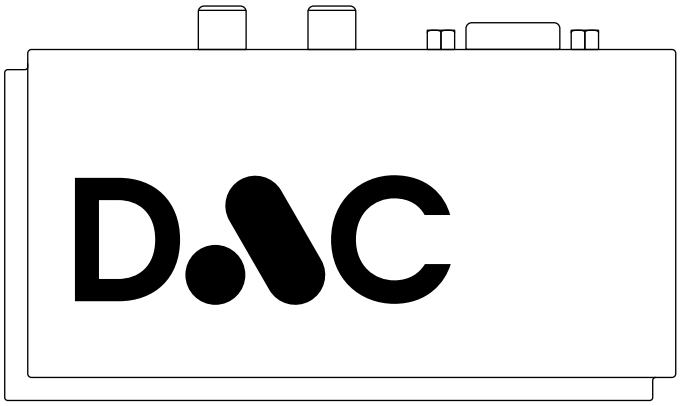
# Analogue DAC
# Reference Manual

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**Analogue**
Celebrate & explore the history of video games with the respect it deserves.

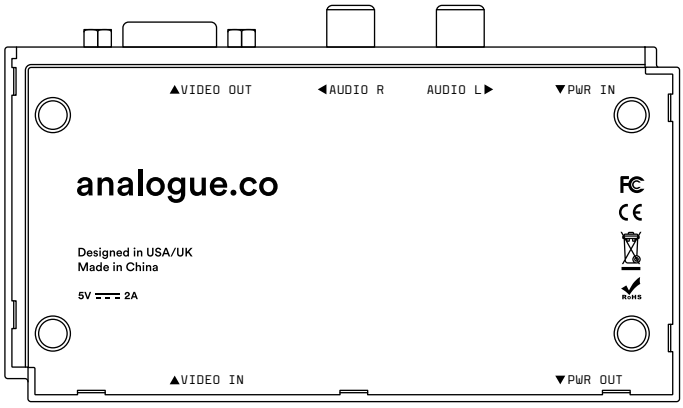



USB Type-A Connector
(Power Output)

HDMI Connector
(Video and Audio Input)

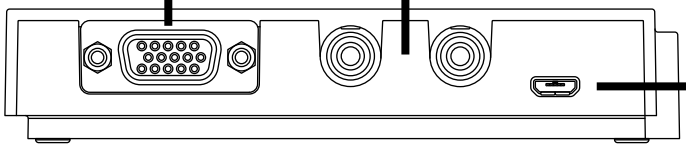



NTSC/PAL
Switch

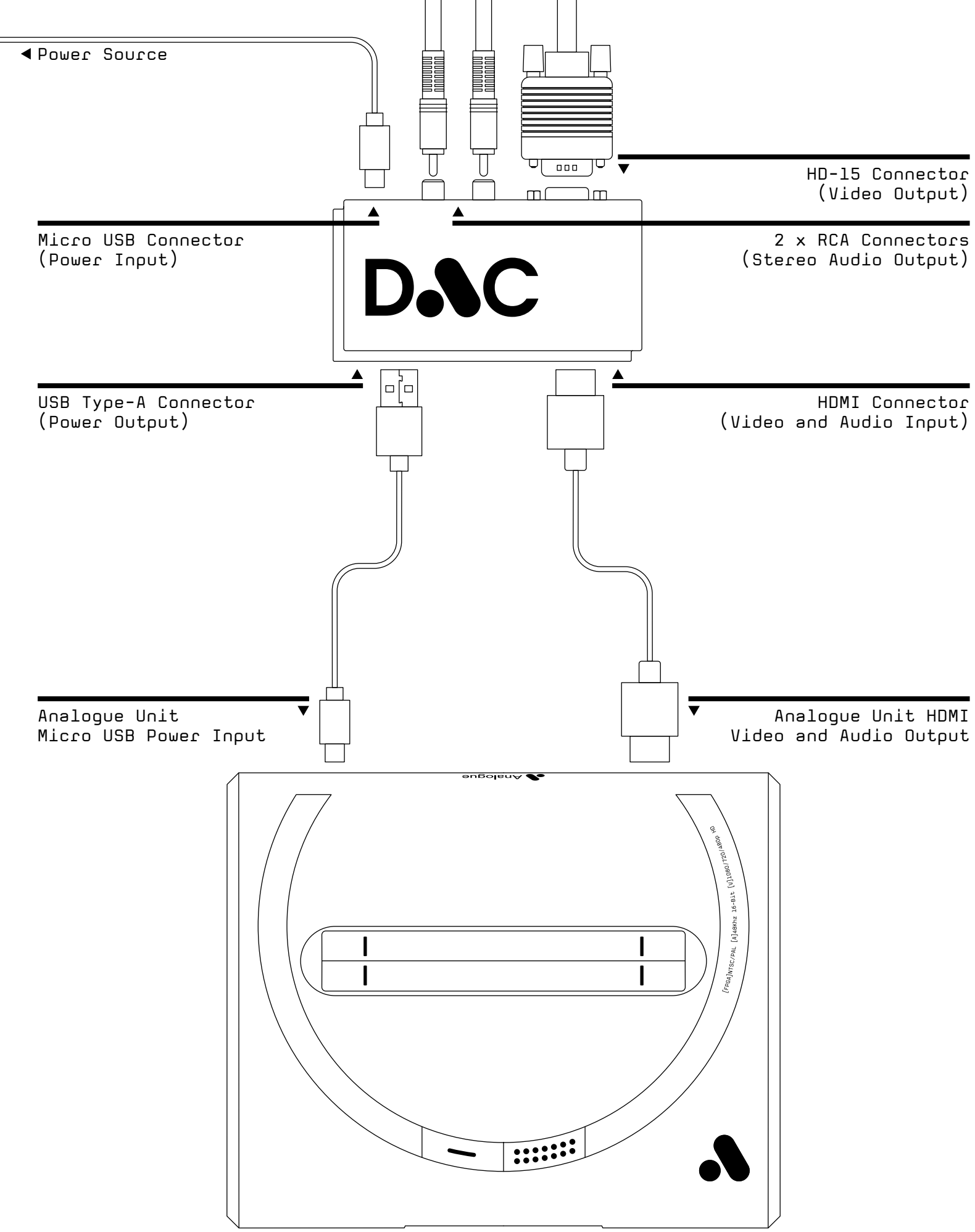



HD-15 Connector
(Video Output)

2 x RCA Connectors
(Stereo Audio Output)



Micro USB Connector
(Power Input)


◀ Power Source
HD-15 Connector
(Video Output)
Micro USB Connector
(Power Input)
2 x RCA Connectors
(Stereo Audio Output)
DAC
USB Type-A Connector
(Power Output)
HDMI Connector
(Video and Audio Input)
Analogue Unit
Micro USB Power Input
Analogue Unit HDMI
Video and Audio Output
Analogue

# Thank you for purchasing Analogue DAC

DAC has been specifically designed for Super Nt and Mega Sg to convert their digital signals into high-quality analog video and audio signals for latency-free gameplay on CRT monitors and televisions.  Future Analogue products will also support DAC.

DAC supports RGB Video, Component Video, S-Video and Composite Video and should be compatible with any display or capture device accepting these input types.  DAC uses an FPGA for its video and audio processing capabilities, so it can be upgraded with improved firmware.

**What's in the box**

— Analogue DAC
— 1 x micro-USB to USB Type A Cable

**Setting up DAC**

In order to connect DAC to Super Nt or Mega Sg, you will need a HDMI cable, a micro-USB to USB Type-A cable and a 5v/2A USB power adapter, preferably those which came with Super Nt and Mega Sg.

First, connect the HDMI cable from the HDMI connector on Super Nt or Mega Sg to the HDMI connector on DAC. This sends the video and audio signals from the consoles to DAC.

Second, connect Super Nt or Mega Sg micro-USB connector to DAC's USB Type-A ("full-size") connector using the first micro-USB to USB Type A cable. This will send power from DAC to the console.

Third, connect the USB power cable to DAC's micro-USB connector using the second micro-USB to USB Type A cable, then plug in the USB power adapter into an AC power source and the USB Type A connector. This powers DAC and console.

Fourth, connect your analog cable or adapter to the HD-15 ("VGA") connector and your analog video cable to your display device or capture card. Connect your DAC's audio outputs to your audio receiver, amplifier or sound card.

You can hot swap analog connections, DAC and your console know what video signal to generate based on the adapters and cables connected. You can also revert to HDMI without powering down the console, just remove the HDMI cable from DAC and connect it to an HDMI input. DAC can be used to power Mega Sg or Super Nt even if it is not being used to generate analog video and audio.

You may see diagonally-skewed rolling gray bars on your screen when the console powers on. This is normal because the FPGAs in the consoles and DAC take a second or two to configure themselves and communicate with each other, after that your image should become stable and recognizable. If you see "NO SIGNAL" being displayed in large, blocky letters, check your HDMI cable and connection between Super Nt or Mega Sg and DAC.

**Upgrading your Super Nt or Mega Sg's Firmware**

DAC will not work with Mega Sg or Super Nt consoles whose firmware (v4.5 and v.4.6, respectively) predates DAC's release. You must upgrade your Super Nt and your Mega Sg's firmware to versions with DAC support. DAC will only work with Super Nt or Mega Sg, it will not work with any other HDMI device at this time. Please go to Analogue's support page, located here, to download the required firmware.

**Upgrading your DAC's Firmware**

To update DAC's firmware, you must connect it to a computer with a USB port. DAC will appear as a USB mass storage device to any modern version of operating systems such as Microsoft Windows, macOS or Linux. The "disk drive's" label should be "DAC V0_#." Even a smartphone can upgrade DAC with the appropriate USB adapter cable.

You can use the micro-USB to USB Type-A cable which comes with DAC, Super Nt or Mega Sg. Plug in the larger Type-A connector into your PC and the smaller micro-USB end to the micro-USB connector on DAC. Just copy the firmware file to the "USB drive" which appears and the firmware will automatically upgrade itself. The LED will blink rapidly for four seconds, then the firmware update will be complete. DAC is "unbrickable".

**Compatible AV Cables & Adapters**

Analogue recommends cost effective cables sold by Monoprice provide optimal results. Here is a list of compatible cables and links where you may purchase them:

— Monoprice VGA to S-Video/RCA (Composite) Adapter Cable

**Component Video**

— Monoprice 12ft VGA to 3 RCA Component Video Cable

— Monoprice 6ft VGA to 3 RCA Component Video Cable (HD15 – 3-RCA)

— Monoprice 6in VGA to 3x RCA Component Video Cable (HD15 to 3x RCA)

**RGB Video – BNC Connectors**

— Monoprice VGA HD-15 to 5 BNC RGB Video Cable for HDTV Monitor cable - 6FT

— Monoprice VGA HD15 Male to 5x BNC Female Adapter Cable - 1ft

**RGB Video – SCART Connector**

For SCART connections, the most hassle-free way to deliver analog video to your TV set may be to use the Monoprice VGA HD15 Male to 5x BNC Female Adapter Cable – 1ft in combination with this :

Male SCART to 4 x BNC + 2 x RCA breakout

Connect the Red, Green and Blue video terminals together. The composite synch line is Gray/White, so connect the matching terminals together. There is no audio connection at DAC's analog video connector, you will need to plug in the RCA cables into the RCA jacks on DAC.

If you own an Analogue Nt Mini, you may reuse those cables and adapters, the HD-15 connector pinouts on Nt Mini and DAC are identical. You can construct your own cables using the information provided here :

For SCART RGB detection DAC provides +5v on the HD-15 connector's pin 9.

**RGB Video – VGA or DVI Connector**

You can use any VGA-to-VGA cable or adapter with HD-15 Connectors on it. Note the gender of the connector's input device. The VGA display or capture device must be able to support a 15KHz horizontal scan frequency, which is what 240p/480i consoles output. Typical VGA CRTs do not. You may also connect DAC to a display or capture device, such as a flat panel LCD, which has a DVI-A or DVI-I input connector with the appropriate cables or adapters. Not all devices with a DVI connector will support the 15KHz horizontal scan frequency which DAC provides.

**DAC-only Peripheral Support**

The following peripherals become compatible with Mega Sg or Super Nt when DAC is used :

— Light Guns – SNES Super Scope, Sega Genesis Menacer, SNES and Genesis Konami Justifier, Sega Master System Light Phaser

— Sega 3-D Glasses (with the Sega Power Base Converter)

— Other “CRT-only” peripherals may be supported by future Analogue products

The original Sega Power Base Converter is the only Genesis to SMS converter with a cartridge slot and a card slot. 3-D Master System games require both, the cartridge slot for the game and the card slot to communicate with the 3-D Glasses. The lip at the back of the Power Base Converter prevents the device from fitting over the Mega Sg because the lip blocks the HDMI port. You can run the Power Base Converter as a pair of bare printed circuit boards, cut the thick plastic off the Power Base Converter which overlaps the HDMI port, or use a low-profile right-angle HDMI cable or converter to fit in the small gap between Mega Sg and the Power Base Converter when fully inserted into Mega Sg’s cartridge slot. If you choose to use an HDMI right angle adapter, look for Amazon ASIN B00A30FE58. These HDMI right angle adapters will work after you dremel or file down the right side of the rear plastic until you begin to see the circuit board. Filing down the plastic will give enough clearance for the Power Base Converter to fit snugly next to the right angle adapter and allow you to use your 3-D Glasses with their cartridges.

**NTSC/PAL Switch and the Hardware Submenu**

The switch on DAC near the HD-15 connector will change the console’s frame rate to NTSC/60Hz or PAL/50Hz refresh rates. The NTSC position is closest to the HD-15 connector and the PAL position is closest to the HDMI connector. If you are using either composite or s-video connections, the switch will also change the color encoding to NTSC or PAL-compatible color. A 60Hz CRT may refuse to display a 50Hz signal and vice-versa.

The switch’s settings will override Mega Sg or Super Nt menu settings except for the import/export setting. Mega Sg’s hardware submenu item has reduced the number of regions settings to two and renamed them Domestic (Japan, Korea) and Export (Americas, Europe, Australasia). Super Nt relies purely on the NTSC/PAL switch.

If the game has code to detect the state of the region setting bit(s), use the region setting to set the bit(s) to the option the game expects and then flip the switch to the desired speed after the game begins. This allows you to play an NTSC game at PAL speeds or play a PAL game at NTSC speed. Some early SNES and Genesis games that support more than one region will adjust their code for NTSC or PAL speed once they detect the system’s speed and will maintain that speed until reset.

**DAC Settings**

DAC presents mostly the same menus as you can access when Super Nt or Mega Sg is being used with HDMI, but the “Video Settings” menu option has been renamed to “DAC” and reduced to a single screen of options and a pair of submenu screens.

Limit Browser Width

The File Browser for fonts and LED animations will show 60 columns of text and numbers per line. If checked, the File Browser will show 30 columns of text and numbers per line. If a file name is too long to be displayed fully on one line of the File Brower, the name will scroll to the left so you can read the whole file name. Text at 60 characters per line can be extremely hard to read when output via composite video. 30 characters per line text is not an issue, even with composite.

— DAC LED Brightness

— Sets the brightness of DAC’s led.

— Link DAC LED to power LED

— This option makes the DAC’s LED behave like the LED on Super Nt or Mega Sg.

**Advanced Settings**

DAC gives three options for synchronization over RGB :

— RGB Composite Synch (one synch wire, 75-ohm terminated synch)

— RGB Separate Synch (two synch wires, TTL-level synch)

— RGB Synch on Green (zero synch wires)

These settings can also be accessed with HDMI via the DAC Color submenu screen within the Video Settings menu option. Setting the wrong synch option may result in a black or garbled screen. You can use any other video output from HDMI to Composite to set the synch option to an option your device supports if the default analog option (Composite synch) does not function with your display device. Remember to save your settings before switching over to analog video.

You can also change the Synch setting temporarily with a combination of holding a direction down on your D-pad and pressing the reset button on your console. Holding Up and Reset will set the Super Nt and Mega Sg to Composite Synch, holding Right and Reset sets Synch on Green and holding Down and Reset gives you Separate Sync. If you are not getting any picture on your display or capture device, try each setting using this method. The setting will not be saved unless you Save Settings.

**Invert RGB Synch**

This option will toggle the polarity of the Synch signal from positive to negative or negative to positive. Use this option if your display is showing a difficulty acquiring or losing sync with the default option. You can adjust the Synch polarity by holding down the button assigned to the Back function on your console and pressing the reset button on the console.

**DAC Settings (Continued)**

No Chroma Filter
This setting should likely only have any visible effect with Mega Sg. This will adjust the color fringing seen with Composite Video. S-Video is virtually free of color fringing, so this option's effect using that connection is minimal. It has no effect on Component Video or RGB Video connections.

7.5 IRE Black Level

Brightness for Composite Video is measured in IRE units, and 0.0-100.0 is the usable range of IRE units. This option sets the black level to the US NTSC standard of 7.5 IRE when enabled. This option will only have an effect for Composite Video and S-Video. If disabled, 0.0 IRE will be used, which became the Japanese NTSC standard and was always used for PAL.

700mv RGB Level

When disabled, RGB will use 1v signaling for each color signal. Most RGB displays prefer 700mV, use this for those displays that prefer higher voltage levels. It has no effect for any other connection type.

**Extra Features**

Extra Features exists as a submenu of DAC.
For Super Nt, all the listed options will work with DAC. The Pseudo-Hires Blending works for all output devices, although original SNES hardware would display as if the option is turned on for Composite Video and off for S-Video or better.

Mega Sg will allow the user to Enable CRAM dots and use Original TMS9918A Palette.
Any other options shown in the submenu will not have any effect.

DAC will show interlaced 480i video for those few Genesis and SNES games which use interlacing. DAC will also pass Dolby Surround audio encoding for those SNES games which support it to the analog audio outputs for Super Nt.



# To be this good takes Analogue.

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