OPERATIONS MANUAL

TBC·SYNC+

DIGITAL VIDEO TIME BASE CORRECTOR AND SYNCHRONIZER

+ DIGITAL EFFECTS

WARRANTY

Primary condition: This warranty is valid only after completion within ten (10) days of the enclosed warranty card and return of the original to Prime Image, inc., 19943 Via Escuela, Saratoga, CA 95070. A copy of this warranty should be kept for purchaser's records.

Prime Image, inc. warrants that each new unit is free of defects due to faulty material and/or improper workmanship. Prime Image, inc. further warrants, subject to the conditions set forth herein, that it will repair or replace any part of the enclosed unit which proves defective by reason of faulty material and/or improper workmanship, for a period of 3 years from the date of original purchase at retail, without charge for parts or labor.

Conditions of Warranty:

Unit Purchase: Original purchase must be from an authorized Prime Image, inc. distributor or representative.

Original Purchaser: This warranty is limited to the original purchaser of the unit at retail. Warranty is non-transferable.

Notification of Defect: The Prime Image, inc. distributor or representative who supplied the unit must be notified of any defect in material or workmanship.

Return of Unit to Prime Image, inc. (At Prime Image, inc. Option): Approval shall have been obtained from Prime Image, inc. before return of unit or any parts and accessories of unit. Prime Image, inc. is not obligated to accept any unit or other goods without prior Prime Image, inc. authorization to do so.

Proper Shipment: The unit shall be shipped or delivered to a facility authorized by Prime Image, inc. to render the services provided hereunder in either its original package or a similar package affording an equal degree of protection.

Unauthorized Repair, Abuse, etc.: The unit shall not have been previously altered, repaired or serviced by anyone other than a service facility authorized by Prime Image, inc. to render such service; the serial number on the unit shall not have been altered or removed; the unit shall not have been subject to accident, misuse, abuse or operated contrary to the instructions contained in the accompanying manual. Replacement parts covered under this warranty carry only the unexpired term or portion of the original product warranty.

Prime Image, inc. reserves the right to make improvements on its products or parts without assuming any obligation to install them in previously manufactured units.

This warranty is in lieu of all other warranties expressed or implied, including, without limitation, any implied warranty. Prime Image, inc. shall have the final right of determination as to the existence and cause of any defect and the appropriate action required in accordance with this warranty. In no event shall Prime Image, inc. be liable for any collateral or consequential damages or losses associated with its product.

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SECTION 1.0: GENERAL INFORMATION

SCOPE:

This manual provides the information necessary to install, operate, and perform routine maintenance on the Model TBC+ Digital Video Time-Base Corrector, manufactured by Prime Image, inc.

MANUAL IMPROVEMENTS:

Changes to this manual are documented by numbered engineering change orders. Individual users of this manual are encouraged to report any errors, omissions, or suggestions for improvement to:

Publications Department
Prime Image, inc.
19943 Via Escuela
Saratoga, CA 95070

PROPRIETARY INFORMATION:

The information in this manual is furnished solely for the purpose of providing instructions for installation and operation of the equipment described herein. Any other use of this information without the written consent of Prime Image, inc. is strictly prohibited.

SECTION 1.1 DESCRIPTION

FEATURES:

The TBC+ System is a high performance digital video time-base corrector (TBC) which provides advanced video tape production capabilities for demanding professional requirements.

The TBC+ contains a full complement of processing functions using a component video format internally. In addition to the features and operating modes customarily provided in high quality TBCs including compatibility with dynamic tracking VTRs, the following video 'special effects' features enhance the usefullness of the System:

POSTERIZATION - in which the output video is quantized into discrete levels which contributes a coarse grained or contoured effect as a result. The quantization severity is controlled by the CW rotation of the control and affects the luminance and the color information. Activated by pulling the posterization knob out.

SEPIA - in which the output is converted from a full color image to a brown toned representation. Activated by pulling the sepia knob out.

MOSAIC - in which the output is quantized spatially in rectangular pattern with an adjustable block size. Activated by pulling the mosaic knob out.

These special effect functions may be used separately or may be combined to produce a wide range of effects which may enhance the visual interest of a sequence or still.

In addition to improving the time-base stability of the video playback, the TBC+ provides a convenint means for correcting other parameters of the video which may be incorrect with front panel controls for Video level, Set-up level, Chroma level, and Hue.

FUNCTION:

The TBC+ Digital Video Time-base Corrector is used to correct the timing of a signal from a Video tape recorder to the level of stability required for broadcast or for clean editing. The TBC+ provides timing correction by digitizing the video, storing up to 16 horizontal lines worth of information, and recalling the stored data at a very stable rate.

The input video is first separated into its luma and chroma components before digitization to 8 bit precision which allows 1 part in 256 or .4 IRE maximum resolution in luma and .4% maximum of chroma saturation. The digitization process occurs at greater than 8 MHz for luma and at greater than 4 MHz for chroma which allows retention of the spectral components in the picture below the chrominance information as well as excellent color performance.

After recall from the RAM memory, the digital video is reconverted to analog components and recombined together with clean sync, blanking, and burst from the sync generator to form a composite video signal.

The TBC+ contains an internal sync generator which may be used as the reference sync or may in turn be "gen-locked" to an external reference. A system output is provided from the sync generator which is advanced from the output video by 8 horizontal lines and is intended to be fed back to the recorder as a V-lock reference to position the recorder output in the center of the TBC's correction range.

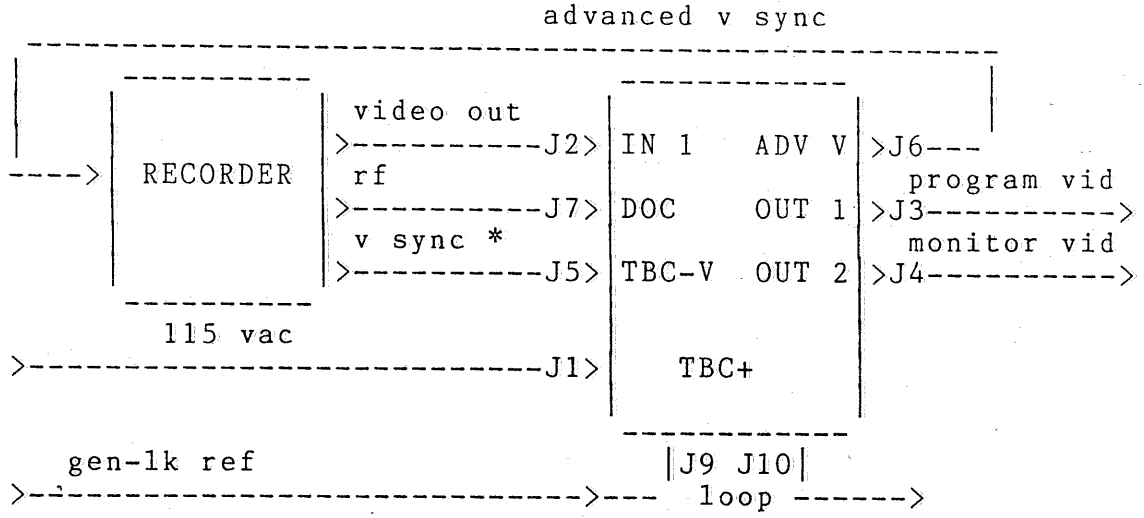
DROP-OUT COMPENSATION:

The TBC+ provides Drop-Out Compensation (DOC) by monitoring the rf from the recorder and upon the detection of a drop-out the memory data is flagged as being of questionable quality and upon recall is replaced with video recorded from the previous line.

SECTION 1.2 APPLICATIONS

The TBC+ is intended to be used with a V-locked recorder in which the capstan is servoed to play back video at the correct overall rate with the vertical locked to a reference video or sync input.

The TBC+ then operates on this signal to stabilize the timing and provide both horizontal and color lock to the reference sync signal. The resultant output may be switched or mixed with other sources. Fig. 1.2 depicts a typical system using the TBC+.



* = dynamic tracking only

EXAMPLE INTERCONNECTION

----- FIG. 1.2 -----

The TBC+ is designed to operate with NTSC type 525 line recorders having dynamic tracking feature which allows the clean display of a picture in high speed shuttle modes bi-directionally and functions with v-locked nonsegmented recorders.

SECTION 1.3 SPECIFICATIONS

The following specifications apply at 25 deg. C.

PERFORMANCE:

Window	16 horizontal lines
Bandwidth	4.2 MHz
S/N Ratio	58 dB
Diff. Phase	1.5 deg.
Diff. Gain	1.5%
K Factor	3%
Sampling	8 bit luma, 8 bit chroma
Residual Timebase error	± 15 ns.

ENVIRONMENTAL:

Operating Temp.	+32 to +113 deg F (0 to +45 C)
Operating Humidity	10% to 95% RH non-condensing
Power Supply	117 VAC ± 10%, 50 -60 Hz
Power dissipation	50 VA
Width	19" (48.3 cm)
Height	1.75" (4.45 cm)
Depth	15" (38.1 cm)
Weight	16 lbs. (7.3 kg)

SECTION 2.0 SHIPPING

This section contains the information necessary to unpack, inspect, store, repack and ship the TBC+ system.

SECTION 2.1 UNPACKING

The TBC+ is shipped, fully assembled, within a re-usable cardboard shipping carton which may be opened with a sharp, short-bladed knife. Within the carton the TBC+ is supported in foam packing material and wrapped in an anti-stat poly bag. Accessories are contained in a separate bag below the unit and a packing list delineating the contents of the carton will be found in an external pouch. The shipping weight of the TBC+ with carton is less than 25 lbs. and may be carried by one person with care.

SECTION 2.2 INSPECTION

The individual parts of your unit were inspected prior to shipment, and the unit should be in good operating order. Carefully inspect the unit and accessories for any physical damage sustained in transit. Notify your dealer or the factory immediately and file a claim with the carrier if the unit is received in a damaged condition.

Please check to ensure that you have received all of the items that should accompany the unit. Refer to the accessory parts list in SECTION 2.3. If you have any difficulties with the unit, if it is not operating properly, or if accessories are missing, contact your dealer or the factory Customer Service Department.

Retain the carton and original packing materials. If the unit must be shipped, this will save having to order a new carton.

SECTION 2.3 ACCESSORIES

PART #	DESCRIPTION	MFG PT #	QTY
-----	Line cord, AC pwr	Alpha #545	1
F0899	Manual, Operators		1
-----	Fuse, 3AG-1A		1
F0906	Plug, BVU-280 Adaptor		Option
-----	Packing carton w spacers & anti-stat bag		1
F0905	Recommended spares kit		Option

SECTION 2.4 PACKING

When repacking the unit for shipping insure that the unit and accessories are secured in the configuration described in SECTION 2.1, all seams are securely sealed with tape, and the carton is clearly marked.

SECTION 3.0 INSTALLATION

This section contains the information necessary to properly install the TBC+ system including power, environmental, mounting, and interconnection requirements.

SECTION 3.1 POWER AND ENVIRONMENTAL

The TBC+ system is designed to operate from a power source providing 115 VAC or 230 VAC, single phase 60 Hz power, at 75 VA. The unit is protected by a 1 Amp fuse.

When shipped from the factory the unit is configured for 115 VAC operation.

**********WARNING**********
Before connecting the TBC+ unit to the power line check the line voltage selector inside the line filter-fuse assembly on the rear panel to ensure that the proper voltage rating is indicated. Failure to observe the proper ratings can at least blow the fuse and could cause serious damage to the unit and constitute a fire hazard.

To protect operating personnel and equipment the unit should only be connected to a three-pronged grounded receptacle using the power cable provided. Connector J1 accepts the three-prong female connector on the power cable, and Main power switch S1 adjacent to J1 applied AC power to the unit.

The TBC+ is cooled by an internal fan which draws cool external air in through the slots at the top of the front panel and exhausts warmed air out the rear panel at 8-12 cfm if unobstructed.

**********WARNING**********
Proper operation of the unit within the specifications cannot be guaranteed if the top cover of the unit is removed thus depriving the electronics of optimum cooling. Furthermore, operating the unit with the top removed will expose the operator to the fan blades which are not shrouded and is NOT recommended.

SECTION 3.2 MECHANICAL INSTALLATION

The TBC+ is shipped ready for bench top operation with four rubber feet on the case bottom. If rack mounting is desired the unit may be mounted directly to the rack by screws through the mounting ears. The feet must be removed from the case bottom to allow vertical clearance with a unit directly below the TBC+.

SECTION 3.3 SYSTEM INTERCONNECTION REF FIG. 3.3

All connections to the TBC+ system are made at the rear panel. The Table below describes the interconnection requirements.

REF	NAME	CHARACTERISTICS / FUNCTION
J1	AC Power	115/230 VAC, 60 Hz, 75VA
J2	Video In	1V,75 ohm, BNC, Uncorrected video input
J9,10	Gen Lock In	HiZ loop-thru, 2 BNC's, Reference sync input from external generator. The Video Outputs 1 & 2 will be locked to this input
J7	DOC In	RF or TTL, 100 mV min, BNC
J5	TBC-V	Comp sync, 300 mV min, BNC, uncorrected sync input from dynamic tracking VTR
J3	Video Out 1	1V, 75 ohm, BNC, primary corrected video output. May be bypassed using front panel "Bypass" switch
J4	Video Out 2	1V, 75 ohm, BNC, secondary video output
J6	Adv Sync Out	1V, 75 ohm, BNC, Vertical sync with advanced timing to recorder.
J8	3.58 Feedback	1V, 75 ohm, BNC

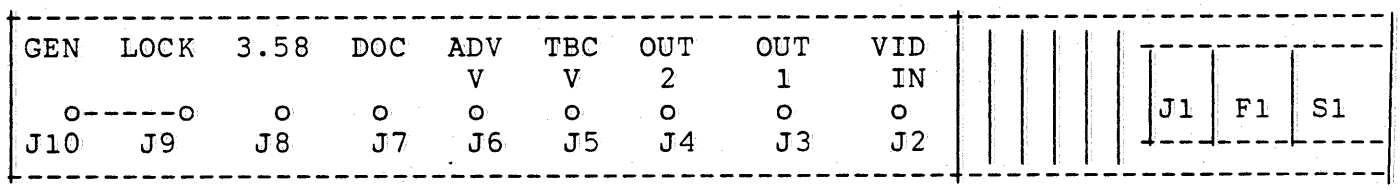


FIG. 3.3 ----- REAR PANEL CONNECTORS

The unit may be connected to your system according to the desired application using RG-59/U (or equivalent) coaxial cable terminated with BNC connectors. Refer to SECTION 4.2 for first time operation and SECTION 5.1 for installation adjustments.

SECTION 4.0 OPERATION

This section provides the information necessary to operate the TBC+. Included herein are descriptions of the operating controls and indicators, instructions for first-time operation of the system, and operating modes.

SECTION 4.1 CONTROLS AND INDICATORS REF FIG. 4.1 ---

The location of front panel controls and indicators are described in the following table. Additional internal preset adjustments are described in SECTION 5.1.

REF	NAME	CHARACTERISTICS / FUNCTION
S1	Power Sw (on/off)	2 pos. rear panel rocker for AC
S2	Bypass Sw	2 pos. push-push, bypasses Video In directly to Video Out 1
R1	Video Level Control	±3 db pot, push to preset, pull to adjust, normalizes video input.
R2	Chroma Level Cntl	+3 to -60 db pot, push preset, pull adjust, normalizes video input
R3	Setup Level Control	± 10 IRE pot, push preset, pull to adjust, normalizes video input
R4	Hue	±45 deg pot, push preset, pull to adjust, normalizes video input
I1-I7	Video Level Ind.	7 LEDs (4 yellow, 1 green, 2 red) indicates input video level in bar-graph format.
I8	Gen Lock Indicator	LED (green) indicates the presence of a Gen-Lock reference input
R6	Poster Control	Pull on, rotate CW to increase the magnitude of the effect, push off
R7	Sepia Control	Pull on, push off.
R8	Mosaic Control	Pull on, rotate CW to increase the magnitude of the effect, push off
R9	Horizontal phase	± 1 uS, multiturn trimpot, adjusts the relative timing of the sync on the output video to the reference
R10	Burst phase	±120 nS, multiturn trimpot, used to adjust the relative timing of the burst on the output video to Gen-lock reference

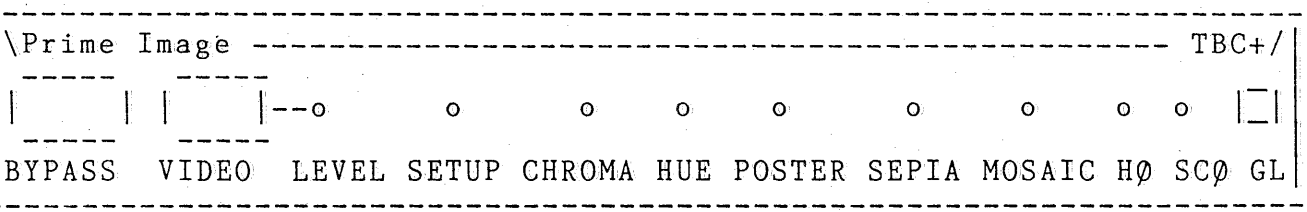


FIG. 4.1 ---- FRONT PANEL CONTROLS AND INDICATORS

SECTION 4.2 FIRST TIME OPERATION

The following procedures should be followed after installing the TBC+ to ensure proper operation in your system environment. If proper operation cannot be obtained or if malfunction is suspected, refer to In Case of Difficulty in SECTION 6.

**********NOTE**********DO NOT alter the settings of any internal switches or potentiometers. They have been preset at the factory and should be adjusted only by qualified service personnel.

1. Connect VIDEO OUT connector J3 to the following test equipment using 75 ohm coaxial cable:
   NTSC standard 525 line/60 Hz picture monitor
   NTSC vectorscope (Tek 520A or eq)
   NTSC waveform monitor (Tek 529 or eq)

2. Activate system inputs to the TBC+ from a recorder or a test signal generator at J2 and a reference generator at J9, 10 if desired.

3. Set AC power switch to ON and the Bypass switch to ON and verify the following:
   a. that the fan operates
   b. that at least one video level indicator is ON
   c. that if a Gen-lock reference is connected I8 is ON
   d. that a perfectly normal picture is displayed on the monitor.

4. Set the Bypass switch OFF and verify the following:
   a. that a reasonably normal picture is displayed on the monitor (may be displaced vertically).
   b. that each of the four video controls (Video level, Chroma level, Set-up level, and Hue: pull out to adjust, push in for preset) operate when activated and when returned to the preset condition result in normalized video out on the waveform monitor.
   c. that each of the three video effect controls (Poster, Sepia, and Mosaic: pull out to activate, push in to turn off) operate when activated.

   In this configuration the operating specs may be verified except for residual error.

5. Place the recorder in PLAY and verify the following:
   a. that the output video is time base corrected.
   b. that a properly framed picture is displayed on the monitor.

   In this configuration the DOC and dynamic tracking capabilities of the TBC+ may be demonstrated.

If the factory preset levels for the video controls are not proper or if you wish to adjust the system timing for your installation refer to SECTION 5.1.

SECTION 4.3 OPERATING MODES

STANDBY/POWER OFF:

In this mode the signal present at Video In connector J2 is directly connected to Video Out 1 connector J3.

STANDBY/POWER ON:

In this mode the AC input is connected, the AC power switch S1 is ON, and the Bypass switch S2 is ON.

The Video Out 1 connector J3 carries Input Video from J2 but the Video Output 2 connector J4 contains a corrected version of the input video.

This mode may be used to monitor the performance of the TBC+ without affecting the primary video output or to quickly verify the presence of playback video or to pass an input which does not require correction.

In this mode at least one front panel indicator will be ON.

NORMAL COLOR, GEN-LOCK:

In this mode the AC switch is ON, the Bypass switch is OFF and at least one indicator is lit.

In this mode all controls are active and the TBC+ is correcting video.

If the video input is a monochrome signal the output burst may be suppressed by an internal jumper as outlined in SECTION 5.1.

Operation of the TBC+ is fully automatic and will tolerate hot switches of the input with full correction established within one frame time.

In the normal operating mode the TBC+ may free-run on its internal sync generator or lock to an external reference input at connector J9/J10.

If a reference input is detected the TBC+ will phase-lock to the signal and the Gen-lock indicator I8 will be ON.

The output when gen-locked is RS-170A compatible and factory-set to the correct sync-burst phase relationship.

The sync and burst phase may be adjusted manually using the front panel controls (HØ, SCØ) if desired.

SECTION 5.0 ALIGNMENT

This section provides the information necessary to adjust the preset controls for tailoring the TBC+ to your exact system requirements and to allow correction of possible drift in factory settings as the equipment ages. In no case should the cover be removed and these adjustments be attempted without first completely familiarizing yourself with the system and observing the reasonable safety requirements inherent in this electronic device and by qualified service personnel. Failure to exercise care may result in the voidance of the equipment warranty and is entirely the responsibility of the operator.

SECTION 5.1 INSTALLATION ADJUSTMENT REF FIG 5.3

The TBC+ is preset at the factory to normalized values for all controls and should be very close to optimum for most applications. If however, in operation one or more controls typically need to be set manually the preset control internally may be adjusted to compensate for your system.

The preset controls are:

Videl level PS	R38	right of manual pot
Setup level PS	R40	right of manual pot
Chroma PS	R39	right rear of manual pot
Hue PS	R41	left front of manual pot
HØ	R9	adjustable from front
SCØ	R10	adjustable from front
Color Kill Jumper	W1	rearward of poster pot R6
DOC RF/TTL Jumper	W2	far rear in front of J6

NOTE: R9 and R10 may be adjusted from the front without removing the top panel.

5.1.1 Allow the TBC+ to warm-up and stabilize its internal temperature for at least 10 minutes before proceeding.

5.1.2 Remove the six screws securing the case top.

5.1.3 Refer to the adjustment location drawing (FIG 5.3) to determine the physical location of the desired pot.

5.1.4 Push the required knob IN to enable the preset mode.

NOTE: Do not leave the case top off for any longer than necessary to complete the adjustment. The top is essential for providing proper air flow to the TBC+ circuitry and will destabilize the temperature when removed and expose the operator to unshrouded fan blades and 115 VAC wiring.

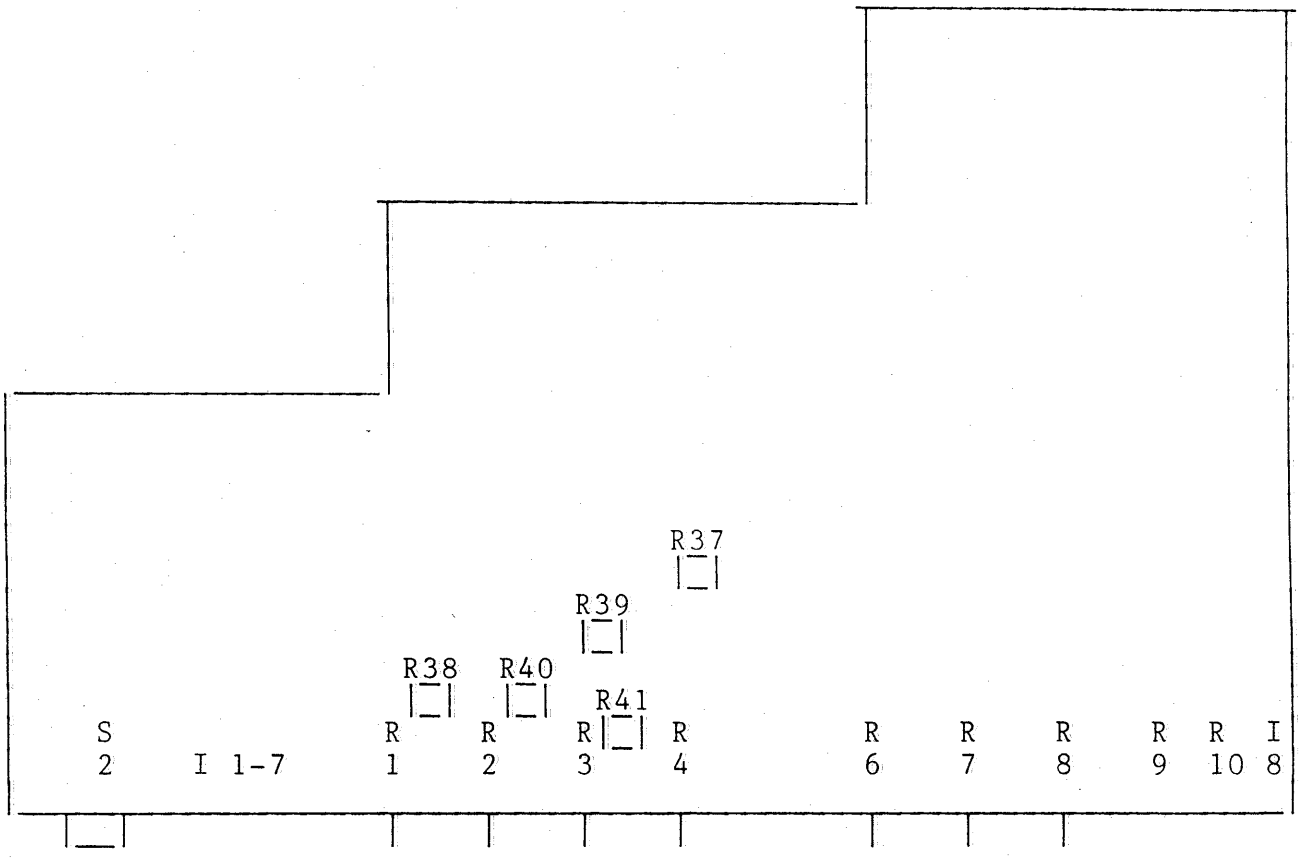
5.1.5 Remove the case top and with a small, insulated adjustment tool make the adjustment required.

SECTION 5.1 cont.

5.1.6 Replace the case top and secure with six screws.

5.1.7 If the presence of a color burst on the output is desired at all times color kill jumper W1 may be removed.

5.1.8 For an RF or TTL DOC input W2 may be moved accordingly.



------ FIG 5.3 ----- INTERNAL ADJUSTMENT LOCATIONS - top view

SECTION 6.0 SERVICING

ROUTINE MAINTENANCE:

The TBC+ system is inherently a low maintenance unit which requires only a periodic dusting internally when used in an unfiltered environment. The fan used is a sealed bearing, brushless DC unit which should be replaced every 5 years in continuous duty operations.

IN CASE OF DIFFICULTY:

All TBC+ systems are designed and tested to perform as outlined previously in this manual. The manufacturer does not assume any responsibility for damage or malfunction resulting from operation of this unit outside of the published environmental or interface specifications or improper operation resulting from custom interfacing or any unauthorized internal modification.

If you encounter any malfunction during the warranty period, call your dealer or our customer service department at the factory to arrange for service. DO NOT attempt to service this unit during the warranty period; to do so will void the warranty.

You may have out-of-warranty products repaired by your dealer or authorized repair facility.

IF YOU CALL FOR HELP:

If you call for service, list the following information about your unit. It will help your dealer in diagnosis and repair.

1. The model and serial number of your unit.
2. The system configuration (including VCR types).
3. The problem you are having and the specific effect on the picture.

SECTION 6.1 TROUBLESHOOTING

The following table provides troubleshooting information for frequently encountered problems.

CONDITION	POSSIBLE CAUSE
Nothing happens at power ON.	Fuse blown. Line plug loose.
Fuse always blows at power ON.	Wrong line voltage selected.
Fan inoperative.	Fan fuse blown.
Output video not corrected.	Bypass mode selected.
Output corrected but rolls vertically.	Recorder not v-locked or Genlock input missing.
Output corrected but picture not framed vertically.	Advanced V sync not fed back to recorder.
Output corrected but picture not framed horizontally.	Misadjustment of H phase pot R37. (See Fig. 5.3)
Drop-outs evident on screen.	Misadjustment of DOC threshold RF not connected to DOC IN J7.

SECTION 7.0 ADDENDUM

This addendum is a supplement to the TBC+ Operations Manual. It describes the operations of the TBC·SYNC+. The TBC+ Operations Manual should be read and understood before reading the addendum.

SECTION 7.1. WARRANTY

The warranty of the TBC· SYNC+ is identical to the warranty which covers the TBC+. For details see Page 1 of the Operations Manual.

SECTION 7.2. INTRODUCTION

The original full-frame video synchronizer was developed for utilization at E.N.G. and Sports events. Its purpose was to synchronize a non-synchronous signal, typically microwave transmitted, to a reference signal or another non-synchronous signal.

The characteristics of a full-frame video synchronizer mandated full-frame (525 line) memory capabilities. Once the synchronizer was developed it quickly made its way from the "on location" broadcasting vans into post-production houses which found it to be a handy tool for freeze frame/freeze field applications as well as a way to synchronize two non V-locked VTR's.

Through advanced technology Prime Image, inc. has developed a video synchronizer which provides the user clean "hot switching" and reliable operation when coming out of an "auto freeze". In addition to improved hot switching the TBC·SYNC+ allows the user to freeze frame, freeze field "1" or freeze field "2". A variable field strobe and frame strobe mode are also added. All of the features of the TBC· SYNC+ will work concurrently with the special effects controls of the TBC+.

SECTION 7.3. OPERATION

Before continuing please read pages 10-13 of the Operations Manual. This describes the operation of the TBC+ and is important to understand before understanding the operation of the TBC·SYNC+.

The TBC ·SYNC+ receives a non-synchronous video signal via the "Video In" connector J2 on the rear panel. The video information is separated into its component format and then digitized. This non-synchronous information is written into R.A.M. one line at a time. Once a known good field (262½ lines) is stored in R.A.M. it is read out of R.A.M., constructed back into an anlog signal and outputted through the Video Out 1 and 2 jacks J3 and J4. Synchronization occurs because the read clock is generated, in part, by a V.C.O. whose frequency is determined by use of an external Gen-Lock source inputted to J9 or J10,or by use of an internal sync generator chip.

If a bad field is written into R.A.M., the TBC.SYNC+ will detect it and continue reading (outputting) the last known good field. This is known as an auto freeze. Once a good field is written into R.A.M., theTBC·SYNC+ de-activates itself from the auto freeze mode and begins the continuous read/write cycle until the next bad field occurs. Auto freeze may be de-activated by switching S3 to the off position.

Defining Bad Field

The TBC ·SYNC+ will monitor the input video signal and auto freeze under four conditions:

Horizontal line detect: If the TBC·SYNC+ does not detect a horizontal sync pulse within lines of the last known good H. sync pulse, the TBC· SYNC+ will auto freeze. Loss of input video or excessive skewing are examples of how the H. sync detection circuitry will go into auto freeze mode.

Missing Vertical Sync: If a vertical sync pulse is missing during any field, the TBC·SYNC+ considers this a bad field and will auto freeze. As with the H. line detect circuitry, the loss of input video will activate the missing vertical sync detection circuitry and send the TBC SYNC+ into an auto freeze mode.

Incorrect Vertical Sync: By definition vertical sync occurs every 16.3 millisec., switching between even and odd fields. The TBC· SYNC+ monitors the incoming video signal and detects both the position (timing) of vertical sync as well as field identification (even/odd). A tape which has incorrectly edited video on it might contain a segment whose fields read even, odd, even, odd... The detection of the two repeating fields will cause an auto freeze.

Tape Head Switch Mask: Ten lines of video are masked during each field. This is done so that H. line detect circuitry does not auto freeze.

De-activating Auto Freeze (A Fr) Functions

Your new TBC.SYNC+ has been set at the factory to auto freeze during any of the four previously mentioned conditions. It may be desirable to de-activate any one or all of the incorrect video detection circuits. This may be accomplished by following these instructions:

Remove the six screws which secure the top cover to the TBC·SYNC+. Inside you will see two PCB's. The bottom PCB is the T.B.C. The top board is the synchronizer. On the synchronizer board you will notice a four-position D.I.P. switch. To disable an auto freeze function simply switch the desired switch to the off position.

S1 H. Line Detect	S3 Head Switch Mask
S2 Missing V. Sync	S4 Incorrect V. Sync

Once this has been accomplished re-secure the unit's top cover. Never operate the TBC ·SYNC+ without a top cover for prolonged periods of time.

A master auto freeze (A Fr) disable switch is located on the rear of the TBC.SYNC+. If the user is using the shuttle mode of a V.T.R. this switch should be in the on (up) position. If this switch is off the TBC·SYNC+ will auto freeze during shuttle operations.

In addition to the features listed in section 1.1 the Prime Image, inc. Synchronizer allows these added functions:

Freeze Frame: Full frame memory allows for the user to freeze a desired frame. Once a frame of memory is stored in R.A.M., Field "1" or Field "2" may be chosen.

Freeze Field 1: In an action shot it may be necessary to select a field freeze if the output video is jittery due to Field 1 vs. Field 2 differences.

Freeze Field 2: Select Field 1 or Field 2.

Frame Strobe: Strobes output video one frame at a time.

Field Strobe: Strobes output video one field at a time. Frame strobe and field strobe rates are variable utilizing the front panel strobe potentiometer.

All of the above functions are activated by pulling out on the strobe potentiometer.

In any of these modes of operation the user may still utilize any of the standard TBC+ special effects controls.

SECTION 7.4. INSTALLATION

The installation of the TBC.SYNC+ is basically the same as the TBC+ which is described on pages 6, 9 and 10 of the Operations Manual. The only difference is that because of the increase of memory, from a 16 line memory to a 525 line memory, the V.T.R. does not need to be V.locked to the TBC·SYNC+.

Please keep in mind that it is important to leave clearance behind the TBC·SYNC+ when installed to provide maximum air flow for cooling purposes.