tvONE®
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# 1T-C2-750 HDMI™-compatible scaler PLUS

User Guide V3.00

MNL-1T-C2-750-V3.00

May 2019

# In this guide

Thanks for buying this 1T-C2-750 DVI scaler. The 1T-C2-750 has two high quality graphic scalers capable of working at full DVI video rates. HDMI and HDCP compatible, the 1T-C2-750 can be used to convert digital DVI-D, HDMI, or analog DVI-A signals to another format, with full CORIO™ 2 picture-in-picture flexibility. The 1T-C2-750 supports HDMI audio.

# In the box

- 1T-C2-750


- 12 V DC power lead with adapter

- HDMI to DVI adapter

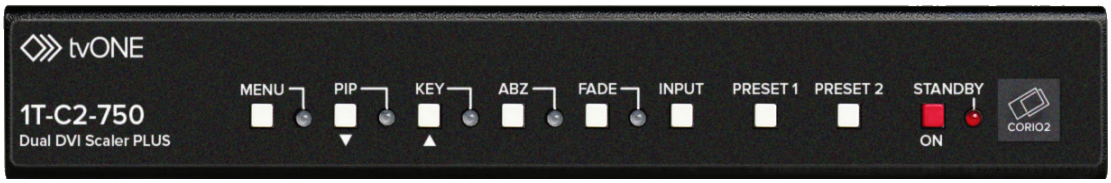
- User guide
- Safety guide

> In the unlikely event that a component is missing or damaged, please contact tech.usa@tvone.com or tech.europe@tvone.com.

# About your 1T-C2-750 DVI scaler

You can control your 1T-C2-750 with the buttons of the front panel, or with a serial controller.

## Front panel




| | |
|---|---|
| MENU | ■ Press once to show the on-screen display.<br>■ Press and hold to close the on-screen display.<br>■ Press and hold for more than three seconds to store the current settings. |
| PIP | If the on-screen display is not active, press to enable and disable the picture-in-picture, or shrink, feature. |
| KEY | If the on-screen display is not active, press to enable the keying feature.<br>**Note:** the default key color is black, so the black foreground becomes transparent. |
| ABZ | Toggles between windows A, B, and Z. |
| ABZ (LED) | ■ Off = window A selected.<br>■ On and steady = window B selected.<br>■ Flashing = window Z (background) selected. |
| FADE | Fades out the current window. Press again to fade the same window back in. |
| INPUT | Toggles between inputs DVI-I 1 and DVI-I 2. |
| PRESET1<br>PRESET2 | ■ Press once to load a saved preset.<br>■ Press and hold to overwrite the preset with the current settings.<br>■ Press and hold for more than five seconds to return the preset to the factory default setting. |
| STANDBY | ■ Press and hold to enter standby mode.<br>■ Press once to wake up the 1T-C2-750. |

## Rear panel


| | |
|---|---|
| DC 12V | Connect to an electrical outlet with the power supply provided. |
| DVI-I 1 | Connect to a source. |
| DVI-I 2 | Connect to a source. |
| PC/HD SCALED OUT | Connect to a display. |
| RS232 | Optional: connect to a PC, or to a serial controller. |

You can connect a range of inputs and outputs using our adapters.

Read more on page 3.

# Inputs and outputs

## DVI-I inputs

Connect any of the following inputs with a DVI cable, or with an adapter.

- Digital DVI-D
  Maximum 1920x1200 @60 Hz / 1080p60
- Analog RGBHV
- Analog RGsB (sync on green)
- Analog RGBS (composite sync at TTL levels)
- Analog YUV/YPbPr (including tri-level)

In most cases, the input used is auto-detected. DVI-D takes priority over any analog source.

Read more about manually selecting an input type on page 24.

## PC/HD Scaler DVI-I output

The output can support DVI-D and an analog output type simultaneously:

- Digital DVI-D
  Maximum 1920x1200 @60 Hz / 1080p60
- Analog RGBHV
- Analog RGsB (sync on green)
- Analog RGBS (composite sync at TTL levels)
- Analog YUV/YPbPr (including tri-level)

Read more about changing the output resolution and the sync/video format on page 11.

### Adapters

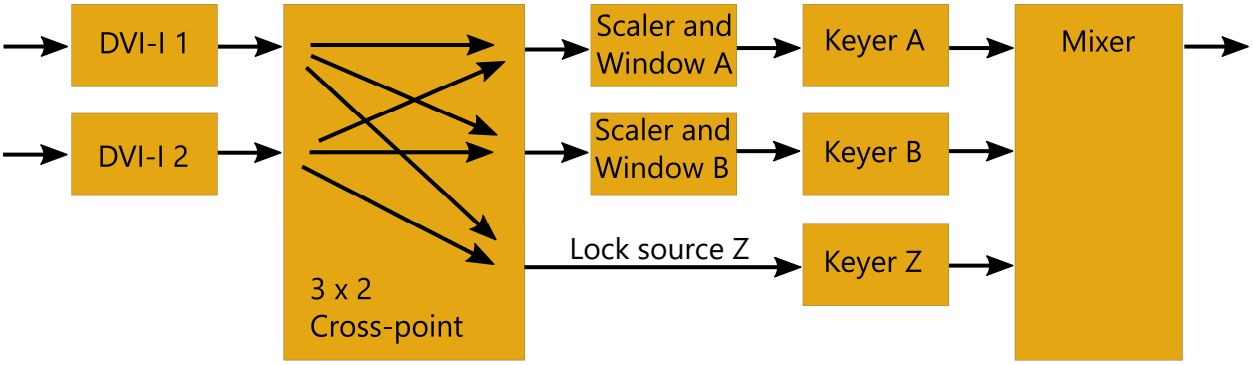
You can use our adapters to connect any of the following formats to DVI inputs and outputs. Unless stated, you can use all of these adapters with both DVI-I and DVI-U modules.

| Adapter | Product number | Male connector | Female connector |
|---|---|---|---|
| HDMI adapter | CMD1941 | DVI | HDMI |
| Analog PC adapter | ZDH-2040 | DVI-I | VGA |
| Analog RGBHV adapter | ZDB-2038 | DVI-I | Analog RGBHV on BNCs |
| YPbPr/YUV adapter | ZDR2042 | DVI-I | YPbPr/YUV on RCAs |
| YPbPr/YUV adapter cable | ZDB2044 | DVI | YPbPr/YUV on BNCs |

For our range of adapters, visit tvone.com.

# Block diagram of scaling and keying

This unit has 2 scaling engines and 3 keyers. The outputs from the scaling engines and keyers are mixed together to form a single image.




As the diagram shows, the two DVI-I inputs are available for use by either of the scalers, or as a lock source, also known as window Z, where the output is synchronized to an input.

Read more on page 11.

Windows A and B can be scaled, and then each window can be keyed to remove any color, or nearby range of colors.

Read more on page 20.

The resulting windows are merged together into a single output, according to your chosen layer priority.

Read more on page 14.

Not shown in the block diagram:

- Still image stores SIS1 and SIS2, which provide a static source for windows A or B.
- Border generators, which can place borders of any color or opacity around each window.

# Upgrading the firmware

For best results, always use the latest firmware. You can download the latest firmware from www.tvone.com/firmware-updates.

1. Check your current firmware version on the firmware version screen of the on-screen menu.
   Press MENU > ▲.

   ```
   www.tvone.com
   SW: 65 PT: 12 BT:13
   ```

   The SW number is your current firmware version.
2. Connect your device to your PC with an RS-232 cable.
3. Download the latest firmware from www.tvone.com/firmware-updates.
   Find your device in the list and download the firmware updating .exe file.
4. Install and open the CORIO™2 Firmware Updater tool.

   
5. Select Update Firmware.

# Controlling the 1T-C2-750 with the buttons of the front panel

You control some functions of this unit by pressing and holding combinations of buttons.

### In this section



## Saving your configuration

> To access this function, the unit must be switched on and in active mode. This function does not work when the unit is in standby mode.

To save your current configuration, press and hold MENU until you hear a beep.

## Locking the buttons of the front panel

> To access this function, the unit must be switched on and in active mode. This function does not work when the unit is in standby mode.

To lock and unlock the buttons of the front panel, press and hold STANDBY and INPUT at the same time.

When the buttons lock, you hear a beep and the STANDBY LED flashes.

When the buttons are locked, you can only unlock the buttons and save your current configuration. When you save your configuration, the buttons remain locked when the unit powers on.

## Restoring your last saved settings

> To access this function, the unit must be switched on and in active mode. This function does not work when the unit is in standby mode.

If you can't see the on-screen menu, or you're experiencing a problem, you can restore your last saved settings.

To restore your last saved settings, press and hold STANDBY and MENU at the same time until you hear a single beep.

**Note:** stop pressing the buttons after a single beep. If you continue to press the buttons, the unit will reset all settings to factory defaults.

## Factory reset

> To access this function, the unit must be switched on and in active mode. This function does not work when the unit is in standby mode.

To reset all your settings to their factory defaults, press and hold STANDBY and MENU until you hear two beeps.

When you reset settings to factory defaults, your custom resolution settings are kept. To completely reset the unit and delete resolution settings, update your firmware.

Read about updating firmware on page 4.

## Switching between different resolutions

> To access this function, the unit must be switched on and in active mode. This function does not work when the unit is in standby mode.

The default resolution of the 1T-C2-750 is 1280x720p @60 Hz. The unit stores three preset resolutions that you can switch between by pressing and holding the button combinations below.

| Button combination | Resolution |
|---|---|
| MENU + PIP | 720x480 @59.94 Hz |
| MENU + KEY | 1280x720 @59.94 Hz |
| MENU + ABZ | 1280x1024 @60 Hz |

**Note:** if the 1T-C2-750 is locked to a DVI-I source, the resolution of that source overrides the output resolution chosen here.

# Configuring your 1T-C2-750 with the menu

You can configure your 1T-C2-750 with the on-screen menu.

On the front panel of your 1T-C2-750, press MENU to enter a submenu and select and clear items, and navigate with ▲ and ▼.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## In this section



## Map of the on-screen menu

| | |
|---|---|
| Welcome | |
| Firmware version | |
| Adjust preset | |
| Adjust outputs | Lock |
| | Output resolution |
| | HDCP |
| | Output type |
| | Background Y/U/V |
| | Allow HDMI output |
| | Allow errors |
| | Audio embedding |
| | Exit |
| Adjust windows | Window to adjust |
| | Source |
| | Window enable |
| | Zoom level % |
| | H/V Zoom pan % |
| | In (pixel mode only) |

| | | |
|---|---|---|
| | Out (pixel mode only) | |
| | Image freeze | |
| | H/V crop % | |
| | H/V out shift | |
| | Shrink level % | |
| | H/V position % | |
| | Aspect change | |
| | Aspect adjust | |
| | Image smoothing | |
| | Image flip | |
| | Max fade level % | |
| | Layer priority ABZ | |
| | Exit | |
| Adjust keyers | Window to adjust | |
| | Keyer enable | |
| | Y Key min/max | |
| | Y Key soft | |
| | U Key min/max | |
| | U Key soft | |
| | V Key min/max | |
| | V Key soft | |
| | Exit | |
| Adjust borders | Border enabled | |
| | Border size H/V | |
| | Border offset H/V | |
| | Border Y/U/V | |
| | Border opacity | |
| | Exit | |
| Adjust sources | Source to adj | |
| | HDCP | **Note:** Set Source to adj to DVI-I 1 or DVI-I 2. |
| | Display emul. EDID | **Note:** Set Source to adj to DVI-I 1 or DVI-I 2. |
| | EDID capture | **Note:** Set Source to adj to DVI-I 1 or DVI-I 2. |
| | Autoset status | **Note:** Set Source to adj to DVI-I 1 or DVI-I 2. |

| | |
|---|---|
| | Aspect correct |
| | TL position adjust |
| | BR size adjust |
| | On source loss |
| | Input pixel phase |
| | RGB input type |
| | RGB/VYU level |
| | YUV black level |
| | De-interlace |
| | F. swap |
| | Exit |
| Adjust transitions | Transition type |
| | Transition time |
| | Exit |
| Adjust resolutions | Warning |
| | Image to adjust |
| | Interlaced |
| | Horizontal frequency coarse |
| | Horizontal frequency fine |
| | Clocks/line |
| | Lines/f |
| | H/V active |
| | H/V start |
| | H/V sync width |
| | Sync polarity |
| | Exit |
| System | Firmware version |
| | Software date |
| | In |
| | TAC# |
| | PPF# |
| | Save power-on settings |
| | OSD on power up |

| |
|---|
| Autoset sense |
| RS232 baud rade |
| Buzzer |
| Resolutions |
| Still images |
| Power cycles |
| Firmware updates |
| Hours in use |
| Exit |

# Using the menu

Use the buttons on the front panel to open and control the on-screen menu.

- To open the menu, press MENU.
- To navigate within the menu, press ▲▼.
- To select an item, or to open a submenu, press MENU.
- To change a value in brackets [ ], select the value by pressing MENU, then use ▲▼ to change the value. Press MENU again to select the new value.
- To close a submenu, navigate to the bottom of the submenu and select Exit.

After a few idle seconds, the menu closes.

# Presets

You can save up to 10 preset combinations of window size, position, and keying.

Save presets with the Adjust presets submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

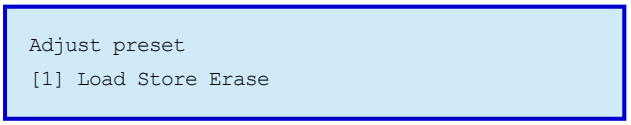
Saving presets only saves items from the following submenus:

- Adjust outputs
- Adjust windows
- Adjust keyers
- Adjust borders

If you want to save items from other submenus, use the buttons of the front panel to save your full configuration.

Read about saving your configuration on page 5.

## Storing presets




1. Choose settings until your 1T-C2-750 is set up as you want it.
2. Navigate to the Adjust preset menu.
3. Select a preset number [1].
4. Select Store.

You can also store presets in slot 1 or slot 2 by pressing and holding PRESET 1 or PRESET 2 until you hear a beep.

### Loading presets

You can load the presets from slot 1 and slot 2 using the buttons of the front panel.

If you want to load a preset from another slot, navigate to that preset using the on-screen menu, and select Load.

### Erasing presets

You can erase a preset by selecting Erase for that preset.

You can erase the presets in slot 1 or slot 2 by pressing and holding PRESET 1 or PRESET 2 until you hear two beeps.

## Outputs

You can configure your outputs, including enabling and disabling locking, changing the resolution of your output, and overlaying your output onto a computer or video source.

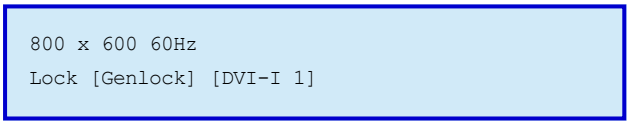
Configure outputs with the Adjust outputs submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

### Locking

You can enable and disable locking, choose the lock source, and choose one of three lock modes.

- Select a lock source, and then select a lock method.




The top line shows the resolution of the selected lock source.

The bottom line shows the locking mode, in this example [Genlock], and the lock source, [DVI-I]. Choose from the following lock modes:

| | |
|---|---|
| Off | The output resolution is defined in the resolution settings, and there is no background source visible. |
| Genlock | The output is Genlocked to the selected lock source. The output signal is synchronized with the input, and adjustable, but there is no lock source visible. |
| Lock and mix | The output video is locked to the selected source, and the syncs are locked, with an additional internal video processing delay. The background for the output is that of the lock source, unless you swap foreground and background. |
| Frame lock | The frame rate of the output is locked to the frame rate of the input.<br>Frame lock only works if the output resolution frame rate matches that of the lock source frame rate. |

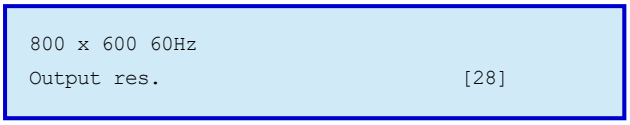
In both genlock and lock and mix modes the source selected for the lock determines the resolution of the output image.

In frame-lock mode, the output resolution is independent of the lock source, but the frame-rate must match that of the source. For example, 1280x1024 @60 Hz can be frame- locked to 640x480 @60 Hz.

## Resolution

You can set a resolution for your output. This resolution is overridden by the resolution of your lock source if you enable locking.

- Choose a preset resolution by changing the slot number.



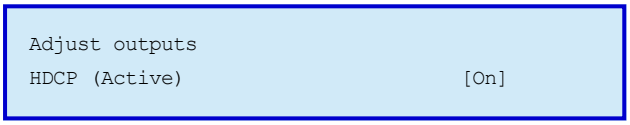

The top line shows the current resolution.

The bottom line shows the resolution slot.

## HDCP

You can enable and disable HDCP.

HDCP is a High-bandwidth Digital Content Protection system, which prevents units not equipped with a HDCP receiver from receiving high definition video signals. The 1T-C2-750 supports HDCP 1.4.




The bottom line shows the status of HDCP.

| Status message | Description | Effect |
|---|---|---|
| No display | There is no display attached<br>(HOTPLUG is low). | No output. |
| Unavailable | The device attached is not capable of supporting HDCP. | HDCP-encrypted source is not displayed. |
| Supported | The device attached is capable of HDCP, but the output is not currently encrypted. | HDCP-encrypted source is not displayed. |
| Active | The device attached is capable of HDCP, and the output from the unit is encrypted. | HDCP-encrypted source is displayed. |
| Rep. supprt | The attached repeater unit, for example, a scaler, is capable of HDCP, but the output is not currently encrypted. | HDCP-encrypted source is not displayed. |
| Rep. active | The attached repeater unit, for example, a scaler, and the output from the unit is encrypted. | HDCP-encrypted source is displayed. |

You can also enable and disable HDCP for specific inputs.

Read more on page 24.

## Output type

You can choose the type of signal your output produces. The type of output depends on the resolution you select.

```
Adjust outputs
Output type                          [RGBHV]
```

The bottom line shows the current type of output signal.

## Background Y/U/V

You can set the value of the fixed background color, which is present when PIP is used with no lock source background displayed.

```
Adjust outputs
Back Y/U/V [16] [128] [128]
```

The bottom line shows the current values for Y, U, and V.

## Allow HDMI

You can set the output to support HDMI resolutions and embedded audio.

```
Adjust outputs
Allow HDMI output [On]
```

The bottom line shows the current mode of the output. When the mode is Off, the output supports the default settings for DVI outputs.

## Allow errors

You can choose to ignore errors from EDID checksums.

```
Adjust outputs
Allow errors                         [On]
```

The bottom line shows the current status.

## Audio embedding

You can enable and disable audio embedding for HDMI inputs and outputs. If you enable audio embedding, you can send the audio from an AV signal to your output.

- Set Audio emb. to On.
- Select WinA to set the audio source to always be from the main window's video source.

```
Adjust outputs
Audio emb. [On] [DVI-I 1]
```

The bottom line shows the status of audio embedding.

# Windows

You can configure your windows, including the window source, and its position, size, and zoom level.

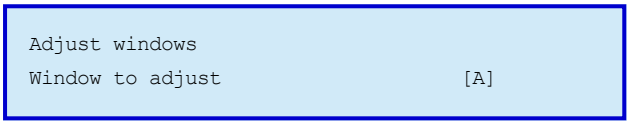
You can change a window's size in a number of different ways, depending on whether Aspect adjust is set to Simple, Advanced or Pixel. These instructions are for simple mode, unless otherwise stated.

## Configuring windows with the Adjust windows submenu

1. Choose a window in Window to adjust.
2. Configure that window with the other menu options.
3. To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Window to adjust

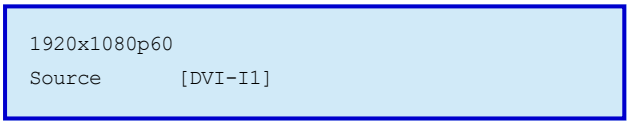
You can choose which window to configure.




The bottom line shows the currently selected window.

## Source

You can change the input source for the window.

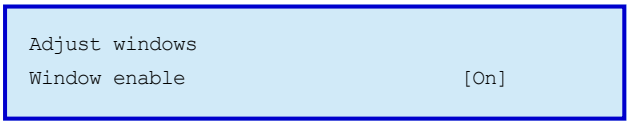



The top line shows information about the current source.

The bottom line shows the current source.

## Window enable

You can enable and disable the window.



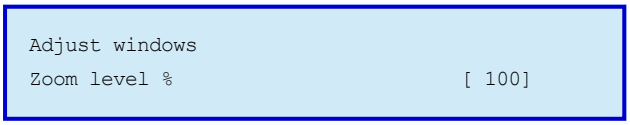

The bottom line shows the status of the window.

## Zoom level %

You can choose how magnified the picture appears in the window.

## When Aspect adjust is in simple mode

- Select a percentage from 100 (1x magnification) to 1000 (10x magnification).

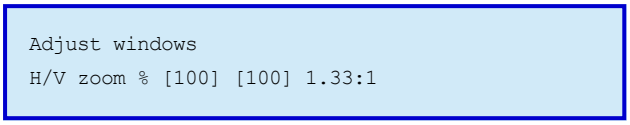



The bottom line shows the percentage value of magnification.

### When Aspect adjust is in advanced mode

You can set the horizontal and vertical magnification separately.

- Select horizontal or vertical, and then select a percentage from 100 (1x magnification) to 1000 (10x magnification)..




The bottom line shows the percentage magnification for the horizontal axis and vertical axis, and the aspect ratio.

For example, for a ratio of 4:3 the number is 1.333, which is 4 divided by 3.

### When Aspect adjust is in pixel mode

You can set the exact size and position of the image in pixels with the In and Out options.

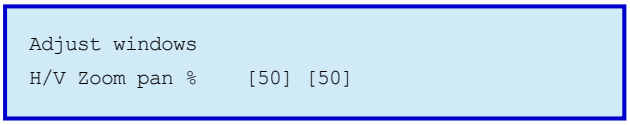
Read more on page 15.

### H/V Zoom pan

If you choose to magnify the picture, you can choose which part of the picture to show on the screen.

### When Aspect adjust is in simple or advanced mode

- Select horizontal or vertical, and then select a percentage from 0 to 100.




The bottom line shows the percentage value of the horizontal and vertical position. [50] [50] shows the picture centered in the window. [0] [0] shows the picture in the top-left corner of the window.

### When Aspect adjust is in pixel mode

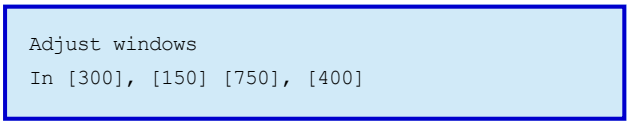
You can set the exact size and position of the image in pixels with the In and Out options.

Read more on page 15.

### Pixel mode - In and Out

When Aspect adjust is in pixel mode, you can change the size and position of a source image, and the size and position of that image as it appears on your display.

### In



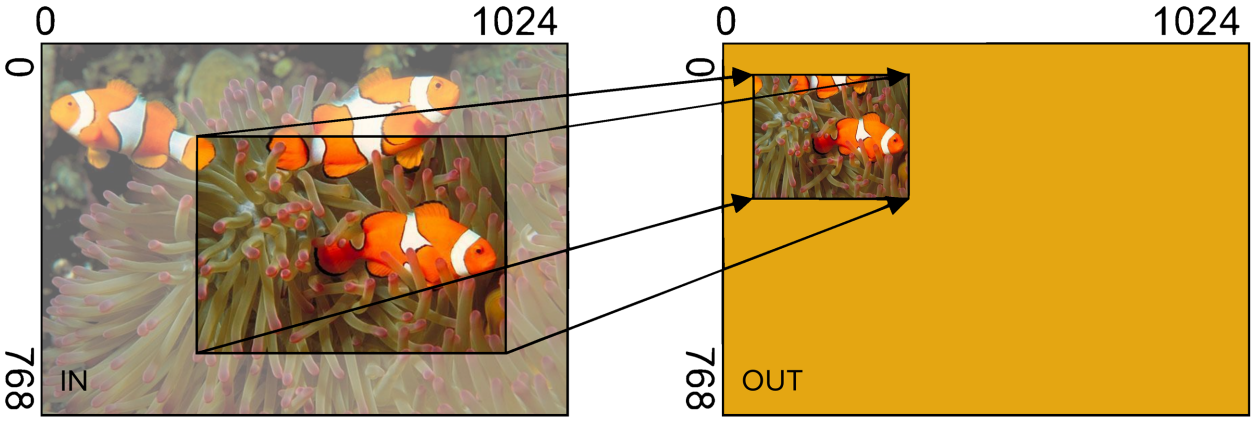

The bottom line shows, in pixels, the horizontal and vertical distance of the source image from the top-left corner, and the horizontal and vertical size of the source image.

## Out

```
Adjust windows
Out [50], [50] [250, 300]
```

The bottom line shows, in pixels, the horizontal and vertical distance of the display window from the top-left corner, and the horizontal and vertical size of the display window.

## Example




In this example, the selected area of the source image has the coordinates 300, 150, and the size 750, 400.

The display window has the coordinates 50, 50, and the size 250, 300.

## Image freeze

You can enable and disable freezing of a video input. A frozen input shows as a still image that displays until you remove it.

**Note:** frozen images are lost if the 1T-C2-750 loses power.

```
Adjust windows
Image freeze    [Off]
```

The bottom line shows the status of freezing.

## H/V crop

You can crop a scaled image.

You might crop images when you create a picture-in-picture display and the scaled image has an aspect ratio that is different to that of the window. For example, a letterbox video with black bars at the top and bottom. Cropping does not change the shape or aspect ratio of the image.

## When Aspect adjust is in simple or advanced mode

- Select horizontal or vertical, and then select a percentage from 0 to 50.

```
Adjust windows
H/V crop %     [0] [0]
```

The bottom line shows the amount of horizontal and vertical cropping.

### When Aspect adjust is in pixel mode

You can set the exact size and position of the image in pixels with the In and Out options.

Read more on page 15.

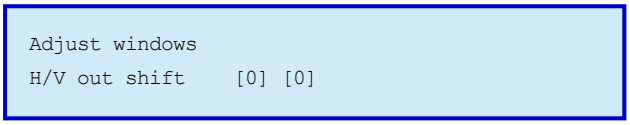
### H/V out shift

You can position the window horizontally and vertically on the display.

Use out shift for fine tuning only. When your image has a shrink value of less than 100% , use the H/V position option.

The horizontal position is measured in pixels , and the vertical position is measured in lines. Increasing pixels or lines shifts the image to the right, or down. Decreasing pixels or lines shifts the image to the left, or up.

- Select horizontal or vertical, and then increase or decrease the number of pixels or lines.




The bottom line shows the pixel or line value of the horizontal and vertical position.

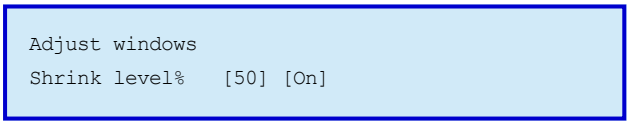
### Shrink level

You can enable and disable shrinking, and choose what percentage of the display's available screen space the window occupies. You can shrink the image down to 10% of the overall output size.

Use this option with picture-in-picture displays, with a background image. By default, this option is disabled.

### When Aspect adjust is in simple mode

- Select a percentage value, and then select [On].

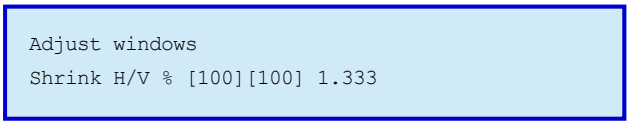



The bottom line shows the percentage of occupied space, and the status of the shrink option.

### When Aspect adjust is in advanced mode

You can set the horizontal and vertical shrink level separately.

- Select a percentage value, and then select [On].




The bottom line shows the percentage of occupied space for the horizontal axis and the vertical axis, and the aspect ratio.

### When Aspect adjust is in pixel mode

You can set the exact size and position of the image in pixels with the In and Out options.

Read more on page 15.

## H/V position

You can change the position of a shrunken image on the display. You cannot move the image off the screen.

### When Aspect adjust is in simple or advanced mode

```
Adjust windows
H/V position %   [100] [50]
```

The bottom line shows the percentage value of the horizontal and vertical position.

### When Aspect adjust is in pixel mode

You can set the exact size and position of the image in pixels with the In and Out options.

Read more on page 15.

## Aspect change

You can change the aspect ratio of the window.

If the aspect ratio of the input is unusual, use the zoom, shrink, and crop options.

```
Adjust windows
Aspect change [Normal]
```

The bottom line shows the status of the aspect ratio.

## Aspect adjust

You can choose how to control the scaling of windows. The default mode is simple mode.

- Simple mode gives you basic control over zooming and shrinking the window, as well as positioning the window on the display.
- Advanced mode allows you to independently adjust the horizontal and vertical components of the zoom and shrink options. Independent values allow you to create custom aspect ratios, and convert one aspect ratio to another.
- Pixel mode allows you to specify the exact size and coordinates of the window on the display.

```
Adjust windows
Aspect adjust [Simple]
```

The bottom line shows the current mode.

## Image smoothing

You can smooth jagged edges, which improves the quality of scaled images. Choose from four modes, off, medium, high, and auto. For best results use auto mode, which varies the amount of smoothing depending on the level of magnification.

```
Adjust windows
Image smoothing [Auto]
```

The bottom line shows the smoothing mode.

## Image flipping

You can flip an image vertically and/or horizontally. You might use this option if your projector is mounted on the ceiling.

```
Adjust windows
Image flip [Off]
```

The bottom line shows the status of image flipping.

## Max fade level

You can make the window transparent. Choose a percentage value from 0 to 100%, where 100% is fully opaque.

```
Adjust windows
Max fade level % [100]
```

The bottom line shows the percentage value of opacity.

## Layer priority ABZ

You can change the order of the window layers. Use this option to change the layer of the selected window, where 1 is the layer on top.

You cannot change the layer of the background color, which stays at layer 3.

```
Adjust windows
Layer priority ABZ [3]
```

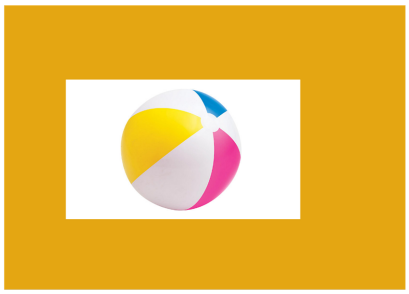
The bottom line shows the number of the layer occupied by the window.

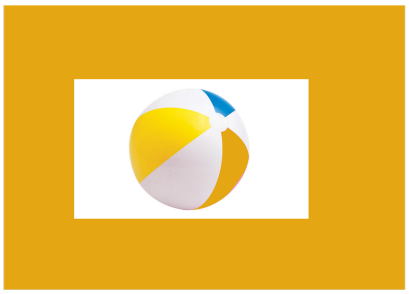
# Keyers

You can make specific colors of an image transparent by configuring the Y, U, and V components of the image. Configure keying with the Adjust keyers submenu.

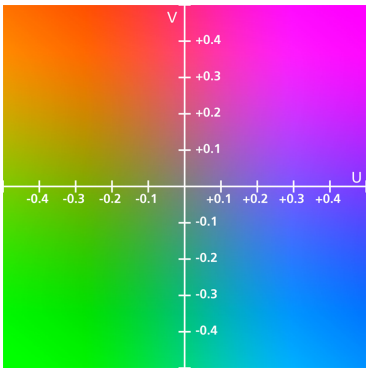
To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

In this example, the keyed image is a beach ball. Magenta is transparent.





### What are Y, U, and V?




- The Y value is the luminance value. Very dark, or black, has a Y value of 0. Very bright, or white, has a Y value of 255.
- The U value is the B-Y component. This is the difference between the blue value and the luminance value.
- The V value is the R-Y component. This is the difference between the red value and the luminance value.
- If part of an image is black, gray, or white, then its U and V values are both 128, the mid-point of the scale.

## Configuring keying with the Adjust keyers submenu

1. Choose a window in Window to adjust.
2. Configure that window with the other menu options.

## Keying an image to make some parts transparent

1. Choose the window to key in Window to adjust.
2. Disable keying in Keyer enable.
3. Set all Y, U, and V min/max values to 0, 255.
4. Set all Y, U, and V softness values to 0.
5. Disable key inversion from the Y/U/V Key invert options.
6. Enable keying in Keyer enable.
7. For all Y, U, and V min/max values, increase the minimum value until just before the color you want to key appears.
8. For all Y, U, and V min/max values, decrease the maximum value until just before the color you want to key appears.
9. Optional: increase the softness value in Y soft, U soft, and V soft.

   You might need to make fine adjustments to the min/max values for Y, U, and V.

### Window to adjust

You can choose which window to key.

```
Adjust keyers
Window to adjust                    [A]
```

The bottom line shows the currently selected window.

### Keyer enable

You can enable and disable keying.

```
Adjust keyers
Keyer enable                        [Off]
```

The bottom line shows the status of keying.

### Y Key min/max

You can use brightness to choose what areas to make transparent by changing the Y value.

1. Increase the maximum value until the lightest areas that you want to make transparent disappear.
2. Increase the minimum level to bring back any darker parts of the image.

```
Adjust keyers
Y Key min/max   [0] [32]
```

The bottom line shows the minimum and maximum values of luminance.

### Y Key soft, U Key soft, V Key soft

You can remove noise from a keyed image, which usually happens at the edges of the keyed areas.

Increasing the softness increases the range of keyed colors, so that the keying of images varies depending on how close a color is to the keyed-out range.

```
Adjust keyers
Y Key softness   [0]
```

```
Adjust keyers
U Key softness   [0]
```

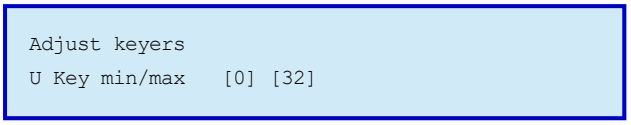
```
Adjust keyers
V Key softness   [0]
```

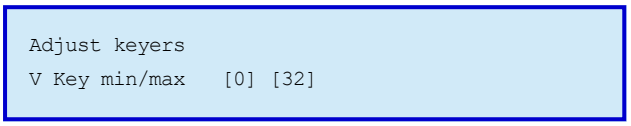
The bottom line shows the softness value.

### U Key min/max, V Key min/max

You can choose what areas to make transparent by color by changing the U or V value.

1. Set Min to 0 and Max to 255 for both U and V.
   The whole image becomes transparent.
2. Increase the minimum values until just before the color you want to key appears.
3. Decrease the maximum values until just before the color you want to key appears.




The bottom line shows the minimum and maximum values of color.

# Borders

You can add a colored border to each window. Add and configure borders with the Adjust borders submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Choosing a window

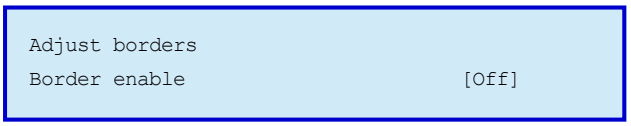
Select a window to configure by pressing ABZ on the front panel.

The ABZ LED light tells you which window is selected:

- Off = window A selected
- On and steady = window B selected
- Flashing = window Z (background) selected

## Border enable

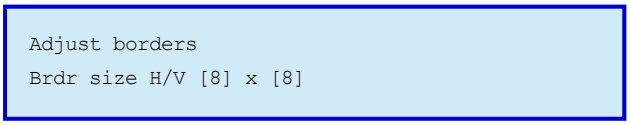
You can enable and disable the border.




The bottom line shows the status of the border.

## Border size

You can choose the height and width of the border in pixels. Borders can be between 0 and 255 pixels high or wide.




The bottom line shows the width and height of the border.

## Border position

You can offset the border from the window. Borders can be offset by 99 pixels in all directions.

- To move the border up, choose a negative value for V.
- To move the border down, choose a positive value for V.
- To move the border left, choose a negative value for H.
- To move the border right, choose a positive value for H.

```
Adjust borders
Brdr offset H/V [8] x [8]
```

The bottom line shows the horizontal and vertical position of the border.

## Border color

You can change the color of the border by choosing values for Y, U, and V.

Read more about Y, U, and V on page 20.

- To change the brightness of the color, change the Y value.
- To change the hue of the color, change the U and V values.

```
Adjust borders
Brdr Y/U/V [8] [128] [128]
```

The bottom line shows the current values for luminance, B-Y color, and R-Y color.

## Border opacity

You can choose the opacity, or transparency, of the border.

- To make the border fully transparent, choose 0%.
- To make the border fully opaque, choose 100%.
- To make the border semi-transparent, choose a value in-between.

```
Adjust borders
Brdr opacity % [100]
```

The bottom line shows the current opacity of the border.

## Creating a drop shadow

You can create a drop shadow effect with the border size, offset, and opacity options.

1. In Brdr size H/V, set both values to 0 pixels.
2. In Brdr offset H/V, set both values to 10 pixels.
3. In Brdr opacity %, set the opacity to 30%.

# Sources

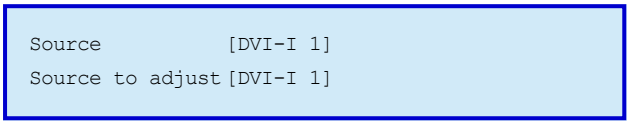
You can configure the color, brightness, and sharpness of your sources.

Configure sources with the Adjust sources submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Source to adjust

You can choose which source to configure.




The bottom line shows the currently selected source.

## HDCP

**Note:** Set Source to adj to DVI-I 1 or DVI-I 2.

You can choose whether to support content encrypted with HDCP (High-bandwidth Digital Content Protection). To play encrypted content you must have a display that supports HDCP.

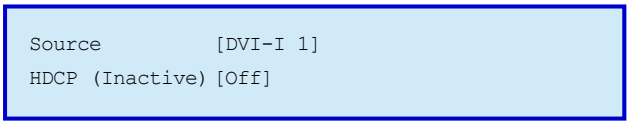
If you choose Off, the source might:

- Send an unencrypted version of the original signal
- Send an unencrypted signal but at a lower resolution
- Refuse to send an unencrypted signal

If the source cannot send an unencrypted signal, you cannot play the content.

If you choose On, and you have a display that supports HDCP, you can play encrypted content.

The (Active) and (Inactive) messages tell you if your source is trying to send content encrypted with HDCP.




The bottom line tells you if the source is trying to send encrypted content, and if you are supporting encrypted content.

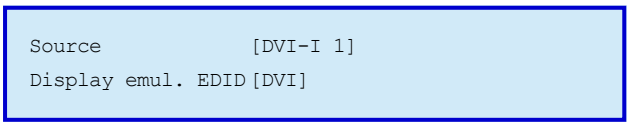
## Display emulating EDID

**Note:** Set Source to adj to DVI-I 1 or DVI-I 2.

You can send saved EDID information to the source. Use EDID capture to save EDID information.

## Sending EDID information to the source

1. Choose a packet of EDID information from Display emulating EDID.
2. To save your settings, press and hold MENU until you hear a beep.
3. Restart your 1T-C2-750.



The bottom line shows which packet of EDID information you are sending to the source. You can choose from the following options.

| | |
|---|---|
| Mem1<br>Mem2<br>Mem3<br>Mem4<br>Mem5 | Free slots for you to save your own EDID information using EDID capture |
| HDMI | Default HDMI EDID information for your 1T-C2-750. When you choose HDMI, some audio features are available. |
| DVI | Default DVI EDID information for your 1T-C2-750 |
| Mon | The EDID information of your current display |

You can choose to ignore errors from EDID checksums.

Read about allowing EDID errors on page 13.

## EDID capture

**Note:** Set Source to adj to DVI-I 1 or DVI-I 2.

You can capture the EDID information from a connected DVI or HDMI display, and store it in one of five memory slots on your 1T-C2-750. Use Display emulating EDID to access the stored EDID information.

## Saving EDID information from a display

1. Connect the display to the output port of your 1T-C2-750.
2. In EDID capture, select a memory slot to store the EDID information.
3. In EDID capture, select Grab.

Read about sending information to the source in **Display emulating EDID** above.

```
Source       [DVI-I 1]
EDID capture [Mem1] Grab
```

The bottom line shows your chosen memory slot, and the grab command.

## Autoset status

**Note:** Set Source to adj to DVI-I 1 or DVI-I 2.

You can automatically adjust the position of the image on your display. You might need to fine-tune the position afterward, using TL position adjust and BR size adjust.

For best results, use a still, bright image when using the autoset feature.

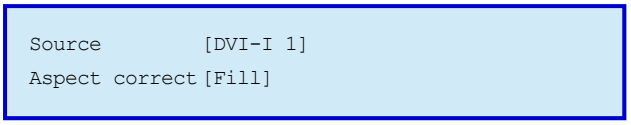
To automatically adjust the position of the image, set Autoset status to PhaseAdj.

```
Source         [DVI-I 1]
Autoset status [Inactive]
```

The bottom line shows you if autoset is active.

## Aspect correct

You can change the aspect ratio of the source.

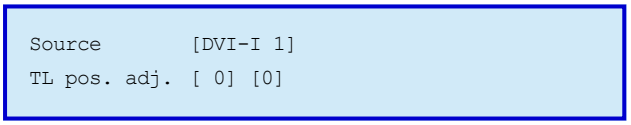



The bottom line shows the current aspect mode. You can choose from the following options.

| Option | Result |
|---|---|
| Fill | The source is stretched to fill the display. |
| Aspect (default) | The aspect ratio of the source is not changed. |
| H-fit | The source is stretched horizontally and vertically until it fills the full width of the display. The source can become clipped at the top or bottom. |
| V-fit | The source is stretched horizontally and vertically until it fills the full height of the display. The source can become clipped at the left or right. |
| 1:1 | Each source pixel is represented by a single output pixel, with no scaling applied.<br>If the input resolution is higher than the output resolution, then only part of the source shows on the display. If the input resolution is lower than the output resolution, then black bars show around the image. |

## TL position adjust

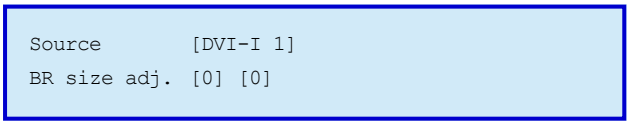
You can adjust the top and left position of the image. Use this setting after using Autoset status to remove any black bars around the image.




The bottom line shows the current positions for the top and left of the image.

## BR size adjust

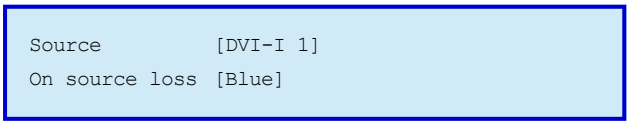
You can adjust the bottom and right position of the image. Use this setting after using Autoset status to remove any noise around the image.




The bottom line shows the current positions for the bottom and right of the image.

## On source loss

You can choose what appears on your display when there is no signal from your source, or the signal is corrupted.




The bottom line shows what appears when the source is lost. Choose from the following options.

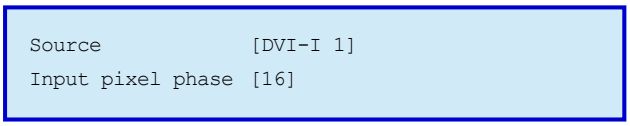
| Option | Description |
|---|---|
| Show | Shows the broken, distorted, or unstable source.<br>You can use this option when your source is poor quality with a constantly jumping picture. |
| Freeze | Freezes the most recent frame. Playback resumes when the source becomes stable again. |
| Blue | Turns the window blue, to represent source loss.<br>This is the default option. |
| Black | Turns the window black. |
| Remove | Removes the window and shows any background, for example, a lock source.<br>This is useful if you use picture-in-picture. |

## Input pixel phase

You can improve resolution and reduce noise for an analog source connected to your 1T-C2-750 with an adapter.

## Adjusting the resolution of an analog source

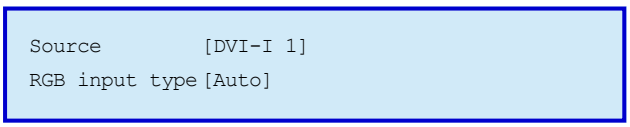
1. Connect the analog source to your 1T-C2-750.
2. Show an image from the analog source that has fine detail.
   The best kind of image has sharp, vertical lines.
3. Adjust the value of Input pixel phase until the image is clear and crisp.




The bottom line shows the current value of pixel phase.

## RGB input type

You can select the type of RGB source connected to your 1T-C2-750.

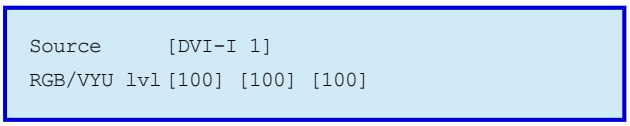



The bottom line shows the currently selected type. Choose from the following options.

- Auto
- D-RGB
- D-YUV
- A-RGB
- A-YUV

## RGB/VYU level

You can adjust the color of the source image.



The bottom line shows the current values for R or V, G or Y, and B or U.

## YUV black level

For analog sources with a resolution of 720x487i 59.94 Hz or 60 Hz, you can adjust the black level.

```
Source          [DVI-I 1]
YUV black level [0] IRE
```

The bottom line shows the current black level.

## De-interlace

You can reduce the motion artifacts caused by de-interlacing.

```
Source [DVI-I 1]
De-int [Auto]
```

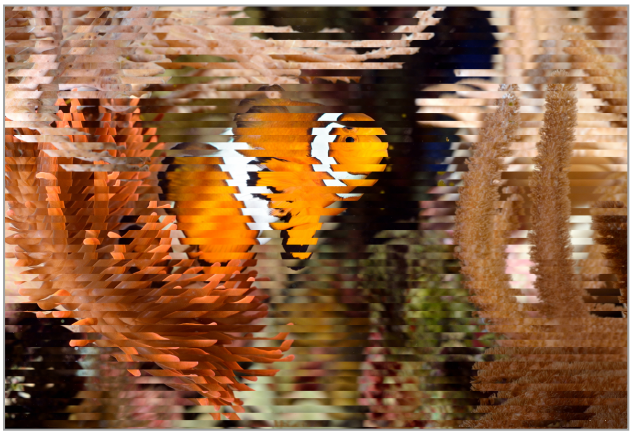
The bottom line shows the current mode of compensation for de-interlacing. Choose from the following options.

| Mode | Function |
|---|---|
| Normal/weave | The two interlaced fields are simply combined, or woven, together. This mode often shows artifacts on moving images. |
| Auto | Automatically compensates for de-interlacing. |

## Field swap

You can adjust the order of fields for interlaced video.

Use this feature if your interlaced source appears on your display like this:



```
Source       [DVI-I 1]
F.swap [Off] Offset 0
```

The bottom line shows if field swapping is active, and the current amount of adjustment.

## Still image

You can choose a still image from the still image store.

Upload images to the still images store with our CORIOcontrol software.

Get CORIOcontrol from the CORIOcontrol tab at tvone.com/high-performance-universal-scaler-our-newest-full-featured-design.

```
Source      [SIS 1]
Still image [1]
```

The bottom line shows the currently selected still image.

# Transitions

You can choose what happens when you change a source.

To use transitions with presets, select and configure a transition, and then press and hold a preset button to save the preset with your new transition.

Configure transitions with the Adjust transitions submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Transition type

You can choose the appearance of the transition.

```
Adjust transitions
Transition        [Fade]
```

The bottom line shows the current type of transition. Choose from the following options.

| Transition | Effect |
|---|---|
| Cut | One image disappears, and the other appears. |
| Fade | One image fades out, and then the other image fades in. |
| Wipe | One image disappears in strips or blocks, and then the other image appears in strips or blocks.  |
| Push | One image moves off the display as it fades out, and then the other image moves onto the display as it fades in. |

## Transition time

You can choose how long the transition takes to occur.

```
Adjust transitions
Transition time   [.5]
```

The bottom line shows the current transition time in seconds.

## Move type

If you choose Wipe or Push from Transition type, you can choose which direction the transition effect

travels.

```
Adjust transitions
Move type [Left -> Right]
```

The bottom line shows the current direction. Choose from the following options.

| Option | Effect |
|---|---|
| Left → Right | Wipe: The strips or blocks move from left to right.<br>Push: The image exits from left to right, and enters from right to left. |
| Right → Left | Wipe: The strips or blocks move from right to left.<br>Push: The image exits from right to left, and enters from left to right. |
| Up → Down | Wipe: The strips or blocks move from top to bottom.<br>Push: The image exits from top to bottom, and enters from bottom to top. |
| Down → Up | Wipe: The strips or blocks move from bottom to top.<br>Push: The image exits from bottom to top, and enters from top to bottom. |
| Diagonal | Wipe: The strips or blocks move from top left to bottom right.<br>Push: One image fades out, and then the other image fades in. |
| Diamond | Wipe: The blocks expand in diamond shapes.<br>Push: One image fades out, and then the other image fades in. |

### Wipe size

If you choose Wipe from Transition type, you can choose the size of the strips or blocks.

```
Adjust transitions
Wipe size         [ 100]
```

The bottom line shows the current size of the strips or blocks. Choose a value from 10 to 2000.

## Custom resolutions

You can create custom resolutions. You might want to create a custom resolution for an unusual display, or a display that does not provide accurate EDID data, for example, an analog display.

**Risk of deleting standard resolutions**
**Do not** use options from the Adjust resolutions submenu to correct the appearance of an image on a standard resolution display.
Instead, use Adjust sources > Autoset status, Adjust sources > TL position adjust, Adjust sources > BR size adjust, and Adjust windows > Shrink level.

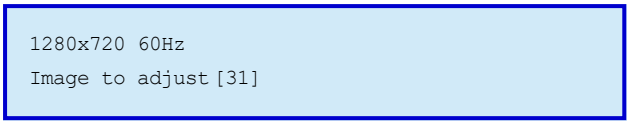
**Loss of signal, or unusual effects**
Changing the resolutions in the Adjust resolutions submenu affects both sources and displays. Any changes you make with this submenu take place immediately, and can create a resolution that your display can't process.
The only way to undo changes you make with the Adjust resolutions submenu is to update the firmware.
Read about updating the firmware on page 4.

Create custom resolutions with the Adjust resolutions submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Image to adjust

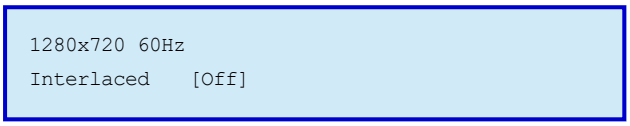
You can choose which resolution to change.




The bottom line shows the chosen resolution slot. The top line shows the resolution that is saved to that slot. The default setting is the resolution currently in use.

## Interlaced

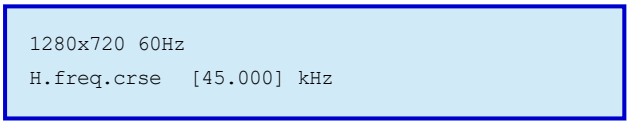
You can turn interlacing on and off.




The bottom line shows if interlacing is on or off.

## Horizontal frequency course adjustment

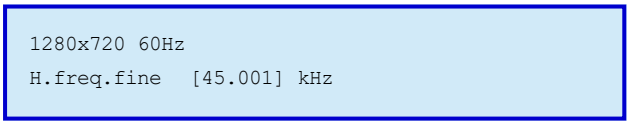
You can change the horizontal synchronization timing frequency in 100 Hz steps. Use this option first, and then use H.freq.fine to make final adjustments.




The bottom line shows the current value of horizontal synchronization timing frequency.

## Horizontal frequency fine adjustment

You can change the horizontal synchronization timing frequency in 1 Hz steps. Use H.freq.crse first, and then use this option to make final adjustments.



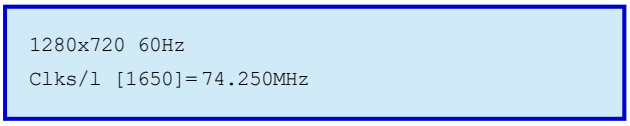

The bottom line shows the current value of horizontal synchronization timing frequency.

## Clocks per line

You can change the total number of image pixels on one line of your display, including the horizontal sync pulse and blanking time.

Clocks per line is normally a multiple of 8.

**Moiré effect**
If the value of clocks per line is incorrect, you might see swirling patterns appear on your display.




The bottom line shows the current value of clocks per line, and the calculated pixel frequency.

## Lines per frame

You can change the total number of lines of video present in the image. This includes the vertical Sync pulse, the blanking period, and the active video.

```
1280x720 60Hz
Lines/f [628]= 60.317 Hz
```

The bottom line shows the current value of lines per frame and the calculated vertical sync frequency.

## H/V active

You can choose how many pixels wide and lines high your image is.

```
1280x720 60Hz
H/V active [1280]x720
```

The bottom line shows the current numbers of pixels and lines.

## H/V active start

> Only adjust the values of H/V start if you are monitoring the results with an oscilloscope.

You can change the amount of time between the sync pulse and the active video.

> **Shifted or corrupted image**
> If the value of horizontal or vertical active start is incorrect, you might see black bars around the image, or the image might be corrupted.

```
1280x720 60Hz
H/V start    [88]x23
```

The bottom line shows the current values of horizontal active start, and vertical active start.

## H/V synchronization

> Only adjust the values of H/V sync if you are monitoring the results with an oscilloscope.

You can change the pulse width.

```
1280x720 60Hz
H/V sync     [88]x23
```

The bottom line shows the current values of horizontal synchronization, and vertical synchronization.

## Synchronization polarity

You can make the horizontal and vertical polarity positive or negative.

```
1280x720 60Hz
Sync polarity [+H+V]
```

The bottom line shows the current polarities. Choose from the following options:

- +H+V
- +H-V
- -H+V
- -H-V

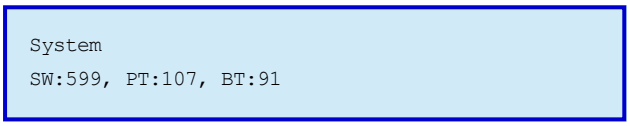
# System settings

You can see information about, and configure, your 1T-C2-750. Configure your system with the System submenu.

To save your settings, when you finish making changes, press and hold MENU until you hear a beep.

## Firmware version

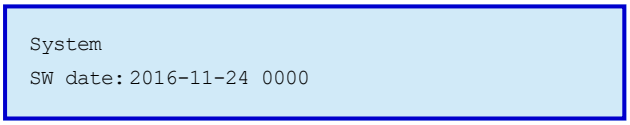
You can see what version of the firmware is installed on your 1T-C2-750.




The bottom line shows the current version of the firmware after SW:.

## Firmware release date

You can see the release date of the firmware installed on your 1T-C2-750.

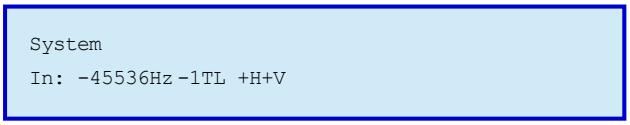



The bottom line shows the release date.

Read about updating the firmware on page 4.

## In

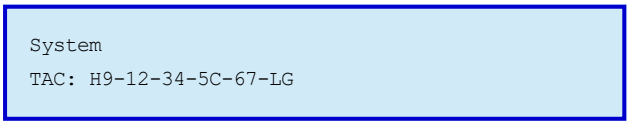
You can see the line rate of the source, the total lines, and the synchronization polarity.




The bottom line shows the line rate of the source, the total lines, and the synchronization polarity.

## TAC number

You can see the TAC number, a unique identifier for your 1T-C2-750.




The bottom line shows the TAC number.

## PPF number

PPF means pay-per-feature. This feature is under development.

## Save power-on settings

You can save changes you have made in any submenu. If you don't save your changes here, your changes are deleted when you disconnect the power from your 1T-C2-750.

```
System
Save power-on settings
```

You can also press and hold MENU until you hear a beep to save your settings.

## On-screen display on power up

You can choose whether to display the welcome screen of the on-screen display when you start your 1T-C2-750.

```
System
OSD on power up [On]
```

The bottom line shows whether the welcome screen appears when you start your 1T-C2-750.

## Autoset sense

You can choose the brightness threshold that the autoset feature uses to detect edges.

```
System
Autoset sense [Medium]
```

The bottom line shows the current brightness threshold. Choose from the following options:

- Low
- Medium
- High
- Very high

The default value is medium.

## RS232 baud rate

You can change the baud rate used for RS-232 connections.

```
System
RS232 baud rate  [57600]
```

The bottom line shows the current baud rate. Choose from the following options:

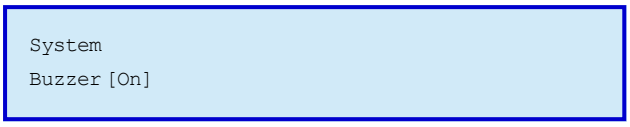
- 9600
- 19200
- 28800
- 33600
- 38400
- 57600

The default value is 57600.

## Buzzer

You can turn the beep on or off.

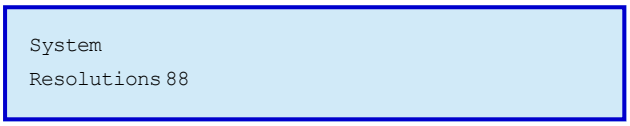
The beep tells you when you have pressed a button for long enough.




The bottom line shows whether the beep is on.

## Resolutions

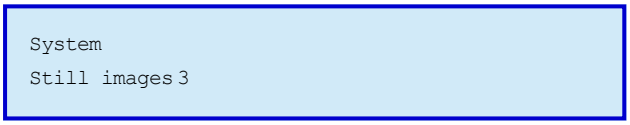
You can see how many resolutions are stored on your 1T-C2-750.




The bottom line shows the number of resolutions.

## Still images

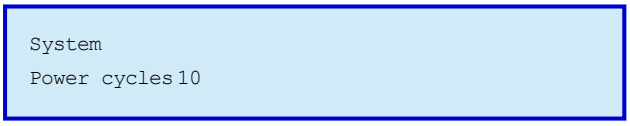
You can see how many still images are stored on your 1T-C2-750.




The bottom line shows the number of still images.

## Power cycles

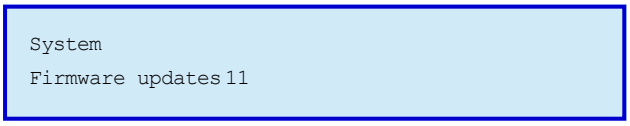
You can see how many times your 1T-C2-750 has been powered on.




The bottom line shows the number of power cycles.

## Firmware updates

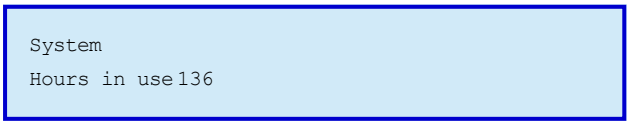
You can see how many times the firmware of your 1T-C2-750 has been updated.




The bottom line shows the number of updates.

## Hours in use

You can see how many hours your 1T-C2-750 has been in use.



# Using an external serial controller

You can control your 1T-C2-750 with ASCII-based commands. Connect a serial controller or PC to the RS-232 input of your 1T-C2-750.

## In this article



## Serial standard

The default serial standard is:

- 57600 baud
- 8 bits
- No parity
- 1 stop bit

You can change the baud rate in the System submenu.

Read more about changing the baud rate on page 34.

## About the communication protocol

**Note:** do not send a line-feed to the 1T-C2-750.

- The 1T-C2-750 and serial controller exchange packets of ASCII data that contain hexadecimal numbers.
- The 1T-C2-750 acknowledges all received packets as part of a software handshake.
- The 1T-C2-750 can take up to 30 ms to act upon a command and then acknowledge it.
- Control packets start with an ASCII F and end with an ASCII carriage return.
- To send decimal or hexadecimal numbers, convert the number to a two-character ASCII first. Two characters are sent for each byte encoded.
- A gap of 1 second or more between the characters of a sent command causes the command to time out. Sent characters are lost.
- Write packets, which send command functions to the 1T-C2-750, are 20 characters long, including the carriage return at the end. The 1T-C2-750 returns a 20 character message that includes the new value of the changed parameter, or the value used if the requested value was out of range.
- Read packets, which request information from the 1T-C2-750, are 14 characters long, including the carriage return at the end. The 1T-C2-750 returns a 20 character message that includes the write flag, and with the ACK flag set.
- If a command is invalid, the 1T-C2-750 returns the ACK flag as 0. Other than the ACK=0 flag, the returned message is identical to the sent message.
- Send one message at a time. You can't send another message until the 1T-C2-750 has sent a response. If you don't get a response, there might be a problem with your hardware, of you might be using the wrong serial data, for example, the wrong baud rate. To simplify programming, you can send messages with a gap of around 100 ms between messages. Depending on the message and

how long it takes the 1T-C2-750 to act on the command, you might need to leave longer between messages.

- If you use the buttons of the front panel to make a change, the 1T-C2-750 returns one or more 20 character messages to the serial controller. The messages keep the serial controller and 1T-C2-750 synchronized.

## Message format

Format of a write message:

SOP → CMD → CHA → WINDOW → OUTPUT/Function → Function → PAYLOAD x3 → CS → EOP

Format of a read message:

SOP → CMD → CHA → WINDOW → OUTPUT/Function → Function → CS → EOP

Parts of a message:

| | |
|---|---|
| SOP | Start of packet<br>The ASCII character F. |
| CMD | Command.<br>ASCII-hex byte to indicate the type of command being sent. Each bit in the byte has a different function.<br>■ Bit 7 = Write (0) or Read (1) request. Messages from the 1T-C2-750 are always write messages.<br>■ Bit 6 = ACK bit. Set to 0 for messages to the unit.<br>■ ACK= 1 returned means message was OK.<br>■ ACK=0 returned means an error was present in the message.<br>■ Bit 2 = This bit must be set.<br>■ Bit 0, 1, 3, 4, 5 = 0 Reserved for future use. |
| CHA<br>SOURCE | This byte has multiple uses, and defaults to 0 unless used for:<br>**CHA**<br>Channel.<br>When a channel number is used in the Adjust Sources section (see later).<br>0x0 = DVI-I1, 0x =DVI-I2<br>0xF0 = SIS1, 0xF1 = SIS2.<br>**SOURCE**<br>Byte to indicate the source chel to be altered (if appropriate).<br>0x0 = DVI-I1, 0x =DVI-I2 |
| WINDOW / LOGO / BORDER | Bit 7 = 0 (Reserved).<br>Bit 6..0 = Represents the window to be adjusted.<br>For example, Window A is sent as 41, because 0x41 is ASCII for A. |
| OUTPUT and Function HIGH | Bit 7..4 = Number representing the output to adjust (0 for 1T-C2-750). Bit 3..2 = Reserved (set to 0). Bit 1..0 = Bits 9 and 8 of the function code. (Remainder of bits [7..0] are in FUNC LOW.)<br>For example, If the function code is 0x234, then this byte is 0x02. |

| | |
|---|---|
| Function LOW | ASCII-hex byte to indicate the lowest 8 bits of the actual function to set or receive (e.g. change Zoom value).<br>A later table details all the functions available. |
| PAYLOAD<br>x3 bytes | A series of ASCII-hex bytes carrying the data to send. Read requests have no payload - the payload is in the data sent back. Write packets require a payload, and this is always in 'triple-bytes', meaning 3 bytes are required, MSB first. For example, '000001' is 1 in decimal, '010000' is 65536 in decimal, and 'FFFFF0' is -16 in decimal. |
| CS | Check sum.<br>ASCII-hex byte that is the (check) sum of all previous bytes (excluding the SOP F character).<br>For example, the command F0400400800C8 has the check sum of 04+00+4+00+82+00+00+0=C8, so the complete command to send is F0400400800C8.<br>A shortcut for debugging allows the check sum to be replaced by 2 question marks, for example, F0400400800??. This is purely for test and debugging. During normal use, use a check sum. |
| EOP | End of package.<br>This is a carriage return (no line-feed) - ASCII code 13 (decimal). |

## List of functions

The following tables list all menu functions, their function number and valid range of adjustment. For more information about the functions themselves, see the relevant section of this user guide.

### Menu top level

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Preset number | 225 | 1 to 10 |
| Preset load | 226 | Set to 1 to load – automatically resets to 0. |
| Preset store | 227 | Set to 1 to store – automatically resets to 0. |
| Preset erase | 228 | Set to 1 to erase – automatically resets to 0. |

### Adjust outputs

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Output enable | 170 | 0=Blanked, 1=Active |
| Lock source (connector) | 149 | 0x10 to 0x11 = DVI-I1 to DVI-I2 |
| Lock method | 10A | ■ 0 = Off<br>■ 1 = Genlock<br>■ 2 = Lock & Mix |
| Lock H shift | 14A | -4096..4096 |
| Lock V shift | 14B | -4096..4096 |
| Output resolution | 083 | 1..1000 |

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Output image type | 0E2 | ■ 0 = RGBHV<br>■ 1 = RGBS<br>■ 2 = RGsB<br>■ 3 = YUV<br>■ 4 = tlYUV<br>■ 7 = tlRGB |
| HDCP required | 223 | 0..1, Off, On (if display supports it) |
| HDCP status | 234 | ■ 0=Unavailable<br>■ 1=Supported<br>■ 2=Active<br>■ 3=Repeater supported<br>■ 4=Repeater active<br>■ 5=No display<br>■ Other values indicate various HDCP authentication states. |
| Allow errors | 2B4 | 0 = Off 1 = On |
| Background Y | 13B | 16..235 |
| Background U | 13C | 16..240 |
| Background V | 13D | 16..240 |
| Allow HDMI output | 288 | 0=DVI only, 1=Use HDMI if supported |
| HDMI audio routing | 268 | 0=Mute, 1=On, 2=WinA |
| HDMI On source | 269 | 0x10 onwards for DVI-I1, etc. |

## Adjust windows

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Program source / Window source (connector) | 082 | 0x0 to 0x11 = DVI-I1 & DVI-I2<br>0xF0 = SIS1, 0xF = SIS2 |
| Source resolution | 0F8 | Read only – returns # of resolution |
| Window Enable | 12B | 0..1 = Off, On |
| Zoom level % | 086 | 100..1000 |
| Zoom level H % | 103 | 100..1000 (only used in Advanced A/R mode) |
| Zoom level V % | 105 | 100..1000 (only used in Advanced A/R mode) |
| Aspect ratio in | 107 | 0.1:1..9.99:1 (read only) |
| H/V zoom pan % (H) | 09F | 0..100 |

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| H/V zoom pan % (V) | 0A0 | 0..100 |
| Image freeze | 09C | 0..1 = Off, On |
| H/V crop % (H) | 223 | 0..100 |
| H/V crop % (V) | 224 | 0..100 |
| H/V out shift (H) | 0AD | -4096..4096 |
| H/V out shift (V) | 0AE | -4096..4096 |
| Shrink level % | 087 | 10..100 |
| Shrink level H % | 104 | 10..100 (only used in Advanced A/R mode) |
| Shrink level V % | 106 | 10..100 (only used in Advanced A/R mode) |
| Shrink enable | 18E | 0..1 = Off, On |
| H/V shr. pos.% (H) | 0DA | 0..100 |
| H/V shr. pos.% (V) | 0DB | 0..100 |
| In (top-left H) | 21B | |
| In (top-left V) | 21D | |
| In (H size) | 21C | |
| In (V size) | 21E | |
| Out (top-left H) | 21F | |
| Out (top-left V) | 221 | |
| Out (H size) | 220 | |
| Out (V size) | 222 | |
| Aspect change | 190 | 0..2 = , Letterbox, Pillarbox |
| Aspect adjust | 102 | 0..2 = Simple, Advanced, Pixel |
| Image smoothing | 0A1 | 0..3 = Off, Med, High, Auto |
| Image flip | 095 | 0..3 = Off, Horiz., Vertical, H & V |
| Max fade level | 10F | 0..100 = Fade level % |
| Fade out / in | 193 | -1 = Fade out<br>0 = No action<br>1 = Fade in |
| Layer priority | 144 | 0..5 = Layer priority<br>(Other layers are automatically moved.) |

## Adjust keyers

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Keyer enable | 127 | 0..1 = Off, On |
| Y key min/max (min) | 0AF | 0..255 |
| Y key min/max (max) | 0B2 | 0..255 |
| Y key Softness | 121 | 0..255 |
| Y key Invert | 122 | 0..1 = Off, On |
| U key min/max (min) | 0B0 | 0..255 |
| U key min/max (max) | 0B3 | 0..255 |
| U key Softness | 123 | 0..255 |
| U key Invert | 124 | 0..1 = Off, On |
| V key min/max (min) | 0B1 | 0..255 |
| V key min/max (max) | 0B4 | 0..255 |
| V key Softness | 125 | 0..255 |
| V key Invert | 126 | 0..1 = Off, On |
| Swap fore / background | 144 | 0..1 = Off, On |

## Adjust borders

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Border enable | 150 | 0..1 = Off, On |
| Border H size | 152 | 0..99 |
| Border V size | 151 | 0..99 |
| Border H offset | 153 | 0..99 |
| Border V offset | 154 | 0..99 |
| Border Opacity | 158 | 0 (fully transparent) ..100 (solid) |
| Border Y | 155 | 16..235 |
| Border U | 156 | 16..240 |
| Border V | 157 | 16..240 |

## Adjust sources

| Menu item | CHA | Function in Hex | Range of adjustment in decimal |
|---|---|---|---|
| Source to adjust.<br>This only changes what's shown in the menu – use the CHA values below to change settings of a source. | CHA | 116 | 0x0 to 0x1F = DVI-I1 to DVI-I2<br>0xF0 = SIS1, 0xF = SIS |

| Menu item | CHA | Function in Hex | Range of adjustment in decimal |
|---|---|---|---|
| Still Image / Testcard | F0..F1 | 0DC | 0..10 |
| Autoset | 10..11 | 0FE | 1= Start Autoset procedure |
| Aspect correct | 10..11 | 240 | 0=Fill (default)<br>1=Aspect, 2=H-fit, 3=V-fit, 4=1:1 |
| EDID to use | 10..11 | 243 | 0..7 to specify EDID entries 1..Mon |
| EDID capture entry# | 10..11 | 244 | 0..7 to specify EDID entries 1..Mon |
| EDID capture Grab | 10..11 | 245 | Set to 1 to Grab. Auto-resets to 0. |
| HDCP advertise | 10..11 | 237 | 0=Off, 1=On |
| HDCP status | 10..11 | 238 | 0=Inactive, 1=Active |
| TL pos. adj. (left) | 10..11 | 0B6 | -100..100 |
| TL pos. adj. (top) | 10..11 | 0B7 | -100..100 |
| BR size adj. (right) | 10..11 | 0DE | -100..100 |
| BR size adj. (bottom) | 10..11 | 0DF | -100..100 |
| On source loss<br>(was Deglitch) | 10..11 | 0A3 | 0=Show, 1=Freeze, 2=Blue, 3=Black, 4=Remove |
| Source stable (read only) | | 22A | 0=Unstable, 1=Stable |
| Input pixel phase | 10..11 | 091 | 0..31 |
| RGB input type | 10..11 | 0C1 | 8 = Auto<br>6 = D-RGB<br>11 = D-YUV<br>10 = A-RGB<br>12 = A-YUV |
| RGB contr. (red) | 10..11 | 0C5 | 75..150 |
| RGB contr. (green) | 10..11 | 0C6 | 75..150 |
| RGB contr. (blue) | 10..11 | 0C7 | 75..150 |
| YUV setup level | 10..11 | 23E | 0=0 IRE, 1=7.5 IRE |
| De-int. | 10..11 | 0B8 | 0..6 = , Auto, Film 3:2, M.comp.low, M.comp.med, M.comp.high, Frame/bob |
| Field swap | 10..FF | 0C9 | 0..1 = Off, On (swaps odd/even fields) |
| Field Offset | 10..FF | 196 | 0..7 = -4..+3 (defaults to 4 = 0) |

## Adjust transitions

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Transition type | 112 | 0..3 = Cut, Fade, Wipe, Push |
| Switching fade time | 0F5 | 0 (off) to 50 (5.0 seconds) |
| Wipe type | 145 | 0 = Left -> Right<br>1 = Right -> Left<br>2 = Up -> Down<br>3 = Down -> Up<br>4 = Diagonal<br>5 = Diamond |
| Wipe Size | 146 | 10..2000 |

## Adjust resolutions

1. Set Image to adjust to the correct value.
2. Change other values.

Do not change Image to adjust with the buttons of the front panel during this process.

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| Image to adjust | 081 | 1..1000 |
| Interlaced | 0CA | 0..1 = Off, On |
| H.freq.crse | 0BE | 10000..200000 |
| H.freq.fine | 0BF | 10000..200000 |
| H/V active (H) | 096 | 64..2047 |
| H/V active (V) | 097 | 64..2047 |
| H/V start (H) | 08B | 0..1023 |
| H/V start (V) | 08C | 0..1023 |
| Clks/l | 08D | 64..4095 |
| Lines/f | 08E | 64..2047 |
| H/V sync (H) | 08F | 8..1023 |
| H/V sync (V) | 090 | 1..1023 |
| Sync polarity | 094 | 0..3 = ++, +-, -+, -- |

## System

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| SW (Software version) | 0D2 | Read only |
| PT (Product type) | 0C4 | Read only |

| Menu item | Function in Hex | Range of adjustment in decimal |
|---|---|---|
| BT (Board type) | 0C2 | Read only |
| Advanced menus | 11D | 0..1, Off, On |
| Autoset Sense | 0FF | 0..3 = Low, medium, high, v.high |
| OSD on Power up | 189 | 0..1, Off, On |
| Store | 0C8 | Set to 1 to store |
| Buzzer | 0CB | 0..1 = Off, On |
| Power cycles | 0D6 | Read only |
| Firmware updates | 0DD | Read only |
| Hours in use | 0D7 | Read only |
| Resolutions | 0D8 | Read only |
| Number of Still Images / Testcards | 0D9 | Read only |
| RS232 Baud rate | 0AB | 0..6 = 9600, 19200, 28800, 33600, 38400, 57600, 115200 |

## Example messages

Each character shown below is sent as a ASCII character, so F0400 is sent as 'F' '0' '4' '0' '0'.

## Set window A to enable advanced aspect control

**Note:** check sum is ?? for debugging.

Sent message:

| SOP | CMD | CHA | WIN | OUT | FUN | PAY | CS | EOP |
|---|---|---|---|---|---|---|---|---|
| F | 04 | 00 | 41 | 01 | 02 | 000001 | ?? | CR |

Returned message:

| SOP | CMD | CHA | WIN | OUT | FUN | PAY | CS | EOP |
|---|---|---|---|---|---|---|---|---|
| F | 44 | 00 | 42 | 00 | 82 | 000011 | 19 | CR |

## Set window A Shrink to 110

**Note:** this message is invalid, because the maximum level for shrink is 100.

Sent message:

| SOP | CMD | CHA | WIN | OUT | FUN | PAY | CS | EOP |
|---|---|---|---|---|---|---|---|---|
| F | 04 | 00 | 41 | 00 | 87 | 00006E | ?? | CR |

Returned message:

| SOP | CMD | CHA | WIN | OUT | FUN | PAY | CS | EOP |
|---|---|---|---|---|---|---|---|---|
| F | 44 | 00 | 41 | 00 | 87 | 000064 | 70 | CR |

## Simulating pressing a button on the front panel

Simulate a button press with function code 0x24F and the following payload codes.

For example, to load preset 1, enter `F041041024F000291??<CR>`.

| Button press | Payload |
|---|---|
| Power down | 0400E1 |
| Power back on – see Reset command. | N/A |
| Reset menu settings to power-on values | 0100E2 |
| Reset menu settings to factory defaults | 2300E2 |
| Lock / unlock front panel buttons | 0100E3 |
| Cycle presets (demo mode) | 0100EE |
| Toggle window A/B/Z | 00020D |
| INPUT | 00024E |
| FADE | 000251 |
| SELECT (menu adjust) | 000128 |
| Decrement / PIP (menu adjust) | 00029E |
| Increment / KEY (menu adjust) | 00029F |
| Load Preset 1 | 000291 |
| Load Preset 2 | 000292 |
| Load Preset 3 | 000293 |
| Load Preset 4 | 000294 |
| Load Preset 5 | 000295 |
| Load Preset 6 | 000296 |
| Load Preset 7 | 000297 |
| Load Preset 8 | 000298 |
| Load Preset 9 | 000299 |
| Load Preset 10 | 00029A |

## Restart the 1T-C2-750

The restart command is sent as binary, not as ASCII text.

0x53, 0x06, 0x04, 0x01, 0x55, 0xAA, 0x55, 0xB2

For example, in Visual Basic, enter:

```
Chr$(&H53) + Chr$(&H6) + Chr$(&H4) + Chr$(&H1) + Chr$(&H55) +
Chr$(&HAA) + Chr$(&H55) + Chr$(&HB2)
```

# Troubleshooting

## In this section



# There's no picture on my display

## What's the problem?

I can't see any images or video on my display screen.

## Why does this happen?

There might be a connection issue somewhere in your system.

## What to do

## First try this

Can you see any LED lights on your 1T-C2-750?

- If you can't see any LED lights, make sure the AC power adapter is connected properly and that the electrical outlet is switched on.
- If you can see one or more blue LED lights, but the STANDBY LED light is off, check that all your input and output cables are connected properly to your inputs and displays, and to your 1T-C2-750.

## Then try this

- Check that your display equipment is set to the correct input, and format or standard.
- Try changing the resolution with the following shortcut button combinations.

| Button combination | Resolution |
|---|---|
| MENU + PIP | 720x480 @59.94 Hz |
| MENU + KEY | 1280x720 @59.94 Hz |
| MENU + ABZ | 1280x1024 @60 Hz |

If you can see the on-screen menu when you press MENU:

- Check that your display equipment is on and can support the resolution set in the Adjust output submenu.
- Check that you are using the correct cables and equipment.

## If that doesn't work

You might have a problem with HDCP compatibility.

Read about troubleshooting HDCP issues on page 50.

If the steps above don't work, or you can't see on the on-screen menu, go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# I can't see the full image on my display

## What's the problem?

The picture is shifted and I can't see the whole thing.

## Why does this happen?

The window containing the picture might be positioned incorrectly.

## What to do

## First try this

Try the autoset function:

- In Adjust sources, set Autoset status to PhaseAdj.

If the position of the window is still not quite right, try fine tuning:

- In Adjust sources > TL pos. adj, adjust the top and left positions.
- In Adjust sources > BR size adj. adjust the bottom and right positions.

## Then try this

Try resetting to factory default settings.

- To reset all your settings to their factory defaults, press and hold STANDBY and MENU until you hear two beeps.

## If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# The resolution looks wrong

## What's the problem?

The resolution or aspect ratio of the picture does not look right on my display.

## Why does this happen?

The resolution data might have become altered or corrupted beyond the ability of a display to show it. This can happen because changes made in Adjust resolutions are stored automatically.

### What to do

### First try this

Check the resolution settings in the Adjust resolutions submenu.

Read more on page 30.

### Then try this

Update your firmware.

Read more on page 30.

### If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

## I can't change the resolution

### What's the problem?

I want to adjust the resolution of the output, but the Output image option is missing from the Adjust resolution submenu.

### Why does this happen?

The 1T-C2-750 is in lock mode, and the output resolution is fixed to be the same as the lock source.

### What to do

### First try this

Turn off lock mode in Adjust outputs.

Read more on page 11.

### If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# The picture is green

## What's the problem?

I haven't adjusted the colors on my display, but the picture is green.

## Why does this happen?

You might have a mixture of YUV and RGB settings and equipment.

## What to do

### First try this

1. If you have an RGB display, make sure Adjust outputs > Output type is set to RGB.
2. Check that you are using the correct cables and equipment.

### If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# The picture is rolling or pink

## What's the problem?

I selected an RGB source, and the image on my display is rolling or pink.

## Why does this happen?

RGB input type might be set incorrectly.

## What to do

### First try this

1. Check that Adjust sources > RGB input type is set correctly.
2. Check that you have the correct cables and equipment.

### If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# The picture is flashing, snowy, or missing

## What's the problem?

- The picture is flashing
- All I can see is snow
- There's no picture

## Why does this happen?

You might have a source that is encrypted with HDCP and your 1T-C2-750 is not set to output HDCP.

## What to do

## First try this

1. In Adjust outputs > HDCP, check that HDCP is set to On.
2. In Adjust inputs > HDCP, check that HDCP is set to On.

## If that doesn't work

Go through the steps of the general troubleshooting checklist.

Read the general troubleshooting checklist on page 50.

If the advice here doesn't work, first contact your distributor. If your distributor can't help, contact tvONE support at tech.usa@tvone.com or tech.europe@tvone.com.

# General troubleshooting checklist

If specific troubleshooting advice isn't helping, or your product has stopped working, go through the points below. If your product still doesn't work, you might need to return it for repair.

Read about returning your product on page 51.

1. Make sure your product is set up correctly, as shown in this guide.
2. Check that your cables and equipment are all connected firmly.
3. Check that your product is connected to an electrical outlet that is switched on.
   Can you see LED lights on the front of your product?
4. Test your sources by connecting them directly to a display.
5. Test your display by connecting it directly to a source.
6. Test each cable.
7. Try restoring your product to factory default settings.
   **Note:** during factory reset your custom settings are deleted.
   Read about restoring your product to factory default settings on page 5.
8. Try updating your firmware.
   **Note:** during a firmware update your custom settings are deleted.
   Read about updating your firmware on page 4.

# Returning a product for repair

You can request to return your product to tvONE™ for repair. When you contact tvONE support, have the following information ready.

- Product type
- Serial number of the faulty unit (this is on the underside of the unit)
- Full details of the issue
- Invoice number (if available)

Contact tvONE support for your area.

- Customers in North, Central, and South America (NCSA), email tech.usa@tvone.com.
- Customers in Europe, the Middle East, and Africa (EMEA), email tech.europe@tvone.com.
- Customers in Asia, email tech.asia@tvone.com.

## EMEA and Asia

Customers in EMEA and Asia receive an RMA Request form from tvONE support. Complete the form and return it to tvONE support for your area.

## All customers

tvONE support decides if your product needs to return for repair, and, if needed, provide a return authorization number.

Send your product to tvONE by insured carrier or registered mail. Write your return authorization number on the outside of the packaging, and on any documents you send with your product.

You must arrange and pay for shipping and insurance. Products in transit are your responsibility. tvONE does not accept responsibility for products lost in transit.

> Do not return a product for warranty repair without a return authorization number. tvONE will not repair your product.

# Specifications

| Inputs | | Output | |
|---|---|---|---|
| Connectors | ■ 2x DVI-I | Connector | ■ DVI-I |
| Input type | ■ DVI-I<br>With tvONE adapter:<br>■ HDMI<br>■ VGA<br>■ RGBHV<br>■ YPbPr/YUV<br>■ CV/YC<br>■ BNC | Output type | ■ DVI-I<br>With tvONE adapter:<br>■ HDMI<br>■ VGA<br>■ RGBHV<br>■ YPbPr/YUV<br>■ CV/YC<br>■ BNC |
| Digital DVI-D format:<br>Max HD resolution<br>Max PC resolution | <br>1080p @60 Hz<br>1920x1200 @60 Hz | Digital DVI-D format:<br>Max HD resolution<br>Max PC resolution | <br>1080p @60 Hz<br>1920x1200 @60 Hz |
| Analog DVI-A format:<br>Max HD resolution<br>Max PC resolution | <br>1080p @60 Hz<br>2048x2048 | Analog DVI-A format:<br>Max HD resolution<br>Max PC resolution | <br>1080p @60 Hz<br>2048x2048 |
| Max horizontal scan rate | 150 kHz | Vertical refresh rate | Any to 250 Hz |
| Signal format | ■ RGBHV<br>■ RGBS<br>■ RGsB<br>■ YPbPr | Signal format | ■ RGBHV<br>■ RGBS<br>■ RGsB<br>■ YPbPr |
| Sync | ■ TTL level<br>■ 10 kΩ<br>■ Positive or negative | | |
| Termination | 75 Ω | | |
| RGB level range | 0.5–2.0 Vp-p | RGB level range | 0.7 Vp-p |
| Scan rate detection | Automatic | | |
| **General** | | | |
| Latency | 1–2 frames delay | Horizontal filtering | Full digital |
| Size and position | ■ Automatic with AutoSet<br>■ Manual | Conversion technology | Proprietary, CORIO™®2 |
| Image size | User-definable presets | Frame rate conversion | Frame add/drop |
| Image freeze | One video frame | Color resolution | 24-bit |
| Settings memory | Non-volatile | Sampling rate | 162 MHz |
| Zoom range | Variable to 10x Zoom | Digital sampling | 24-bit, 4:4:4 format |
| Shrink range | Variable to 10% | Firmware memory | Flash, upgradeable with RS-232 |
| Image mirroring | ■ Horizontal<br>■ Vertical | Analog Video Adjust | ■ RGB levels contrast<br>■ Phase |

| | | | |
|---|---|---|---|
| **General** | | | |
| Control | ■ Buttons of front panel<br>■ On-screen menu<br>■ Serial control with RS-232<br>■ Serial control with CORIO™ tools | | |
| **Physical** | | | |
| Size HxWxD mm | 30 x 200 x 90 | Weight kg | 0.52 |
| Size HxWxD inches | 1.18 x 7.87 x 3.54 | Weight lb | 1.14 |
| Power | 12 V DC @1 A | | |
| **Environment** | | | |
| Operating temperature | ■ 0–50 °C<br>■ 32–122 °F | Storage temperature | -10–70 °C<br>14–158 °F |
| Operating humidity | 10–85%, non-condensing | Storage humidity | 10–85%, non-condensing |
| **Optional accessories** | | | |
| Rack mounting kit | RM-230 | DVI to HDMI adapter | CMD1941 |

# Regulatory compliance

## European ‘CE’ Mark Statement

Emissions: BS EN 61000-6-3:2001 (Generic Immunity Standard for Residential, Commercial and Light Industrial).

Immunity: BS EN 61000-6-1:2001 (Generic Immunity Standard for Residential, Commercial and Light Industrial).

## FCC Statement

Class A Device: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the user guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

# Contact us


tvone.com

info@tvone.com

Support NCSA: tech.usa@tvone.com

Support EMEA: tech.europe@tvone.com

Support Asia: tech.asia@tvone.com