

WIZARD WORKSHOP ARTICLES

SC502 CAMERA MOUNT

It has been discovered that an unknown number of SC502's have been shipped to the field without grooves machined in the bezel for camera mounting. Any SC502 brought into your service center for this problem should be returned to Factory Service for repair.

--Paul Egan
December, 1975

SC 502 SEVERE VERTICAL ABBERRATIONS

Coils L-470 and L-475
(108-0054-00) were found to
be wound on 1K ohm coil forms
instead of 15M ohm forms. Purge
any coils found that are wired
on a 1K ohm coil form from your
stock.

Rich Andrusco, 12 Aug 1977

SC 502 POWER MODULES - 70 VOLT SUPPLY READING HIGH

Manufacturing has found a batch
problem with the power transformers,
120-1016-00. Due to an extra turn
in the winding, the 70 volt supply
is out of spec, reading high. This
problem can be found in all trans-
formers with DATE CODE 7704 as well
as some with DATE CODE 7703 and 7705.
Purge all transformers with DATE CODE
7704ONLY, from your stock.

Rich Andrusco, 23 Sept 1977

WIZARD WORKSHOP ARTICLES

SC-502 BRIGHT SPOT AT START OF SWEEP

Manufacturing has informed me that some units may have been shipped with the incorrect diodes installed for CR-884 and CR-885. If you have a unit with a bright spot at the start of your sweep, between .5 sec/div and 1 msec/div, check these diodes. Both CR-884 and CR-885 should be 152-0242-00's.

Submitted by--
Dave Laurs
Mfg. Staff Eng.

Inserted by--
Rich Andrusco
January, 1978

TEKTRONIX TYPE SC502 TV SYNC SEPARATOR - CUSTOM MOD

The SC502 Mod FC provides an NTSC TV Sync Separator in lieu of certain triggering modes. This Custom Mod provides a TV Sync Separator circuit for 525-line 60 Hz video signals. For a Quote, please call Dick Taylor, Modified Products, at ext. 5522. The audio test set consisting of a TM515, SG502, DM502, DC504, and SC502 Mod FC makes an excellent TV servicing packaging. (U.S. availability only.)

Submitted by--
Abe Taghioff
June, 1978

PRODUCT

SC 502

DATE

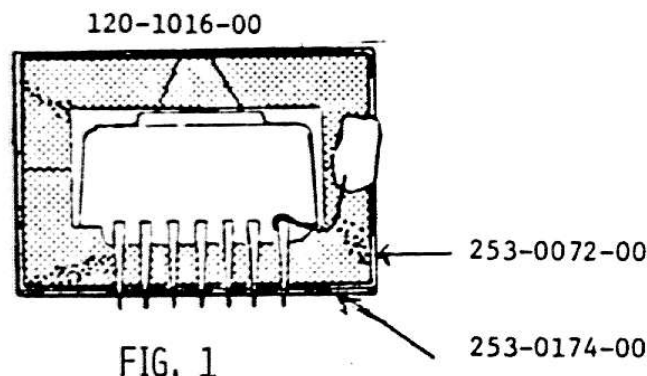
Oct. 82

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TEKTRONIX TYPE SC502 PREVENT TRANSFORMER CORE FROM SHORTING
TO CIRCUIT BOARD RUNS

It has been found that the high voltage transformer, P/N 120-1016-00, when assembled to the circuit board has had very thin tape placed between the board and the transformer core, which in turn has caused instances where the core has been shorting to the circuit board runs. An internal change has been made to correct this. Refer to Fig. 1. The description of the change consists of adding a layer of .003 press tape (P/N 253-0072-00) to T800 High Voltage transformer. To insure reliability of the instrument they have increased the coverage and total thickness of the insulating tape. Poly-double sided tape (253-0174-00) will still be used, but applied on top of the new tape as shown in Figure 1. It is recommended that any time the transformer circuitry is worked on, this transformer should be removed and this additional tape be installed on the transformer core to prevent future shorting. Also, any transformers in stock should be checked to see if this additional tape is on the bottom of the transformer core. If it is found to be missing it is recommended that you install this additional tape.



--Rich Andrusco
June, 1978

WIZARD WORKSHOP ARTICLES

SC-502 NEW CUSTOM MODIFICATION

Modified Products has a new custom modification, SC-502 MOD FC. The SC-502 MOD FC is a Tektronix type SC-502 oscilloscope having a "T.V. Sync Separator" circuit for 525 line 60Hz video signals in lieu of "LF Reject" trigger coupling mode. For details please contact Modified Products, extension 5522.

--Rich Andrusco
November, 1978

SC-502 NEW CUSTOM MODIFICATION

Modified Products has a new custom modification, SC-502 MOD GD. The SC-502 MOD GD is a Tektronix type SC-502 oscilloscope having the Var. Time/Div. range extended to X4.0 to provide a calibrated 2S/Div. sweep rate. For details please contact Modified Products at extension 5522.

--Rich Andrusco
November, 1978

SC502 NEW FIELD MOD KIT - 050-1171-00

Reference: Corporate Mod #M33663

There is a possibility that high Beta transistors used for Q855 may cause instability in your High Voltage stage which causes Z-axis modulation and switching. A field mod kit, 050-1171-00, has been set up to alleviate this problem. This kit is now set up in Customer Service and is now orderable.

October, 1979

SC 502 INTENSITY FADES IN AND OUT

The TM 500 line has been experiencing problems with the Intensity when varying the Intensity level control R831, P/N 311-1801-00. The intensity will fade in and out as the level is varied, due to excessive end play in the part. The vendor has been notified and is taking corrective action.

Rich Andrusco
Oct. 1979

PRODUCT

SC 502

DATE

Oct. 82

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SC502 Maintenance Notes

"Vertical Problems"

Input signals have roll-off on certain ranges-

- 1 - Suspect CR-145 or CR-150

Chan. 1 Inter-acts with Chan. 2-

- 1 - Suspect Q355, Q365, Q410 or Q415
- 2- Suspect U360-1 has open connection

Chan. 1 or Chan. 2 will not meet 14 divisions Test-

- 1 - Check interface connector "F", pins 1 and 2 or pins 4 and 5 for -7 volts. If high check VR-156 or VR-256.

Unit always acts like it is in the 1-2 Mode-

- 1 Suspect LR-360 is open

Trace shifts vertically when varying Focus on Intensity-

- 1 - Suspect contamination on CRT Vertical deflection neck pins.

No Vertical Position Control-

- 1 - Suspect CRT neck pin connectors are open.
- 2 - Suspect Delay Line is shorted.
- 3 - Opened delay line.

Vertical Aberrations in Both Chans. (spike up)-

- 1 - Verify that R-475 and R-481 are "N"-Type resistors. There should be a small "N" on their bodies.

At 20 nanosec the corner of the Leading Edge is a ramp-

- 1 - Suspect CR-153, CR-170, or CR-253, CR-270

At 20 nanosec you almost meet Risetime Specs or just make it-

- 1 - Suspect L-470 or L-475

Chan. 2 has Oscillations-

- 1 - Suspect CR-245, CR-250, CR-253 or CR-270

(continued on the following page)

WIZARD WORKSHOP ARTICLES

SC502 MAINTENANCE NOTES (CONTINUED)

Risetime out of specs or at edge of specs-

- 1 - Using Fairchild brand transistors for Q450, Q455, Q460 and Q465 may cause Risetime problems.

Gains off in .2V and 20 V positions due to oscillations-

- 1 - Use of "Motorola" brand transistors for Q160 or Q260 helps.
- 2 - If oscillations appear at F1 and F2 (Chan. 1) or F4 and F5 (Chan. 2) and it's the same frequency as High Voltage suspect loose ground screws or a short CRT shield.
- 3 - In early serial numbers Q150 and Q170 may need selecting.

Aberrations

- 1 - Re-dressing of deflection leads sometimes help

Gains or Trace Jumpy-

- 1 - Suspect R180 or R280 (Gain Adjustments)
- 2 - Suspect cold solder joints on Delay line
- 3 - Suspect contamination on CRT Vertical deflection neck pins

Chop Frequency Too Low (Should be about 500 KHZ)

- 1 - Suspect U355 or associated capacitors

Chop Blanking will not always run with certain IC's-

- 1 - Suspect an open resistor in U355 circuit.

Chop Mode - Spike riding on signal-

- 1 - Suspect U355

Trace stays vertically centered-

- 1 - Suspect Q720 and/or R721

Incorrect Chan. Switching-

- 1 - Suspect U360

CH-1 or CH-2 Trace Hangs Up or Jitters-

- 1 - Suspect CR126 or CR127 is leaking

CH-1 or CH-2 fails "HF COMPENSATION" (Roll off)-

- 1 - Suspect R100 or R200 is broken or out of tolerance

(continued on the following page)

"Horizontal and Triggering Problems"Trace too long or too short-

- 1 - Suspect resistors in Schmidt Trigger circuit (EX: R310, R312, or R315)
- 2 - Suspect U850 (H.V. Multiplier) if sweep is too low

20 nanosec non-linear at start of sweep-

- 1 - Suspect C-775, C-776, C-766, C-791 or C-785
- 2 - Normally C-785

Oscillations on one end of trace in 20 microsec position-

- 1 - Check tolerance of VR-781

Trace folds over on left side of screen-

- 1 - Suspect VR795 is open

Free running trace sometimes triggers-

- 1 - Suspect CRT

External Horizontal Aberrations-

- 1 - Short term spike - Suspect C-514
- 2 - Long term spike - Suspect C-516 or C-520

Sweep runs in Amp. Mode-

- 1 - Check U650-18, if low replace CR649

Cannot Balance Ext. Horizontal-

- 1 - Suspect Q520 is leaky
- 2 - Suspect Q525 or Q530

Ext. Horizontal has jitter or balance drifts-

- 1 - Suspect Q520A and B is not matched.

Sweep ramps once and stays at right side of screen-

- 1 - Suspect Q300, Q310, Q315, and associated circuits

No Sweep

- 1 - Check 3.7 Volt supply on U-600-11
- 2 - Suspect Q660, Q665 or Q670

Sweep will not Free Run

- 1 - Suspect U650, R664, or C-662
- 2 - Check for -5 volts on U650-5

(continued on the following page)

SC502 MAINTENANCE NOTES (CONTINUED)

No Sweep, No Trigger-

- 1 - Suspect Q655

When in Auto, cannot get free running trace when Trig level control is set to both mechanical stops. And when in Normal Mode you see spikes on the Trigger View signal-

- 1 - Check P19-2 for AC signal, if present suspect C552 or C567

Poor Trigger Level range in Normal Mode-

- 1 - Suspect Q550, Q555, Q560 or Q565

Poor Trigger sensitivity or Trig. View problems-

- 1 - Suspect Q575 or Q580

Poor Trig sensitivity at 6 MHz-

- 1 - Suspect U595

No Trigger (No Trig. Pick-off to Trig. Ckts)-

- 1 - Suspect Q340, Q345, Q400 or Q405

Free-running Trace When in Auto - Wont' Tirgger-

- 1 - Possible operator trap - make sure single sweep button is off.

Auto Trig is bad but Normal Trig is good-

- 1 - Suspect U650

External Trig Gain Bad-

- 1 - Suspect R583 is out of tolerance

TP-677 Reads 0 volts but ramp does not start at zero volts-

- 1 - Suspect Q690 or associated circuits

No Sweep in Auto Mode (Locked up)-

- A - Look at T1 and T3 of R560-
 - 1 - T1 should have about +.7 volts
 - 2 - T3 should have about -.1 to -.2 volts.
- B - If bad, about -7 volts one of your supplies may be bad
Suspect LR500 is open. IF T3 has a high positive voltage suspect LR530 or LR592
- C - If okay you can ignore Q550, Q555, Q560, Q565, Q580 Q575 and associated circuits.

(continued on the following page)

SC502 MAINTENANCE NOTES (CONTINUED)

D - Insert Input to External Input-

- 1 - Sweep is normal - Eliminates major section (U595, U600, Q300, Q310, Q315, Q660, Q665 and Q670 should all be good.
- 2 - Sweep inop. - Remove External input and check U650-6 for about +5 volts. If okay check U650-5 for about -5 volts and U650-4 for +3.7 volts. If both check good suspect U650. If voltages are bad at U650, pins 4, 5 or 6 suspect that the switching or trigger circuits are defective. At U650-3 there is normally a positive squarewave in all modes except in Auto. mode. At U650-8 there is normally a 0 volt to 7 volt ramp.

Note: TP575 with no input normally sits at -.7 volts. If the unit won't sweep TP575 may have -2 volts to +2 volts. If it does press LF reject button and see if voltage goes to -.7 volts. If voltage now reads -.7 volts suspect Q500 and associated circuits. If voltage does not go to -.7 volts suspect Auto Trigger circuits.

No Sweep on only one channel-

- 1 - Check voltages on the cathodes of CR126 and CR226. If voltage is not zero suspect diode is defective.

"High Voltage Circuit Problems"

No HV (won't oscillate)-

- 1 - Suspect L850 or CR869 is open
- 2 - Check low voltage supplies

No High Voltage-

- 1 - Suspect H.V. Multiplier

Sounds like arcing or clicking and fuse opens-

- 1 - Suspect U850

Intensity brightens up or dims when in External Horizontal-

- 1 - Suspect CR800 is defective
- 2 - Suspect R800 is out of tolerance

The first two divisions of trace brightens up in the .2microsec to 10 microsec positions-

- 1 - Suspect R809 is out of tolerance

No Intensity Control (Full On)-

- 1 - Suspect CR882, CR884 and CR885

(continued on the following page)

SC520 MAINTENANCE NOTES (CONTINUED)

Incorrect Intensity Control (Beam Current Adjust not set in normal area)-

- 1 - Beam current adjust is normally off to one side.
- 2 - Check waveform at F-15 to see if waveform reaches zero volts DC. If not, then suspect Q830.

Intensity Modulation when Intensity is turned up (1 to 2½ Major Divisions when in .1, .2 and .5MS ranges)-

- 1 - Suspect VR880 and VR890

Intensity Modulation - (Sinewave Oscillations)-

Monitor F-15, you should see oscillations. Disconnect CR881 (kills H.V.) and see if oscillations disappear. If oscillations disappear reconnect CR-881 and check U860-3 for oscillations. If oscillations are present on U860-3 replace C-868. If oscillations are not present on U860-3 replace T-800.

+70V or -70V Supply Climbs, won't regulate-

- 1 - Suspect Q860 or R893 is open

-70V is 5 or 6 volts less than +70V supply-

- 1 - Suspect R882 is open
- 2 - Suspect Q855

+70V Good but -70V is high (More negative)-

Check oscillator waveform if normal replace Q860. If the positive square pulse is flat but then goes to a positive half sinewave before going negative suspect T800.

Both 70 Volt Supplies Regulate High-

- 1 - Check TP860 for .4 volts
 - A - If high suspect R869
 - B - If .4 volts is normal suspect Q855 - may need selecting for lower Beta.
- 2 - May be caused by a less than normal loading condition

+70V Low but within Specs and -70V Low but out of Specs-

- 1 - Suspect VR855 is out of tolerance
- 2 - Suspect Q855

"Miscellaneous Problems"

Unit won't turn off

- 1 - Suspect P13, cable assembly, or power switch is defective
- 2 - Suspect Q930

(continued on the following page)

SC502 MAINTENANCE NOTES (CONTINUED)+5 Volts Defective-

- 1 - Suspect VR969 which will be damaged if fuse blows.

Power Shuts down when selecting Chop Mode or any other position. (Shut down usually occurs between positions of switch)

- 1 - Suspect Mode Switch S300-5 is intermittently closing

Unit Blows +5V Fuse-

- 1 - Suspect CRT, H.V. Multiplier, or H.V. transformer if +5V circuits are good.

--Rich Andrusco

Mar. 1980
ISSUE 10-05

SC502/SC504 HI VOLTAGE MULTIPLIERS

Reference: SC502 Instruction Manual, Schematic 8-A1U850, SC504 Instruction Manual, Schematic 8-A1U1590

Hi voltage multiplier I.C., Part Number 152-0634-00 has had an undesirable infantile failure rate in the recent past. An improvement was made in the vendor's manufacturing process and parts with date code 8107 and above have proven to be much more reliable. I recommend you purge your stock and reorder as necessary. You will receive parts with date code 8107 and above or pre-tested older parts. Thanks to Bob Funk and Chris Andreadis in Woodbridge for their SAR on this problem.

--Terry Turner
92-236, Ext. 1288
Jan. 82

ISSUE 12-01

SC 502/SC 504 HALO SUPPRESSION CRT MOD KIT

Reference: M44232, M44233, P/N 154-0859-00

P/N 050-1601-00 is the mod kit which is used when replacing the CRT in SC502 and SC504. The old CRT P/N 154-0730-05 is no longer available.

Mike Laurens
92-236, Ext. 1706
Issue 12-17
Aug. 27, 1982

SC502 -70 VOLT SUPPLY TOO POSITIVE

Serial Number: B029000 and below.

Reference: M43479

If the -70 volt supply operates too positive (not negative enough) and is out of specification, the cause may be the Beta of Q855 (H.V. Oscillator) being on the low side of its specifications. To bring the supply back into specifications C858, .047 uf, P/N 283-0341-00, is added in parallel with C857.

--Mike Laurens
92-236, Ext. 1706-WR
Issue 12-20
Oct. 8, 1982

SC502 VARIABLE CONTROLS TOO STIFF

The horizontal and vertical variable gain controls have a very stiff switch detent. This switch detent has gotten stiffer over the years, to the point that the controls had become nearly impossible to turn.

A new part number has been set up for the vertical variable controls (R177, R277) which have a lighter detent. The new number is 311-1599-01 and is a direct replacement for the old control. The horizontal switch number (S700) remains at 311-1803-00, but the specifications have been altered to limit the detent torque.

The new parts can be installed in any SC502 where the current variable controls are judged to be too stiff.

Tek use only
Thanks to D. Wood, Manchester U.K., for his input via a SAR.

Craig E. Vogel
Clark County Service Support
C1-866, (206) 253-5616
Issue 15-14

SC50X INCORRECT DANGER LABELS

REF: SC502 B042200 - B042290
SC503 B040590 - B040700
SC504 B025800 - B025980

The SC502, SC503, and SC504 oscilloscopes have a warning label inside that states: "DANGER - Up to XXX volts on this board". This label is to warn the service technician of hazardous voltages on the circuit boards. Due to an inventory mixup, some of the oscilloscopes have labels stating the wrong danger voltage. Below is a list of the serial numbers of the oscilloscopes that may have incorrect labels, the voltage that should be stated for each oscilloscope, and the Tektronix part numbers for the labels. Any SC50X in the affected serial number range that is sent in for repair should have the labels inspected and replaced as necessary.

SC502	B042200 - B042290
	80V 334-2361-00
SC503	B040590 - B040700
	200V 334-3300-00
SC504	B025800 - B025980
	150V 334-3299-00

Craig E. Vogel
Clark County Service Support
C1-866, (206) 253-5616
Issue 16-16

WIZARD WORKSHOP ARTICLES

SC502 -20 V POTENTIOMETER CHANGE

Mod: M64705

The -20 V potentiometer is occasionally brushed when removing and installing the protector side cover. This will cause the -20 volts to change in value, nullifying calibration.

To correct this, change A3R947 to a close case pot, Tek P/N 311-1248-00, which is a direct replacement.

Martin DeLuke
Clark County Service Support
C1-866, (206) 253-5617
Issue: 17-24

PRODUCT

SC 502

DATE

1-08-88

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