TBCPlus Product Information

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Description

TBCPlus is an internal broadcast quality video processing card for the Amiga that:

- Operates as an infinite window time-base-corrector (TBC) using 8-bit 4:2:2 CCIR-601 professional quality all digital video signal processing.
- Provides a real-time video frame-grabber and 16.7 million color frame-buffer for use with professional image processing and paint software.
- Transcodes composite and Y/C inputs into simultaneous composite and Y/C outputs and includes full video processing amp controls (i.e., Proc Amp).
- Includes a three channel video input switcher in composite and Y/C.
- Includes a programmable video special effects generator for solarization, pseudo color, strobe, freeze, monochrome, etc.
- An optional SMPTE/EBU time-code receiver/generator is available that operates in all VITC/LTC formats and standards (drop frame, color frame, NTSC/PAL, etc.).
- An optional Comb Filter is also available providing enhanced Composite Video output.

The TBCPlus is a normal Zorro II Amiga Card that can be installed in any open Zorro slot of the Amiga A2000/A3000(T)/A4000(T).

Up to Five (yes five!) TBCPlus cards can be installed in a single A2000/A3000T/A4000T and independently controlled. Maximum of four cards in the A3000/A4000. Will NOT overload the A3000's or A4000's power supply when the maximum of four TBCPlus units are installed.

Utility control software is included to use and control all features of the TBCPlus under Amiga DOS 2.0 or greater. Full featured professional video image processing and paint software is also available (ImageFX).

FEATURE	BENEFIT
8-bit 4:2:2 (CCIR-601) Digital signal processing of video.	Professional quality digital video processing means broadcast quality video output with no "pots" or "tweaking" needed.
Infinite window time-base-correction.	Allows the TBCPlus to be used in an array of video setups: desktop video to studio applications with VCR/VTRs, laser disks, cameras, satellite feeds, etc.
Real-time digital video processing (Proc Amp+) amplifier.	Full control over video output for signal enhancement and correction with professional results.
Built-in Real-time 16.7 million video frame-grabber.	Video can be captured and manipulated using image processing software, such as ImageFX. Using the included software, the TBCPlus can also double as an electronic video stillstore and signal generator.
Built-in 16.7 million video frame-buffer, expandable to two frames.	Paint in 16.7 million colors using professional paint software. Double-buffered animation is also possible when two frames of video memory are present.
Three channel video input switcher for both composite and Y/C.	Allows multiple video sources to be processed by the TBCPlus and "Hot" switching between the sources.
Composite and Y/C input with simultaneous composite and Y/C output.	Full video transcoding between Composite and Y/C formats.
With full control of hue, saturation, brightness, contrast, horizontal phasing, chrominance bandwidth and gain, chrominance delay, luminance filtering with programmable peaking and coring, luminance delay, SC-H phase adjustment, genlock to output delay, SC fine frequency adjustment, and color-killer thresholds.	
At resolutions of 720x484 for NTSC or 720x576 for PAL.	

FEATURE (cont'd)	BENEFIT (cont'd)
Convert from NTSC/PAL/SECAM to NTSC/PAL video standards.	Allows for very flexible video standard conversion for true worldwide applications.
Professional Video special effects generator for solarization, pseudo color, strobe, freeze, monochrome, etc.	Allows the TBCPlus to be a major part of your video production solution by providing professional video effects.
Both Genlock/Reference (BBI) input and Advance-Sync output.	Allows the TBCPlus to be easily integrated into any video production suite.
Composite Keyer with external digital Key input.	Allows an external digital keyer to key reference video over the composite output for special effects.
TBCPlus is expandable via GVP's exclusive Digital Features Bus (DFB) and Video	Allows for future expansion of the capabilities of the TBCPlus for video editing using JPEG/MPEG boards, 3D DVE generators, Amiga

Expansion Bus (VEB) technologies.	genlock/encoder boards, etc.
Amiga FAST RAM expansion of 0, 2, or 8 megs of memory via SIMMs.	Provides applications with more memory such as the available image processing and paint software. Transparent DMA transfer of images to/from this memory for faster, professional results.
Software control panels (Intuition based) with full AREXX and CLI interfaces. Unlimited custom setups can be saved and recalled.	Instant point and click control of all functions. User selectable configuration of the control panel for custom applications.
Optional Digital Comb Filter module.	Provides 5.5Mhz wide-band operation even on composite video signals and removes the cross-color or "hanging dots" video artifacts of composite video. Produces even higher quality video output.
Optional Full SMPTE/EBU time-code receiver/generator operating in VITC and LTC formats.	Allows applications to both read or generate time-code for video editing applications. Control software can be instructed to grab or freeze selected video frames or induce other video special effects.
Optional external Remote-control box expandable.	Allows the TBCPlus to be remotely controlled for those video professionals that demand "hands-on" control. Some functions may be user programmable for custom applications.

Works in 30Hz, 29.97Hz, 25Hz, 24Hz drop frame and color frame modes. Can put a SMPTE burn-in window anywhere over the video.

Notes:

TBCPlus can convert standards: PAL-B/G,-H,-I (50Hz) to/from PAL-N (50Hz), NTSC4.43 (50Hz) bidirectionally. Conversion from SECAM to any 50Hz standard is also programmable. Conversion of NTSC-M (60Hz) to/from NTSC4.43(60Hz), PAL-M (60Hz) can also occur bidirectionally. Some of the major standards along with their applicable regions are listed below:

- NTSC-M (United States, Canada, Japan, Korea, Mexico, etc.)
- PAL-I (UK, South Africa, etc.)
- PAL-B,G,H (Germany, Continental Europe, Mid-East, etc.)
- SECAM-L,K (France, USSR & Eastern Europe, Mid-East, etc.)
- PAL-M (Brazil)
- PAL-N (Argentina, Paraguay, etc.)
- NTSC-N (Boliva, etc.)

Applications

The TBCPlus is a vital addition to any professional Amiga video production system. Owners of the Newtek Video Toaster can use the TBCPlus to time-base-correct the input video using multiple cards and perform unlimited DVE effects between video sources from consumer grade VCRs. IV-24 users can use TBCPlus to convert "dirty" VCRs or other low-quality sources into broadcast quality for use in titling, picture-in-picture, genlocking, etc. The TBCPlus can be used in a stand-alone fashion as the main video processing card for animations, commercial illustration, video special effects, image analysis, software warping or morphing of images, video paintbox applications, and many more.

Feature									
# TBC Channels	1	1	1	1	1	1	2	1	1
Correction Window	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite
Frame Synchronizer	Y	Y	Y	Y	Y	Y	N	Y	Y
CCIR601 4:2:2 D1 Processing	Y	N	N	Y	N	N	N	N	N
16.8 Million Color FrameBuffer	Y	N	N	N	N	N	N	N	N
Real-time 16.8M Color FrameGrabber	Y	N	N	N	N	N	N	N	N
SMPTE/EBU VITC & LTC Codec	Option	N	N	N	N	N	N	N	N
NTSC & PAL on same Card	Y	N	N[1]	Y	N[1]	N	Y	Y	Y
Electronic StillStore Function	Y	N	N	N	N	N	N	N	N
Genlock (Ref) Input	Y	Y	Y	Y	Y	Y[2]	N[3]	Y	Y
Advanced Sync Out	Y	Y[4]	N	N	N	Y	Y	N	N
Composite & Y/C Inputs	Y[5]	Y	Y	Y	Y	Y	Y	Y	Y
Composite and Y/C Outputs	Y	Y	Y	Y	Y	Y	N[6]	Y	Y
Hot Switching of multiple inputs	Y	N	N	N	N	N	N	N	N
Full Transcoding	Y	N	Y[7]	Y	Y	Y	N[6]	Y	Y
RGB/YUV Output (MII/BetaSP)	Option	Option	N	N	N	Option	N	N	N

Built-in Standards Conversion	Y[8]	N	N	N	N	N	N	N	Y[8]
Selectable Vertical Blanking	Y	Y[9]	N	N	N	Y	Y[10]	N	N
Frame/Field Freeze	Y	Y	Y	Y	Y	Y	Y	Y	Y
Variable Rate Strobe	Y	Y	N	Y	Y	N	Y	Y	Y
Monochrome Mode	Y	Y	N	Y	Y	N	N	Y	Y
Full Proc-Amp Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Solarization & Posterization Special Effects	Y	N	N	N	N	N	N	N	N
Video Enhancement Features	Y	N	N	N	N	N	N	N	N
Video Features Bus Expandable (Future)	Y[11]	Y[12]	N	N	N	N	N	N	N
Amiga Fast RAM Expansion	Y[13]	N	N	N	N	N	N	N	N
Dual Frame Buffers	Y[14]	N	N	N	N	N	N	N	N
Expandable to four fields	Y[14]	N	N	N	N	N	N	N	N
Comb Filter Circuit	Option	Option	N	N	N	Y	N	Y	Y
Programmable Remote Control Box	Option	Option[15]	Y[15]	Option[15]	Option[15]	Option[15]	Y[15]	Option[15]	Option[15]

Feature									
Advanced Software Control	Y	Y	N	N	Poor	Poor	N	Poor	Poor
ARexx Control	Y	Y[16]	N	N	N	N	N	N	N
Direct ImageFX Support	Y	N	N	N	N	N	N	N	N
Professional Paint Support (EGS Paint)	Y	N	N	N	N	N	N	N	N
Built-in Test Signal Generator (Programmable)	Y	Y[17]	N	N	N	N	n	N	N
Requires Single Slot	Y	Y	Y	Y	Y	N[18]	Y	Y	Y
# of Stored Setups	Infinite	10	1	3	5	8	3	4	4
Uses Serial Port for Control	N	Y	N[19]	Y	Y	Y	N[19]	Y	Y
Broadcast Quality	Y	N	N	Y	Y	Y	Y	Y	Y
Drop Out Compensation Circuit	N	N	N	N	N	N	N	N	N
Low Power Consumption	Y	N	N	Y	Y	N	N	Y	N
US List Price	$ 695	$ XXX	$ XXX	$ XXX	$ XXX	$ XXX	$ XXX	$ XXX	$ XXX

1 Separate NTSC and PAL versions available at increased cost to user.

2 Requires NovaLox full-length Genlock/Ref card ($ EXTRA).

3 Requires Optional Genlock Kit ($ 150.00 Extra).

4 Advanced sync must be jumpered as output, giving up loop-thru on Ref inputs.

5 TBCPlus has Two composite input channels and one Y/C input channel (two Y/C input channels if Y is connected to CVBS2 and C is connected to CVBS1).

6 Requires Optional S-Video Kit ($ 100.00 Extra).

7 Older TBCard was CVBS or Y/C input but CVBS output only.

8 Converts by non-blurring/non-averaging interpolation system. Please note that modes that convert from 60Hz field rate standards to other 60Hz field rate standard (i.e. same field rates) will be broadcast quality regardless of color encoding standard. Conversion from one field rate to a different field rate, such as converting 60Hz field rate standards to 50Hz field rate standards will only be of viewable quality.

9 Requires setting hard to find jumper on main board.

10 Choice of 14 or 21 blanked lines.

11 TBCPlus is fully expandable using GVP's custom Digital Features Bus™ and Video Expansion Bus™ to add new and exciting features such as full non-linear editing and full-motion JPEG compression, complex 3-D DVE effects, Amiga Genlock/Encoder, and RGB/YUV output for MII/BetaSP.

12 Custom CVE™ port for DPS Personal Animation JPEG Recorder.

13 Expandable from 0 Megabyte to 2 Megabytes, or 8 Megabytes using industry standard SIMM (single in-line memory module) boards.

14 Expandable by using GVP custom Video SIMM board. One frame of video for each Video SIMM board installed.

15 Remote is NOT programmable by application software.

16 Very limited, few commands.

17 Requires NewTek VideoToaster™, pre-recorded test patterns only.

18 NovaMate with NovaLox Genlock/Ref board requires two full-length slots!

19 Controllable from included Remote control box Only.

TBCPlus Technical Specifications

Host Commodore Amiga 2000, 3000(T) and 4000

Communication and frame grabber transfer through Zorro bus expansion slot

Inputs Note: The video inputs may come from a variety of video sources (i.e. VCR/VTR, laserdisk, still camera, camcorder, studio feed, etc.) with different levels of input quality and in a variety of signal formats.

Three software switchable CVBS and Y/C (intermixed) Channels w/AGC:

Channel #1:

Composite Video Port #1 BNC jack	1 V p-p / 75 W ohm
or separate Y2 input port in Y/C mode	1 V p-p / 75 W ohm

Channel #2:

Composite Video Port #2 BNC jack	1 V p-p / 75 W ohm
or separate C2 (burst) input port in Y/C mode	286 mV-300mV p-p / 75 W ohm

Channel #3:

Y/C Video Port #1 4-pin mini-DIN (S-VHS) compatible connector

Note: The Y/C inputs (#1 and #2) have the following levels:

NTSC -	Y @ 1 V p-p / 75 W ohm, C (burst) @ 286 mV p-p / 75 W ohm
PAL -	Y @ 1 V p-p / 75 W ohm, C (burst) @ 300 mV p-p / 75 W ohm

One Black-Burst (Reference/Genlock) Input Channel:

BBI Input BNC jack	BBI @ 440 mV p-p to 4V p-p / 75 W ohm or Hi-Z

Note: When the BBI signal is not present the TBCPlus locks the color-burst and sync timing to the internal Broadcast-quality digital sync generator for accurate color framing. When the black burst signal is present, the encoder will lock both the SC-H phase and sync timing to the broadcast-quality external reference for output timing. If time-code or other vertical interval information is present on the BBI signal, the TBCPlus can output this information on the CVBS output as well if desired. This signal can also be keyed over the selected input channel or frame-buffer contents for special effects via the EXTKEY input channel.

One External Key Input Channel:

EXTKEY Input BNC jack	TTL Level - Programmable polarity

One SMPTE (LTC) Audio-Level Input Channel (if SMPTE option is installed):

SMPTE Input RCA jack	Audio Level

Note: This input channel can receive LTC data in forward or backward direction at a rate from 1/30th to 80X nominal frame rates in SMPTE and EBU formats.

Outputs One Composite Video Genlocked Output:

CVBS BNC Jack	1 V p-p / 75 W ohm

One Separate Y/C Genlocked Output Channel:

S-Video Compatible Output, 4 pin mini-DIN jack

NTSC Y/C 3.58 -	Y @ 1 V p-p / 75 W ohm, C (burst) @ 286 mV p-p / 75 W ohm
PAL Y/C 4.43 -	Y @ 1 V p-p / 75 W ohm, C (burst) @ 300 mV p-p / 75 W ohm

One Advance-Sync Output:

ADSYN BNC jack	4 V p-p or 2 V p-p / 75 W ohm

Advance Composite Sync output signal 4.1mS ahead of CVBS output.

One SMPTE (LTC) Output Channel (if SMPTE option is installed):

SMPTE Output RCA jack	Two modes: Analog Audio Level or Digital level
Analog Output:	Audio-Line level with programmable gain from -24dB to +9dB
Digital Output:	TTL level

TBCPlus Technical Specifications *continued*

Performance

Window	525 Line - NTSC & PAL-M 625 Line - PAL, SECAM
Bandwidth	5.5 MHz - NTSC, PAL & PAL-M, SECAM (Y/C Input Mode or CVBS with Digital Comb Filter Module).
Signal to Noise Ratio	58 dB
Differential Phase	<1°
Differential Gain	<1%
K-Factor (2T)	1%
Sampling	4:2:2, 8-bit Luma, 8-bit each Chroma, CCIR - 601 (D1) Y - 13.5 MHz, U / V - 6.75 MHz
Residual Time-Base Error	± 15 nsec.

Standards Conversion **Broadcast Quality**

Input Output

NTSC	To	PAL-M, NTSC 4.43
PAL-M	To	NTSC, NTSC 4.43
NTSC 4.43	To	PAL-M, NTSC
SECAM	To	PAL, PAL-N
PAL	To	PAL-N
PAL-N	To	PAL
Preview Quality		
NTSC	To	PAL, PAL-N
PAL-M	To	PAL, PAL-N
NTSC 4.43	To	PAL, PAL-N
SECAM	To	NTSC, PAL-M, NTSC 4.43
PAL	To	NTSC, PAL-M, NTSC 4.43
PAL-N	To	NTSC, PAL-M, NTSC 4.43

Operational Controls

Fully software controllable using up to five TBCPlus boards. With full control of hue, saturation, brightness, contrast, horizontal phasing, chrominance bandwidth and gain, chrominance delay, luminance filtering with programmable peaking and coring, luminance delay, SC-H phase adjustment, genlock to output delay, SC fine frequency adjustment, color-killer thresholds. Other Advanced Controls are also selectable.

Brightness (Setup)	± 22 IRE
Contrast (Gain)	0 to 140% adjustment
Hue	± 360°
Saturation (Chroma)	0 to 150%
FC Adjust	± 450 PPM @ 2 PPM steps
Chroma Delay	±37 nS
Luma Delay	±0.2 mS in 37 nS steps
H-Position	+ 0.7 mS; - 4.0 mS
H-Phase Adjust	±2 msec
Burst Phase Adjust	³ 360°
Freeze	Off / Field (odd or even) / Frame / 2 Frame
Strobe	Variable rate
AGC	On / Off / Manual adjust
Color Kill	On / Off
Input Select	Composite or Y/C

TBCPlus Technical Specifications *continued*

Environmental

Operating Temperature	+ 32°F (0°C) to +113°F (45°C)
Operating Humidity	10 % to 90% Non-Condensing
Power Dissipation	8 Watts

Full length ZORRO II card