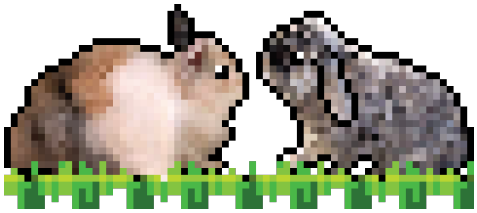
RetroTINK



2X-M PRO Multiformat

User Manual

Revision 1.0
August 10th, 2020

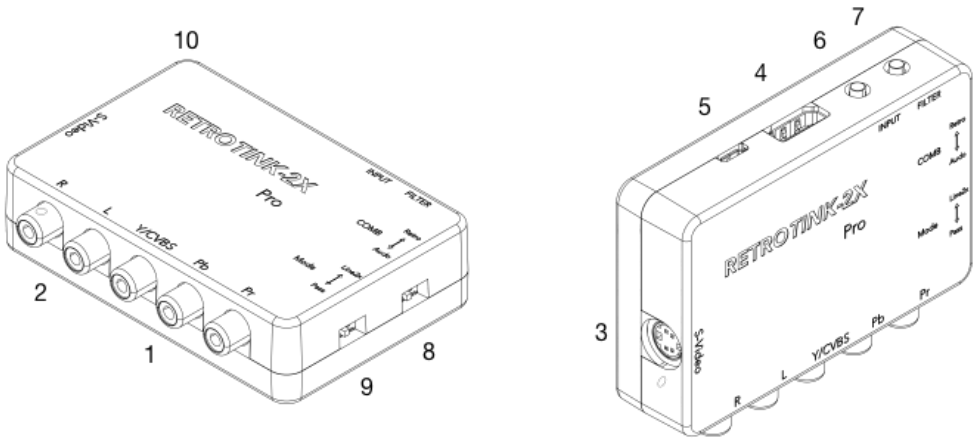
CE

Introduction

The RetroTINK-2X Pro Multiformat (2X-M) is a device capable of line-doubling standard definition sources from composite, S-video and component signals from retro consoles. The 2X-M is also capable of passing 480p component video signals without alteration in timing to the digital video output port. All processes are essentially “zero added lag” to preserve the original gaming experience.

The 2X-M includes support for scanline generation for standard definition sources, firmware updates over USB and multi-region decoding of NTSC/PAL/PAL-60 and other encoded formats.

Description



1. YPbPr/CVBS input. For composite sources, connect the Yellow video line to the Green jack.
2. Audio input.
3. S-Video input.
4. Digital Video output.
5. microUSB power input. Connect to any microUSB power source capable of supplying 500 mA or more.
6. INPUT button. Cycles between component, S-video and composite inputs.
7. FILTER button. Cycles between normal and scanline modes.
8. COMB switch. Toggles between notch and automatic comb filtering for composite video.
9. MODE switch. Toggles between line doubling and pass-thru modes.
10. Indicator LED.

Quick Start

First insert a microUSB power cable to the device. You may use any source capable of supplying at least 500 mA.

Second, connect your console to the device. You can leave both the component/composite and S-video inputs plugged in at the same time, although both video ports share the same set of audio inputs.

Third, press the 'INPUT' button until the correct video input type is selected. The 'Indicator LED' shows the current input:

- GREEN - Component (480p sources will cause the green to turn purple)
- WHITE - S-video
- YELLOW - Composite

Fourth, make sure that the 'MODE' switch is set to 'Line2x'.

Fifth, connect the device to your display via a Digital Video cable. You should now see the output from your console on your display.

Finally, press the 'FITLER' button until your desired effect is shown. The filters cycle between norma and scan-line effects.

The RT2X-M remembers the input and filter settings between power cycles.

Advanced Features

Comb Filtering

The 'COMB' switch controls how the video decoder performs chroma/luma separation for composite video sources. For retro-consoles such as the NES that use off-spec encoding the 'Retro' setting may produce less vertical artifacts at the expense of horizontal resolution by using a notch type filter. The 'Retro' mode is probably most similar to an old fashioned analog CRT TV.

For cleaner video sources, such as LaserDisc and newer generation consoles, the 'Auto' position will generally produce a sharper and cleaner image.

We recommend you try both settings and using the mode you prefer.

Pass Thru Mode

The 'MODE' switch allows the line doubler to be turned on or off. For normal gaming on 240p/288p sources, this should be set to 'Line2x' to output 480p/576p.

Setting the 'MODE" switch to 'Pass' turns off the line doubler and the device simply digitizes the video signal to the Digital Video output but preserves the original timing. Pass-thru mode may be useful for video capture so that more advanced de-interlacing techniques can be applied later in software.

Pass-thru is also useful if you wish to use the 2X-M as an transcoder for a RGB monitor or as a pre-processor for a device like the OSSC.

De-interlace Field Offset

Press the 'MODE' and 'INPUT' button at the same time to cycle between different combinations of odd/even field offsets. This may be useful for certain ports of 240p games that are incorrectly output as 480i on a modern console. This allows for perfect reconstruction of the original image as if they were line doubled from 240p content. The de-interlace field offset is not saved across power cycles.

Firmware Upgrade

The 2X-M has the ability to upgrade the firmware over USB using a PC-based application. No special tools are needed.

Firmware upgrades requires that the 2X-M be started in bootloader mode. Hold the 'INPUT' button down while connecting the 2X-M to a PCB via USB cable. The LED indicator should remain solid RED.

If the upgrade process fails, simply restart by powering off the device and re-entering the bootloader. Since the bootloader resides in a protected region on memory on the microcontroller, bricking the device is extremely unlikely.

To exit bootloader mode without upgrading, disconnect the microUSB cord from the 2X-M, then reinsert without holding the 'INPUT' button down.

Detailed and firmware files may be found on www.retrotink.com.

THE 2X-M HAS A CUSTOM FIRWMARE BASE. DO NOT USE 2X-M FIRMWARE ON ANY OTHER DEVICE OR VICE VERSA.

Troubleshooting

Q: No image is shown.
A: Double check that the 2X-M is powered up and that the Digital Video cable from the 2X-M is securely plugged into your TV. Try another TV and Digital Video cable. Without any console connected, you should see a blue screen. If you do not, contact your seller for additional assistance.

Q: Image is black and white.
A: Press the 'MODE' button to cycle to the correct input mode (composite, S-Video, component).

Q: Image is okay but then becomes glitchy when switching input sources.
A: Power cycle the device if this happens.

Q: Picture is noisy and/or interference is seen.
A: In almost every case, the noise originates from the console, console's power supply and/or the cables used to connect the console to the 2X-M. The noise almost never originates from the 2X-M itself. In addition, to preserve image sharpness, the 2X-M does minimal filtering to attempt and smooth out noisy sources. For the best image quality, always use official power supplies for your console and shielded video cables.

Q: No sound is heard.
A: Double check to make sure the audio cables are connected correctly. Try another TV. The off-spec video timing of some-retro consoles causes some displays to reject the audio stream in the Digital Video connection. Alternatively, directly connect the audio output from your console to your sound system and bypass the 2X-M.

Specifications

Input Connections	CVBS, S-Video, Component and Analog Stereo Audio
Output Connection	Digital Video Connector, TMDS
Supported Formats	240p, 288p, 480i, 576i and 480p
Supported Standards	NTSC, PAL, PAL-60
Latency	< 100 µS from analog input to Digital Video output
Data Interface	FTDI USB Virtual Serial Port, 115200 bps 8-N-1 RTS/CTS Flow Control
Power	< 300 mA over microUSB, 500 mA PTC fuse for overcurrent protection

Disposal

If your RetroTINK malfunctions, please contact the place of purchase via e-mail or through their website to arrange repair or replacement. All RetroTINK units come with one years warranty. Outside of warranty, resellers may also offer repair services at their discretion.

If you do need to dispose of the unit, in most countries you can recycle the unit for free at your local recycling centre. To find your nearest centre in the UK, visit the Recycle More website at http://www.recycle-more.co.uk and type in your postcode. In the Republic of Ireland, visit https://www.weeeireland.ie/household-recycling/where-can-i-recycle/.

If you live outside of the UK or ROI, please check with local authorities or contact us to arrange for a return of your unit.