offsets.

10.7 Scheduling cues and playback

Using Picturall media servers, both single and occurring events can be scheduled based on date and time. Schedule can be defined for a cue in stack or playback. The server supports various conditions for scheduling cue playback.

- After creating cues and adding them to a cue stack playback, right click on target cue and set the trigger type to timecode and define **Wallclock as the timecode provider**.

- Then select Scheduling from the contextual menu. This will open the cue scheduling dialogue.

Tip: Cues can be scheduled to repeat and if no repeat is defined, the cues will run only once.

Supported scheduling conditions for calendar repeat:

- Day of the week (any combination of weekdays)
- Day of the month (any or specific day of a month)
- End of repeat (last date of calendar repeat)

Supported scheduling conditions for repeat within day:

- Enabled
- Every X hours/minutes/seconds
- Stop time

Common scheduling conditions:

- Start date
- Start time (mirrors timecode)

Scheduling conditions can be combined in arbitrary ways. For example, a cue can be scheduled to repeat from two o'clock to five o'clock, every 5 minutes, on Fridays and Saturdays.

Scheduled cues are indicated by an icon (for repeating, for non-repeating) in cue playback view.

Note: Only the first occurrence of the repeating schedule is listed in playback view, and the cue is listed based on its timecode even when its scheduling conditions prevent it from running next.

- For a scheduled cue to run, it must have trigger type timecode and it must be in a playback with Wallclock as the selected timecode provider. Date information required for scheduling is not provided by other timecode providers. With different timecode provider, the cue will run when its timecode will match the provider's timecode, but schedule will not be used.

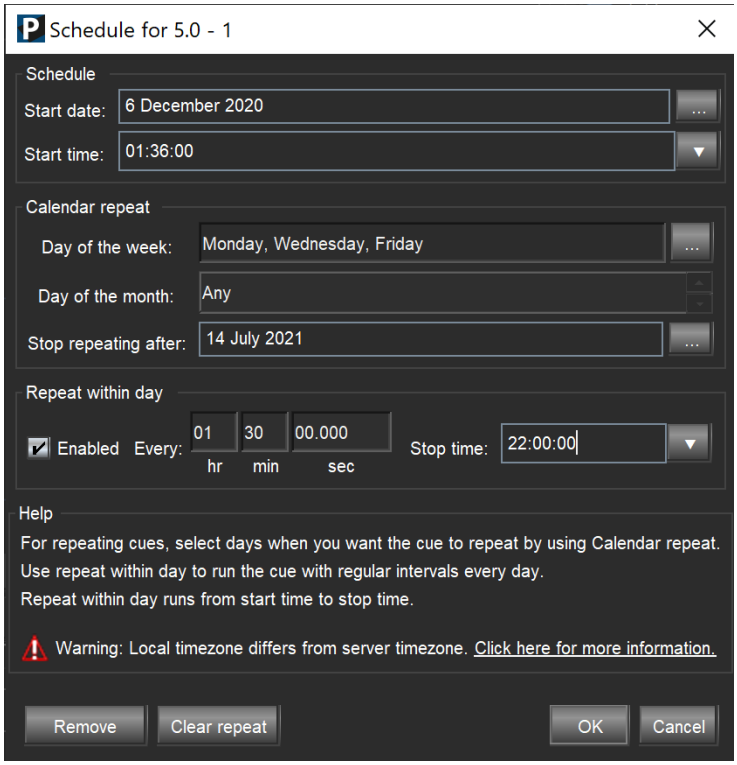


Fig. 113 - ***Scheduling a cue: options menu***

Note: If the server time settings are not correct check the Time settings from web configurator in *Set time*.

The system automatically suggests the date and time when the menu is opened based on the server time settings.

- Edit the start date by clicking on the calendar button  and setting the start time by typing in the value or from the time drop down list.

- If a scheduled event is required only on certain weekdays define the days by clicking  at the end of the **Day of the week** row.

- If the repeat is required only once a month, define an exact day number when the playback is repeated every month in the **Day of the month** field.

- Set the stop time for the scheduled event from the calendar repeat menu.

- Enable the **Repeat within day** selection if the event is required to trigger more than once a day. Set the daily repeat schedule within 24-hour clock to appointed time fields.

Tip: Both calendar and repeat within day scheduling options can be combined for more advanced scheduling situations.

Scheduling occurs in the time zone defined in the server configurator. A warning will appear at the bottom of the scheduling menu if there is a difference between the local time zone and the defined server time zone. Clicking on the notification will give more information on the time zone situation.

Note: Scheduling cannot be done beyond December 31st, 2035.

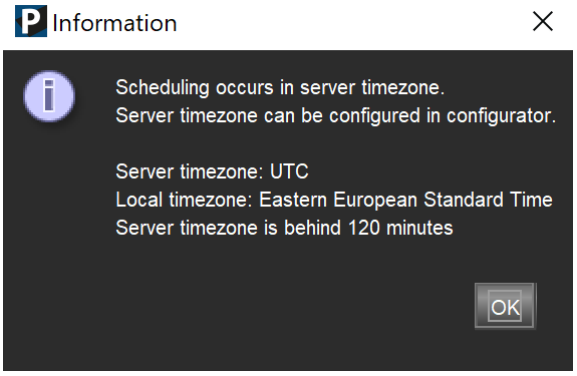


*Fig. 114 - **Scheduling a cue: Time zone warning***

Note: When scheduling cues to run on different days, the playback view lists cues based on their timecode. Next on the cue list might no longer be the next cue to run if it is scheduled for another day. See following chapter for more details.

10.7.1 Playback schedule view

Playback view contains a table icon which opens/closes playback schedule view.

- The schedule view shows each scheduled cue and when the cue will be played according to the schedule.
- The schedule column in cue stack playback summarizes the entry schedule (if defined).

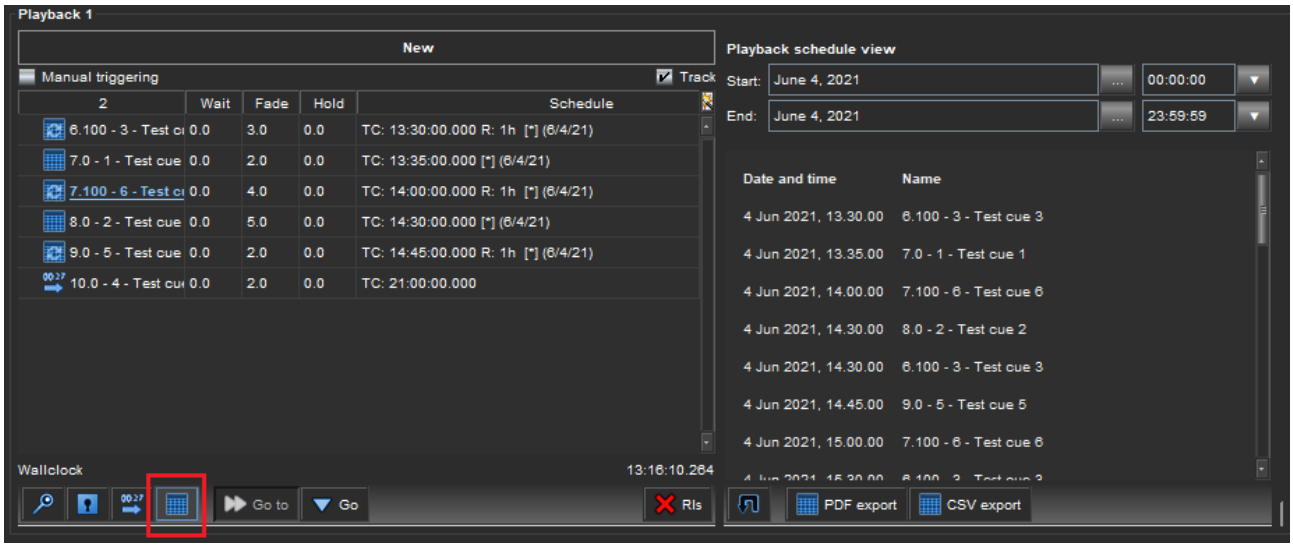


*Fig. 115 - **Playback schedule view***

- An entry without a defined schedule has a timecode displayed.
- A cue scheduled to repeat every hour is shown multiple times in the list.
- A cue without any daily repeat schedule appears only once per day.

10.7.2 Schedule export to PDF/CSV

It is possible to export the playback schedule view in PDF and CSV reports.

1. Set the date and time range from the schedule view.
2. Click **PDF export** or **CSV export**.
3. Confirm the save dialog to export the file.

Note: Some characters and symbols are not supported in PDF export. This will not prevent the export, but the unsupported characters will be left out from the exported document.

10.8 Show example

Let us create a simple show in which one media layer is playing in the background and another layer is on top of it with a logo (still image) on it. Using cues, the logo will move from the left side of the projection area to the right side.
To achieve this, do the following:

1. Open the **Cues** panel and make sure **Recording…** is enabled.
2. Click the **Clr** button to clear the Programmer
3. Go to **Layers**, select a background media and play it on Layer 1 (a green border appears around these controls).
4. In **Cues**, click **Save new** to create a cue with the recorded media state. A new cue appears in the Cue list.
5. In **Layers**, select the logo image in the Media selection panel of Layer 2, play it and use the position controls to place it on the left side of the composition.
6. Make sure that media selection, play mode and position control adjustments are recorded on the Programmer.
7. In **Cues**, click **Save new** to create a new cue.
8. In **Layer 2**, use the position controls to move the logo to the right side of the composition.
9. In **Cues**, click **Save new** to save the position change to a new cue.

Three cues are created in the Cue List: a background media without logo, the background media with the logo on the left and the background media with the logo on the right.

10. Click **S-add** to create a new cue stack in the Cue stack list. Select the cues and drag them into this stack.
11. Drag the stack into Playback 1.
12. Select the first cue in the Playback list and click **Go**.
    - Enter timings for each cue (**Wait**, **Fade** and **Hold**).
    - Right-click a cue to change its trigger type (**Manual** or **Automatic**).
    - In **Manual** mode, keep clicking **Go** to go through the three cues of the Playback.

10.9 Live show recommendations

Here a few tips and recommendations for live show setup:

- Create a cue with all layers stopped and zero intensity then put it at the beginning of the main showcue stack. This way the programming starts from blackout and there are no surprises when jumping back to start of the show.
- Use separate playbacks to play different sequences of media on different displays.
- Set the User Interface so that the **Cues**, **Layers**, and **Performance** panels are visible.
- When live, use the **Layers** panel only for adjusting minor things such as audio volume.
- Hide the **Displays**, **GPU** and other tabs that do not directly affect the show.
- Set hotkeys on the keyboard to play specific Playbacks (Edit > Options > Keymap), by default **F9**, **F10** and **F11** play Playback 1, 2 and 3 respectively.

10.10 Cue macro

A cue macro is an action associated to a Cue or a Cue stack.

Note: - Cue macro and Layer macro are different concepts.
- A saved show (.pcf file) containing Cue macros can only be loaded on Picturall Commander from version 2.6 and onwards.

10.10.1 Cue macro and Cue stack macro

10.10.1.1 Cue macro

A cue macro is associated to a cue and affects all CSEs of this cue.

- The cue macro is executed when the cue is executed.

To create a cue macro:

- Right-click a cue in the Cue List (or a CSE in a Cue stack) then click **Edit macro…**

10.10.1.2 Empty cue

It is possible to create a cue macro on an empty cue (a cue with no layer change).
To create an empty cue:

- Right-click a cue in the **Cue List** then click **Add cue**.

Note: It is also possible to delete the parameters of an existing cue to make it empty.

10.10.1.3 Cue stack macro

A Cue stack can have two types of macro associated to it: **entry macro** and **exit macro**.

- The entry macro is executed when the Cue stack is **loaded** in a playback.
- The exit macro is executed when the Cue stack is **released** from a playback.

To create a Cue stack macro:

- Right-click a Cue stack in the Cue Stack List then click **Edit entry macro…** or **Edit exit macro…**

10.10.2 Cue macro actions

Tip: A little “M” appears next to the Cue number (or Cue stack number) to indicate that a Cue macro is enabled.

When creating a Cue macro, the following window opens and four macro actions are available:

- Trigger a specific cue
- Trigger a specific playback
- Send a network command
- Custom macro

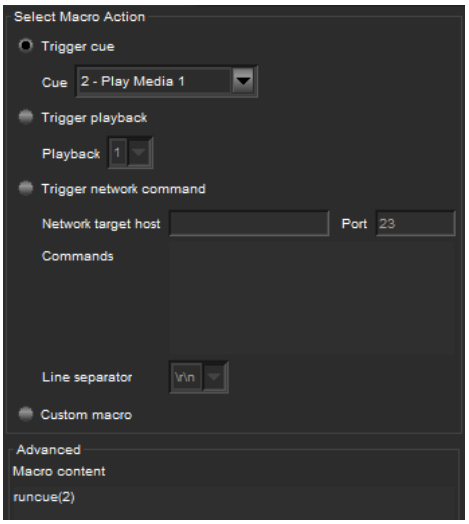


*Fig. 116 - **Cue macro***

10.10.2.1 Trigger cue macro

This executes a cue when a macro is executed.

1. Click **Trigger cue**.
2. Click the dropdown list and select a cue.
3. Click OK.

10.10.2.2 Trigger playback

This executes a playback when a macro is executed.

1. Click **Trigger playback**.
2. Click the dropdown list and select a playback number.
3. Click OK.

10.10.2.3 Trigger network command

This sends a custom command to a device connected on the same network when a macro is executed.

1. Click **Trigger network command**.
2. Enter the target address and port number.
3. Enter the command to be sent.
4. Choose the Line separator.
5. Click OK.

10.10.2.4 Macro content and Custom macro command

When creating a cue macro, the content of the macro is displayed in the Macro content section.

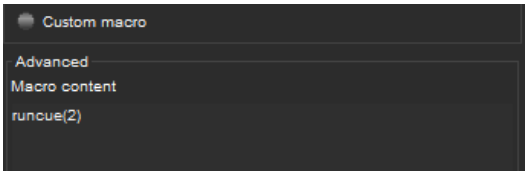


*Fig. 117 - **Macro content***

Cue macros are written in **Lua** scripting language, and support complex interactions. For example, a single custom macro can be used to trigger multiple cues and playbacks and send a network command.

Tip: - Click an action to load a command then click custom macro to edit the content.
- The command list is available in a document enclosed to this User Manual.

To create a custom cue macro:

1. If needed, click any action to load the content.
2. Click **Custom macro**.
3. Edit the content to create a custom command.
4. Click OK.

Note: Custom macro does not have syntax validation. Enter custom commands carefully.

10.10.3 Edit or remove a cue macro

To edit a cue macro:

1. Right-click a Cue or a Cue stack then click **Edit macro…**
2. Edit the cue macro then click **OK**.

To remove a cue macro:

1. Right-click a Cue or a Cue stack then click **Edit macro…**
2. Click **Remove macro**.

10.10.4 Create cue macros using Lua commands

For more information, see *Appendix E Cue macro Lua API* page 161.

10.11 Automatic show start on system start up

It is possible to start a show (cue stack) on system start up using an entry macro.
Create an entry macro for a cue stack which is needed to run immediately after a system has booted up (without separately triggering a cue in Commander).

1. Right click on cue stack
2. Select Edit entry macro
3. Select Trigger cue or Trigger playback depending on requirement

Note. If the cue stack is loaded into a playback in an exported show, it will run the entry macro at start up.

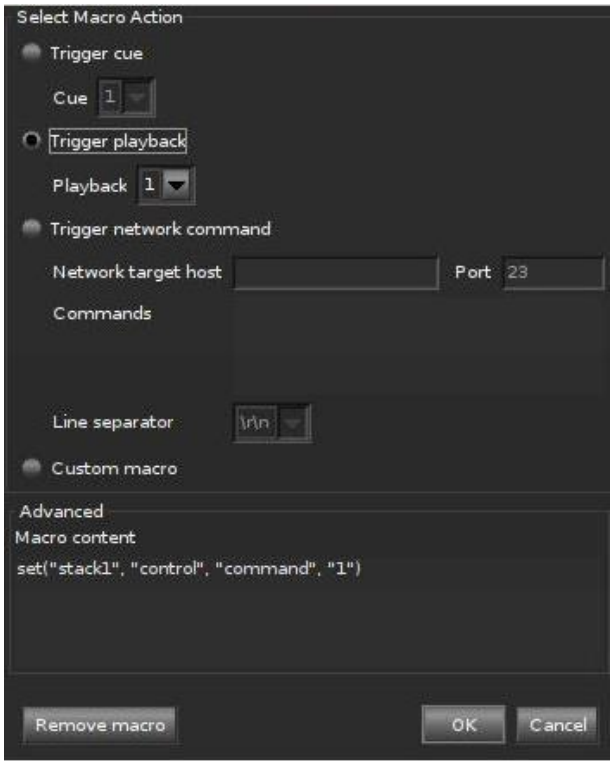


Fig. 118 - ***Entry macro for a cue start on start up***

11 Miscellaneous

11.1 Save a show

Save a show to recover it or to reuse it on another computer using Picturall Commander.

1. Run Picturall Commander.
2. Go to **File > Save show.**
3. Select a folder and enter a filename.
4. Click **Save**.

The show is saved in a **PSF** file.

- Go to **File > Load show** to load a show.

11.2 Sync card – Genlock (Picturall Pro only)

The sync card is an optional card for Picturall Pro to enable Genlock.

Note: - Genlock is automatically enabled if the sync card is installed.
- The Frame Lock connectors are currently not supported.
- Genlock is possible for the following refresh rates: 50Hz, 60Hz,100Hz, 120Hz and 200Hz.

11.2.1 Genlock menu

In the **Genlock** menu, check the sync status.
- If needed, click **Resync genlock** to reset synchronization.
- If needed, use **Framelock pulse delay** to adjust the sync manually using an offset in nanoseconds.

11.2.2 House sync status LED

When the Genlock is correctly connected, the LED under the connector lights up (labeled House sync).

*Fig. 119 - **Genlock connection status LED***

11.2.3 GPU sync status

The “SYNC” LEDs indicate the sync status per GPU.
The following image shows which LED corresponds to which GPU.

*Fig. 120 - **LED-GPU correspondence***

SYNC LED status	
LED off	GPU is not connected
Yellow LED on	GPU is not synchronized
Yellow LED blinking	GPU is synchronized but nearly losing sync
Green LED blinking	GPU is synchronizing
Green LED on	GPU is synchronized

Table 9 - GPU sync status

Note: Sync LEDs are only available for First generation of Picturall media servers. For **Picturall Mark II series** see the instructions for GPU sync status from chapter 11.2.4

11.2.4 Framelock menu on front panel display

GPU sync status can be verified from the server front panel display. Press the **Next/Status button** on the front panel to show the Framelock menu. The OLED display menu shows the status of House sync, sync rate and the sync status of each available output card.

- The letter **Y** in Sync Status indicates that GPU sync is active. Each output card has its own letter.
- The letter **N** indicates that the GPU sync is not active, or the GPU is not synchronized.

If the server has two GPUs installed and the Sync status is “Y, Y”; both GPUs are synchronized.

11.3 Performance

*Fig. 121 - **Performance menu***

In the **Performance** menu, monitor the performance of the system as graphs.
Use the **Enabled** checkboxes to show/hide the corresponding graphs.

Tip: These metrics are useful to show potential problems.

Graph	Description
CPU	Average workload. **“1”** means the load is equivalent to a single CPU core being fully loaded. **“8”** means that 8 cores are fully loaded. If the value is higher than number of CPU cores installed, the CPUs is doing more than it can handle. However, this value does not reflect the smoothness of the playback. The average workload can get high without affecting playback quality.
CPU_TEMP	CPU temperature in Celsius degrees.
GPU	GPU refresh rate. The server unit’s performance is fine if the indicator values match the display’s refresh rate. In this example the display refresh rate is 60.
GPU_DRAW	Time it takes GPU to draw one single frame. If GPU_DRAW reaches 80% of GPU_SWAP, lower GPU load (effects, resolutions, active layers).
GPU_MEM	The amount of memory used by the GPU.
GPU_SWAP	Time it takes GPU to show one frame (except when Triple buffering is enabled). This should always be 16.67 ms for 60Hz displays.
GPU_TEMP	GPU temperature in Celsius degrees.
GPU_TEX	The amount of data transferred to the GPU (in megabytes per second).

Table 10 - Performance

11.3.1 Toggle view

On the top left of the **Performance** tab toolbar are the view buttons:

Toggle between graph and table view, or both of them side by side horizontally or vertically.

11.3.2 Refresh

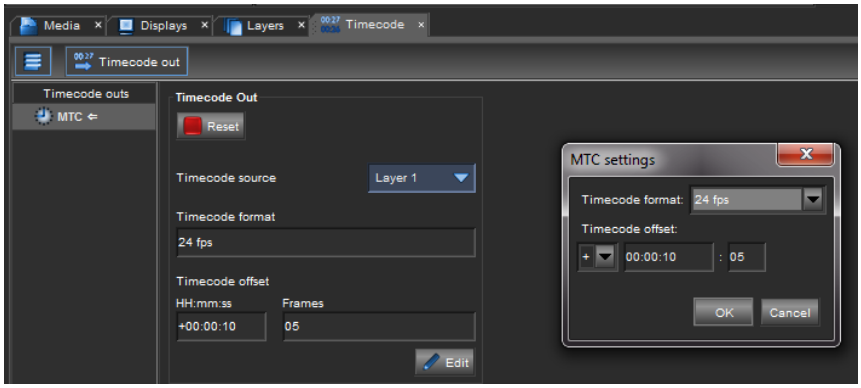
On the top right corner, set refresh rate, turn refreshing on/off and manually refresh the graphs.

11.3.3 Color

In the **Color** column in the table, click the **[…]** buttons on every row to set the color scheme of the graph view.

11.4 Timecode out

In the **Timecode** menu, set the timecode format and offset it by time or frames.

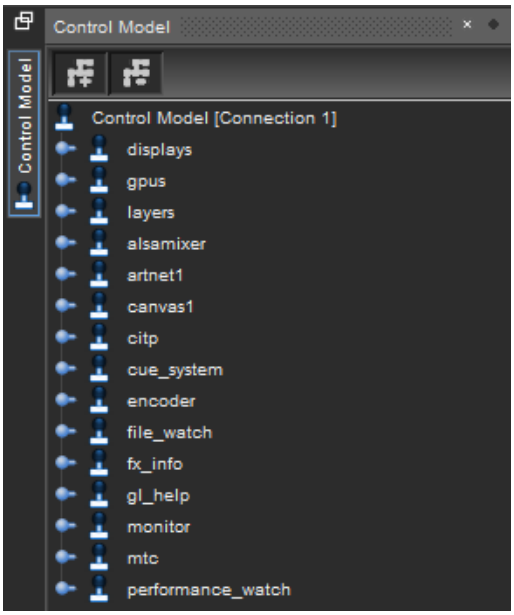


The Timecode format and Timecode offset fields show the current values.

1. In **Timecode source**, click the dropdown and select the layer to output the timecode from. Or select **OFF** to disable sending the outgoing timecode.
2. Click Edit and enter new values in the MTC Settings dialog.

11.5 Control Model

The **Control Model** is a tree structure of all the control groups, the controls and the attributes in them. Control model can be useful when integrating the server into custom control systems.



1. Open both the **Control Model** and **Properties** tab.
2. Click in the tree structure to view control-specific information and view the information on the Properties tab.

11.6 Commander Log

Commander log can be used to inspect diagnostics information and to review commands sent to the server ("TXTOUT").

- Go to **View > Commander Log…** to open the panel.

Commander log can be useful when integrating the server into custom control systems. To adjust level of detail written into Commander log, please see Options -> Logging.

11.7 Replacing / hiding the default error image

By default, the server will output an error image containing a red cross with an error message. For example, when an input cable is disconnected from the source. To change this default image

- Create and save new image as default_error_image.png
- Create folder "errors" with a computer and copy the new error image to this folder
- Upload the folder with Commander UI to server file path /picturall/media/

The file can be an image or an empty transparency layer if you don't want anything to show up.

This new error image will take effect after a reboot, and will remain in effect until it is manually deleted and restarted.

The error text is a separate item and needs to be disabled through telnet command or with a cue macro, and will only remain until the next restart. The telnet commands to use

- **set_global hide_error_text true** – for removing the error text
- **set_global hide_errors true** – for removing both error text and the image

To setup up a cue macro to do this automatically at start up

- Make a cue stack
- Edit entry macro
- Trigger network command with network target host "localhost" port 11000
- Place either "set_global hide_error_text true" or "set_global hide_errors true" in the commands field and click ok,
- Drag the cue stack in to a playback and export. It will then always add the stack to a playback and run the entry macro at startup
- Export the state where it is ran at startup

12 User maintenance and Troubleshooting

12.1 User Maintenance – Air filter

Tip: For optimal performance, this air filter must be cleaned by the user regularly (once a year).

The Picturall Series Media Server is equipped with a removable air filter at the front of the media server.

12.1.1 Air filter cleaning - Picturall Twin, Quad and Pro

Note: This user maintenance is applicable to both First generation and Mark II series.

Tools: Torx T20 screwdriver, duster or vacuum.

1. Turn the media server off and unplug mains.
2. Remove the four screws on the front panel.
3. Using both hands, gently pull the front panel on a straight axis.
4. Gently tilt it down until mechanical stop.

The front panel is in safe still position.

5. Pull the air filter and take it out from the media server.
6. Carefully clean the air filter with a duster or vacuum.
7. When the air filter is clean, gently put it back in place.
8. Gently tilt up the front panel until it is aligned.
9. Gently push the front panel back in place on a straight axis.
10. Set the screws back in place.

The air filter is cleaned and the media server is ready for use.

12.1.2 Air filter cleaning - Picturall Twin Compact and Quad Compact

Note: This user maintenance is applicable to both First generation and Mark II series.

Tools: Torx T10 screwdriver, duster or vacuum.

1. Turn the media server off and unplug mains.
2. Remove the screws of the filter cover on top of the front panel.
3. Remove the filter cover using the screwdriver to access the air filter.
4. Gently pull the air filter upwards on a straight axis and take it out from the media server.
5. Carefully clean the air filter with a duster or vacuum.
6. When the air filter is clean, gently put it back in place.
7. Set the filter cover back in place.

The air filter is cleaned and the media server is ready for use.

12.2 System Diagnostics

System diagnostics are used for technical support. It is a file exported from Picturall Commander to be sent to technical support.

To export the system diagnostics file:

1. Go to **File** > **Get system diagnostics**.
2. Save the file on the computer.

12.3 Troubleshooting

The network cannot connect to a Picturall Mark II media server

- Make sure to use a 1GB network connection.

Picturall Commander installation failure

- Make sure to install the latest version of Picturall Commander as it corrects all known issues

Layer control > Advanced: Dropdown menus are not visible

- Make sure to use the latest version of Picturall Commander as it corrects all known issues

Unable to Connect to the Server

- Verify that the server and the computer running Picturall Commander are using the same netmask.
- Verify that the server IP-address is correct.
- Verify that the network is running correctly with a ping command.
- Verify that there is no more than one DHCP server in the network.
- Verify that the firewall is not blocking the connection.

Video Playback is not smooth

- Disable unused displays.
- Verify there are no playing back of layers that are not visible: select all layers in the Layer list, right-click on them and select **Stop**. Then click **Play** on the desired layers only.
- Too many layers or too high resolutions are in use. Playback performance is 4-16 layers of FullHD depending on the display setup, codecs and bitrates.
- Simultaneous use of displays with different refresh rates. Force resolution and refresh rate in the **Configurator**.

Video output has poor resolution

- Disable unused outputs.
- Position displays using the same graphic card closer to each other and optimize the pixel space in the **GPUs** tab.

“Cable disconnected” error message keeps displaying

- Stop all playbacks.

Output not displayed due to cable disconnection or image processor reboot

- In Picturall Commander, go to GPU menu and click **Refresh displays**.

Sync error when connecting an external clock while the media server is running (Picturall Pro with Genlock)

- In Picturall Commander, go to Genlock menu and click **Resync genlock**.

APPENDICES

Appendix A. DMX chart

DMX Chart - Layer full

LAYER SIZE AND POSITION:

- Composition canvas has coordinates from 0,0 to 1,1 with 0,0 being the bottom left corner
- Layer default position is 0.5, 0.5 (32768, 32768 in DMX values).
- Position coordinate is the layer center point coordinate.
- Default scale for layer is 1.0 (32768 in DMX values). Default layer width is 1.0 in canvas coordinates.
- Layer height is affected by media Aspect ratio and Aspect-control. Media default Aspect is used when Aspect is 1.0.
- Aspect ratio height multiplier derived from media aspect ratio and scale.
- For Scale and Aspect value, descriptions contain physical value multiplier. For example, “7 x” in Scale means the layer is seven times larger is scaled and “7 x” in Aspect means the media aspect ratio is multiplied by seven.

LAYER:

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
1		Intensity				0	255
2	3	X	Layer X position	0 – 65535	Coordinate ranges from -5 to 5	32768	32768
4	5	Y	Layer Y position	0 – 65535	Coordinate ranges from -5 to 5	32768	32768
6	7	Rotation		0 – 65535		32768	32768
				0 – 16383	Continuous rotation counterclockwise, 240 RPM – 0 RPM		
				16384	Indexing rotation counterclockwise 360'		
				16385 – 32767	Indexing rotation counterclockwise		
				32768	Center position		
				32769 – 49151	Indexing rotation clockwise		
				49152	Indexing rotation clockwise 360'		
				49153 – 65535	Continuous rotation clockwise, 0 RPM – 240 RPM		
8	9	Scale		0 – 65535		32768	32768
				0	Mirrored and flipped layer max size, -5 x		
				1 – 21844	Mirrored and flipped layer upscaling, -5 x		
				21845	Mirrored and flipped layer fullscreen, -1 x		
				21846 – 27306	Mirrored and flipped layer downscaling -1 x – 0 x		
				27307 – 32767	Layer downscaling, 0 x – 1 x		
				32768	Layer fullscreen, 1 x		
				32769 – 65534	Layer upscaling, 1 x – 7 x		
				65535	Layer upscaling max size, 7 x		
10	11	Aspect	Vertical Scaling	0 – 65535		32768	32768
				0	Flipped layer upscaling max size, -5 x		
				1 – 21844	Flipped layer upscaling, -5 x - -1 x		
				21845	Flipped layer original aspect ratio, -1 x		
				21846 – 27306	Flipped layer downscaling, -1 x – 0 x		
				27307 – 31402	Layer downscaling, 0 x – 0.75 x		
				31403	4:3 -> 16:9 conversion, 0.75 x		

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
				31404 – 32767	Layer downscaling, 0.75 x – 1 x		
				32768	Layer original aspect ratio, 1 x		
				32769 - 34587	Layer upscaling, 1 x – 1.33333 x		
				34588	16:9 -> 4:3 conversion, 1.33333 x		
				34589 - 65534	Layer upscaling, 1.33333 x – 7 x		
				65335	Layer upscaling max size, 7 x		
12		Draw mode		0 – 255	Check ranges table	0	0
13		Media index		0 – 255		0	No value
14		Media library		0 – 255		0	No value
15		Media mode		0 – 255	Check ranges table	0	0
16		FPS		0 – 255		112	112
				0	Media default fps		
				1 – 63	1 – 63 fps fixed playback		
				64 – 160	0% - 200% relative playback speed		
				112	Media default fps		
				161 – 255	Reserved (frame blending)		
17	18	Seek	Seek to position	0 – 65535		No value	No value
				0	Beginning of the media		
				65535	End of the media		
19		Audio volume		0 – 255		0	255
20		Reserved	Reserved			No value	No value
21		Reserved	Reserved			No value	No value
22		Sync source	Layer sync source (V1.2 and later)	0	Internal (no sync)	0	0
				1 – 128	Sync to layer 1 – 128		
				255	Sync to MTC		
23		Saturation		0 – 255		128	128
				0 – 127	Less saturation		
				128	Default		
				129 – 255	More saturation		
24		Brightness		0 – 255		128	128
				0 – 127	Less brightness		
				128	Default		
				129 – 255	More brightness		
25		Contrast		0 – 255		128	128
				0 – 127	Less contrast		
				128	Default		
				129 – 255	More contrast		
26		Gamma		0 – 255		128	128
				0 – 127	Low gamma		
				128	Default		
				129 – 255	High gamma		
27		Brightness Red		0 – 255		128	128
				0 – 127	Reduce Red		

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
				128	Default		
				129 – 255	Increase Red		
28		Brightness Green		0 – 255		128	128
				0 – 127	Reduce Green		
				128	Default		
				129 – 255	Increase Green		
29		Brightness Blue		0 – 255		128	128
				0 – 127	Reduce Blue		
				128	Default		
				129 – 255	Increase Blue		
30		Contrast Red		0 – 255		128	128
				0 – 127	Reduce contrast for Red color		
				128	Default		
				129 – 255	Increase contrast for Red color		
31		Contrast Green		0 – 255		128	128
				0 – 127	Reduce contrast for Green color		
				128	Default		
				129 – 255	Increase contrast for Green color		
32		Contrast Blue		0 – 255		128	128
				0 – 127	Reduce contrast for Blue color		
				128	Default		
				129 – 255	Increase contrast for Blue color		
33		FX1 Index	FX1 Index	0 – 255	Select FX	No value	No value
34		FX1 Library	FX1 Library	0 – 255	Select FX (look at FX Assignment sheet)	0	0
35		FX1 Param1	FX1 Param1	0 – 255		No value	No value
36		FX1 Param2	FX1 Param2	0 – 255		No value	No value
37		FX1 Param3	FX1 Param3	0 – 255		No value	No value
38		FX1 Param4	FX1 Param4	0 – 255		No value	No value
39		FX1 Param5	FX1 Param5	0 – 255		No value	No value
40		FX1 Param6	FX1 Param6	0 – 255		No value	No value
41		FX2 Library	FX2 Library	0 – 255	Select FX	0	0
42		FX2 Index	FX2 Index	0 – 255	Select FX	No value	No value
43		FX2 Param1	FX2 Param1	0 – 255		No value	No value
44		FX2 Param2	FX2 Param2	0 – 255		No value	No value
45		FX2 Param3	FX2 Param3	0 – 255		No value	No value
46		FX2 Param4	FX2 Param4	0 – 255		No value	No value
47		FX2 Param5	FX2 Param5	0 – 255		No value	No value
48		FX2 Param6	FX2 Param6	0 – 255		No value	No value
49		Reserved	Reserved			No value	No value
50		Reserved	Reserved			No value	No value
51		Reserved	Reserved			No value	No value
52		Reserved	Reserved			No value	No value
53		Reserved	Reserved			No value	No value
54		Reserved	Reserved			No value	No value

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
55		Reserved	Reserved			No value	No value
56		Reserved	Reserved			No value	No value

RANGES:

Parameter	Value	Name	Description
Draw mode	0	Additive	Add layer intensities
	1	Replace	Replace lower layer
	2	Subtract	Subtract upper layer from lower layers
	3	Darken	Select darker parts of upper and lower layers
	4	Lighten	Select lighter parts of upper and lower layers
	5	Multiply	Multiply layer intensities
	6	Linear burn	Linear burn (Subtract variant)
	7	Screen	Screen layers (opposite of Multiply)
Media mode	0	Media default	
	1	Play Next	Play next media after current
	2	Play Stop	Stop after playing current media
	3	Play Pause	Pause on the last frame of current media
	4	Play Loop	Loop current media
	5	Pause	
	6	Stop	
	10	Play Loop collection	Play next media and after last media in collection, replay from the first one.

EFFECTS:

FX NAME	Library	Index	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5	Parameter 6
Wave	1	1	Amplitude	Amplitude aspect	Frequency	Frequency aspect	Speed	
Water Ripple	1	2	Size	X	Y			
Blur	2	1	Size					
Heavy blur	2	2	Blur size					
Gaussian blur	2	3	Blur size					
Radial Blur	2	4	Size	Amount				
Radial Blur Advanced	2	5	Size	Amount	Blur center X	Blur center Y		
Directional Blur	2	6	Blur size	Angle				
Glow	2	7	Threshold	Glow size				
Chromakey	3	1	Threshold	Red key	Green key	Blue key	Smoothing	
Chromakey Inverse	3	2	Threshold	Red key	Green key	Blue key	Smoothing	
Lumakey	3	3	Accuracy	Key	Smoothing			
Lumakey Inverse	3	4	Accuracy	Key	Smoothing			
Alpha Fill	3	5						
Alpha Fill inverse	3	6						
Alpha Key	3	7						
Quick Border	4	1	Amount of border	Outside blur	Inside blur	Border color red	Border color green	Border color blue
Edge Blur	4	2	Blur amount					
Mask	4	3	Mask left	Mask right	Mask top	Mask bottom		
Keystone	4	4	On/Off	Left side	Right side	Top side	Bottom side	
3D Plane	5	1	X Rotation	Y Rotation	Z Rotation	Continuous rotation speed	FOV	Material mode
3D Cube	5	2	X Rotation	Y Rotation	Z Rotation	Continuous rotation speed	FOV	Material mode
3D Sphere	5	3	X Rotation	Y Rotation	Z Rotation	Continuous rotation speed	FOV	Material mode
Sepia	6	1	Amount					
Inverse	6	2						
Halftone	6	3	Amount					
Halftone Advanced	6	4	Amount	Background Red	Background Green	Background Blue	Background Transparency	
Comic	6	5	Amount					
Pixelize	6	6	Amount					
Edge Laplace	7	1	Mixing	Laplace amount				
Edge Laplace Add	7	2	Amount					
Sharpening	7	3	Radius					
Pencil Sketch	7	4	Amount	Intensity				
Cartoon	7	5	Border	Intensity				
Tiles	8	1	Scale					
Kaleidoscope	8	2	Amount	Shape	Scale	Zoom	Speed	Amplitude
Drop Shadow	9	1	Opacity	X Offset	Y Offset	Color Red	Color Green	Color Blue

DMX Chart - Layer mini

LAYER SIZE AND POSITION:

Ranges are same as in full layer

DMX COARSE	DMX FINE	NAME
1		Intensity
2	3	X
4	5	Y
6	7	Rotation
8	9	Scale
10	11	Aspect
12		Draw mode
13		Media index
14		Media library
15		Media mode
16		FPS
17		Audio Volume
18		Reserved

DMX Chart - Master

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
1		Grid width	Number of displays in a display grid horizontally	0 – 255	Number of columns in a display grid	1	1
2		Grid height	Number of displays in a display grid vertically	0 – 255	Number of rows in a display grid	1	1
3		Blend size	Amount of blend overlap in percentage	0 – 255	Blend the edges of adjacent displays	0	0
4		Blend gamma	Blend gamma value	0 – 255	Gamma correction on blend area	128	128
				0 – 128	Less intense blend gamma (0.00 to 0.45)		
				128	Default value: 0.45		
				128 – 255	More intense blend gamma (0.45 to 0.90)		
5		Aspect ratio	Select display aspect ratio	0 – 255	3 predefined values		
				0	16:9 (default)		
				1	4:3		
				2	16:10		
				3 – 255	16:9 (ignored)		
6		Test images	Test images	0 – 255	Show test images on display	0	0
				0	None (default)		
				1	Display numbers (DN)		
				2	DN + Blend areas		
				3	DN + Display borders		
				4	DN + Display grid		
				5	DN + Control points		
				6	DN + Selected display grid		

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
				7	DN + Layer borders		
				8	Layer numbers (disables Display numbers)		
				9	DN + Blue background		
				10	DN + Canvas grid		
				11	DN + Canvas lines all (horizontal, vertical, diagonal)		
				12	DN + Canvas lines only horizontal		
				13	DN + Canvas lines only vertical		
				14	DN + Canvas lines only 45 degrees diagonal		
				15	DN + Canvas lines only 135 degrees diagonal		
				16	DN + Canvas lines horizontal and vertical		
				17	DN + Canvas lines horizontal and 45 degrees diagonal		
				18	DN + Canvas lines horizontal and 135 degrees diagonal		
				19	DN + Canvas lines vertical and 45 degrees diagonal		
				20	DN + Canvas lines vertical and 135 degrees diagonal		
				21	DN + Canvas lines diagonal of 45 and 135 degrees		
				22 – 255	None (ignored)		
7	8	Cue Triggering		0	Do nothing		
				1-65535	Trigger cue		
9		Playback 1		0	Do nothing		
				1-255	Select cue stack & trigger first cue		
10		Playback 2		0	Do nothing		
				1-255	Select cue stack & trigger first cue		
11		Playback 3		0	Do nothing		
				1-255	Select cue stack & trigger first cue		
12		Playback 4		0	Do nothing		
				1-255	Select cue stack & trigger first cue		

DMX Chart - Display

DMX COARSE	DMX FINE	Name	Description	Values	Values description	Default Value	Home/ locate value
1		Display position		0 – 255		0	0
				0	Display not affected by setup, keeps previously set values		
				1 – 254	Display position. Display within grid size is enabled. Display out of grid is disabled.		
				255	Reset display position and grouping		
2	3	Keystone TL X	Keystone top left X	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
4	5	Keystone TL Y	Keystone top left Y	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
6	7	Keystone TR X	Keystone top right X	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
8	9	Keystone TR Y	Keystone top right Y	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
10	11	Keystone BR X	Keystone bottom right X	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
12	13	Keystone BR Y	Keystone bottom right Y	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
14	15	Keystone BL X	Keystone bottom left X	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
16	17	Keystone BL Y	Keystone bottom left X	0 – 65535	Moves coordinate 0 – 0.5 units towards the center	0	0
18	19	Angle X	Angle correction by X	0 – 65535	Horizontal distortion to compensate tilted viewing angle. Range - 0.0 – 1.0	32768	32768
				0	0.0 No distortion (default)		
20	21	Angle Y	Angle correction by Y	0 – 65535	Vertical distortion to compensate tilted viewing angle. Range - 0.0 – 1.0	32768	32768
				0	0.0 No distortion (default)		

Appendix B. BIOS setup

Press the **Del** button on startup to access BIOS settings.

Tip: Load default settings and reboot the server before modification (Exit > Load Setup Defaults).

Here are the default Pro BIOS settings:

- Advanced > SATA Configuration > SATA Mode > AHCI Mode
- Advanced > SATA Configuration > S.M.A.R.T Status Check > Disabled
- Advanced > Onboard devices configuration > Azalia HD Audio > Disabled
- Advanced > Onboard devices configuration > Intel LAN1 Controller > Disabled
- Advanced > Onboard devices configuration > Intel LAN2 PXE OPROM > Enabled
- Advanced > Onboard devices configuration > Asmedia USB 3.0 Controller > Disabled
- Advanced > Onboard devices configuration > Marvell Storage OPROM > Disabled
- Boot > Boot > Full Screen Logo > Disabled
- Boot > Boot > Wait for ’F1’ if error > Disabled
- Boot > Boot > Setup mode > Advanced mode
- Boot > Hard Drive BBS Priorities > SSD first
- Tool > ASUS O.C. Profile > Label "pro_defaults" > Save to Profile "1"

Appendix C. Optimize GPU resolution and drawing performance

This chapter describes how to optimize the GPUs performance when positioning displays.

C.a. Definitions

- **GPU** Output board consisting of two outputs.
- **Output** Physical output connector.
- **Display** Destination where the picture will be displayed. For example, it could be a single display or a projection surface composed of one or several outputs. Usually there is one display for each output.
- **Canvas** Total drawing area. Displays are placed inside a canvas.

Note: Using display splitters enables having more than one display for one output.

C.b. Calculated optimization

In the **GPUs** menu, select a GPU and click **Optimize**.
The automatic calculation optimizes the graphic card performance with the current display setup.
If the displays are not side-by-side horizontally in the show composition, using the automatic canvas optimization gives the best results.

C.c. Canvas and coordinates

Canvas is the drawing area defined in coordinate system, it is not a pixel space.
Canvas coordinates are in 0.0 - 1.0 range in both X and Y axis and origin is in left bottom corner. A display is positioned in the canvas by setting display X and Y position, display width and height and rotation.

Use the display wizard to set display grids easily.

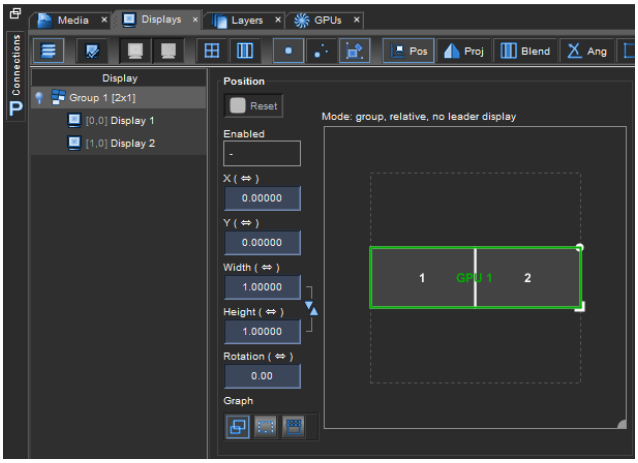


*Fig. 122 - **2x1 grip made with Display wizard***

Display coordinates are independent of the display resolution and physical aspect ratio. X and Y in display positioning point to the left bottom corner of the display.

- X and Y in layers point to center of the layer.
- When scale and scale height are 1, the layer fills the entire display.
- Layer aspect ratio control adjusts the aspect ratio of content.
- Layer scale controls layer width and height while keeping aspect ratio constant.

C.d. Calculating pixels

Drawing is done independently on all GPUs and each GPU draws only the part of the canvas that is needed by all the displays connected to that GPU. Then GPU draws one rectangular area that covers all the displays.

GPU allocates drawing area that has same resolution as all outputs combined. Output resolutions are composed in horizontal grid except for Matrox TH2GO modes 3x1080p @ 50Hz and 3x1366x768 which have vertical composition.
For example, if GPU is configured for 2 x 1280x1024 resolution, then drawing area will have resolution of 2560 x 1024. For TH2Go 3 x 1280x1024 resolution will be 7680x1024 (2 x 3 x 1280 = 7680). For vertical exceptions 3 x 1366x768 will be 4098x1536 and 3 x 1080p resolution is 5760x2160.
If the displays for GPU are positioned in canvas so that they form similar horizontal (or vertical for the exceptions mentioned before) grid, then displays will have true native resolution[1].
If displays have gap between them or they have different sizes then scaling will be performed and native resolution might not be archived.
To know actual pixels representing single display, first calculate the total area covered by GPU. Then for each display, multiply the display X and Y resolution by portion of the display width/height of the GPU draw area. With total width (Total_w), total height (Total_h), display size (w and h) and GPU resolution (GPU_w and GPU_h). Equation for display "real" resolution is:

$$width : GPU\_w \times \frac{w}{Total\_w}$$

$$height : GPU\_h \times \frac{h}{Total\_h}$$

For example, a setup has two displays with resolutions of 1280x1024.

- Display 1 has position 0.0, 0.36 and size 0.5 x 0.28.
- Display 2 has position 0.82, 0.36 and size 0.18 x 0.10.
- Total width for GPU drawing those displays will be 1: Display 2 has rightmost point in the canvas which is position 0.82 + width 0.18 = 1.0.
- From this we subtract leftmost point, which is inside display 1 and X position is 0. So total width is 1.

Total height is computed similarly, in this case display 1 has both upper and lower limits so area height is same as display 1 height: 0.28.

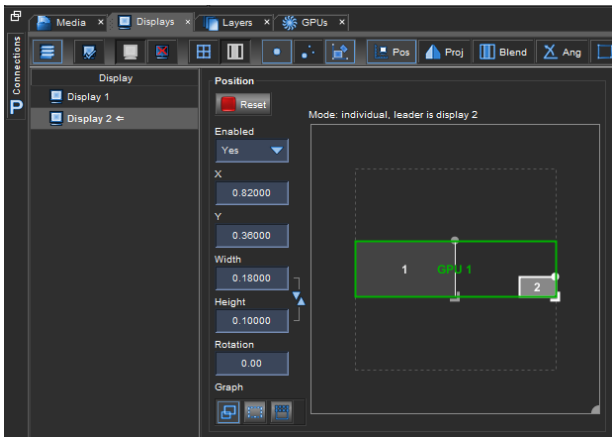


Fig. 123 - ***Drawing area example***

[1] Native resolution requires displays without Keystoning, Edge blending or curved surface correction applied.

- GPU_w = 2 _ 1280 = 2560
- GPU_h = 1024
- Total_w = 1
- Total_h = 0:28
- Display 2 w = 0:18 and h = 0:10.

Then:

$$width : 2560 \times \frac{0.18}{1.00} = 460$$

$$height : 1024 \times \frac{0.10}{0.28} = 365$$

The GPU draws Display 1 and 2 in the same pixel space (green area).
Display 2 will have only 460 x 365 pixels representing full display area.

Situation will be even worse in the following situation:

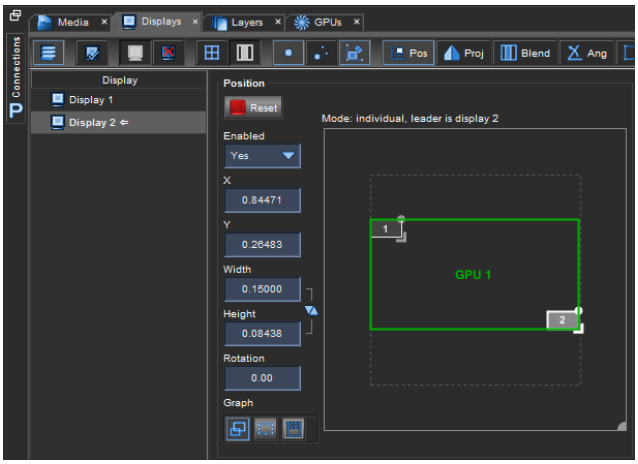


*Fig. 124 - **Another example of bad performance optimization***

Total area is huge compared to either display.
Common situation is for the setup display to be "control monitor" showing everything.

> Note: If the control monitor is connected to a GPU that has other displays connected, resolution in those display is going to be bad. This also affects performance.

C.e. Performance

All layer that are even partially inside GPU draw area are drawn in that GPU. Videos playing on those layers have to be transferred to the GPU by PCIe bus and the layers have to be drawn. This requires lot of resources from PCIe bandwidth and GPU processing power. This is particularly troublesome in control monitor situation.

C.f. Conclusion

To get optimal performance and resolution for displays:

- Position displays that are connected to same GPU as close to each other as possible
- Avoid setups where many displays show same area of canvas

Appendix D. Picturall Server communication protocol specifications

D.a. Locating Pro on network

Pro listens to multicast group 224.0.0.180 port 11009. When it receives message "HELLO", it responds with a UDP packet containing following data:

```
/** Structure for Pro identification over network.
*
* All strings use UTF-8 character encoding and are always null terminated if
* not otherwise specified.
*
* If string doesn't fit into the allocated buffer it will be silently
* truncated, but will remain null terminated.
*
* bc_version is currently 1. If you get larger values, then protocol has been
* changed and you should discard the packet and get updated specifications
* from Picturall.
* */
struct bcast_identity_s {
char magic[16]; // "PICTURALL SERVER" (no null termination)
uint32_t bc_version; // bcast protocol version network byte order
char ip[32]; // null terminated IP-address
char name[32]; // null terminated host name
char version[32]; // null terminated server version string
} __attribute__ ((packed));
```

Clients can then connect to a given IP address and use the version field for detecting compatible versions.

D.b. Connecting to a Picturall server

Communication with Picturall server works through TCP/IP based telnet-like connection to server command line. Client starts communication by connecting to Pros IP address and port 11000. You can then send commands to Pro.

For example, you can telnet 10.0.0.1 11000 on the command line on a Windows or a Mac computer. This grants you access to the Pro command line. You can then enter config on the command line. Pro should print current version number and some internal configuration data.

When you connect to Pro you should immediately send following command:

```
wait\_startup
```

This command waits until Pro startup procedure and show loading is completed. If you connect while Pro startup is still in progress you might get unexpected results or even hanging due to other commands being sent. If Pro startup is already completed when this command is given, the command will not do anything.

D.c. Control model

Pro has three layers of control abstractions: objects, controls and parameters. Objects are independent units that implement some parts of Pro's functionality. Objects usually have some user controllable parameters to control functionality. They are grouped into different controls. Controls contain any number of parameters. Parameters are basic controllable entities and they can be of different types:

- **Int** 64bit signed integer
- **Double** floating point value
- **String** UTF-8 string
- **DoubleArray** Array of floats
- **Bool** True / false value which is actually integer value where 0 is false and any other value is true.

One video layer in Pro consists of several objects: Source, Composer and Audio which are named source*n*, layer*n* and audio*n* where *n* is the number of the layer. Layer 1 is controlled by objects source1, layer1 and audio1.

To get description of controls on a given object you can send command `ctrl_info` *object* where *object* is name of the object. By sending command `ctrl_info source1` a similar output is displayed:

```
cmd_ctrlInfo() at cmdiface.cc:2409: Control info for source1:
Control:object:0:"Object controls"
Parameter:name:String:"Object name":0:source1
Parameter:description:String:"Description of the object":0:
Control:info:0:"Media information"
                                                r
Parameter:play_state:Int:"Play state. Like Media Mode, but this is
read-only and tells the actual playback state.":1:6:0:255
Parameter:timecode:Int:"Timecode of currently playing media
in nanoseconds":1:0:0:9223372036854775807
Parameter:media_length:Int:"Length of current media
in nanoseconds":1:0:0:9223372036854775807
Control:selection:0:"Media selection"
Parameter:slot:Int:"Currently playing media":0:0:0:255
Parameter:collection:Int:"Currently playing media library":0:0:0:255
Control:control:0:"Media control"
Parameter:media_end_action:Int:"Media: Action to take at end of file":0:0:0:10
Parameter:play_state_req:Int:"Media: Requested play mode":0:6:0:6
Parameter:seek:Double:"Seek":2:0:0:1
Control:sync:0:"Layer synchronization"
Parameter:source:Int:"Sync source":0:0:0:255
Control:time:0:"Media timing"
Parameter:fps:Double:"Frame rate control":0:30:1:140
Parameter:relative_fps:Double:"Relative fps":0:1:0.1:2
Parameter:fps_mode:Int:"FPS mode":0:0:0:1
Parameter:effective_fps:Double:"Current effective fps":1:0:0:10000
Parameter:fps_control_allowed:Bool:"":1:1:0:1
Control:frame_blending:0:"Frameblending"
Parameter:mode:Int:"Frameblending mode":0:0:0:1
```

1st	"Parameter" text (always the same)
2nd	Name of the parameter
3rd	Parameter type
4th	Parameter description
5th	undefined
6th	Default value
7th	Minimum value (only for numbers)
8th	Maximum value (only for numbers)

Table 11 - Fields in parameter descriptions

Looking at the above, you can see that there are 7 controls, although you might be interested in only some of them. The most interesting ones in the layer source are the `info`, `selection` and `control` controls. They all have parameters that define what you are currently playing back.
Parameter description contains at least 6 fields separated by ':' that are defined in table 7
You can also use command `ctrl_status` *object* to see an object's current parameter values. Both `ctrl_status` and `ctrl_info` commands send their output normally as human readable text, but also as a message that is easier to parse by computers.

D.d. Parameter descriptions

Because most of the parameters are trivially understood and you can query them using the ctrl_info command, only the nontrivial parameters are described here.

D.d.a. Media Mode

Media mode parameter in Source / control describes whether the media is paused, stopped or playing. There are multiple play modes because we need to know what to do when the media is played to the end: should we loop, stop or continue to next clip.

-1	Error condition
0	Default (play loop)
1	Play next
2	Play stop
3	Play pause
4	Play loop
5	Pause
6	Stop

Table 12 - Media modes

Media modes. We have multiple play modes where the last word tells us what happens when the media is played to the end: should it loop, stop or continue to next clip

0	Additive
1	Replace
2	Subtract
3	Darken
4	Lighten
5	Multiply
6	Linear burn
7	Screen

Table 13 - Draw modes

D.d.b. Playback information

When video is playing on any layer, the source for layer actively updates Source / info control.

D.d.c. Draw modes

Layer draw mode is defined in Composer / draw_mode. Draw modes are described in table 9

D.e. Messages from Pro

Pro has specifically formatted messages that can be used to receive information about different aspects of the system.
Messages are sent together with any other output in normal Pro connection. Messages are formed as single lines in following format:

```
MSG(target, source, type, content)
```

- **target:** ID of message target
- **source:** Object ID of the sender
- **type:** Message type specified as number
- **content:** Content of message depends on message type

13	CTRL_STATUS	Control status (result of `ctrl_status`)
14	CTRL_INFO	Control info (result of `ctrl_info`)
15	ENUM_OBJECTS	Object list (result of `enum_objects`)
20	OVERFLOW	Message queue overflow (value 20)
24	MODEL_CHANGE_ADD	Model changed: object added (value 24)
33	CMD_SYSTEM_RESULTS	system and system_bg command results
38	CMD_SYSTEM_LINE_RESULTS	system_bg command line output

Table 14 - Message types

D.e.a. Model changed: object added

When new object is added, server sends `MODEL_CHANGE_ADD` message. Message has 24 as a type. Message content is the name of the added object.

D.e.b. Message queue overflow

If the client cannot keep up with the network traffic the server generates, the server will send the client a message with type 20 (message queue overflow). This message has no content. Immediately after sending this message, the server will disconnect the client to prevent server crash resulting from out-of-memory condition.

D.e.c. Control status

Control status message is generated either by directly requesting it by running command `ctrl_status` or by changing a parameter in control. For example, if you change layer intensity from lighting console, you should get control status message to all clients connected to Pro.
Find the object that the controls belong to by translating messages source field from number to object name as specified in section D.E
Message contents are strings that lists controls and their current values in a format that is compatible with set command. Many controls can be specified by separating them with string "\n".

Example message (linefeeds added for better readability):

```
MSG(100002, 176, 13, object name="source1",description=""\n
info media_file="/picturall/media/33_CederbergWildernessArea.jpg",
play_state=5,timecode=0,media_length=40000000\nselection slot=2,
collection=0\ncontrol media_end_action=0,play_state_req=0,seek=0\n
sync source=0\ntime fps=30,relative_fps=1,fps_mode=0,effective_fps=25,
fps_control_allowed=1\nframe_blending mode=0\n)
```

D.e.d. Control info

Control info message is like control status except that instead of status this message sends information about objects parameters.
Message content is the parameter descriptions for object.
Example message (linefeeds added for better readability):

```
MSG(100002, 176, 14, Control:object:0:"Object controls"\nParameter:name:
String:"Object name":0:source1\n
Parameter:description:String:"Description of the object":0:\nControl:info:0:"
Media information"\nParameter:media_file:String:"Filename of current media":
1:\nParameter:play_state:Int:"Play state.
Like Media Mode, but this is read-only and tells the actual playback state.": 1:6:0:255\n
Parameter:timecode:Int:"Timecode of currently playing media in nanoseconds":
1:0:0:9223372036854775807\nParameter:media_length:Int:"Length of current media in
nanoseconds":1:0:0:9223372036854775807\nControl:selection:0:"Media selection"\n
Parameter:slot:Int:"Currently playing media":0:0:0:255\nParameter:collection:Int:"
Currently playing media library":0:0:0:255\nControl:control:0:"Media control"\nParameter:
media_end_action:Int:"Media: Action to take at end of file":0:0:0:10\nParameter:play_state_req:
Int:"Media: Requested play mode":0:6:0:6\n
Parameter:seek:Double:"Seek":2:0:0:1\nControl:sync:0:"Layer synchronization"
\nParameter:source:Int:"Sync source":0:0:0:255\nControl:time:0:"Media timing"\nParameter:
fps:Double:"Frame rate control":0:30:1:140\n
Parameter:relative_fps:Double:"Relative fps":0:1:0.1:2\nParameter:fps_mode:Int:"FPS mode":
0:0:0:1\nParameter:effective_fps:Double:"Current effective
fps":1:0:0:10000\nParameter:fps_control_allowed:Bool:"":1:1:0:1\nControl:frame_blending:0:"
Frameblending"\nParameter:mode:Int:"Frameblending mode":0:0:0:1\n)
```

D.e.e. Object list

Object list is result of `enum_objects`. It lists objects and their object ID:s. It is used to translate object IDs to object names.
Message content is list of all the objects in `object_number:object_name` format separated by \n.

Example message (linefeeds added for better readability and message is clipped):

```
MSG(100002, 1, 15, 101:gl_help:\n102:canvas1:\n103:artnet1:\n104:encoder:
\n105:mtc:\n140:fx_info:\n175:layer1:\n176:source1:\n180:audio1:\n181:
fx_l1_fx1:\n182:fx_l1_fx2:\n183:layer2:\n184:source2:\n188:audio2:\n189:
fx_l2_fx1:\n190:fx_l2_fx2:\n191:layer3:\n192:source3:\n196:audio3:\n197:
fx_l3_fx1:\n198:fx_l3_fx2:\n199:layer4:\n200:source4:\n204:audio4:\n205:
fx_l4_fx1:\n206:fx_l4_fx2:\n207:layer5:\n208:source5:\n212:audio5:\n213:
fx_l5_fx1:\n214:fx_l5_fx2:\n215:layer6:\n216:source6:\n220:audio6:\n221:
fx_l6_fx1:\n222:fx_l6_fx2:\n223:layer7:\n224:source7:\n228:audio7:\n229:
fx_l7_fx1:\n230:fx_l7_fx2:\n231:layer8:\n232:source8:\n236:audio8:\n237:
fx_l8_fx1:\n238:fx_l8_fx2:\n239:layer9:\n240:source9:\n244:audio9:\n245:
fx_l9_fx1:\n246:fx_l9_fx2:\n247:layer10:\n248:source10:\n252:audio10:\n
253:fx_l10_fx1:\n254:fx_l10_fx2:\n255:layer11:\n256:source11:\n260:
audio11:\n261:fx_l11_fx1:\n262:fx_l11_fx2:\n263:layer12:\n264:source12:\n
268:audio12:\n269:fx_l12_fx1:\n270:fx_l12_fx2:\n271:layer13:\n
272:source13:\n276:audio13:\n277:fx_l13_fx1:\n278:fx_l13_fx2:\n279:layer14:\n
280:source14:\n284:audio14:\n285:fx_l14_fx1:\n286:fx_l14_fx2:\n287:layer15:\n
288:source15:\n292:audio15:\n293:fx_l15_fx1:\n294:fx_l15_fx2:\n295:layer16:\n
296:source16:\n300:audio16:\n301:fx_l16_fx1:\n302:fx_l16_fx2:\n303:layer17:\n
304:source17:\n308:audio17:\n309:fx_l17_fx1:\n310:fx_l17_fx2:\n311:layer18:\n
312:source18:\n316:audio18:\n317:fx_l18_fx1:\n318:fx_l18_fx2:\n319:citp:\n
320:monitor:\n321:file_watch:\n322:stack1:\n323:stack2:\n324:stack3:\n
325:cue1:\n326:gpu1:\n327:gpu2:\n328:gpu3:\n329:gpu4:\n)
```

In example above object source1 would have object id of 176.

D.f. Commands

D.f.a. ctrl_status

This command displays current parameter status for given object. If the object is not specified, all parameters for all objects are displayed. Parameters are sent both as human readable format and as a message.
Examples:

```
ctrl_status layer30
ctrl_status source1
```

D.f.b. ctrl_info

This command displays parameter information for a given object. If an object is not specified, all parameters for all objects are displayed. Parameters are sent both as human readable format and as a message.
Examples:

```
ctrl_info layer30
ctrl_info source1
```

D.f.c. enum_objects

This command sends a list of objects defined in the Pro show. The list is sent both as human readable format and as a message.

D.f.d. loglevel

This command allows the client to specify whether debugging log messages and human readable messages from commands should be sent to this client. This command takes either "all" or "none" as argument.

D.f.e. receiving

This command controls receiving of the system messages. It takes one parameter that is either "all" or "none". `receiving all` orders Pro to start sending messages to the client giving the command. `receiving none` on the other hand stops messages from being transmitted to that client.

D.f.f. set

The 'set' command sets parameter values in given control / object combination. This command takes three arguments: First is name of the object to control, the second is control name and the third one specifies parameters and their values.
Third argument takes the form `parameter=value`[...] where `parameter` is name of the parameter belonging to selected object and value is a valid value for that parameter. Multiple parameter / value pairs can be given by separating them with comma.

Examples:

```
set layer14 composition x="0.3",y="0.2",intensity="0.8"
set source1 selection slot=3,collection=2
```

Set command also allows specifying timing for single set command. When time is specified, the set command effects are crossfaded to new values in time seconds.
Complete set command format:

```
set object_name ctrlname [time=<time>] paramname=pvalue[,param2name=p2val[,...]]
```

For example:

```
set layer1 composition time=1.5 intensity=0.0
set layer1 composition time=1.5 intensity=1.0,x=1.0
```

D.f.g. wait_startup

This command blocks all other commands until server startup has been completed. This should be called immediately after you have connected to Pro to verify that server startup is complete before sending any commands.

D.f.h. fullscreen

This command allows you to set layer position to match given screen. It is also possible to set layer to cover list of displays.

Example:

```
Fullscreen layer1 4 Set layer 1 to fill display 4.
fullscreen layer2 2 5 3 Set layer 2 to fill bounding box formed by displays 2, 3 and 5.
```

D.g. system and system_bg

These commands execute arbitrary command as Linux shell command. Difference between system and system_bg is that system blocks while the command is running and then gives all of the command output in one message. system_bg on the other hand runs the command on background sending one MSG for each line the command outputs as it is available.
These commands send `CMD_SYSTEM_RESULTS` message once the command is complete and `CMD_SYSTEM_LINE_RESULTS` for each output line.
`CMD_SYSTEM_RESULTS` has following fields that can be in any order:

- **stdout** Complete output from standard output
- **stderr** Complete output from standard error output
- **exit_code** Command exit code. 0 usually means success and any other value some kind of error. This depends on the command being run.
- **id** Unique id for this system call. Used to identify possibly overlapping output from multiple system_bg calls.
- **error** Error description in case of bad system call.
- **success** yes/no depending on whether the call succeeded.

None of the fields are mandatory except for success and that either error or `exit_code` must be given.

All strings have '"' and ' ' escaped and linefeed replaced with 'n'.
`CMD_SYSTEM_LINE_RESULTS` has only fields id, stdout and stderr. They behave like in `CMD_SYSTEM_RESULTS`. Id field is mandatory.
Both system calls have following structure in sending messages:

- Send CMD_SYSTEM_LINE_RESULTS to define id
- Run the command and send CMD_SYSTEM_LINE_RESULTS for each line the command outputs
- Send CMD_SYSTEM_RESULTS when the command completes

Example:

```
10.0.0.1 # loglevel none
10.0.0.1 # receiving all
10.0.0.1 # system ls /picturall/media/bbb
MSG(100001, 0, 38, id=3)
MSG(100001, 0, 38, id=3, stdout="bbb_sunflower_2160p_60fps_normal.mp4\n")
MSG(100001, 0, 38, id=3, stdout="bbb_sunflower_2160p_60fps_normal.mp4.thumb\n")
MSG(100001, 0, 33, success="yes", id=3, stdout="bbb_sunflower_2160p_60fps_normal.mp4\n
bbb_sunflower_2160p_60fps_normal.mp4.thumb\n", stderr="", exit_code=0)
```

Line wrapping has been changed in the example to increase readability.

Appendix E. Cue macro Lua API

E.a. Lua related console commands

lua cmd

Execute given piece of lua code, quotation marks must be escaped with a backslash.

For example, lua "dmesg(\"hello\"); dmesg(\"world\")"

lua_file filepath

Execute given Lua script from the filesystem.

Given filepath can be either absolute or relative.
If a relative filepath is given the script file is looked up from /picturall/media/scripts/
For example, command "lua_file my_script.lua" would execute /picturall/media/scripts/my_script.lua

E.b. Custom Lua functions

Following Lua functions are available globally.

function dmesg(...) -> nil

Write a message to all clients.

Parameters:

varargs: Accepts any number of string, number, or boolean arguments.

The varargs are concatenated before printing

function mesg(...) -> nil

Write a message to the current connection.

Parameters:

varargs: Accepts any number of string, number, or boolean arguments

The varargs are concatenated before printing

function list() -> nil

Print all the objects in the console.

function dump(object) -> nil

Print debug information about the object in the console

Parameters:

object string: Name of the object to use

If the object does not exist, error is raised.

function get_objects() -> table

Returns a table containing names of all the server objects.

function get_object_controls(object) -> table

Returns a table containing names of all the controls in an object.

Parameters:

object string: Name of the object to use

If an argument with an invalid type is given, error is raised.

function connect(output, output_id, input_name, input_id) -> **nil**

Connect output of IO object to input of another IO object.

Parameters:

output string: Name of the output object
output_id int: Output index on the object
input string: Name of the input object
input_id int: Input index on the object

If an argument with an invalid type is given, error is raised.
If connecting the objects failed, error is raised

function set(object, control, param, value) -> boolean

Assign a value to an objects parameter.

Parameters:

object string: Name of the object to use.
control string: Name of the control in the object.
param string: Name of the parameter in the control.
value string: Value to assign for the parameter.

Returns false if the object, control, or the parameter does not exist.
On success true is returned.
If an argument with an invalid type is given, error is raised.

function run(cmd) -> **nil**

Execute given string in the console

Parameters:

cmd string: command to run

function get(object, control, param) -> (number | string | **nil**)

Gets the value of a parameter from an objects control.

Parameters:

object string: Name of the object to use.
control string: Name of the control in the object.
param string: Name of the parameter in the control.

On success returns either a number, boolean, or string depending on the type of the parameter.

If the parameter does not exist on the object, nil is returned.
If an argument with an invalid type is given, error is raised.

function set_pda_value_by_index(object, control, parameter, index, value) -> nil
Similar to set() but assigns value to an array type parameter

Parameters:
object string: Name of the object to use.
control string: Name of the control in the object.
param string: Name of the parameter in the control.
index integer: Index in the parameter to set.
value number: Value to assign for the parameter array index.

If an argument with an invalid type is given, error is raised.
If the object, control, or the parameter is does not exist, error is raised.
If the parameter on the object is not a DoubleArray, error is raised.

If the given index is out of range, this function will silently fail.

function time() -> number
Returns the since server startup

function ustclock_get() -> number
Returns the current time in nanoseconds since the server startup.

function sleep(s) -> nil
Pause the current thread for given time.

Parameters:
s number: Time in seconds.

function wait(ns) -> nil
Sleep until the given time from the server startup.

Parameters:
ns number: Time in nanoseconds to wait for.

function is_global_true(name) -> boolean
Return if the given global variable is true.

Parameters:
name string: Name of the global to check

Global variable is true if it exists and does not have value "0"
Global variable is false if does not exist or has value "0"

function runcue(cue_number) -> nil
Run the specified cue.

Parameters:
cue_number number: Number of the cue to run.

function transaction() -> TransactionObject
Returns a new transaction object.

Transaction objects can be used to change values of multiple parameters
in a synchronized manner.

function transaction:set(object, control, param, value[, table timing[, transition]]) -> boolean
Add a new parameter change to this transaction.

Parameters:
object string: Name of the object to use.
control string: Name of the control in the object.
param string: Name of the parameter in the control.
value string: Value to assign
timing table: Parameters to use for timing, see below.
transition string: Transition type to use, see below.
Timing parameter expects a table containing following optional keys.
By default all timing parameters are set to 0

wait: Time to wait before changing this parameter.
fade: Duration to fade between old and new value
hold: How long to hold the new value.

Transition parameter modifies how the old value changes to new value.
By default transition is set to linear.

"linear": Use linear interpolation for the fade
"ease": Use ease-in-out function for the fade

If an argument with an invalid type is given, error is raised.

function transaction:commit() -> nil
Commit the parameter changes in the transaction.
Same transaction can be stored and committed multiple times.

E.c. Cue macro Lua functions

Following functions are available inside custom cue macros

function print_macro_info**() -> nil**
Log information about the current cue macro.
function cue_wait_fade**() -> nil**
Sleep until previous cue has started fading.

function cue_wait_hold**() -> nil**
Sleep until current cue has finished fading.

function cue_wait_end**() -> nil**
Sleep until current cue is done.

E.d. Cue macro Lua globals

Following variable is available inside custom cue macros
which contains information about the active cue.

```
macro_info = {
    cue_stack_id
    cue_id
    cue_start_time
    cue_total_length
    cue_wait_time
    cue_fade_time
    cue_hold_time
}
```

Appendix F. Interact with web pages sources (mouse and keyboard)

Analog Way Picturall Media Servers support the displaying of web pages. Internally this is handled by the Chromium Embedded Framework. "Web API UIEvents" can be sent to a webpage with the "send_ui_event" lua command.

F.a. Setting up a testing environment

While this is not a requirement and can be skipped. Let us first set up a testing environment, in the form of some JavaScript event listeners. This way we can see the events as they are received by the webpage.
This is done by copy pasting the following into the JavaScript text box for a webpage in the media manager or commander.

```
window.addEventListener('mousedown', mouselog);
window.addEventListener('mousemove', mouselog);
window.addEventListener('mouseup', mouselog);

function mouselog(e){
    console.log("type:" + e.type + ", x:" + e.x + ", y:" + e.y + ", ctrlKey:" + e.ctrlKey);
}

window.addEventListener("keyup", keylog);
window.addEventListener("keypress", keylog);
window.addEventListener("keydown", keylog);

function keylog(e){
    console.log("type:" + e.type + ", key:" + e.key + " (" + e.keyCode + "), code:" + e.code);
}
```

By default, websites console.log are ignored by showtime (to avoid spam). We can enable this console logging, by first setting the command "set_global enable_cef_logging 1"

More info on the Web API UIEvent can be found here:
https://developer.mozilla.org/en-US/docs/Web/API/KeyboardEvent
https://developer.mozilla.org/en-US/docs/Web/API/MouseEvent

F.b. Sending UI events, a few examples

Let us start with a few simple usage examples of sending UI events, and later go into the details of the API.

F.b.a. Clicking left mouse button

```
send_ui_event("source1", "Mouse ButtonLeftDown 1010 890")
send_ui_event("source1", "Mouse ButtonLeftUp 1010 890")
```

The website received the two UI events as:
OnConsoleMessage: type:mousedown, x:1010, y:890, ctrlKey:false
OnConsoleMessage: type:mouseup, x:1010, y:890, ctrlKey:false

F.b.b. Moving the mouse

send_ui_event("source1", "Mouse Move 800 600")

The website received the UI event as:
OnConsoleMessage: type:mousemove, x:800, y:600, ctrlKey:false

F.b.c. Clicking the "A" key on keyboard

send_ui_event("source1", "Keyboard KeyDown Name KeyA")
send_ui_event("source1", "Keyboard KeyChar Name KeyA")
send_ui_event("source1", "Keyboard KeyUp Name KeyA")

The website received the 3 UI events as:
OnConsoleMessage: type:keydown, key:a (65), code:KeyA
OnConsoleMessage: type:keypress, key:a (65), code:KeyA
OnConsoleMessage: type:keyup, key:a (65), code:KeyA

Depending on the website. If the website is a game for instance. It may be helpful to add a sleep in between the KeyDown and KeyUp to simulate the key being pressed down a while:

send_ui_event("source1", "Keyboard KeyDown Name ArrowLeft")
sleep 0.50
send_ui_event("source1", "Keyboard KeyUp Name ArrowLeft")

Here the ArrowLeft is left pressed down for half a second.

F.c. API in details

Users can programmatically send events to a webpage by using the following lua command.
send_ui_event([source_name], [event_message])

The [source_name] argument is the name of the source with the webpage where events are to be sent.
The first valid name here is "source1" and the last is "source32".
The [event_message] is described below.

F.c.a. Keyboard events

[event_message] is of format "Keyboard [event_type] Name [KeyName] [modifiers]"

where [event_type] is one of KeyDown, KeyChar, KeyUp
where [modifiers] is optional and is zero or more of CapsLock, NumLock, Shift, Ctrl, Alt, AltGr, Meta, MouseButtonLeft, MouseButtonMiddle, MouseButtonRight
where [KeyName] is one of the following key names in the "standard 101 keyboard layout".

KeyA,	Digit1,	F1,	NumLock,
KeyB,	Digit2,	F2,	NumpadDivide,
KeyC,	Digit3,	F3,	NumpadMultiply,
KeyD,	Digit4,	F4,	NumpadSubtract,
KeyE,	Digit5,	F5,	NumpadAdd,
KeyF,	Digit6,	F6,	NumpadEnter,
KeyG,	Digit7,	F7,	Numpad1,
KeyH,	Digit8,	F8,	Numpad2,
KeyI,	Digit9,	F9,	Numpad3,
KeyJ,	Digit0,	F10,	Numpad4,
KeyK,	Enter,	F11,	Numpad5,
KeyL,	Escape,	F12,	Numpad6,
KeyM,	Backspace,	PrintScreen,	Numpad7,
KeyN,	Tab,	ScrollLock,	Numpad8,
KeyO,	Space,	Pause,	Numpad9,
KeyP,	Minus,	Insert,	Numpad0,
KeyQ,	Equal,	Home,	NumpadDecimal,
KeyR,	BracketLeft,	PageUp,	ContextMenu,
KeyS,	BracketRight,	Delete,	ControlLeft,
KeyT,	Backslash,	End,	ShiftLeft,
KeyU,	Semicolon,	PageDown,	AltLeft,
KeyV,	Quote,	ArrowRight,	MetaLeft,
KeyW,	Backquote,	ArrowLeft,	ControlRight,
KeyX,	Comma,	ArrowDown,	ShiftRight,
KeyY,	Period,	ArrowUp,	AltRight,
KeyZ,	Slash,		MetaRight
	CapsLock,		

Example usage, of "key A" pressed while modifier keys Shift and Ctrl are also down:
send_ui_event("source1", "Keyboard KeyDown Name KeyA Shift Ctrl")

F.c.b. Keyboard events, Raw keycode interface

While the above is the recommended usage. Advanced users may want to send keys by raw keycode numbers instead of by key name. The above usage example is functionally the same as the following.
send_ui_event("source1", "Keyboard KeyDown 38 65 Shift Ctrl")
Here, the key name KeyA has been replaced by its two raw keycode numbers 38 and 65. The first keycode number is called the "uievents-code" (aka "native_keycode") and the "uievents-key" (aka "dom_keycode")
This interface is provided to support the sending of keys that are not present in the "standard 101 keybord layout".

The uievents-code is specified here: https://www.w3.org/TR/uievents-code/#code-value-tables
More helpfully here is a simple table of the uievents-code: https://developer.mozilla.org/en-US/docs/Web/API/KeyboardEvent/code/code_values#code_values_on_linux_x11_when_scancode_is_available
The uievents-key is specified here: https://www.w3.org/TR/uievents-key/#named-key-attribute-value
More helpfully here is a simple table of the uievents-key: https://docs.microsoft.com/en-us/dotnet/api/system.windows.forms.keys
(The w3 key spec was based on Microsoft key enumeration)

F.c.c. Mouse events

[event_message] is of format "Mouse [event_type] [x] [y]"

where [event_type] is one of Move, ButtonLeftDown, ButtonLeftUp, ButtonMiddleDown, ButtonMiddleUp, ButtonRightDown, ButtonRightUp
where [x] [y] are the x y coordinates. Their range is related to the browser window width and height of the webpage, which can be configured in media manager and commander.
where [modifiers] is optional and is zero or more of CapsLock, NumLock, Shift, Ctrl, Alt, AltGr, Meta, MouseButtonLeft, MouseButtonMiddle, MouseButtonRight

Example usage, of moving mouse while left mouse button is down and Alt button is down:
send_ui_event("source1", "Mouse Move 900 700 MouseButtonLeft Alt")

Appendix G. JavaScript examples

Picturall Commander can run custom JavaScript just like most web browsers. In Chrome for instance, this is done in *Menu > More tools > Developer Tools > Console*.
Here are a few examples of this feature.

Note: When developing your own JavaScript code, its recommended to first make sure your code runs without error in your own browser.

Tip: It is possible to add multiple custom JavaScript to one web page.

G.a. Ex: Browser scroll up and down

In Commander > Media > Network > Webpage:

- Set **Web page address** to https://en.wikipedia.org/wiki/Main_Page
- Set **Browser window width** to 1920
- Set **Browser window height** to 1080

- Set **JavaScript to execute when web page is loaded** to:

```
var state_scroll_down = true;
setInterval(function() {
var old_y = window.pageYOffset;
window.scrollBy(0, state_scroll_down ? 1 : -1);
var new_y = window.pageYOffset;
if (old_y == new_y) {
state_scroll_down = !state_scroll_down;
}
}, 100);
```

This works on any webpage that is taller than the browser height window.

Note: This is just an example and scrolling browser window through JavaScript is not very smooth.
If smooth scrolling is required. It is better to set browser window height large enough to fit the whole webpage, and do the scrolling in commander layer instead.

G.b. Ex: Fill in text field and click button

In Commander > Media > Network > Webpage:

- Set **Web page address** to https://duckduckgo.com
- Set **JavaScript to execute when web page is loaded** to:

```
document.getElementById("search_form_input_homepage").value = "Test";
document.getElementById("search_button_homepage").click();
```

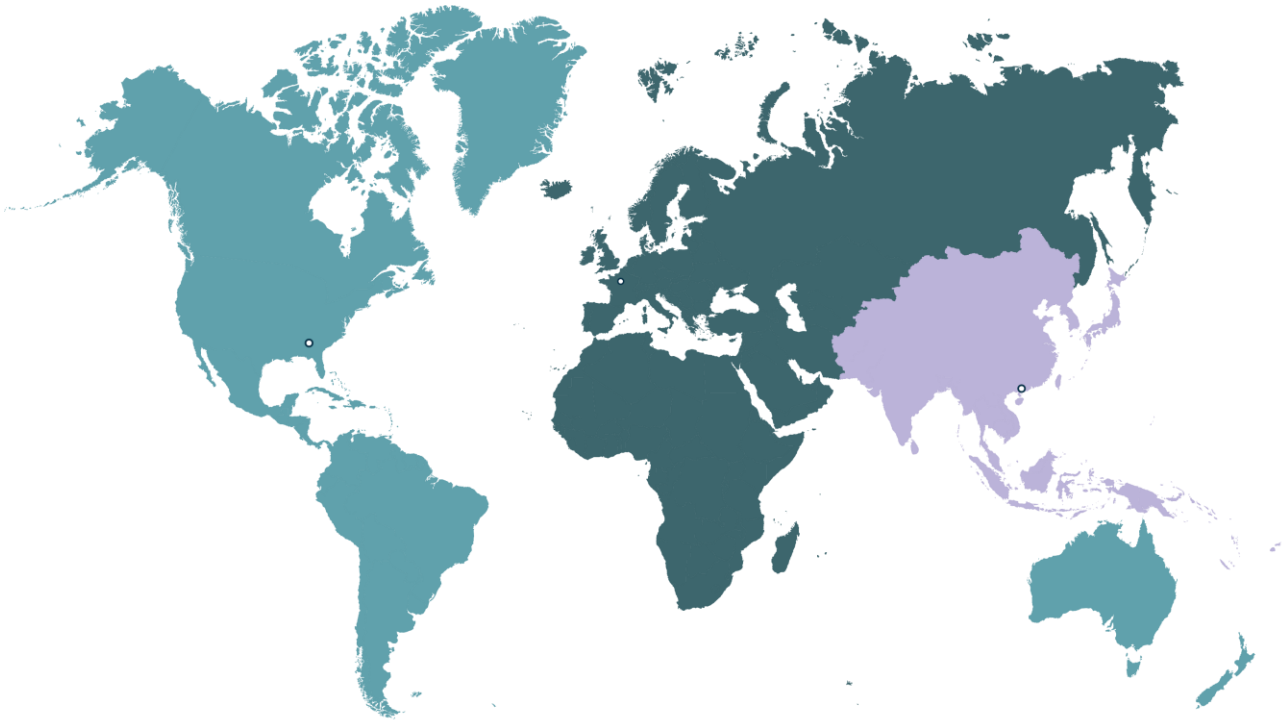
G.c. Ex: Change background and text color

In Commander > Media > Network > Webpage:
- Set **Web page address** to https://en.wikipedia.org/wiki/Main_Page
- Set **JavaScript to execute when web page is loaded** to:

```
document.body.style.color = "yellow";
document.body.style.background = 'black';

var elems = document.getElementsByTagName("div");
for (var i = 0; i < elems.length; i++) {
var elem = elems[i];
elem.style.color = "yellow";
elem.style.background = 'black';
}
```

CONTACT INFORMATION



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