



EVA SDK IDE User's Manual

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LEADING EDGE COMPUTING

Preface

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Revision History

Revision	Description	Date
1.0	Initial release	2021-04-21

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1 Introduction

The ADLINK Edge Vision Analytics (EVA) SDK provides an integrated development environment (IDE) for developers wanting to build computer vision and video analytic solutions with deep learning technology. The EVA SDK IDE is based on PyFlow, a general purpose runtime extendable Python Qt visual scripting framework, to expand the EVA SDK. The EVA SDK IDE allows users to quickly establish GStreamer pipelines and easily modify their properties.

This document introduces the EVA SDK IDE interface including how to generate GStreamer pipelines and how to get metadata information from ADLINK GStreamer elements. This document does not include information on PyFlowBase features. For more details about the PyFlowBase, refer to <https://pyflow.readthedocs.io/en/latest/index.html>.

The EVA SDK IDE supports 64-bit Microsoft Windows operating systems. Refer to the EVA SDK Installation Guide for information on installing any additionally required software.

After installing the EVA SDK and required software, execute the EVA SDK IDE using one of the following methods:

Method 1: Run the desktop shortcut.

From the Windows Desktop, double-click the EVA SDK IDE icon.



The shortcut will automatically set the environment variables and execute the EVA SDK IDE.

Method 2: Manually run the environment variable settings, and then execute the EVA SDK IDE.

Open a command prompt in Windows and run the following command to set the environment variables.

```
> C:\ADLINK\gstreamer\setupvars.bat  
> C:\ADLINK\eva\scripts\setup_eva_envs.bat
```

Note: The environment variables are removed when the command prompt is closed.

After setting the environment variables, execute the EVA SDK IDE.

```
> EVA_IDE.exe
```

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2 EVA SDK IDE User Interface

This chapter introduces the EVA SDK IDE user interface (UI) and common UI operations.

2.1 Introduction

This section is a detailed description of the UI.

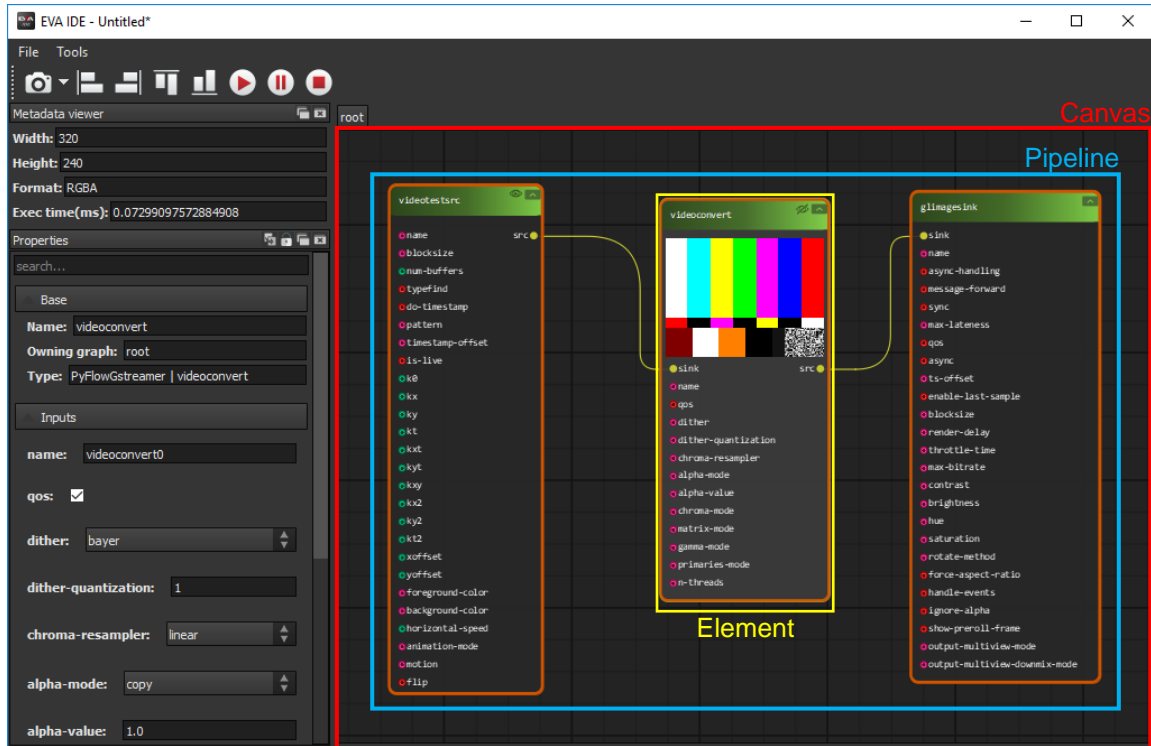











Figure 1: EVA SDK IDE User Interface (UI)

Table 1: EVA SDK IDE User Interface (UI) Items

Item	Description
Canvas	This area is used to edit elements and pipelines.
Element (Node)	The element is the node from PyFlowGstreamer. Only support the configurable GStreamer element list.
Pipeline	Use this area to link the elements as a pipeline.
GStreamer Control Buttons	<p>After creating a pipeline, click “Play”, “Pause” or “Stop” to control it.</p> <ul style="list-style-type: none">  Play: plays a GStreamer pipeline  Pause: pauses a GStreamer pipeline.  Stop: stops a GStreamer pipeline.
Properties	Select an element to show its editable properties. For more details, refer to Edit Properties of Elements
Metadata Viewer	<p>Shows the width, height, format of the video stream, the execution time, and AI information.</p> <p>For more details, refer to How to Review the Admetadata information.</p>
Alignment Buttons	<p>Select the nodes and click the alignment button to align them.</p> <ul style="list-style-type: none">  Aligns the selected nodes to the left node.  Aligns the selected nodes to the right node.  Aligns the selected nodes to the top node.  Aligns the selected nodes to the bottom node.
Canvas Screenshot	<p> Takes a screenshot of the canvas and saves the image to file. The default image file format is PNG.</p> <p>Click the down arrow to change the image format.</p> 

2.2 UI Operations

2.2.1 Move the Canvas

Method 1: Hold down **<Alt>** and the left mouse button to drag the canvas.

Method 2: Hold down the middle mouse button to drag the canvas.

2.2.2 Zoom the Canvas

Method 1: Scroll the mouse wheel to zoom the canvas.

Method 2: Press **<Ctrl> + <=>** to zoom in the canvas; press **<Ctrl> + <->** to zoom out the canvas.

Method 3: Hold down the right mouse button and move the mouse to zoom the canvas.

2.2.3 Hotkeys

Quickly zoom in and display a node: Click the node (element) on the canvas and press **<F>**.

Quickly display all nodes: Press **<H>**.

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3 Creating GStreamer Pipelines

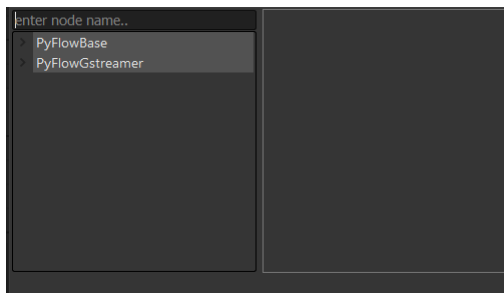
This chapter describes how to create and run GStreamer Pipelines in the EVA SDK IDE.

3.1 Adding an Element

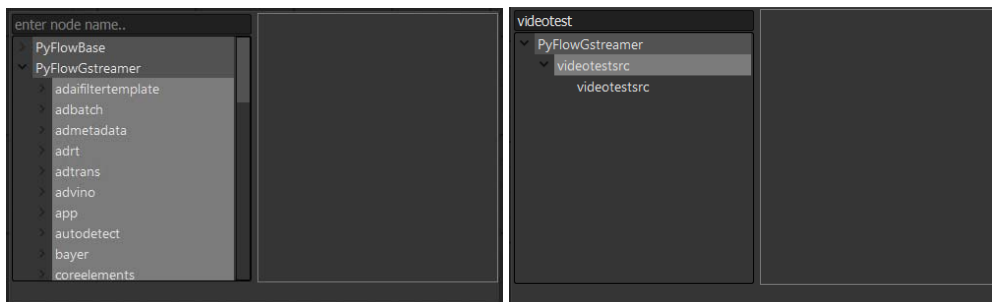
3.1.1 Right-click Method

Use the following steps to add an element using the right-click method.

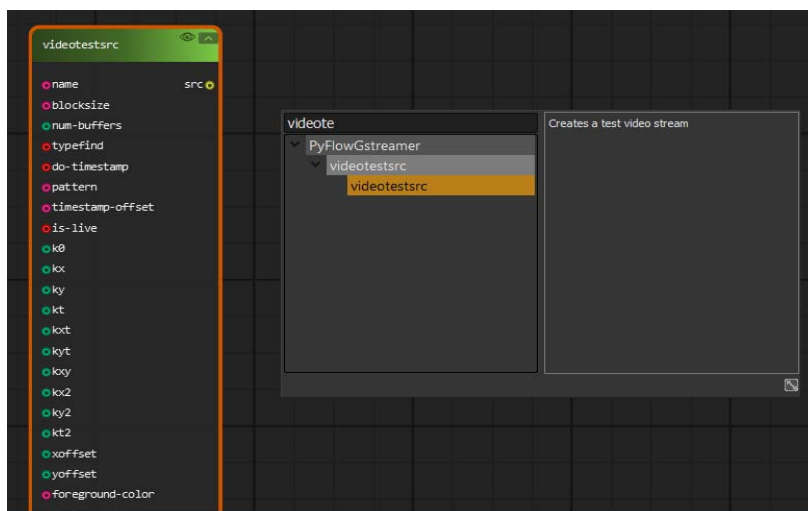
1. Right click on the canvas.



2. Select **PyFlowGstreamer** and choose the element, or enter element name in **enter node name** to search the specified element.



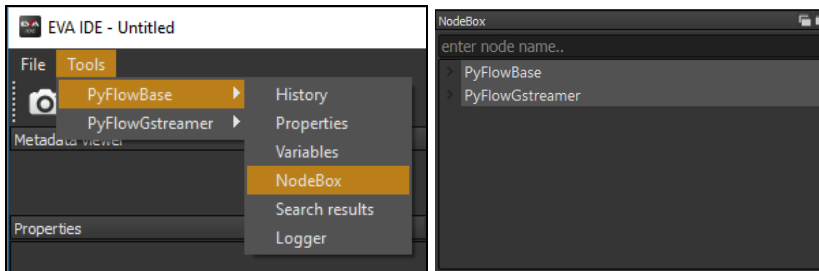
3. Drag the specified element to the canvas.



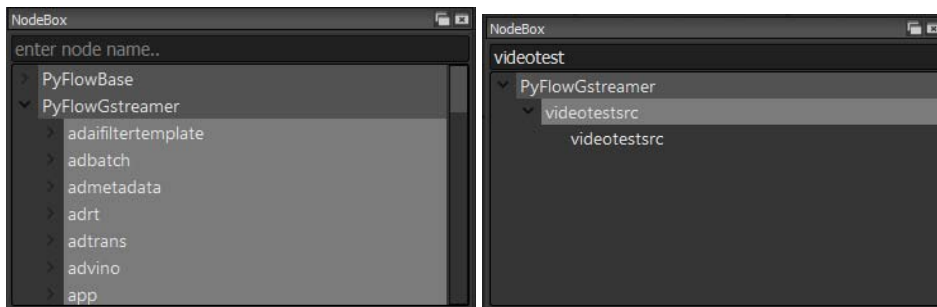
3.1.2 NodeBox Method

Use the following steps to add an element using the NodeBox method.

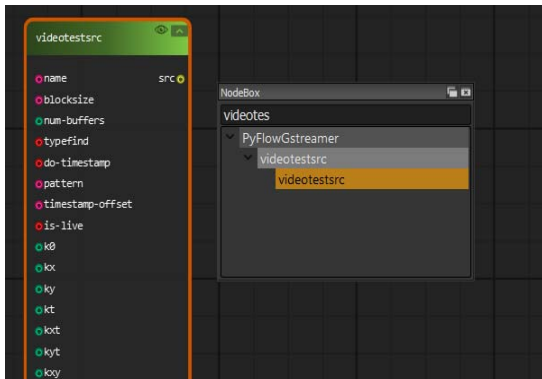
1. Tools → PyFlowBase → NodeBox



2. Select **PyFlowGstreamer** and choose the element, or enter element name in **enter node name** to search the specified element.



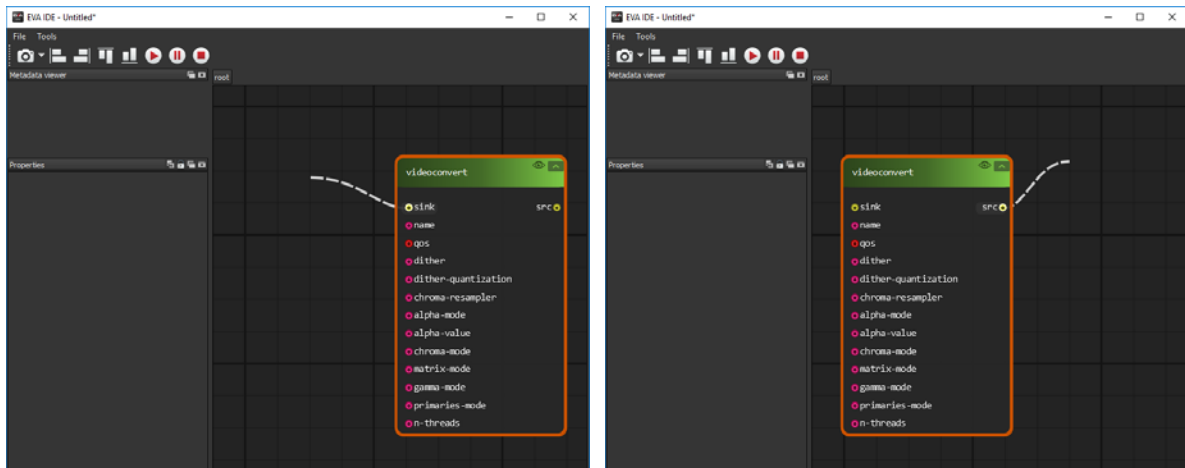
3. Drag the specified element to the canvas.



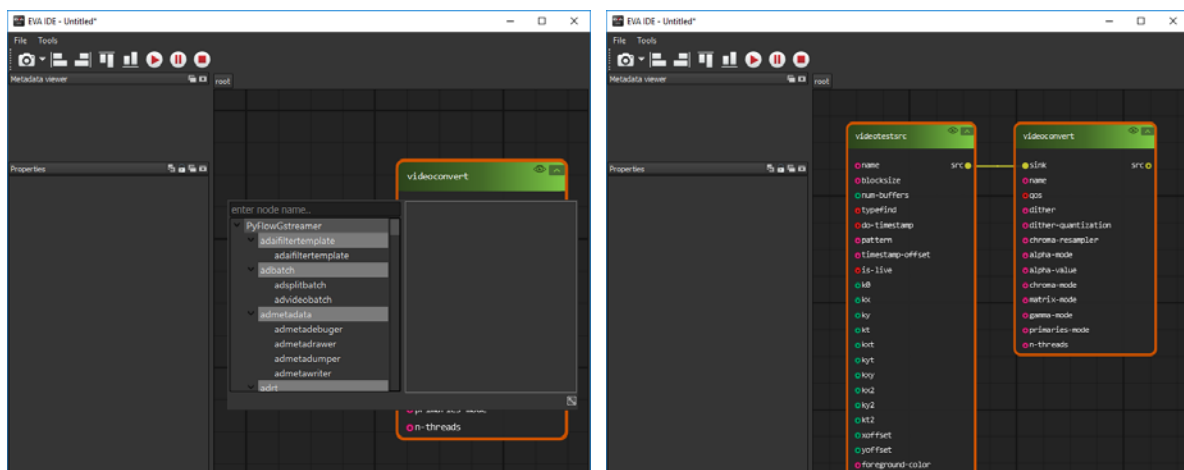
3.1.3 Pin Hint Method

Use the following steps to add an element using the Pin Hint method.

1. Left-click a source pin of an element (such as src pad or sink pad) and drag it to an empty space.



2. The NodeBox will display on the screen. Enter an element name in **enter node name** to search the specified element.



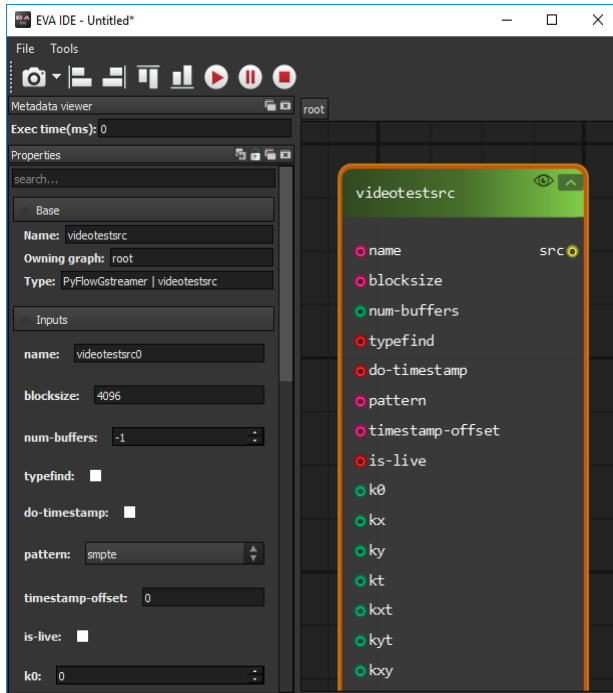
3.2 Deleting Elements

To delete an element, select it and then press **<Delete>**.

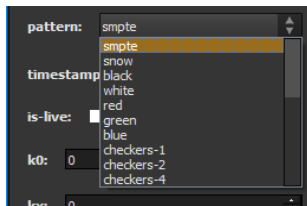
3.3 Editing Element Properties

Note: Properties must be modified when the pipeline state is stopped.

1. Select an element to modify its properties. For example, select **videotestsrc** to display its properties.



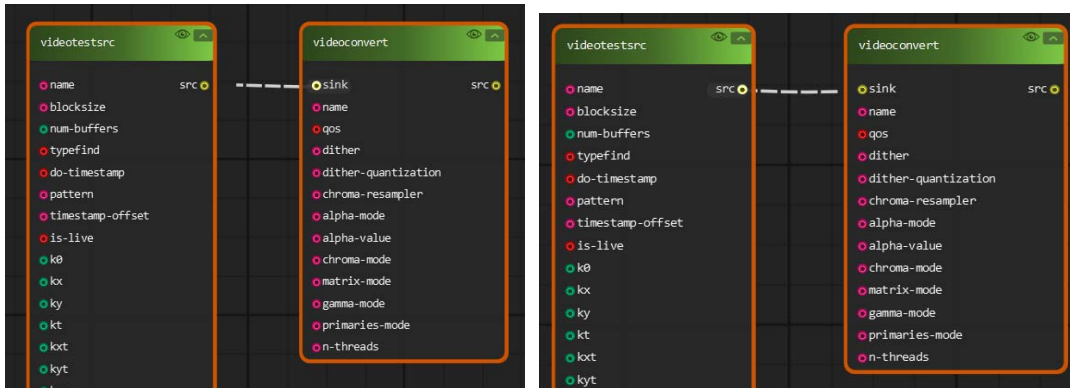
2. Click **pattern**, and select **ball**.



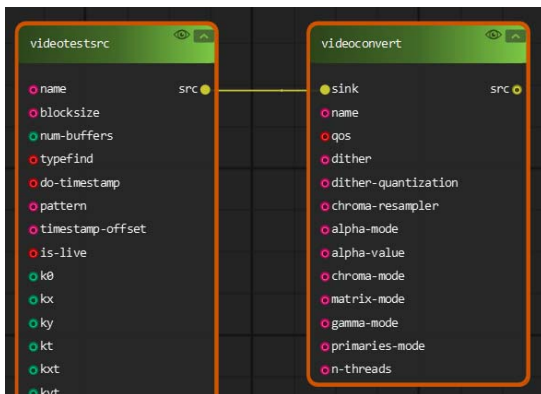
3.4 Linking/Unlinking Elements

3.4.1 Linking Elements

To connect elements, left-click the source's element GstPin and drag it to the target's GstPin. GstPin includes src and sink. In the following example, The left figure is a sink GstPin connected to a src GstPin. The right figure is a src GstPin connected to a sink GstPin.

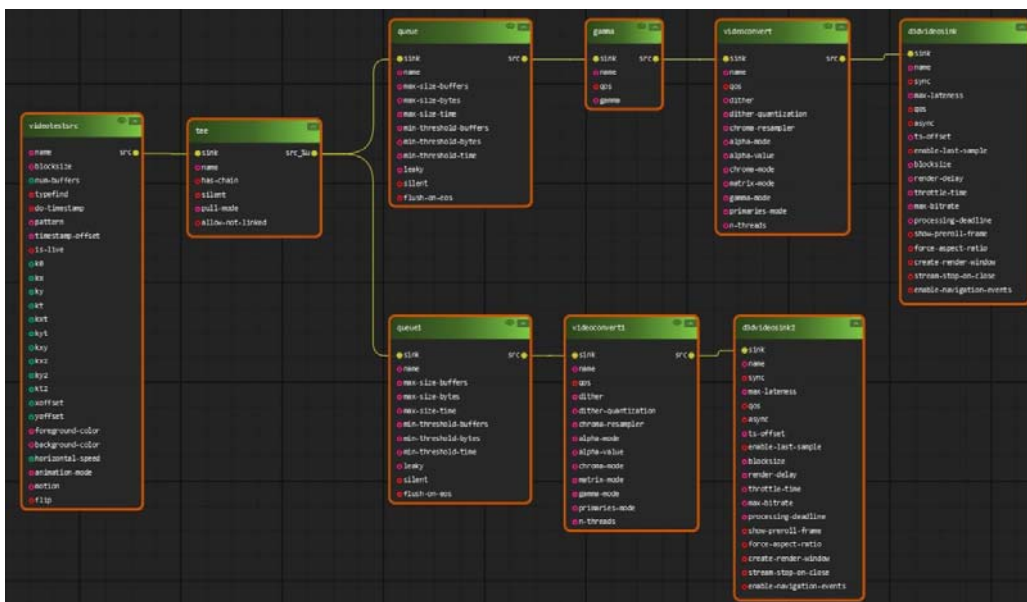


The following figure is linked.



Note: If using pin hints, the connection will link automatically.

If the sink GstPin or src GstPin supports multiple streams, such as a tee element that supports multiple output streams, multiple elements can be connected.




3.4.2 Unlinking Elements


Click the connection near sink or src GstPad to unlink the elements.

3.5 Pipeline Controls


3.5.1 Play a Pipeline

After creating a complete pipeline in the IDE canvas, click the play button () to play the pipeline.

3.5.2 Pause a Pipeline

After creating a complete pipeline in the IDE canvas, click the pause button () to pause the pipeline.

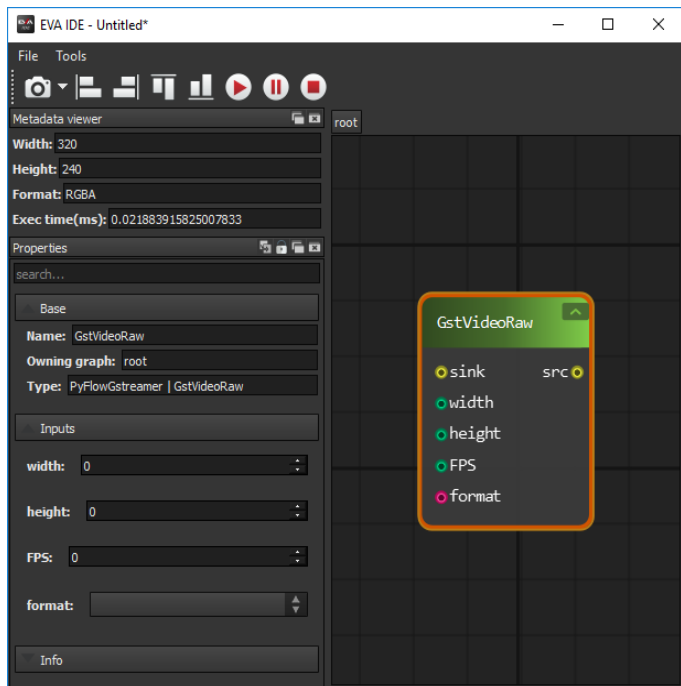
3.5.3 Stop a Pipeline

After creating and playing a complete pipeline in the IDE canvas, click the stop button () to stop the pipeline.

3.6 GstVideoRaw

Use **GstVideoRaw** to support the capsfilter element to enforce video/x-raw data format, width, height and framerate.

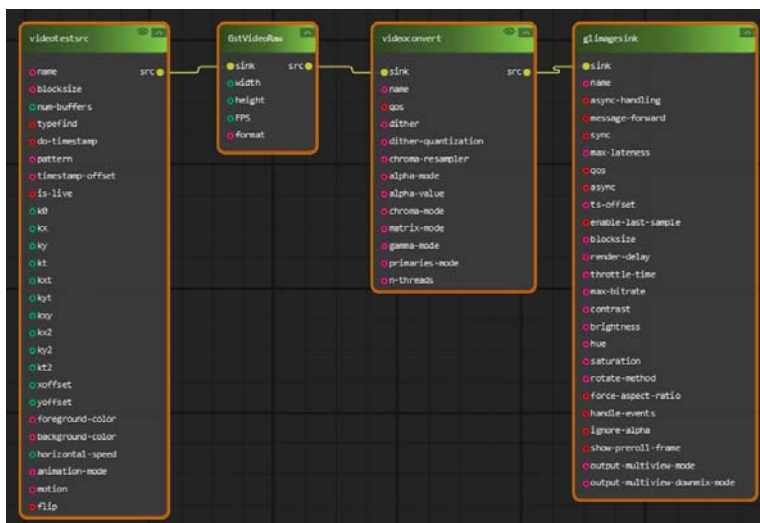
- width: The width of the image in pixels.
- height: The height of the image in pixels.
- FPS: The video frames per second. Default = 0.
- Format: The format of the video.



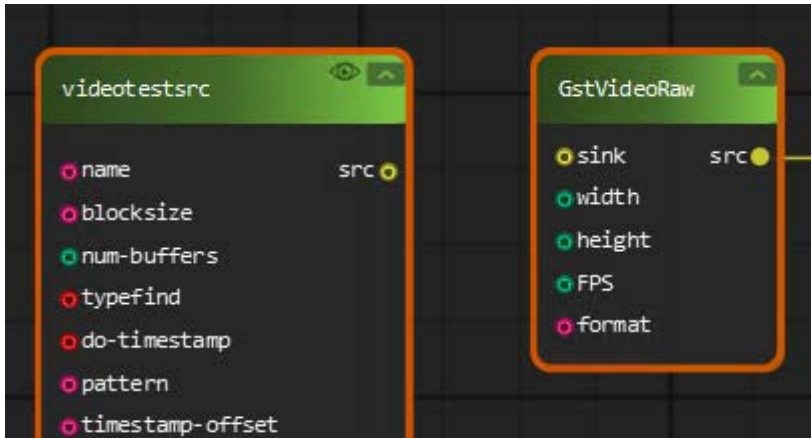
Use limitation

GstVideoRaw's GstPin can only be linked once. If the connection is removed, GstVideoRaw and the related element node must be rebuilt by deleting the original node and creating a new one.

The following figure is an example using GstVideoRaw.

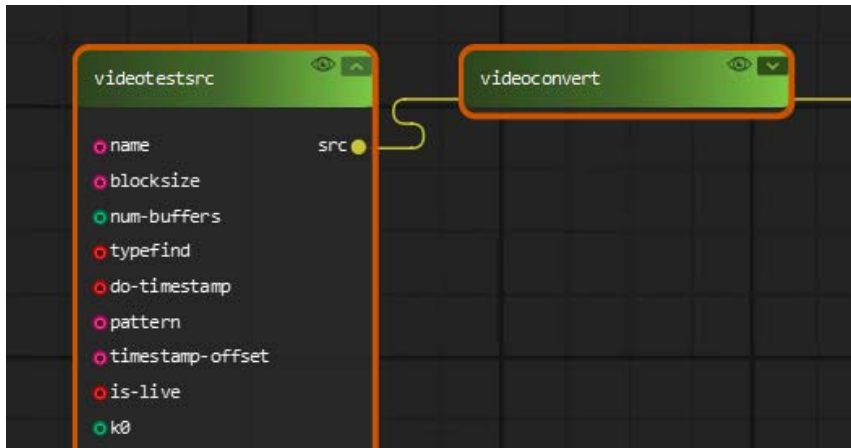


After unlinking a GstVideoRaw node and videotestsrc element, they cannot be reconnected; they must be deleted. To reuse videotestsrc or GstVideoRaw, new elements must be created.



3.7 Collapsing/Expanding Element Properties

Click  to collapse an element, and  to expand it.



3.8 Use Cases

This section includes examples on how to use the EVA SDK IDE.

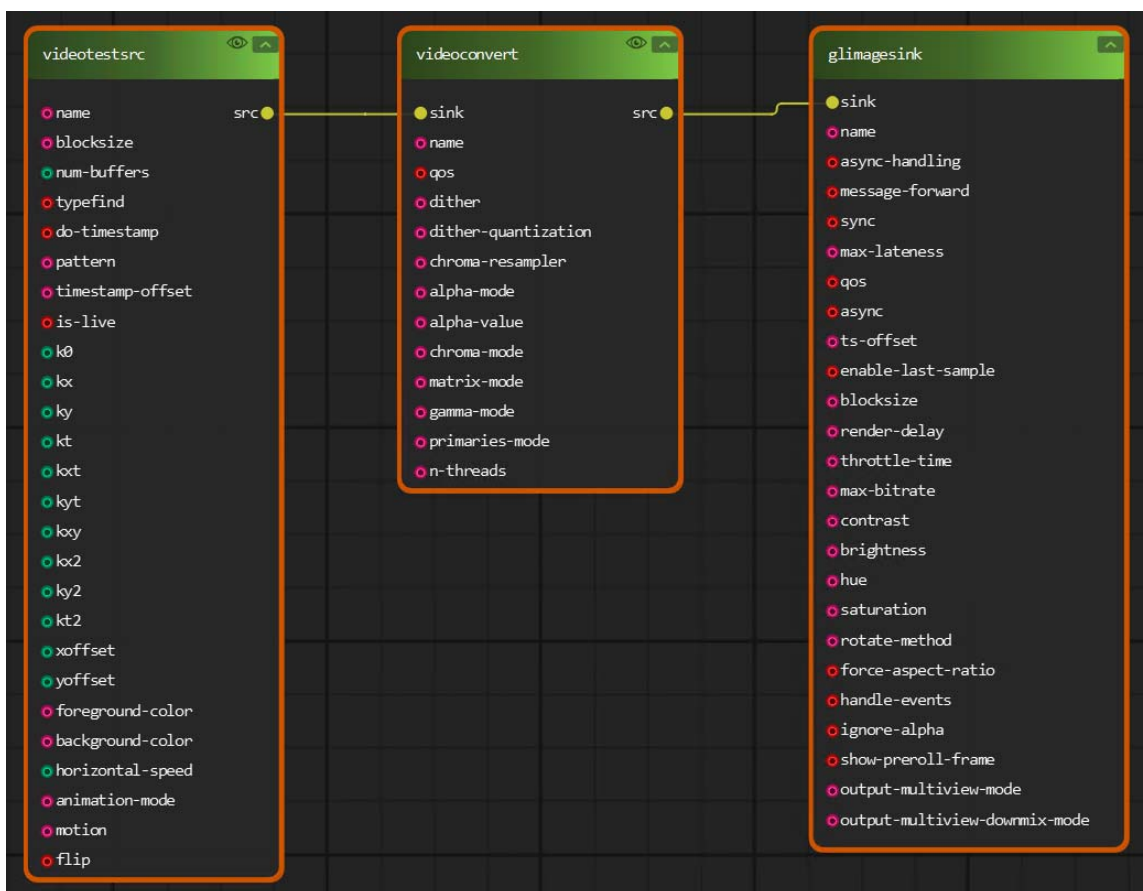
3.8.1 Use Case 1

This example describes how to play a test video via OpenGL.

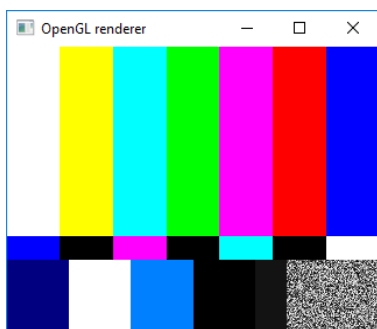
Use the following `gst-launch` command.

```
gst-launch-1.0 videotestsrc ! videoconvert ! glimagesink
```

First, add a `videotestsrc` element, a `videoconvert` element, and a `glimagesink` element to the canvas in the EVA SDK IDE. The `videotestsrc` element must connect to the `videoconvert` element, and the `videoconvert` element must connect to the `glimagesink` element as shown in the figure below.



Click the play button to show the video in an OpenGL renderer.



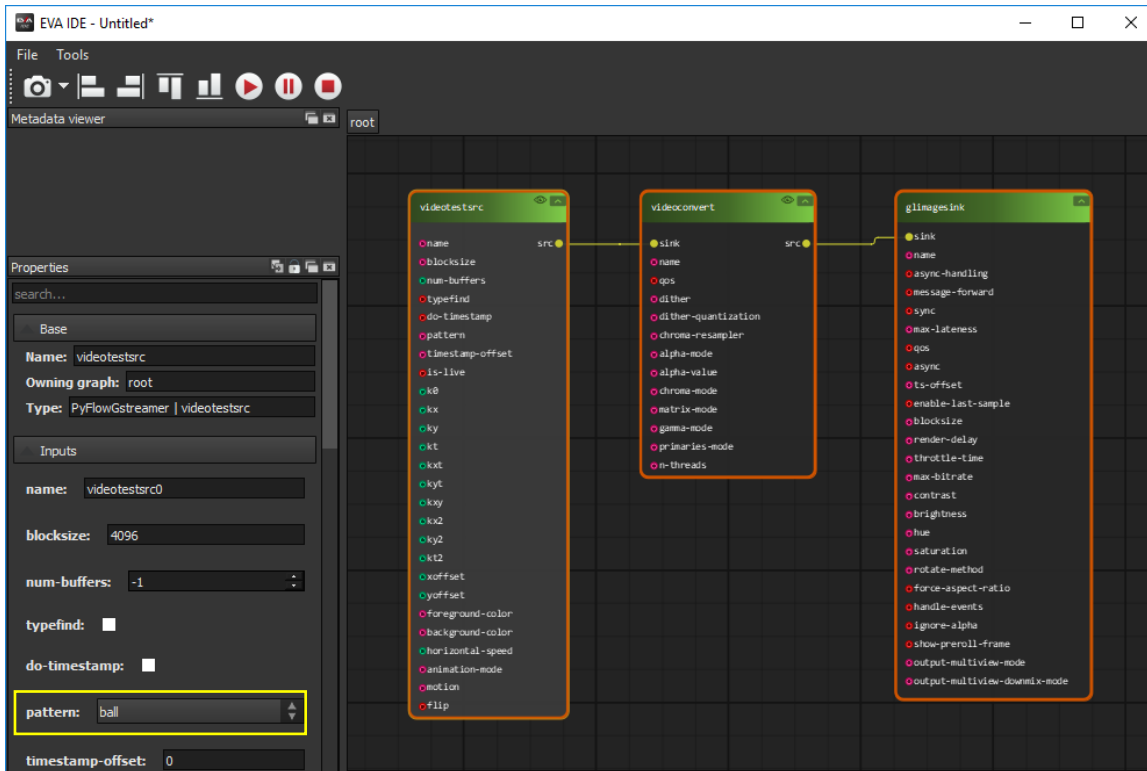
Click the stop button to stop the pipeline.

3.8.2 Use Case 2

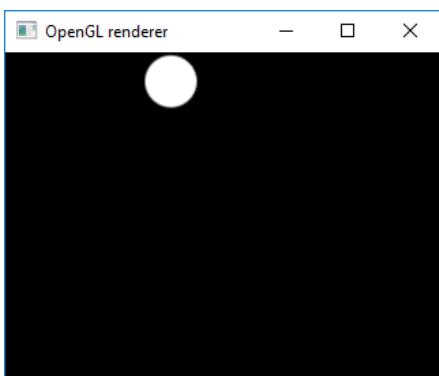
This example describes how to play a test video with a ball pattern via OpenGL.

```
gst-launch-1.0 videotestsrc pattern=ball ! videoconvert ! glimagesink
```

Following from the example in Use Case 1, in the stop state, select the videotestsrc element and modify its *pattern* property to **ball**.



Click the play button to show the ball video in an OpenGL renderer.



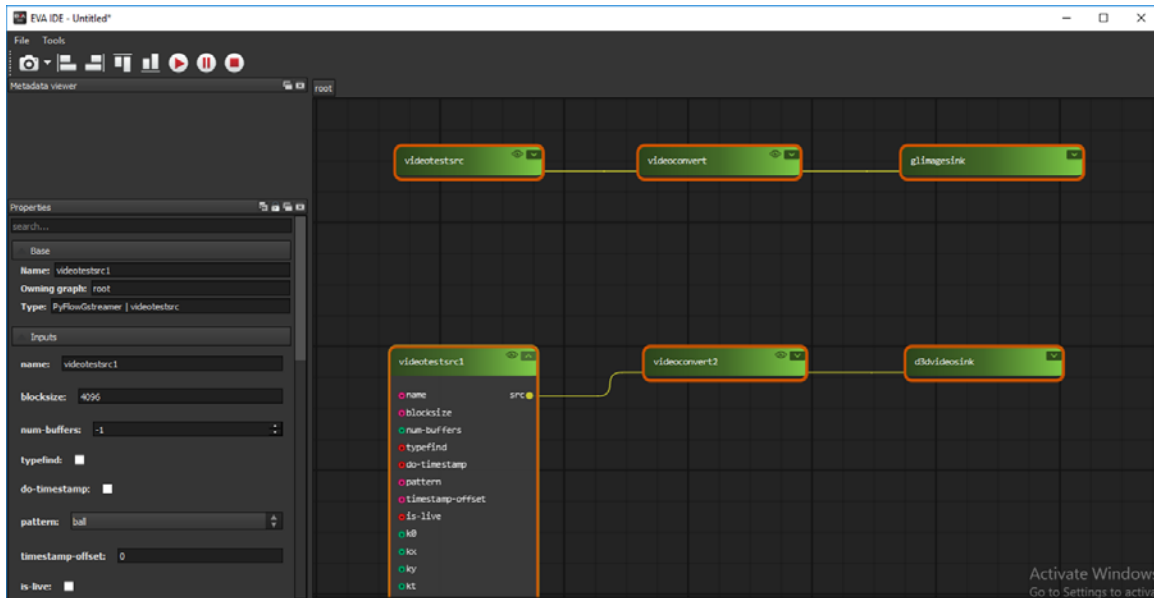
Click the stop button to stop the pipeline.

3.9 Gst Commands

To generate Gst commands from pipelines in the canvas, click **Play GStreamer pipeline**. If the pipeline can be played, gst-launch-1.0 commands will be generated in C:\ADLINK\eva\IDE\command.txt.

If there is more than one pipeline in the canvas, all of the commands will be included in the file.

In the following example, there are two pipelines in the canvas.



After playing, the gst commands are created in command.txt.

```
command.txt - Notepad
File Edit Format View Help
|-----Pipeline No.1-----
gst-launch-1.0 videotestsrc ! videoconvert ! glimagesink
|-----
|-----Pipeline No.2-----
gst-launch-1.0 videotestsrc pattern=ball ! videoconvert ! d3dvideosink
|-----
```


Note: The command file will be erased each time GStreamer is played. Be sure to back up command.txt if you want to save the Gst commands.

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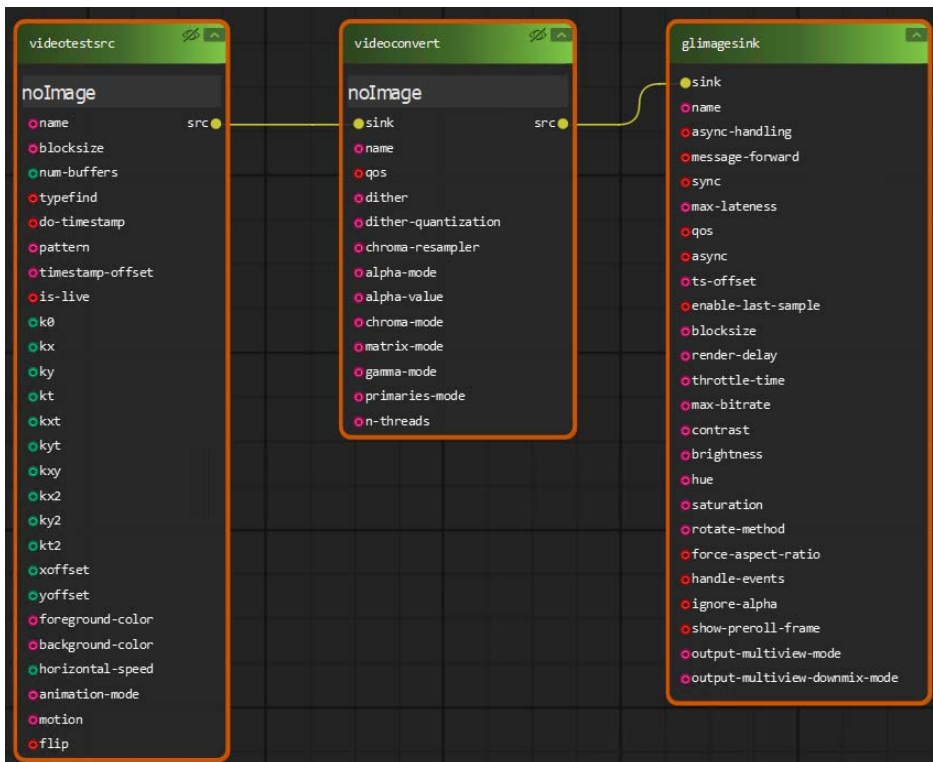
4 Reviewing Admetadata Information

Admetadata information includes the width, height and format of the video, execution time (ms), and inference information (if any) in the specified element.

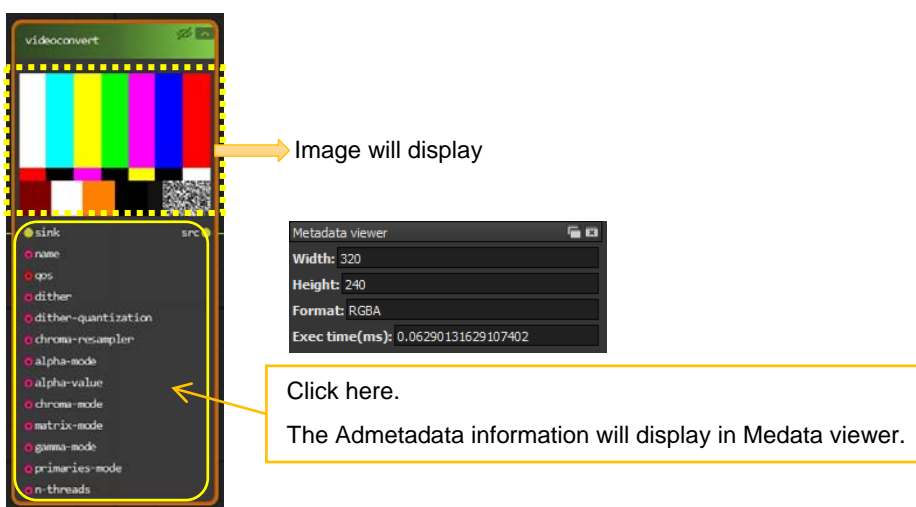
After creating a complete pipeline, click **ViewImage**,  or , on the specified element to open its metadata viewer. If there is no video source, the screen will show **noImage**.

: Close state.

: Open state.



Click the play button to start the pipeline; the image (if any) will display. Then click the specified element; the metadata viewer will show the Admetadata information.



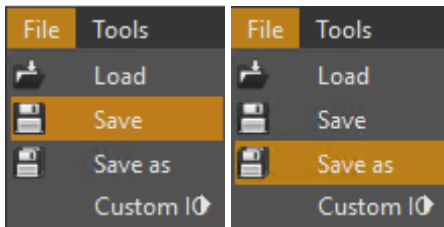
After playing and showing the admetadata information, you can click the pause button to pause the streams, or click the play button to keep playing them.

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5 Save/Load a GStreamer Pipeline

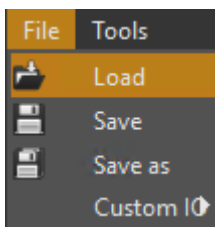
5.1 Save a GStreamer Pipeline

File → Save or File → Save as a pygraph file



5.2 Load a GStreamer Pipeline

File → Load to load a pygraph file



Note: The EVA SDK IDE cannot load a pygraph file that contains unsupported elements. For example, Windows does not support ximagesink. If the pygraph file includes ximagesink, the EVA SDK IDE will not load the file successfully.

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6 Use Limitations

6.1.1 EVA SDK IDE Limitations

- PyFlow's preferences settings cannot be modified. User's modifications will not be retained.
- The EVA SDK IDE will not retain the dock tools added by users.
- The EVA SDK IDE will not restrict users from mismatched translators to connect the inference models. Confirm that the inference model elements will connect to the matched translator. Otherwise, the incorrect translator may try to access memory without permission, causing the EVA SDK IDE to crash. For example, a Yolo inference model must use the `adtrans_yolo` element.

6.1.2 PyFlow Known Issues

- After clicking "New file", the `pyflowbase` node or the `gststreamer` element cannot add to the canvas any more. To fix this issue, restart the EVA SDK IDE.
- Abnormal mouse operations may make PyFlow crash. To fix this issue, restart the EVA SDK IDE.

6.1.3 GStreamer Pipeline Limitations

- There cannot be any unlinked source elements such as `filesrc` in the canvas.
- There cannot be any unlinked sink elements such as `autovideosink` in the canvas.
- There cannot be any unlinked bin elements such as `decodebin` in the canvas.

6.1.4 glimagesink Element Limitations

- The `glimagesink` element only supports one object in the pipeline on Windows.
- Only one `glimagesink` node can be added to the canvas on Windows.
- When adding a GStreamer element to the canvas, a new `gststreamer` object will be created automatically. If an existing `glimagesink` element is deleted from the canvas and a new one is added, there will be multiple `glimagesink` objects.

Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User's Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
 - Keep equipment away from water or liquid sources.
 - Keep equipment away from high heat or high humidity.
 - Keep equipment properly ventilated (do not block or cover ventilation openings).
 - Make sure to use recommended voltage and power source settings.
 - Always install and operate equipment near an easily accessible electrical socket-outlet.
 - Secure the power cord (do not place any object on/over the power cord).
 - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
 - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

Getting Service

Ask an Expert: <http://askanexpert.adlinktech.com>

ADLINK Technology, Inc.

Address: 9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.

Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.

Address: 300 Fang Chun Rd., Zhangjiang Hi-Tech Park, Pudong New Area
Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH

Address: Hans-Thoma-Straße 11
D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: germany@adlinktech.com

Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you.