KENWOOD 2022 Dayton Hamvention Kenwood Forum



TRIO TS-311



Kenwood Forum Committee

Mark Gilger – WB0IQK Jan Servaites – N8CBX Terry Wagoner – K9TW Peter Shilton – VE7PS

- Agenda:
 - Introduction Mark Gilger (WB0IQK)
 - Updating & repairing Hybrid- Jan Servaites (N8CBX)
 - Common Equipment Problems Terry Wagoner (K9TW)
 - Kenwood Legacy Equipment Resources Mark Gilger (WB0IQK)
 - Questions and Answer Session-
 - Jan Servaites (N8CBX),
 - Terry Wagoner (K8TW),
 - Mark Gilger (WB0IQK)

KENWOOD HYBRID INTRODUCED





Serial Number Data Base

I'm looking for Serial Numbers, Original Purchase dates and where purchased.

Serial Number Data Base

CALL	MODEL	S/N	DATE	Full Date	Purchased From:
	SM-220	4120085	1984	10/2/84	
NOBCZ	SM-220	8010013	1987	4/24/87	Delaware Amateur Supply
WF4B	VFO-820	640497	1979		
KK4JPF	VFO-820	730375	1973		
WF4B	SP-820	661413	1979		
WF4B	AT-230	3010185	1980		
	AT-230	4120018	1984	10/2/84	
WA9NJR	TS-520	231093	1975	9/1/75	Electronic Center
WA2GTT	TS-520	260563	1975	12/31/75	
WB2KNR	TS-520	520720	1977	3/12/77	Hamtronics
K3MYK	TS-520	520762	1977	3/20/77	Hamtronics
	TS-520S	560574	1977	7/23/77	Henry Radio, Butler MO
K8YXB	TS-520S	620269	1977	10/1/77	
KI5PM	TS-520S	732175	1978	6/13/78	Webster Radio
WA3GPU	TS-520S	730328	1978		
N9JR	TS-530S	1110561	1981	11/28/81	Ham Radio Center, St. Louis, MO
W3VVV	TS-530S	2020774	1982	7/1/82	Long's Electronics
KOPSA	TS-530S	2040084	1982		
W2AQY	TS-530S	2010330	1982	2/10/82	
ККЗН	TS-530S	3080401	1983	9/1/83	
K7TGL	TS-530S	4030123	1984	1/1/84	Ros Electronics



Request for information...

- 1. Suggestions for future Forum subjects.
- 2. Future Forum presenters needed.

Send information to WB0IQK@ARRL.NET

HYBRID SERVICE & PARTS

Manual Compilation Series:

Last Updated: 3/4/2019

WB0IQK – Mark – Email: wb0iqk@gmail.com, Web: https://wb0iqk.webs.com/ This bound book is a compendium collection of Kenwood technical data covering the older series of radio's. Mainly the 520-830, although some items on the other older radio's and amplifiers are included. The information documented here was derived from Kenwood - Net activities (website information, reflector information and over the air discussions), Kenwood manuals and Service Bulletins. This Volume 1, Rev 1 is 367 pages in length covering 58 subjects. The binding binds the pages just like a typical paper back book. The book is made up using 20# white bond paper with





Kenwood service and technical support:

N9HE – Steve, AZ, Email: <u>n9he@guarked</u> com WB2KNK - onn, ver Email: <u>unternanteer@yahoo.com</u>

AK4AA – David Lyndon (Old Ham Dave), NC, Email: <u>ak4aa36@gmail.com</u>, Web: <u>http://oldhamdave.com/</u> W0NTA – Dick, Greeley, CO, Phone: (970)381-6768 Email: <u>dick@w0nta.com</u>, Web: <u>http://www.w0nta.com</u> K9TW – Terry, MI, Phone: (269)663-8943 Email: <u>waqstw46@aol.com</u>, Web: <u>http://www.k9tw.com</u> WA8SAJ – Jeff, OH - Phone: (440)951-6406, EMAIL: <u>wa8sai@ncweb.com</u>, Web: <u>http://wb4hfn.com/Services/WA8SAJ/SAJ-Repair.htm</u> HamRepair.com - Cal Fisher – TX, Phone: 214.476.5107, E-Mail: <u>info@HamRepair.com</u>, Web: <u>http://web.ttp://web.intp://www.affordableradiorepair.com/</u> N0BXE, Affordable Radio Repair, Mike Alexander, Florence, CO., E-Mail: <u>mike@affordableradiorepair.com</u> Web:<u>http://www.affordableradiorepair.com/</u> KA5IPE-Clif Holland.-Awid, Mabank: TX 75147 Phone: 214.850.0073 Email: clif@awid.com Web: http://www.avid.com/ * (Suspended Repairs - Retired)

K6ARU, Turner Radio, Lancaster, Calf., 616-945-9097 Email: k6aru@cwo.com

Midwest Technical Services, Watertown, Sdak, Phone: 605-882-1706, Email: <u>tcmmoes@yahoo.com</u>, Web Page: <u>http://www.midwest-technical.com/</u> AK4AA, Dave Lyndon, Hot Springs, NC, Phone: 828-622-0115, email: <u>ak4aa36@gmail.com</u> Web: <u>www.oldhamdave.com</u> * (Also TS-940) KC9INK, <u>Walley</u>, Indianapolis, IN, Does local repair work only, Phone 317 823 9380, E Mail <u>wallydoc@yahoo.com</u>, *(Also TS-940) K7ZS – Kevin Lahaje, Hillsboro, OR, Email: <u>kevin@k7zs.com</u> *(Also TS-940's)

Burghardt Radio Repair, Watertown, SD, Phone: (605) 886-7314, Email: service@burghardtradiorepair.com, Web: http://www.burghardt-amateur.com/*(Also TS-940's) Avvid Electronics, 322VZ County Road 2714, Mabank, TX 75147, Phone: 214-850-0973, Email: <u>clif@avvid.com</u>, Web: <u>www.avvid.com</u> / (Only later radio's, no hybrids) WB0CJB, Paul Kemp, Columbia, TN, Email: <u>pckemp4@hotmail.com</u> (Works on most Hybrid Kenwoods, Drakes, Kenwood, etc.) KD7DNT, West, Walter Dilley, Email: <u>walter.dilley@gmail.com</u> web: <u>https://kd7dny.com</u>.

Kenwood Parts:

K4EAA - KEN - EMAIL <u>ken@k4eaa.com</u>, Web: www.k4eaa.com

KD7DNY – Walter Dilley, Email: walterdilley@gmail.com Web: http://www.hybridrestore.com/ KD7DNY – Walter Dilley, Email: walterdilley@gmail.com Web: http://kd7dny.com/ East Coast – Phone: (800)632-3323, Web: http://www.kenwoodparts.com/parts/index.php Radio Boatanchor Parts: TEL: 207-942-5745 strmrs@roadrunner.com Web: http://tubes tubes tubes.tripod.com/index.html PacParts Inc., Phone: 800-421-5080, Web: http://www.pacparts.com/ Nationwide Radio & Eq. Sales LLC, Mark Olson "President", 1490 Norfield Rd, Suamico, Wi. 54173, Email: ke9pg@new.rr.com Phone: (920) 434-8097 Web: http://marketplaceadvisor.channeladvisor.com/StoreFrontProfiles/default.aspx?sfid=86409

Parts Description:

Band Switch Coupler:

- K4EAA KEN EMAIL: <u>ken@k4eaa.com</u>, Web: <u>www.k4eaa.com</u>
- Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/
- East Coast P/N: D22-0409-05 (L5) NYLON COUPLER R-5000 TS-830S TS-820S R-1000 www.eastcoasttransistor.com

TS-520, TS-820, TS-530, TS-830 Flat Pack RL1:

- 1. K4EAA KEN EMAIL: ken@k4eaa.com , Web: www.k4eaa.com
- Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/
- Online Components, Web: http://www.onlinecomponents.com/keywordsearch.aspx?text=nf4eb-12v



TS-520, TS-820 Antenna Relay:

1. Kens Electronics, Web: http://www.kenselectronics.com/ P/N: 401013-S term 12VDC replace MH4P-12VDC in T599D, TS520S, TS820 2. Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/





HYBRID SERVICE & PARTS

Parts Description:

Band Switch Coupler:

- 1. K4EAA - KEN - EMAIL: ken@k4eaa.com , Web: www.k4eaa.com
- 2. Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/
- 3 East Coast P/N: D22-0409-05 - (L5) NYLON COUPLER R-5000 TS-830S TS-820S R-1000 www.eastcoasttransistor.com

TS-520, TS-820, TS-530, TS-830 Flat Pack RL1:

- K4EAA KEN EMAIL: ken@k4eaa.com , Web: www.k4eaa.com 1.
- Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/ 2.
- 3. Online Components, Web: http://www.onlinecomponents.com/keywordsearch.aspx?text=nf4eb-12v

TS-520, TS-820 Antenna Relay:

1. Kens Electronics, Web: http://www.kenselectronics.com/ P/N: 401013-S term 12VDC replace MH4P-12VDC in T599D, TS520S, TS820 2. Kenwood Hybrid Restoration & Repair, Email: jim@hybridrestore.com Web: http://www.hybridrestore.com/

HYBRID High Voltage Capacitor replacement kits: (These are Nichicon 150uF @500VDC caps.)

1. K4EAA - KEN - Web: www.k4eaa.com

- Kenwood Hybrid Restoration & Repair, Web: http://www.hybridrestore.com/
- 3. Mouser number is 647-LGN2H151MELC25. Web: https://www.mouser.com/
- 4. Allied number is 70249746. Web: https://www.alliedelec.com/

Misc. Items:

TS-830 Rectifier board relay – Source unknown at this time...

TS-940 Relay Omron G6E134P-ST-US-DC12 . Digikev Panasonic part # 255-1473-ND

TS-520, 820, 530, 830 Drive Sprockets, email: NR6C@roadrunner.com , Web: http://nr6c.com/sprocket.htm

TS-520/820 Paddle Switch Handles, KF7QGU, eBay user: jd_dude, Search for "Kenwood Paddle Switch Handles"

TL-922 upgrades, Kessler Engineering LLC, Ph; 937-458-3173, email: don@KesslerEngineeringLLC.com, Web; www.KesslerEngineeringLLC.com

TS-830&530 Remote VFO Cable Kit, Kenwood Hybrid Restoration & Repair, Web: http://www.hybridrestore.com/ HYBRID High Voltage Capacitor replacement kits, K4EAA - KEN - Web; www.k4eaa.com and Kenwood Hybrid Restoration & Repair, Web; http://www.hybridrestore.com/

HYBRID Power Cords, Kenwood Hybrid Restoration & Repair, Web: http://www.hybridrestore.com/

HYBRID Cabinet Screw Kits, K4EAA - KEN - Web: www.k4eaa.com and Kenwood Hybrid Restoration & Repair, Web: http://www.hybridrestore.com/

HYBRID Final Cage Repair Kits, K4EAA - KEN - Web; www.k4eaa.com and Kenwood Hybrid Restoration & Repair, Web; http://www.hybridrestore.com/

HYBRID Cabinet Feet, Kenwood Hybrid Restoration & Repair, Web: http://www.hybridrestore.com/

HYBRID SK Fets and Transistors. Phone: 800-543-3568 -Web: http://www.ceitron.com/

Cabinet Paint - ACE Hordware, Bust Stop, Machine & Implement, Ford Gray Gloss, Item# 082901171393

VFO STABILIZER:

Cumbria XLOCK – No longer in business.

K4DPK VFO Stabilizer - PHILLIP W CHAMOLEY, 28 E CAMELIA RD NE, ROME, GA 30161













KENWOOD ALC CONTROL BOX BY: WA8SAJ

" ALC " CONTROL BOX FOR HOLDING TRANSMITTER POWER OUTPUT "STEADY" FOR DRIVING LOW EXCITATION AMPLIFIERS



See complete article on: WWW.WB4HFN.COM



- Kenwood Hybrid Legacy Radio Nets
 - Saturday, 7.230 7.235mhz @ 3:30 pm Eastern
 - Sunday, 14.316 mhz @ 18:00 z
 - Yahoo Kenwood Group
- Hybrid Net Web Site:
 - www.wb4hfn.com
- Yahoo Kenwood Group
 - https://groups.yahoo.com/neo/groups/TS-520_820_530_830/info

KENWOOD My Web Site at: www.wb4hfn.com

WB4HFN Home Page

Kenwood Net Home Page

Brochures and Flyers Articles & Information Equipment Manuals Designed QSL Cards Magazine Advertisments Dayton Hamvention Forum

Kenwood Hybrid Radio Nets: Saturday - 7.235 MHz @ 3:30 EST/EDT Sunday - 14.316 MHz @ 18:00 GMT





KENWOOD Updating & Repairing Kenwood Hybrid Radios Presenter – Mr Jan Servaites (N8CBX)

Digital Readout (DG-5)



Modern T/R Relay

Topics in this lecture:

- •Update your hybrid with a digital display (DG-5)
- •Repairing a TS-511S (Problems & Solutions)
- •Modern relay to replace the 300 ohm relay
- •Tips & Hints

Hamvention Forums 2022 Kenwood Hybrid Radio Legacy Rm 4, 9:15am – 10:50am Saturday, May 21 2022





KENWOOD Kenwood Introduces the DG-5 for the TS-520S (1976)



The DG-5 includes 38 TTL chips, and hard to find them available & expensive



*Kenwood Introduces the DK-520 kit for the TS-520 using the DG-5

DG-5 uses three frequencies: VFO, CAR, HET to automatically calculate frequency readout





KENWOOD Kenwood's DG-5 for earlier models too!

DK-520 owner's manual free download: http://www.wb4hfn.com/KENWOOD/Kenwood-Manuals.htm

The Service Bulletin (Oct 6, 1977) covers installation for TS511S/TS520/TS900/R599 (Good info!)

KENWOOD Today we have the DG-5 Emulator kit

DG-5 Emulator kits available from KV6O, Stephen Leander, for \$75. Uses 6 chips, including the Atmel 328P microcontroller, same one used in the "Arduino". Kits were available in 2020, but shipments are suspended due to part shortages (as of 4/03/2022)

Signal Levels Needed

Measured levels (TS520S) at RCA jacks and works fine

HET - 0.620Vpp

CAR - 0.750Vpp

VFO – 0.670Vpp

As a general rule, signal levels of 400mVpp or higher are fine

(Vrms = 0.353 x Vpp)



KV60 DG-5 Emulator kit to replace the Kenwood DG-5 digital readout for the TS-520S N8CBX 05-06-2020





Dual stage buffer (511S)

New PC boards

Power supply unit





KENWOOD Kenwood TS-900



•The TS900's HET freq. requires a single-stage buffer amplifier
•The buffer board is mounted as close to the RF board as possible.
•VFO & CAR no buffering required



KENWOOD Kenwood 599A Twins



•The R599 needs no HET buffer; Connect directly with coax cable

- •The R599 is the easiest of all Kenwood radios to modify, and works great
- •My R599A was upgraded to have modern radio features to include:
 - •Digital frequency readout
 - •2M & 6M transverters
 - •Panadapter display An IF tap to bring out the 3.395 MHz IF freq.
 - •(The IF tap is explained in the SM-220 manual)

Kenwood TS-511S



The TS511's HET freq. requires a <u>dual-stage buffer</u> amplifier
The buffer board is mounted as close to the RF board as possible.
VFO & CAR no buffering required

KENWOOD Repairing the TS-511S

The 511S was released in 1971 and after 51 years many have seen a hard life

-Low receiver sensitivity and particularly weak reception on 20M, 15M and 10M Bands -Low power output and drops off in the higher freq. bands

HET-oscillator is affected by:

•bad crystals – Drifted away from the fundamental frequency causing low level of oscillation

•dirty band switches – Deoxit may help, but need to be removed to clean the backsides

•out-of-tolerance resistors – Carbon composite resistors will increase resistance with age

•weak tube – A weak 6AW8A and/or bad cathode & grid resistors (the 6AW8A is a combined amp & mixer tube)

•Detuned or dead osc – Broken tuning slug & circuit problems (applies to MIX & ANT coil packs)

Repairs:

1st - Swap out 6AW8A; 2nd - Check resistors; 3rd – Inspect tuning slugs, 4th -Clean bandswitch

Findings:

- After checking some resistors, it was decided to replace all resistors with new 1/2W carbonfilm resistors. It was later found that about 90% were out-of-tolerance (too high)
- Tube sockets looked worn and were replaced
- Other components were also replaced (including some weak crystals)
- A de-soldering gun is necessary!!!...Any HAKKO gun works great...I still use my 808 gun
- It is advised to remove the RF & IF boards for the repairs....Document all connecting wiring to these boards. A digital camera is recommended.

KENWOOD Repairing the TS-511S

My 511S was DOA, purchased on Ebay. No receive & no power output! It needed a complete restoration to include tubes, resistors, cleaning and so on. (*Visit my 2017 charts* <u>*Kenwood's Early 500 Series*</u> to see all the rebuild pictures) After rebuilding the RF & IF & coil pack boards, it was working again.

New parts to include:

- •carbon-film resistors
- •ceramic caps
- tube sockets
- •misc. diodes and so on





KENWOOD Repairing the TS-511S

Those early Kenwood servicing procedures are written for 1960s test equipment. I experimented with my own procedures using modern tools. (SDR Panadapter using Softrock & HDSDR software) BPF & SSB filter alignment -



KENWOOD Modern T/R Relay for the 300ohm Relay

Relay - NTE R16-17D5-12 (4P-DT 5A-12VDC coil These relays are getting hard to find anymore
Socket – TYCO Electronics 27E126
Coil resistance – 180 ohms
Relay requires moving 4 wires
New socket is higher quality

2-3 hrs operation with new relay, working fine

Relay Timing Comparisons				
Relay	Operate time	Release time		
385	10ms	2ms		
300	8ms	2ms		
NTE	5ms	1.5ms		





KENWOOD 511S Tips & Hints

Improved Audio – Masa Yamamoto AB9MQ says how to improve the TS-511S audio characteristics for a more mellow sound and providing more lows. This mod was realized by the TS-520S component changes. Locate the Pi audio filter on the X52-0010-00 Generator Unit and remove (L2, C17, C18)

Replace L2 with a 6.8K resistor

Replace C17 with a 0,047 capacitor (plastic film style)

Replace C18 with a 0.01 ceramic capacitor



KENWOOD 511S Tips & Hints

CW filter installing – Masa Yamamoto AB9MQ provided this information that wasn't included in the owner's manual....(Also to review is Bill Shadid (W9MXQ) article that he wrote back in Feb. 2021...https://www.ozaukeeradioclub.org/index.php/newsletters)

The illustration shows some wiring changes to be made on the IF and Carrier boards for the CW to work properly.



Thank You!....73 from N8CBX



Terry Wagoner – K9TW

www.k9tw.com/

Hybrid Transceivers Common & Model Specific Problems

KENWOOD Hybrid Transceivers Common & Model Specific Problems

- 1. Molex connectors
- TS-820S and TS830S
- 2. Relay Contacts
- Ant TR and Aux Control Relays
- 3. Bandswitch Contacts
- TS530S and TS830S
- 4. Cathode Metering Resistors
- Final Tube Arc Over vs Thermal Run Away
- Meter Protection Diode String Mod
- 5. VFO Air Variable Capacitor Dirty Rotor Shaft Wiper Contact
- Intermittent Receive
- Digital display flicker and blanking
- 6. Screen Grid Divider Resistors

- 7. Bias Voltage Adjustment Pot
- Final Tubes Thermal Runaway
- Final Tubes Gassy
- 8. CB Modifications
- 9. Wrong Fuse
- Automotive Fuse
- Time delay fuse
- 10. Sublimated Solder Parasitic Suppressor Lugs
- 11. VFO Analog Dial Tracking with Digital Display
- DO NOT Attempt Blading
- 12. TS820S DG-1 (bad vias soldering, bad input molex connector, bad intraboard molex connectors, wrong Carrier input level)

- 13. No Modulation in SSB
- TS830S RF Processor Switch contacts
- Mod to switch housing

14. No ALC Indication when Peaking the Drive

- ALC indication pegs FSD when Flip to Send
- Common Problem All Models
- TX Level Diagram

15. Common Active Device Failures

- Relay keying transistor
- Linear series pass regulator transistor
- Meter FET
- Ant Step-up Transformers and RF Amp Mosfet (nearby lightning and accidental transmit RF at SO-239)



Molex Connectors

TS-820S Molex Spring Temper Wedge Crimp Terminals



KENWOOD TS-820S Molex Crimp Connector



KENWOOD TS830S Molex Crimp Connector


KENWOOD TS-820S Molex Connector Bad as Built



KENWOOD TS-830S Molex Connector Bad As Built



KENWOOD DG-1 Bad Molex Intraboard Wedges - Gapped





KENWOOD DG-1 Good Molex Intraboard Wedge – No Large Gaps



KENWOOD TS-820S Damaged DG-1 Molex Connector



KENWOOD TS-820S DG-1 Molex Conn. Improper Repair Attempt



Solder Applied to Flat Male Stabs of DG-1 17 Pin Molex Connector on the DG-1 Unit

KENWOOD Micromark Tool for Molex Connector Cleaning



KENWOOD TS-820S Molex Crimp Connector Test & Inspection



KENWOOD TS-830S Molex Connector Spudger



KENWOOD TS-83OS Molex Connector Spudger Testing















RELAYS

MH4P TRI-2 Antenna Relay

TS520/TS820 Omron MH4P Ant TR Relay Under Metal Shield Can. Actuating coil = 300 Ohms



KENWOOD MH4P Aux Control Relay No TRI-2 Marking



KENWOOD TS530S Clear Antenna TR Relay Fujitsu



KENWOOD TS530S Black Case Antenna TR Relay Fujitsu

TS530S Ant TR Relay. Two Types of Solder in Fujitsu Relays. One with clear Lexan Cover and one with Black Case

> TS5305 ANT TR FUJITSU FOR 321D012 BLACK LASE HERMETIC

SEALED COVER

COIL Res à 230 OHMS

TS830S Antenna TR Relay



KENWOOD TS830S Burned Up Antenna TR Relay



KENWOOD TS830S Burned Up Antenna TR Relay



KENWOOD Modified Factory Omron Antenna TR Relay



Omron MY2N vs. MX-2P

Omron MY2N and MY2Z are not subs for TS830S Omron MX-2P.



KENWOOD TS530S Omron LZN4 Aux Control Relay



KENWOOD TS830S Omron LZN4 Aux Control Relay



KENWOOD Omron LZN4 Aux Control Replacement



KENWOOD LZN4 Aux Control Relay Replacement





Removing Relay Covers



Relay Contact Burnishing Files





Bandswitch Contacts



Kenwood Hybrid Bandswitch Contact Problems

<u>TS520, TS520S, TS520SE</u>

•Seldom have bad RF Board "hanging board" Bandswitch contacts. The S5 Bandswitch contacts that switch in fixed Padder caps and select band specific Tank Coil taps rarely are bad. Often very dirty. Both can be cleaned in place.

•Clean with an artist brush with "mushroomed" bristles. Can twirl and can apply to rotor wiper to distribute especially to contacts at either side of 6:00 position. No need to apply contact cleaner from can with spray nozzle. Applies too much product. No need to soak. If stubborn contacts can use full strength D100L and flush with D5 and blow off with compressed air or canned computer duster.

<u>TS820, TS820S</u>

- Seldom have bad Bandswitch contacts on the Coil Pack Board. The S4 Bandswitch contacts that switch in fixed Padder caps and select band specific Tank Coil taps rarely go bad. Can be very dirty. Both can be cleaned in place. Same cleaning method as used on the TS520 models.
- Suggest remove the RF board to replace bad SG divider resistors. With RF board removed gives good access to the VFO shield can access plate to allow cleaning of the air variable capacitor rotor shaft wiper contact without removable of the VFO. Also gives better access to the Bandswitch contacts on the Coil Pack board.

TS530S, TS530SP, TS830S

- Bandswitch contacts on the 7 Red/Brown vertical switch decks on the RF Board are weak link on these models. Common to be dirty and intermittent. May have to rock Bandswitch knob to find a sweet spot either side of the detent. Biggest problem is loose rivets that secure the hair pin contacts to the pc board foil trace. Rivets lose their contact pressure making high resistance and intermittent contact. An attempt at in place cleaning should be first attempted before removing the RF board to clean and repair poor contacts.
- Not all of the red/brown phenolic decks have loose rivets. Good to first try in place contact cleaning. The spacing is close between decks and metal shield plates so the mushroomed artist brush helps by being able to twirl it between the close spaces. Still need to apply cleaner to the rotor wiper and distribute to the 7-6-5 O clock contacts at bottom of the travel arc.

TS530S, TS530SP, TS830S (Cont.)

- Three ways to correct loose rivets condition. 1. Clean contacts and rotors and apply silver conductive ink as shown on K4EAA website 2. Clean contacts and solder hair pin contact to rivet head and foil trace. 3. Clean contacts and apply jumper wires from the solder lug of the hair pin contacts to the mating PC board male stabs. With all three methods must measure contact resistance to ensure problem has been corrected.
- See the detailed cleaning and repair procedure on Dick Housden's W0NTA website.
- The S22 switch contacts that switch in fixed Padder caps and select band specific Tank Coil taps are rarely bad. Often very dirty. Can be cleaned in place. Must remember to apply grease to the detents. Super Lube Silicone PTFE based is good choice. Apply to the accessible detent valleys with blade of small flat blade screw driver and to both ball bearings and distribute to all valleys with the two ball bearings.

TS830S BS Contact Cleaning


KENWOOD TS830S BS Contact Jumper Wire Repair



KENWOOD TS830S Bandswitch White Rotor Position



TS830S S22 Wiper





Cathode Resistors



Problem Area No. 4 Final Tube Cathode Metering Resistors

- Factory resistors are carbon composition and are hygroscopic. They draw moisture. Moisture at the area where the carbon is pressed around the lead wires causes corrosion and high resistance. Very common for the resistor value to drift high with age up to and including going open.
- Don't replace multiple parallel cathode metering resistors with a single resistor.
- The cathode metering resistors are not fuses. Do not increase wattage ratings. Install a 3 silicon rectifier diode string across the resistors to prevent Panel meter damage. See Kenwood pages on WB4HFN website.
- Recommend that all owners who buy a new to them Hybrid should measure the resistance of the cathode metering resistors. There are two 10 ohm resistors in parallel on the TS520 and TS820 models and four 20 ohm resistors in parallel on the TS530/TS830 models. Resistance should be very close to 5 ohms. The higher the resistance the higher the Ip (plate current) indication will read false high. At 10 ohms Ip will read 2X false high, at 15 ohms Ip will read 3X false high etc.



Cathode Resistor

Problem Area No. 4 (Cont.)

- There are two operational conditions that can damage and/or destroy the cathode metering resistors.
 - 1. Final tube arc over from the Anode to the Beam forming plates.
 - 2. Thermal runaway
- Strongly recommend installation of diode mod to protect the Panel Meter. Clamps the 900vdc across the resistors to approximately 2vdc.
- I use FR-257-B 1000PIV 2.5A Fast Recovery diodes, but common 1000 PIV 1A silicon rectifier diodes will work.
- Make sure there is a 6A fast blow fuse in the Holder. No MTH/MTL time lag/delay fuses and no high amperage automotive fuses (15 to 20 Amp 32 vdc).

Cathode Resistor Damage



Cathode Resistor Damage





Cathode Resistor Damage



KENWOOD TS820S Final Tube Arc Over Protection Diodes



TS830S Arc Over Meter Protection

