USER MANUAL

Applicable to T Series Software Version 8.1.88

For T3 V8.1.88 and earlier, T1 International V8.1.88 and earlier

Email: Kommander@kystar.net

Website: www.kommander.com.cn/en

Contents

1. About Kommander

Kommander - a professional multi-screen production platform engineered for synchronized media orchestration in live event environments. Core capabilities include:

- ✓ Seamless integration of mixed media formats (video/audio, graphics, static assets, documents, and live streams)
- ✓ Precision control modules: chronometric synchronization, environmental data displays, and auxiliary toolkits
- ✓ Broadcast-grade signal processing: SDI/NDI input capture with frame-accurate playback
- ✓ Advanced asset management with multi-layer scene grouping
- ✓ The system's dynamic content routing architecture ensures sub-frame latency for real-time rendering across heterogeneous display surfaces (LED walls, projection arrays, etc.), maintaining uncompromised visual fidelity.

Hardware Configuration Guidelines

System requirements scale according to:

Windows	Recommend win 10 enterprise edition
Office	Recommend office 2019, at least office 2016
RAM	At least 16G
ROM	At least 1T
Software version	Recommend V7.0.58
Motherboard	Latest BIOS&drivers
Graphics card	Latest drivers T3: recommend NVIDIA RTX 4000 and above T1: recommend NVIDIA T600 and above
CPU	T3: recommend Intel i7-12700 and above T1: recommend Intel i5-12400 and above
Capture card	Latest drivers,recommend brands: BMD, AJA
Peripherals	Latest drivers for DMX, MIDI devices, etc.

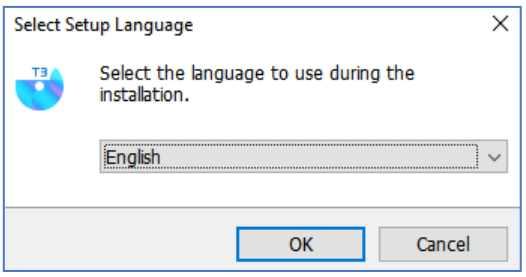
2. Installation

Installation Guide (Kommander T1/T3 - Universal Workflow)

1) **Installation Initialization**

Execute Kommander_T1(T3)_Setup_X64.exe with administrative privileges.

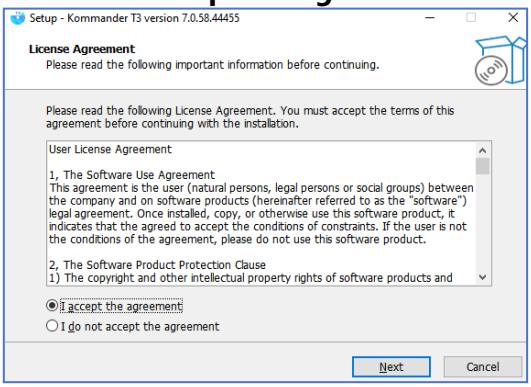
Follow the graphical setup wizard.



2) **EULA Acknowledgement**

Review End-User License Agreement (EULA)

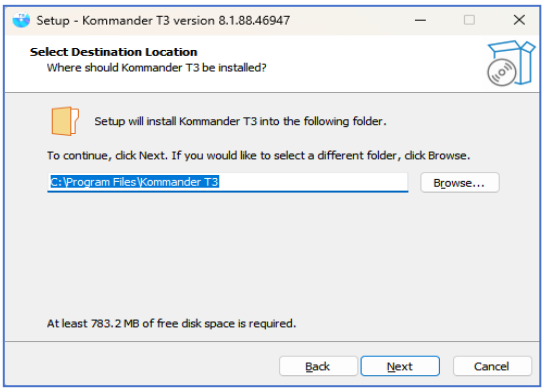
Activate **"I accept the agreement"** radio button → Click **Next**



3) **Deployment Path Configuration**

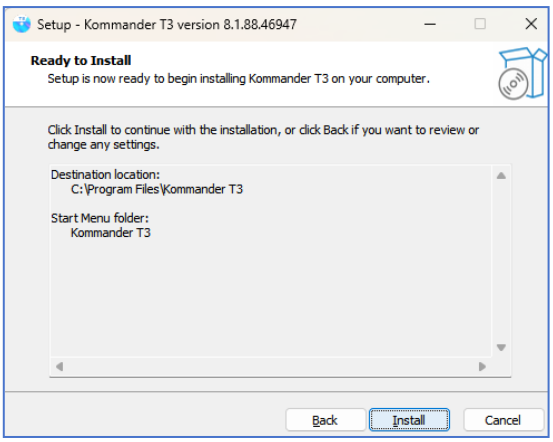
Specify installation directory (Default: C:\Program Files\Kommander)

Verify disk space allocation → Click **Next**



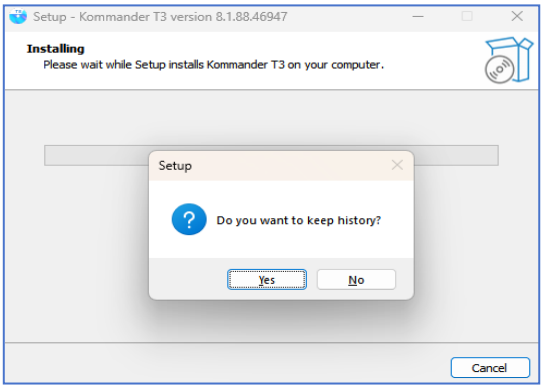
4) **Pre-Installation Verification**

Confirm system resources: → Click **Install**



5) **Version Migration Protocol**

When upgrading from legacy installations, Registry Retention Dialog appears during uninstallation.



✧ **"Retain Historical Data"** (Default):

Preserves user registry branches; Maintains project cache.

✧ **"Full Reset"** (Troubleshooting Mode):

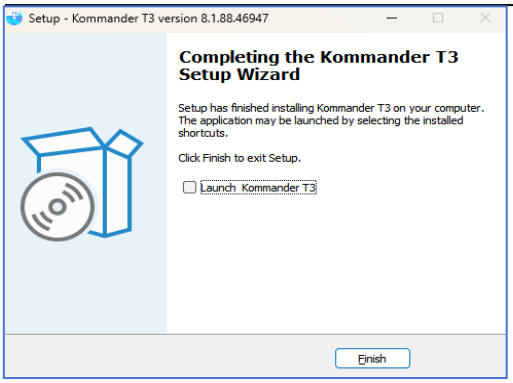
Purges registry keys; Deletes temporary assets;

Performance Note: Initial project load may require additional latency

6) **Runtime Deployment**

Monitor progress via Windows Installer service (MSIServer.exe)

Completion trigger: **"Setup completed successfully"** status message



7) **Post-Installation Initialization**

Launch Methods:

A. Desktop shortcut:

B. Start Menu:

Start → All Programs → Kommander Suite → [T1/T3 Instance]

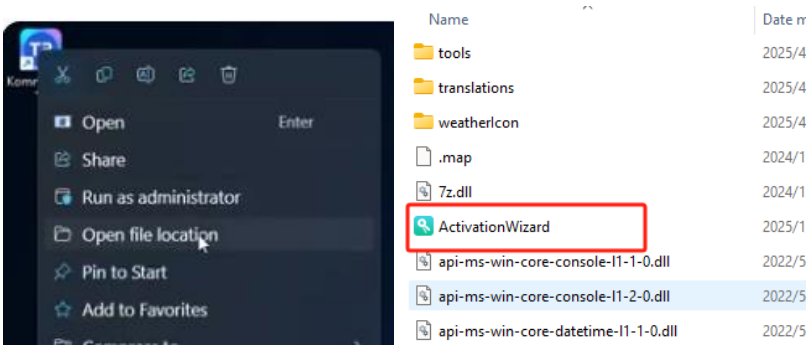
3. Activation

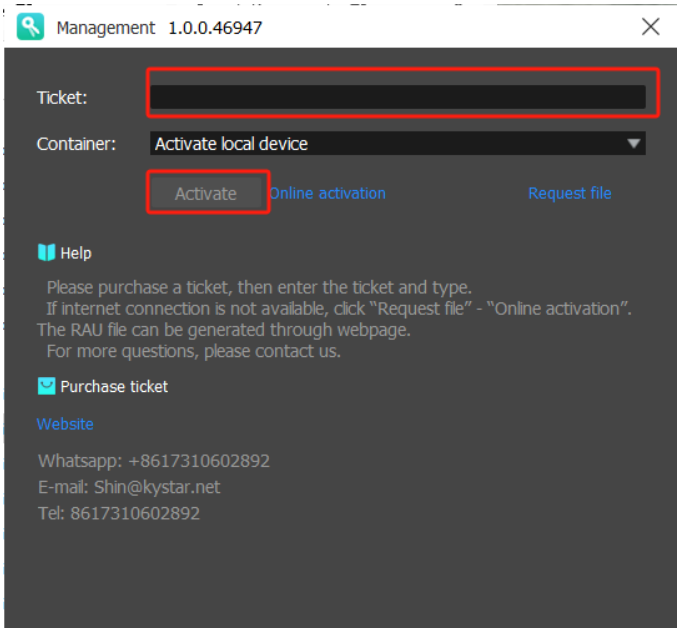
Software Activation Steps

3.1 Activating a Device with Internet Connection

- Right-click **Kommander T3**, select **Open file location**, scroll to find **ActivationWizard**, and launch it.
    - Enter the **Ticket ID** (obtained from your sales representative). Ensure no spaces precede or follow the ID.
    - Click **Activate**. Upon successful activation, double-click the software shortcut to start using it.

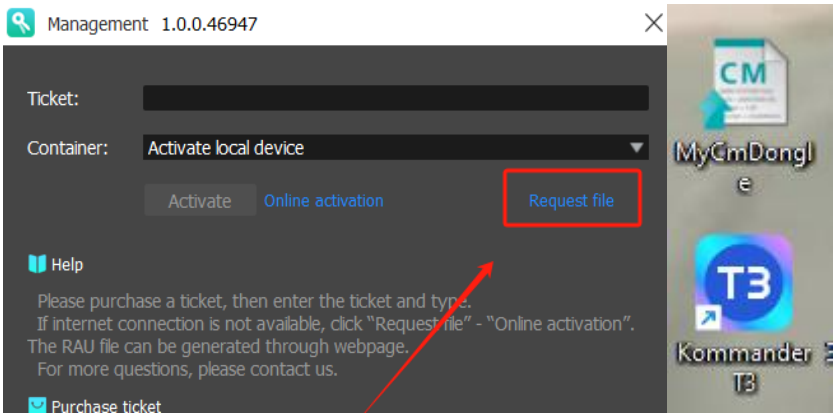
    Note: Ensure the Ticket ID is entered accurately. For assistance, contact your sales representative.

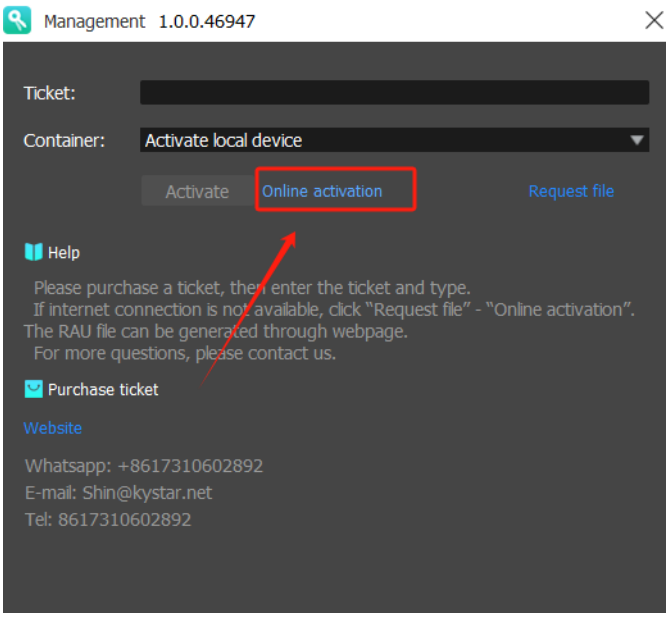


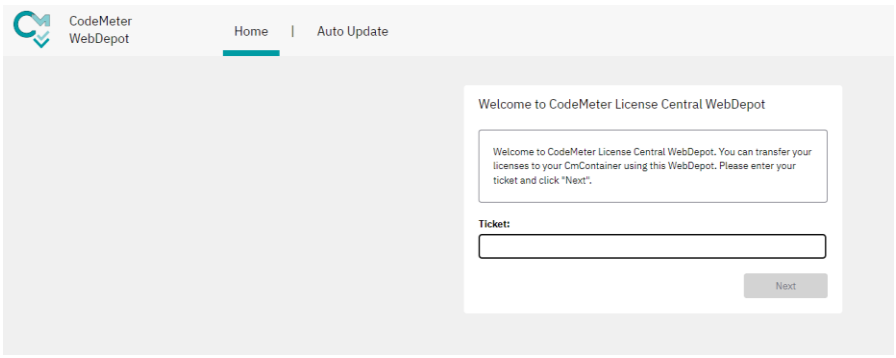


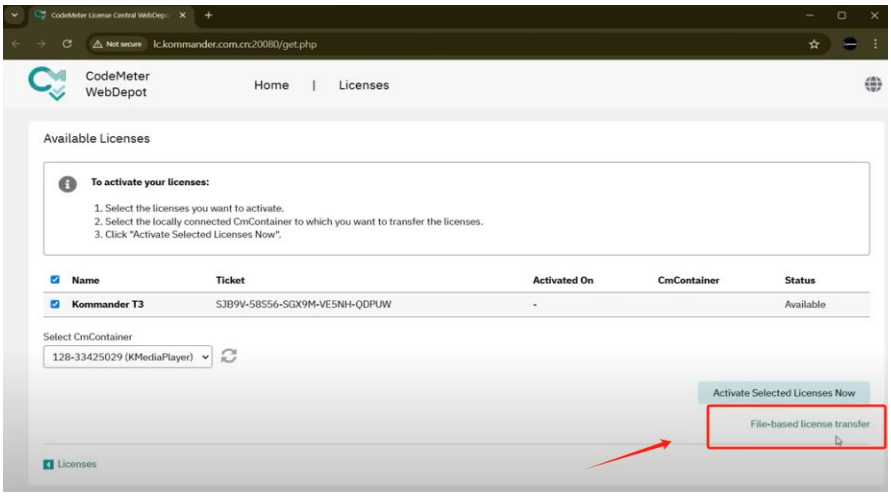
3.2 Activating a Device Without Internet Connection

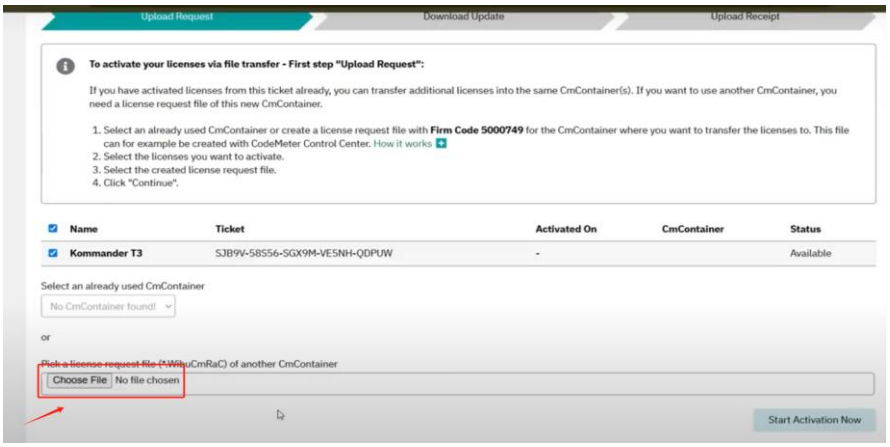
- In **ActivationWizard**, click **Request file** and save the generated activation file to your desktop.
- Transfer this file to a computer with internet access.
- On the online computer:
  - Install **Kommander**, right-click its shortcut, select **Open file location**, and launch **ActivationWizard**.
  - Click **Online Activation** to open the web interface. Enter the **Ticket ID** and click **Next**.
  - Select **File-Based License Activation**, upload the transferred request file, and click **Start Activation**.
  - Download the activated file, transfer it back to the offline device, and double-click it to complete activation.

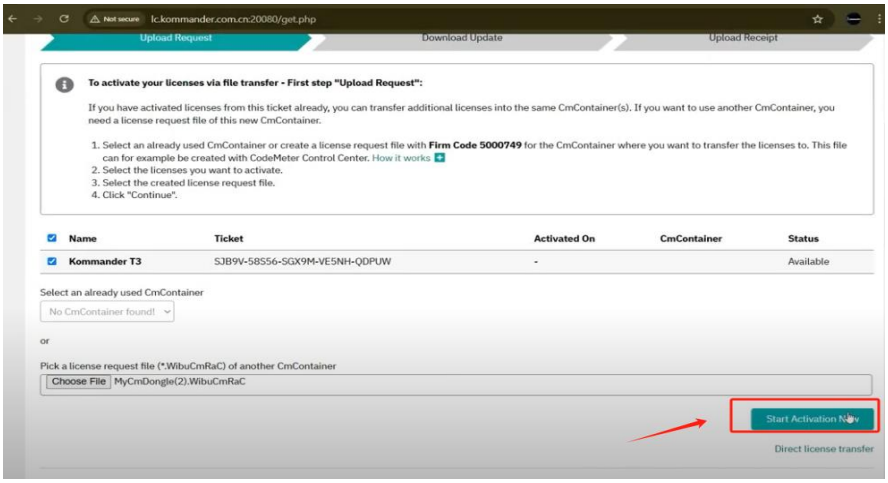


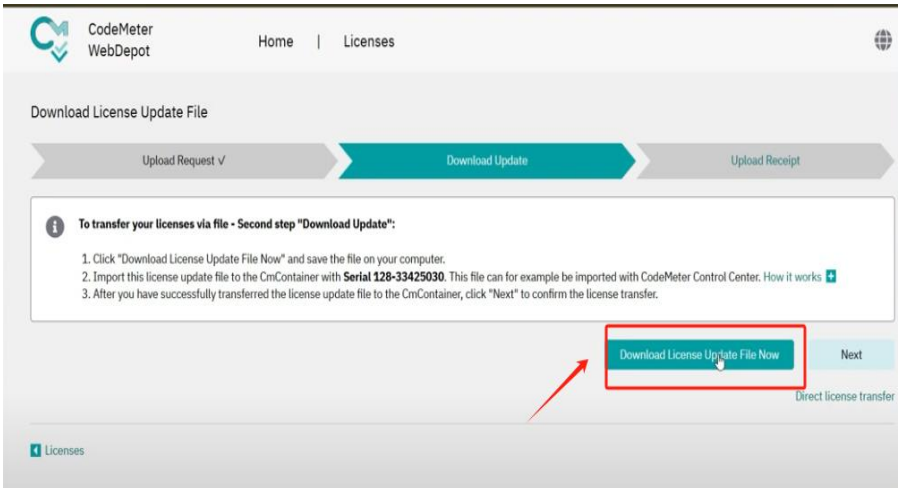



CodeMeter
WebDepot
Home | Auto Update
Welcome to CodeMeter License Central WebDepot
Welcome to CodeMeter License Central WebDepot. You can transfer your licenses to your CmContainer using this WebDepot. Please enter your ticket and click "Next".
Ticket:
Next


lc.kommander.com.cn:20080/get.php
CodeMeter
WebDepot
Home | Licenses
Available Licenses
To activate your licenses:
1. Select the licenses you want to activate.
2. Select the locally connected CmContainer to which you want to transfer the licenses.
3. Click "Activate Selected Licenses Now".
Name
Ticket
Activated On
CmContainer
Status
Kommander T3
SJB9V-58S56-SGX9M-VE5NH-QDPUW
-
Available
Select CmContainer
128-33425029 (KMediaPlayer)
Activate Selected Licenses Now
File-based license transfer
Licenses


Upload Request
Download Update
Upload Receipt
To activate your licenses via file transfer - First step "Upload Request":
If you have activated licenses from this ticket already, you can transfer additional licenses into the same CmContainer(s). If you want to use another CmContainer, you need a license request file of this new CmContainer.
1. Select an already used CmContainer or create a license request file with Firm Code 5000749 for the CmContainer where you want to transfer the licenses to. This file can for example be created with CodeMeter Control Center. How it works
2. Select the licenses you want to activate.
3. Select the created license request file.
4. Click "Continue".
Name
Ticket
Activated On
CmContainer
Status
Kommander T3
SJB9V-58S56-SGX9M-VE5NH-QDPUW
-
Available
Select an already used CmContainer
No CmContainer found!
or
Pick a license request file (*.WibuCmRaC) of another CmContainer
Choose File No file chosen
Start Activation Now


lc.kommander.com.cn:20080/get.php
Upload Request
Download Update
Upload Receipt
To activate your licenses via file transfer - First step "Upload Request":
If you have activated licenses from this ticket already, you can transfer additional licenses into the same CmContainer(s). If you want to use another CmContainer, you need a license request file of this new CmContainer.
1. Select an already used CmContainer or create a license request file with Firm Code 5000749 for the CmContainer where you want to transfer the licenses to. This file can for example be created with CodeMeter Control Center. How it works
2. Select the licenses you want to activate.
3. Select the created license request file.
4. Click "Continue".
Name
Ticket
Activated On
CmContainer
Status
Kommander T3
SJB9V-58S56-SGX9M-VE5NH-QDPUW
-
Available
Select an already used CmContainer
No CmContainer found!
or
Pick a license request file (*.WibuCmRaC) of another CmContainer
Choose File MyCmDongle(2).WibuCmRaC
Start Activation Now
Direct license transfer



Tutorial Video:

We've created a step-by-step guide on YouTube for your reference:

https://youtu.be/kG852vK--uk?si=ZNbQmY_AoUGuTN7

4. Interface Overiew

4.1 Application launch configuration

Main Application


Controller

Displayer

Icon 1: Main Application
Working Modes:
Master/Backup/Slave node configurations
Full software functionality with native output capabilities
Thin-Client Variant: Output-only mode in select hardware profiles

Icon 2: Controller (Multi-device Systems)
Full-featured project editing suite
Remote orchestration of networked nodes
Non-Output Architecture: Operates as command hub without local rendering

Icon 3: Displayer (Multi-device Systems)
Thin-client deployment model
Functionality Constraints:
Zero project editing capabilities
Optimized for real-time visualization workflows

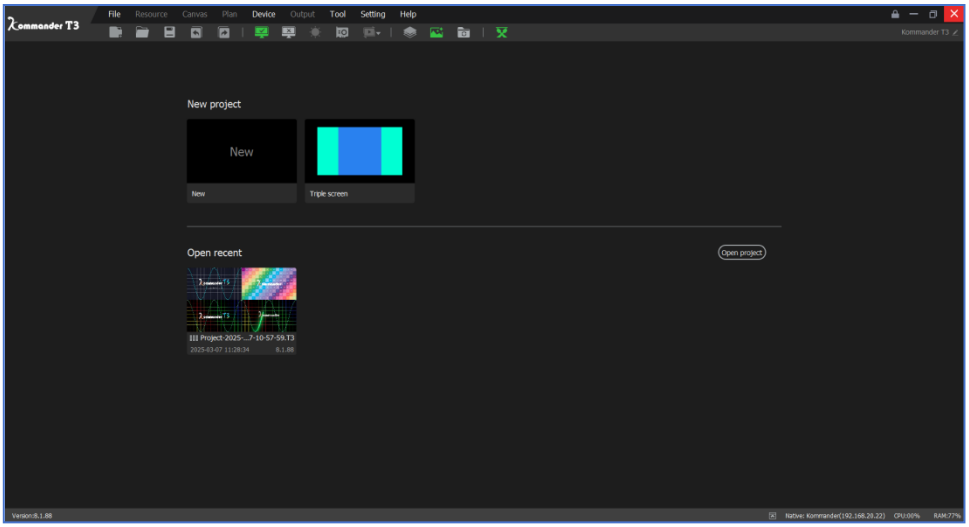
Technical specifications:

Component	Execution Mode	Key Capabilities	Limitation
Main Application	Master/Backup/Slave	Full software functionality + native output	N/A
Controller	Controller	Networked device management	No local rendering
Displayer	Thin-client	Visualization-only	No editing/configuration

4.2 Main Application Launch Interface

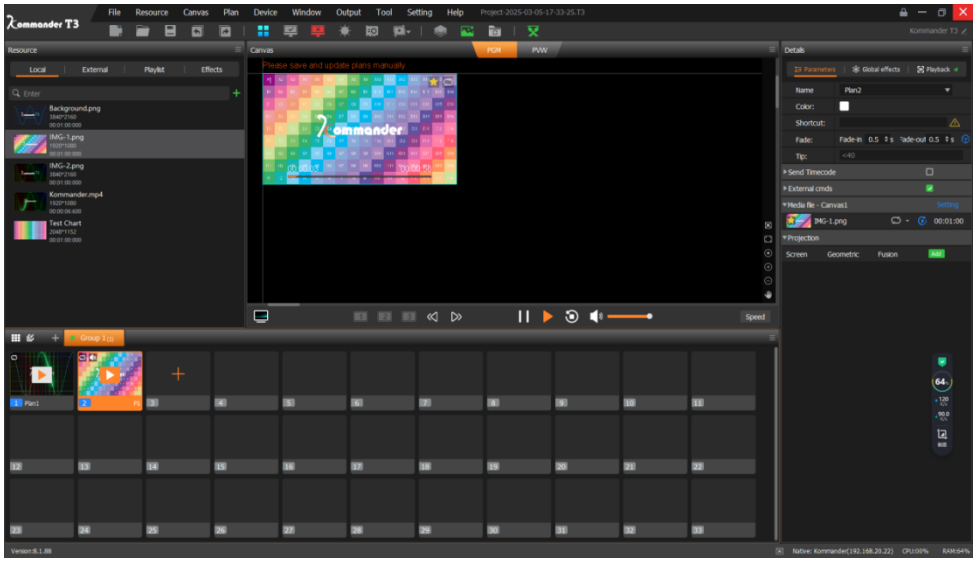
New project:
Create Blank Project: Generates empty project container with default parameters

Template-Based Creation: Initializes projects from predefined templates
Open recent:
Metadata Display: Shows project thumbnails, modification timestamps, and directory paths
Quick Access:
Direct Launch: Execute projects via recent history list
Explorer Integration: Access full project directory through "Open Project" portal

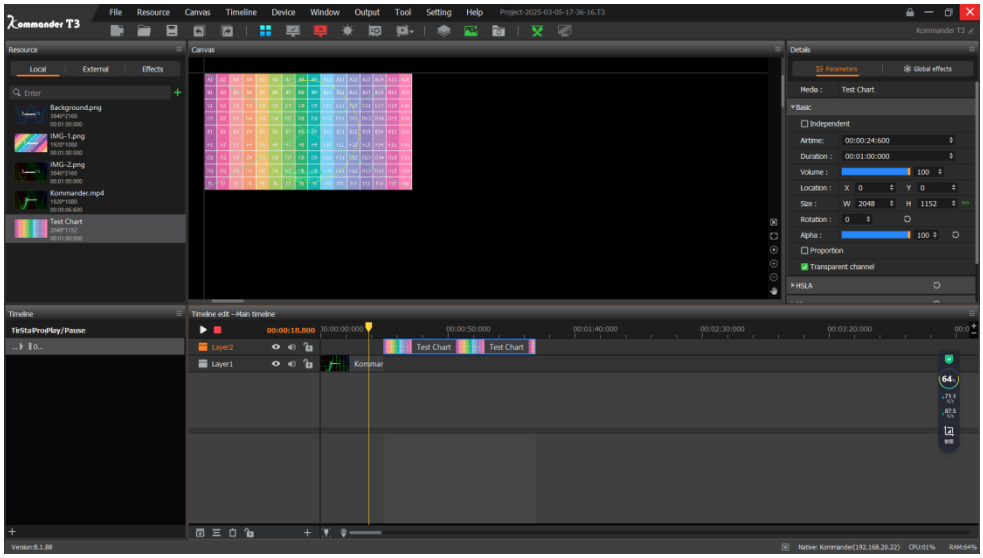


4.3 Editing Workspace

Plan mode



Timeline mode



The main interface of both the **Main Application** and **Controller** (as illustrated above) comprises the following functional zones and panels:

1) Menu Bar:

Core navigation options, include File, Resources, Canvas, Device, Window, Plans, Timeline, Output, Tools, Settings, Help.

2) Tool Bar:

Quick-access controls and system status indicators.

3) Resources Panel:

Centralized management of project media assets (video/audio/GFX).

Supports drag-and-drop ingestion with format validation.

4) Canvas Workspace:

Program canvas (PGM), Preview canvas(PVW) and Global playback settings.

5) Details:

The attributes of selected resource will be presented here, including plan, timeline and window files.

6) Output Monitoring:

Real-time output preview with embedded status data visualization.

7) Plan Window:

Management of Plans and Plan groups.

8) Timeline List:

Centralized timeline management panel, with playback state indicators (Running/Pause/Stop) and command controls (Play/Stop/Jog).

9) Timeline editing window:

Multi-track editing (video/audio/GFX)

10) Status Bar:

Software version vX.Y.Z.

Node Health (CPU/GPU/RAM utilization)

Multi-device connection status

Timecode I/O (LTC, MTC)

External Interface, Streamdeck/NDI etc.

4.4 Thin-Client Interface

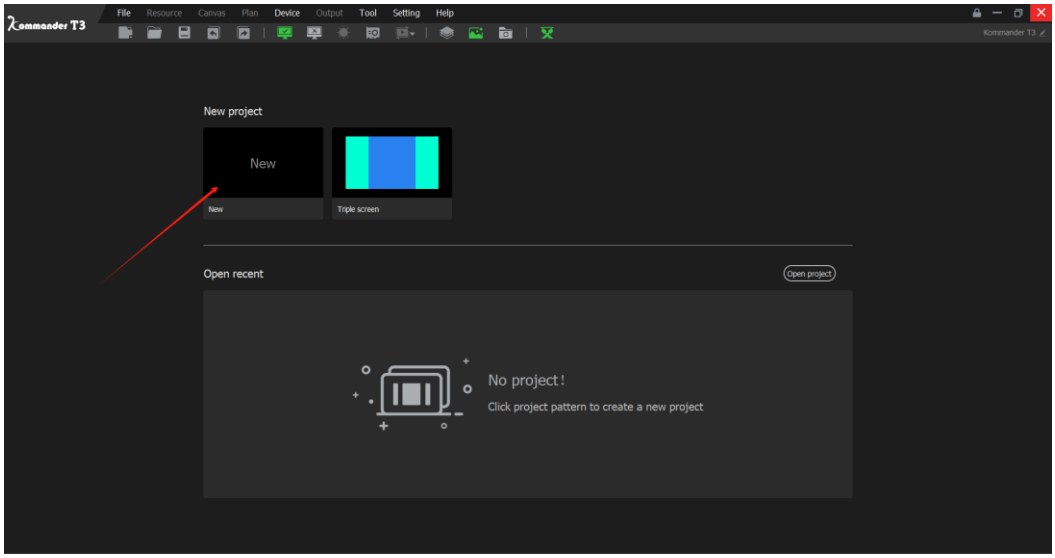
5. Quick Start Guide

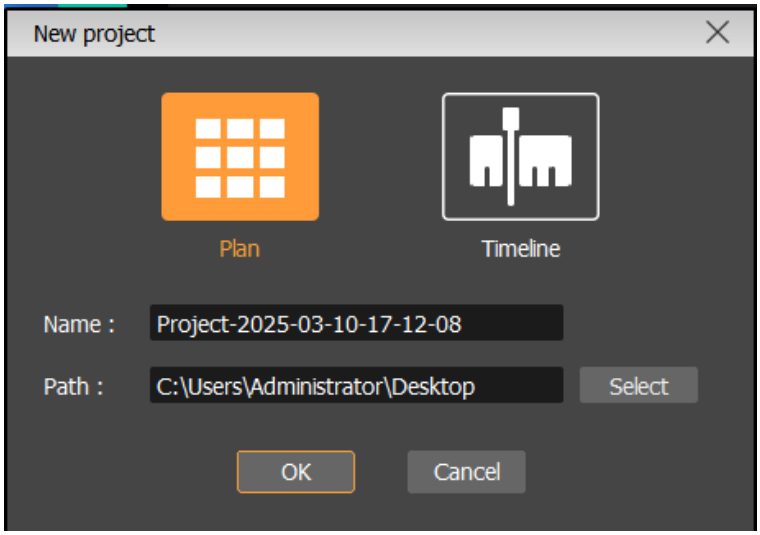
5.1 Launching the application

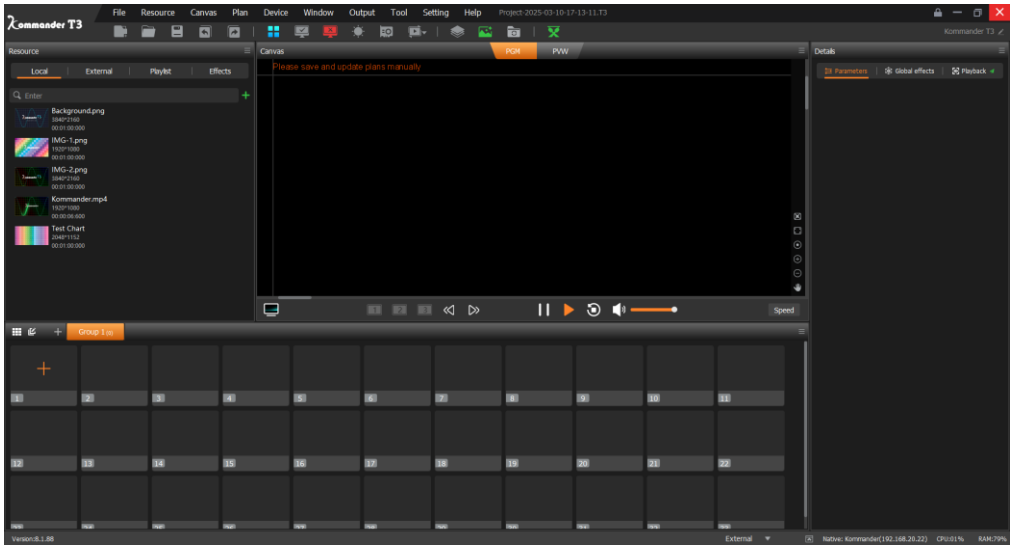
Execute the main program. 

5.2 Creating projects

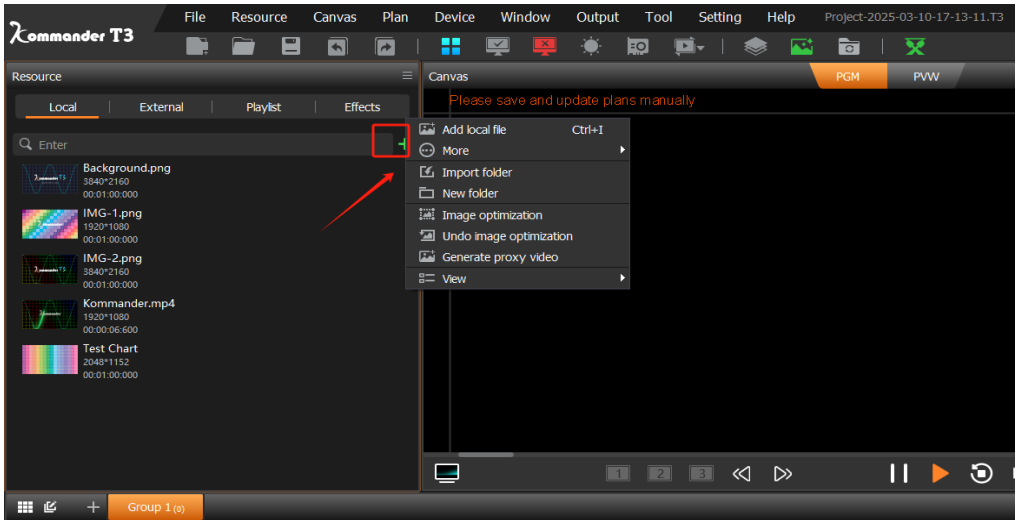
Click **New** → Define project name and storage path (.kproj format) → **Confirm**
Plan Projects: Event-driven content organization
Timeline Projects: Temporal media sequencing
Recommendation for new users: Start with Plan Mode







5.3 Resources Ingestion



Methods:

1) Click + in “Resource”
2) Right-click context menu → import files
3) Drag-and-drop from OS file explorer

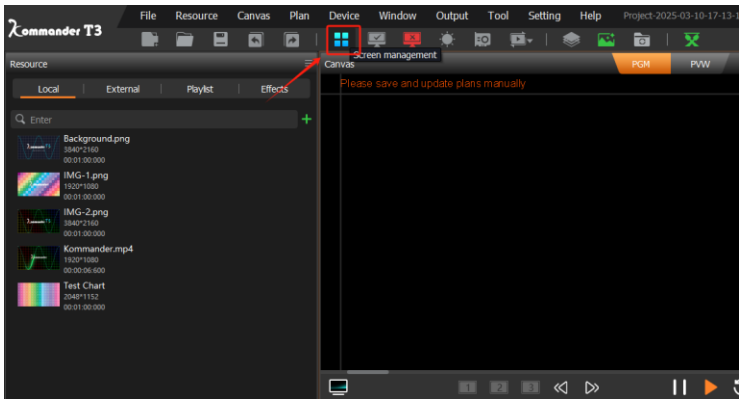
5.4 Screen Management

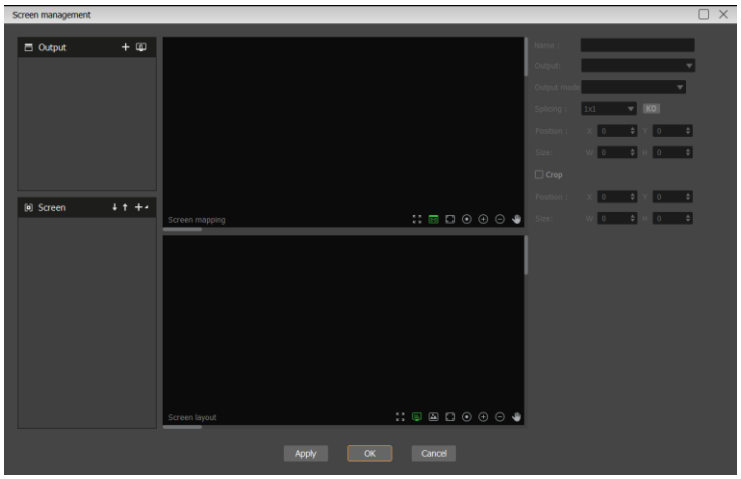
1) Automatic Configuration

Multi-monitor setups auto-detected via Windows EDID parsing.
Default canvas layout

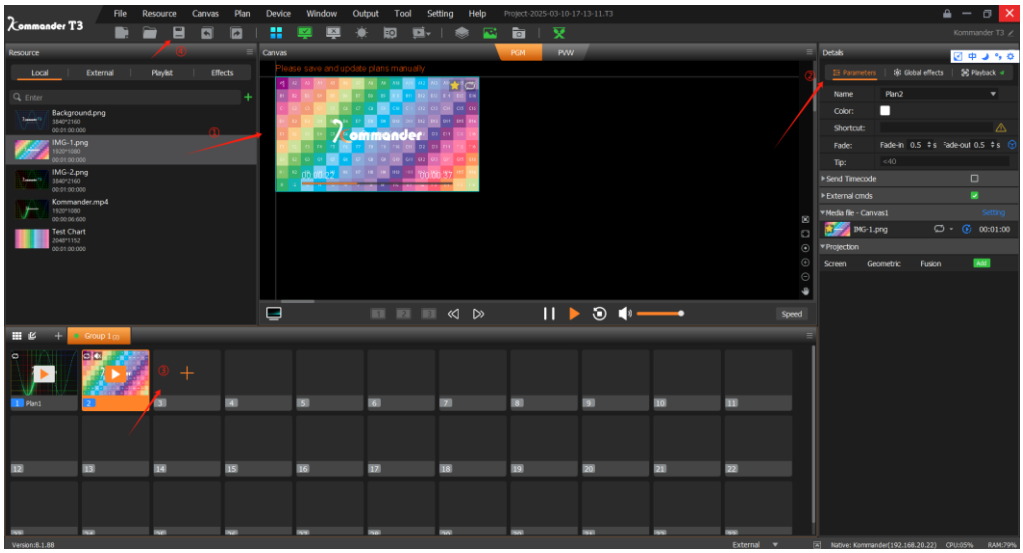
2) Manual Adjustment

Navigate: Tools Bar → Screen management
Customize configuration mapping (see functional module - screen management)





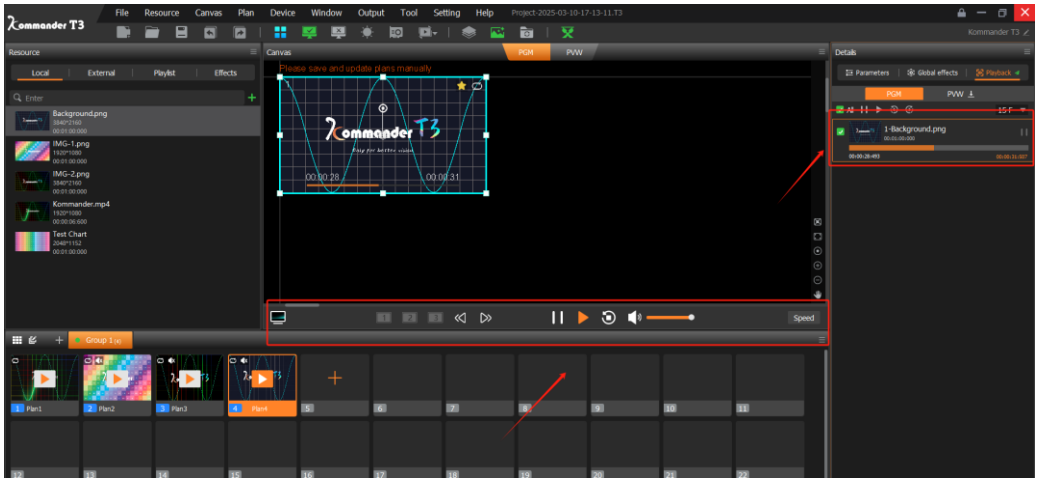
5.5 Canvas Programming workflow



1) Output assignment: Drag assets to target canvas zones (direct output binding)
2) Parameter adjustment: Select canvas element → Modify via Details
3) Plan save: Click +in Plan Panel
4) Project save: Click **save project** in Tool bar
Technical Note: Canvas modifications synchronize to output displays with sub-frame latency.

5.6 Live production control

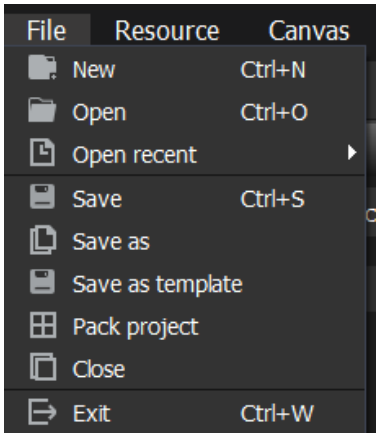
1) Plan execution
Trigger presets via icon clicks during events (cue-based switching)
2) Global controls
Play/Pause, Blackout, Mute, Seek



6. Functional Modules

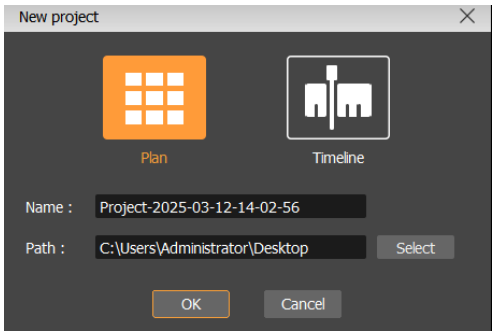
6.1 Project Management

6.1.1 File Menu



The interface provides centralized access points for project and application-level operations (as illustrated above).

6.1.2 New Project Creation



Access Paths:

1) Launch Screen
2) File Menu

Project Type Comparison

Plan Projects	Timeline Projects
Preview editing: Enabled	Preview editing: Disabled
Canvas modifications do NOT propagate to presets (decoupled architecture)	Real-time Canvas-Preset Synchronization
Exclusive Preset Activation (single preset per canvas)	Multi-layer Preset Stacking with Priority Management

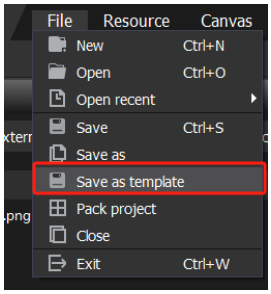
Plan Projects	Timeline Projects
Playlist Support: Enabled	Playlist Support: Disabled
Static Effect Properties (no temporal automation)	Dynamic Effect Property Curves (timecode-driven)
Task Management & Cloud Integration: Supported	Task Management & Cloud API: Unsupported
Full MIDI/OSC/DMX Protocol Support	Limited Control Protocol Compatibility
Blackout Handling: Direct Implementation	Standby Layer Dependency (fallback to black if inactive)
Synchronized Asset Playback on Preset Activation	Per-Preset Asset Offset Configuration
Event-Driven Device Control (preset/file progress triggers)	Timeline-Embedded Control Commands (playback/device control)
Timecode-Batched Preset Execution	Master Timeline Synchronization Only

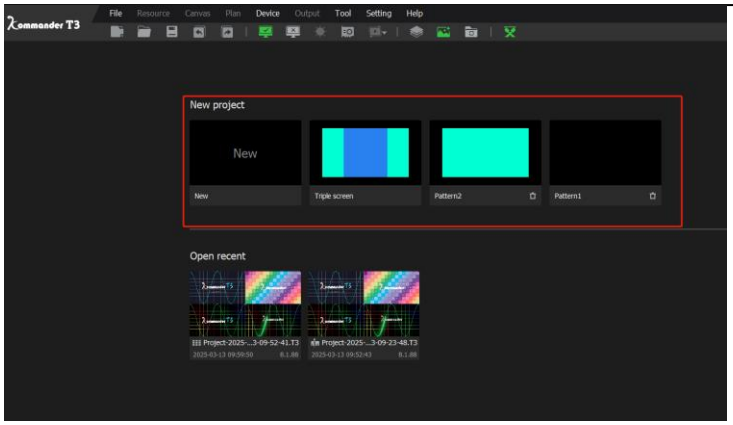
Storage Directory: Ensure the target path has read/write permissions and sufficient storage capacity.

6.1.3 Saving Project Templates

A project template allows exporting the current project's **display configuration data** (screen layouts, output mappings, etc.) into a reusable format. This streamlines project creation in scenarios requiring identical display setups, significantly reducing repetitive configuration efforts.

Saved templates are displayed on the **launch interface** (as illustrated below) for quick access during new project initialization.



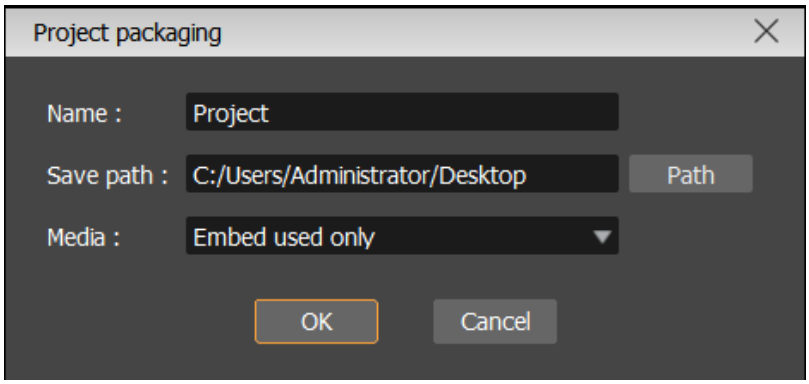


6.1.4 Project Packaging

Project assets may be distributed across multiple storage locations. To ensure project portability across systems, simply copying the project file is insufficient. Utilize the **Project Packaging** feature to:

Aggregate all project-related data (media, configurations, metadata)

Organize and transfer assets to target devices



Key Features:

1) **Project Renaming**: Reset the project name during packaging
2) **Asset Scope Selection**:
   - **Include only referenced assets** (used in timelines/presets)
   - **Include entire media library** (all resources linked to the project)

Pre-Packaging Checklist:

1) Verify target directory has sufficient storage capacity
2) Confirm write permissions for the destination path

Workflow Diagram:

a. **Asset Crawling** → b. **Dependency Resolution** → c. **Package Assembly**

6.1.5 Recent Projects, Backup & Recovery

Recent Projects

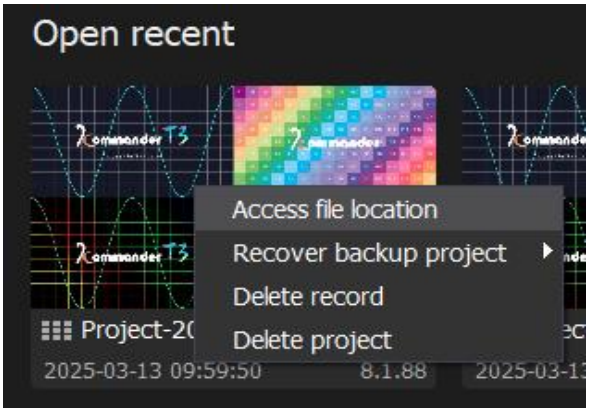
1) The software automatically tracks recently opened projects.
2) **Retention Policy**: Records are cleared during software reinstallation/uninstallation unless explicitly preserved.
3) Displayed in both the **File Menu** and **Launch Page**, sorted by last-access timestamp in descending order.

Auto-Backup Mechanism

1) **Backup Directory**: %AppData%\ProgramName\Projects\
2) **Backup Triggers**:

Trigger	Backup Type
Project Opening	Initial State Snapshot
Editing Session	Scheduled backups per **System Settings** → **Auto-Backup** rules
Critical Events	Crash recovery, multi-device synchronization checks

3) **Backup Access**:
   - Navigate to **Launch Page** → **Recent Projects** → **Right-click** → **"Restore from Backup"**
4) **Retention Policy**: Cyclic overwrite (oldest backups purged first). Backups persist after software uninstallation.



Project Recovery

1) **Plan**: Unexpected closure (application crash/process termination).
2) **Workflow**:
    - Upon relaunch, the software prompts to restore from the latest scheduled backup.

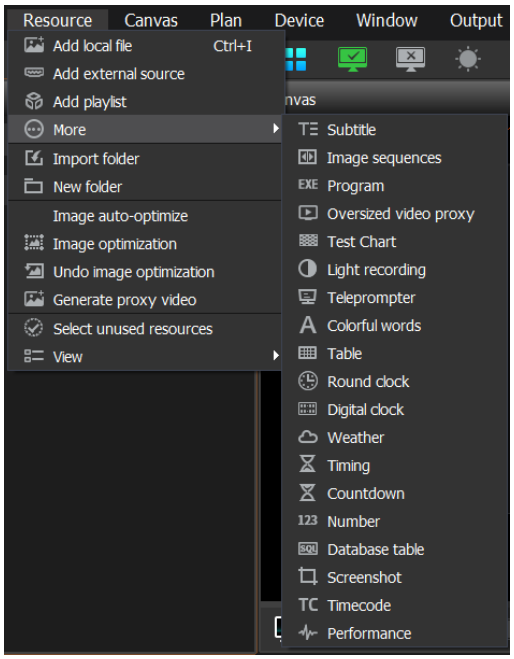
Version Compatibility Guidelines

1) Opening Newer Projects in Older Software**:**
    - Error: **"Unsupported Project Version"**
    - **Design Principle**: Forward compatibility only (new software opens old projects; reverse not guaranteed).

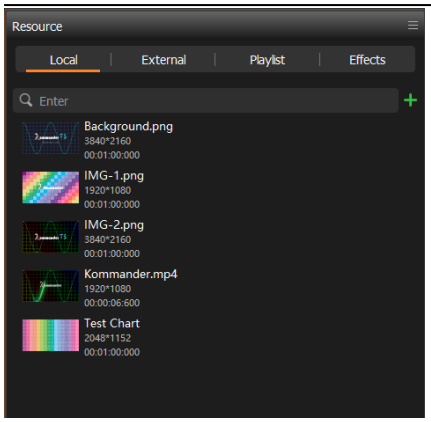
2) Opening Legacy Projects in New Software**:**
    - Warning: **"Version Mismatch — Save As to Upgrade"**
    - **Procedure**:
        - Execute **Save As** → Automatic schema conversion → Generates upgraded file → Opens modified project.

6.2 Resource Management

6.2.1 Resource Menu



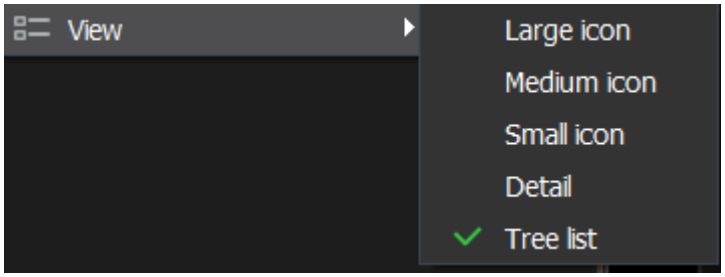
6.2.2 Resource Window



Window Components

1) **Local Files**:
   - Video, images, audio, PPT, Word, and other local documents.
2) **External Sources**:
   - Webpages, capture cards, NDI, Spout, network streams.
3) **Asset Groups**:
   - Predefined playback sequences from the media library (supports auto-loop).
4) **Effects**:
   - Real-time processing tools: morphing, color grading, alpha masking, dynamic transitions.

View Modes



Mode	Scope	Search Behavior
Icon View	Current directory	Local directory + subfolders
(Large/Medium/Small)		
Details View	Path + current files	Local directory + subfolders
Tree View	Full directory structure	Global search across all local assets

Default Sorting: Chronological (by import time), customizable via drag-and-drop.

6.2.3 Resource Ingestion

1) Access Points:

- Resource menu, context menu (right-click in library), **+** button, drag-and-drop.

2) Plan Attributes:

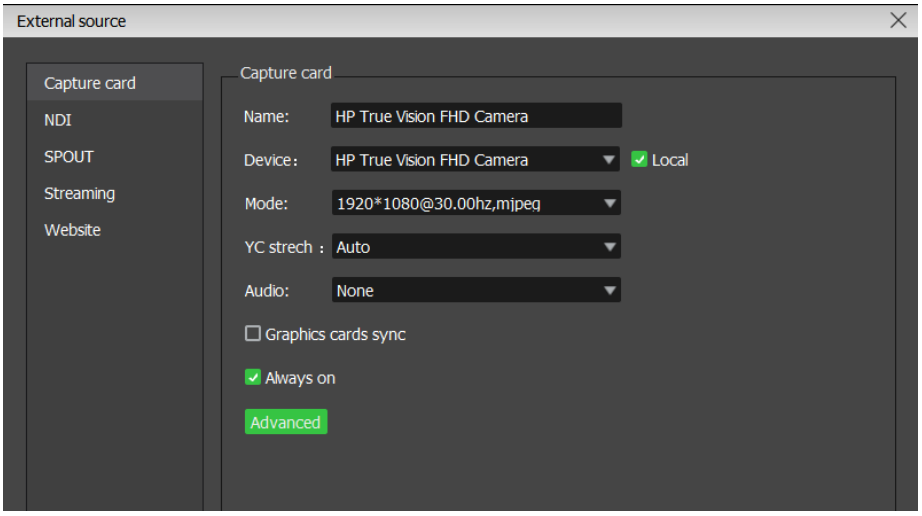
- Office file handling (PPT/Word) configurable via **System Settings** → **File Parsing**.

3) Local File Types:

- Supported formats: MXF, MOV, MP4, WAV, PPT (Microsoft PowerPoint), DOCX.

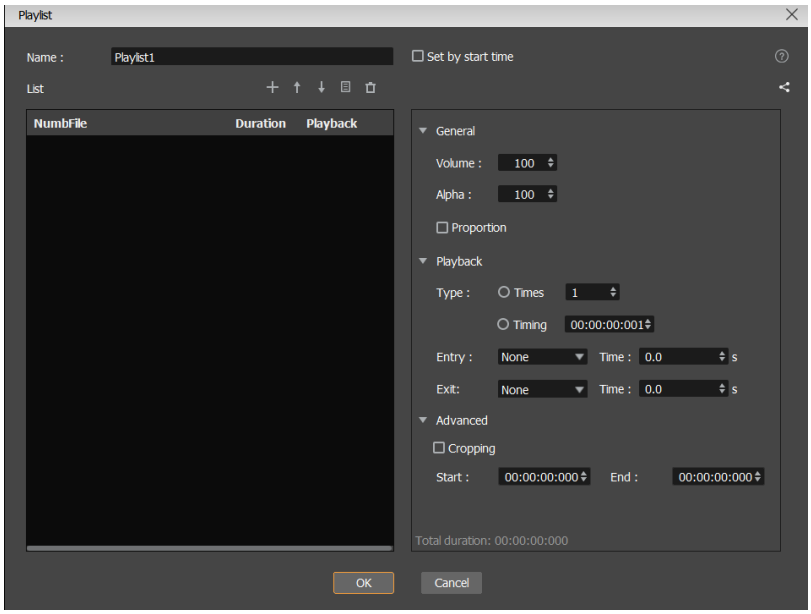
4) External Sources:

- Protocols: NDI|HX3, SDI (SMPTE 292M), RTMP, SRT.



5) Asset Groups:

- Create playlists with loop/random/shuffle modes.



6) Advanced Types:

- Add via context menu: subtitles, dynamic text (RGB 幻彩字), teleprompters, digital/analog clocks.

7) Folder Import:

- Preserves original directory hierarchy (NTFS permissions retained).

8) Folder Creation:

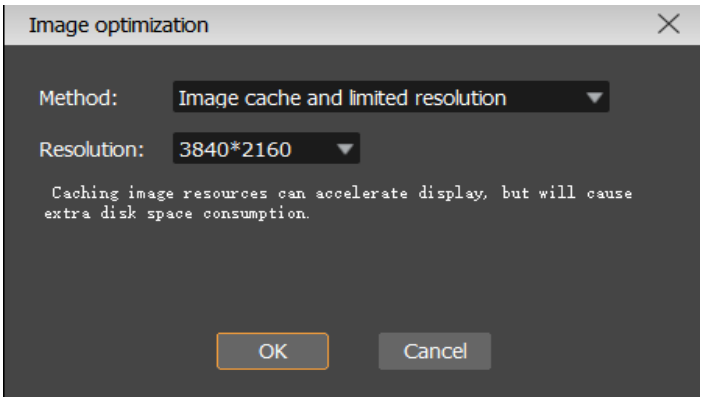
- Generate empty directories for asset organization.

6.2.4 Asset Optimization

1）Current Scope: Only image optimization is supported. Optimized images automatically replace the original versions during output.

2）Auto Image Optimization (Toggle):

- When enabled, images added to the media library are automatically resized to the target resolution.
- **Logic**:
  - Images exceeding the target resolution are proportionally downscaled.
  - Optimized versions replace originals in output pipelines, which may cause brief output flickering during substitution.
- **Consistency**: Applies uniformly across all image ingestion methods.



3）Manual Image Optimization:

- **Function**: Batch-resize media library images to a specified resolution.
- **Scope Variations**:

Invocation Point	**Scope**
Resource Menu	Global (all local files)
Resource Window (path-specific)	Directory-level
File Context Menu	Individual file

4）Optimization Reversal:

- Restores original images for output instead of optimized versions.
- Follows the same scoping rules as manual optimization.

5）Proxy Video Generation:

- **Purpose**: Supports **Canvas Proxy Mode** for low-bitrate preview rendering.
- **Workflow**:
  - Generates lightweight proxies (lower resolution/quality) for canvas editing.
  - Final output retains original high-quality assets.
- **Note**: Proxy rendering affects only the canvas, not final exports.

6.2.5 Additional Features & Specifications

1）Persistent Caching

- **Supported Formats**: Most file types (video, Office docs, web sources, etc.)
- **Behavior**:
  - Enables background preloading of assets even when not actively outputting.

- **Resource Impact**: Increases RAM/GPU memory usage (enable only with sufficient resources).
- **Benefit**: Eliminates load latency during sudden output demands.

- **Defaults Enabled**: Capture cards, Office files, webpages, executables.

2）Force Reload

- **Applicability**: Persistent-cached assets and active canvas outputs.
- **Use Cases**:
  - Apply parameter changes requiring full reinitialization.
  - Recover corrupted/non-responsive asset handles.

3）Asset Replacement

- **Rules**:
  - Strict type matching (image→image, video→video, etc.).
  - Inherits metadata/properties from the original asset (position, keyframes, effects).
- **Scope**:
  - Propagates to all presets, canvas instances, and asset groups using the original file.

4） Dependency Tracking

- **Query Function**: Audit asset usage across:
  - Preset triggers
  - Canvas placements
  - Asset group playlists

5） Identify Unused Files

- **Function**: Filters and displays unused files within the current directory to facilitate cleanup.
- **Workflow**:
  1. Run scan → 2. Review flagged files → 3. Batch delete/purge

6） File Status Indicators

Icon	Condition	Action
	File load failure	Verify: - File corruption - Codec compatibility

Icon	Condition	Action
		- Permissions
	File not found	Confirm: - Intentional deletion - Abnormal loss (disk disconnection)

Critical Notes:

- **Abnormal File Loss**: Contact technical support if files disappear without user action.
- **Persistent Load Failures**: After verifying file integrity/type compatibility, escalate to support.
- **Type-Specific Errors**: Refer to **Resource Support → File Type Specifications** for detailed troubleshooting.

6.2.6 Resource Support Specifications

6.2.6.1 Video

Video is the most common media format and the core functionality of broadcast control software. This section details supported video formats, hardware decoding capabilities, and optimization strategies.

Supported Video Formats

Default Supported Types:
MP4, AVI, MKV, WMV, FLV, MOV, ASF, MPEG, MPG, TP, TS, MTS, M2TS, VOB, RMVB, RM, RAM, DIVX, EVO, OGM, M1V, M4V, MPE, 3GP, WEBM (with alpha channel), ProRes, KVC (proprietary high-performance format), KPF (proprietary protected format), KRAWF (proprietary raw frame sequence format).

Extended Support:
Drag-and-drop unsupported formats into the media library if compatible with FFmpeg decoders.

Proprietary Formats

KVC (Kommander Video Codec)

- **Advantages**:
  - Optimized decoding with minimal CPU/GPU overhead
  - Instant random seek (frame-accurate)
  - Hardware decoding support up to 8K+ (theoretical 16K×16K)
  - Supports YUV420/YUV444 with alpha channel

- **Variants**:

Type	Compression
Lossless KVC	Uncompressed
KVC-II	Lossy

- **Limitations**:
    - Requires NVIDIA GPUs with CUDA 11.7+
    - Currently only supported by DX9_EX rendering engine
    - Larger file sizes compared to H.264/H.265

KRAWF (Kommander Raw Frame Pack)

- **Purpose**: Lossless playback of image sequences (BMP/PNG/TIFF) as video.
- **Advantages**:
    - 30% faster read speeds vs. raw frame playback
    - Minimal performance overhead
- **Limitations**:
    - High storage requirements (disk I/O bottleneck)
    - Tested for 8K@60Hz on enterprise-grade RAID arrays

KPF (Kommander Protected Format)

- **Features**:
    - AES-256 encryption with DRM controls:
        - Device binding
        - Time-limited playback
        - Password protection
    - Performance identical to source codec
- **Playback Requirements**:
    - Valid software license
    - Matching product series authorization
    - Additional credentials if encrypted (password/device ID/time window)

Error Status Indicators

Icon	Status	Description
	Unauthorized Playback	Software lacks valid KPF playback license
	Device Restriction	Current hardware not in permitted device list
	Expired License	Playback time window has elapsed

Icon	Status	Description
	Password Error	Incorrect/missing decryption password
	Expiring License (3-day warning)	Click to view files nearing expiration

Video Playback Performance Specifications

Hardware Decoding Support & Constraints

Codec	Specifications
MPEG-2	8-bit, max width/height: 4080 pixels
H264 (AVC)	8-bit YUV420, max width/height: 4096 pixels
VP8	8-bit YUV420, max width/height: 4096 pixels
VP9	8-bit YUV420, max width/height: 8192 pixels
KVC	NVIDIA CUDA GPUs only. Desktop: ≤16384 pixels (disk I/O limited), Laptop: ≤8192 pixels. Supports YUV420/444
Hap	Hap-1, Hap-A, Hap-Q variants

Notes:

- Hardware decoding capabilities depend on GPU specifications.
- KVC resolution limits are constrained by disk I/O bandwidth despite theoretical GPU support.

Codec Comparison

Codec	Compression	YUV	Alpha	Encode Speed	Decode Overhead	Seek Performance	Common Formats
H264 (AVC)	High	420p	No	Fast	High	Poor	MP4
H265 (HEVC)	Very High	420/444	Yes	Fast	Very High	Poor	MP4
VPx	High	420p	Yes	Very Fast	Very High	Poor	WebM
Hap	Medium	N/A	Yes	Slow	Low	Smooth	MOV
KVC (Lossy)	Medium	420/444	Yes	Fast	Low	Smooth	KVC
KVC (Lossless)	Low	420/444	Yes	Fast	Low	Smooth	KVC

Codec	Compression	YUV	Alpha	Encode Speed	Decode Overhead	Seek Performance	Common Formats
KRAWF	Very Low	420/444	No	Slow	Low	Smooth	KRAWF

Key:

- **High compression** = smaller file size at same resolution.

Video Production Guidelines

Resolution	Frame Rate	Format	Codec	Pixel Format	Recommended GPU	Remarks
JPG	N/A	Image	N/A	YUV420/YUV444	-	Max width/height: ≤16K. For ultra-wide images, use downsampled resolutions.
JPG Sequence	N/A	Image Seq	N/A	YUV420/YUV444	-	Use video formats for resolutions >4K.
1080p	30 FPS	MP4	H264	YUV420	NVIDIA P2000	Recommended bitrate: ~10 Mbps
	60 FPS	MP4	H264	YUV420	NVIDIA P2000	Recommended bitrate: ~20 Mbps
4K	30 FPS	MP4	H264	YUV420	NVIDIA P2000	Recommended bitrate: ~40 Mbps
	60 FPS	MP4	H264	YUV420	NVIDIA P2000	Recommended bitrate: ~80 Mbps
	60 FPS	MOV	Hap	RGB	NVIDIA P2000	Hap requires fixed bitrate. Align resolution to multiples of 16.
8K	30 FPS	MP4	H265	YUV420	NVIDIA RTX 4000	Recommended bitrate: ~80 Mbps
	60 FPS	MP4	H265	YUV420	NVIDIA RTX 5000	Recommended bitrate: ~160 Mbps (frame drops may occur with complex scenes)
	30 FPS	MOV	Hap	RGB	NVIDIA RTX 5000	Align resolution to multiples of 16.

Recommendations:

- For resolutions >8K: Convert to **KVC** via Kommander Assistant or split into multiple files.
- Prioritize KVC transcoding for optimal playback performance.

Technical Compliance:

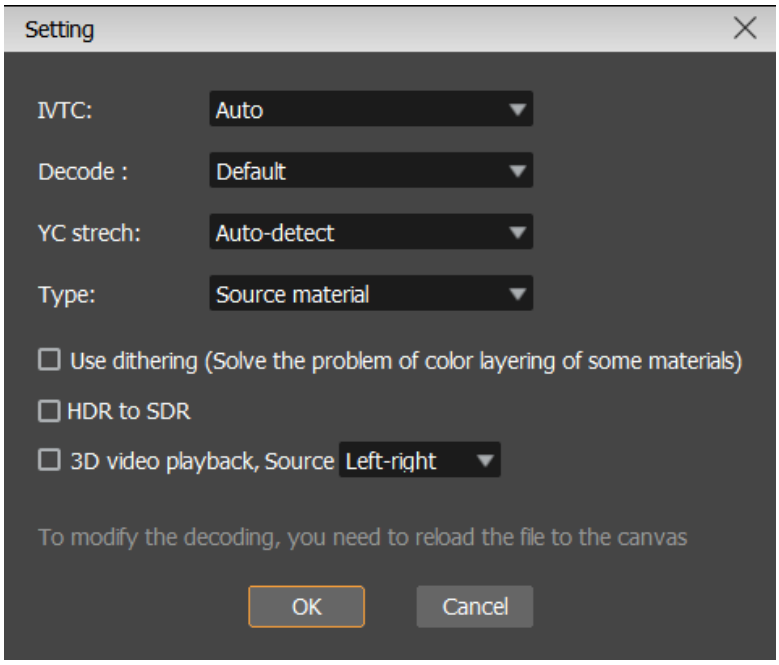
- All specifications align with SMPTE ST 2110-21 for broadcast-grade workflows.

Video Configuration Properties

Key Playback Parameters

Two primary settings affect video playback:

1) **System Settings → Codec Module** (see System Settings chapter)
2) **File Context Menu → Settings**



Parameter Descriptions

1) **Deinterlacing**
    - **Issue**: Automatic deinterlacing may fail, causing visual artifacts.
    - **Solution**: Manual override available in settings.
2) **Decoding**
    - **Default**: Follows hardware decoding toggle in system settings.

- **Fallback**: Automatically switches to CPU-based software decoding if hardware acceleration is unsupported.
- **Transparency Note**: Disable hardware decoding manually if alpha channels are lost.

3) **YC Range Expansion**
   - **Function**: Adjusts color gamut mapping to prevent color shifts.
   - **Auto-Detect**: Enabled by default (may require manual correction).
   - **Troubleshooting**:
     - **Washed-out colors**: Enable expansion.
     - **Overly dark colors**: Disable expansion.
4) **Asset Type**

Type	Use Case
Standard	Conventional playback
360° Panorama	Spherical LED displays with **UV Unwrapping** effect
Cube Map Panorama	Cubic projection mapping (see *UV Unwrapping Effects* chapter)
Hemispherical	Dome projection systems
Spherical	Full-sphere VR/AR output

   - **VR Cropping**: Enables real-time 视角 control for partial panorama output (see *VR Cropping* chapter).
5) **Dithering**
   - **Purpose**: Mitigates color banding in gradient-heavy content.
   - **Recommendation**: Enable for videos with compression artifacts.
6) **HDR to SDR Conversion**
   - **Modes**:
     - **Direct HDR Output** (10/12-bit pipelines)
     - **Tone-Mapped SDR** (8-bit compatibility)
   - **Note**: See *HDR Workflow Specifications* for details.
7) **3D Playback**
   - **Manual Selection Required**:
     Specify **Top-Bottom** or **Side-by-Side** formats.
   - **Reference**: See *3D Playback Guidelines* chapter.

6.2.6.2 Audio

Supported Formats

The following audio formats are supported:

- MP3, MP2, MPA, AAC, OGG, WAV, WMA
- APE, AC3, FLAC, MAL, M2A, M4A
- RA, DTS, DTS-HD

Playback Specifications

1) **Visual Representation**:
    - Audio files contain no video stream. A **placeholder icon** is displayed on the canvas during playback to indicate the presence of the audio object in the current program.
2) **Parameter Configuration**:
    - No editable parameters are available for audio files.
    - For output settings and property configurations, refer to the **Canvas Object Properties** section.

6.2.6.3 Images

Supported Formats

All standard image formats are supported, including:

- JPG/JPEG, BMP, PNG, GIF
- TIF/TIFF, ICO, TGA

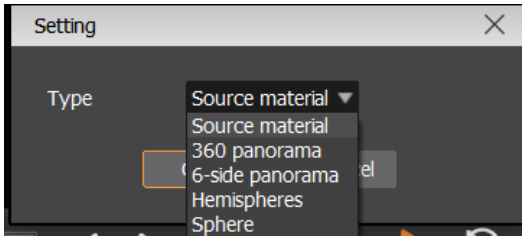
Playback & Optimization

1) **CMYK Handling**:
    - Preprocessing for CMYK images ensures color accuracy and optimized loading efficiency.
2) **Hardware Acceleration**:
    - Automatic hardware decoding detection (enabled where supported).
3) **High-Resolution Support**:
    - Capable of loading images exceeding 20,000 pixels in resolution via a high-performance decoding library.
    - **Recommendation**: Optimize images above 4K resolution for improved performance.

Asset Type Configuration

Images can be categorized as:

- **Standard**
- **360° Panorama**
- **Cube Map Panorama**
- **Hemispherical**
- **Spherical**



Use Case:

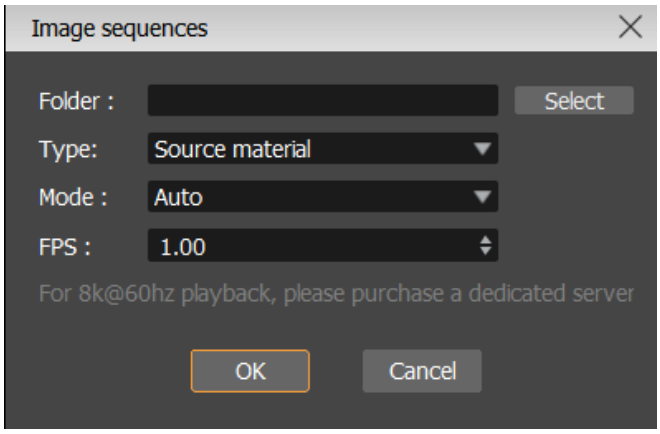
- Compatible with **UV Unwrapping** and **spherical display outputs** (see *Projection Mapping* chapter).

6.2.6.4 Frame Sequences & Image Sequences

Frame sequences and image sequences are both derived from folders containing sequential image files, which are read and output dynamically.
In **auto-playback mode**, they function similarly to video files. High-end playback systems often utilize uncompressed frame sequences (rather than compressed video) for lossless image output in mission-critical scenarios.

Product-Specific Implementation Differences

Feature	Standard Products	Frame Sequence Products
Use Case	Simple image queue playback	High-performance playback scenarios
Supported Frame Rate	0.01–5.00 fps	0.01–60.00 fps
Playback Performance	Basic playback	8K@60Hz support for uncompressed BMP/TIFF via direct storage access (DMA)
Recommended Formats	All supported formats	Uncompressed BMP/TIFF formats
Hardware Requirements	None	High-performance storage subsystems (NVMe RAID 0/10) and motherboards with PCIe 4.0 x4 lanes



Supported Image Formats: PNG, JPG, TIFF, BMP, SVG.
Requirements:

- No zero-byte files allowed.
- Filenames must follow sequential naming conventions (e.g., frame_0001.jpg, frame_0002.jpg).

Asset Type Configuration

Images can be categorized as:

- **Standard**
- **360° Panorama**
- **Cube Map Panorama**
- **Hemispherical**
- **Spherical**

Use Case: Compatible with **U-shaped LED walls** and **spherical projection systems**.

Playback Modes

1) **Auto-Playback**:
    - Sequential image switching at user-defined frame rates (0.01–60.00 fps).
    - **Low Frame Rate Use**: Suitable for slideshows (limited transition effects).
2) **Manual Switching**:
    - Provides an image pool for on-demand output.
    - **Advantages**:
        - No need to individually add images to the media library.

- Direct canvas switching interface for rapid image selection (see diagram below).

Frame Sequence Optimization

For **8K@60Hz playback**, consider converting raw frame sequences to:

Type	8K@60Hz	Transcoding Requirements	File Size	Playback Server Requirements
Raw Frame Sequence	Supported	None	Uncompressed (e.g., BMP/TIFF)	Extreme disk I/O (NVMe RAID 0+), PCIe 5.0
Frame Sequence Pack	Supported	Time-intensive packaging	≈ Resolution × 3 × frame count (no compression)	Moderate disk I/O, PCIe 4.0+
KVC Lossless	Supported	Long transcoding time	- JPG: 30× original size - PNG: 1.5× - TIFF/BMP: Reduced	Low disk I/O, CUDA-enabled GPU (NVIDIA)
KVC Lossy	Supported	Long transcoding time	Smaller than KVC Lossless	Low disk I/O, CUDA-enabled GPU (NVIDIA)

Technical Recommendations:

1） **Raw Frames**: Use for pixel-perfect quality with enterprise storage solutions.
2） **KVC Formats**: Prioritize for balanced performance/quality with CUDA GPUs.
3） **Visual Fidelity**: No perceptible difference between raw frames and KVC transcodes.

6.2.6.5 Large Video Proxy

In multi-node systems, the **controller** and **master** must manage all media assets, but may lack the resources (performance/storage) to handle oversized video files.
The **proxy video** feature addresses this by allowing:

- Controller to use lightweight proxy files for program orchestration.
- Master to reference proxies for non-local outputs.

Proxy File Workflow

1) **Proxy Generation**:

- Generated from source files using **Kommander Assistant**.
- **Requirements**:
  - Matching duration, framerate, and visual content as source.
  - Reduced resolution/quality (e.g., 1080p H.264 @ 5Mbps).

2) **File Definitions**:

Term	Description
Proxy File	Low-res substitute for controller/master. Requires valid local path.
Playback File	Full-res source for output nodes. Requires valid network/shared storage path.

3) **Deployment Best Practices**:
   - Pre-copy oversized playback files to target devices (use enterprise-grade file synchronization tools).
   - Store playback file paths in a centralized database (e.g., SQL or NoSQL).

6.2.6.6 Office Documents (PPT, PDF, DOC, XLS)

Supported Formats

- **Presentations**: PPT, PPTX
- **Documents**: DOC, DOCX, WPS (WPS Office)
- **Spreadsheets**: XLS, XLSX
- **Portable Documents**: PDF

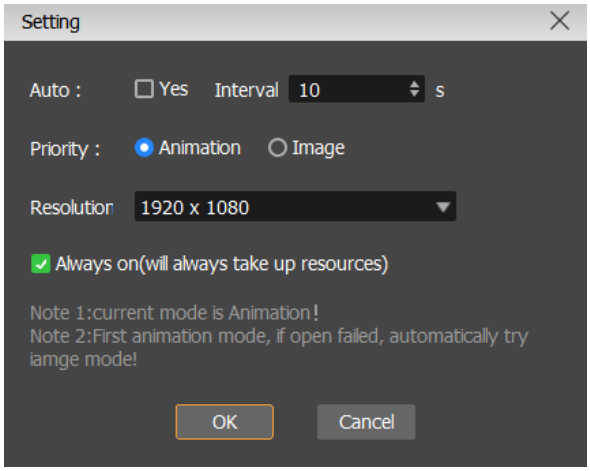
System Requirements

- **Local Office Suite Installation Required**:
  - Microsoft Office 2016 or later (recommended)
  - WPS Office (limited animation support for PPT)

Configuration Parameters

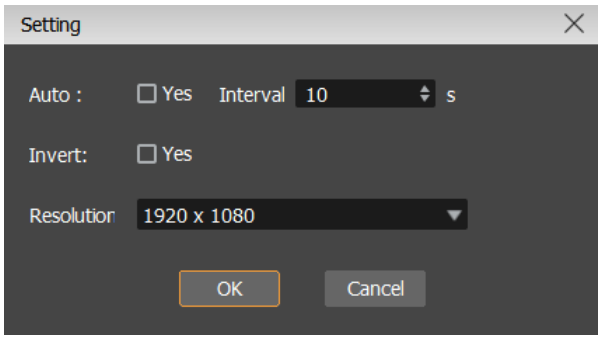
Global Settings:
Configure default parameters and document handling methods under **System Settings** → **Office** (see *System Settings* chapter). Individual file-level overrides are supported.

PPT/Presentation Settings



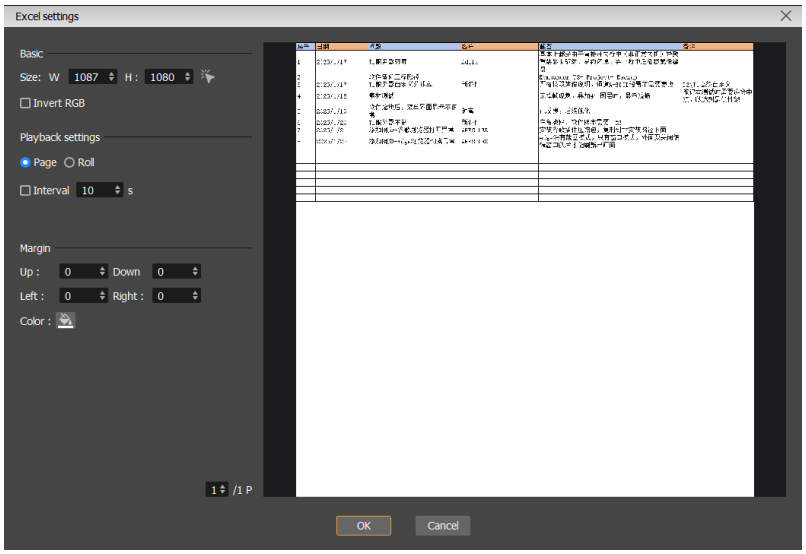
1) **Auto-Play**:
    - Enables automated slide transitions with user-defined **page interval duration** (applies to all document types).
2) **Playback Priority**:
    - **Animation Mode**: Renders PPT animations via local Office/WPS, then reprocesses for output (higher resource usage).
    - **Image Mode**: Converts slides to static images (lower overhead).
    - **Fallback**: Auto-switches to Image Mode if animation rendering fails to prevent black screens.
3) **Resolution**:
    - Supports widths up to **32,000 pixels** for ultra-large screen outputs (specific rendering modes only).

Word & PDF Settings



- **Auto-Play & Resolution**: Functionality identical to PPT.
- **Color Inversion**:
    - Converts white backgrounds to black for improved LED display readability.

Excel Configuration



1) **Workbook Limitations**:
   - Only the **first worksheet** is displayed. Split multi-sheet workbooks into separate files.
   - Maximum supported dimensions: 16,384 × 16,384 cells. For larger datasets, split into multiple files and use **Asset Groups**.
2) **Page Dimensions**:
   - Define split dimensions based on screen resolution.
   - **Recommendation**: Pre-format column widths and color styles in Excel for optimal display.
3) **Color Inversion**:
   - Same as Word/PDF settings (converts white backgrounds to black).
4) **Playback Modes**:
   - **Page Flip**: Slide transition effects.
   - **Scrolling**: Vertical/horizontal content panning.
5) **Margins**:
   - Adjust margins to improve readability if Excel layouts are not screen-optimized.

Document Handling Modes

1) **Animation Mode**: Preserves embedded animations. Three implementations:

Mode	Compatibility	Max Resolution	Features	Limitations
Screenshot	Office ≤2010	8K	High CPU/GPU usage	No effects, single instance
Injection	Office 2013+	16K	Multi-instance support, overlay	Requires COM API permissions

Mode	Compatibility	Max Resolution	Features	Limitations
			effects	
Window	All versions	32K	Ultra-wide screen support	No overlays, placeholder-only on canvas

2) **Image Mode**:

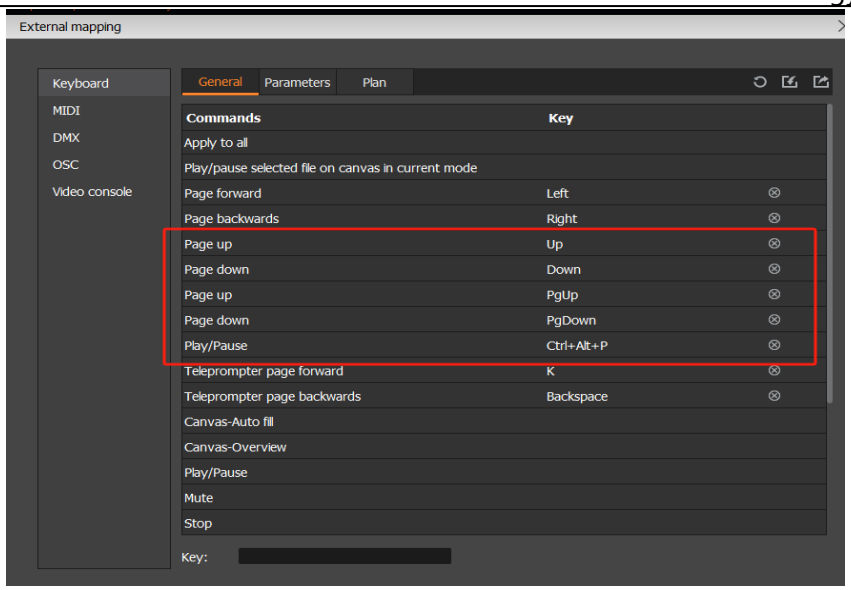
   Pre-rendered images with limited resolution (fallback option).

3) **Program + Parameters**:

   Launches external Office apps with document paths (auxiliary method).

Canvas Editing & Operations

1) **Display Modes (PPT Only)**:
   - **Live Canvas**: Outputs current slide with effects.
   - **Next Slide Preview**: Non-output preview (static image, no animations).
2) **Page Number & Font Size**:
   - Toggle visibility of page numbers (lower-left corner).
     - **Internal**: Visible only to operators.
     - **External**: Displayed on output screens.
3) **Loop Playback**:
   - Enables continuous looping from last slide back to first (PPT/DOC/XLS).
4) **Start Page**:
   - **Auto**: Resumes from last-closed page (non-persistent).
   - **Fixed**: Always starts at specified page.
5) **Navigation Controls**:
   - **Manual**: Use page buttons in the Properties panel.
   - **Hotkeys**: Configure via **Settings** → **Key Mapping** (default: PageUp/PageDown, Alt+P).



- **Remote Clickers**: Map to keyboard shortcuts as needed.

Additional Notes:

- **PPT Audio Handling**: Embedded video audio routes directly to the system sound card. Volume control is unavailable within the software.

6.2.6.7 Capture Cards

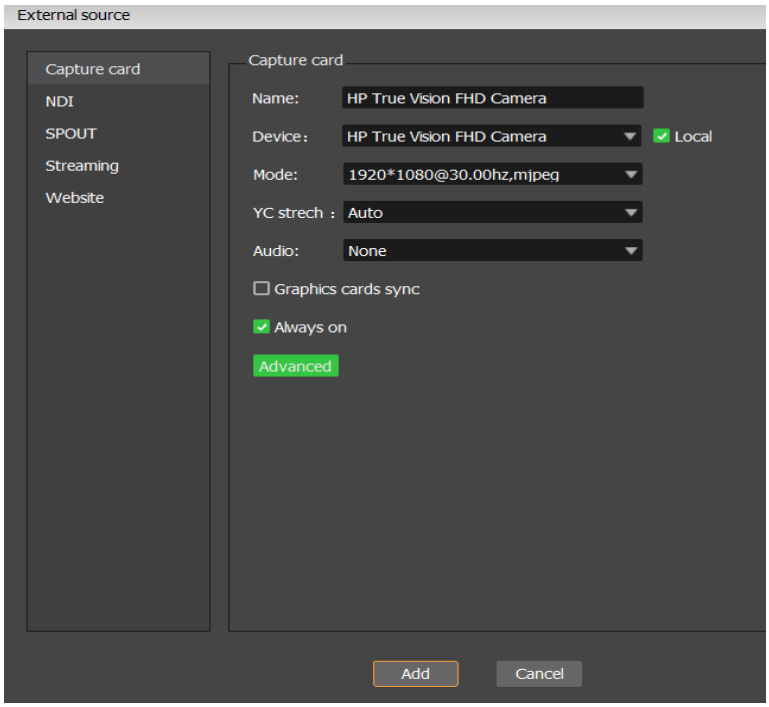
Capture Card Solutions & Recommendations

Solution	Key Manufacturers	Special Features
DirectShow Framework	Chinese brands: Tiancheng, Baoshi, Magewell International brands: Blackmagic Design	- Tiancheng & Baoshi support **signal status monitoring**.
Blackmagic SDK	Blackmagic Design	- Supports **signal status monitoring** and **output functionality** for I/O cards. - Cards are displayed with the **[BMD]** prefix in the software.

Recommended Manufacturers:

- **Tiancheng**, **Baoshi** (domestic), and **Blackmagic Design** (international) due to their compatibility and advanced feature support.

Parameter Description



1） **Device**:

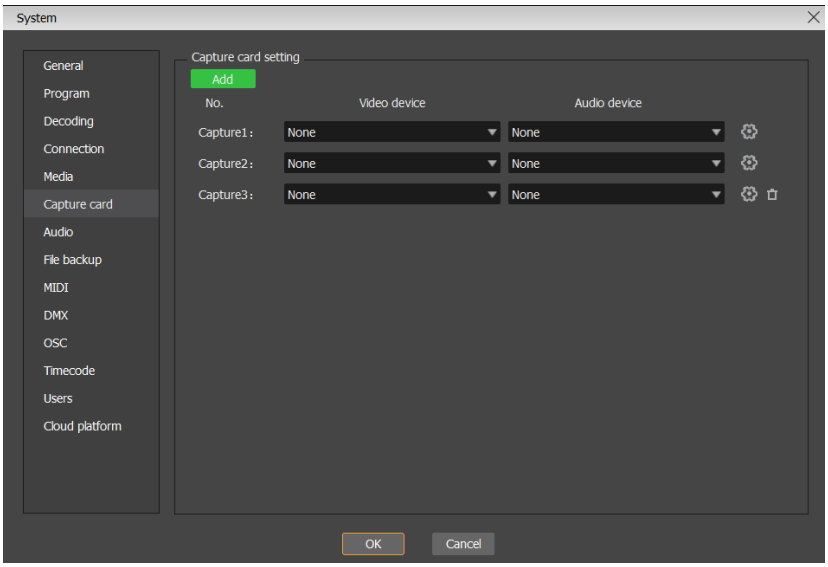
a. The dropdown lists all detected local capture cards. In a multi-unit setup, it is recommended to deselect the "Local" option and use a capture card proxy instead.

b. Items prefixed with **[BMD]** in the dropdown indicate that the capture card is detected via the BMD SDK and supports decoding. This may result in two entries for the same physical card, representing two different usage modes with varying performance characteristics.

c. For TianChuang, Baoshi, and BMD capture cards, the dropdown displays the current signal status. If a signal is present, the input mode is listed; otherwise, "no signal" is shown.

2） **Capture Card Proxy**:

During program editing, only the index of the proxy capture card is recorded. Specific configurations for proxy capture cards are managed under "System Settings > Capture Card" on each device (see figure below). Proxy parameters are identical to those on the current interface. This method is suitable for multi-unit setups, where the display unit verifies the actual capture card from the proxy file.



3）**Input Source**:
This option is visible for BMD capture cards and allows switching between input sources.

4）**Mode**:
For BMD capture cards, this displays supported resolutions@frame rates. For DirectShow-based cards, it shows "resolution@frame rate, color sampling format."

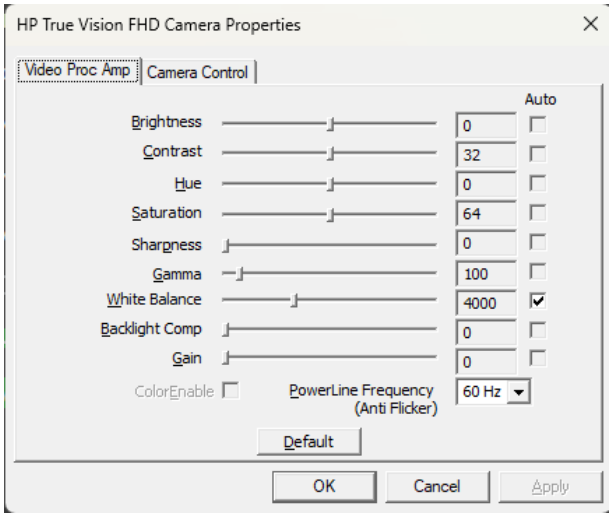
5）**Format**:
Visible for BMD capture cards, this lists supported bit depths and color sampling formats.

6）**Audio**:
Binds all detected audio capture devices and supports combining audio and video capture into a single object.

7）**Graphics cards sync**:
a. In multi-device setups, the same captured signal may need to output through multiple devices. Without synchronization, visual desynchronization is likely.
b. Enabling this mode applies special processing to ensure synchronized output across multiple units.
c. Currently, this feature is only effective for BMD Blackmagic capture cards and activates after predefined scenario switching. Requirements:

- Capture card materials must be linked to the predefined scenario.
- If desynchronization persists, manually re-switch the predefined scenario.

8）**Advanced Settings**:
Opens the capture card’s settings window for additional configurations (e.g., deinterlacing).
Note: BMD capture cards do not support this feature; configurations must be adjusted manually.



Additional Notes

- Current testing confirms support for 4×4K@60Hz capture.
- If the canvas displays abnormalities, use the "AMCAP" tool under the Tools menu to verify the capture card feed. If AMCAP shows anomalies, the capture card itself may be faulty. Otherwise, contact your sales representative for software-related troubleshooting.

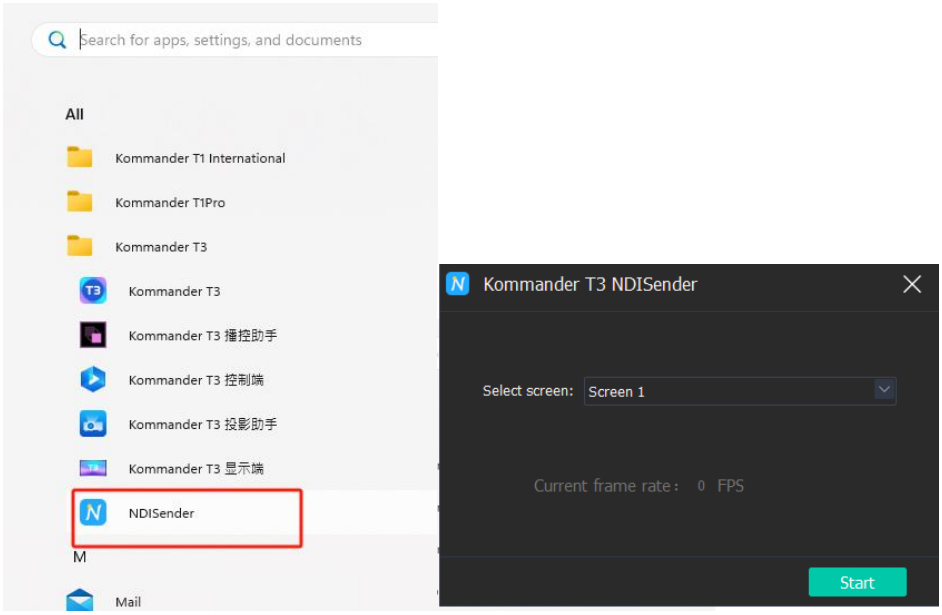
6.2.6.8. NDI Capture

NDI Capture enables the acquisition of screen content from remote terminals over a network as input sources. The current software integrates an NDI 6.0-compatible receiver, theoretically supporting 8K output.

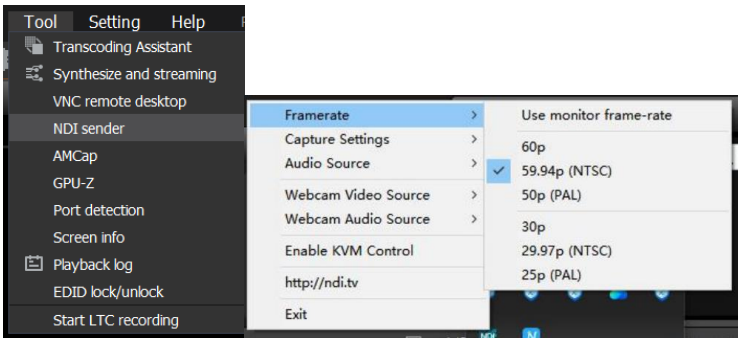
NDI Transmitter

To use NDI Capture, ensure the transmitting terminal has an NDI transmitter installed and running. The software includes both a proprietary NDI transmitter and the official NDI transmitter. Options include:

- **Proprietary NDI Transmitter**:
  - Launch from the software installation directory or the system Start menu.
  - Interface: Select a screen and click **Start Transmitting** to initiate NDI transmission.
  - Resolution matches the screen's native resolution; frame rate depends on the terminal's CPU performance.



- **Official NDI Transmitter**:



  - Access via **Tools > NDI Transmitter** in the menu. The transmitter icon will appear in the system tray.
  - Configure transmission parameters via its menu (see figure below).
  - Supports audio capture and transmission in addition to video.
  - **Note**: A single computer can run multiple NDI transmitters to stream different screens simultaneously.

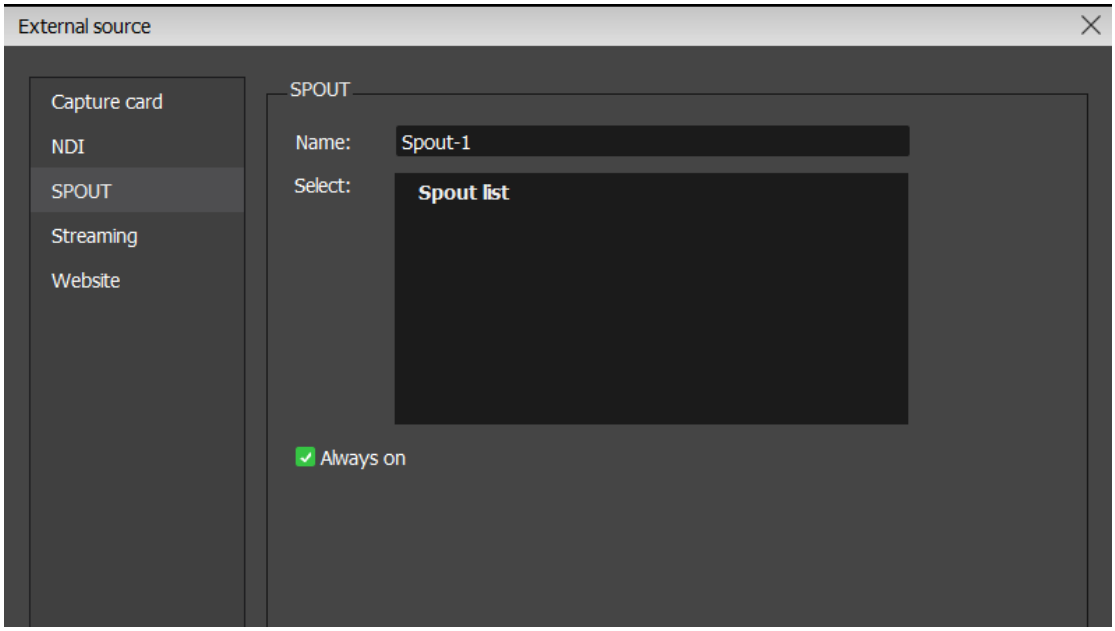
Troubleshooting:
If NDI malfunctions, first verify the transmitter's status by switching to an alternate NDI transmitter.

NDI Receiver

- To add an NDI source, select the desired transmitter from the list. If the target NDI source is unavailable, retry later.
- If the added source fails to open or remains undetected:
  - Confirm the transmitter is actively streaming.
  - Check for network connectivity issues.

6.2.6.9. Spout Input

Spout is a GPU memory-sharing technology for Windows systems. When third-party applications on the local machine support Spout output, the software can acquire their screen content via Spout input. Compared to conventional screen capture, Spout delivers optimal performance by directly sharing GPU memory. **Note**: For successful operation, both the third-party application and this software must run on the same GPU; otherwise, memory sharing will fail.



Cross-Machine Usage:
Spout requires NDI support for cross-device operation, which falls under the NDI framework. This section does not cover NDI-related configurations.

Implementation Requirements:

- Similar to NDI, Spout requires coordination between a transmitter and receiver. However, the transmitter is typically integrated into the third-party application being captured (e.g., for functional validation) rather than requiring a standalone transmitter installation.
- **Compatibility**: The Spout versions of the transmitter and receiver must match.
- **Identifier**: Spout input sources are identified by unique names. Ensure the third-party application and this software agree on the designated Spout source name.

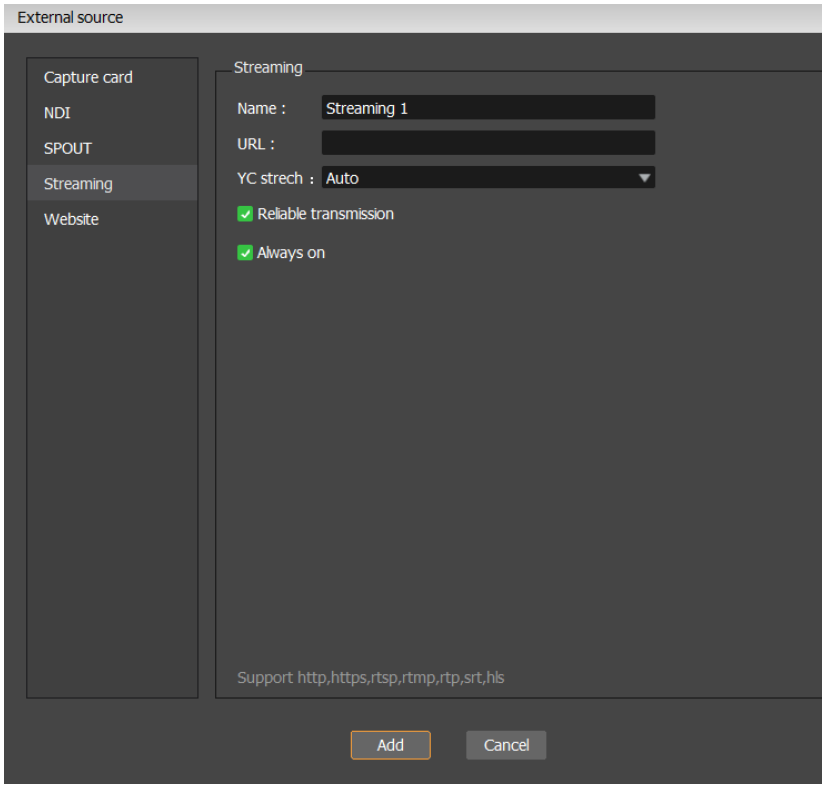
Additional Notes:

- **Unity Compatibility**: The widely used *KlakSpout* plugin in Unity only supports DirectX 11. If the rendering engine must be configured to DirectX 9, use

the **dedicated Spout implementation** provided by our software for Unity integration.

6.2.6.10. Straming Media

Network Media refers to streaming content delivered over a network, including both live streams and on-demand streams (e.g., videos from platforms like Youku). On-demand streams are functionally equivalent to local video files.



Supported Protocols

The software currently supports the following network streaming formats:

- HTTP/HTTPS
- RTSP/RTMP
- SRT
- HLS

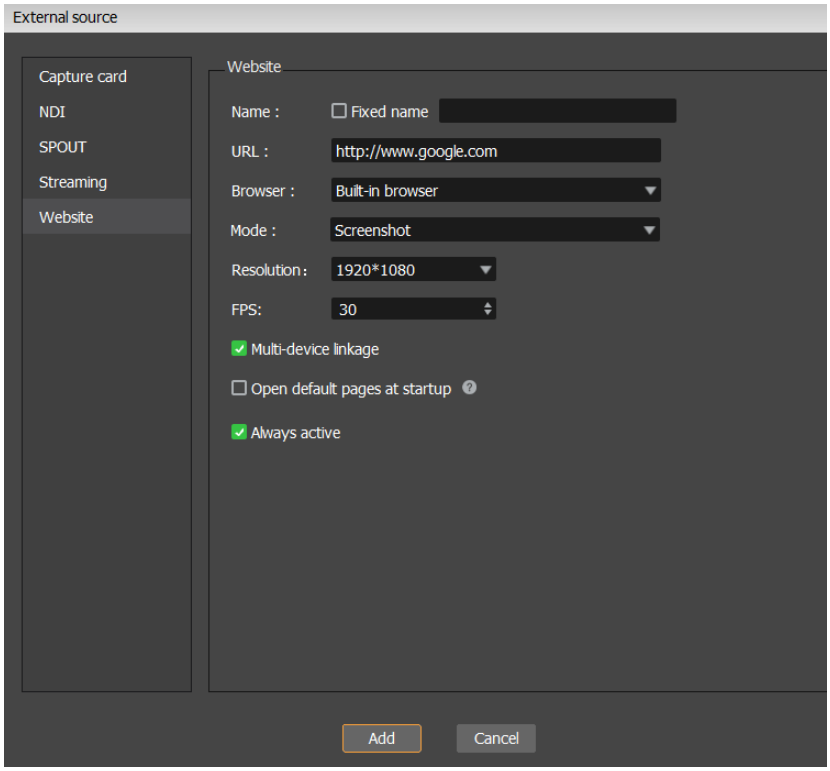
Configuration Parameters

- **URL Address**: Specifies the playback address of the media source, analogous to a local file path. Ensure the URL includes the full path **with the protocol header** (e.g., http://, rtsp://).
- **TCP Priority**: By default, the software automatically prioritizes UTP and TCP protocols. Select this option if the media source exclusively supports TCP.

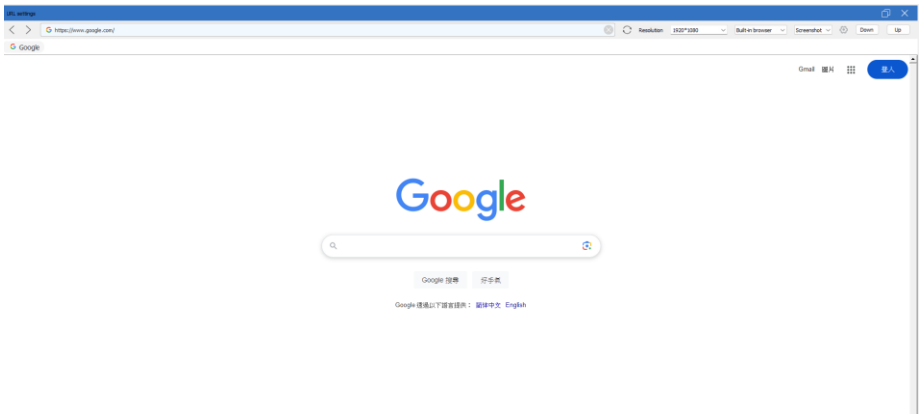
Additional Notes

- Other parameters follow standard configurations and are not detailed here.
- Testing confirms support for **8K network stream playback** under sufficient network bandwidth conditions.

6.2.6.11. Webpage



New Window



Edit Window

1) **Address**:
    - The URL of the webpage or the launch path of a local HTML file.
2) **Browser**:

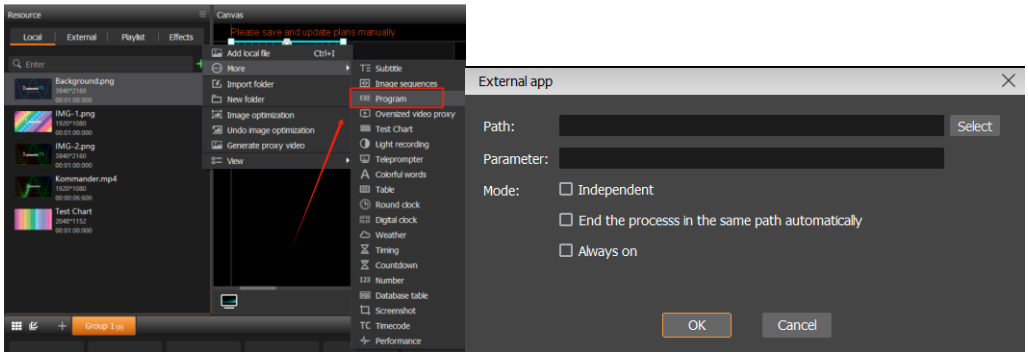
- Supported browser types:
  - Built-in browser
  - Chrome
  - Internet Explorer
  - Microsoft Edge

3) **Launch Method**:
   - **a. Screenshot Mode**:
     - Opens the webpage in a browser and captures its content via screen capture.
     - **Advantages**:
       - Supports overlay effects and canvas preview.
       - Enables multi-screen output.
       - Changes apply in real time during live browsing.
       - Maximum resolution: 16,384.
     - **Disadvantages**:
       - High performance overhead.
       - Recommended for resolutions below 8K.
       - Limited number of concurrent webpage instances.
   - **b. Window Mode**:
     - Opens the webpage in a browser and directly controls its position and visibility.
     - **Advantages**:
       - Low performance overhead.
       - Supports resolutions up to 31,620.
       - Allows more concurrent webpage instances.
       - Enables interactive operations (e.g., mouse clicks) on the output window.
     - **Disadvantages**:
       - Canvas displays only a placeholder image.
       - Window operations may disrupt output.
       - No post-processing effects.
       - Limited to single-screen output.
4) **Resolution**:
   - Defines the webpage dimensions. Supports any resolution below 31,620.
5) **Frame Rate**:
   - In Screenshot Mode, limits the capture frame rate to reduce overhead.
   - Configured in the Edit Window settings.
6) **Open on Startup**:
   - When unchecked: Restores the last viewed page before exiting.
   - When checked: Loads the specified startup page upon relaunch.
7) **Additional Recommendations**:

- **a.** Avoid webpage redirects that open new windows, as this retains the original page and doubles performance overhead.
- **b.** Contact technical support if automatic webpage login fails.
- **c.** Refreshing the Edit Window triggers multi-device synchronization, but browser-specific refresh actions apply only locally.
- **d.** When "Real-time URL Synchronization" is disabled, multi-device linkage updates occur only upon closing the Edit Window. If enabled, updates occur in real time when the URL changes.
- **e.** If the above methods are insufficient, use the "Program" material type to launch the browser directly.

6.2.6.12. Program

This feature provides robust support for programmatic control, enabling users to schedule and manage third-party applications similarly to video playlists. Applications can be launched, positioned at specified locations, and terminated automatically during scenario transitions, enhancing workflows such as Unity/Flash interaction switching, professional application integration, and supplementary implementations for webpages or Office tools.



Configuration Parameters

1) **Path**:
   - The executable launch path (*.exe*) of the third-party program.
2) **Parameters**:
   - Custom parameters can be configured to achieve specific launch behaviors. Parameters are application-dependent.
   - **Primary Use Case**: When invoking a browser to open a webpage, enter the URL in the parameter field. Separate multiple parameters with spaces (including multiple spaces).
3) **Launch Mode**:
   - Different launch modes address compatibility conflicts between program-defined startup settings and the software's requirements.
   - **a. Embedded Mode**:

        - The program is embedded into the software, establishing a direct link with playback control.
        - Window position and size are determined by the canvas placeholder's location (relative to the display output).
        - **Use Case**: Enforces fixed window placement. **Note**: May fail if the program resists external control.
    - **b. Independent Mode**:
        - The software launches the program without controlling its window. Position and size follow the program's default settings.
        - **Use Case**: Ideal for programs with predefined layouts. **Advantage**: Lowest failure rate. **Limitation**: Adjustments require modifying the "Program" asset.
    - **c. Independent Mode (Window Position Control)**:
        - The software launches the program and relocates its window to the canvas-defined position.
        - **Use Case**: Programs requiring position control but not size enforcement. **Note**: Position settings may be ignored based on the program's internal logic.
    - **d. Independent Mode (Window Position & Size Control)**:
        - Similar to Embedded Mode but with weaker software-program coupling.
        - **Use Case**: Reduces playback-related anomalies. **Note**: Position/size settings may still be overridden by the program.
4) **Terminate Same-Path Processes Automatically**:
    - **Recommended**: Enable to ensure process controllability.
5) **Persistent Launch**:
    - **Default**: Disabled. Enable for faster application startup.
    - **Requirement**: Verify sufficient system resources before enabling.

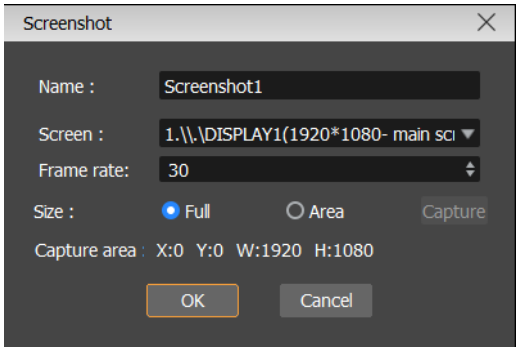
Additional Notes

- **Compatibility Limitations**:
    - Program behavior varies by design; not all applications are fully controllable.
    - Only the program's **main window** is supported. Applications with multiple windows (e.g., QQ chat windows, Tencent Meeting sessions) require custom parameter support from the developer.
    - Control failures may occur if the software cannot retrieve valid control handles.
- **Browser Workaround**:
    - If the built-in browser underperforms, use a locally installed browser (e.g., Chrome) via the "Program" feature:

        - **Path**: Browser executable (*.exe*).
        - **Parameters**: Target URL and browser-specific arguments.
    - **Multi-Window Output**: For simultaneous large-screen display of multiple webpages (including persistent launches), use separate **portable browser instances** to ensure individual window control.

6.2.6.13 Screen Capture

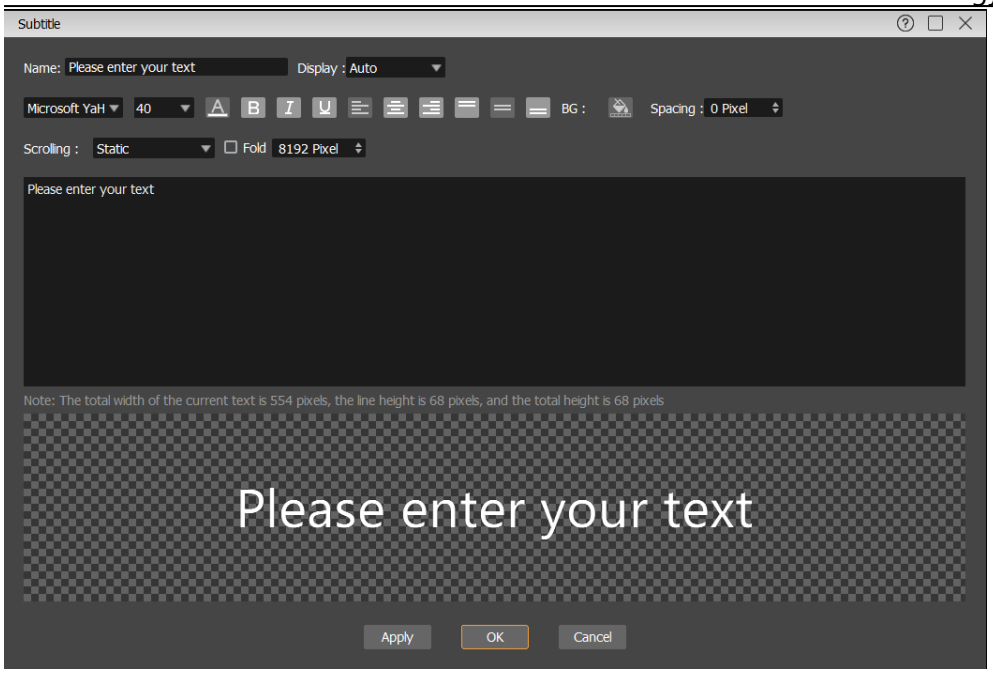
Captures a specified screen or partial region of a local computer to output content from other application windows. While it is recommended to directly add target applications to the broadcast software for output, this feature serves as a supplementary method.



- **Screen**: Lists all local physical displays.
- **Frame Rate**: Capture frequency. High performance overhead — use moderate rates.
- **Capture Area**:
    - **Full Screen**: Captures the entire display.
    - **Custom Area**: Select any rectangular region.

6.2.6.14 Subtitles

Subtitles are widely used for welcome messages, advertisements, and annotations. They support customizable fonts, sizes, colors, backgrounds, and animation effects (e.g., scrolling, page flips).



Attribute Specifications

1) **Display Mode**:
   - **Automatic**: Dynamically calculates width/height based on text content and font size.
   - **Fixed Display**: Manually defines width/height. Content is rendered within these bounds (clipping occurs if undersized). Ideal for known display areas.
2) **Font Size**:
   - Dropdown lists common sizes, but any numeric value can be entered.
3) **Color & Background**:
   - Supports RGB/HEX color selection with transparency (alpha channel).
4) **Scrolling Effects**:

Direction	**Features**
Left/Right/Up/Down	Configurable speed and **pixel overlap** for seamless looping.
Page Flip	Exclusive to Fixed Display mode. Auto-paginates text and flips pages at set intervals.

5) **Auto-Wrap**:
   - Enabled only in Fixed Display mode. Wraps text within the defined width.
6) **Circular Screen Mode**:
   - Designed for ultra-wide displays (e.g., stadium ribbon boards).
   - **Workflow**:
     a. Set Fixed Display dimensions to match the 环形幕.

b. Input text (duplicate content automatically tiles).
c. Pair with horizontal scrolling for seamless output.

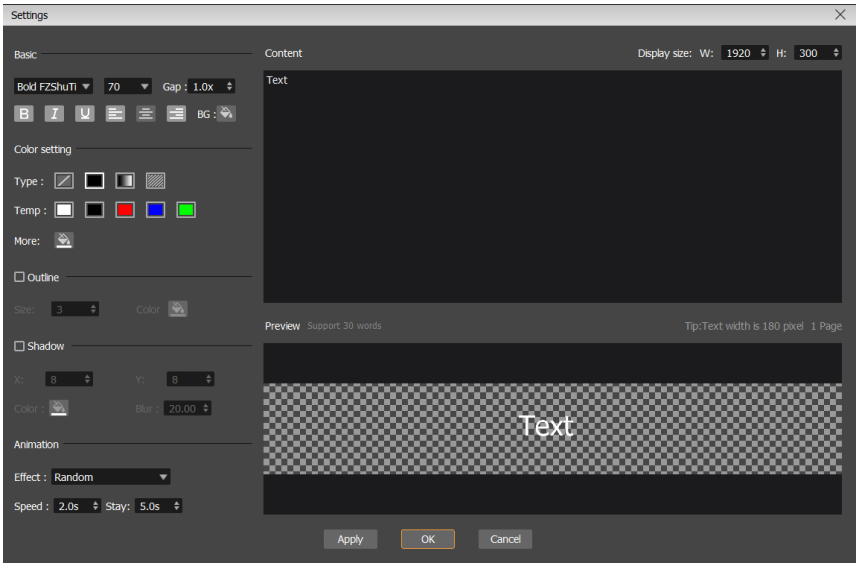
7) **Horizontal Folding**:
   - **Trigger**: Enable when screen width exceeds 16,384 pixels.
   - **Behavior**:
     - Disabled: Content scales non-pixel-perfectly.
     - Enabled: Wraps content vertically if total area ≤16,384×16,384, enabling pixel-perfect output for displays exceeding 50,000 pixels wide.

Technical Notes:

- **Integration Interfaces**: Supports real-time subtitle updates (append/prepend text) for queue systems.
- **Font Requirements**:
  - Install custom fonts locally.
  - Multi-unit systems require font installation on **all terminal machines**.

6.2.6.15. Chromatic Text (Colorful words)

Compared to standard subtitles, this type is more suitable for marquee screens and welcome panels. It supports displaying only one line of text at a time. When text exceeds the limit, it will automatically split into multiple lines and cycle line by line.



1) **Display Area**: Requires pre-defined dimensions for the display region due to line-based rendering.
2) **Font Style**: Similar to standard subtitles but adds character spacing customization.

3) **Fill**:
   a. Font color supports four modes: transparent, solid color, gradient, and pattern/texture.
   b. Gradient mode allows multi-color transitions and rotation angle adjustments.
   c. Pattern/Texture: Includes built-in textures and supports importing custom images.
4) **Outline**: Adds outlines to fonts, often used for hollow-out text effects.
5) **Shadow**: Enhances text with 3D depth using shadow effects.
6) **Animation**: Chromatic text features entry and line-switching animations (20+ effects, e.g., Cut, Fly In, Expand, Wipe). Supports customizable duration per line.

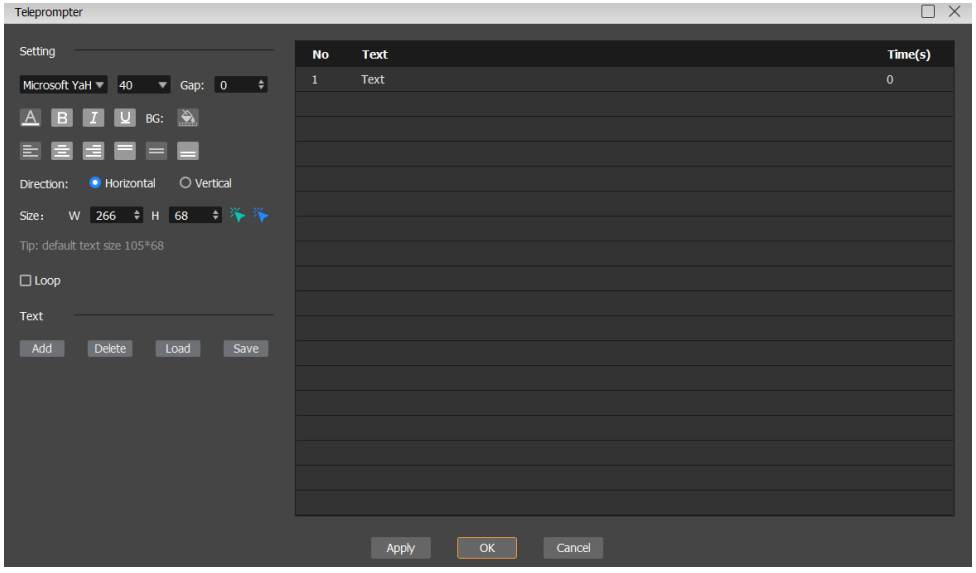
6.2.6.16. Prompt Board Tool

Defines a set of prompt messages triggered by received timecodes to indicate current or upcoming event phases, ideal for multi-group collaboration scenarios.

1) **Display Area**: Sets resolution for content rendering.
2) **Countdown Display**: Shows a countdown for the current program segment.
3) **Row Display**: Divides list data evenly by specified rows or auto-adjusts row height based on content.
4) **Content Management**: Edits row names, prompt messages (commands), and trigger timecodes.

6.2.6.17. Teleprompter

A text-based material displayed line-by-line, supporting manual or automatic switching (with per-line duration settings). Primarily used for reverse-display cues in live performances.



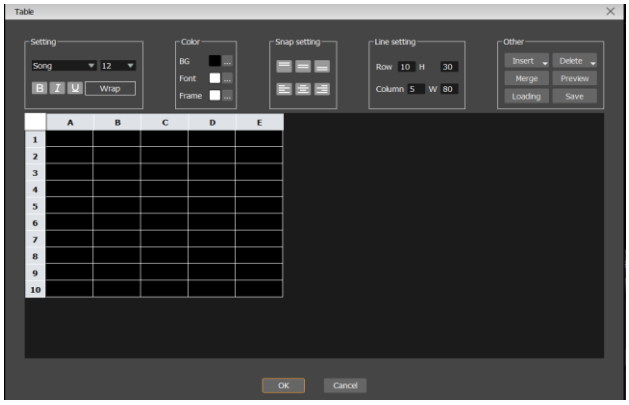
1) **Font Style**: Consistent with other tools.

2) **Orientation**: Horizontal or vertical display.
3) **Resolution**: Configured based on display area size. Can auto-generate using maximum content width/height or match the canvas window size.
4) **Loop Pagination**: When enabled, loops to the first line after the last line's duration ends. If disabled or last line duration is 0, stays on the final line.
5) **Import**: Supports .txt file imports.
6) **Per-Line Duration**: A value of 0 prevents auto-advancement.
Canvas Controls:

- Manual line switching when the teleprompter is selected on the canvas.
Note: The teleprompter provides APIs for updating subtitle content and enabling loop pagination, suitable for integration with queue management systems.

6.2.6.18. Table

A simplified table tool supporting cell-level styling and content customization as an alternative to Excel editing. No animation effects are supported, with single-page display only, suitable for scenarios involving small datasets.



1) **Font Settings**: Consistent with other widgets.
2) **Color Settings**: Per-cell customization for background, font, and borders. Background supports transparency, enabling layered design effects when combined with base images.
3) **Alignment**: Configurable per cell.
4) **Row/Column Setup**: Define table dimensions (rows/columns) and resolution (maximum area: 16384*16384).
5) **Insert**: Add rows or columns.
6) **Merge**: Merge selected cells.
7) **Delete**: Remove selected rows or columns.
8) **Import**: Load data from Excel files.
9) **Export**: Save data in KMDTF format (reimportable).

6.2.6.19 Database Query Integration

This feature enables direct data retrieval from databases for tabular display, supporting scheduled refreshes to maintain real-time data.

Current Support:

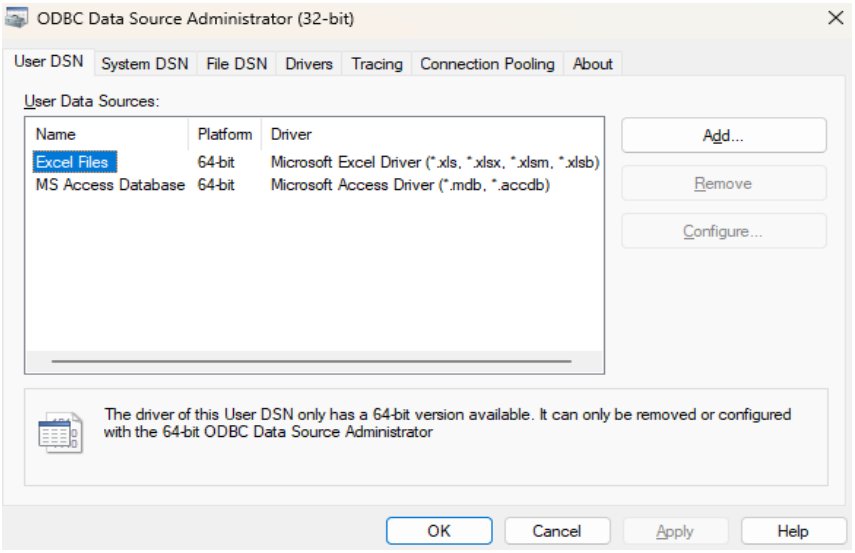
- ODBC connections on Windows systems only.
- Compatible with MySQL and SQL Server databases.

Prerequisites:

- Confirm database type, server IP, database name, username, password, and query statement.
- Database access security is outside our scope of responsibility. Verify connectivity and permissions beforehand.

ODBC Connection Guide

Skip this step if the system already has an ODBC driver for the target database. Otherwise:



1) Search "ODBC" in the Start menu to open **ODBC Data Source Administrator**.
2) Under *User Data Sources*, check for SQL Server or MySQL drivers. Install missing drivers externally.
3) For existing data sources:
    - Select the data source and click *Add*.
    - Configure settings in the pop-up window:
        - **MySQL**: Specify server, port, credentials.
        - **SQL Server**: Define server instance and authentication.

Database Query – Parameter Settings

1) **Style**: Inherits basic table styling configurations.

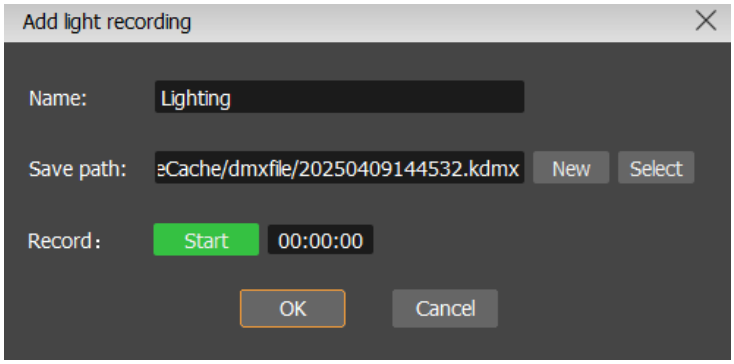
2) **Header Row**:
   a. Apply distinct styling to highlight headers (disabled by default).
   b. If enabled, input column titles in the first row of the right-side list.
3) **Auto Pagination**: Enable for multi-page display when data exceeds one page.
4) **Interval**: Sets both page-switching delay and database refresh interval.
5) **Rows/Columns**: Total count (includes header row in row count).
6) **Row/Column Dimensions**: Adjust via drag-and-drop or input fields in the right-side list. Customizable per real-time data.
7) **Test Connection**: Validates database connectivity and auto-populates sample data to assist style adjustments.

Notes:

- A size preview for the generated table is displayed at the bottom-right corner. Adjust row/column dimensions and fonts for optimal display.
- Resolve database connection/query errors using the provided error messages.

6.2.6.20. Light Recording

This feature captures DMX lighting data via ArtNet, saves it as a file, and replays the recorded data through ArtNet during playback to synchronize on-site lighting. Ideal for scenarios where physical lighting consoles need to be removed post-debugging.



Domain: Specifies the ArtNet universe for the recorded lighting data.
Save Path: Default storage location for recordings. A folder is automatically created upon entry. Use the **New** button to modify the path.

Recording Workflow:

1） Ensure ArtNet is configured and the lighting console is operational.
2） Click **Start Recording** to begin capturing DMX data from the specified domain.
3） Click **Stop Recording** after the target lighting sequence completes. Data is saved to the designated file.

Playback Workflow:

1） Disconnect on-site lighting from the console and route outputs to the software.
2） Drag the recorded file onto the canvas. The on-site lighting will replicate the effects as if connected to the console.

System Configuration (Pre-Playback):
Navigate to *System Settings* > *DMX*:

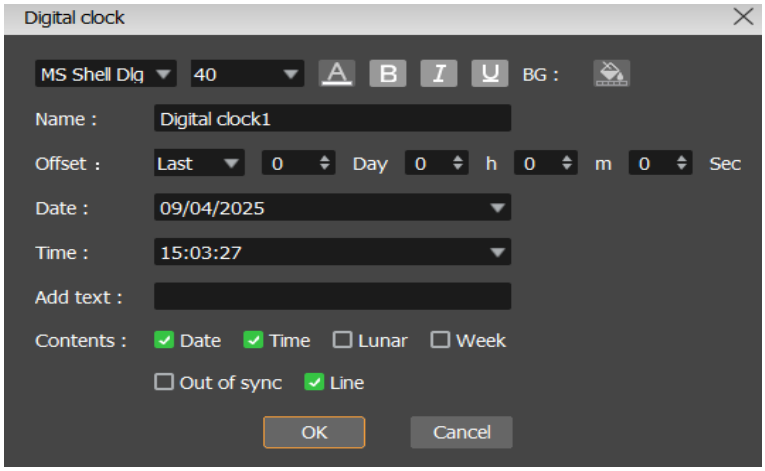
1） **Console IP**: Configure the IP address of the lighting console. Only DMX data from this source will be recorded.
2） **DMX Output IP**: Define target device IPs for playback. Leave blank to broadcast to all devices.

Notes:

- Ensure network stability during recording and playback.
- Verify DMX channel mappings match the console configuration.

6.2.6.21. Digital Clock

Displays the local system clock or the master clock in multi-device setups, providing time synchronization for front desks, stations, etc. Supports multiple time formats and integrates with background images for diverse visual styles.



1） **Font Style**: Customize font type, size, color, and background.
2） **Time Offset**: Adjusts the base clock (local system or master clock) forward/backward by days, hours, minutes, or seconds to accommodate time zones or special scenarios.
3） **Date Format**: Supports common date display styles.
4） **Time Format**: Offers standard time display options.
5） **Fixed Prefix**: Adds static text (e.g., "Beijing") to indicate the time zone. *Note: Use subtitle tools for prefixes requiring distinct font styles.*

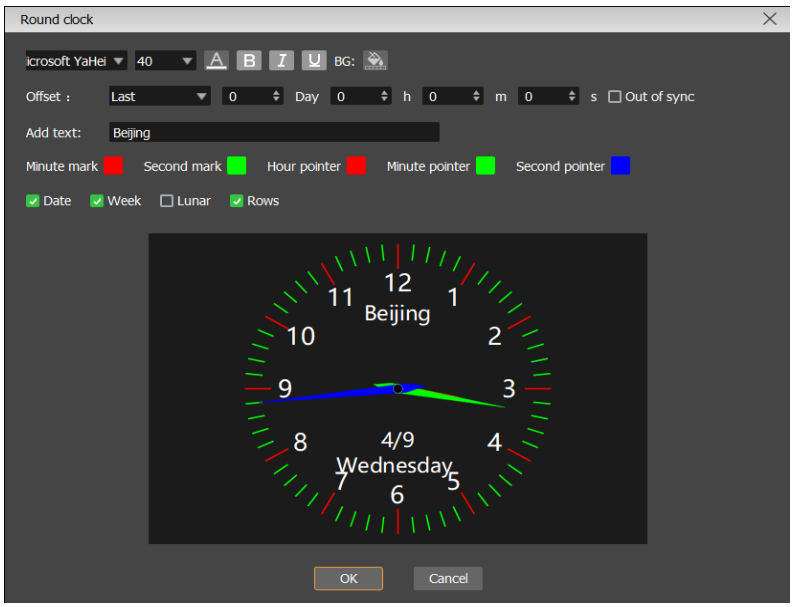
6） **Display Mode**: Toggles visibility of date, time, lunar date, and weekday. All four elements can be enabled or hidden.

7） **Local System Clock**: Defaults to the master clock in multi-device setups. Enable this option to strictly follow the local system clock (or reflect real-time clock changes).

8） **Single-Line Display**: Shows all four elements in a single line or separates them into multiple rows.

6.2.6.22. Analog Clock（Round Clock）

Displays the local system clock or master clock via a dial interface, suitable for front desks, stations, etc. Shares core functionalities with the digital clock but uses a classic clock-face design.



1） **Shared Settings**: Font style, time offset, fixed prefix, date/weekday/lunar display, single/multi-line mode, and local clock options align with the digital clock.

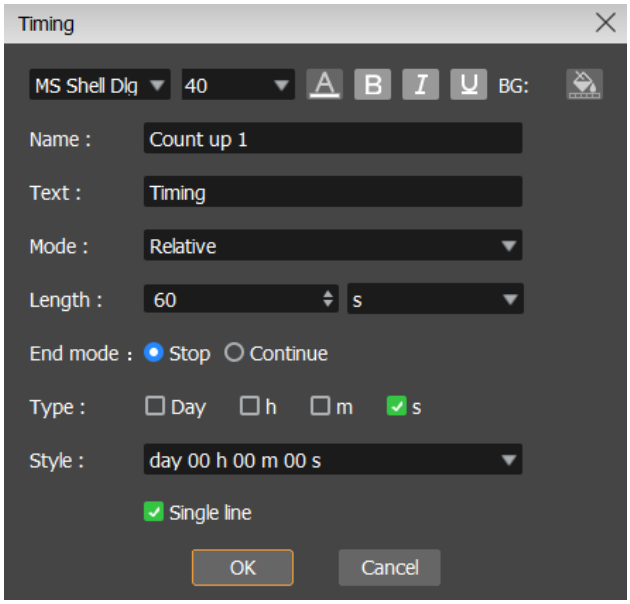
2） **Dial Element Colors**: Customize colors for hour markers, minute markers, hour hand, minute hand, and second hand.

3） **Recommendation**: Pair with background images for enhanced aesthetics.

Note: Ensure compatibility between clock styles and background layouts for optimal visual coherence.

6.2.6.23. Count-Up Timer / Countdown Timer

The count-up and countdown timers share similar functionalities but differ in timing direction, primarily used for competitive events or activity countdowns. These timers operate on a single-instance core, meaning all displays synchronize identically. For multiple independent timers, create separate instances.



1）**Shared Settings**: Font style, fixed prefix, and single-line display align with tools like the digital clock.

2）**Timing Modes**:

a. **Relative Time**: Starts timing from zero (count-up) or counts down from a predefined duration. Triggered when the canvas initiates playback.
b. **Absolute Time**: References a specific date/time, displaying the elapsed time (count-up) or remaining time (countdown) relative to this fixed point.

3）**End Behavior**: Defines actions when reaching the target value or time:

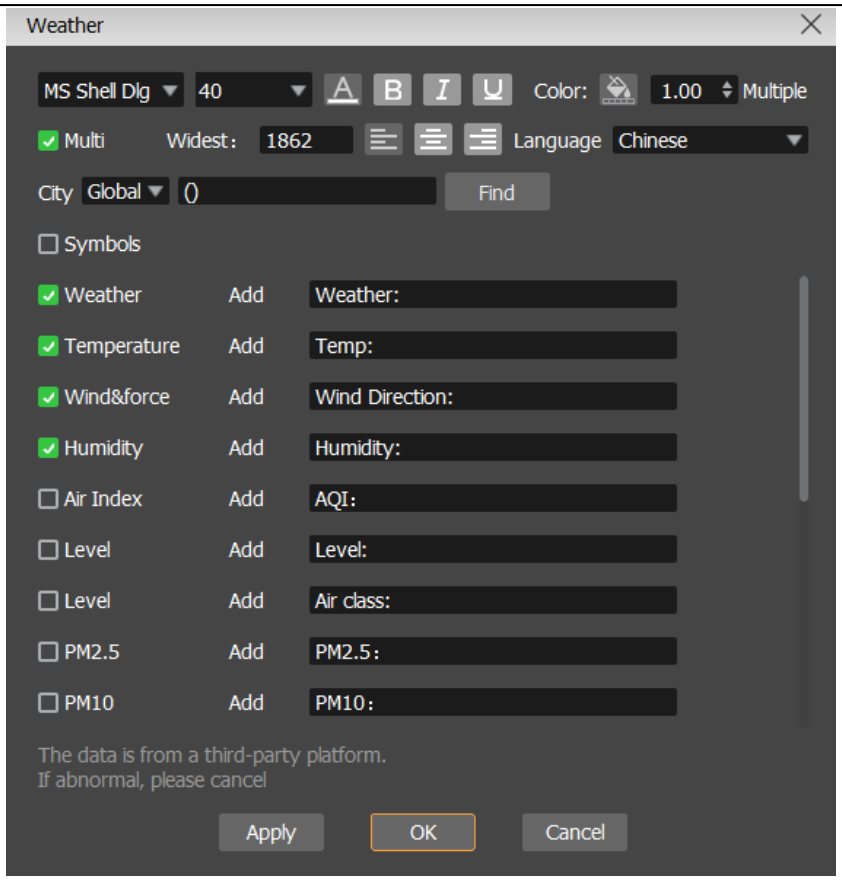
a. **Stop**: Timer halts. Countdown displays "0"; count-up shows the maximum value or target time.
b. **Continue**: Timer persists. Countdown shows negative values; count-up exceeds the limit/target, highlighted in red.

4）**Display Units**: Customize time units (days, hours, minutes, seconds) via checkboxes.

5）**Display Style**: Supports common time formatting.

6.2.6.24. Weather Display

Designed for lobbies, tourist sites, etc., this tool shows domestic and international city weather, supports multiple languages, and displays weather conditions, air quality, and activity indices.



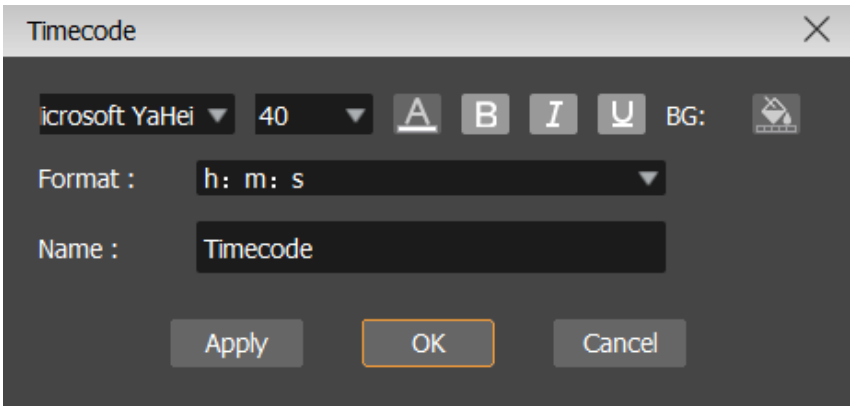
1) **Font Style**: Consistent with other tools, with added line spacing controls.
2) **Multi-Line Display**: Auto-wraps content when exceeding the maximum defined width.
3) **Language**: Display language depends on third-party weather platform support.
4) **City Selection**:
    - Domestic cities: Hierarchical selection (province-city-county).
    - International cities: Search-based input (including domestic).
5) **Weather Icons**: 195 built-in icons automatically match current conditions.
6) **Supported Data**:
    - **Weather**: Conditions, temperature, wind direction/speed, humidity.
    - **Air Quality**: AQI, air quality level, PM2.5, PM10, SO_2, NO_2, CO, O_3.
    - **Indices**: Exercise, car wash, clothing, fishing, UV protection.

Notes:

- Real-time weather data requires an internet connection.
- Third-party platforms may not guarantee stable availability of non-core parameters.
- Data refreshes approximately every 3 hours.

6.2.6.25. Timecode Receiver Display

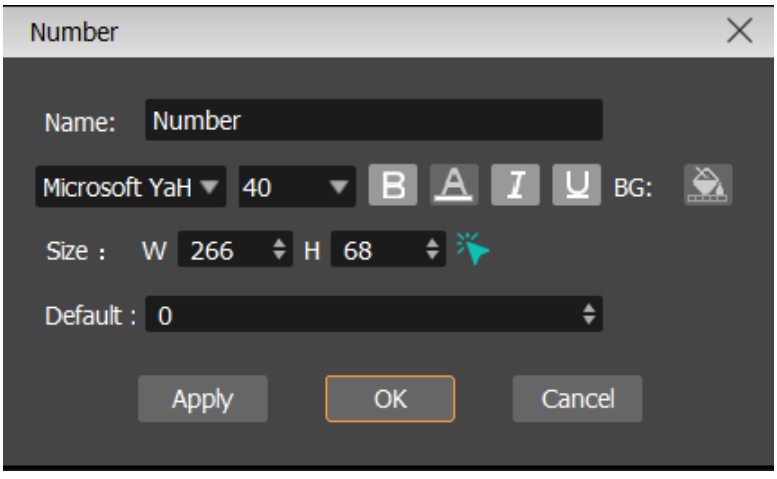
Used to display received timecode data on a monitoring screen. Supports three formats: *HH:MM:SS*, *HH:MM:SS.mmm*, and *Seconds-Frames*.



6.2.6.26. Numeric Tool

A specialized text tool exclusively for numeric input, ideal for scoring in competitions.

- **Resolution**: Defines the display area size. Insufficient resolution may truncate content.
- **Initial Value**: Accepts any numeric input.
- **Quick Operations**:
  - The canvas properties panel supports quick increment/decrement operations, undo, and reset.



6.2.6.27. Performance Monitor

Displays real-time CPU and memory usage of the device on the output screen for load monitoring.

- **Current Parameters**: Limited to CPU and memory metrics. No advanced parameters are available.

6.2.6.28. Test Pattern Generator

Generates screen-calibration test images matching the resolution of on-site displays for rapid setup.

- **Pattern Resolution**:
  - For standard modular rectangular screens: Enter the **unit board resolution**.
  - For irregular screens: Enter the **total resolution** (final image size matches this value).
  - *Note: Total resolution is recommended not to exceed 8K.*
- **Export**: Generated patterns can be exported as PNG images via the right-click context menu.

Key Notes:

- Ensure resolution accuracy to avoid display anomalies.
- For non-standard screens, verify total resolution compatibility with hardware limits.

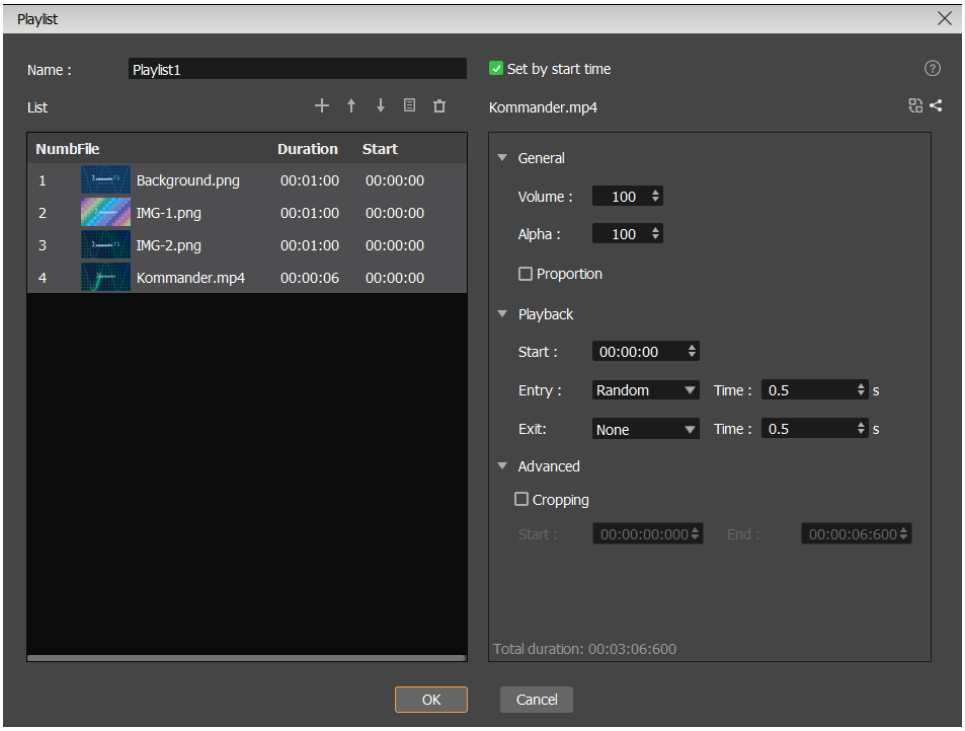
6.2.6.29. Media Group

A feature that allows combining media library files into a unified playlist for program scheduling. Files in the group loop according to specified rules during playback.

- **Supported Projects**: Available in *scenario projects* only (not supported in timeline projects).

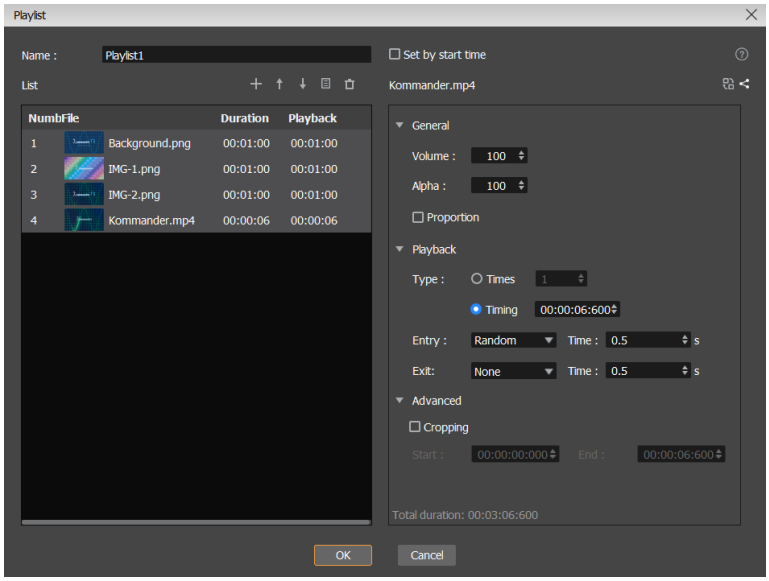
Playback Modes

1）Start Time Scheduling



- Enable by checking "Set by Start Time."
- Each file must define a playback start time (e.g., 2:30).
- Before the scheduled time, the previous file loops continuously.
- The start time for the first file is ignored (treated as "00:00").
- *Use case*: Ideal for individual window-specific timing.

2）Duration-Based Playback



- Default mode when "Set by Start Time" is unchecked.
- Define playback duration for each file.
- Starts with the first file, advances to the next after the duration expires, and loops back to the first after the last file.

Supported Media Types & Guidelines

- **Supported Types**: Most media types except *count-up/countdown timers*, *timecode*, and *prompt boards*.
- **Multi-GPU Version Restriction**: Only supports *video*, *audio*, and *images*.

Usage Recommendations:

1） Avoid arbitrary combinations of *subtitles*, *capture cards*, *NDI*, or widgets, as their unique properties may cause conflicts. Test thoroughly if required.
2） **Office Files**: Only support auto-pagination (configured in file properties). Manual pagination is disabled.
3） **Window Objects** (e.g., programs, web/Office windows): Cannot be dragged to the canvas multiple times for multi-screen output. Only one instance is allowed.
4） Avoid placing *animated subtitles* both inside a media group and individually on the canvas, as duplicate instances may cause confusion.

Note: Non-video/image groups may require special handling during plan switching. Verify effects before deployment.

File Property Settings

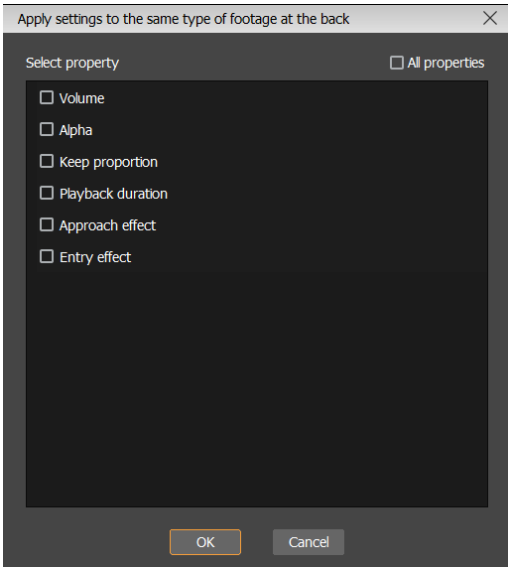
- **Volume**: Applies to *video/audio* only. Default: 100. Combines with window/global volume settings.
- **Transparency**: Supported for all except *audio*, *lighting files*, and *programs*. *Web/Office* transparency is ignored in windowed mode.
- **Maintain Aspect Ratio**: Scales files proportionally to their native resolution.
- **Playback Duration**: Core property defining how long a file plays.
  - *Video/audio*: Configurable by loops or duration (milliseconds).
  - *Other files*: Duration-based only.
- **Entrance/Exit Effects**: 10+ effects available (default: random). Entrance and exit occur sequentially (not simultaneously). Exit effects are currently not recommended.
- **Time Trimming**: Allows cropping specific segments for *video/audio*.

Additional Operations

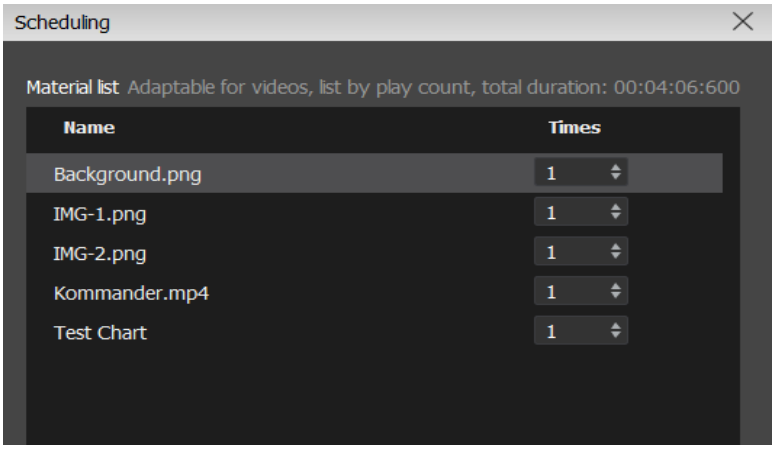
- **Playlist Sorting**: Manual drag-and-drop reordering. 

- **File Replacement**: Replace File A with File B while retaining properties. 

  Requires compatibility (e.g., B must be a valid replacement for A).
- **Apply to All**: Copies selected properties of the current file to all subsequent files of the same type. Separate actions required for different types. 



- **Auto-Scheduling**: Exclusive to *video-only* groups. 
  - Add files to the playlist, set loop counts, and click "Auto-Schedule."
  - The system prioritizes files with higher loop counts and redistributes them evenly.
  - *Note*: Changing loop counts may completely alter the playlist sequence.



Key Reminders:

- Validate resolution and compatibility for non-standard screen setups.

- Test combinations involving dynamic elements (e.g., widgets, NDI) in advance.

6.2.7. Special Effects

Note: Special effects will be detailed in their respective dedicated sections.

Category	Effects
Dynamic Effects	Flash Screen, Auto Shake, Auto Zoom, Loop Scroll
Color Effects	Feathering, RGB Color Adjustment, Invert, Emboss, Night Vision, Color Temperature, Advanced RGB Calibration, Chroma Key, Sharpening, Noise Reduction
Distortion Effects	Mirror, Kaleidoscope, Fisheye, Magnify, Mosaic, Swirl, Offset, Blur, Radial Blur - Zoom, Radial Blur - Rotation
Overlay Effects	Border, Mask Layer
Functional Effects	UV Unwrapping, VR Cropping, Dome Projection, 3D Transformation

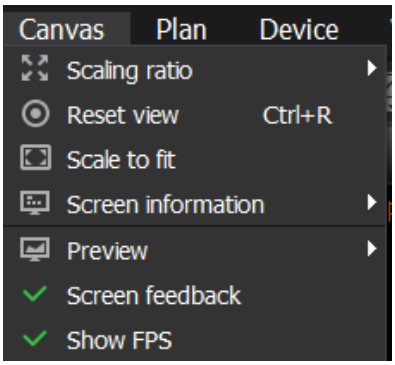
Key Notes:

- Effects vary in compatibility depending on content type (e.g., video, image, text).
- Advanced effects like *Chroma Key* and *Dome Projection* require specific hardware or scene configurations.

6.3. Canvas Functionality

The canvas serves as the program editing area for arranging windows relative to screen layouts and managing global playback controls.

6.3.1. Canvas Menu



1) **Zoom Level**: Adjusts the canvas zoom ratio, ranging from 1:1 (maximum) to 1:32 (minimum). Supports quick switching via **Ctrl + [number 1-6]**.
2) **Reset to Origin**: Quickly returns the canvas to its original position after extensive panning.

3) **Fit to View**: Automatically scales the canvas to a proportion suitable for global preview.
4) **Screen Labels**: Displays screen-related information in three modes:
    - *None*: No labels.
    - *Screen Name*: Shows screen identifiers.
    - *Screen Name + Output Device IP*: Includes IP addresses of connected output devices.
5) **Preview Modes**:
    - **Real-time Preview**: Displays all content (including remote device outputs) at native resolution.
        - *Pros*: Accurate representation.
        - *Cons*: High performance overhead.
    - **Proxy Video**: Shows low-resolution proxy videos for non-local outputs. Local outputs retain native quality.
        - *Pros*: Balanced performance.
        - *Cons*: Requires pre-generated proxies.
    - **Thumbnail Mode**: Displays thumbnails for non-local outputs. Local outputs remain unchanged.
        - *Pros*: Minimal overhead.
        - *Cons*: No real-time preview.
6) **Display Echo**: Toggle on/off canvas rendering to reduce performance load (useful for optimizing resource usage during bottlenecks).
7) **Frame Rate Overlay**: When enabled, shows real-time decoding frame rates on objects to detect frame drops.

6.3.2. Basic Canvas Operations

1) **Canvas Navigation**:
    - Activate the **Move Tool**  in the widget panel.
    - **Middle Mouse Button Drag**: Pan the canvas.
    - **Reset to Origin**: Instantly aligns the canvas top-left corner to the origin.
    - **Scroll Controls**:
        - *Shift + Mouse Wheel*: Horizontal panning.
        - *Mouse Wheel*: Vertical scrolling.
        - *Scrollbar Drag*: Manual panning.
2) **Fill Screen**: Use the **Fill Screen Tool**  to expand a window to cover its current screen. For multi-screen setups, fills the smallest bounding rectangle across screens.
3) **Canvas Scaling**:
    - Adjust via the Canvas Menu or widget panel tools (**Zoom Level**, **Fit to View**).

- **Ctrl + Mouse Wheel**: Dynamic zoom adjustment.

Notes:

- Ensure hardware acceleration is enabled for optimal real-time preview performance.
- Proxy generation is recommended for complex multi-device projects.

6.3.3. Canvas Modes & Global Controls for Plan Projects

The software provides **Real-time Mode (PVW)** (actual output) and **Preview/Edit Mode (PGM)** (non-disruptive editing and previewing).

1) **Switch to Previous/Next plan** 
   - Navigates between plans in the output/preview queue. Playback state aligns with global settings after switching.
2) **Playback Controls (Play/Pause/Stop/Volume/Mute)**
   
   - **Colored Icons**: Indicate global canvas playback state (not individual file states).
   - **Impact**: Controls playback for all files.
     - Timers (count-up/countdown) pause/resume with playback.
     - Streaming objects (subtitles, capture cards) remain unaffected.
   - **Volume**: Global audio control applies to Real-time Mode only.
3) **Call Main KV Plan**:
   - **Association**: Link plans via right-click menu or drag-and-drop onto the Main KV button.
   - **Indicator**: Active Main KV plans in Real-time Mode lack a corner marker. Previous plans retain markers to track pre-show positioning.
4) **Blackout Toggle** 
   - Instantly blacks out the Real-time output (for emergencies or transitions). Does not affect Preview Mode.
   - **Fade Effects**: Duration set in system settings.
   - **Editing During Blackout**: Enabled via "Allow Editing During Blackout" in system settings. Output remains black, but the canvas stays editable.
   - **Auto-Exit**: Blackout ends automatically when switching plans or outputting from Preview Mode.
5) **Global Playback Speed**:
   - Adjustable from **0.1x to 4.0x** for slow-motion or accelerated playback.
   - **Default**: Labeled as "1.0x" for normal speed.

6.3.4. Preview/Edit Mode (PVW)

Used for temporary edits and previews during live events. **Avoid heavy usage during peak performance to prevent output lag.**

- **Default State**: Paused to minimize resource consumption.
- **Limitations**:
  - **PPT**: Animations disabled; static images used for preview.
  - **Audio**: Muted to avoid interference with Real-time output.

1) **Preview Output**:
   - **Playback**:
     - Start with **Ctrl+Enter** (auto-pause optional) or click to play.
     - Syncs playback progress with Real-time canvas for seamless transitions.
   - **Overwrite Warning**: Unlinked preview content may overwrite Real-time plans. Save previews as new plans or update existing ones to prevent this.
2) **Copy Real-time to Preview**:
   - Available in the output monitor window. Enables editing based on current output progress for minimal viewer disruption.
3) **Close Preview Content**:
   - Right-click and select **Close Program** to terminate preview sessions and free resources. Does not affect saved plans.

Key Notes:

- Use proxy files or lower resolutions in Preview Mode for smoother editing.
- Validate synchronization rules before critical operations.

6.3.5. File Status Indicators on Canvas

Common File Status Descriptions

1)  Indicates the file is the **primary file**.
2)  The file is **not muted**.
3) Playback mode:
   -  Looping playback.
   -  Stops playback when finished.

-  Freezes on the last frame.
-  Switches to the next plan after playback.
-  Switches to a specified plan after playback.

4) **Playback Progress**: Always visible for the primary file; visible for non-primary files when selected.
5)  When **"Show Frame Rate"** is enabled, the bottom-left corner displays the **decoding/output frame rate**, indicating playback performance (turns red if too low).

Other Status Indicators

-  A **program-type file** running in windowed mode (canvas shows a placeholder).
-  An **Office file** running in windowed mode (canvas shows a placeholder).
-  A **webpage file** running in windowed mode (canvas shows a placeholder).
-  Placeholder for an **audio file**.
-  Placeholder for a **lighting control file**.
-  **File failed to load**: Try reloading via right-click menu, then check file parameters and device settings.
-  **File not found**: Verify if the file is on a removable drive or if there's a connection issue.
-  **No KPF playback license**: The software lacks authorization to play this DRM-protected file.
-  **Incompatible file**: The file was not transcoded using the correct software tools (series name mismatch).

-  **Password error**: The file is either unregistered or the entered password is incorrect.
-  **Expired playback**: The file has a time-limited license and is no longer playable.
-  **Device restriction**: The file is locked to specific devices, and the current one is unauthorized.

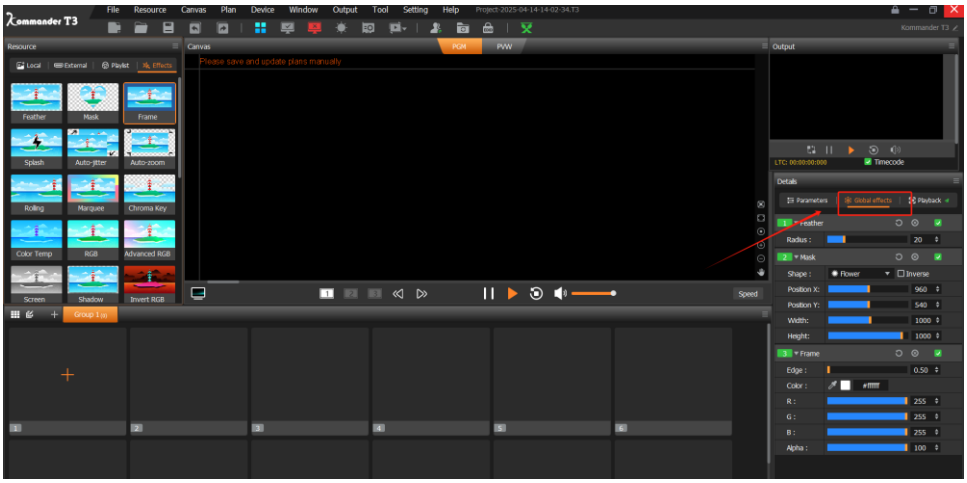
Note: Placeholder graphics simplify resource management but do not reflect real-time content. For troubleshooting, check logs or file properties.

6.3.6. Additional Canvas Logic

When in **preview/edit mode**, if there are live-streamed assets (including NDI, capture cards, or Office documents) that share the same source as the current output, the preview will display either the output content or the first frame normally. Upon switching to **real-time output mode**, the actual output content will automatically take effect.

6.3.7. Global Effects Editing & Control

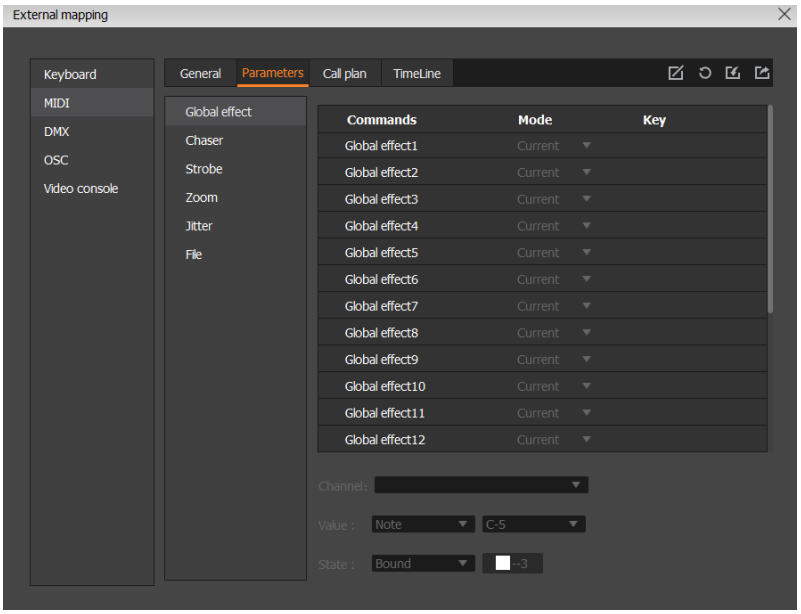
Global Effects



1) **Apply Effects**: Switch to the effects list, then drag and drop the desired effect onto the **Global Effects** section in the properties panel to apply it to all file windows.
2) **Reset/Delete/Enable/Disable**: These operations function the same as for file-specific effects.
3) **Multiple Instances**: The same effect can be added multiple times with

different parameters, similar to templates.

4) **MIDI Quick Control**: Supports enabling/disabling up to **20 effects** via MIDI shortcuts. Configure key mappings in **Settings > Mapping Management**.



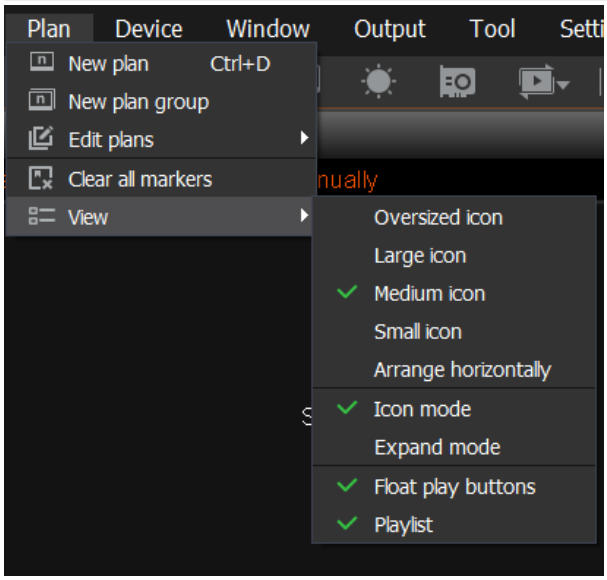
Quick Controls for Global Effects

- **Flash Screen, Auto-Zoom, and Auto-Shake** effects provide **four mappable global toggles and frequency adjustments**. Once enabled, all files linked to these effects will display them.

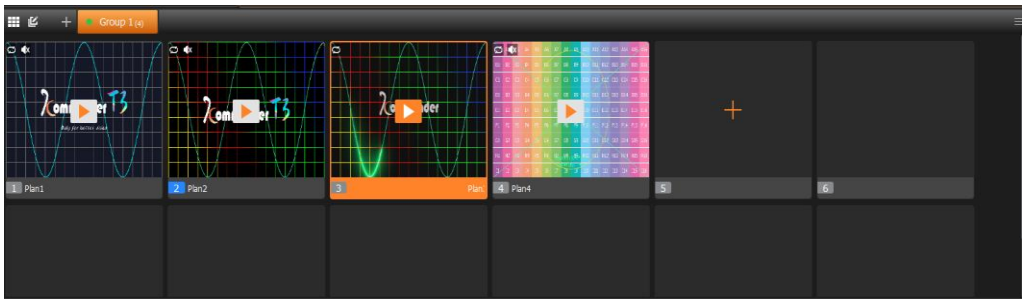
6.4. Plan Window & Plan Group Overview

6.4.1. Plan Menu & Window

Plan Viewing Modes



1) **Icon Mode**: Supports five display styles:
   - Extra Large Icons
   - Large Icons
   - Medium Icons
   - Small Icons
   - **Horizontal Layout**: Icons arrange horizontally (no line breaks), with sizes adjusting to window height.
   - Use the top-left toggle  to switch between **Icon Mode** and **Expanded Mode**.



2) **Expanded Mode**: Displays plan content in a layered view, showing files and key statuses per layer.

3) **Hover Play Button (Toggle)**: Changes interaction behavior for plan blocks (see illustration below).
4) **Show Index Numbers (Toggle)**: See illustration below.

When Neither "Hover Play" nor "Show Index" is Enabled:

Plan Thumbnail Status Indicators

-  : Special playback state alert (e.g., jumps/cuts).
-  : All files in the plan are muted.
-  : Alphanumeric shortcut key for plan switching.
- **Thumbnail Generation**:
  - Stitched from file positions/sizes **or** captured from the canvas for direct content representation.

Note: Thumbnail clarity depends on canvas resolution and layer complexity. For

high-precision editing, use **Expanded Mode**.

6.4.2 Plan Group Interaction and Functionality

The software supports saving multiple plan groups, allowing users to organize plans based on different session or scene requirements.

1) **Create New Plan Group**: Triggered via the **New Group** button or the plan menu. Automatically adds the group at the end of the list.
2) **Pagination**: When the number of plan groups exceeds one page, use **page navigation buttons** or **mouse wheel scrolling** to switch pages.
3) **Group Label**: The number next to a group name indicates the count of plans within that group.
4) **Active Group Indicator**: A green dot marks the group containing the currently outputted scenario.
5) **Rename**: Double-click or right-click a group to rename it.
6) **Reordering**: Drag and drop group tabs to rearrange their order.
7) **Delete**: Right-click a group or select it and press **Delete** to remove the group and all its plans.

6.5 Canvas Window Editing and Plan Editing

6.5.1 Saving and Modifying Canvas and Plans

1) **Canvas-Plan Association**:
    - **Manual Save & Update Mode**: No need to pre-create plans. Adjust canvas content first, then save or update plans.
    - **Auto-Save Mode**: Edits to plans are saved automatically, but ensure the correct plan is selected before editing.
        - Controlled by the **"Enable auto-save for canvas edits in non-expanded mode"** setting under **System Settings > General**. Default: **Off** (manual save required).
        - **Expanded Mode** always uses auto-save unless manually overridden.

    Exceptions where auto-save does not apply:
    - Switching between real-time and preview canvases for the same plan.
    - Modifying a temporary preview plan before output.
    - Opening a project with mismatched edit modes from the last session.

Visual Cues:

- **"Manual Save Required"** on canvas: Changes do not affect plans until saved.
- **"Auto-Save Enabled"**: Changes sync automatically.

2) **Modifying Plans in the Plan Window**:
   - Changes made via the **plan properties panel**, **right-click menu**, or **expanded view cells** instantly update the canvas.
   - The system adjusts the canvas-plan relationship based on settings and edit modes—monitor prompts for changes.
   - **Note for Fixed Projects**: Verify edit modes before closing projects to avoid disruptions in remote control or program publishing.

6.5.2 Canvas Window Operations

Drag files from the resource window to the canvas for window creation or replacement. Key rules:

1) **Video/Image Files**:
   - **Auto-Fit**: Fills the screen if dropped on a screen area; otherwise, opens at native resolution.
   - **Resizing**: Drag edges to adjust size. Hold **Ctrl** for free scaling.
   - **Aspect Ratio Reset**: Restores the window to match the source file's resolution ratio.
   - **Cloning**: Dropping the same file multiple times creates synchronized instances (shared decoding).
   - **Replacement**: Inherits replaced file's properties (except time trimming).
     - **ALT + Drag**: Replaces the target and all its linked instances.
     - **SHIFT + Drag**: Independent playback (no synchronization with same-source files).
   - **Batch Operations**:

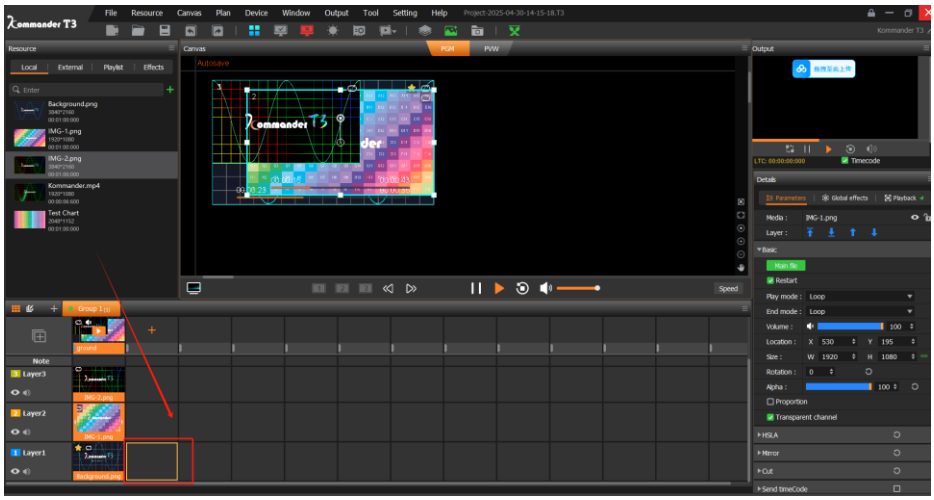
- Drag multiple files to trigger **batch plan generation**.
- Select multiple canvas objects + double-click a library file to replace them simultaneously.

2) **Tools (Audio, Subtitles, Timers, etc.)**:
   - No replacement logic when dropped on existing files.
   - Always displayed on top.
   - **Single-Instance Core**: Identical content across all displays. Create separate files for unique instances.
3) **Audio/Lighting Recording Files**: Generate fixed placeholder graphics.
4) **Playback State**: All non-program/windowed objects auto-play upon opening, following the global playback state.
5) **Layer Management**: New windows open above existing ones. **Expanded Mode** clarifies layer hierarchy. Blank layers auto-create if needed.
6) **Naming Logic**: If a plan is named "Plan i," adding/replacing files auto-renames it to match the file name.

Note: For program/windowed objects, refer to the **Resource Management** section for additional constraints.

6.5.3 Plan Editing in Expanded Mode

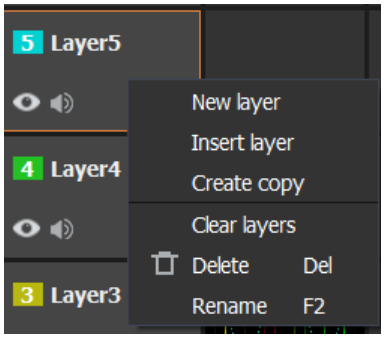
Users can drag files from the resource list into the expanded plan list for program editing.



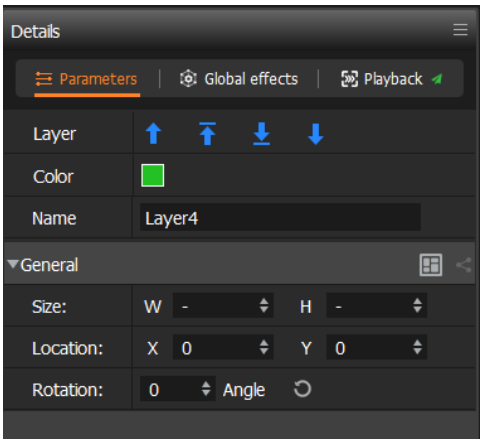
1） Layer Operations

- Each program layer holds one file. Layers stack with upper layers covering lower ones.
- **Layer Creation/Management**:
  - Create new layers via the **Add Layer** button. 

- Right-click layers for **delete**, **rename**, or **clear** operations.



- **Layer Properties**:



  - **Color & Order**: Adjust layer color and hierarchy.
  - **Position/Size/Rotation**:
    - Initialize values by clicking **Apply Screen Values**  to match a selected screen.
    - Click **Apply to File**  to propagate changes to the layer's file.
  - **Hierarchy Adjustment**: Modify via properties panel or drag-and-drop layer headers.

2) Layer Controls**:**

- **Visibility Toggle** (👁): Shows/hides the layer in real-time on the canvas.
- **Audio Toggle** (🔊): Enables/disables audio output for the layer.

3) Layer File Operations

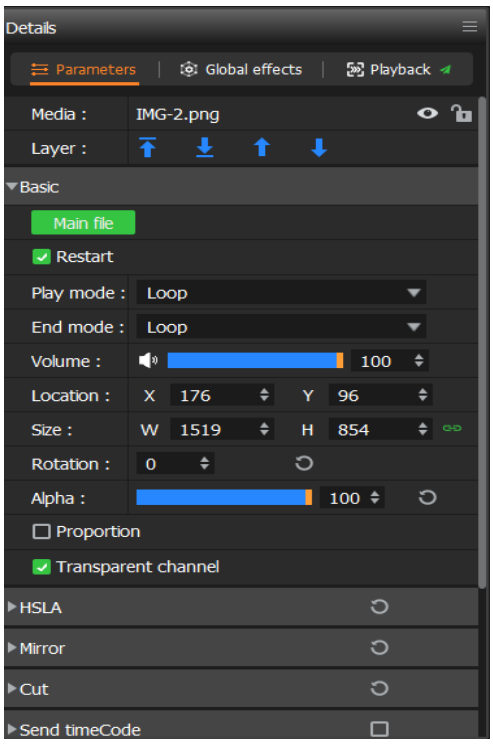
- **Drag-and-Drop**:
  - Drop files from the resource library into any cell to create or replace windows.
  - Batch files auto-fill cells sequentially.

- **Note**: Some product licenses restrict window counts. Exceeding limits will hide extra windows during output.

- **Cross-Plan Playback**:
  - Drag a file across multiple plan cells to create a **cross-plan linked file**. These files share unified properties and resume playback automatically.
- **Copy/Move Plans**:
  - Use right-click **Cut/Copy/Paste** to transfer entire plans.
  - Insert plans via **"Insert Copied/Cut Plan Before/After"** in the target context menu.

6.5.4. Window File Properties

Window file properties can be configured via the following methods: canvas right-click menu, file properties window, cell right-click menu in expanded plan mode, plan right-click file list, and plan properties panel.

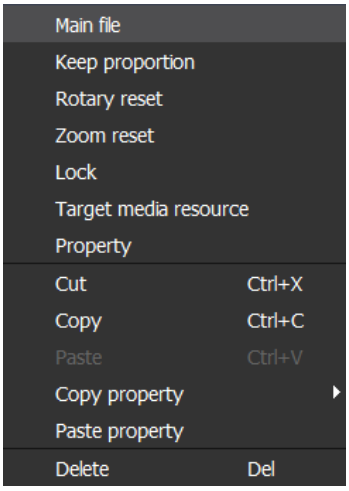


1） **Layer Adjustment**:  Adjusts the stacking order (Z-order) of windows.

2） **Lock**:  Locks the file to prevent accidental modifications (note: excludes batch plan modifications).

3） **Visibility**:  Controls the display/hide state of the file. Useful for plan requiring audio-only output (e.g., narration) or alternating between capture signals and other content without creating multiple plans.

4）**Primary File**:



- Each plan must define one primary file, defaulting to the first file dragged onto the canvas.
- The primary file can be set via the properties panel, right-click menu, or playback mode adjustments (files with jump relationships are automatically marked as primary).
- Plan status reminders and timed task playback counts are calculated based on the primary file.

5）**Playback Speed**:

- Applies to video/audio files only. Adjustable between 0.1x and 4.0x.
- Supports audio output during speed changes with minimal pitch distortion.

6）**Restart Playback on Switch**:

- **Checked**: Inherits the playback progress of the same-source file currently on the canvas.
- **Unchecked**: Starts playback from the beginning.
- Used in continuous playback plans where partial files require progress synchronization despite visual or window differences.
- Inherited properties include progress, playback mode, audio settings, and time trimming. Files stopped or frozen on the last frame restart after inheritance.

7）**Playback Mode**:

- Linked to **End Mode**, defining post-playback behavior.
- **Loop Playback**:
  - For videos/audio: loops based on duration.
  - For other files: continuous display (no end trigger).
- **Fixed Duration**: Sets total playback duration for all file types; playback ends when reached.
- **Fixed Play Count**:
  - For videos/audio only. Playback ends after the set count.
  - Supported for composite materials but limited to 1 loop.

8） **End Mode**:

- **Loop Playback**: No effect when paired with "Loop Playback" playback mode.
- **Freeze on Last Frame**: Displays the last frame after playback ends.
- **Switch to Next Plan**: Automatically jumps to the next plan in the output sequence. Freezes if no next plan exists.
- **Switch to Specified Plan**: Jumps to a predefined plan (any group).

9） **Volume**:

- Supports mute, unmute, and 0–100% volume adjustment (100% = original volume).
- **Single Audio Mode** (enabled in system audio settings): Only one file's audio is active on the canvas; others are muted automatically.

10） **Position/Size/Rotation**: Adjusts window position, size (linked scaling supported), and rotation on the canvas.

11） **Transparency**: 0–100% adjustment for window transparency.

12） **Maintain Aspect Ratio**:

- **Checked**: Preserves file aspect ratio, adding black borders (configurable as transparent) if mismatched with the window.
- **Unchecked**: Stretches the file to fill the window, potentially distorting the image.

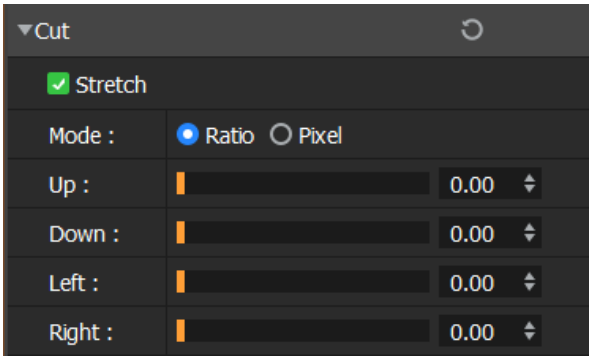
13) **Enable Alpha Channel**:

- For materials with transparency: retains transparency when checked; displays as opaque when unchecked.

14) **Chroma Adjustment**: Adjusts window brightness, contrast, saturation, and hue.

15) **Mirror**: Supports horizontal or vertical mirroring of window content.

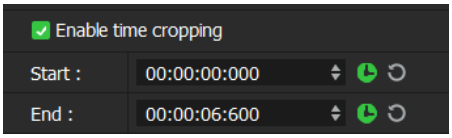
16) **Cropping**:



- Trims the top, bottom, left, or right edges of the image.
- **Proportional/Pixel-based**: Adjustable via ratio or pixels.

- **Post-cropping**: Stretch to fill the window or retain original size (cropped areas display as transparent).

17) **Time Trimming**:



- For video/audio only. Trims a segment for playback.
- Millisecond precision; supports using the current playback position as a trim point.

18) **Audio Channel Mapping**: Configures output soundcard and channel assignments (see *Audio Channel Mapping* section).

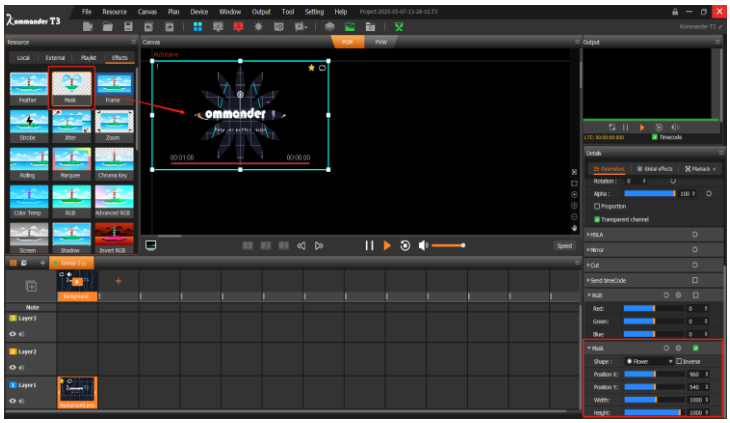
19) **Timecode Transmission**: Sets the file's playback progress as a timecode (see *Timecode* section).

20) **Command Triggering**: Links playback progress to third-party device commands (see *Command Transmission* section).

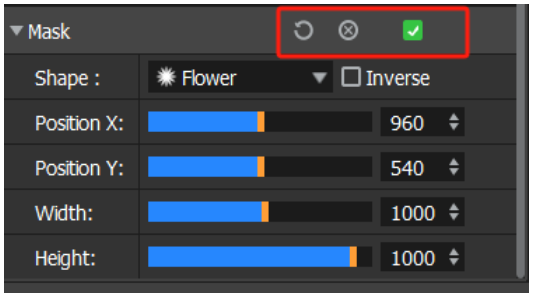
21) **Additional Notes**:

- **Office, Countdown Timer, Teleprompter, and Digital Widget**: Include shortcut operations in the properties panel (see respective sections).
- **Effects**: Configuration details are covered in the *Effects* section.
- **Clone/Unclone**:
    - **Clone**: Generates a window copy with synchronized playback progress.
    - **Unclone**: Breaks synchronization between a cloned window and its source, allowing independent operation.

6.5.5. File Effect Overlay Instructions



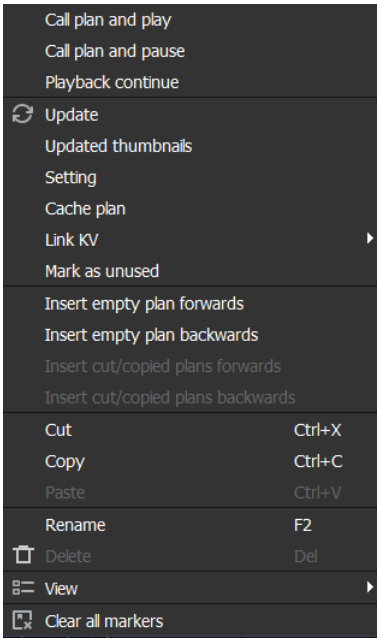
Switch to the effect list and drag the desired effect directly onto a canvas file window or onto the corresponding cell of an expanded plan file to apply the effect to the target file. After applying an effect, the file's properties panel displays the effect's parameter list.



1) **Reset**: Restores effect properties to default values.
2) **Delete**: Removes the effect.
3) **Enable**: The effect is active only when this option is checked.
4) **Parameters**: Vary by effect; explore settings as needed.

6.5.6. Plan Editing and Execution

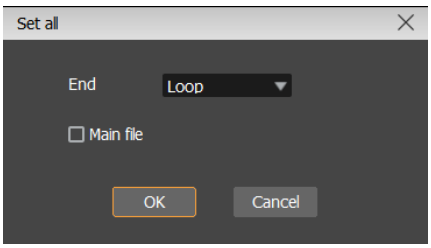
1) **Create Plan**:
    - **Entry Points**:
        - Click the "+" icon in the plan window (creates a new plan at the icon's position).
        - Use the "New Plan" option in the plan menu, canvas right-click menu, or the **Ctrl+D** shortcut. The latter three methods append a new plan to the end of the plan list. New plans automatically become linked to the canvas.
    - **Insert Options**:
        - Insert blank plans before/after existing ones.
        - Insert copied/cut plans before/after existing ones.



2) **Update Plan**: Right-click a plan and select "Update" to overwrite it with the current canvas content.
3) **Execute Plan**:
    - **Click Execution Icon**: Triggers playback. If the global playback state is paused/stopped, execution switches to playback.
    - **Other Execution Methods**:
        - Double-click non-icon areas of the plan thumbnail.
        - Press **Enter** after selecting a plan.
    - **Execute and Pause**: Use the right-click menu option "Execute and Pause."
    - **Navigation**:
        - Use shortcuts or global controls to switch to the previous/next plan.
        - Assign and use plan-specific shortcuts.
        - Additional execution methods are available under **Settings > Mapping Management**.
    - **Visual Indicators**:
        - Active plans are highlighted in orange, with scrolling names and an orange badge (except standby plans).
        - Pre-configured canvas plans display a green playback icon.
4) **Plan Selection**:
    - Single-click, **Ctrl**/**Shift** multi-select, or **Ctrl+A** to select all.
5) **Plan Reordering**:
    - Drag-and-drop to adjust order (supports batch movement).
    - Use "Cut > Insert Before/After" to reposition plans.
6) **Usage Status and Clear Markers**:

- Plans are marked as "used" after execution for user reference.
- Right-click a plan to manually mark it as "unused."
- Use "Clear Usage Markers" in the plan menu or window to reset all plans.

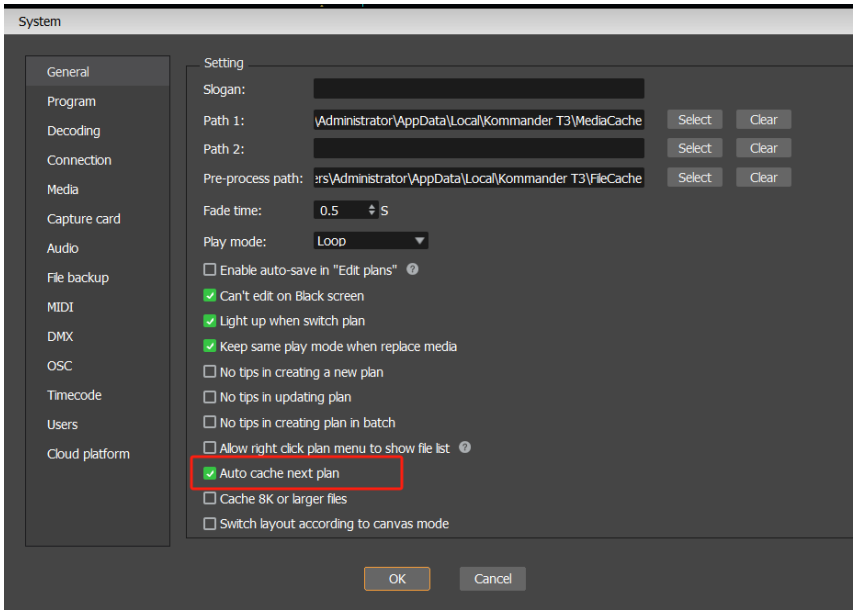
7) **Batch Settings**:



- Apply "Loop," "Stop," or "Freeze on Last Frame" to all files in a plan.
- Exclude the main file to preserve original jump logic.

8) **Manual Caching**:

- Right-click to cache a plan, improving switch speed during execution.
- Only one plan can be cached at a time (cached plans are labeled green).
- Caching consumes system resources.
- Enable "Auto-Cache next plan" in system settings to automate caching based on plan logic.



9) **Mark as Standby Plan**:

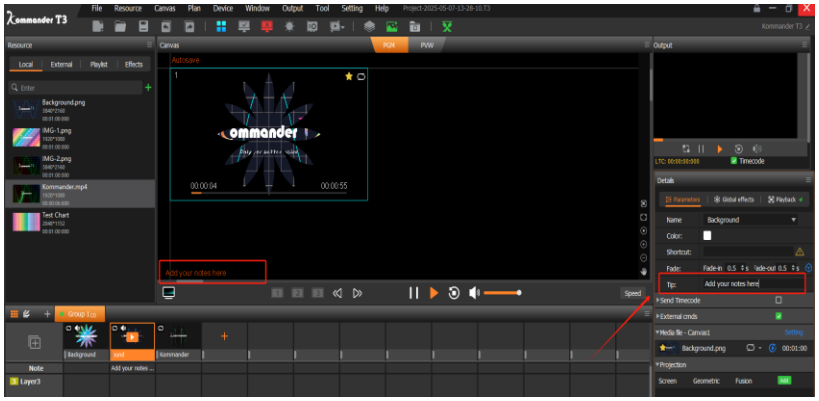
- Bind to the standby key via right-click or drag-and-drop.
- Click the standby key for quick execution. Standby plans lack an orange badge, which remains on the last executed plan.

6.5.7. Plan Properties

1) **Basic Settings**:

- Edit name, color tags, and assign shortcuts (changes reflect in the plan window).

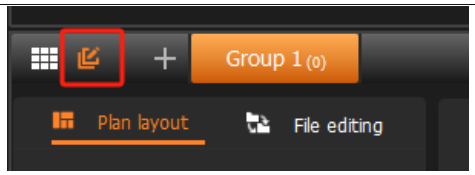
2) **Transition Settings**:
   - Adjust fade-in/out duration during plan switches (defaults to system settings).
3) **Plan Prompts**:
   - Set messages to display on the canvas during execution (e.g., reminders or preparation notes).



4) **Timecode Transmission**:
   - Send timecode based on plan execution timing.
5) **Command Triggers**:
   - View all commands triggered by plan execution, including those linked to file playback progress.
   - Add commands with triggers based on plan timing or playback progress (see *Command Transmission* section).
6) **Media File Management**:
   - View all files in the plan and modify playback modes or auto-restart properties.
   - Accessible via the "File List" option in the plan right-click menu.
7) **Projection Template Switching**:
   - Link plan switches to projection template changes (e.g., geometric correction/blending templates).
   - Enables dynamic projection adjustments (e.g., Project Object A in Program 1, Object B in Program 2).

6.5.8 Batch Plan Editing

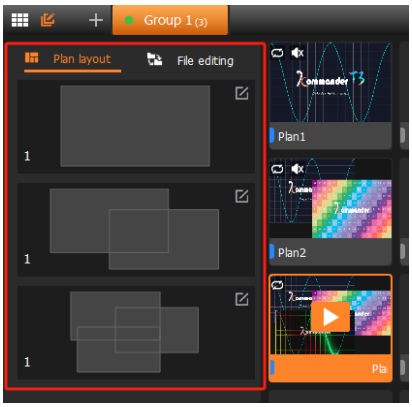
Access the editing interface through the "Batch Plan Editing" option in the plan menu. This feature supports unified editing of batch plans under the current plan group.



Current capabilities include batch operations on window layouts: creating, moving, deleting windows, and replacing window files. It supports unified file replacement and attribute modification across multiple plans.

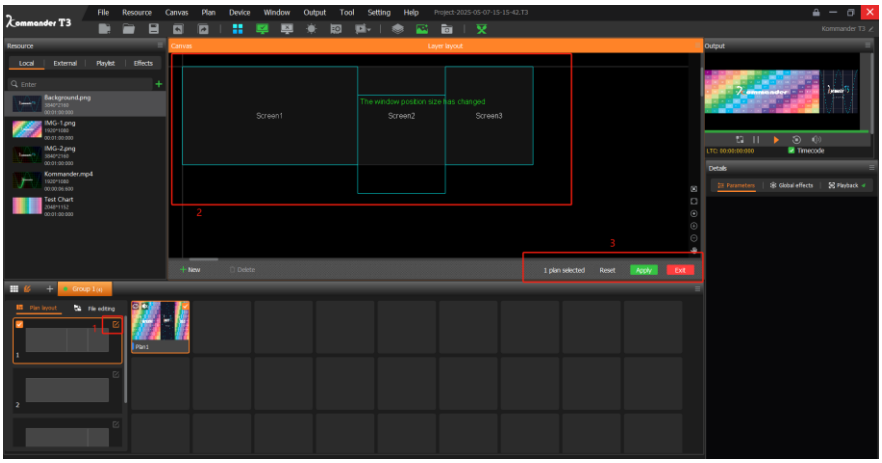
Important linkage logic: In the current version, modifications made to plans in use (active output or preview states) through plan attributes or batch editing will take effect immediately.

6.5.8.1 Plan Filtering and Editing Based on Layout



- The left panel displays layout lists generated based on window positions/sizes under the current plan group. Layouts are visualized as window arrangements, with the bottom-left number indicating the count of plans using that layout.
- Clicking a layout filters the right panel to show only plans using that layout.
- Click the "Edit" button (top-right) to enter layout editing mode.

Editing Workflow:

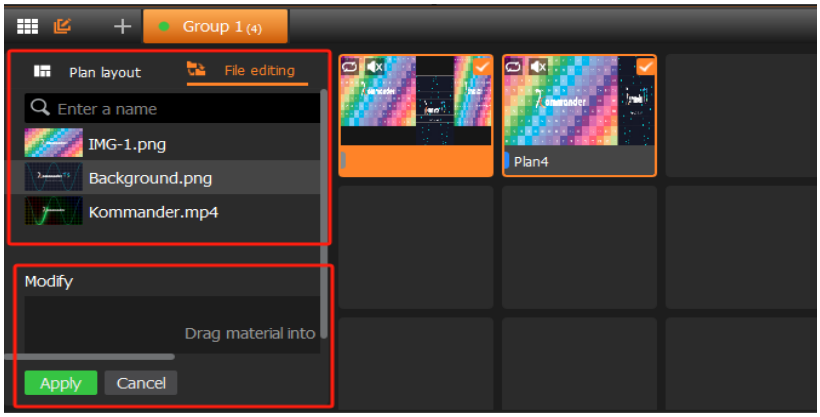


1) **Layout Visualization**: Blue frames on the canvas represent existing windows in the layout.
2) **Supported Operations**:
   a. **Move windows**: Drag and drop directly.
   b. **Delete windows**: Select and press *Del* or use canvas deletion tools.
   c. **Create windows**: Drag files from the media library to the canvas.
   d. **Replace window content**: Drag new files from the media library onto existing windows (*Note: Replacement is type-restricted. Some file types only allow same-type replacements, consistent with standard canvas drag-and-drop rules*).
   e. **Undo/Redo**: Supports *Ctrl+Z/Ctrl+Y*. Use "Reset All Windows" or right-click menu options to reset individual windows.
3) **Plan Selection Mode**:
   - The preset list switches to selection mode (play icons hidden).
   - Supports *Ctrl/Shift* multi-select and *Ctrl+A* for full selection.
4) **Apply Changes**: Click "Apply" to execute batch updates. Thumbnails refresh automatically.

6.5.8.2 Batch File Editing in Plans

In this mode, plan windows enter selection state (playback functions disabled).

A/B File Replacement:

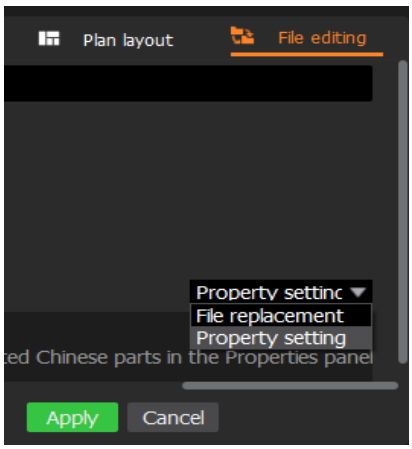


1) **Select Source File**: Choose a file in the list. The right panel auto-refreshes to show presets containing this file.
2) **Initiate Replacement**:
   - Select "File Replacement" from the dropdown.
   - Drag a new file from the media library to the modification window or click to browse.
     (*Note: Replacement follows type compatibility rules identical to canvas operations.*)
3) **Select Target Plans**: Choose plans to modify.

4) **Execute Replacement**: Click "Apply" to complete.
    - The B file inherits all attributes of the original A file.
    - Thumbnails refresh upon completion.
    - *The preview canvas resets after operation.*

Batch Attribute Modification for Homologous Files:

1) **Select Source File**: Choose a file in the list. The right panel auto-refreshes to show relevant presets.
2) **Edit Attributes**:

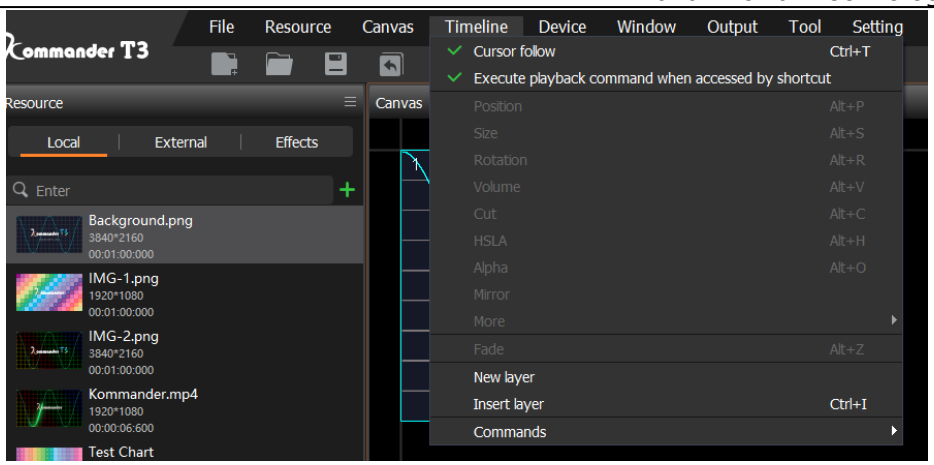


    - Select "Property Setting" from the dropdown.
    - Adjust parameters in the *Attribute Window* > *Parameter Settings* sub-window (initial values reflect default settings, not current applied values).
    - All changes are logged in the modification list.
3) **Confirm Edits**: Review/remove modifications using the edit list.
4) **Select Target Plans**: Choose plans to update.
5) **Apply Changes**: Click "Apply" to finalize. Thumbnails refresh as needed.

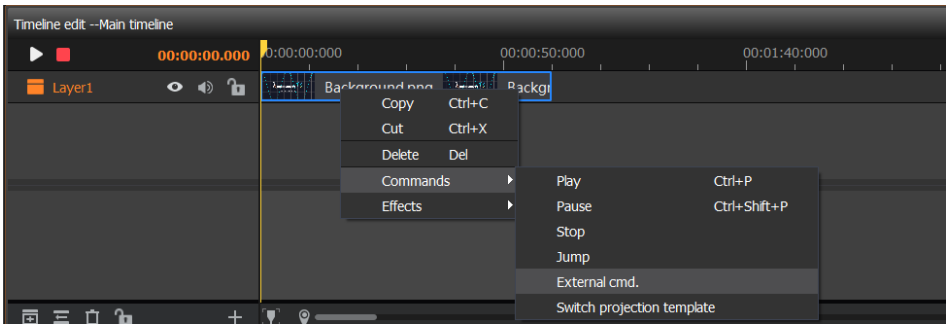
6.6. Timeline Project Editing Instructions

Specify whether to create a timeline project when initializing a new project. Components related to timeline editing include the **canvas**, **timeline list**, **timeline editing window**, **attribute window**, and **timeline menu**.

6.6.1. Timeline Menu



1) **Cursor Follow**:
   - When enabled, selecting an object in the timeline editing window automatically aligns the cursor (playback progress) to the object's start position. Disabling this option removes the linkage.
2) **Other Functions**: Refer to corresponding functional window descriptions.
3) **Effects**:



a. When objects are selected in the timeline editing window, click here to apply timeline effects.

b. **Alternative Entry Points**: Right-click menu in the timeline editing window or the lower-left corner of the window.

c. **Supported Effects**: All attributes supporting continuous parameter changes, including special effect properties.

6.6.2. Timeline Program Editing

1) **Layer Operations**:
   - Plan layer structures to clarify program organization.

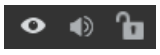
     a. **Add/Delete Layers**:
     - *Add*: Via timeline menu, layer right-click menu, or lower-left corner.

       
     - *New Layer*: Inserts a layer at the top.
     - *Insert Layer*: Inserts a layer above the selected layer.
     - *Delete Layer*: Deletes the layer and all associated objects (supports *Ctrl+Del*).

b. **Layer Selection**:

- Click to select a layer (highlighted state). Files added to the canvas default to the selected layer; a new layer is created if none is selected.

c. **Layer Reordering**: Drag layer tabs to adjust hierarchy.

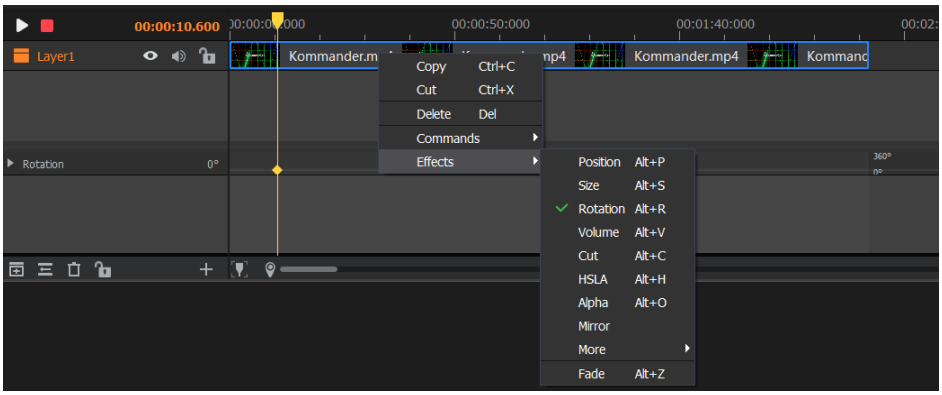
d. **Layer Attributes**: 

- *Visibility*: Hidden layers are excluded from output.
- *Mute*: Muted layers exclude audio output.
- *Lock*: Prevents editing of locked layers.
- *Output Mode*:
  i. **Normal**: Outputs during standard playback.
  ii. **Standby**: Outputs only in standby mode.
  iii. **Both**: Outputs in both modes.
- *Linked Screen*: Assigns a screen to preset default window positions/sizes for layer files (modifiable post-placement).

2) **File Placement and Replacement**:
a. Drag files to the canvas (ensure a layer is selected and the cursor is at the target time).
b. Drag files to the timeline editing window (pre-set linked screens to minimize repositioning).
c. **File Replacement**:
   - Drag files to existing windows/objects or double-click media library files.
   - Prompts confirm resource length usage (new files inherit duration and attributes by default).

3) **File Attributes and Effects**:
a. **Independent Playback**:
   - Disabled: Syncs with timeline cursor (e.g., pauses with timeline).
   - Enabled: Loops continuously, unaffected by timeline pauses.

b. **Start Time**: File's display start time on the timeline.
c. **Playback Duration**: Display duration on the timeline.
d. **Attribute Panel**: Matches plan attributes (including effects).
e. **Timeline Effects**:



Parameters can vary dynamically with playback progress.

Add Effects: Via timeline menu, right-click menu, or drag-and-drop from the effects panel.

Delete Effects: Uncheck in the right-click menu.

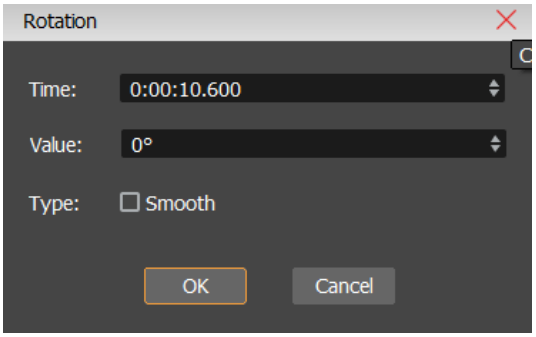
Modify Effects:

i. Create keyframes by clicking the timeline curve.

ii. Drag keyframes vertically to adjust parameter values.

iii. Drag keyframes horizontally to adjust timing.

iv. Double-click keyframes to input values manually.

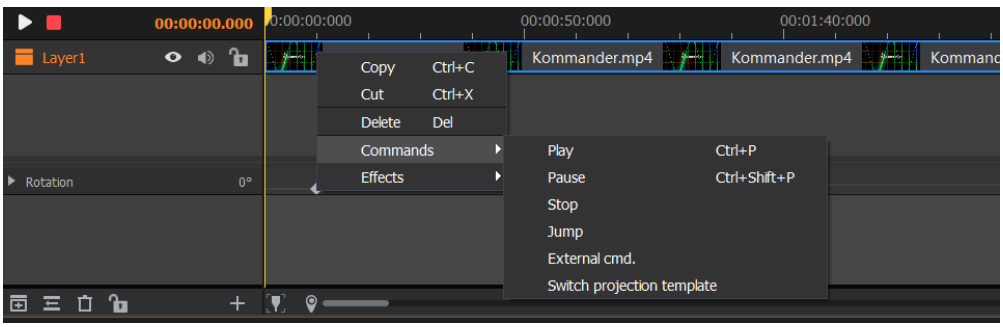


v. For multi-parameter effects, click the left block to edit all parameters.

vi. Modify position/size via canvas interactions.

vii. Batch select, move, or delete keyframes.

4) **Timeline Commands**:



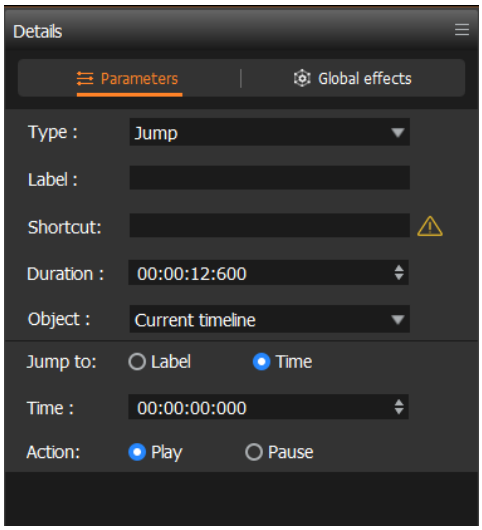
a. Supports commands for diverse operational plans.

b. **Play Command**: Acts as a marker for quick navigation or triggering external timelines.

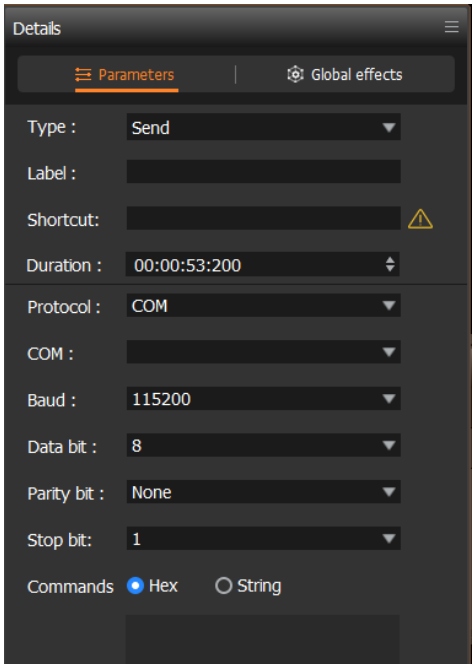
c. **Pause Command**: Pauses current/specified timelines at the marker.

d. **Stop Command**: Stops playback and resets to timeline zero.

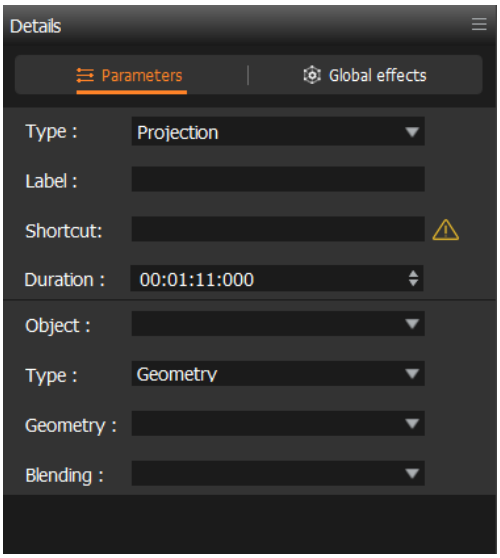
e. **Jump Command**: Skips to a specified position (with optional playback).



f. **External Command**: Triggers UDP/TCP/COM commands to third-party devices.



g. **Projection Template Switch**: Switches templates at the marker (requires pre-configured templates).



5) **Additional Operations**:

a. **Progress Display Modes**:

- *Count-Up*: Shows cursor position.
- *Count-Up/Down*: Displays time remaining until the last object ends.
- *Count-Down/Up*: Prioritizes countdown display.

b. **Cursor Zoom**: Use +/- keys or click zoom controls.

c. **Playback Controls**: Start/pause/stop via top-left buttons.

d. **Cursor Navigation**:

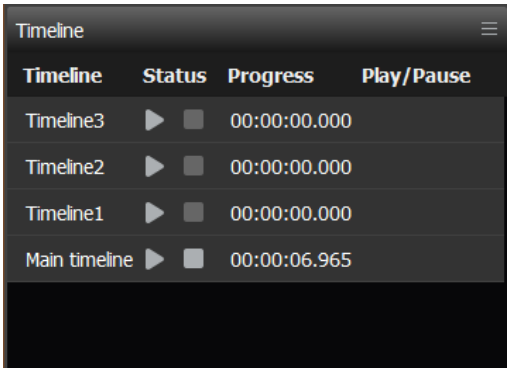
- Click icons to jump to cursor positions or specified timestamps.
- Use *Ctrl/Alt + Scroll Wheel* for fine-grained seeking.

e. **Keyboard Shortcuts**:

- *Shift + Arrow Keys*: Navigate current layer objects.
- *Ctrl + Shift + Arrow Keys*: Navigate all layers.
- *Ctrl + E*: Selects all objects to the right of the cursor.

6.6.3. Timeline Program Management

- **Timeline List Window**



Manages multiple timelines (functionally similar to plans or composite layers).

- **Key Differences from Plans**: Supports concurrent playback of multiple timelines, stacked by list order.
- **Operations**:
  - View playback status/progress, use shortcuts for control.
  - *Create Timeline*: Via "+" icon, right-click menu, or duplication.
  - *Reorder Timelines*: Drag-and-drop or right-click menu.

6.6.4. Additional Notes

1) **Timecode Synchronization**:
   - Master timeline syncs with external timecode (refer to timecode documentation).
   - Master timeline progress can broadcast as timecode.
2) **Multi-device Frame Sync**: Supports synchronized playback across linked devices.

6.7. Master-Control, Master-Backup, and Master-Display Multi-Device Systems

6.7.1. Roles in Multi-Device Systems

- **Program Role Descriptions**

After installation, three executable programs are generated. Taking "Kommander T3" as an example:

- **Kommander T3**: The main program, offering three configurable modes: **Master**, **Backup**, or **Slave** (default: Master). It includes an editing interface and handles output.
- **Kommander T3 Controller**: A control program with two modes: **Control Terminal** or **Backup Control Terminal**. It includes an editing interface but no output capability.
- **Kommander T3 Displayer**: A display program without editing capabilities, solely for output.

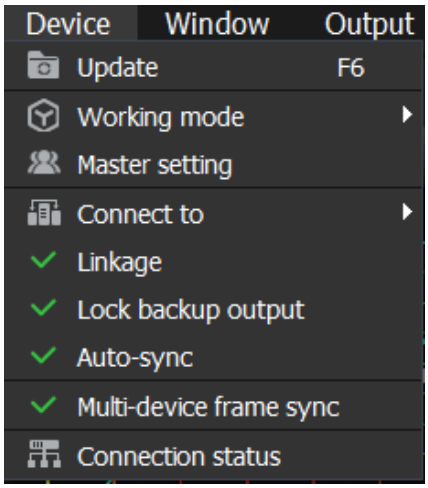
In total, the system supports six roles: **Master**, **Backup**, **Slave**, **Controller**, **Backup Controller**, and **Displayer**.

- **Role Functions and Collaboration**
  The system supports multi-device configurations within the same network segment, including combinations of Master-Backup, Master-Displayer, Master-Slave, Controller-Master, Controller-Backup, and others.

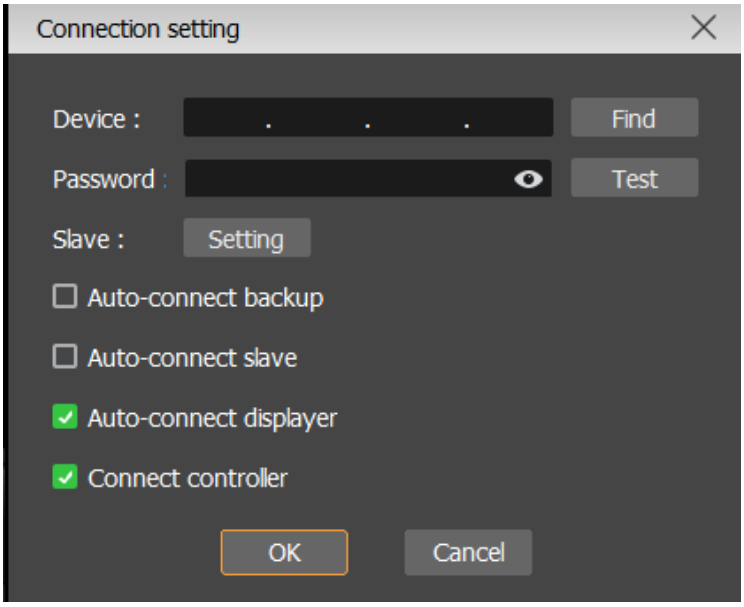
  1) **Controller**: Does not handle output or participate in clock synchronization. It can be added or removed without affecting output. Used for editing, controlling, and previewing projects on the connected Primary. Requires separate licensing.
  2) **Backup Controller**: Mirrors the Control Terminal's functions, ensuring data redundancy and operational consistency. Supports failover for dual-control or backup scenarios.
  3) **Master**: Acts as the decision-maker for clock synchronization, command distribution, and the central hub in multi-output environments (e.g., Master-Display, Primary-Backup). Handles full program functionality and output.
  4) **Backup**: Mirrors the Master Terminal. Ensures seamless takeover during Master failures (e.g., software or output errors) without interrupting output.
  5) **Displayer**: Decodes and renders content for large screens to expand decoding and load capacity. Connects 1–n Display Terminals for n-fold capability scaling. Content is distributed by the Primary to ensure consistency and synchronization.
  6) **Slave**: Supports editing and output, managing independent projects. Synchronizes with the Master for coordinated actions (e.g., play, pause, mute, preset switching).

6.7.2. Multi-Device Management Interface and Key Settings

- **Management Interface**



1) **Working Mode**: Sets the program's role in the local network (e.g., Master, Backup).
2) **Master Settings** (visible only in Master mode):



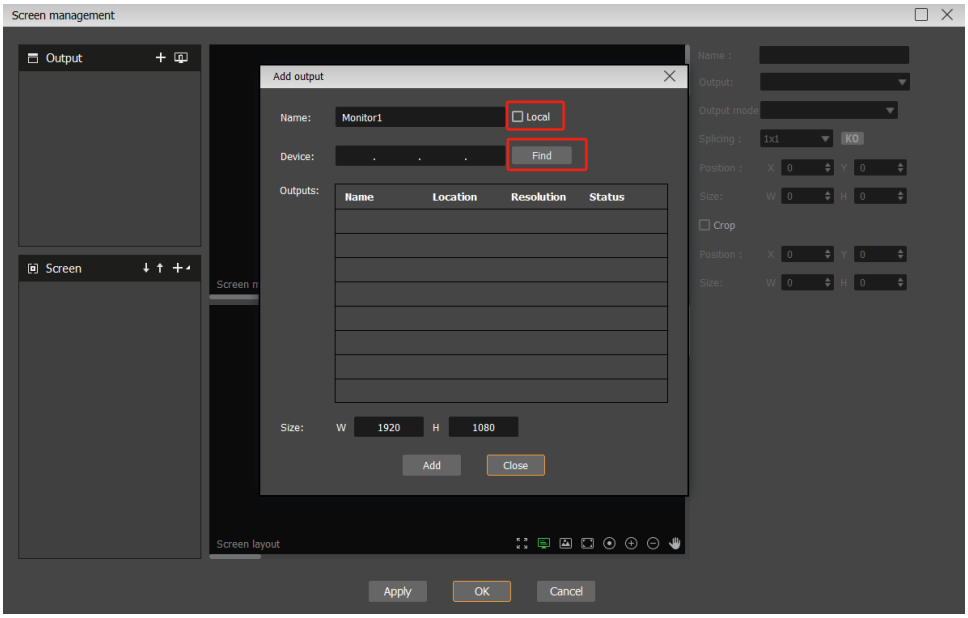
- **Backup & Password**: Specifies Backup address and password (if set). Includes a discovery feature for network Backup.
- **Slave Management**: Lists Slave Terminals for linkage (with password configuration).
- **Auto-Connect on Startup**: Options to auto-connect to Backup, Slave, or Displayer.
- **Allow Controller Access**: Blocks external Controller if unchecked.

3) **Controller Settings** (visible only in Control mode):
   - **Controlled Terminal & Password**: Specifies Controlled Terminal (Master) address and password.
   - **Backup Controller & Password**: Assigns a Backup Controller.
   - **Auto-Connect on Startup**: Links to Controlled or Backup Controller.

4) **Connection**
   - Independent toggles  for Master-Display, Master-Slave, and Master-Backup links (green = active).
   - Real-time status indicators: **Red** (failed), **Yellow** (connected with warnings), **White** (normal).
5) **Real-Time Synchronization**
   - Enabled: Synchronizes actions (e.g., functional operations, screen management, projection data) across terminals.
   - Exclusions: UI behaviors (e.g., canvas mode switching, library folder expansion, window movement).
6) **Backup Screen Data Sync Permission**:
   - When enabled, Backup adopt the Master's screen data during sync. Disabled, they retain existing screen settings.
7) **Multi-Device Frame Sync**:
   - Disabled: Terminals execute commands independently.
   - Enabled: Commands synchronize to the Master's clock for frame-accurate actions (e.g., plan switching).

6.7.3. Establishing Master-Display Relationships

- Master-Slave, Master-Display, Control-Master, and Control-Backup relationships are configured via Master or Control Terminal settings. Display Terminals are configured in **Screen Management**:

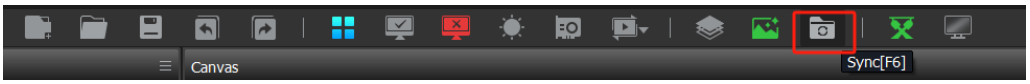


  - Deselect "Local" when adding a display port to assign a remote **Display Unit**. Use the discovery menu to select target units.

- Overlapping screen regions on the editing canvas indicate content rendered via remote ports. Updates require transmitting media to the Displayer for decoding and rendering.
- Remote content preview modes: Real-time video, proxy video, or thumbnails (see **Canvas Functions**).

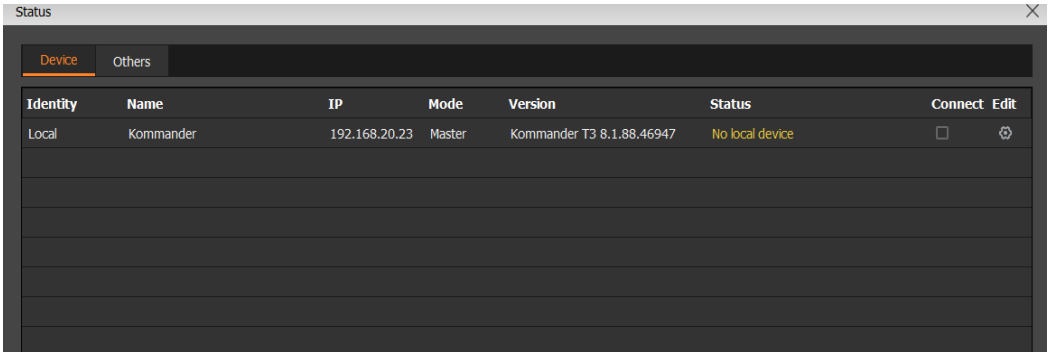
6.7.4. Project Updates

1) **Update Types**:
   - Master updates Backup/Displayer.
   - Master updates Slave Terminals (batch or individual).
   - Controller updates Controlled Terminals, Backup Control Terminals, Master-Backup, and Displayer.
   - Controller updates other Master(batch or individual).
2) **Update Entry Points & Status**



   - Access via Online Menu or Toolbar Update button.
   - **Gray**: No active update. Click to trigger.
   - **Green**: Active file transfer. Click to view progress.
3) **Material Transfer Modes**:
   - **Full Materials**: Transmits all project files to ensure immediate output. Requires more storage and time.
   - **On-Demand Materials** (Displayer): Transfers only required files for decoding/rendering. Reduces storage and transfer time but risks missing files during ad hoc output.
4) **Update Workflow**:
   - Syncs projects first, transfers materials, then syncs playback progress. Output remains unaffected if no active content is updated.
   - Verify target terminal storage before updating.
   - Files with identical MD5 hashes and paths are skipped. Pre-copy large files for efficiency.
   - **Restart Update**: Terminates current update and relaunches parameter selection.
   - **Terminate Update**: Aborts ongoing file transfers.

6.7.5. Multi-Device Status Monitoring and Management Panel



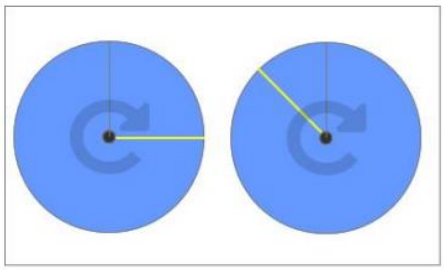
The Master and Controller include this panel for monitoring system-wide operational status and remotely controlling devices based on operational requirements.

1) **Panel Overview**
   a. Displays the status of all devices in the networked environment, including the local device. Refer to the detailed list.
   b. **Status Indicators**:
      - **Normal**: Indicates stable operation with current CPU and memory usage.
      - **Clock Desynchronization**: Marked as a warning (yellow) if frame synchronization is enabled but not achieved. Requires investigation in high-sync scenarios.
      - **Critical Errors** (red): Mandatory resolution (e.g., program/device offline, incorrect mode, network issues, version mismatch, or disabled connections).
2) **Network Device Discovery**
   a. Lists all broadcast control terminals in the network. Multiple entries appear if a single device runs multiple instances.
   b. Centralized control requires password authorization for secured devices.
3) **Remote Control Operations**
   a. **Parameter Configuration**: Remotely adjust system settings (partial support).
   b. **Scheduled Commands**: Set timed instructions for remote devices.
   c. **Log Viewing**: Access and download remote device logs for troubleshooting.
   d. **Remote Firmware Upgrade**: Update devices with version mismatches.
   e. **Device Management**: Reboot or shut down devices during critical failures or operational needs.
   f. **Program Operations**: Switch modes, restart, or terminate programs.
   g. **Master Settings**: View or modify Master configurations.
   h. **Connection Toggles**: Enable/disable Master-Backup or Master-Slave links.
   i. **Output Capture**: Capture and retrieve output images for anomaly analysis.
   j. **Dump File Generation**: Trigger remote dump file creation and retrieval for debugging.
   k. **Cache Clearance**: Purge historical media and temporary cache on remote devices while retaining active project data.

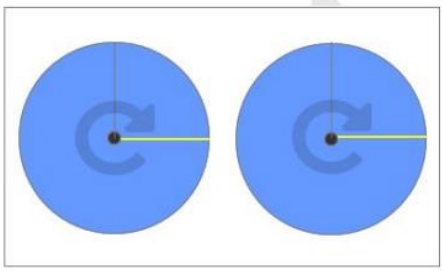
l. **VNC Service**: Enable/disable VNC access (default: disabled for resource efficiency). Use "Tools > VNC Client" post-activation.

6.7.6. Supplementary Technical Notes

- **Synchronization Cards**
  Identical GPU frame rates ensure consistent refresh rates but may not eliminate misalignment. Synchronization cards enforce frame-level timing alignment.



Sync Card Disable



Sync Card Enable

Example: In a 1 Master + 2 Displayer setup, only the two Displays require synchronization cards for strict frame alignment.

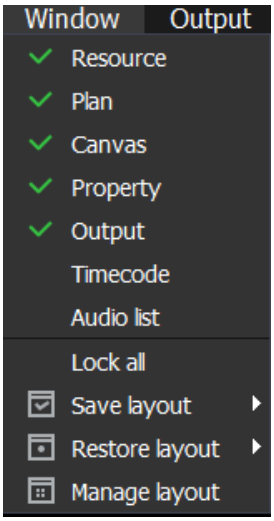
- **Codec Optimization Settings (System Settings > Codec)**
  - **Frame Rate**: Align with GPU frame rate unless specified.
  - **Hardware Decoding**: Recommended (enable by default).
  - **Frame Dropping**: Disable for high-sync environments.
  - **Adaptive File Frame Rate**: Disable for multi-device setups; enable for single-device.
  - **Clock Calibration**: Enable.
  - **Forced Frame Refresh**: Disable (enable only for troubleshooting).
  - **Dedicated Decoding Device**: Enable, except for deinterlaced video output.
- **Server Roles**
  Servers play critical roles in multi-device systems. Refer to the server documentation for troubleshooting operational anomalies.

6.8. Window Management and Custom Layouts

This section covers sub-window management within the main interface. Each sub-window supports visibility toggling, locking, and layout customization for diverse workflows.

6.8.1. Sub-Window Descriptions

The main interface includes nine sub-windows:



- **Media Library（Resource）**: Manages project resources (local files, input sources, composites, effects).
- **Canvas**: Visual editing and preview of content.
- **Plans**: Batch editing and management of plans.
- **Properties**: Edits attributes of selected objects.
- **Output Monitor**: Real-time output preview and control.
- **Timecode Sync**: Monitors timecode input and schedules preset triggers.
- **Audio List**: Standalone audio player for auxiliary playback.

6.8.2. Window Operations

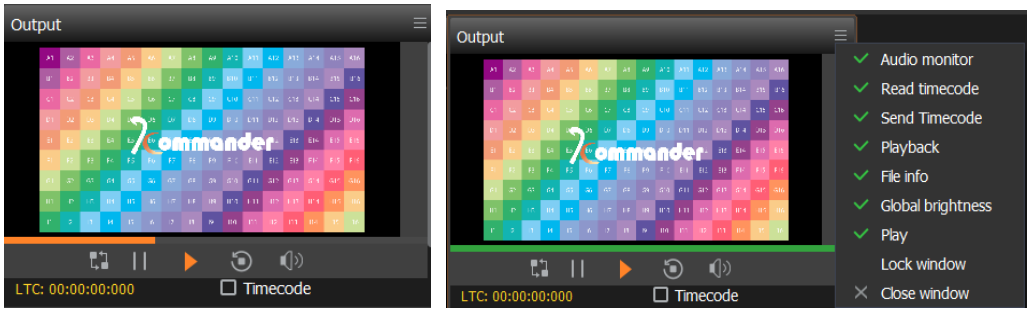
- **Visibility Toggle**: Checkboxes indicate active windows. Clicking opens or activates a window.
- **Global Lock**: Locks all window positions/sizes. Toggle to unlock.
- **Window-Specific Menu** (top-right corner):
  - **Lock/Unlock**: Freezes window dimensions and position.
  - **Close**: Exclusively closes the window via this option.
- **Resizing/Moving**: Drag borders (unlocked windows) or title bars to adjust.

Layout Management

- **Default Layouts**: Factory, Preview (PVW), and Program (PGM).
- **Custom Layouts**: Save adjusted layouts as templates for quick switching.
- **Auto-Layout Switching**: Toggle in system settings to sync layouts with canvas modes (e.g., Preview ↔ Program).
- **Persistent Layouts**: Current layout is saved upon exit and restored on relaunch.

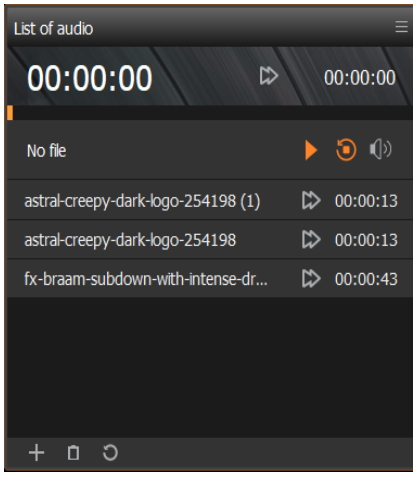
6.9. Output Monitoring Window

This window is currently only visible in Plan projects.



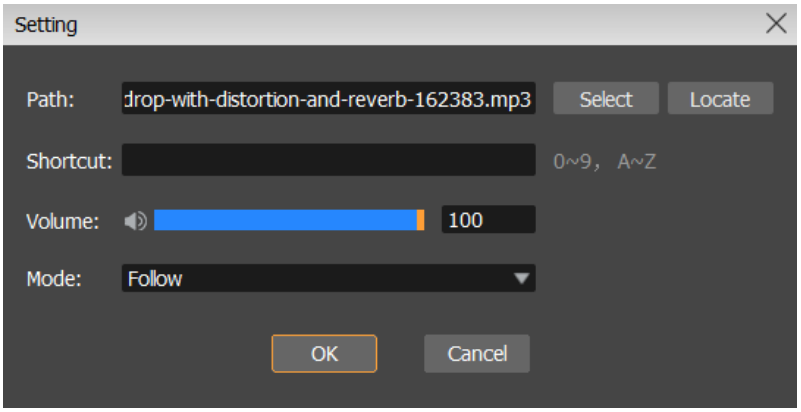
- **Basic Function**: Monitors the output image preview. To ensure clarity, this preview **excludes** the following adjustments:
  - Output brightness
  - Secondary color corrections from screen management
  - Geometric transformations, blending, or special effects
- **Playback Progress Display**: Shows the timeline of the main canvas file. Toggle visibility via the submenu.
- **Audio Monitoring**: Monitors audio from the **default sound card**. Disable during multi-channel mapping.
- **Global Playback Controls**: Synchronized with the Live Canvas (play, pause, stop, mute, volume). Includes a **"Copy Program to Preview"** function to duplicate live content for editing. Edited content can be pushed via **"Preview Output"** without disrupting playback.
- **Timecode Reception**: Displays received timecode values. **Timecode Control** takes priority over other controls; no synchronization occurs if disabled.
- **Timecode Transmission**: Shows the current sent value.
- **File Count**: Total files in the resource library.
- **Plan Count**: Total presets in the project.
- **Brightness/Contrast**: Indicates adjusted output values (range: -100 to +100). 0 = no adjustment.

6.10. Standalone Audio Player



An independent audio player separate from canvas playback, designed for **external audio** (e.g., background music). Mixes with canvas audio via the default sound card.

- **Input**:
  - Click + or Right-click to import audio/video files (supports common formats).
  - Manual triggers: Double-click, context menu, hotkeys, or custom shortcuts (e.g., "next track").
- **Playback Controls**:
  - Play/pause, stop, volume, seek.
  - **Reset Playback State** ↻: Clears playback markers.
- **Audio Properties**:

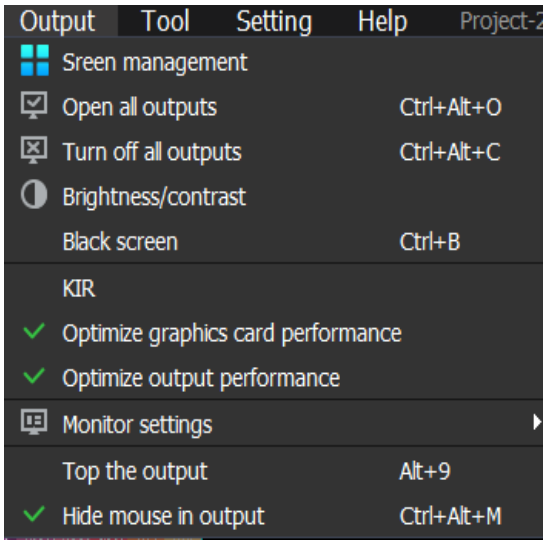


  - **File Replacement**: Use the "Select" function.
  - **File Location (Path)**: Open stored files via "Locate".
  - **Hotkeys**: Assign 0-9 or A-Z for quick access.
  - **Volume Adjustment**: Reduce output gain for loud files (no amplification support).
- **Playback Modes**:

- Single loop, auto-next, or stop after playback. Configure via context menu.

6.11. Output Menu & Screen Management

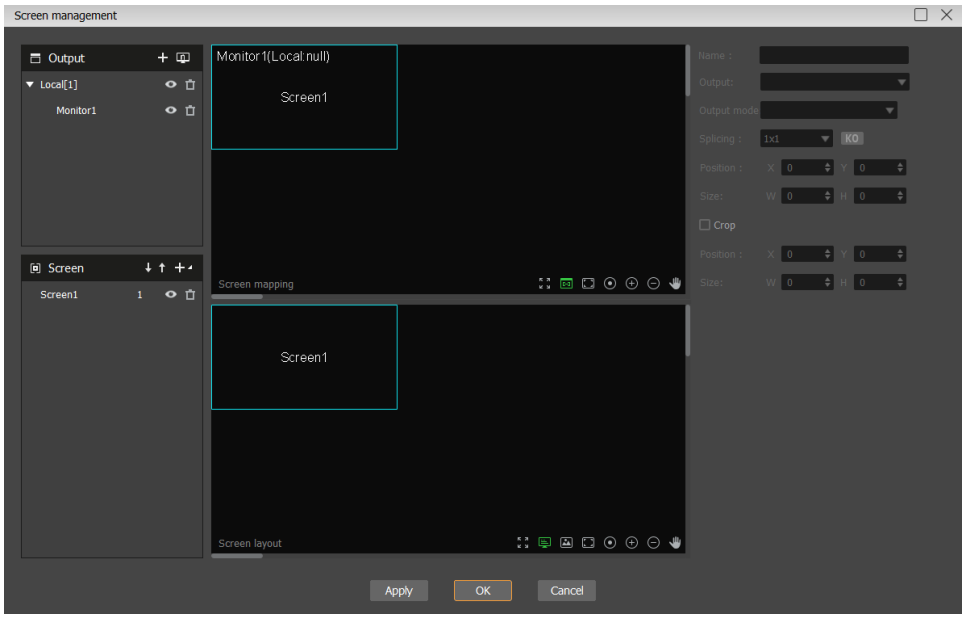
6.11.1. Output Menu



1) **Screen Management**: Maps virtual screens to physical display ports and configures layouts. Supports arbitrary splitting for ultra-wide or irregular screens.
2) **Enable/Disable All Ports**: Toggle all display ports.
3) **Black Screen**: See "Canvas – Global Controls".
4) **Standby Mode**: See "Canvas – Global Controls".
5) **Brightness/Contrast**: Adjust output for environmental needs. Monitor values in the Output Window.
6) **KIR**: Sends heartbeat signals to backend devices for anomaly detection. Enables automatic failover (e.g., Master-backup switching).
7) **Synchronized Transition**: Ensures frame-accurate multi-device/card transitions during preset switching (may delay visuals).
8) **Pause Playback on Cutout**: Reduces GPU load during transitions to prevent frame drops.
9) **Multi-Display Mode**: Set to **Extended** (default) or **Mirror**.
10) **Output Always on Top**: Prevents other windows from overlapping the output.

6.11.2. Screen Management

6.11.2.1. Interface Overview



Two core objects: **Display Ports** and **Screens**.

- **Display Port**: Binds to a physical output (e.g., a GPU port). Handles content rendering.
- **Screen**: Bridges the editing canvas and display ports. Maps canvas content to physical outputs.

Key Features:

- **Flexible Mapping**: Screens can cover partial/full display ports or span multiple ports.
- **Layout Consistency**: Align virtual screens with physical setups for accurate previews.

Workflow Example (refer to diagrams):

- Screen 1 overlaps the lower half of Display Port 1 → Content from Screen 1's upper half outputs via Display Port 1's lower half.
- Asset 1 placed on Screen 1 → Mapped to Display Port 1 → Rendered on the physical screen (see right diagram).

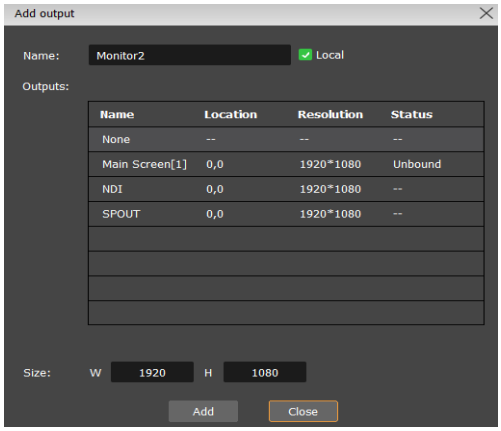
Interface Tips:

- Use dividers to resize/  maximize/minimize canvas sections.

- Click the **Restore** button to reset layouts.

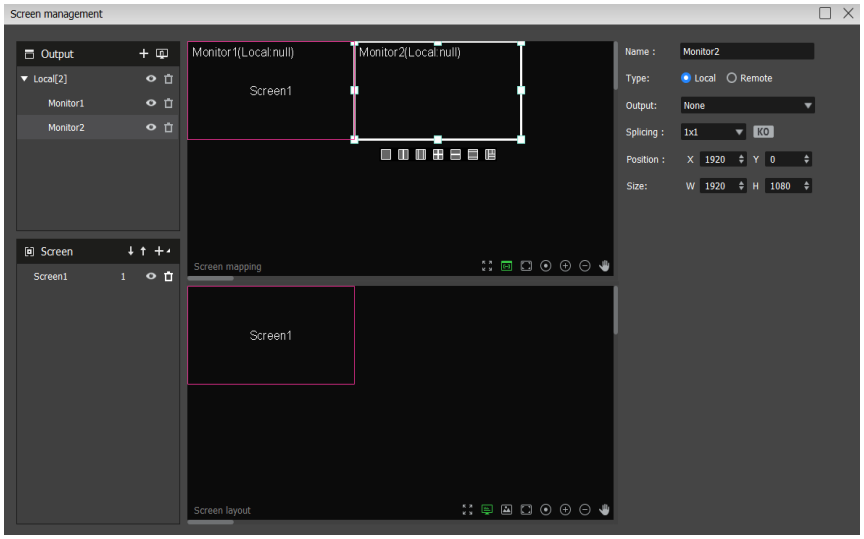
6.11.2.2. Display Ports

1) **Create New Display Port**
   Click the **+** button in the Display Port list to open the configuration window:

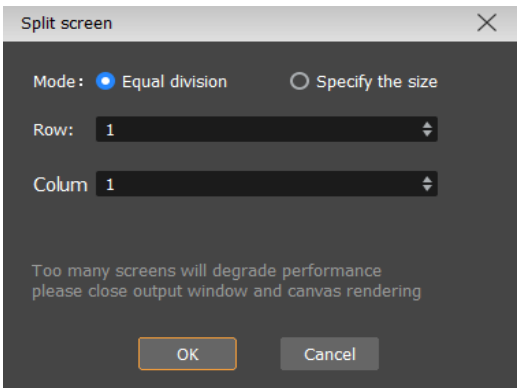


   - **Name**: Assign a descriptive identifier for the port.
   - **Local**:
     - Checked: Binds to the local GPU output.
     - Unchecked: Adds a remote display port. Select the target remote device first.
   - **Output Source**:
     - Lists detected GPU ports, BMD capture cards (output-enabled), NDI, and SPOUT.
     - Select **None** for temporary association (configure later).
     - **Exclusive Binding**: Each port/capture device can only be bound to one display port. Re-binding resets prior associations.
     - **NDI/SPOUT**: Network streams (non-physical devices). Available for all display ports.
   - **Display Dimensions**: Defines the mapped size on the virtual screen canvas. Match physical output resolution for pixel-perfect results.

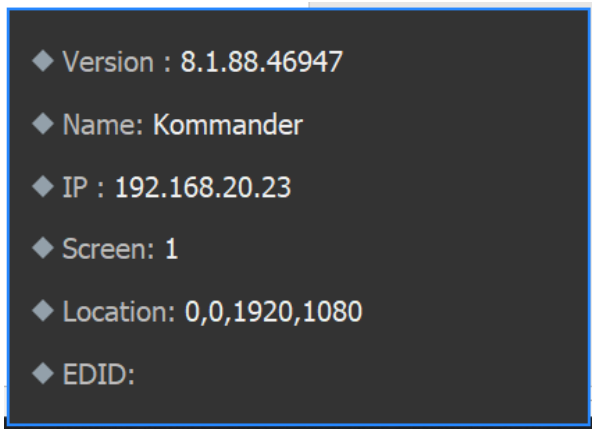
2) **Edit Display Port Properties**



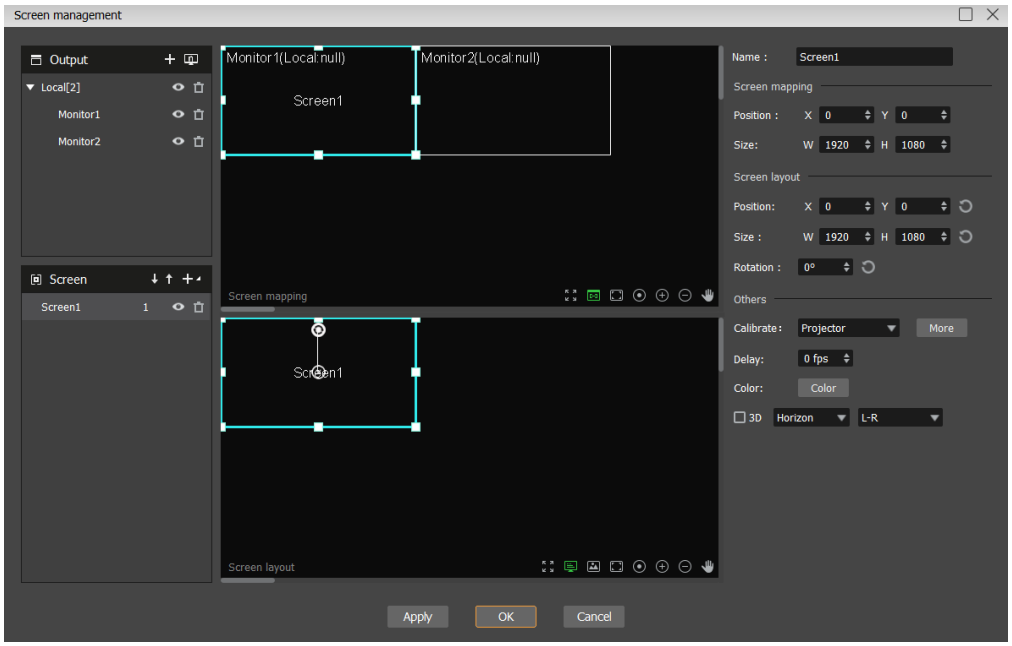
- **List View**: Organized by device-port pairs.
- **Enable/Disable**: Toggles output. Disabled ports are hidden in screen mapping.
- **Type**: Local (GPU) or Remote (networked device).
- **Display Unit**: Target output terminal (editable).
- **Output (Physical Port)**: Specifies the terminal's output connector.
- **Position & Size**: Virtual canvas coordinates. Align with physical port dimensions for optimal accuracy.
- **Partial Output**:
  - **Physical Display**: Enable to render content on a subsection of the physical screen (e.g., windowed output).
- **EDID/K0 Settings**: Configure parameters for K0 multi-screen processors or output boards (see server documentation).
- **Output Mode** (capture cards only): Sets resolution and frame rate.
- **Port Splitting**:
  - Split display ports into sub-screens via canvas  or right-click menu.
  - Supports custom row/column splits or uniform tile generation.



- **Layout Sync** : Toggles automatic canvas-layout synchronization during edits.
- **Display Overlay** : Enable to show port identifiers on physical screens.



6.11.2.3. Screen Groups & Screens



1) **Screen Groups**:
   - Organize screens (e.g., multi-layer projections). Supports group enable/disable.
   - No advanced functionality currently.
2) **Screens**:
   - Core mapping unit. Defines output-to-port relationships and canvas regions.
3) **Screen Order**:

- Overlapping screens render in list order. Adjust sequence if output mismatches expectations.

4) **Create Screen**:
   - Auto-assigns to available ports. Use **Split** via port context menu for fixed mappings.
5) **Screen Properties**:
   - **Name**: Customizable identifier.
   - **Mapping – Position & Size**: Virtual canvas coordinates (pixel-perfect for LED projects).
   - **Layout – Position, Size, Rotation**: Physical screen alignment (match real-world setups).
   - **Calibration**: Options: None, Blending, Scalable Blending (see **Projection** section).
   - **Output Delay**: Compensates for projector latency (frame-based adjustment).
   - **Color Correction**: Addresses output color deviations (e.g., projector tinting).
   - **3D Effects**: Configured in 3D workflows.
   - **Screen Name Overlay**  : Toggle visibility in the layout canvas.
   - **Preview (Layout Mirroring)**  : Syncs main canvas edits to the layout window.

6.12. Projection Workflows

Review Section 5.11 (Screen Management) before proceeding.

6.12.1. Core Concepts

Projection scenarios include flat/curved screens, domes, buildings, and irregular surfaces. While the software supports basic blending (geometry correction, edge fusion, color matching), complex setups (e.g., high-precision domes) require **Scalable** or **MPCDI** data generated by third-party tools (*domeProjector*, *Vioso*).

6.12.2. Projector Selection & Installation

1) **Uniform Models**: Use identical projectors (batch/model) to minimize color/brightness variance.
2) **Stable Mounting**: Prevent vibrations and ensure thermal management.
3) **Overlap & Alignment**:
   - Projector coverage must exceed target area by 20%.
   - Maintain consistent overlap zones (use laser levels for calibration).
4) **Brightness**: Ensure darkest areas meet client specifications.

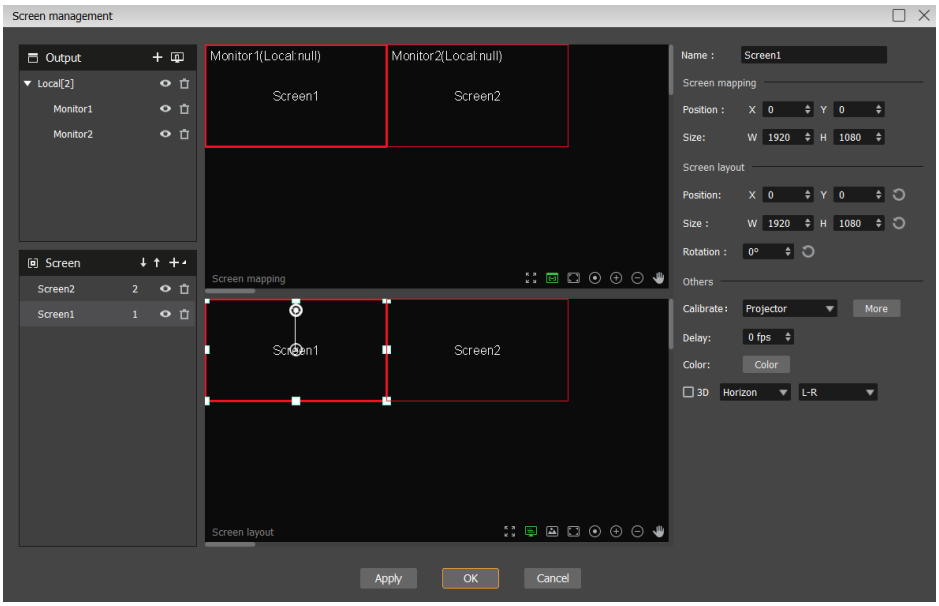
6.12.3. Pre-Projection Planning

1) **CAD Diagrams**: Map site dimensions, obstructions, and projector placement.
2) **Content Samples**: Clarify client expectations (resolution, media types).
3) **Design Mockups**: Define optimal viewing angles and environmental constraints.

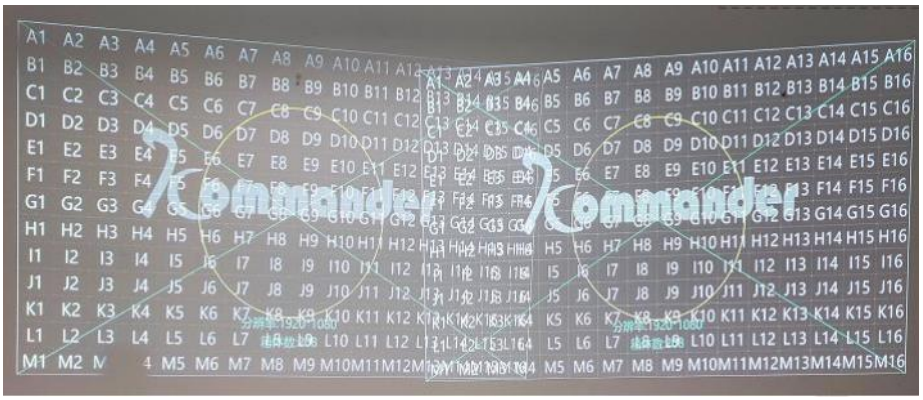
6.12.4. Basic Blending Workflow

Example: 1×2 flat projection.

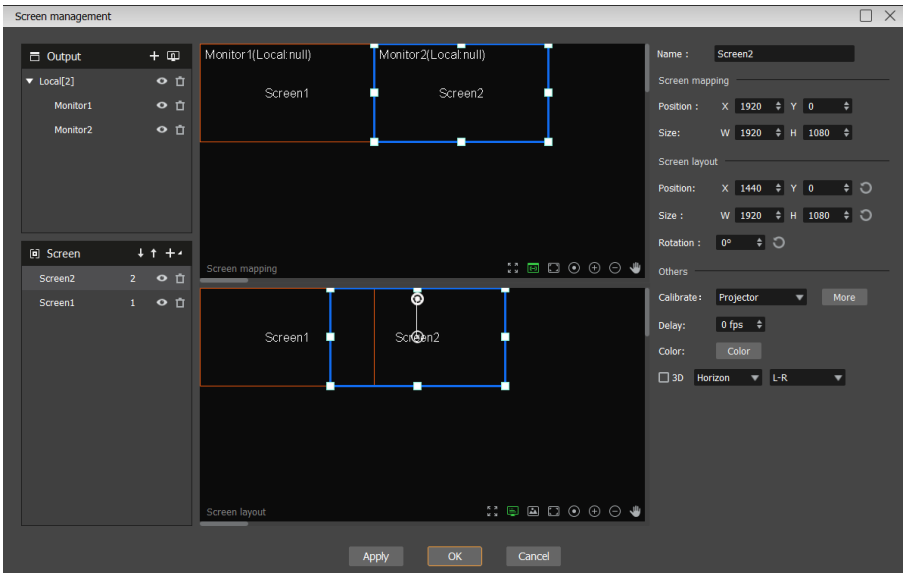
1) **Calibration Grid**: Generate a 16×9 grid @120px for alignment.
2) **Screen Setup**:
    - Create two display ports (linked to projectors).
    - Map two screens to cover both ports.



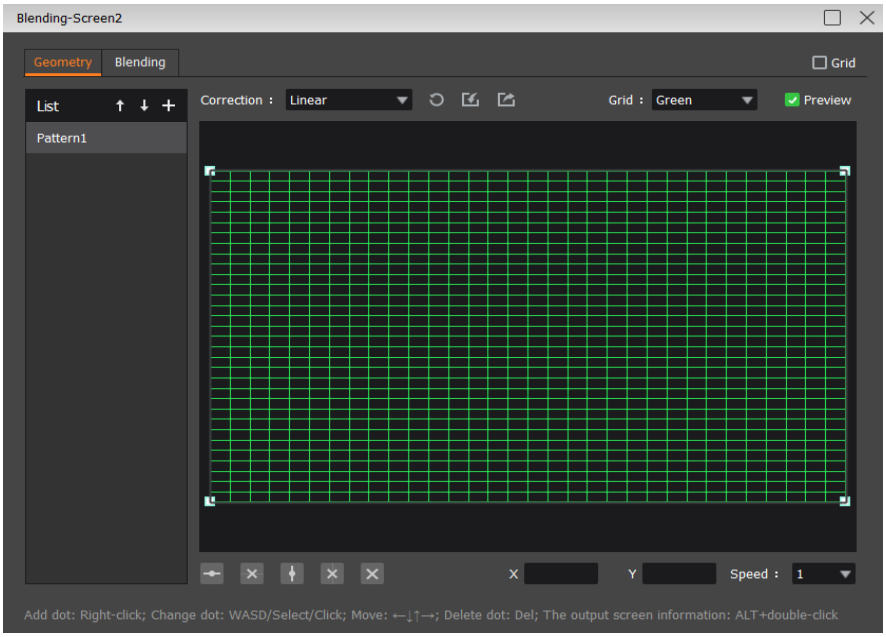
3) **Content Placement**:
    - Drag the grid to both screens.
    - Measure physical overlap columns (determines blend zone).



4) **Screen Adjustment**:
   - Align virtual screen overlap (e.g., set Screen 2's X-position to 1440).
   - Optimize overlap to ~20% for balanced performance.



5) **Geometry Correction**:
   - Select a screen → **Calibrate (More)** → Adjust warping first.



① Calibration Mode Selection

- Linear Correction: For flat projections (linear transformations).
- Perspective Correction: For surfaces requiring perspective adjustments (e.g., near-far scaling effects).
- Comprehensive Correction: For non-planar surfaces (e.g., domes, spheres).

② Control Point Adjustment

- Select points via mouse click or **Ctrl + arrow keys**.
- Adjust positions via mouse drag-and-drop or arrow keys (speed adjustable).
- Add points: Row/column-based insertion or **Ctrl + mouse click** for single points.
- Delete points: Use **Del** or dedicated buttons.

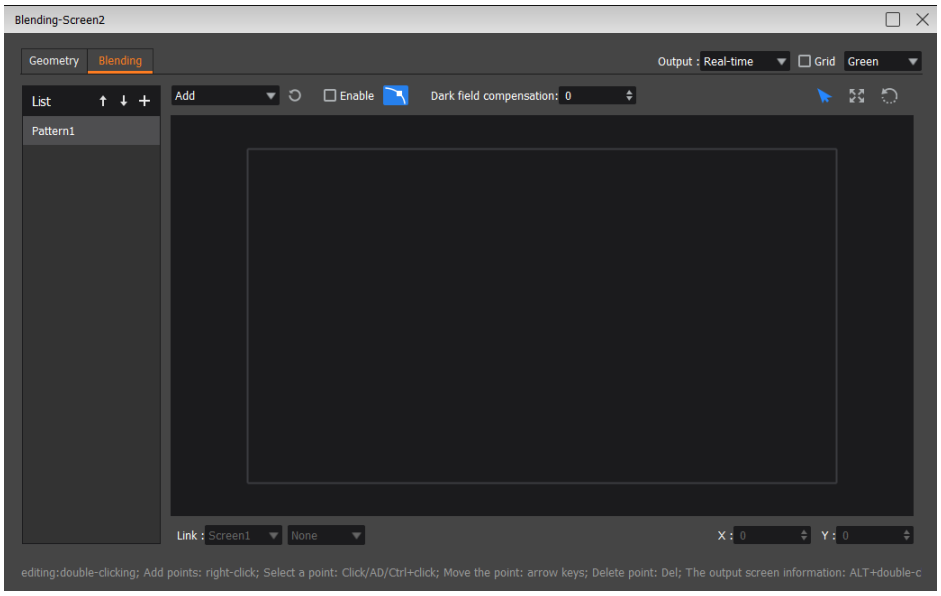
③ Debugging Tips:

- Use **numbered grid patterns** as reference material.
- Focus on blend zone innermost points for flat/curved projections. Adjust points inward to avoid content clipping.
- Simultaneously calibrate overlapping screens to maintain grid proportionality.
- Minimize control points to reduce complexity and artifacts.

④ Additional Notes

- **Multi-Template Support**: Save/load templates for different outputs or temporary states.
- **Data Import/Export**: Transfer calibration settings.
- **Grid Overlay**: Toggle visibility and customize colors for alignment checks.
- **Remote Debugging**: Use **Alt + double-click** on external screens for direct calibration.

6) **Blend Zone Configuration**



① **Initial Setup**:

- Set output to **white** for visibility.
- Enable **grid overlay**.

② **Blend Zone Creation**:

- Add zones based on overlap regions.
- Use **polygon/elliptical masks** to exclude areas (e.g., building windows).

③ **Zone Editing**:

- Link zones to screens for synchronized adjustments.
- Double-click zones to edit control points. Align zone gradients with physical overlap:
  - **Method 1**: Input XY coordinates (e.g., offset by 480px for 4-column overlap on 1920px output).
  - **Method 2**: Drag points to match grid boundaries.
- **Scaling/Rotation Tools**: Adjust zone dimensions or angles.

④ **Edge Curve Optimization**:

Initial Setup:

- Set output to **white** and enable grid lines.

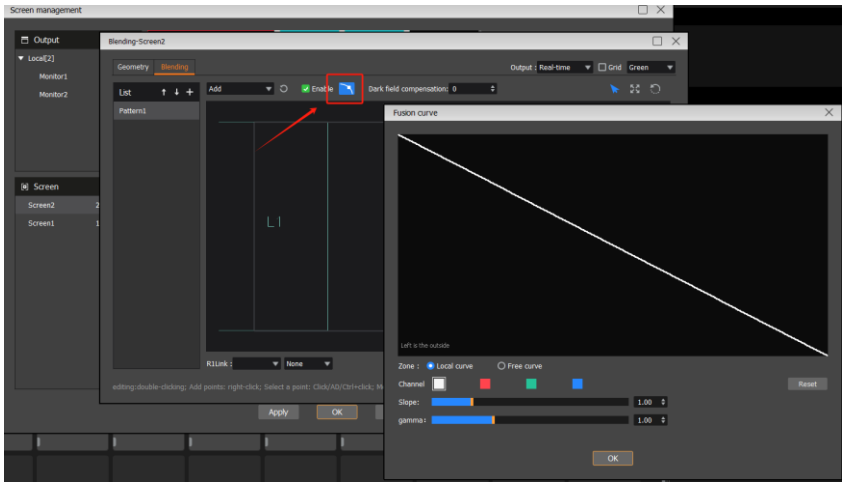
Add Blend Zones:

- Create zones based on overlap regions.
- Mask unwanted areas (e.g., building windows) using polygons/ellipses.

Edit Blend Zones:

- Link zones to screens for synchronized adjustments.
- Double-click zones to edit control points until grid lines align perfectly.
- **Method 1**: Manually input coordinates (e.g., offset by 480px for a 1920px grid with 4 overlapping columns).
- **Method 2**: Drag points while grid lines are visible.
- **Scaling/Rotation**: Use dedicated tools to resize or rotate zones.

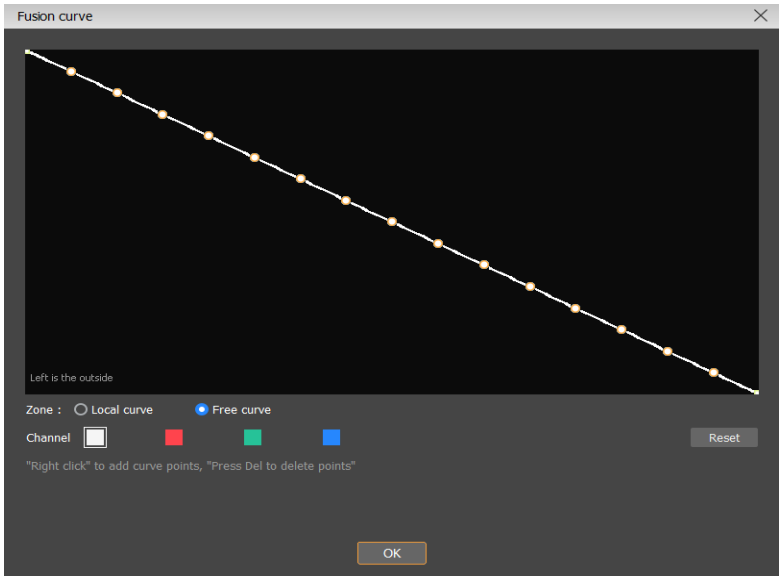
Edge Curve Adjustment:



- Link adjacent zones for unified curve editing.
- **Local Curves**: Fine-tune gamma values for white, red, green, and blue channels.
- **Freeform Curves**: Add/remove points and adjust via arrow keys for precision.

Validation:

- Test with final content and disable blend tools to verify output.
- **Gamma Adjustment**: Fine-tune white channel via keyboard (↑/↓ keys).
- **RGB Channel Calibration**: Independently adjust red/green/blue curves.
- **Freeform Curves**: Use 16-segment control points (prioritize keyboard precision).



⑤ **Validation**:

- Test with final content to verify seamless blending.

⑥ **Color Calibration Note**:

- Projector color adjustments are recommended post-geometric calibration.

6.12.5 Projection Assistant

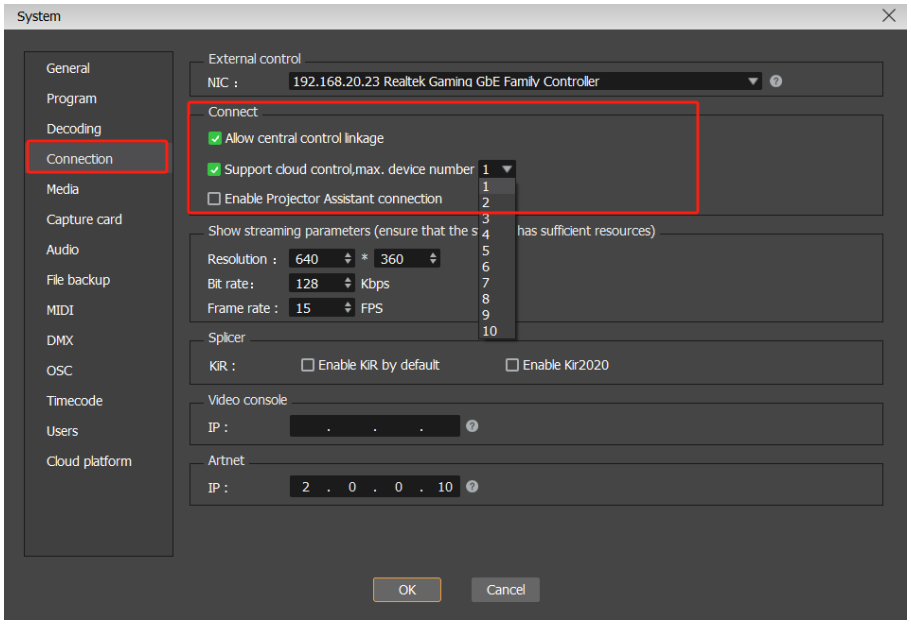
6.12.5.1. Overview

The **Projection Assistant** is a debugging tool that connects to the **Kommander Master** to perform real-time geometric and blend zone adjustments. Key features:

- **Multi-User Collaboration**: Enable parallel debugging across screens.
- **Real-Time Sync**: Changes apply immediately to display outputs.
- **Compatibility**: Works with standard blending workflows (excludes Scalable/MPCDI).

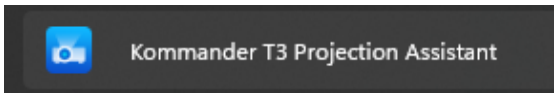
6.12.5.2. Kommander Master Configuration

1) **Enable Connections**:
   - Navigate to **System Settings > Connections**: Enable **"Allow Projection Assistant Access"** and set maximum user limits.



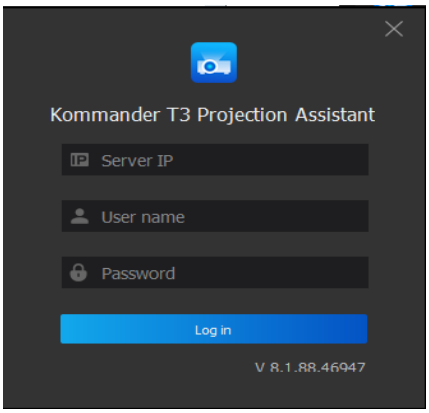
2) **User Accounts**:
   - Add debugger accounts via **System Settings > Users**. Login credentials are mandatory for security.
3) **Screen Setup**:
   - Create screens in **Screen Management** and map to display ports.
   - Pre-process overlap regions to align physical and virtual outputs.

6.12.5.3. Launch, Login, and Usage Instructions



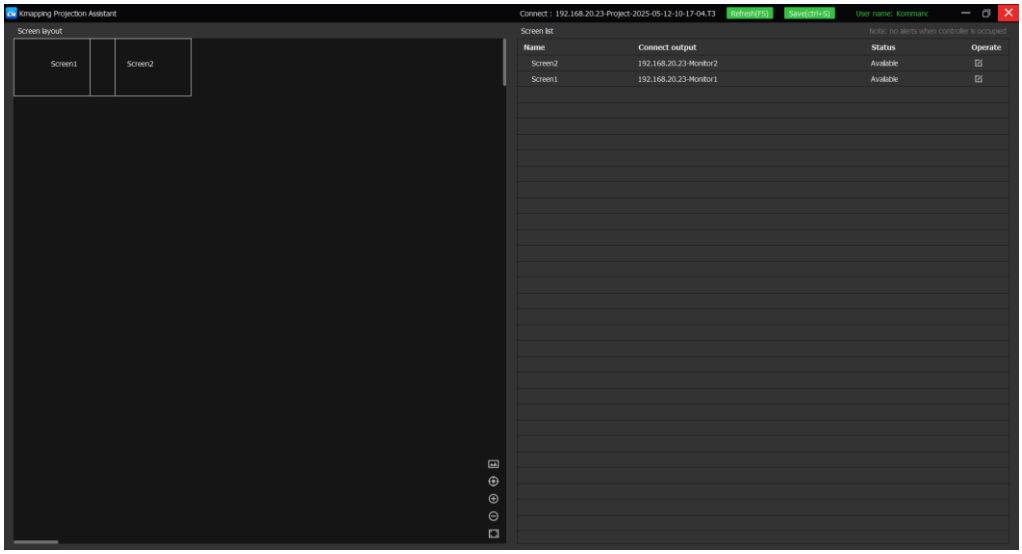
The **Projection Assistant** is bundled and installed with the Kommander software. By default, no desktop shortcut is created. Users can launch it via the **Start Menu** or the installation directory.

- **Login**: Enter the Primary Terminal IP, username, and password, then click **Confirm** to connect.



- **Account Notes**:
    - While the system permits simultaneous logins with the same account, this is **not recommended**, as it disrupts screen occupancy tracking.

Main Interface:



- **Left Canvas**: Displays screen layouts. Click to select a screen; double-click to open its calibration window.
- **Right Panel**: Lists screens with associated display ports and editing status (locked/unlocked). Click **Edit** to open the calibration interface.

Editing Workflow:

- **Save**: Use **Ctrl+S** to preserve adjustments.
- **Sync Data**: Press **F5** to refresh if discrepancies arise between the Assistant and Kommander.
- **Exclusive Access**: Only one user can edit a screen at a time. Monitor occupancy status to avoid conflicts.

6.12.6. Scalable Projection

Scalable technology (third-party) automates blending based on projector channels, ideal for complex scenarios. Licensing is per channel.

Workflow:

1) **Phase 1 – Calibration with Third-Party Tools**:
    - Deploy cameras and projectors.
    - Generate per-projector warping/blending files using third-party software (e.g., domeProjector, Vioso).
2) **Phase 2 – Handover to Broadcast Software**:

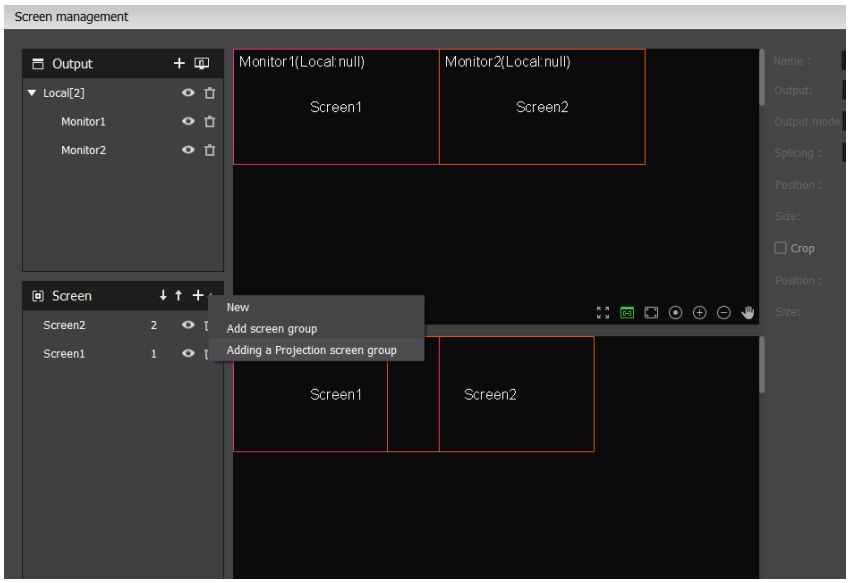
- Remove third-party tools and cameras.
- Link warping/blending files to screens in **Screen Management**.

6.12.7. Projection Screen Groups & MPCDI Projection

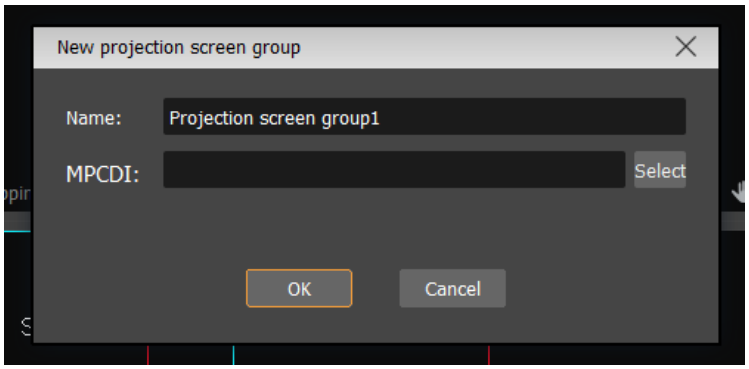
Similar to Scalable, MPCDI uses third-party tools for calibration, exporting MPCDI files (universal format for warping, blending, and color data) for broadcast software.

Implementation Steps:

1) **Add Projection Screen Group**:
   - In **Screen Management**, select **Add Projection Screen Group**.



   - Specify a group name and MPCDI file path (supports MPCDI 2.0 only).



   - *Note*: Loading delays may occur due to large file sizes.
2) **Configure Screen Group**:
   - **Resolution & Mapping**:
     - Set dimensions per projector resolution (use **full resolution** for mosaic/tiled setups).
     - Map projectors to display ports.
   - **Canvas Region**:

- Define the screen group's capture area on the canvas. Use default dimensions (from MPCDI) or custom values.

3) **Content Testing**:
   - Drag media to the projection screen group area for preview.
4) **MPCDI Updates**:
   - To regenerate MPCDI data without altering projector count/resolution, import new MPCDI files via the group's properties.

6.13. Timecode

6.13.1. Introduction

Timecode is a numerical code used to identify the position of each frame or sample in video or audio. It typically consists of hours, minutes, seconds, and frames (e.g., 01:23:45:12 represents 1 hour, 23 minutes, 45 seconds, and 12 frames). Timecode enables precise positioning within media files for editing, synchronization, and post-production workflows.

In live performances, timecode is commonly used to synchronize playback of lighting, sound effects, and video elements. By feeding timecode into control systems, devices can execute actions with millisecond precision, ensuring seamless coordination across multimedia components. To achieve this synchronization, protocols such as **MIDI Timecode (MTC)** or **Linear Timecode (LTC)** are employed. Common use cases include:

- Synchronizing lighting and video with music tempo in concerts.
- Triggering screen content based on game clock data in sports events.
- Coordinating multi-screen playback in commercial presentations.

In live setups, timecode is typically generated by a **master controller** (e.g., an audio mixer) and distributed to other devices. However, the master controller may vary per event, meaning the broadcast control software could act as either the **timecode sender** or a **receiver**. Thus, the software must support both transmitting and receiving timecode.

6.13.2. Usage Considerations

While timecode provides precise timing, practical challenges may affect perceived synchronization:

1) **Latency in MTC**: Network-based MTC may introduce delays (up to ~1 second).
2) **Device Response Variability**:

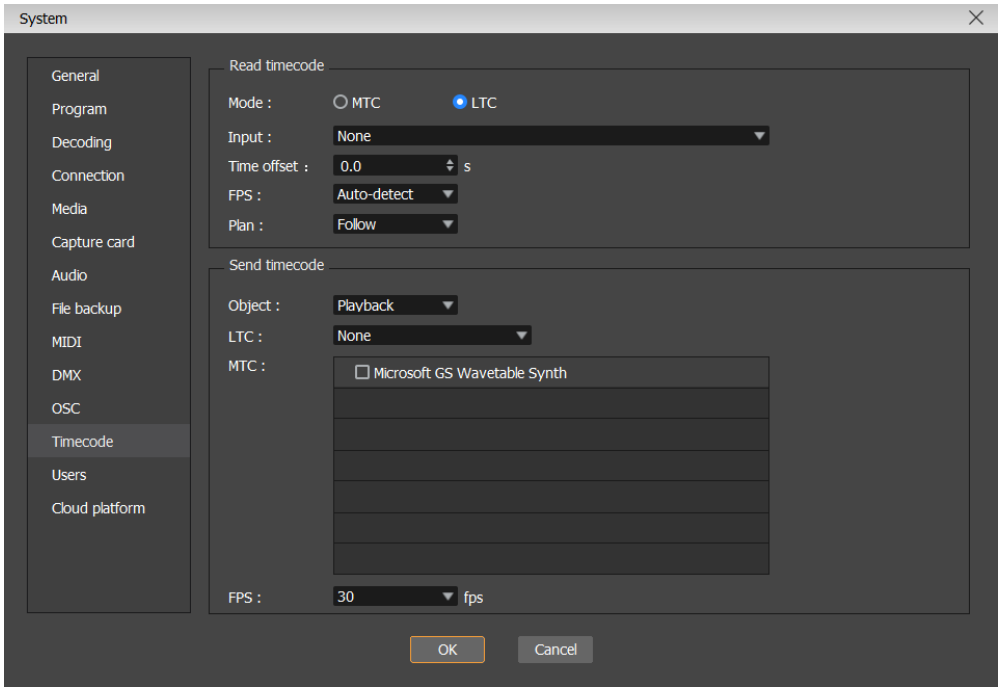
- Devices like video media servers require time for file loading, decoding, rendering, and multi-device synchronization, preventing instantaneous responses.
- Audio consoles may exhibit delays due to the slower propagation speed of sound vs. light, causing visual elements to trigger before audible cues.

3) **Timecode Jitter**: Intermittent frame or second drops may occur.

Mitigation Strategies:

1) **Pre-Event Coordination**:
   - Define all timecode-linked components and confirm each team's response latency.
2) **Audio Console Configuration**:
   - Add a **prefix lead-in duration** (silent timecode playback before actual content) to accommodate synchronization delays. *Optional for low-sync-critical scenarios.*
3) **Program Design**:
   - For timeline-based playback systems: Offset media files by the lead-in duration (e.g., delay playback by 3 seconds). This ensures smooth startup and sync with audio.
   - For unstable timecode environments: Use **trigger-based actions** (event-driven cues) instead of real-time sync. *Note: Seek operations in this mode may cause playback stutter.*

6.13.3. System Settings – Timecode



This module configures timecode sources, synchronization methods, and transmission settings when acting as a sender.

Timecode Receiver Configuration

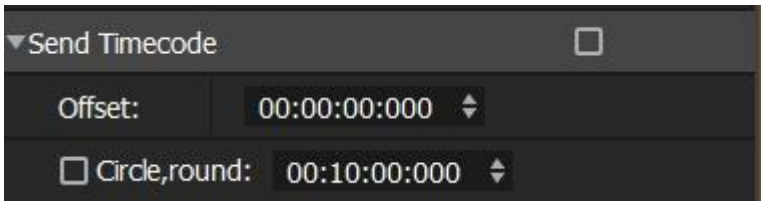
1) **Mode**:
   - **LTC** (Linear Timecode) or **MTC** (MIDI Timecode). Select based on the sender's format.
2) **Input Device**:
   - For **MTC**: MIDI devices detected via protocol.
   - For **LTC**: Audio signal, typically bound to a sound card (avoid using the same sound card for audio output to ensure signal purity). Select based on physical connections.
3) **Time Offset**:
   - Unit: Seconds (can be negative). Adjusts received timecode to resolve fixed synchronization discrepancies.
4) **Frame Rate**:
   - Auto-detected by default. Manually set for known frame rates to minimize drift.
5) **Synchronization Mode – Plan Projects**:
   - **a. Playback Sync**:
     - Syncs plan invocke
       ation, seek, play, and pause actions strictly to timecode. Automatically recalculates and seeks to the correct position if timecode is interrupted.
   - **b. Plan Switching Only**:
     - Triggers only plan changes. Ignores playback sync, risking missed triggers during playback.
6) **Synchronization Mode – Timeline Projects**:
   - **a. Master Timeline Sync**:
     - Master timeline strictly follows received timecode for play, pause, and seek (similar to plan playback sync).
   - **b. Play Command Sync**:
     - Matches received timecode to predefined play command timestamps. Jumps to the command position when matched; plays autonomously otherwise.

Timecode Sender Configuration

1) **Transmission Source**:
   - **a. Plan Timer**: Sends timecode based on plan start time.
   - **b. File Playback Progress**: Sends timecode from a file's playback progress. **Note**: Avoid concurrent file-based timecode sources to prevent conflicts.
   - **c. Selection**: Choose based on workflow requirements.

2) **Output Devices**:
   - **a.** MIDI and audio devices.
   - **b.** Supports broadcasting to multiple devices simultaneously.
   - **c.** Concurrent MTC and LTC transmission allowed.
3) **Output Frame Rate**:
   - Default: 30 FPS. Adjust based on precision requirements.

6.13.4. Plan Projects – Timecode Transmission



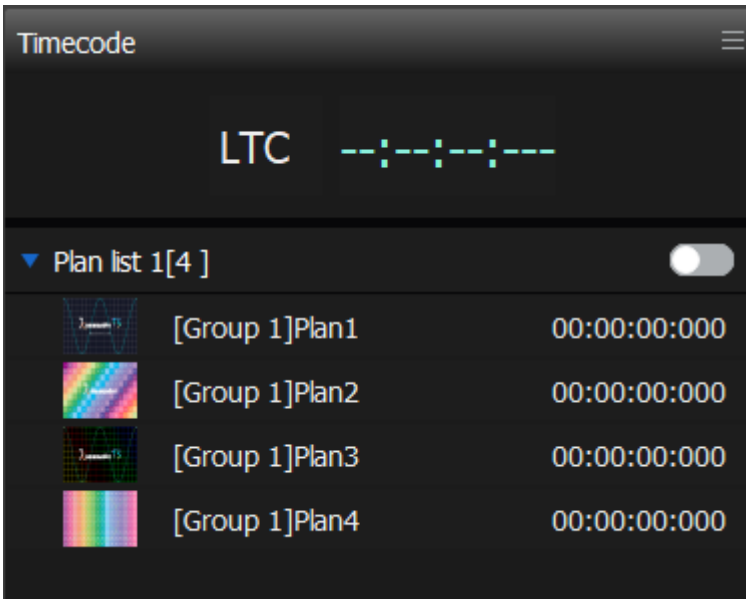
1) **Configuration**:
   - Enable timecode transmission in both **plan properties** and **file properties**. Looped files generate cyclic timecode for repetitive triggers.
2) **Time Offset**:
   - Define offsets to distinguish timecode triggers across scenarios.
   - **Formula**: Transmitted timecode = plan timer/file progress + offset.
     - Example: Plan 1 (offset = 0) sends 0:00:00:00; Plan 2 (offset = 1 hour) sends 1:00:00:00 + file progress.
3) **Single Source Rule**:
   - Only one active timecode source is allowed. Avoid overlapping transmissions.

Tips:

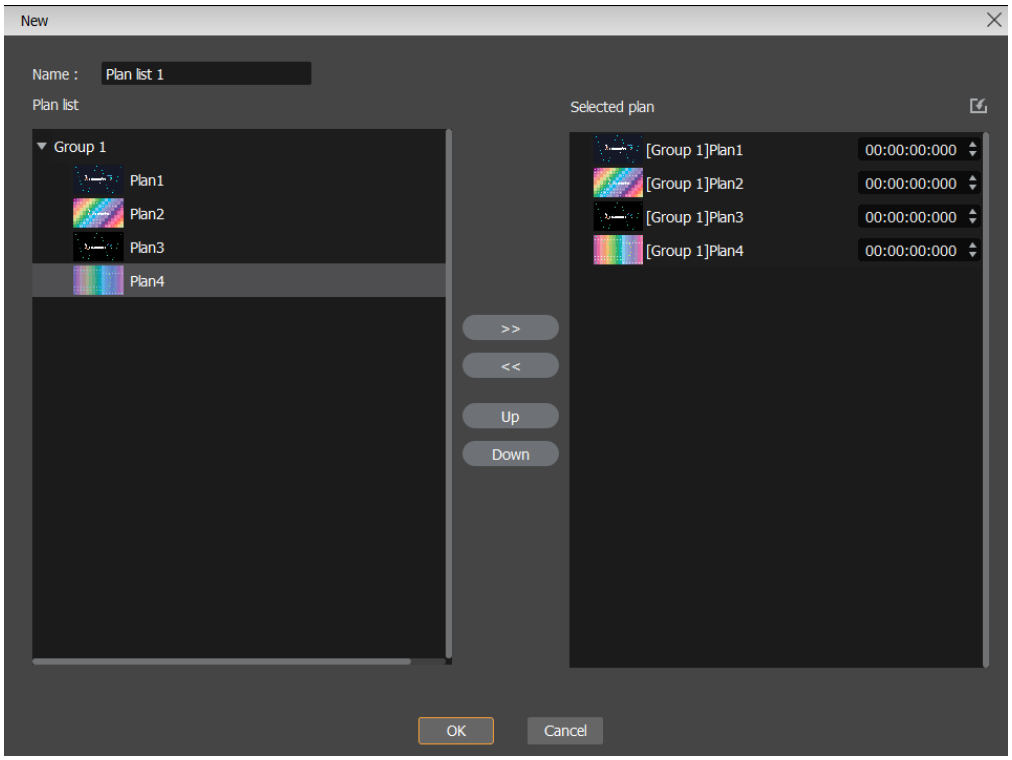
- Uncheck **"Start from Beginning"** to allow files to span across plans.
- For image files, set a fixed duration and use offsets to generate custom timecode ranges.

6.13.5. Timecode Sync Window & Plan Trigger Setup

1) **Prerequisites**:
   - Configure timecode receiver and sync mode in **System Settings > Timecode**.
   - Open the **"Timecode Sync Window"** to create plan trigger sequences.



2) **Interface**:
   - Displays current timecode type and value.
   - Supports multiple plan sequences.
3) **Sequence Editor**:
   - **Left Panel**: List of all plans.
   - **Right Panel**: Trigger sequence with timecode values for each plan.



4) **Import/Export**:

- Import trigger times via CSV (e.g., keyframes exported from Cubase).
- Manual CSV editing supported for custom workflows.

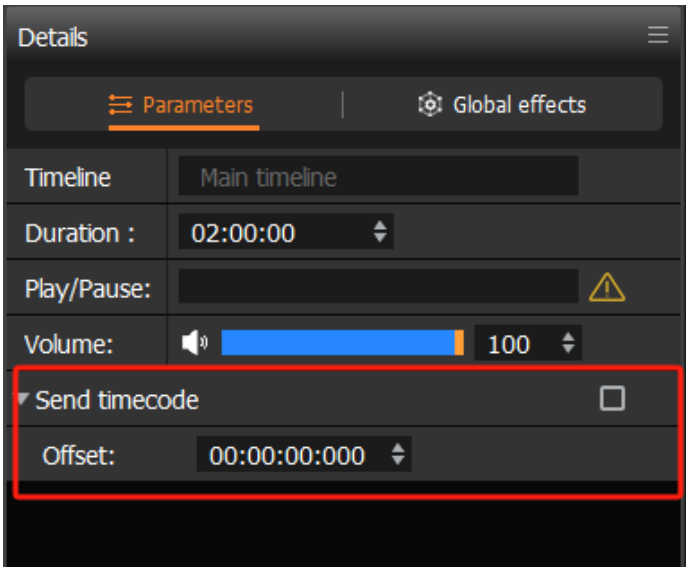
6.13.6. Timeline Projects – Timecode Transmission & Reception

Timecode Transmission in Timeline Projects

- **Master Timeline Only**:
  - Only the **master timeline** can transmit timecode.
  - **Configuration**:
    - **Time Offset**: Adjusts the transmitted timecode value.
    - Transmission stops automatically when the timeline is paused.

Timecode Reception & Synchronization in Timeline Projects

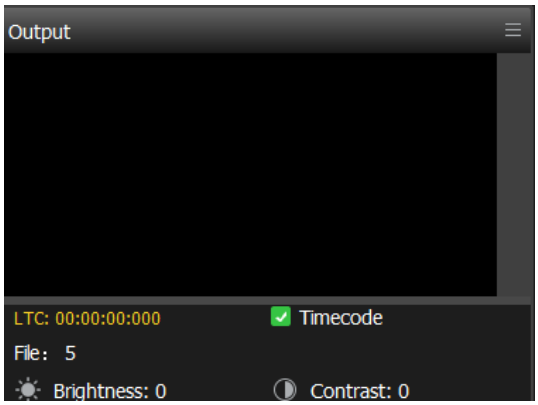
- **Synchronization Modes**:
  - **Master Timeline Sync**:
    - No additional setup required. Synchronizes playback, pauses, and seeks directly with received timecode.
  - **Play Command Sync**:
    - **Setup**: Define **trigger times** in the play command's property panel.
    - **Recommendation**:
    - Offset the play command by a **lead-in duration** (3–6 seconds) to preload files and avoid latency.



Additional Notes

1) **Status Indicators**:
   - The status bar displays real-time feedback for transmitted and received timecode.

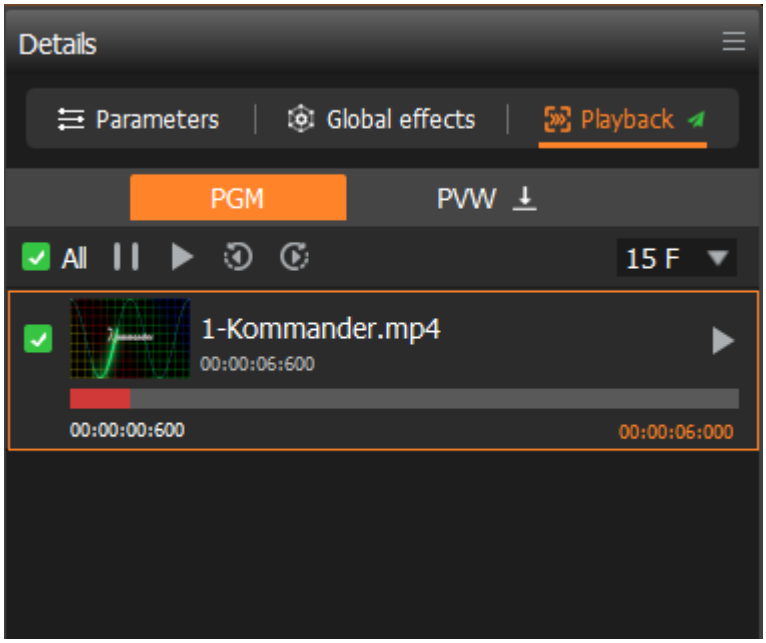
- The output monitoring window includes timecode status and a toggle switch. **Verify the switch is enabled** if synchronization fails.



2) **Hardware Recommendations**:
   - Use a **dedicated timecode interface** (e.g., *Mif4*) for reliable signal routing between devices.
3) **Performance Optimization**:
   - **Video Decoding Overhead**:
     - Apply **time offsets** or delay playback to compensate for high video processing latency.
     - Use **HAP** or **KVC-encoded media** for zero-latency seeking.

6.14. Playback Progress

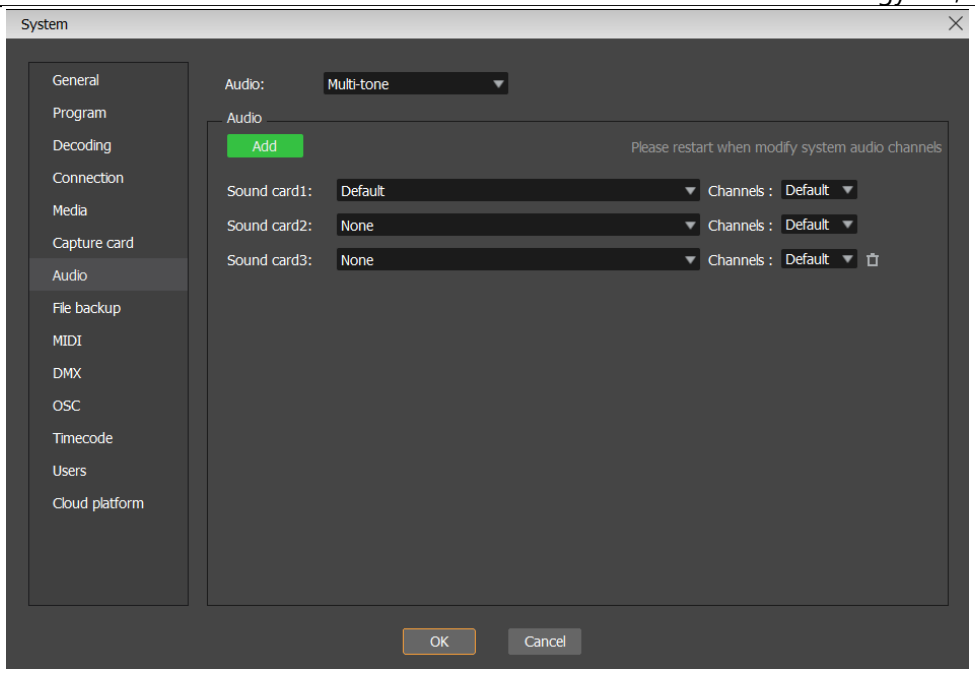
The Playback Progress window can be **embedded within the Properties window** or displayed independently. Switch between modes via the tab name  . When detached, open or activate it from the window menu.



- **Display Modes**:
  - **Flat View**: Shows preview and program mode objects in a single pane.
  - **Paged View**: Toggle via the preview mode tab  or right-click context menu.
- **Functionality**:
  - Displays playback progress and status for each timeline file.
  - Selecting a file synchronizes with canvas object selection, aiding in overlapping object management.
- **Single-File Operations**:
  - **Play/Pause**: Use the control button  next to the file.
  - **Context Menu**: Delete windows or jump to specific timestamps.
- **Batch Operations**:
  - **Top Bar Controls**: Batch pause, play, rewind, or advance selected files. Step size is configurable via the dropdown.
  - **Synchronized Seeking**: Relative seek operations apply to all selected files.
  - **Behavior Notes**:
    - Seek actions do not alter playback states.
    - Step-based operations (rewind/advance) pause playback, including single-file jumps.

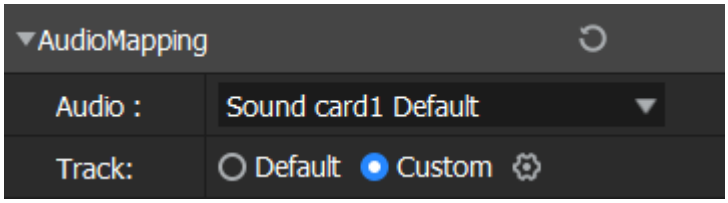
6.15. System Settings – Audio Configuration & Channel Mapping

- **Audio Modes**:
  - **Single Audio**: Only one file's audio is active during canvas output; others are muted.
  - **Multi-Audio**: All files can output audio simultaneously.
- **Audio Device Configuration**:

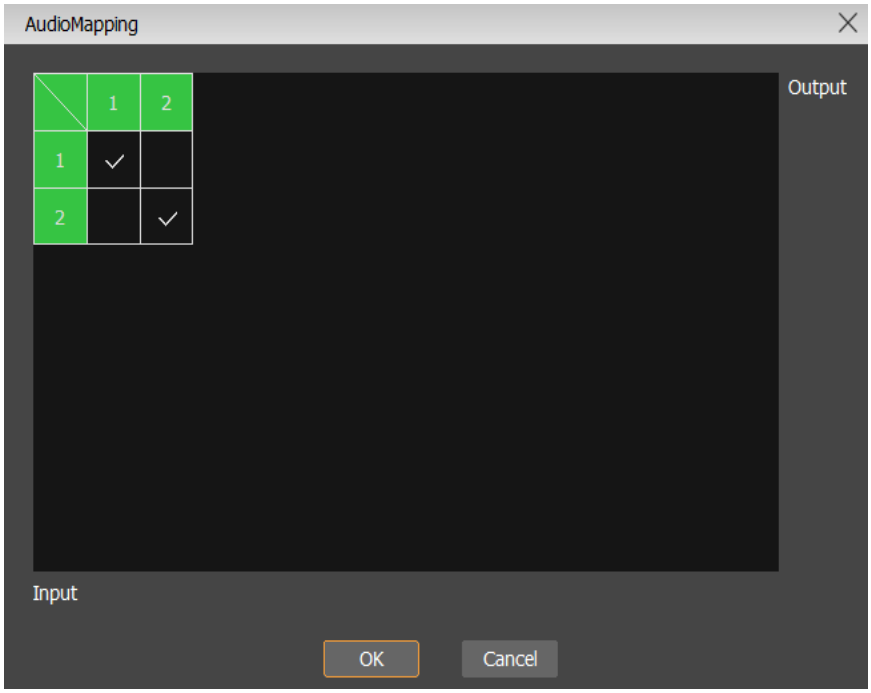


- **Proxy Audio Devices**: Configure multiple proxy devices, each mapped to a physical audio output with customizable channel limits.
  - Default: Sound card 1 uses the system's primary audio device.
  - Multi-device projects require manual setup.
- **Remote Terminals**: Ensure audio-output terminals are properly configured in multi-device systems.

- **File Channel Mapping**:



- **Audio Device**: Assign files to proxy devices (displays physical device names if mapped). Remote devices are not annotated.
- **Track Routing**:

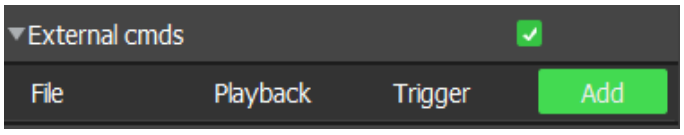


  - Default: 1:1 channel mapping.
  - **Matrix Configuration**: Horizontal = device channels; vertical = file channels. Check intersecting cells to enable output.
  - Supports multi-device mixing for automatic audio blending.
- **Additional Notes**:
  - **External USB Devices**: Configure a **startup delay** to ensure device readiness.
  - **File Replacement**: Channel mappings are inherited from previous files.

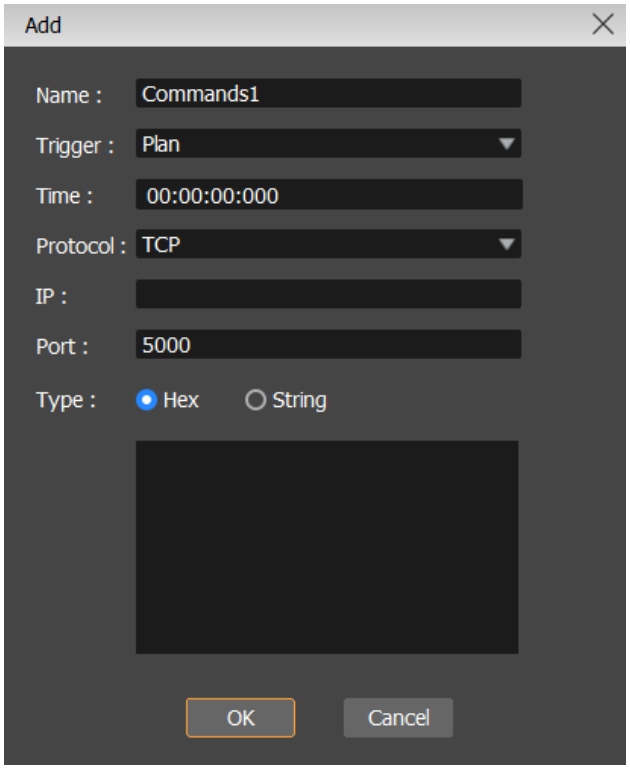
6.16. Command Triggers

Timelines and plans support **command triggers** to synchronize with third-party systems (e.g., snow machines, lighting controllers).

- **Plan Command Configuration**:
  - **Access**: Via plan properties or canvas file properties.



  - **Multi-Command Support**: Add custom triggers with independent timing and targets.



- **Parameters**:
  1) **Trigger Mode**:
  - **Plan Timer**: Triggers after a specified duration from plan activation.
  - **File Playback Progress**: Activates when a linked file reaches a defined timestamp.
  - **Playback End**: Triggers upon file completion (includes last frame pauses or plan jumps).

  2)**Protocol**:

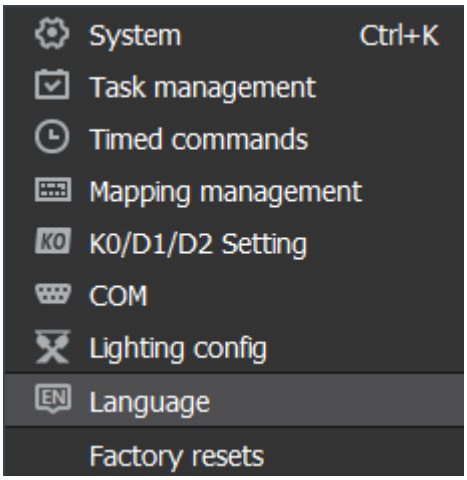
  - **TCP/UDP**: Requires target IP and port. Verify network connectivity.
  - **COM (Serial)**: Configure baud rate, data bits, parity, and stop bits.

  3) **Command Format**: Hex or string, per device protocol.

- **Timeline Command Configuration**:
  - **Insert Command**: Right-click the timeline → **Insert Command**.
  - **Behavior**: Triggers when playback reaches the command marker. Parameters mirror preset configurations.

6.17. Settings

6.17.1. Settings Menu Overview



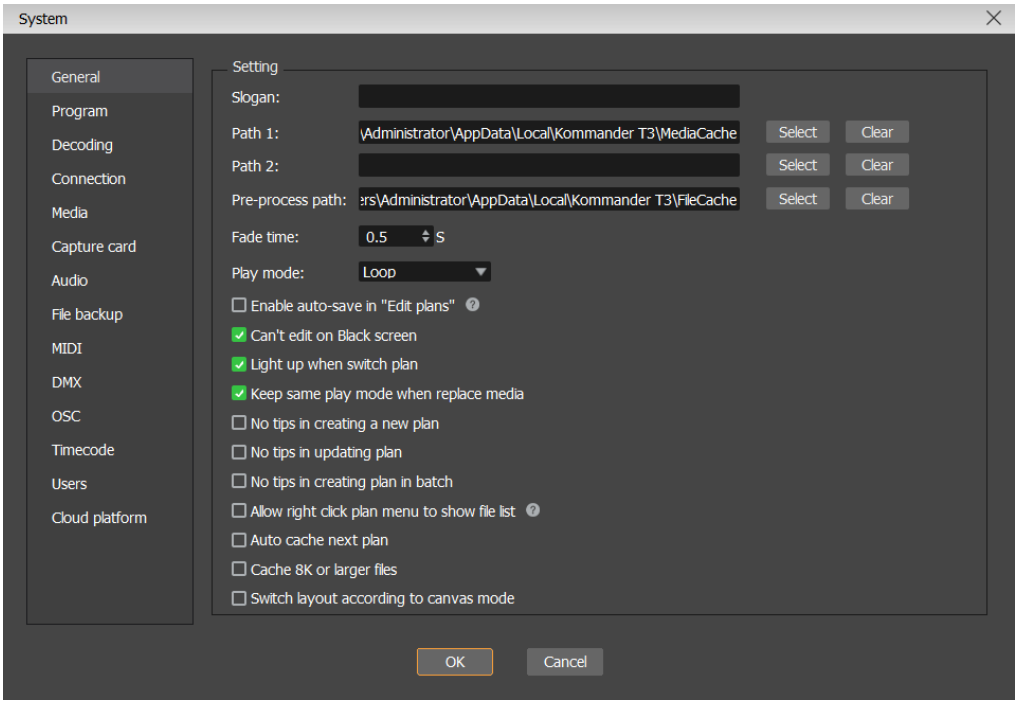
Settings primarily apply to the local terminal software. Some configurations are specific to the current executable (e.g., Controller and Primary Application require separate setups). For remote devices, modify settings via VNC or the multi-link control panel (see *Multi-device Systems* chapter for limitations).

The menu includes:

- **System Settings**: Manages core configurations (program behavior, encoding, etc.).
- **Task Management**: Handles scheduled, looped, and ad-hoc tasks (cloud-sourced).
- **Timed Commands**: Configures triggers for actions like port activation/deactivation.
- **Device Linkage**: Synchronizes with external processors for rapid mode switching.
- **Mapping Management**: Customizes keyboard, MIDI, OSC, DMX, and Kinect gesture mappings.
- **Lighting Library Configuration**: Links lighting consoles to canvas element controls (e.g., file switching).
- **Language**: Toggles UI language.

6.17.2. System Settings

6.17.2.1. General Settings



1) **Output Banner**: Custom text displayed during project initialization (e.g., splash screen).

2) **Cache Paths**:
   - **Cache Path 1/2**: Stores files received in multi-device systems. Assign to high-capacity drives.
   - **Clear Cache**: Regularly purge *MediaCache* and temporary files (e.g., PPT images, thumbnails). Retains active project data but may require restarting projects if anomalies occur.
3) **Fade Duration**: Default transition time for preset switching and blackout.
4) **Default Playback Mode**: End behavior for newly added canvas files.
5) **Disable Editing During Blackout**:
   - Enabled: Blackens both output and canvas windows.

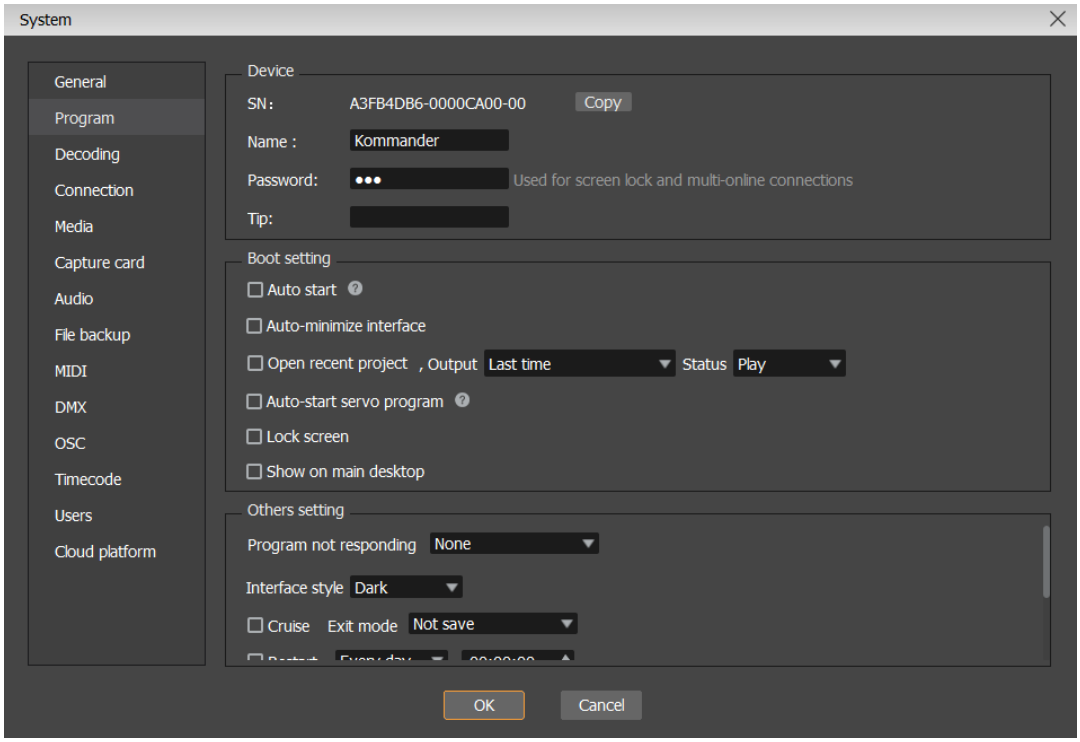
- Disabled: Output window blacks out; canvas pauses but remains editable.

6) **Inherit Playback/End Modes on Asset Replacement**: Toggles inheritance from replaced files.
7) **Suppress Confirmation Prompts**:
   - "Update Plan," "Save As Plan," and "Batch Generate Plan" dialogs.
8) **Enable File List in Plan Context Menu**:
   - Impacts performance; disable to optimize responsiveness.
9) **Auto-Cache Plans**: Preloads queued plans to accelerate switching (requires available system resources).
10) **Allow 8K+ File Caching**: User-defined permission for large file caching (may affect playback performance).
11) **Layout Sync with Canvas Mode**:

- **Program Mode** vs. **Preview Mode**: Automatically switches window layouts.
- **Custom Layouts**: Adjust and save via *Window* > *Save Layout*.
- **Restart Behavior**: Relaunching the application defaults to Program Mode layout.

6.17.2.2. Application Settings

This section configures application-specific parameters.



1) **SN (Serial Number)**:

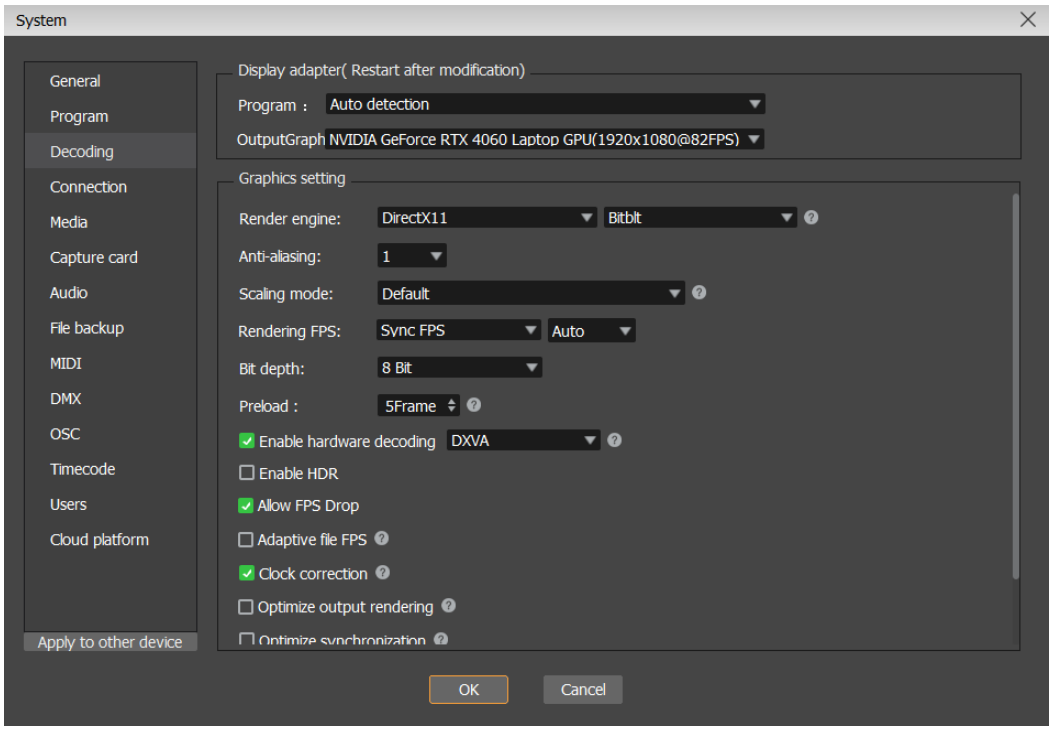
- A unique identifier for the application, used for cloud platform device recognition and encrypted video playback authorization.

2) **Name**:
   - Display name in multi-device networks.
3) **Password**:
   - Multi-link connection password and screen unlock credential to prevent unauthorized access.
4) **Hint**:
   - Reminder for unlocking the main interface.
5) **Auto-Start (on Boot)**:
   - Enable/disable auto-launch with optional delay to ensure system readiness (e.g., USB audio devices, network IP allocation).
6) **Auto-minimize interface**:
   - Recommended for cruise scenarios (e.g., interactive displays or windowed output).
7) **Open Recent Project (on Launch)**:
   - Auto-loads the most recent project. Optionally autoplay the first plan or resume previous playback state (play/pause).
8) **Auto-Start Servo Program**:
   - Enable for multi-device systems (see *Serveo Program* chapter).
9) **Lock Screen**:
   - User-configurable. Auto-Lock Interface on Launch.
10) **Launch on Primary Desktop**:
    - Forces the main window to the primary desktop regardless of previous position.
11) **Crash Handling**:
    - **No Action**: Rely on self-recovery (unreliable).
    - **Auto-Restart After Delay**: For unattended environments (pair with "Open Last Project").
12) **UI Theme**:
    - Dark (recommended for low-light) or Light (high ambient light).
13) **Cruise Mode**:
    - Disables user prompts; executes default actions.
    - **Sub-option**: Toggle auto-save on exit (default: disabled).
14) **Scheduled Restart/Shutdown**:
    - Configure via *Timed Commands*.
15) **DPI Scaling**:
    - Optimizes UI for high-resolution displays (e.g., 4K). Match system scaling settings.
16) **Server Process Monitoring**:
    - Auto-restarts the application after crashes for cruise recovery.

17) **Media File Deletion Protection**:
    - Blocks external file deletion (e.g., via system explorer).
18) **Output Window Right-Click Menu**:
    - Disable to prevent conflicts with interactive overlays.

6.17.2.3. Codec Settings

Note: Configurations apply locally. Use "Sync Parameters to Multi-device" to propagate settings (excludes GPU adapter configurations).



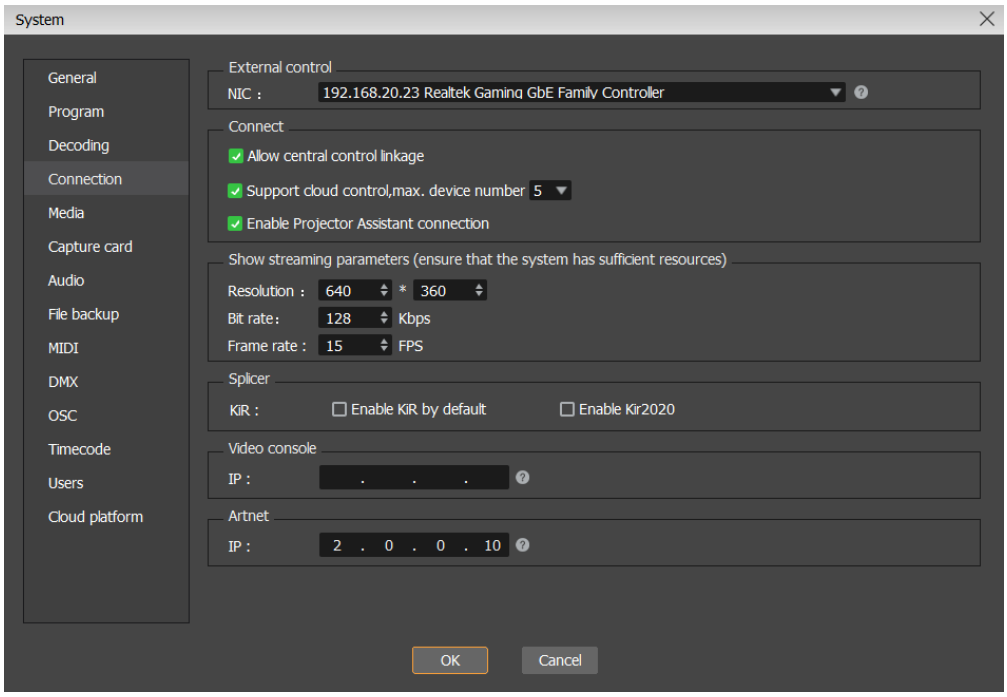
1) **GPU Adapter**:
    - **Rendering Engine GPU**:
        - Primary (canvas rendering) and output GPUs (1–4 GPUs supported; Control Terminal excluded).
        - **Auto-Detect**: Default mode; manually override if needed.
        - **Output GPU**: Prioritize dedicated GPUs for performance. Verify alignment during performance issues.
    - **Hot-Swap Handling**:
        - Disconnecting GPUs triggers "Display Device Lost" warnings. Reconnect or restart the application.
2) **Rendering Engine**:
    - **Windows**: Direct9, Direct9 EX, Direct11, OpenGL.
    - **macOS/Linux**: OpenGL.
    - **Recommendation**: Direct11 (supports HDR/10-bit output).
3) **Anti-Aliasing Level**:

- Higher levels reduce visual artifacts at increased computational cost.

4) **Scaling Mode (Image)**:
   - **Default**: Balanced quality/performance.
   - **High Quality**: Optimized visuals (resource-intensive).
   - **Low Quality (Pixel Decimation)**: For 3D interlaced video playback.
5) **Rendering Frame Rate**:
   - **Fixed Rate**: Manual refresh rate (no GPU sync).
   - **GPU-Synced**: Matches detected GPU frame rate (may require manual calibration for multi-device sync).
6) **YUV Mode**:
   - **YUV1**: Driver-dependent color space conversion.
   - **YUV2**: Proprietary implementation (default for Direct11).
7) **Bit Depth (Output Color Depth)**:
   - **8-bit**: Standard displays.
   - **10-bit**: HDR/High-precision scenarios (requires backend compatibility).
8) **Preload Buffering**:
   - Adjust based on GPU memory. Higher values improve playback smoothness but risk artifacts if oversubscribed.
9) **Hardware Decoding**:
   - **Software Decoding**: CPU-based.
   - **Hardware Decoding**: GPU-accelerated (DXVA, NVIDIA CUDA).
   - **Priority Settings**: Apply to future decodes; reload existing content for changes.
10) **Frame Drop on Performance Limits**:
    - Auto-drops frames to maintain playback continuity.
11) **HDR Enable**:
    - Requires Direct11 engine.
12) **Strict Codec Profile Matching**:
    - **AMD GPUs**: Disable if performance degrades.
    - **NVIDIA GPUs**: Enable if performance degrades.
    - **AMD 680 iGPU (7735HS)**: Forced enable.
13) **Multi-device Sync Optimization**:
    - Balance performance and synchronization:
      - Adaptive File FPS (Frame Rate) ; default: disabled).
      - Clock Calibration (default: enabled).
      - Force Desktop Refresh.
      - Dedicated D3D Decoding (excludes deinterlaced content).
      - Low-Latency Rendering.
      - Render Cycle Correction.
      - Auto-Disable Echo on Canvas/Output Overlap.
      - Force Frame Sync.

6.17.2.4. Connection Settings

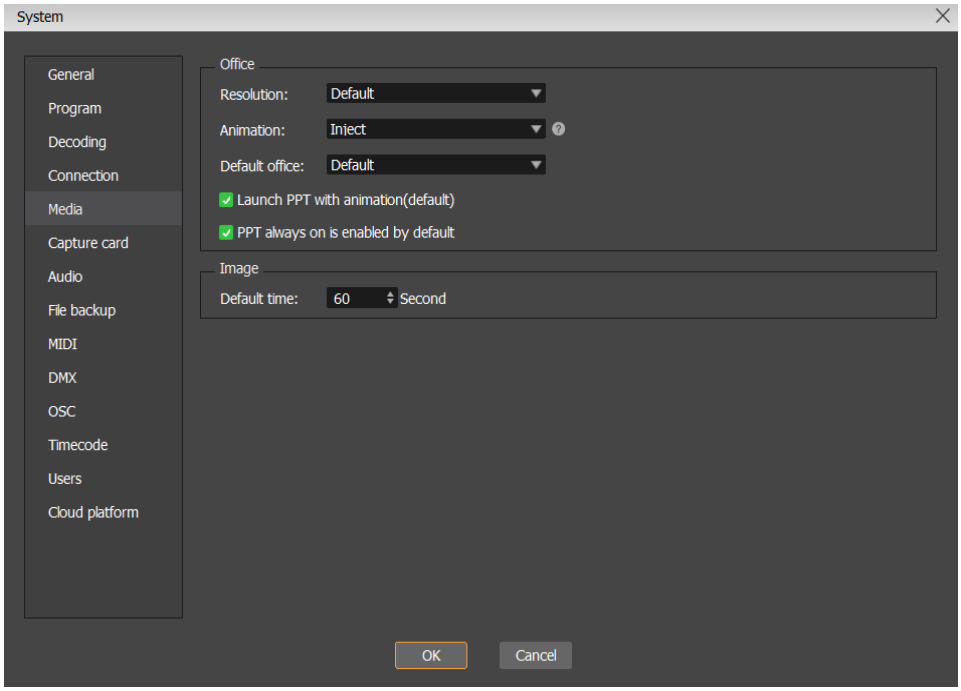
Configurations related to external control interfaces.



1) **NIC (Network Adapter)**:
    - Specifies the network interface used by the software.
2) **Connection Restrictions**:
    - **Enable Central Control via Network**: Allows external control commands.
    - **Enable Cloud Control/Third-Party Platform Access**: Supports WebSocket protocol for cloud control platforms (e.g., Cloud Control, Cloud Central Control). Limits simultaneous connections to manage resource usage.
    - **Enable Projector Assistant Access**: Enables multi-user screen calibration via the Projection Assistant tool.
3) **Show Streaming Parameters**:
    - Configures streaming resolution (maintain 16:9 aspect ratio) to balance display quality and resource consumption.
4) **Splicers**:
    - **Enable KIR by Default**: Toggles Keep-Alive Image Reporting (KIR) on startup.
    - **KIR-2020 Compatibility**: Legacy mode for KC100/Q5 consoles. Incompatible with newer safety systems.
5) **Video Console**:
    - IP address for networked video consoles.
6) **Artnet Connection**:

- IP address for lighting consoles in fixture library mode.

6.17.2.5. Media Settings



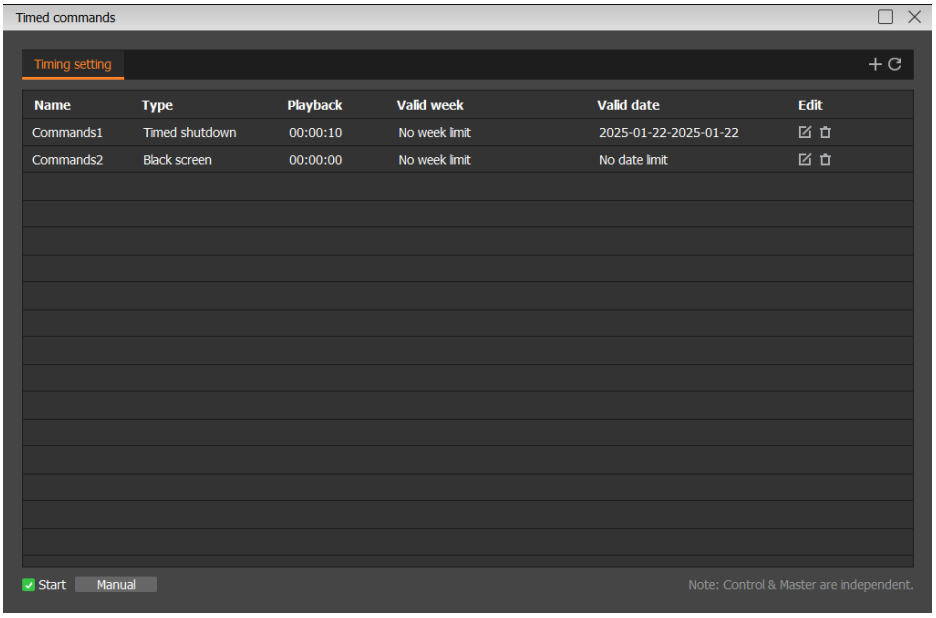
1) **Office File Configuration**:
   - **PPT Animation Modes**:
     - **Injection Mode** (recommended): Supports most Office versions (max width: 15,360px).
     - **Screenshot Mode**: For Office 2010 or earlier (resource-intensive).
     - **Window Mode**: Optimized performance/quality (max resolution: 31,620px). Limited to one window per output screen.
   - **Default Resolution**: Initial Office file rendering resolution (adjustable per file).
   - **Default Office (Application)**: Selects installed Office versions.
   - **PPT Animation Auto-Enable**: Preserves slide transitions; disabled mode uses static images with fade transitions.
2) **Image Settings**:
   - Default playback duration for image files.

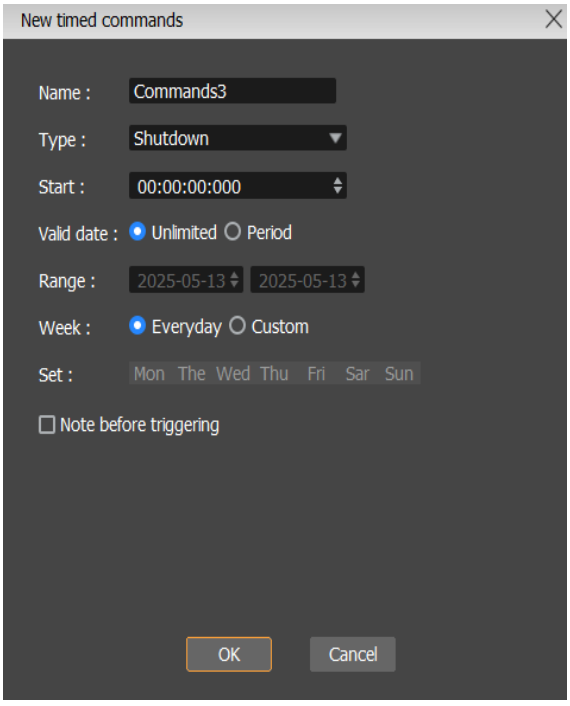
6.17.2.6. Additional Notes

1) **Auto-Backup**: See *Project Management* chapter.
2) **MIDI/DMX/OSC**: Configured via *Mapping Management*.
3) **Capture Card Proxy**: Described in *Resources – Capture Cards*.

4) **Audio**: See *System Settings – Audio Configuration*.
5) **Timecode**: Covered in *Timecode* chapter.
6) **User Management**: Detailed in *External Control* chapter.
7) **Cloud Platform**: See dedicated chapter.

6.17.3. Timed Command Configuration





Supports scheduled actions:

- Shutdown/Reboot
- Black Screen/Unblack
- Enable/Disable All Ports

- Minimize Main Window

Key Features:

- **Multiple Commands**: Define concurrent schedules (time-triggered, non-repeating).
- **Pre-Execution Alerts**: Notify users 3 minutes prior (cancelable).
- **Global Toggle**: Enabled via *Activate Timed Commands*.
- **Multi-device Sync**: Manually synchronize settings across terminals.

6.17.4. Task Management

Manages local/cloud-sourced tasks:

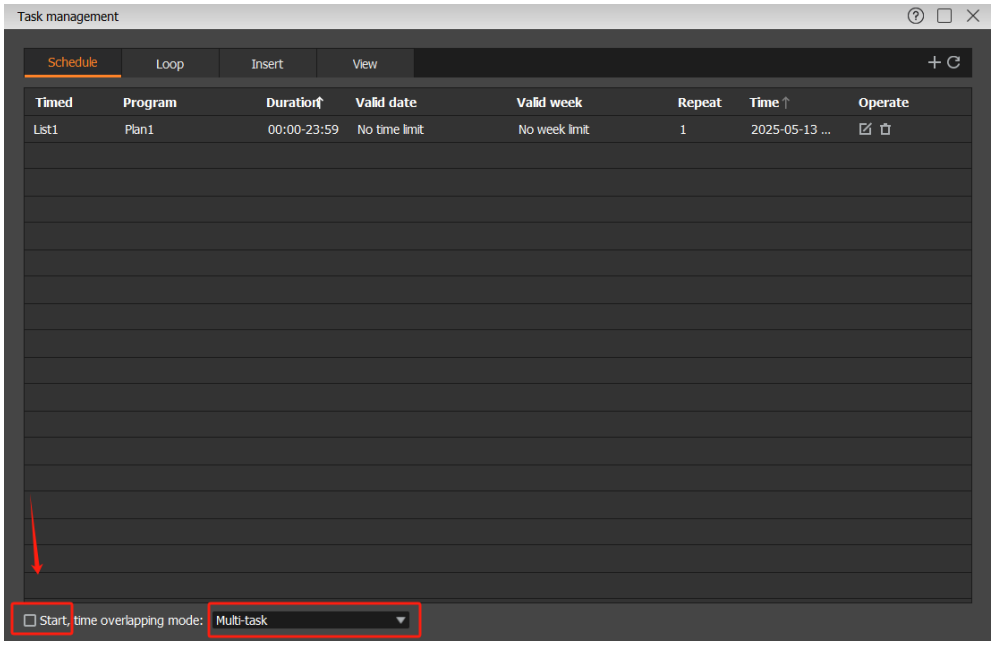
- **Loop Tasks**: Recurring playback sequences.
- **Timed Tasks**: Scheduled executions.
- **Ad-Hoc Tasks**: Cloud-platform interruptions.

Priority Hierarchy:
Ad-Hoc > Timed > Loop

Workflow Notes:

- Avoid manual plan switching during active tasks.
- Idle states default to Plan 1 after the last file completes.

6.17.4.1. Timed Tasks

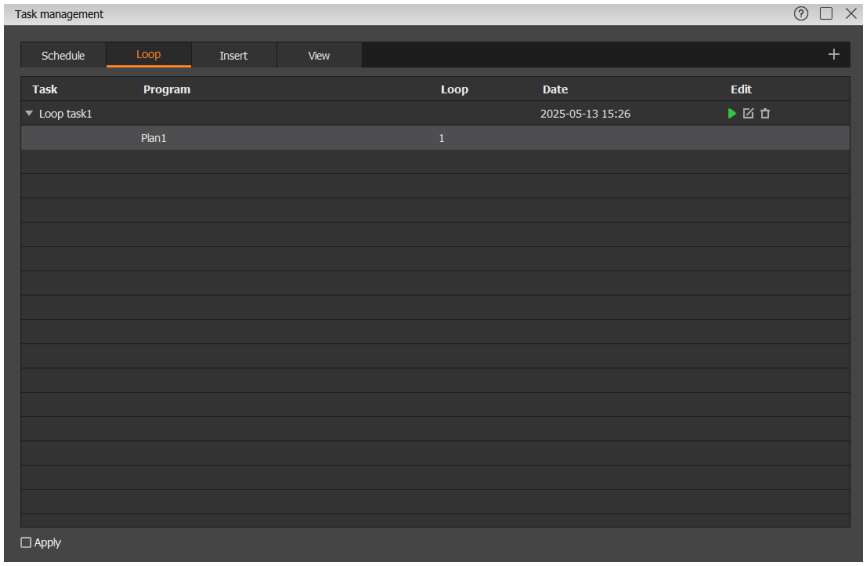


- **Global Toggle**: Enabled via Start (*Activate Timed Tasks*).
- **Conflict Resolution**:
    - **Multi-Task Carousel**: Sequential execution based on creation order.
    - **Recent Priority**: Prioritizes recent tasks.

Task Parameters:

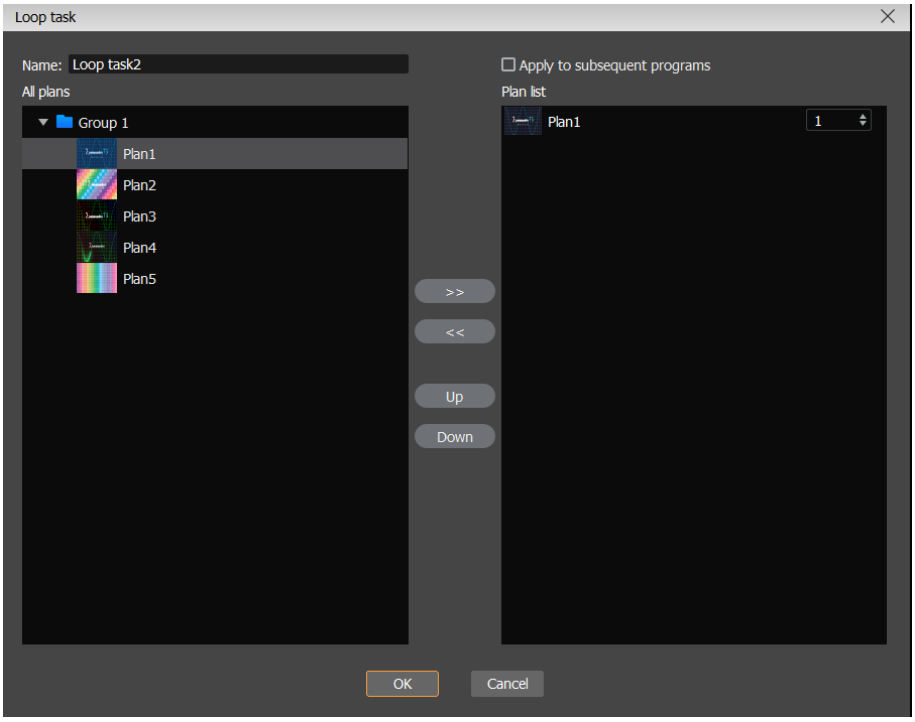
- **Playback Window**: Time-bound (non-crossday).
- **Validity**: Set effective dates/weekdays.
- **Queue Management**: Adjust repetitions, order, and immediate playback priority.
- **Cloud Integration**: Sync with *Multi-Task Carousel* mode for consistency.

6.17.4.2. Loop Tasks



Loop Tasks create a program queue that cycles playback automatically when activated.

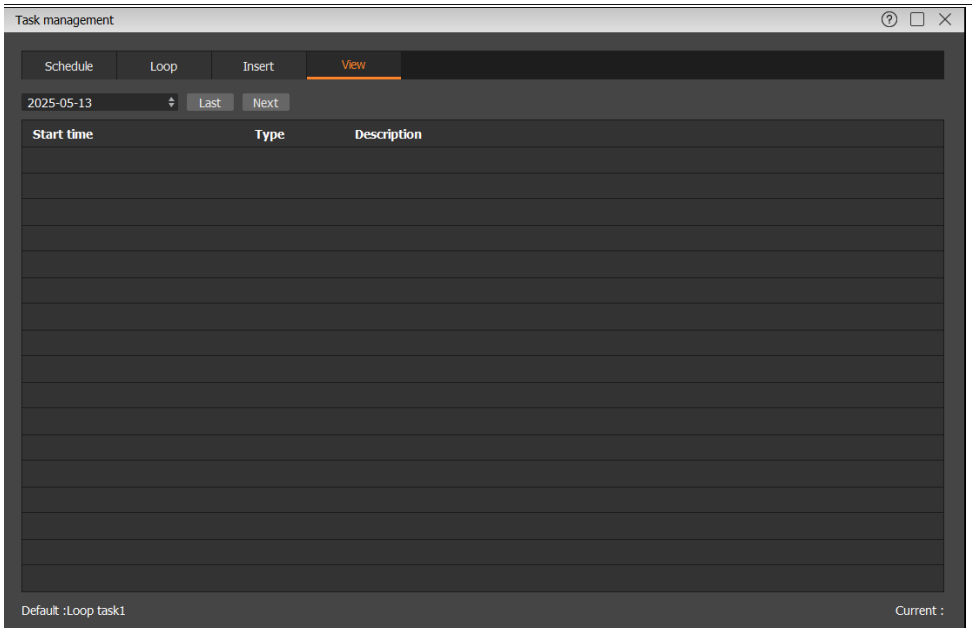
- **Priority**: Lower than Timed and Ad-Hoc Tasks; executes only when higher-priority tasks are inactive.
- **Multiple Tasks**: Supports creating multiple loop tasks, but only **one default task** (marked with ) is scheduled.
- **Cloud Integration**: Auto-designates the latest cloud-sourced loop task as the default.
- **Activation**: Enabled via a dedicated toggle.
- **Use Case**: Ideal for advertising workflows, eliminating manual preset jumps by relying on the main file's playback cycle.



6.17.4.3. Ad-Hoc Tasks

- **Cloud-Exclusive**: Created and managed via cloud platforms.
- **Execution**:
  - Scheduled tasks trigger at specified times.
  - Unscheduled tasks play immediately.
  - Completed tasks auto-remove from the list.
- **Overwrite Policy**: New tasks replace existing ones.

6.17.4.4. Schedule Viewer

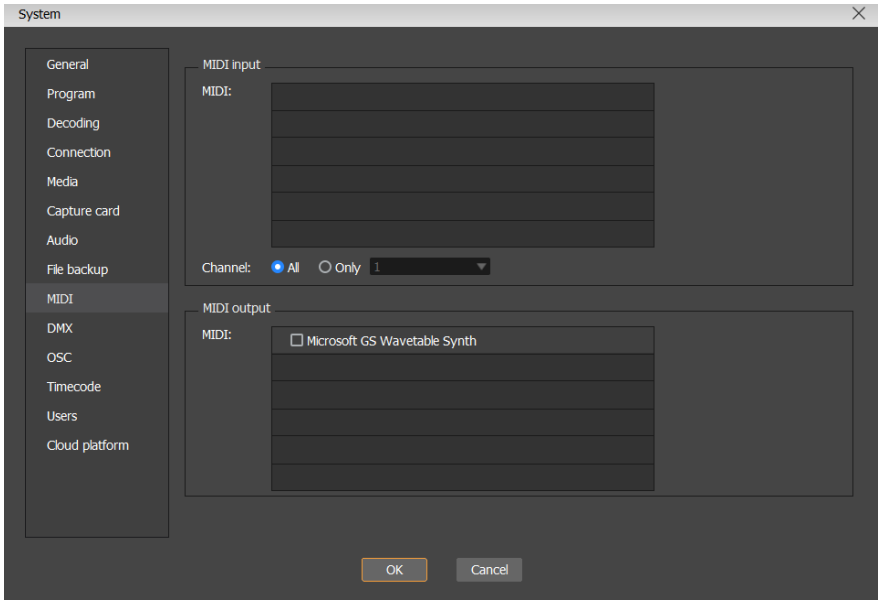


Displays task timelines for a selected day, including historical executions and future plans.

6.17.5. Mapping Management

Configures external control via **MIDI**, **DMX**, **OSC**, and (in specific versions) **Kinect gestures**. Customize mappings to align with user preferences.

6.17.5.1. MIDI Settings

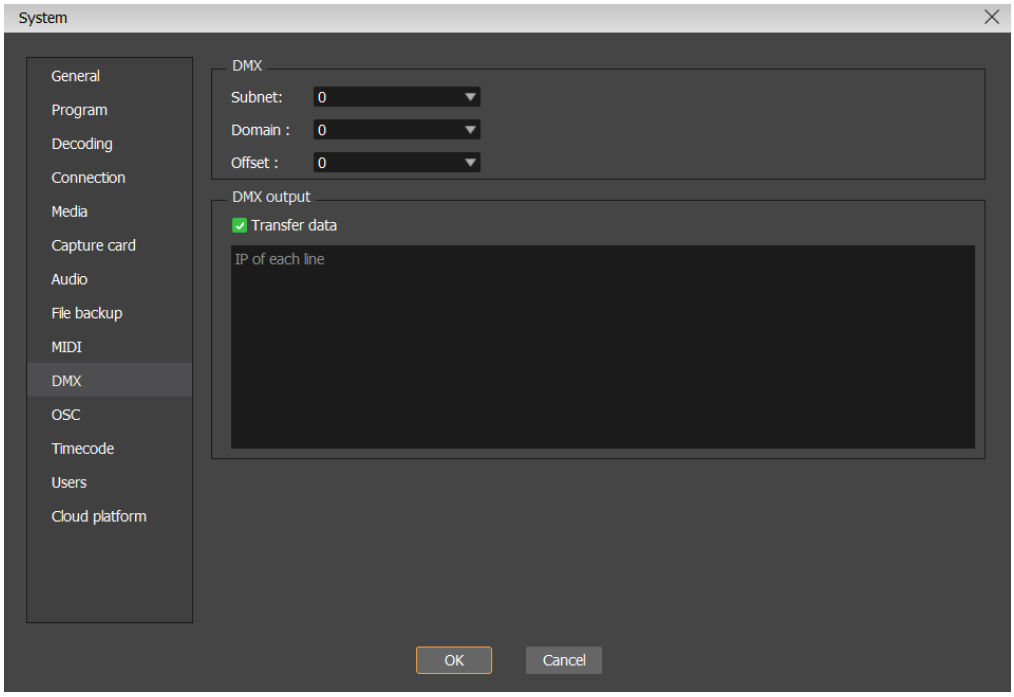


- **Input/Output Configuration**:
  - **Input**: MIDI controllers (e.g., keyboards).
  - **Output**: Feedback to MIDI devices (e.g., LED status indicators).

- **Caution**: Avoid conflating MTC timecode devices with standard MIDI controls.

For video tutorials, please refer to the following link:
https://youtu.be/K2wY1GZqpWE?si=A99IRFPo0AXp9k8M

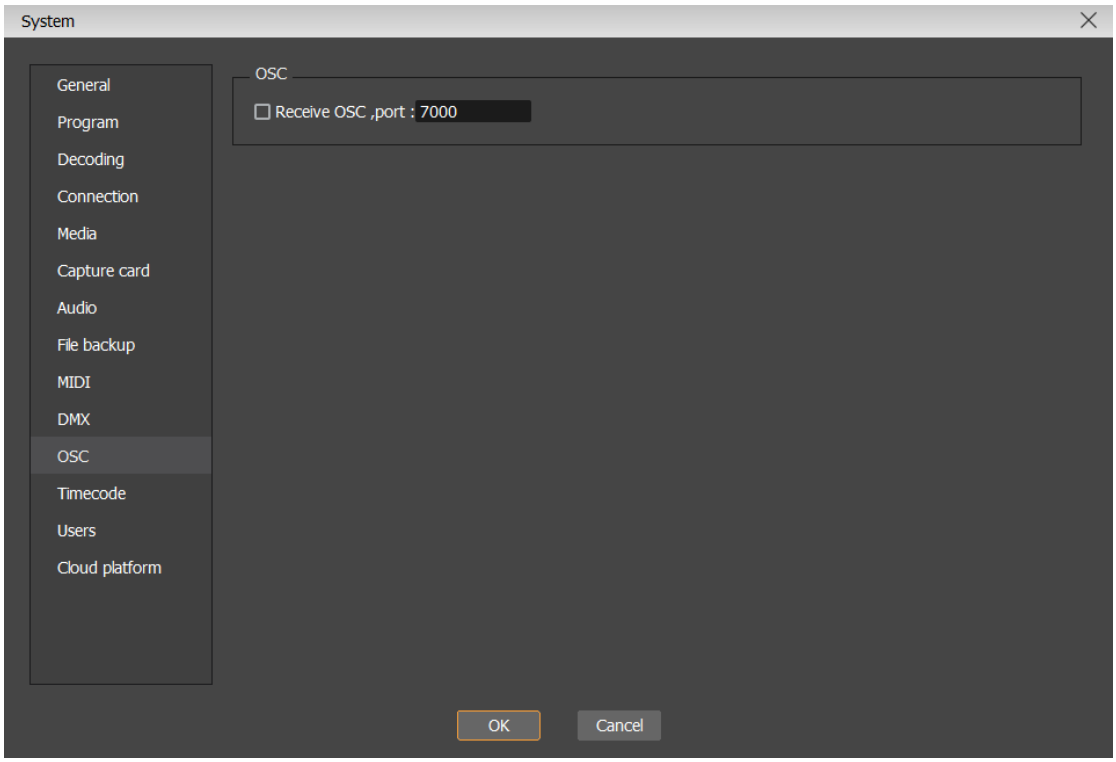
6.17.5.2. DMX Settings



- **Single-Channel Support**: Maps DMX commands to software functions (distinct from fixture library mode).
- **Functionality**: Assign commands to DMX "fixture" attributes (e.g., next cue).

For video tutorials, please refer to the following link:
https://youtu.be/EQsTylEJQv4?si=eJur0bYdfJYRzqxP

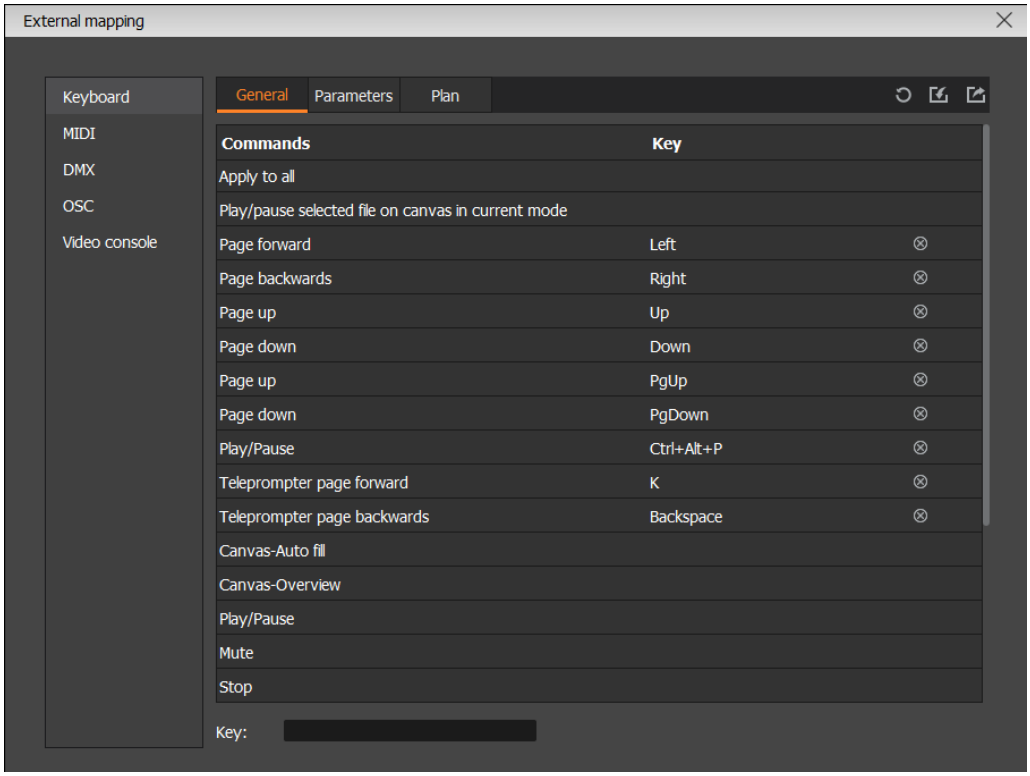
6.17.5.3. OSC Settings



- **Port Configuration**: Set receive port to match OSC software settings.

For video tutorials, please refer to the following link:
https://youtu.be/AuOBEcyvF-c?si=7QcYt7dDACFr7kXt

6.17.5.4. Mapping Configuration



- **Supported Controls**:
  - **Keyboard**: Direct keybinding.
  - **MIDI/DMX**: Enter edit mode  (requires prior system setup) to learn and assign values.
  - **OSC**: View command mappings.
- **Conflict Handling**:
  - Default mappings exist; conflicts are permitted for some entries but generally restricted.
- **Import/Export**: Backup or restore configurations.

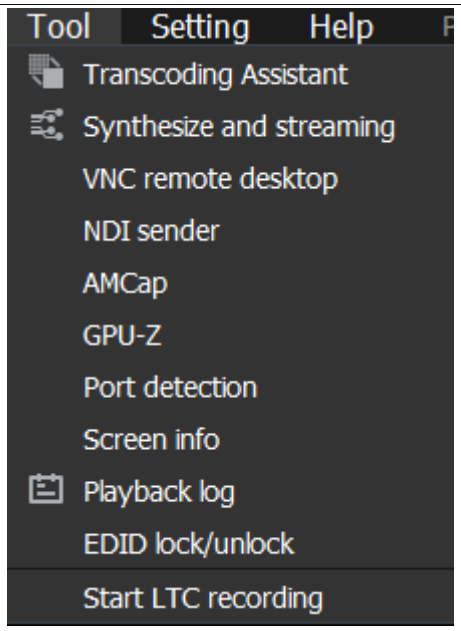
MIDI-Specific Notes:

Key Types:

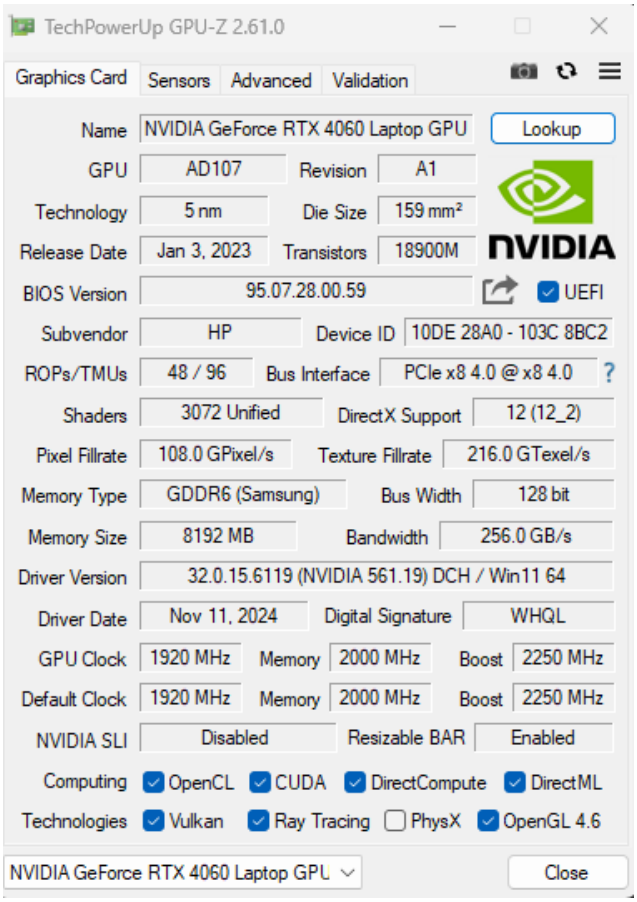
- **Note**: Piano-style triggers with customizable LED colors.
- **CC (Continuous Controller)**: Supports relative/absolute values and ranges.

6.18. Tool Menu and Descriptions of Each Tool

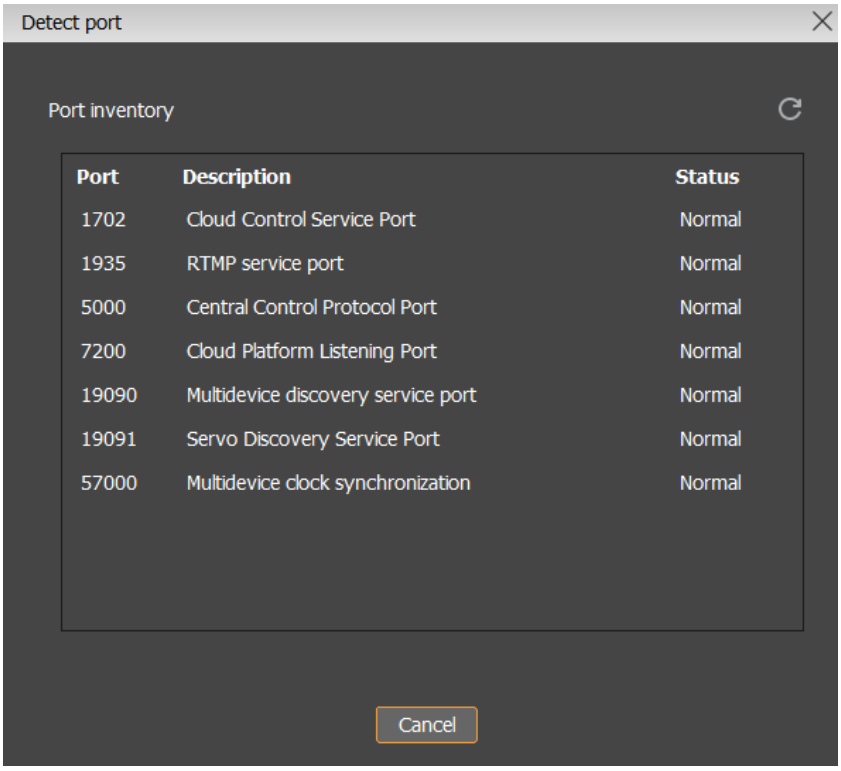
6.18.1. Tool Menu



1) **Transcoding Assistant**: A utility for video transcoding, splitting, cropping, and encryption. For details, refer to the corresponding section.
2) **Compositing & Streaming**: A tool for program video compositing, live streaming to platforms, or preview recording. Details are provided in the relevant section.
3) **VNC Client**: Multi-unit systems typically deploy VNC servers for remote access, and the VNC Client serves as its counterpart.
4) **NDI Sender**: This is the official NDI sender. An additional sender provided by our team is installed in the same directory. Both versions offer identical functionality as companion programs for NDI reception.
5) **AMCap**: A capture card verification tool. Use this to validate capture card functionality if playback anomalies occur in the software. If the issue persists, troubleshoot from the source.
6) **GPU-Z**: System GPU utilization metrics are often incomplete or inaccurate. When performance issues arise, use this tool to capture and share local GPU status screenshots with technical support. Installation may be prompted upon launch; follow the setup steps.



7) **Port Detection**: Verifies the availability of network and serial ports used by the software, ensuring no conflicts. Use this tool when communication errors occur.



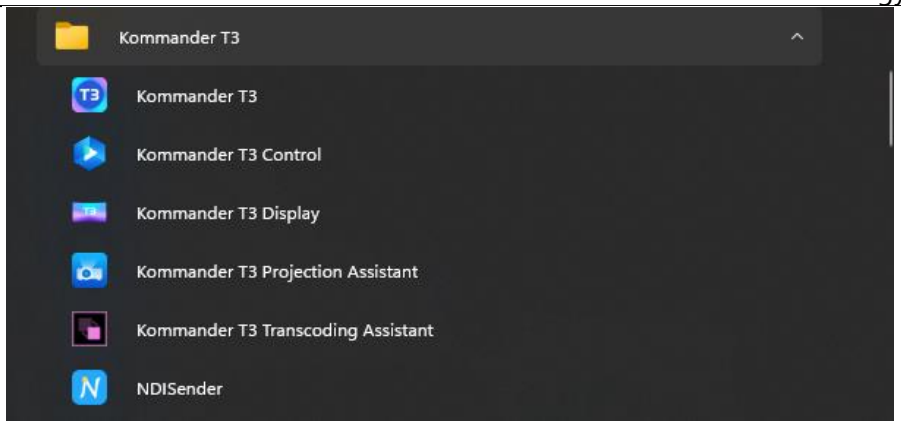
8) **Screen info (Display Screen Identification)**: Prints screen identification labels on all connected displays (consistent with screen management) for easy differentiation.
9) **Playback Log**: Records all resource file playback events for advertiser queries. See the corresponding section for details.

6.18.2. Transcoding Assistant

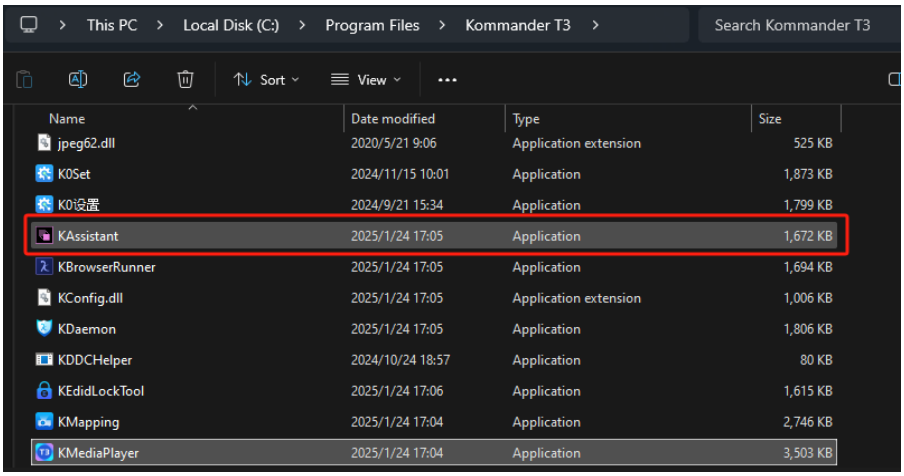
The Transcoding Assistant is an auxiliary tool for video transcoding, encryption, splitting, cropping, audio removal, and sequence frame packaging. This software requires no license to operate.

Launch Methods

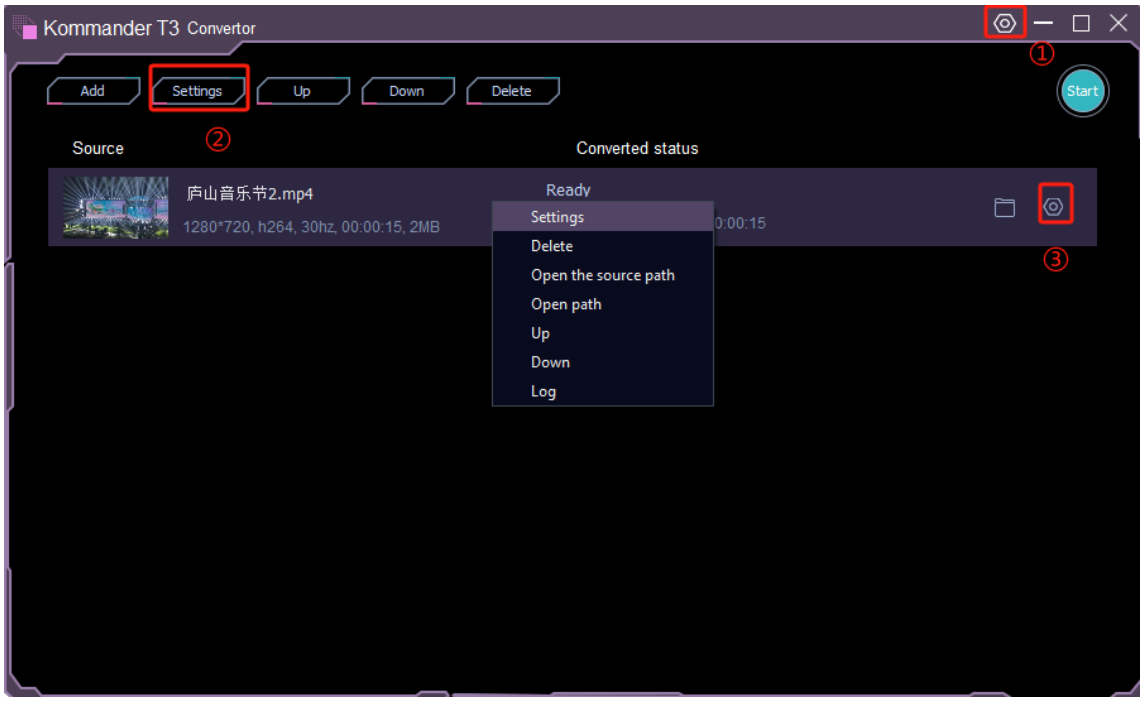
1) Kommander: Navigate to *Tools* > *Transcoding Assistant*.
2) System Start Menu: Locate the Kommander program entry and select *Transcoding Assistant*.



3) Installation Directory: Execute *KAssistant.exe* in the Kommander installation path.

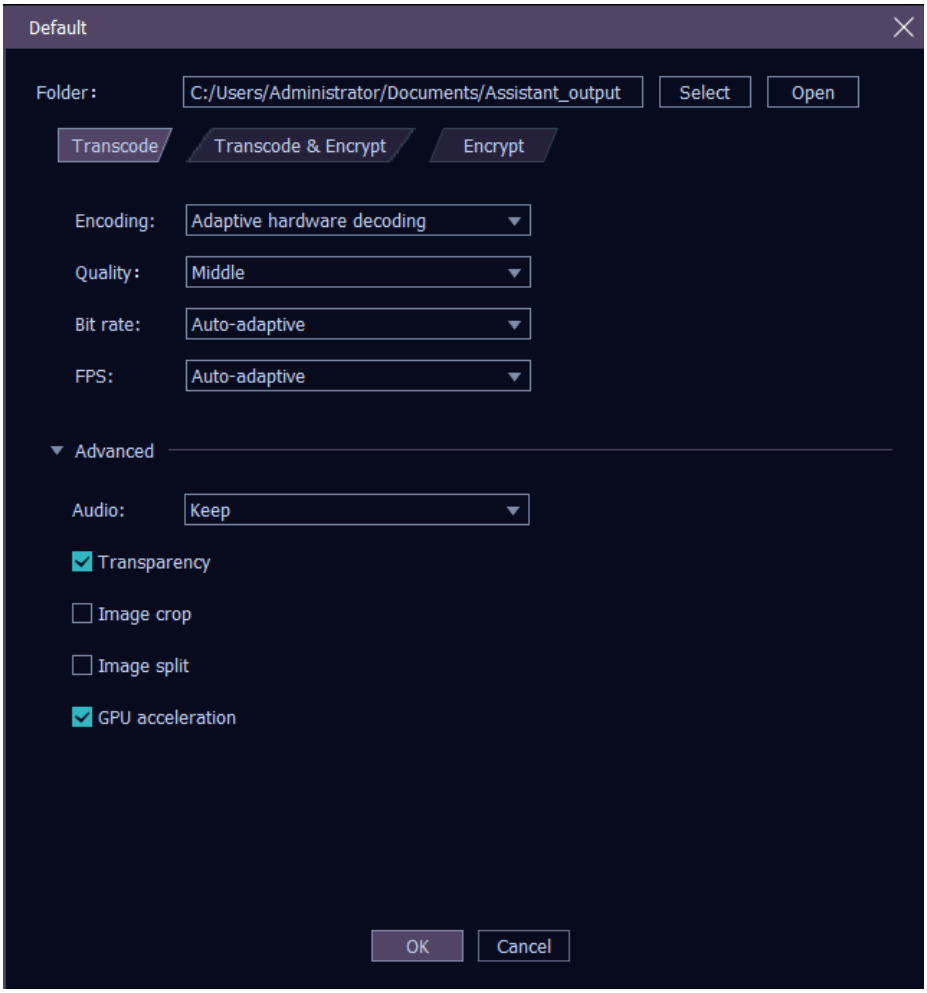


Operation Guide



1) **File Addition**
   a. Click *Add File* to select and add one or multiple files. For sequence frames, use *Add Image Sequence*.
   b. Drag and drop files directly from the system file explorer into the list.
   c. Newly added files will generate default transcoding parameters.
2) **Parameter Configuration**
   - **Default Settings** (Icon 1): Files added to the list inherit these parameters, which are preserved between sessions.
   - **Custom Settings**: Modify parameters via Icon 2 (batch settings for selected files) or Icon 3 (individual file settings) when deviations from defaults are required.

Parameter Descriptions:



a. **Folder (Output Directory)**: Specifies file generation path.

b. **Mode**:

- *Transcode Only*: Video transcoding without encryption.
- *Encryption Only*: Applies encryption protection without transcoding.
- *Transcode & Encrypt*: Simultaneous transcoding and encryption.
- *KRAWF Sequence Package*: Converts sequence frames into lossless KRAWF packages for enhanced playback performance. Output size ≈ (width × height × 3 × frame count).

c. **Transcode Mode**:

- *Master File*: Primary playback output (high resolution/quality).
- *Proxy File*: Low-resolution proxy for control/master terminals to ensure operational responsiveness.
- *Master + Proxy*: Generates both file types.

d. **Encoding**:

- *Adaptive Hardware Decoding*: Auto-selects H.264 or H.265 based on resolution.

- *H.264/H.265/VP9/HAP*: Explicit codec selection.
- *KVC-Lossless*: Proprietary CUDA-accelerated lossless format.
- *KVC-Lossy*: Proprietary CUDA-accelerated lossy format.

Codec Comparison:

Feature	H.264	H.265	HAP	KVC-Lossy	KVC-Lossless	Sequence Package
Max Resolution	4096×4096*	8192×8192*	16384×16384	16384×16384	16384×16384	16384×16384
YUV420/444	Partial	Yes	No	Yes	Yes	Yes
Alpha Channel	No	No	No	Yes	Yes	Yes
10/12-bit Depth	Partial	Yes	No	Yes	Yes	Yes
Encoding Speed	Fast	Fast	Moderate	Fast	Fast	Moderate
Decoding Overhead	High	Very High	Low	Low	Low	Low
Compression Ratio	High	Very High	Low	Medium	Low	Near Lossless
Random Seek/Reverse	No	No	Yes	Yes	Yes	Yes

e. **Encryption**: Four strategies supported:

- *No Password*: Compatible with same-series products.
- *Password Protection*: Requires playback password.
- *Device Restriction*: Whitelist playback via device SN.
- *Time-limited Playback*: Expiration tied to advanced Codemeter dongle clock.
  Note: Local time adjustments backward will sync to dongle time. Restore network time via Codemeter Control Center's clock reset function if expiration errors occur. Continuous validity checks occur during playback.

f. **Quality**: Auto-bitrate presets (High/Medium/Low).
g. **Bitrate**: Linked to Quality. *Adaptive* uses quality-based bitrate; *Custom* enables manual specification.
h. **Frame Rate**: *Adaptive* preserves source frame rate; manual setting supports ≤60 FPS.
i. **Resolution**:

- *Original*: Maintain source resolution.
- *Cropped*: Use post-crop dimensions if applicable.
- Presets or custom values.

j. **Preserve Alpha**: Requires source transparency and codec support.
k. **Image Crop**: Defines region of interest via X/Y offsets and dimensions.
l. **Image Split**: Divides source into n×m grid for multi-output scenarios. Compatible with cropping.
m. **GPU Acceleration**: Enhances speed but may affect quality depending on hardware.
n. **Audio**: Remove or retain audio streams.

3) **Start/Stop Transcoding**
Click *Start* to process files sequentially. Progress is displayed in the status column.
Click *Stop* to abort, marking all pending/active files as failed.

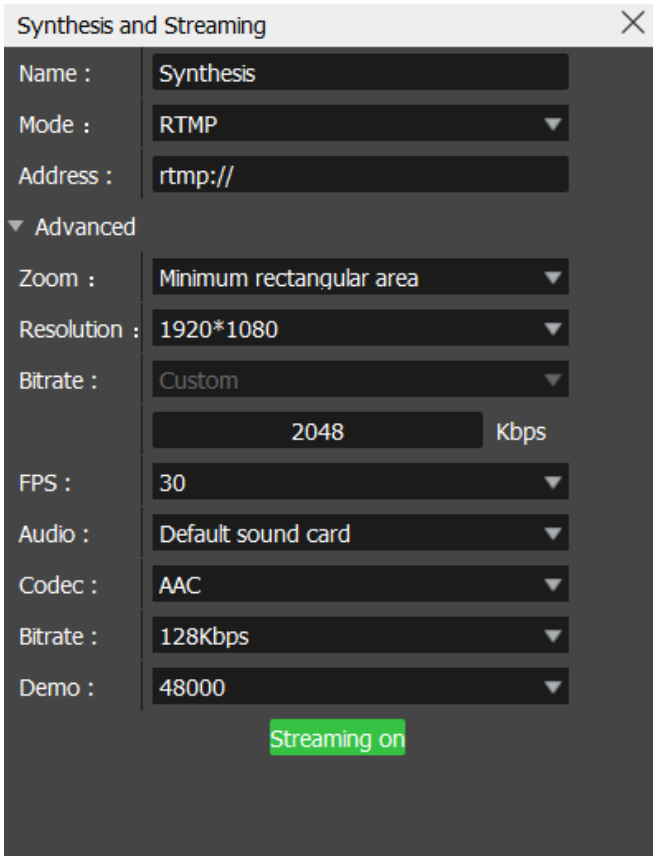
Security Note: For time-limited encryption, ensure advanced Codemeter dongles are used. Legacy dongles lack time synchronization capabilities.

6.18.3 Composition and Streaming

The software provides composition functionality to achieve the following four features:

1) RTMP live streaming of specified regions in the canvas window.
2) Multi-plan composite video generation.
3) Current plan composite video generation.
4) Screenshot generation of the current output.
5) Recording of specified regions in the canvas window.

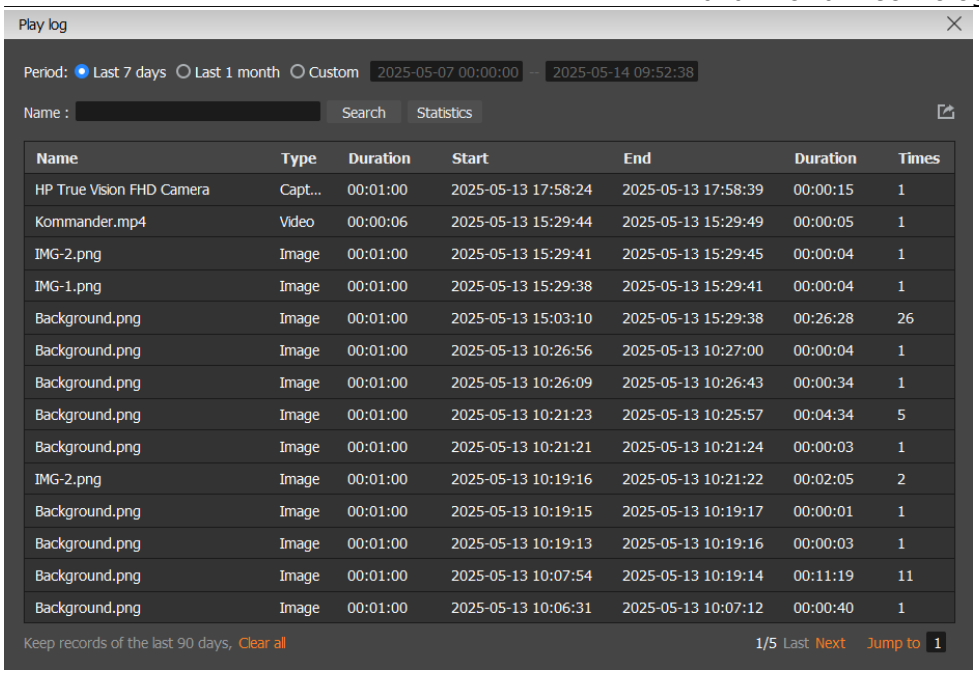
Parameter Specifications:



1) **Composition Area**: Refers to the source image area. The minimum rectangular region of the current canvas file can be used as the source area, or a custom area is supported.
2) **Composition Resolution**: Currently supports custom resolutions below 4K and frame rates below 60 fps.
3) **Audio Options**: Supports muting audio or recording system sound card audio, with configurable encoding methods.

Operation Instructions:
After preparation, click **"Streaming on"** to begin. Composition and screenshot tasks will complete automatically, while streaming and recording require manual termination.

6.18.4 Playback Logs



The software's database logs can record over 100 million entries, including the scheduled start time and playback end time for each file.

Log Filtering: Supports filtering by file name or time range.

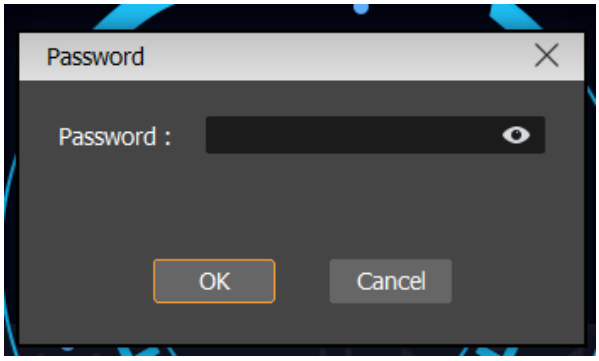
Statistics: Calculates total playback duration and frequency for individual or selected files within a specified period. Files with duration (e.g., video/audio) count actual playback instances, while files without duration count each canvas scheduling as one playback instance.

Export: Logs can be exported as CSV files compatible with Office and WPS. If garbled text appears in Office, use the **"Import"** method to open the file.

Database Management: Logs are automatically cleared after 90 days. Manual log clearing is recommended post-export to reduce disk usage (estimated maximum storage: 10GB).

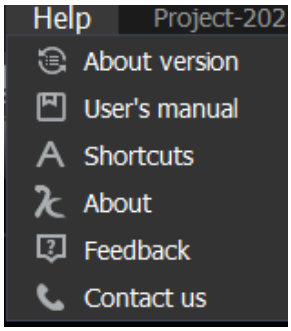
6.19 Lock Screen

When temporary software inactivity is required without interrupting output, the lock screen feature prevents unintended operations.



Keyboard Shortcuts: Partial shortcuts remain active (e.g., PageUp/PageDown, arrow keys for Office navigation).
Control Restrictions: Cloud control remains functional, but central control commands are disabled during lock screen.

6.20 Help and Feedback



1) **User Manual**: Quick access to product documentation.
2) **Shortcut Reference**: Displays system-defined keyboard shortcuts.
3) **Contact Us**: Provides after-sales support details.
4) **About**: Displays product information and remote update entry.

5) **Feedback**: Email issues to **kommander@kystar.com** (managed by technical support, product, and R&D teams). Include the following for troubleshooting:
    - Product name, full version number.
    - Detailed steps to reproduce the issue.
    - Screenshots and log files.

Log Files:

- Log directories are generated upon each software launch:
    - Main program: *Main_<LaunchTime>*, appended with **"dump"** if crash files exist.
    - Daemon: *Daemon_<LaunchTime>*.
- For issues involving crash dumps, upload the entire log directory. Use the **"Export"** function to compress logs into ZIP or navigate to the log directory via **"Log File Directory"**.
- For multi-unit systems, use the **"Multi-device Panel"** to retrieve logs from specific devices.

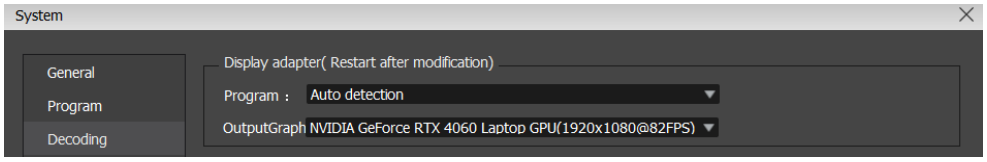
6.21 Multi-GPU Support

Multi-GPU versions support up to 4 GPUs for maximum single-device 16K output. Key differences from single-GPU versions:

- **Control Terminal**: Handles engineering edits and operations.
- **Main Terminal**: Operates in thin client mode (no edit/control functions).

Feature	Controller	Master
Editing	Full editing capabilities. Requires **"Update"** to sync data with master.	Thin client (display only).
Control	Full control. Global controls sync in real-time.	No control (display only).
External Control	Supports cloud control, KApollo, central protocols, shortcuts, MIDI, OCS, DMX, etc.	No external control allowed.
Projection	Not supported (pending update).	Not supported (pending update).

System Settings:



- Master lacks GPU settings under **"System Settings > Codec"** but supports multi-output GPU configuration.

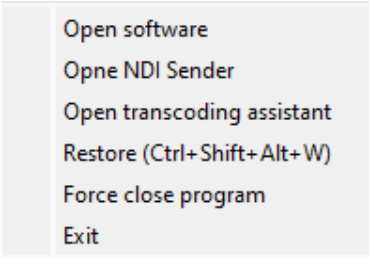
Workflow:

- Screen management and canvas editing logic mirror single-GPU versions.
- File-screen-display-GPU mapping determines final output GPU during synchronization.
- **Note**: Multi-GPU playback lists currently support only video, audio, and image files.
- Use **"Update Project"** to resolve controller-to-output synchronization issues.

6.22 Daemon Program

The software includes a daemon that auto-launches with the software (visible in the system tray ). Key features:

1) **Process Monitoring**: Auto-restarts the software upon abnormal exits for output recovery.
2) **Multi-Device Support**: Assists in launching programs and reporting system status.
3) **Right-Click Menu**: Restore main window, exit program, etc.



6.23 DMX Mode and Fixture Configuration

Treat each canvas window as a lighting fixture, with attributes mapped to DMX channels. Control via Art-Net protocol.
Lighting Config:

1) Create the maximum number of output windows on the canvas.

2) Navigate to **"Settings >DMX"** to assign DMX addresses and enable control per window.
3) Use **"Auto-Address"** for sequential channel assignments.

Resources:

- Default fixture library: Located in *\Dmxconsole* under the installation path.
- **Channel Table**: Lists attribute tags, ranges, and usage for custom fixture programming.
- **DMX Monitor**: Real-time monitoring of DMX data by channel.

Activation: Enable **"DMX Mode"** via the toolbar toggle. Control functions only when this mode is active.

7. FAQs and Additional Features

7.1 3D Video Playback

3D video playback is directly dependent on the 3D implementation of the backend output device, which determines the required parameter settings in the playback software.

Common 3D Video Formats:

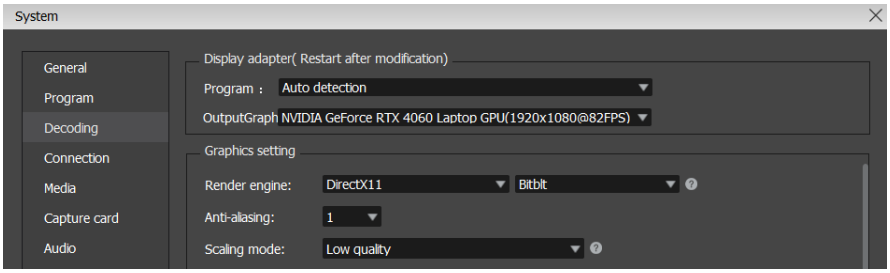
- **Frame Sequential**: Continuous transmission of left/right eye images at double the frame rate (e.g., 120Hz for a 60Hz video).
- **Interlaced**: Left/right eye images are interlaced vertically.
- **Column-Interlaced**: Left/right eye images are interlaced horizontally.
- **Checkerboard**: Left/right eye pixels are alternated in a checkerboard pattern.
- **Side-by-Side**: Left/right eye images are compressed into one frame horizontally.
- **Top-and-Bottom**: Left/right eye images are compressed into one frame vertically.

1) Side-by-Side / Top-and-Bottom 3D Output to 3D Projectors
For side-by-side or top-and-bottom 3D videos, use **cropping and stretching** in the software to isolate the left (top) or right (bottom) image. No processing is required if pre-separated videos are provided.

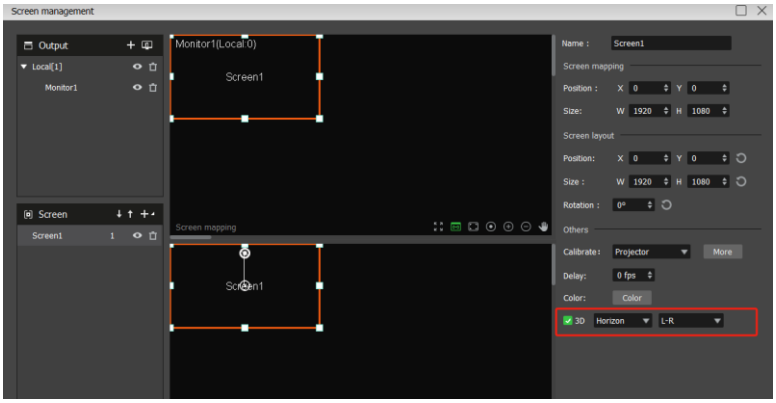
2) Adding "3D Conversion" Effects to Plan Files
Apply **row-interlaced**, **column-interlaced**, or **checkerboard** effects to compatible 3D videos via the plan file's "3D Conversion" feature. The backend device then renders the 3D output.

3) 3D Interlaced Playback with Anaglyph Glasses
Requires red/cyan glasses. Configuration:

- Set **Scaling Mode** to **Low Quality** under *System Settings* > *Codec*.



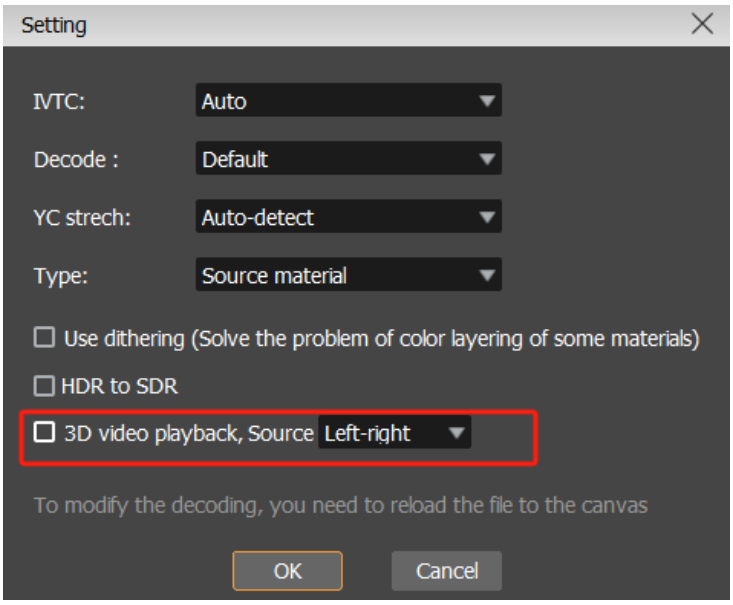
- Enable **3D Effect** in the screen manager, select interlacing method and order. Adjust settings if output is incorrect.



4) NVIDIA 3DVShow Technology

Requires NVIDIA 3DVShow-compatible glasses. Configuration:

- Enable **NVIDIA 3DVShow Mode** in *Resource* > *Video File Properties*.



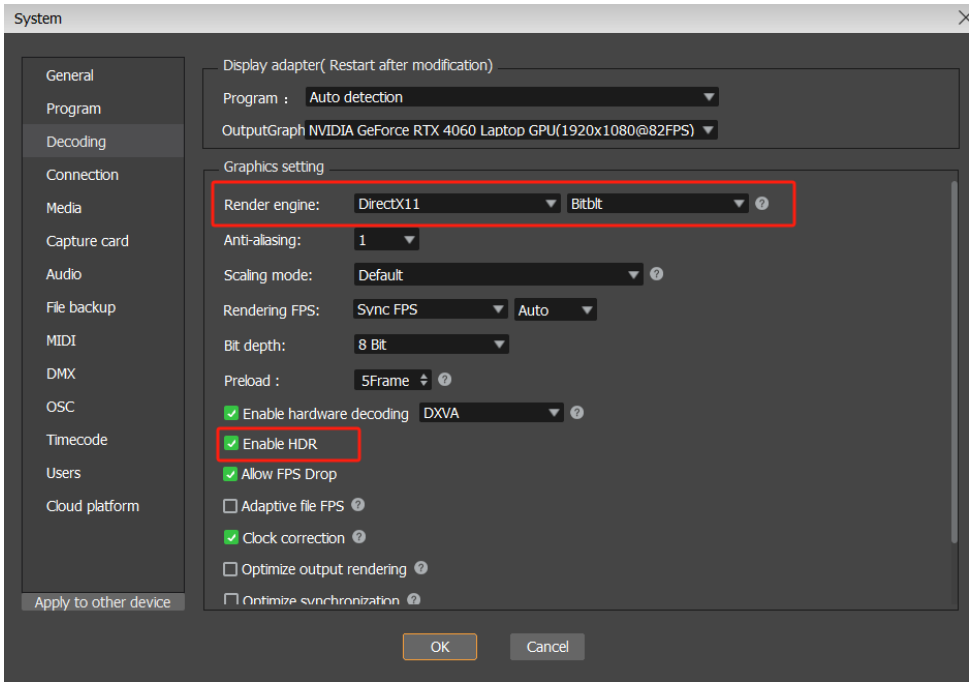
7.2 HDR Playback

HDR (High Dynamic Range Imaging) enhances brightness range to mimic human vision.

Method 1: HDR-to-SDR Conversion

- Supported under **DX9/DX9 EX** rendering engines. Enable **HDR to SDR** in video properties for non-HDR displays.
- **Not supported in DX11**.

Method 2: True HDR Playback
Requires **HDR source**, **HDR playback mode**, and **HDR-enabled display** (HDR mode active).

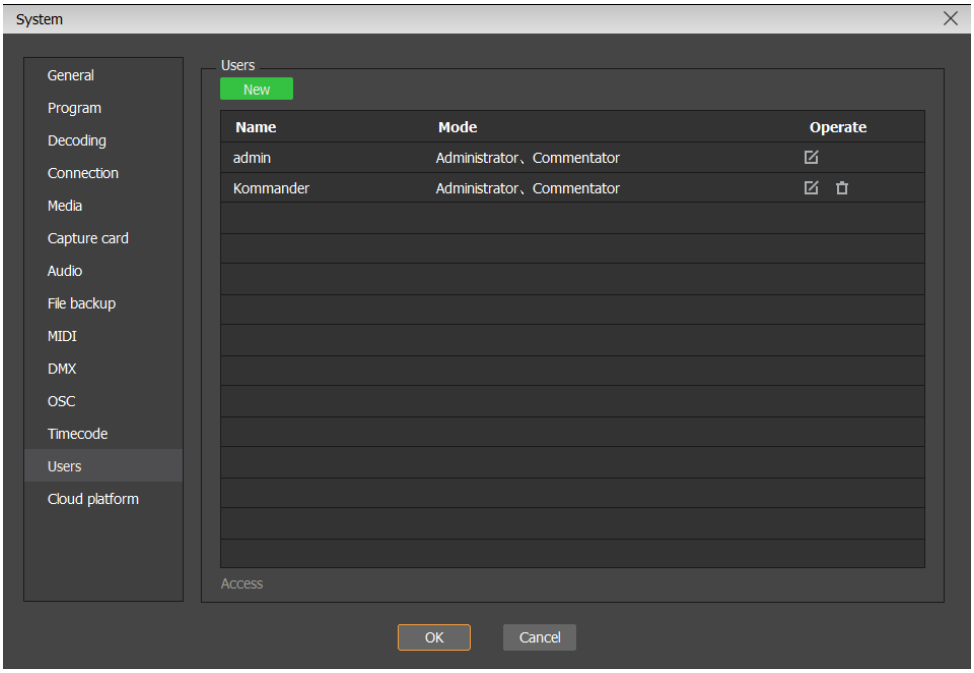


- **Note**:
  - HDR content appears gray on non-HDR displays (auto-converted to SDR).
  - SDR content appears brighter on HDR displays.
  - DX11 automatically toggles display HDR; other modes require manual adjustment.

7.3 Cloud Control and KApollo Central Control

7.3.1 User Management and Settings

- Enable **Allow Cloud Control/KApollo/Cloud Platform Access** under *System Settings > Connection*.
- Configure user permissions and login credentials in *System Settings > User Management*.



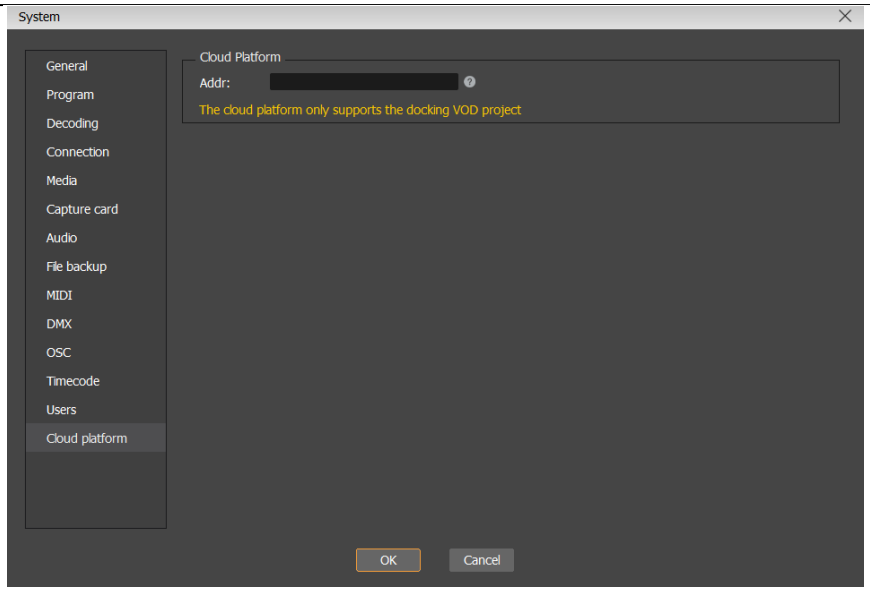
7.3.2 Cloud Control Features

- **Platforms**: Android, iOS (lite mobile versions available).
- **Functions**: Canvas preview, window operations (open/move/replace/delete), plan switching/saving/updating, playback controls (play/pause/stop/mute/volume), display port management.
- **Note**: Supports integration with Kystar splicers, video processors, and hybrid cards.

7.3.3 Kapollo Central Control

- **Capabilities**: Unified control of playback software, splicers, audio matrices, PLCs, environmental devices, and more.
- **Features**: Alarm linkage, scheduled tasks, venue management, user permissions.
- **Platforms**: Windows/Kylin (server), iOS/Android/Windows (client).
- **Templates**: Pre-built playback templates, media library/preview access, real-time object switching, global controls (black screen, PPT page turns, updates).

7.4 Cloud Platform Integration



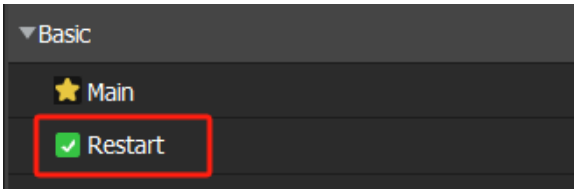
- **System Settings > Cloud Platform**: Supports plan/project synchronization.
- **Status Indicators**: Connection status, download progress.
- **Resource Management**:
  - Downloaded media stored in fixed directories.
  - Tasks auto-sync with schedules, ad inserts, and loops.
  - Automatic cleanup of expired tasks, programs, and resources.

7.5 Local Playback on Displayer

- **Media On-Demand**: Requires enabling under *Settings* > *Programs*.
- **Customizable Interface**: 2x2 grid with user-defined backgrounds/borders.
- **Playback Lists**: Each cell hosts a playlist with customizable thumbnails.
- **Switching**: Toggle between display output and local playback via  buttons.
- **Admin Access**: Password-protected configuration panel (trigger-screen design).

7.6 Continuity Between Plan Transitions

Enable **"Restart"** in canvas file properties or plan settings.

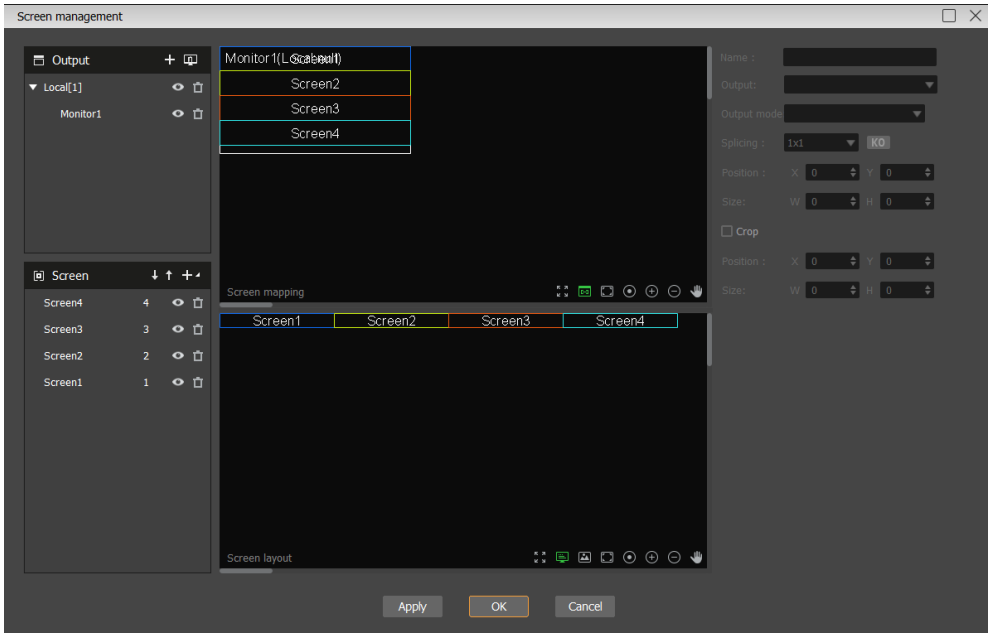


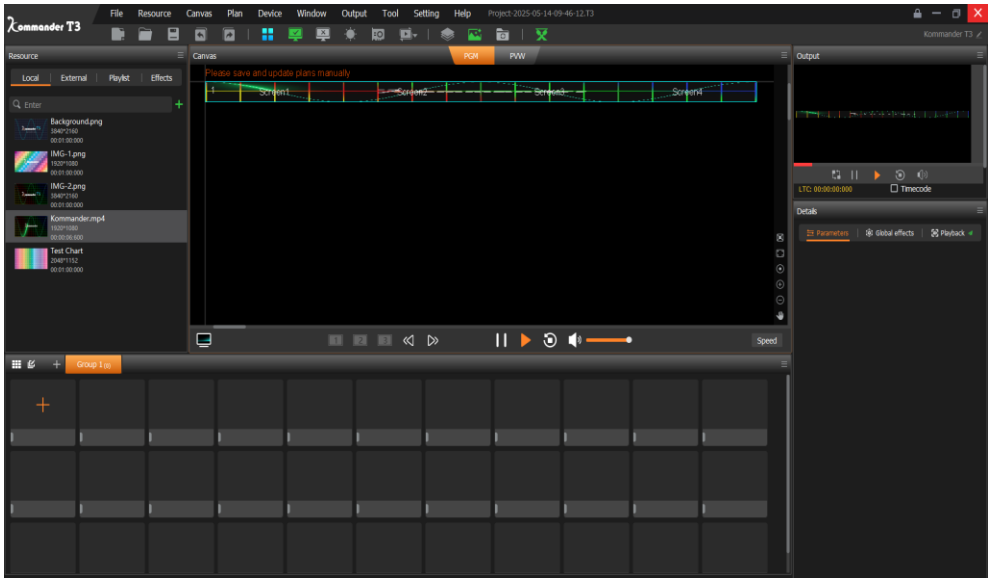
This continues playback progress from the previous plan's source file.

7.7 Ultra-Wide Output with Limited Ports

Example: Single 2K output port driving a 7680x250 screen.

- **Setup**:
    1) Add one 2K display port.
    2) Create four 1920x250 screens.
    3) Vertically map screens to the 2K port; arrange horizontally in layout.
    4) Drag content to the combined area for seamless output.

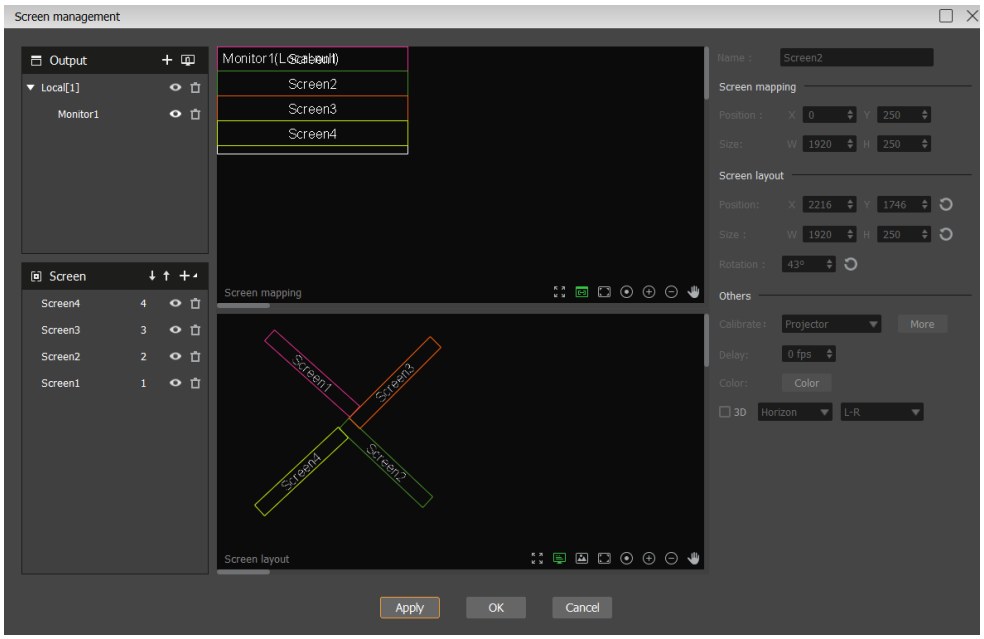


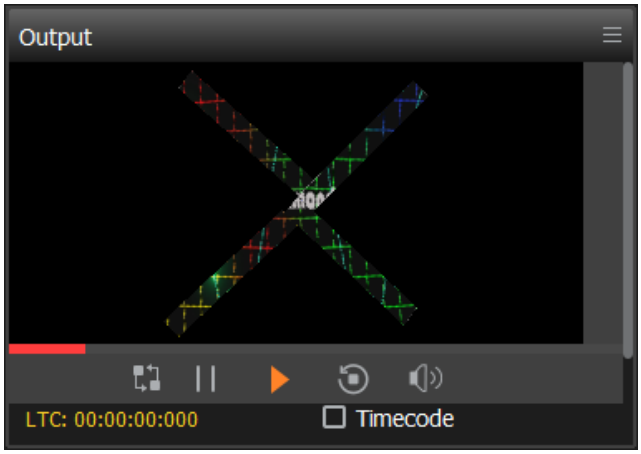


7.8 Irregular Screen Output

Example: Four 1920x250 screens arranged in a windmill pattern via one 2K port.

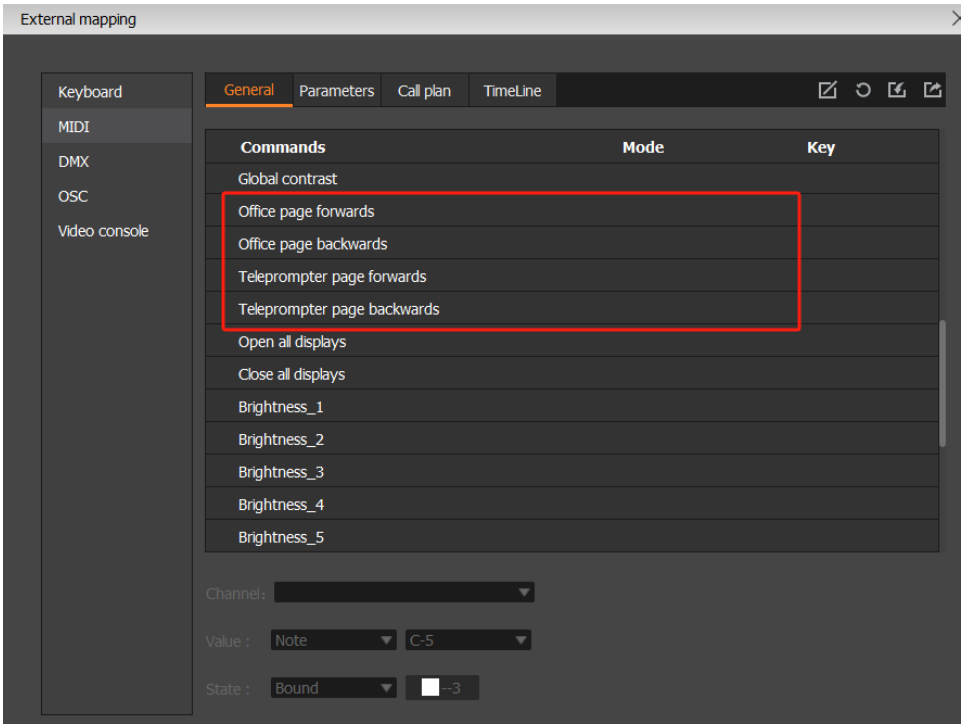
- **Setup**:
    1. Map four screens vertically to the 2K port.
    2. Rotate screens in layout for windmill alignment.
    3. Drag content to cover the entire area.





7.9 Page Turner Malfunctions

- **Check**: Page turner's keyboard shortcuts (brand-specific).
- **Fix**: Adjust Office-related shortcuts in *Settings* > *Mapping Management*.
- **Support**: Provide screenshots of Office settings and system resources if issues persist.



7.10 Dongle Errors

Common causes:

1) Incompatible/expired/locked dongle.
2) Software-dongle mismatch.
   Resolution: Contact support with error screenshots.

7.11 Outdoor Daylight Optimization

1) Increase display brightness.
2) Enable **Light Mode** under *System Settings* > *Programs*.

7.12 Startup Issues (Audio/Network)

- **USB Audio Delays**: Set delayed startup in *System Settings* > *Programs* for external sound cards.
- **Network IP Allocation**: Enable delayed startup to ensure network readiness.

7.13 Error Reporting

Submit the following to support:

- Software name, full version, OS.
- Detailed workflow and logs (via **Feedback** menu).

7.14 Bowguard and KIR

- **KIR**: Monitors signal integrity for failover to backup sources.
- **Activation**: Enable under *Output Menu*.
- **Rules**: Configure under *System Settings* >*Connection*> *Splicer* (KIR2020 for legacy systems).

7.15 Auto-Login for Password-Protected Webpages

- **Requirement**: Webpage provider must implement login via cookies, sessions, or tokens (e.g., JWT).
- **Configuration**: Add parameters as a **"Program"** type in the target webpage.
- **Pad-to-Display Login**: Requires webpage provider support for direct post-login display.