

PROC AMP

(Video Processing Amplifier)

Instruction manual



SignVideo

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PATENT NOTICE

This product is covered by two current patents:

U.S. Patent No. 4,604,646
U.S. Patent No. 5,311,298
Additional patent(s) pending.

SAFETY WARNING

To prevent fire or shock hazard, do not expose the unit (or its power supply) to rain or moisture.

Unplug the unit from the wall outlet if it is not going to be used for an extended period of time..

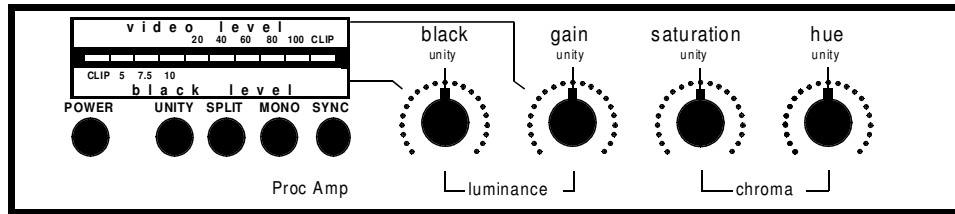
FEATURES



The PROC AMP is a powerful, easy to use tool for the adjustment of video and chroma levels without damaging the signal in any way. To this end, the PROC AMP has the following features:

- The original sync and blanking are passed untouched.
- Unity mode bypasses all controls and provides an output that is visually identical to the input.
- Video quality is to professional standards, allowing the PROC AMP to be left in line at all times.
- All controls are at unity when in the straight up position.
- All controls have marks for easy recording of their position.
- All controls have a range optimized for easy adjustment.
- Luminance gain and chroma saturation both go to zero to provide a black output.
- Black clipping begins at the blanking level and prevents video from interfering with sync.
- White clipping prevents excessive video level.
- Video level meter measures both peak white and black levels, giving you assurance that your output video is within industry accepted standards and thus will play properly on all TV sets and monitors.
- Meter clip LEDs light just BEFORE clipping begins, warning you that video levels are in the clipping region.
- Video with degraded sync can be restored to a standard 40 IRE by pressing the SYNC button.
- Color burst can be removed to provide a true monochrome signal.
- Split screen allows comparison of uncorrected and corrected video.
- Composite video is internally split and recombined without the artifacts often found in competitive units.
- Frequency response is flat well beyond 5 MHz.

CONTROL FUNCTIONS



PUSH BUTTON SWITCHES

POWER

Push in to apply power to the PROC AMP. When off, no power is consumed and no video is passed to the output.

UNITY

Push in to **bypass** all controls and set the video output essentially equal to the video input.

SPLIT

Push in to display a split screen. The right side of the screen is uncorrected ("UNITY") video and the left side of the screen is corrected video.

MONO

Push in to produce a monochrome (black & white) picture by removing the color burst.

SYNC

Push in to ensure that the output sync is always 40 IRE as long as the input sync is greater than 30 IRE. Note that this affects the way that the video level meter works.

ROTARY CONTROLS

luminance black

Shifts the entire visible video signal either brighter or darker in order to set the blacks at the desired level. The meter should read 7.5 on scenes that contain a really dark object. If the black clip LED lights, you should adjust clockwise to stop clipping (see USING THE PROC AMP).

luminance gain

Adjusts the gain of the luminance (or brightness) portion of the picture. Does not adjust chroma along with luminance so it cannot be used as a fader control. Use it to set the brighter regions of the picture to the desired level. Meter should read 80-100 on scenes containing whites. If the clip LED lights, the level is excessive (see USING THE PROC AMP).

chroma saturation

Adjusts the color saturation (also called chroma gain or chroma level). Set by eye with a good video monitor.

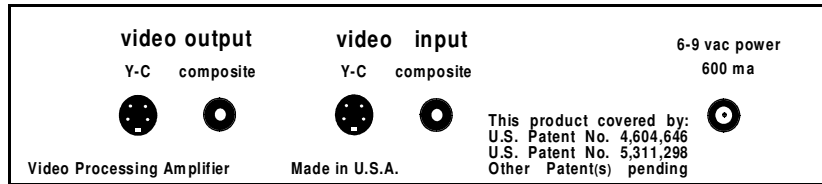
chroma hue

Adjusts the color hue (also called tint or phase) Set by eye with a good video monitor.

METERING

The video level meter reads (1) peak white video level on the right and (2) peak black video on the left. The upper set of numbers is for reading the white level. The lower set of numbers is for reading the black level. Normal video will extend from 7.5 to 100, with 7.5 being the minimum and 100 being the maximum. Going outside of this range produces nonstandard video that will cause problems with some equipment.

HOOK UP



CONNECTIONS

Occasionally, when a new piece of equipment is added to a system, something is moved or disconnected and the new equipment is blamed for problems that occur. Follow the below procedure to ensure that the installation goes smoothly:

1. Decide where to place the PROC AMP; both physical placement and where to connect in the stream of equipment. We suggest that it be connected to the output of the VCR or camera before any other equipment. Use of a VCR as your signal source is assumed in the following:
2. Before hooking up the PROC AMP, turn on all equipment and play a tape to verify that all equipment is operating normally. Verify a picture by using a video monitor that is connected to the last item in your processing chain.
3. Disconnect the video output cable from the VCR output. Verify that the picture went away. Plug this cable into the video output of the PROC AMP.
4. Plug one end of a new cable into the VCR output connector. (the one you just removed the cable from). Plug the other end of it into the input of the PROC AMP.

5. Plug the PROC AMP power supply into a wall outlet. Then, plug the power supply cord into the PROC AMP's "6-9 v ac" power input.

6. Push the power button so that it stays in. A picture should appear on your monitor

Y-C & COMPOSITE INPUTS/OUTPUTS

The PROC AMP **has both composite and Y-C** inputs and outputs. **Apply video to only one input at a time**, if video is fed into both inputs they will mix causing severe distortion. If possible, use the Y-C input as it avoids the Y-C splitting step internally in the PROC AMP.

If you use the Y-C input, the Y-C output will provide the best quality output. The composite output is convenient for feeding a composite monitor.

If you use composite input, the composite output will generally provide the best quality output.

USING THE PROC AMP

About video monitors

A good monitor is your most important asset when setting video parameters. It should be fully DC restored in order to properly display brightness.

A DC restored monitor is one that fades to black, not gray, during a slow fade out. Other monitors can be adjusted to have proper blacks on one scene, but when the scene changes, the blacks will become gray or will lose detail (disappear by being too black).

To set your monitor:

1. Choose a static shot from tape or camera that has good blacks and good whites. Turn on the PROC AMP and press the SYNC button, be sure that all other buttons are out. Set all controls straight up to unity.

2. Using the meter, adjust the black luminance control so that the "7.5" LED on the left lights up but the "5" LED light is dark. Adjust the luminance gain control so that the "100" LED just comes on.

(All of the LEDs in between these two will be lit). The output video now extends from about 7.5 to 100 IRE. (The controls interact somewhat, so re-adjust both until the "7.5" and "100" LEDs just light.)

3. With the room lights off, adjust the brightness and contrast (or gain or picture) controls on your monitor so that the blacks are black, but still have detail and the whites look white. Contrary to what some manuals recommend, the brightness control should be used to set the blacks and the contrast control should be used to set the brightness of the whites.

4. The color settings should be set with color bars connected directly to the monitor input. (the PROC AMP does not provide color bars).

Once your monitor is accurate, you can use it for most video adjustments, relying on the PROC AMP meter primarily for the white readings and occasionally for black readings.

TESTING THE PROC AMP

The following procedure will verify that your PROC AMP is performing normally.

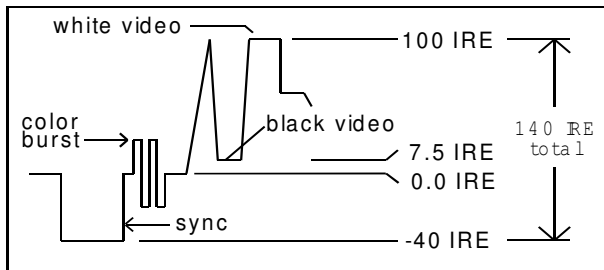
1. Press UNITY. The output picture should be visually identical to the input picture in every respect.
2. Press SPLIT, then release UNITY. There should be no visible change in the right side of the picture. The left side may change depending on the control settings.
3. Adjust each control. Each control should affect only the left side of the screen. (see CONTROL FUNCTIONS for an explanation of what each control should do)
4. Release the SPLIT button. Adjust each control. Verify that each works. Luminance black and luminance gain controls should affect the meter reading.
5. Press the MONO button. The color should disappear giving a monochrome (black & white) picture. Some monitors may give wildly off colors due to excessive "color killer" threshold sensitivity. These usually disappear when the PROC AMP chroma saturation control is turned fully counterclockwise.

HOW TO USE THE METER

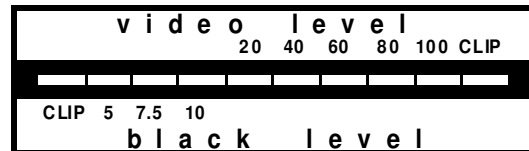
METER BASICS

The meter is a horizontal bar made up of light emitting diodes (LEDs) that light in sequence as the reading increases.

Video inputs and outputs of most equipment, including this PROC AMP, are nominally 1 volt (1v) peak to peak (p-p) to a 75Ω transmission line. For measurement purposes, this is usually split into 40 units of sync and 100 units of video with the sync being the most negative portion of the signal for a total of 140 units. This measurement system is expressed in IRE units:



In the NTSC video system (used in the United States, Canada, Japan & some other countries) the bottom 5-10 IRE of the video is left unused, the blackest black being in this region at about 7.5 IRE.



The left most LED, marked “CLIP”, lights when blacks are being clipped at blanking or 0 IRE. The next 3 LEDs, marked “5, 7.5 and 10”, indicate the level of the blackest parts of the output video signal. If there is no video at or below 10 IRE, then these LEDs will remain off.

The right most LED, marked “CLIP” indicates white clipping while the 5 LEDs to the left, marked “20, 40, 60, 70, 100” indicate peak video level. These light in a bargraph fashion. If none of these are lit, the video has no white peaks above 20 IRE.

It is a good idea to get familiar with the action of the meter by studying some of your tapes that look good and some that don't look good.

METER DETAILS

1. The meter reads relative to the sync so that it will give accurate readings in an environment where the video level may deviate from 1v p-p. 100% is set so that the 100 LED comes on when the video is 2.5 times the sync. All other LEDs are scaled from this 100% reference. This is ideal for feeding a VCR that has an automatic gain control (AGC), since any deviations from 1v p-p will be corrected by the VCR.
2. When the SYNC button is pressed, the sync is set to 40 IRE for a 1v p-p output. Under this condition, the meter reads 100% when the video is 1v p-p. If the video is to be fed to a device that does NOT have an AGC then this is generally the preferred mode.
3. The meter reads black and white peaks that are about 5 μs or more wide. Narrower objects will read if they are more than one line high.
4. The meter measures both black and white within a rectangle just slightly smaller than the overall picture.

SETTING LUMINANCE

Gain

Adjust the **luminance gain** so that, for normal scenes, the video level does not exceed 100%. This occurs when the 100% LED lights sometimes, and the CLIP LED **NEVER** lights. Normal video scenes will vary greatly, typically from 60-100 as people move around, the camera pans across bright objects, etc.

Black

Adjust the **black** control so that the blacks are black and still have detail on a properly calibrated monitor (see "about video monitors"). The monitor is best for general use but the black level meter can be used when you want to be sure something is really black. Set the black control so that the 7.5 LED is on and the 5 LED never comes on. Like the white level, the black level will move around quite a bit, so don't try to set every scene to 7.5 IRE black. However the 5 IRE LED, and especially the CLIP LED, should remain off.

Meter action

As stated earlier, it is a good idea to get familiar with the action of the meter by studying some of your tapes that look good and some that don't look good.

Boosting dark scenes

View the video monitor and turn up the luminance gain until the scene looks normal. The luminance black will probably need adjusting too. When you turn up the gain, small highlights will be turned up to the clipping level causing the CLIP LED to light. This is acceptable since it is intended. If the highlights have color, the color will be preserved. After the gain and black are set, adjust the hue and saturation as desired for the best picture. Expect the picture to get somewhat noisier (snowier).

SETTING CHROMA

Method

The chroma controls are best set by eye on a monitor that is known to be accurate. Even TV stations do this by eye since a vector scope is of little value in day to day production use.

Hue

Like all broadcast style PROC AMPs, the hue control affects only colored areas of the picture - it has no effect on whites or neutral grays.

To correct for a picture that is too green, turn the hue control counterclockwise. To correct a picture that is too red, turn the hue control clockwise.

Saturation

Turn clockwise to increase the intensity (saturation) of the color. Turn counterclockwise to reduce the intensity of the color.

The color portion of a video picture is surprisingly noisy as can be seen by turning the chroma saturation fully clockwise. Fortunately, most situations just require a small adjustment.

Removing Color

Turn saturation fully counterclockwise to remove the color from a scene such as black and white photos etc. (If you are using composite input this will slightly soften the picture). If your whole program is monochrome, you can also kill the color burst with the MONO switch (see "MONO").

USING THE PUSH BUTTON SWITCHES

UNITY

UNITY is used to set the PROC AMP so that it does not affect the video signal. Its output is equal to its input. This is useful to verify what the picture looks like with and without correction.

Details of the UNITY mode:

1. No control has any effect on the output.
2. Both the composite and the Y-C outputs are active.
3. The meter reads normally.
4. Internally, the video is set to a standard voltage with "clamping" circuits. These remain active.

SPLIT

SPLIT is used to verify what the picture looks like with and without correction. The corrected video is on the left side of the monitor. Uncorrected video is on the right. Use of the SPLIT or UNITY controls is a matter of personal preference.

Details of the SPLIT mode.

1. The controls affect only the left side of the picture.
2. In the split screen mode, the hue control affects fine picture detail.
3. The meter reads only the left, corrected portion of the picture.

MONO

The MONO mode suppresses the color burst so that downstream TVs and VCRs will switch to the monochrome mode (Black & white). It has no other effect on the video. This mode should be used for whole programs, not parts of a program as many VCRs and TVs show a flash of excess color when entering the monochrome mode. If you have monochrome scenes in a color program, turn the saturation control to zero for these scenes instead of selecting mono.

Details of the MONO mode:

1. Color burst is suppressed to about -40 dB.
2. Some video signals (especially VCR outputs) have excessively wide color burst and the outer edges of this burst may not be suppressed, causing some monitors/TV to remain in the color mode. This is especially true of VCR outputs.
3. Some TV sets simply refuse to switch to monochrome. Try turning the PROC AMP's chroma saturation control fully counterclockwise. This will lose some detail if you are using composite input. There is no loss of detail if you are using Y-C inputs.

SYNC

Normally the PROC AMP passes sync unchanged, giving maximum protection against accidental sync degradation. When the SYNC button is pressed, proper sync amplitude is ensured by forcing the sync to the standard 40 IRE amplitude. This is used whenever the input video has a loss of sync amplitude that can cause tearing or vertical jitter. This is useful for feeding monitors or mixers but is generally unneeded with **good quality video** or when feeding VCRs since they have an automatic gain control to normalize the level.

Details of the SYNC control:

1. Provides 40 IRE sync output as long as the input sync is greater than 30 IRE.
2. Operates by amplifying the center portion (10-30 IRE) of the sync to the nominal 40 IRE.
3. See "INTERNAL JUMPER OPTIONS" for an alternative mode for this switch.

TECHNICAL NOTES

Composite and Y-C inputs/outputs

The composite output is derived from the outputs of the Y and C output amplifiers by first mixing them in a 1:1 ratio, then amplifying by two to drive the 75Ω output.

The composite input is split right at the input by a simple filter circuit then essentially applied to the Y and C inputs. The overall circuit is arranged so that the Y and C signals which were split at the input recombine with no visible artifacts at the output after passing through the processing circuitry.

Since the composite input splitting filter allows high frequency Y to go through the chroma section, the composite input should not be used when the primary output is Y-C. One exception to this general rule is where the video signal has no high frequency Y. In this case the Y-C splitting will be accomplished without the comb filter artifacts normally associated with VCRs. Video sources that do not have high frequency Y include standard VHS and Beta VCRs as well as most earlier cassette tape formats (1/2" EIAJ, 3/4"). Note: It is possible to add Y-C outputs to most of these machines since the Y and C are recorded separately on the tape.

Luminance control areas

The luminance gain and chroma saturation controls affect 100% of the picture area of the video signal. The luminance black control leaves a small border at the far edges of the picture uncorrected. This region is well out of the "Safe Area" and should be invisible on all TV sets and monitors.

INTERNAL JUMPER SETTINGS

Two options are available by moving internal jumpers.

1. SYNC. This jumper selects between two types of sync processing when the SYNC button is pressed.

The PROC AMP is shipped with the jumper connecting the two pins closest to the front panel. In this position, pressing the SYNC button, selects sync that has been shaped by expanding the middle 20 IRE to fill the full 40 IRE. The output video always has 40 IRE of sync as long as the input video has at least 30 IRE of sync. This mode is best for general use with normal video as it only does the minimum processing sufficient to handle most video. (If video, at the start of blanking, infringes in the sync region below 10 IRE, it will appear in the processed sync and can cause horizontal instability making this mode unusable in that instance. Video in the active picture region is always prevented from infringing on the sync). Removing this jumper provides output video without sync (non-composite video).

If the jumper is moved to connect the two pins furthest from the front panel, sync from the sync separator is used for the output video. This sync will be 40 IRE as long as there is at least 10 IRE of sync on the input video. This mode can restore video that is so bad that few monitors will display a normal picture. It also has a 200 nanosecond delay which shifts the picture slightly to the left. Because of this delay, we do not recommend the general use of this mode.

2. Video clamp. This jumper deactivates the video clamp during the entire vertical blanking period.

The PROC AMP is shipped with this jumper OPEN. If the shorting plug is moved so as to connect the two pins, the video clamp will be deactivated during vertical blanking. This can help pass severely degraded video and some types of nonstandard video. Try moving this jumper if your picture is dark or flashing at the top.

SPECIFICATIONS

General

Input level	1v p-p nominal to 75Ω . Works with 0.5-1.5 v p-p.
Output level	Normal mode: Same voltage as input ±.5 dB. to 75Ω SYNC shaped mode: 1v p-p for 100% meter reading
Distortion:	Composite in/out: Differential gain: 1% max. Differential phase: 1° max. Y/C in/out: Luminance channel differential gain at 3.58MHz: 1% max.(measured with black & white clipping circuits internally disabled)
Frequency response	Composite in/out: ±1.0 dB to 10 MHz. (including any Y/C separation and recombination artifacts) Y/C in/out: ±1.0 dB to 10 MHz.
Signal to noise ratio	Better than 60 DB (including HUM & noise)
Resolution (see note)	800 lines at no more than 1.0 db down. (see note) 1600 lines at no more than 6 db down. (see note)

Control adjustment ranges

luminance black:	±15 IRE
luminance gain:	-40 dB to +6 dB
Chroma saturation:	-35 dB to +6 dB
Chroma hue:	±35° min.

Miscellaneous

Mono mode:	Burst suppressed to -40 dB min.
Color System	NTSC, 3.58 MHz.
Dimensions	9.17" wide, 2.45" high, 6.91" deep
Power Requirements	6-12V ac 400 ma supplied by plug in wall transformer.
Cabinet construction	All metal - painted aluminum

Note about resolution: Like specifying camera sensitivity without stating a signal to noise ratio, specifying resolution without also stating a response level is meaningless. We have stated resolution at full response (-1.0 dB) and at mild degradation (-6dB). When comparing specs with other manufacturers, be sure to ask how it was measured.