

## ROSTEC BBG4 Black Burst Generator for GPU frame

### Features

- Digital synthesis of all PAL video signal components
- Black burst or 100% EBU colorbar
- Genlock to ext. WORD, ext. AES/EBU or internal GPU bus.
- Genlock to 44.1, 48 or 96 kHz Fs
- Optional board for genlock to 2.048 MHz clock or 2Mbit E1 CCITT G703 formats.
- Easy operation via automatic input switching
- Build in flywheel for extended sync safety

### General description

The BBG4 is a Video Reference Generator designed to operate as a Black Burst PAL Video reference in a sound setup, where one or more pieces of equipment need a PAL reference, which has the correct timing relationship to the AES digital sound signal.

It generates a PAL video output signal by digital synthesis from a single crystal master reference, providing a stable and reliable phase relationship between line, frame and subcarrier components in the analog PAL signal.

The internal reference can be synchronized to an external word or AES, or it can be slaved to the DSG3/DSG5E generators via the GPU bus. The genlock mechanism is based upon an extensive sync safety philosophy, guarding efficiently against sync dropouts by means of a built in flywheel and a unique glide principle. When the incoming sync momentarily is lost and reestablished, the video output signal will remain constant in time and frequency within narrow limits, exhibiting no jumps or interruption of continuity.

### Powering up

There are no special considerations to observe when powering up the unit. When an external reference is connected upon power up, the generator will reset itself as close as possible to the relevant sync position, and it will immediately be able to achieve lock, as long as the incoming reference is better than +/-30 ppm in absolute frequency precision.

## **Color bar**

The generator is equipped with a built in colorbar generator, providing a convenient means for testing a setup. The generated numbers are for 100% amplitude, 100% saturation PAL EBU color bars. The numbers are based on NTSC values, which are very close to PAL values. It is not a reference color bar. It is a test tool.

Pressing a toggle switch on the front panel activates the color bar. The switch is recessed and time delayed, to avoid accidental use.

*Avoiding using the color bar, and thus keeping the HF content out of the sync signal reduces the possibility of producing jitter in audio equipment. Most audio equipment use standard video sync separators and input circuits with little or poor HF-screening. The HF content of the video signal may migrate to the digital audio chain, creating unwanted interference and jitter. Disabling the colorbar greatly reduces this possibility.*

## **External sync inputs**

When more than one input source is connected, the BBG4 automatically selects the active input by priority: 1 Word, 2 AES, 3 Internal Crystal  
An internal jumper selects GPU operation, which disables the external AES and word inputs.

## **External Word input**

The Word signal contains left/right information (X/Y preamble) so the video generator locks the start of the video frame to the leading edge of the incoming square wave.

The incoming sampling frequency is detected automatically, switching the internal counters to the correct relationship between video frame and sampling clock.

## **External AES input**

When the incoming sampling frequency is 48 or 96 kHz, the video generator uses the Channel Block Start information in the AES signal to lock the AES Z-preamble to the video frame start.  
When the incoming sampling frequency is 44.1

kHz, the generator switches to word mode, due to the lack of useful relationship between the AES blocks and the video field at this frequency.  
(See *Relationship Video, Word and AES*)

## **Flywheel**

When the input is lost, an internal flywheel circuit immediately takes over, keeping both clock frequency and position of the preambles inside narrow limits. When the input returns, the generator slowly corrects for the accumulated drift in time, gently bringing the relevant leading edges back into perfect sync.

When operating in flywheel mode, the flywheel inertia will gradually be exhausted and it will eventually expire after approx. 20 seconds. If the input is not reestablished before timeout, the reference is handed over to the internal crystal oscillator.

## **LOCK indicator**

The LOCK LED indicates that the video is locked to incoming sync. When the flywheel or internal crystal reference is selected, the LOCK LED will be extinguished. Note that it is also extinguished when the generator is searching for lock or when the incoming sync is invalid or outside the capture range of the generator (typically +/-30 PPM).

## **Composite Video outputs**

The four composite PAL video outputs are available on the back panel connector. The outputs are individually buffered, 75 ohms and 300 mV when terminated according to the PAL/CCIR Video standard.

The output signal is PAL B/G 625 line interlaced 8-field PAL sequence, black level (black burst) or EBU colorbar. Colorbar mode is selected on the front panel by a pressing and holding the switch for 2 seconds.

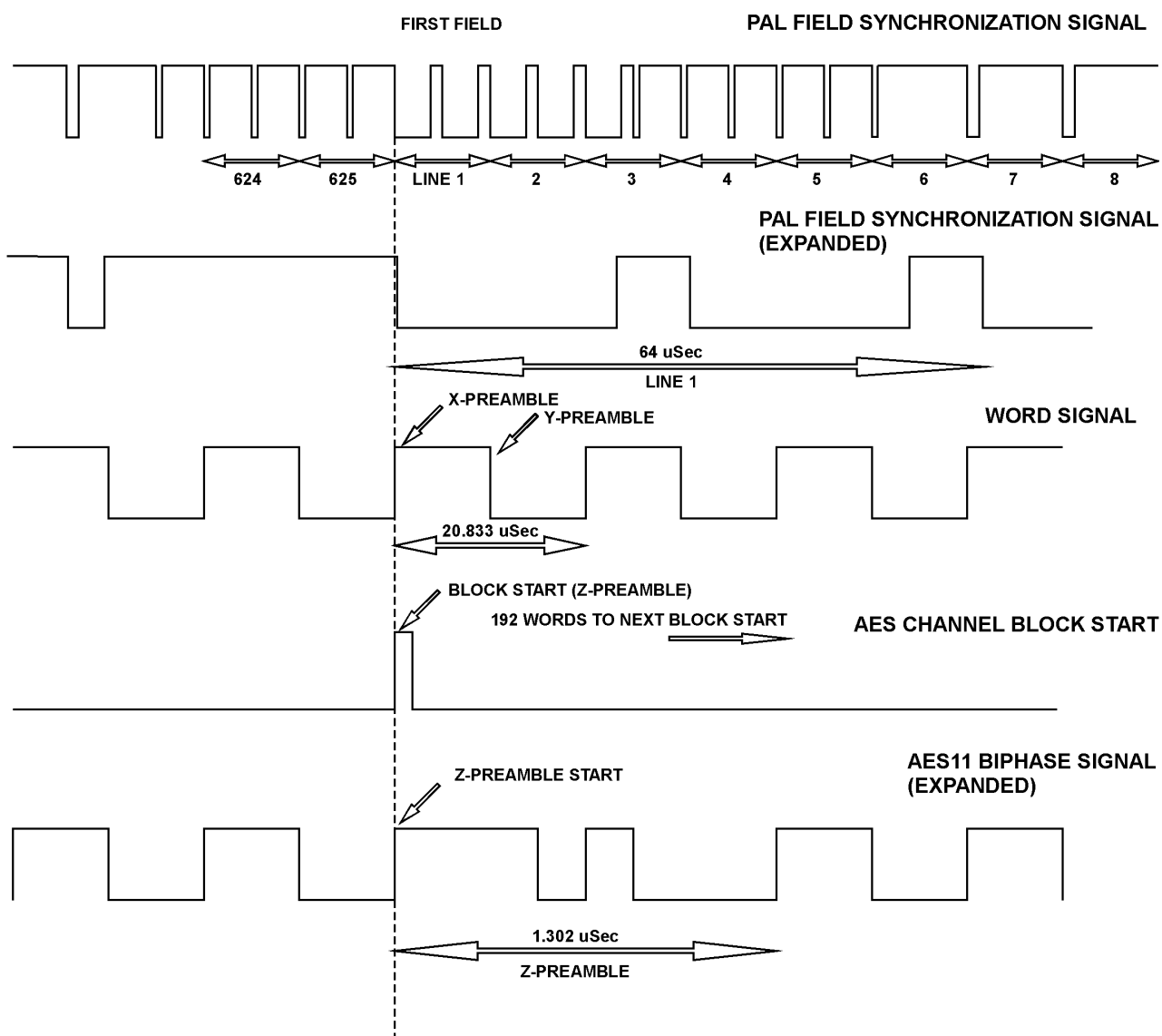
Black level can be adjusted by an internal trimmer to +/- 0,3V. Default factory setting is 0,00V

## NO Sync Alarm

The No Sync Alarm output reacts instantly when the input sync is lost. The flywheel will maintain the sync relationship, but the user is warned about an erratic or unstable input sync.

The output is TTL compatible. Low indicates that received sync is OK.

## Relationship between Video, Word and AES



The generator places the video, word and AES block start as seen on the graphic representation above.

At 48 kHz sampling frequency, the relationship is straightforward:

1 Video field = 5 channel blocks = 960 words. 1 channel block = 192 words

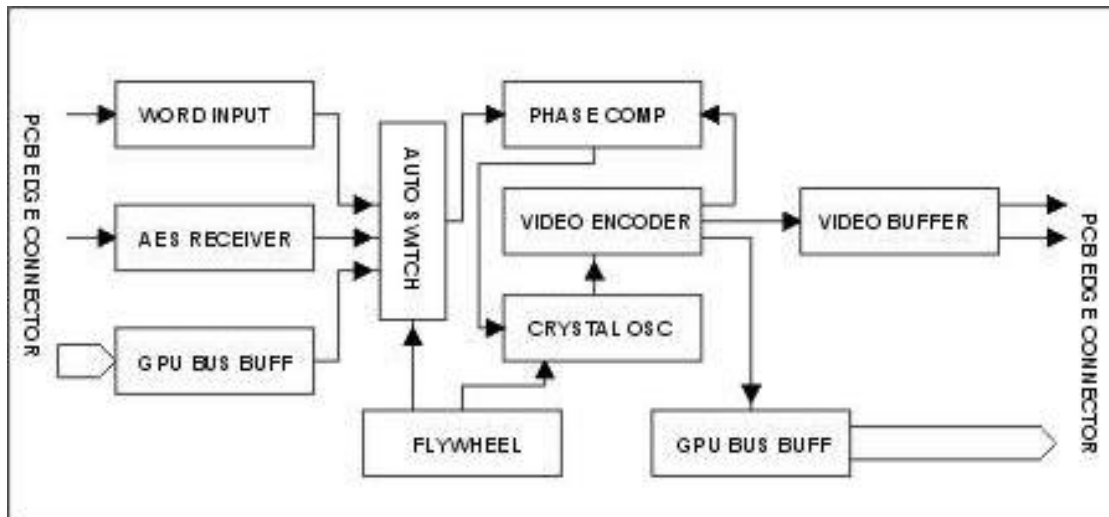
At 96 kHz sampling frequency, the relationship is also straightforward:

1 Video field = 10 channel blocks = 1920 words. 1 channel block = 192 words

At 44.1 kHz sampling frequency, the relationship is less useful:

1 video field = 882 words. But the AES block is still 192 words, so no simple defined position of the AES block start in the video field is possible.

## Block Schematic



***Mechanical and electrical specifications:***

**Dimensions** : Standard GPU card

**Power requirements** : +5V, -5V

**Reference Inputs** : AES balanced 110 ohms RS422  
: SDIF-2 Word clock, 10 kohms, TTL level  
: GPU bus

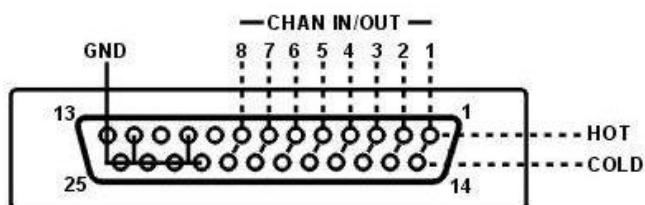
**Outputs** : 4x Composite PAL, black level or color bar. 75 ohms, 0,3V PP terminated  
: 1x No-sync alarm TTL level, 1k Ohms in series

**Stability/accuracy** : Internal crystal accuracy > 5 ppm/25 deg. C,  
: PLL capture range typical +/-30 ppm  
: PLL jitter < 2 nsec, 700Hz - 100kHz  
: Hue accuracy > 2 degrees  
: SC-H phase accuracy > 2 degrees

**Back panel connections:**

## IN/OUT CONNECTIONS BBG4

### 25 POLE SUB-D FEMALE CONNECTOR AT THE GPU BACK PANEL



Word Input: Hot pin1, Gnd pin14  
AES Input: Hot pin2, Cold pin15, Gnd pin16  
No Sync alarm: Hot pin4, Gnd pin17  
Video Output 1: Hot pin5, Gnd pin18  
Video Output 2: Hot pin6, Gnd pin19  
Video Output 3: Hot pin7, Gnd pin20  
Video Output 4: Hot pin8, Gnd pin21