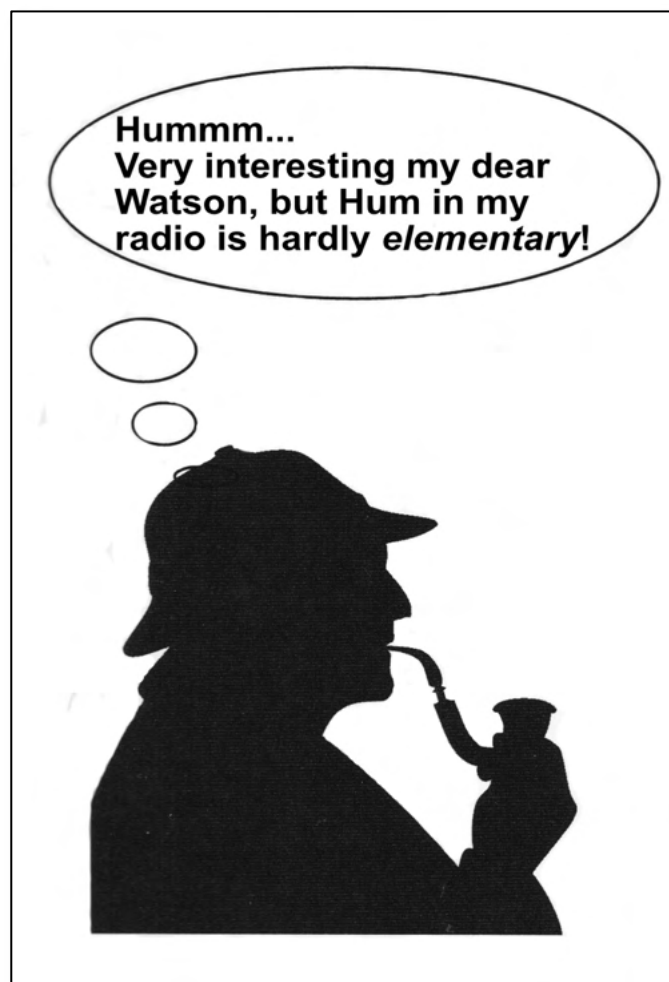




Volume 33 No. 4
February 2024
S.A. Group
Newsletter

Inside Story:



Our Editor is STILL battling with an annoying hum in an Astor radio that's under restoration. With the help of a fellow member, and a good book... he's on the trail to solving the mystery!!

Historical Radio Society of Australia Inc. – S.A. Group

Web Site: www.hrsasa.asn.au

All correspondence should be addressed to the Secretary, HRSA-SA Group, 2-13 Chester Street, Glenelg South, S.A. 5045.

Committee for 2023-24

President:	Graham Dicker	0414 323 099	pres@hrsasa.asn.au
Vice President:	Keith Ellison	0407 304 028	vicepres@hrsasa.asn.au
Secretary:	Ian Smyth	0488 488 776	sec@hrsasa.asn.au
Treasurer:	John Crawford	8344 4978	treas@hrsasa.asn.au
Public Relations:	Alan Taylor	0417 859 074	alantaylor47@bigpond.com
Committee Member:	Warren Lane	0400 272 556	warren@hrsasa.asn.au
Committee Member:	Peter Howard	0424 563 732	peter@hrsasa.asn.au
Committee Member:	Tony Bell	8269-4095	antony.k.bell@gmail.com

Co-Opted Additional Members/Responsibilities:

Shop Keeper:	Alan Taylor	0417 859 074	shop@hrsasa.asn.au
Valve Bank Manager:	John Crawford	8344 4978	vbm@hrsasa.asn.au
Newsletter Editor:	Ian Smyth	0488 488 776	sec@hrsasa.asn.au
Website Editor:	Ian Smyth	0488 488 776	sec@hrsasa.asn.au

Planned meetings for the next few months:

Sunday 25 February

1:00pm to 3:30pm

AMPLIFIERS DAY (1)

Designing and building one from scratch - Large or small - Anyone can do it!

This is an introduction to our "Amplifier Building Competition" which will be a big focus of our **100 Years of Broadcasting in SA** celebrations in 2024.

Participants will be guided through the process and assisted along the way. There will be a second Amplifiers Day to follow up later in the year.

To be held at:

St. Cyprian's Church Hall

70, Melbourne Street, North Adelaide, SA, 5045

Wednesday 6 March

12 noon for a 12:30pm start

MEMBERS LUNCHEON

Formerly known as the "Retirees Luncheon" it is open to all members, partners, and guests.

To be held at:

The Earl of Leicester Hotel

85 Leicester St. Parkside SA 5063

Sunday 24 March (*NOTE: 1 week early to avoid Easter Sunday on March 31*)

1:00pm to 3:30pm

HOME VISIT

We will be visiting the home of one of our members to view his collection and workshop facilities.

Details of the location will be issued to members as the date draws nearer.

To be held at:

To be advised.

Sunday 14 April (Extra meeting to main program)

1:00pm to 3:30pm

Tutor Assistance Workshop

B.Y.O. project and get help. Three workstations will be set up in the hall, each with a very experienced member who will help you diagnose faults etc/ and guide you with restorations, repairs and/or new builds. Places limited to a max of 12 so contact the Secretary and book in now.

To be held at:

St. Cyprian's Church Hall

70, Melbourne Street, North Adelaide, SA, 5045

Sunday 28 April**1:00pm to 4:00pm (NOTE: Tentative dates only)****Visit to South Australian Aviation Museum**

Several HRSASA members have connections with SAAM. We have a lot in common, hence this visit, and possibly, the start on an ongoing relationship between our two groups! More details to follow...

To be held at:

SA Aviation Museum

(New entrance & car park) 16 Bedford Street, Port Adelaide, SA, 5015

Wednesday 8 May**12 noon for a 12:30pm start****MEMBERS LUNCHEON**

Formerly known as the "Retirees Luncheon" it is open to all members, partners, and guests.

*To be held at:***The Reephram Hotel****273 Churchill Rd, Prospect, SA, 5082****Sunday 26 May****1:00pm to 4:00pm****AUCTION**

This will be our first "regular" auction for the year. Members can book a table and sell up to 20 items each. Please contact the Secretary ASAP to book your table. Remember, you **MUST** be a current financial member to buy & sell at our Auction.

*To be held at:***St. Cyprian's Church Hall****70, Melbourne Street, North Adelaide, SA, 5045****Sunday 30 June****10am to 5:00pm (NOTE: Tentative event only)****BUS TRIP & HOME VISIT**

We're planning to visit one of our country members to check out his collection and workshop. This event is not yet confirmed but we will keep you informed as we progress.

*To be held at:***Destination to be advised.****Wednesday 10 July****12 noon for a 12:30pm start****MEMBERS LUNCHEON**

Formerly known as the "Retirees Luncheon" it is open to all members, partners, and guests.

*To be held at:***The Reephram Hotel****273 Churchill Rd, Prospect, SA, 5082****Sunday 28 July****1:00pm to 4:00pm****AGM and AUCTION**

As in previous years, we will be holding the AGM of the Association, including the election of Office Bearers for 2024-25. This will be followed by our second Auction for this year. Members can book a table and sell up to 20 items each. Please contact the Secretary ASAP to book your table. Remember, you **MUST** be a current financial member to buy & sell at our Auction.

*To be held at:***St. Cyprian's Church Hall****70, Melbourne Street, North Adelaide, SA, 5007****Component Corner**

Many new members are probably wondering where to obtain components and valves. The following is a list in order of preference:

HRSA-SA Group Shop: We are working towards a new arrangement for our store. In the meantime, contact our Liaison Officer, Alan Taylor on 0417-859-074 to enquire, or place an order. Alan's email address is:

shop@hrsasa.asn.au

AZTRONICS, 170 Sturt Street, Adelaide. Houses the HRSA-SA Group valve bank and modern components. They will source components for members. Great supporters of the HRSASA.

HRSA Melbourne (see *Radio Waves*) Houses the Victorian HRSA valve bank and odd passive components and kits, plus resource books written especially for members.

WES Components, Sydney. The catalogue is viewable on-line, and orders can be placed through the Shop Keeper/Secretary, as the SA Group has an account, through which we get "trade discount". Go to:

<https://www.wes.com.au> to see all their products.

ITEMS WANTED BY FELLOW MEMBERS:

1. A rectangular, cream-coloured push-button for an AWA "RADIOLA" beside clock/radio.

Contact: Craig Maitland on 0419-188-981

2. A dial glass for an Astor Mickey model HPM (1948) with all states shown. It has two red squares printed on the glass that say, "5 valves". (Can be glass or acrylic)

Contact: Ian Smyth on 0488-488-776

3. Mobile H.F. + V.H.F. + U.H.F. Transceiver

Contact: Barry Chammen on 0409-061-560

4. Philips Transistor Radio – Model No. 198

Contact: Tony Bell on (Home) 8268-4095

5. **WANTED TO BORROW:** A 12-volt power supply for National Panasonic Reel-To-Reel Video Tape Recorder, Model NV-3085A – Has a 4-pin din plug with a groove (see photos below) – Contact: Ian Smyth on 0488-488-776

This unit belongs to a local Primary School, we only need to borrow a power-supply to dub some old tapes.



Socket for 12volt
push-in power
lead.

Are you looking for a hard-to-get part? A strange knob, or a replacement IF coil? Have an item that you'd like to sell? Why not place a free, classified advertisement on our website? Go to the TRADING POST page at: <https://hrsasa.asn.au/page-16/> and have a look at what's on offer right now and help a fellow member. It changes frequently. Why not make use of this free resource yourself? Contact Ian Smyth on 0488-488-776 or by email at ian.smyth@me.com to place your request.

You could also place a free classified advertisement in the "yellow pages" section of our National Magazine "Radio Waves" and reach an Australia-wide audience.

Just contact the Radio Waves editor, Ian Batty on 0402-736-527 or send it by email to:

ianbatty311@gmail.com



PHOTO GALLERY:

From our HRSASA Meeting in January:

(Photos by courtesy of Stephen Parker.)

As we have done over the past few years, we began the year with a simple "SALE DAY" at St Cyprian's Church Hall in North Adelaide where members bring pre-priced items to sell or swap with others. It's a low-stress, great activity to start the year as it can often be rather hot in Adelaide at that time of the year!



Above: The AR7 transceiver that triggered a ballot between two keen buyers!



Above: A well preserved AVO analogue meter was on sale. Note the leather case.



Above: A 4-valve, un-common model small ASTOR Mantle radio in cream Bakelite.



Above: Alan Taylor was selling this "magic eye" FM tuner as well as this tidy Kriesler 1960's bedside radio.



Above: This DENON solid-state Pre-amp was sought after by a couple of buyers.



Above: The old CRO next to the AR7 will need a lot of T.L.C. from its new owner to bring it back to life!

***From our President,
Graham Dicker.***

President's "Banter"!

President's monthly stories from the past (and other ramblings)



The restoration from hell - An OTARI MX5050 MKIII-B2



As most would know by now, one of my passions is the restoration of high-end tape recorders while most of our members are involved in things, mainly radio. I set my collection to having a lowest common denominator of a REVOX A77, anything below that is not my cup of tea! Studio and broadcast grade recorders are my sweet spot (or anything EMI).

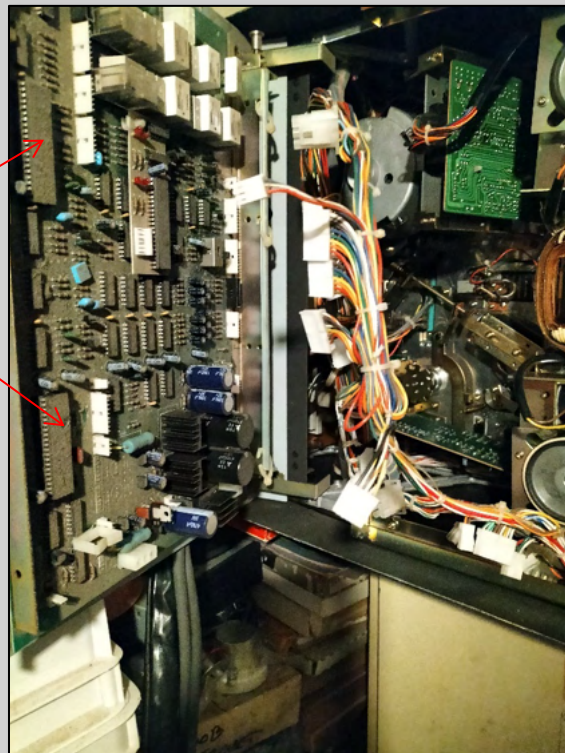
On this occasion, I purchased at auction a non-working OTARI 5050 Mk III ex recording studio machine and paid the princely sum of \$2,500. Most would think that excessive, but for a studio grade machine that was the upper limit and fully restored a good one can command about \$6k. Any small profits from sales in my case usually go into the next purchase to save gear like this from landfill. The benefit for me is the journey and the experience of bringing something back from the dead.

When powering up the recorder all deck controls were dead. The internal audio electronics were also dead except for the VU meters being illuminated! Nothing worked at all, not even some background noise. This I thought would just be a fuse or two. On opening the machine up it was full of dust, no blown fuses but the electrolytic capacitor innards were now leaking outwards! A foam spacer had disintegrated and deposited itself on the rear of the main control board.



Left: Main control board with foam spacer deposited on PCB

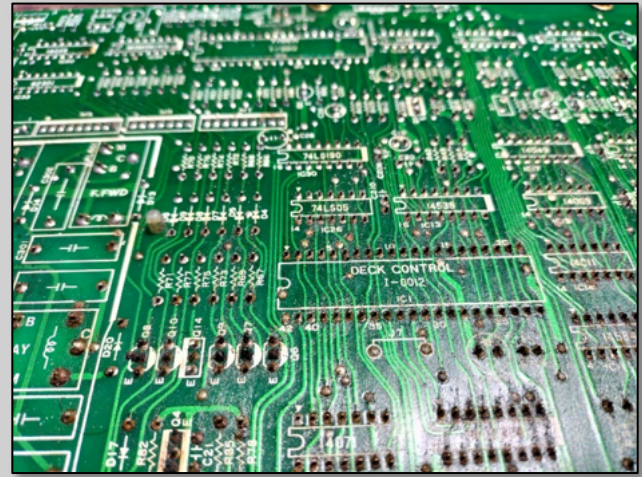
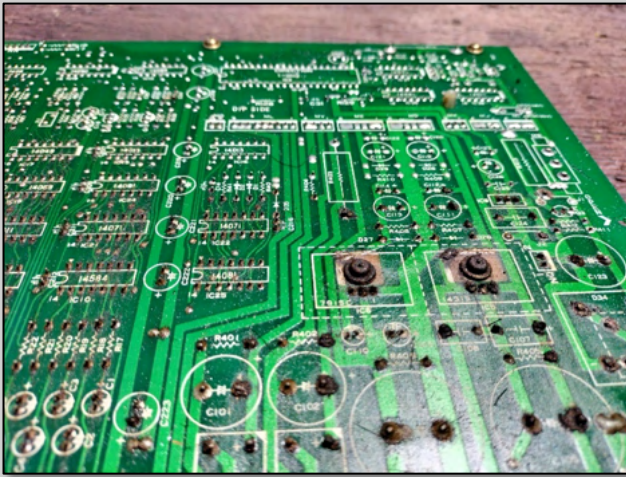
Access to the deck electronics and power supplies in these machines is by way of a swing out main board. 37 connectors later and you can remove the board for service.



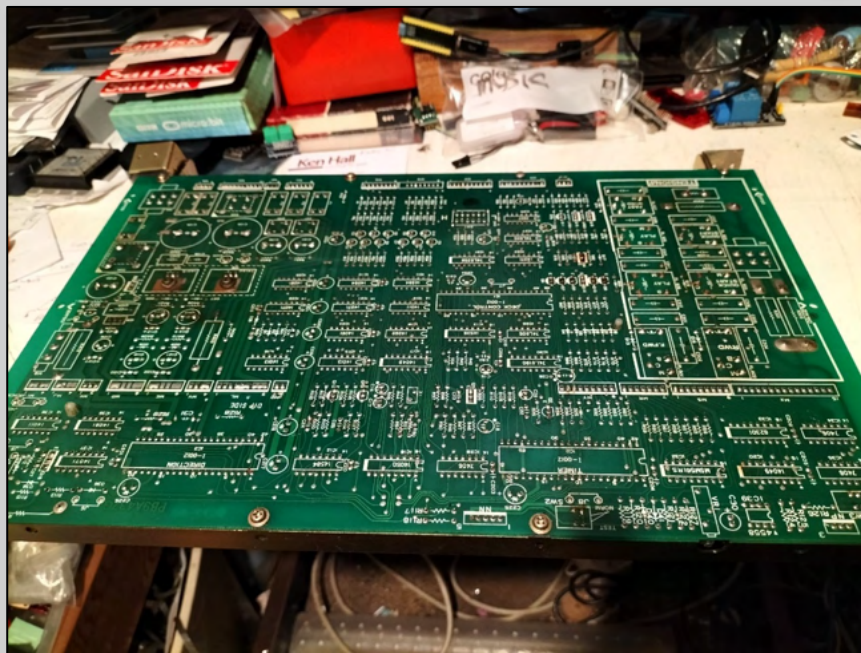
Right: Lots of accumulated dust coating components.

Once the main board was removed, all the disintegrated foam and the dust on the PCB was removed using acetone (Paint thinners) and \$2 a can of Supercheap degreaser. With a final dip in hot soapy water to remove all residues, it just needed a day or so in the sunshine before moving on to resolve the next problem.

As the foam was hydroscopic it turned out that 90% of all the solder joints were now corroded away on the rear of the PCB. After much scrubbing with thinners and a toothbrush, I was eventually able to remove all the crud, but the solder joints were now *very* suspect. After coating the entire PCB with some spray flux, it was time to bring out the bench magnifier and resolder every connection on the PCB.



Above: Two “before” photo’s showing massive corrosion of solder joints



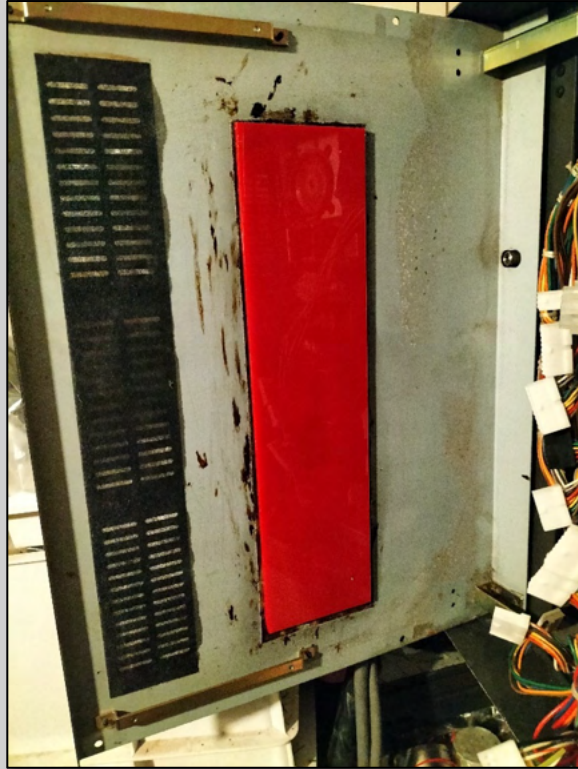
Above: “After” photo showing everything resoldered

After resoldering all connections and replacing all capacitors on the board it was a repeat process with cleaning the flux from the PCB using more thinners and hot soapy water.



Above: Recapped PCB

Below: Laser cutting a new 3mm acrylic spacer and removing the crud left by the old spacer was the next challenge, without doubt the acrylic one at least will not disintegrate in my lifetime.



After replacing the PCB and connecting it up again, still no joy. After more fault tracing it turned out that most PCB via's between the bottom and top of the PCB were open circuit. Pulling the PCB out and resoldering using a short length of TCW (tinned copper wire) through the via's now made continuity. Re-assembly and testing now produced a transport that functioned correctly, however the machine now failed to play a test tape. I should add the deck was totally stripped and all mechanical components were degreased with the Supercheap product then reassembled and relubricated, new motor bearings were also fitted.

After recapping all the analogue audio boards and replacing all preset pots, I was now able to get a play signal and a full replay alignment with an MRL tape now showed we had resolved the play issues.

The record function however was another issue, these machines have switchable replay head stacks between $\frac{1}{2}$ track and $\frac{1}{4}$ track. As it turned out, if you left the head switch in $\frac{1}{4}$ track mode, a "record inhibit" signal was sent to the electronics. Returning the switch back to $\frac{1}{2}$ track then had the record electronics now working, and a full alignment brought most of this back to normal operation. This took some finding and was not documented by OTARI anywhere!!

The final tally: 370 capacitors changed, 215 individual faults and all up 400 hours on the workshop bench. Unless you are into tape machine preservation, I would not recommend anyone tackling one of these machines in this state.



CENTENARY OF BROADCASTING IN SOUTH AUSTRALIA

HRSASA Celebrates with a Valve Amplifier Building Competition

The 3 aims of this competition are (a) to foster community interest in the 100th Anniversary of Broadcasting in South Australia, (b) promote home construction of valve Hi-Fi amplifiers, and (c) raise awareness of the Historical Radio Society of Australia, South Australian Branch, and its activities.

The competition is open to any South Australian resident who has constructed his, or her own amplifier, or one made by a relative who is, or was, a South Australian resident.

There are several different categories each of which will have several rounds to find both the **judging panel award winners** and the **listener panel award winners**. The judging panel awards will be based on technical as well as sonic character to find the winners. The listener awards are purely based on the preference of sonics. Pre-printed scorecards will be made available to all registered listeners/voters and the judging panel.

Depending on the number of entries there may be more than one round for each category eventually ending up with the top three amplifiers for placement as first second and third place in each category and grand overall winners. The HRSASA reserves the right to publish all findings and entrants' circuit diagrams over the 12 months following the competition.

Each entry will be by way of the prescribed entry form (see below.) General members of the public and HRSASA members who would like to join the *listener audience and judging panel* will be required to make an online booking for audience seats on the testing days.

Adelaide radio station involvement, both commercial and non-commercial, to promote and be involved with these activities will be most welcome.

The judging panel will arrange for 5 x 2-minute "test grabs" of music as a standard reference point. The same set of speakers and programme source will be used for every amplifier under test. The nominal speaker impedance will be 8 ohms. The programme source will be + 8 dbm, balanced line 600 ohms. Adapters and attenuators will be provided to accommodate 500 mv p-p input and unbalanced amplifiers.

Judged panel prizes will be awarded for each category as follows:

First, second and third place winners (ie/ 3 awards x 6 categories =18 awards)

There will be a judge's award to the **Best Overall Amplifier** (one award) plus the judge's **Best Technical Achievement** (one award)

The **listener award** will be for first place in each category (6 awards) plus an overall **Best Amplifier** (one award.)

Categories:

1. Single Ended
2. Less than 17 watts (push-pull)
3. OTL Amplifier (Output transformerless)
4. Hybrid amplifier
5. More than 17 watts push-pull
6. Open section (including solid state)

Prizes donated by Rola Australia:

1. **Best overall amplifier based on sonics**

One pair of ROLA OPT-50 Ultra linear push-pull output transformers valued at \$800.00

2. **Best Technical Achievement based on construction and circuit diagram**

One pair of Rola OPT-15 Ultra linear push-pull output transformers valued at \$400.00

3. **Listener Award – Best overall amplifier based on sonics**

One pair of Rola OPT-10SE Single-ended output transformers valued at \$140.00

All other awards – A Certificate of Achievement.

Cost of entry is free to all HRSASA members and the public. Closing date for judging to be announced.

COMPETITION RULES:

1. All entries may be either mono or stereo. Those with an internal pre-amp with equalisation will need to be tested in the flat EQ position.
2. All amplifiers must be entirely valve designs (solid-state rectifiers permitted.) There will be two additional categories: Hybrid and fully solid-state (Open category) to accommodate other designs.
3. All entries must be the applicants own work, or that of a DIRECT relative and must be an SA resident. (Deceased direct relative who contributed is permitted.)
4. Modified or commercially built equipment is not permitted.
5. Each submitted amplifier should include a schematic diagram (hand-drawn is O.K.) and should include a paragraph highlighting “clever” or “novel” aspects to its design or construction.
6. Credit will be given to other information supplied, such as photographs taken during construction, test results, notes on what worked and what didn’t during construction process.



HRSASA VALVE AMPLIFIER BUILDING COMPETITION 2024

ENTRY FORM

Please email all entries to: pres@hrsasa.asn.au

<u>ENTRANT DETAILS:</u>	
Name:	
Address:	
Phone number:	
Email address:	
HRSASA Member No:	
Amplifier Description:	
<u>CATEGORIES: (Circle one)</u>	
1. Single Ended 2. Less than 17 watts (push-pull) 3. OTL Amplifier (Output transformerless) 4. Hybrid amplifier 5. More than 17 watts push-pull 6. Open section (including solid state)	

HRSASA VALVE AMPLIFIER BUILDING COMPETITION 2024

ENTRY FORM

Please email all entries to: pres@hrsasa.asn.au

<u>ENTRANT DETAILS:</u>	
Name:	
Address:	
Phone number:	
Email address:	
HRSA Member No:	
Amplifier Description:	
<u>CATEGORIES: (Circle one)</u> 7. Single Ended 8. Less than 17 watts (push-pull) 9. OTL Amplifier (Output transformerless) 10. Hybrid amplifier 11. More than 17 watts push-pull 12. Open section (including solid state)	



AZTRONICS – RELOCATED AND NOW OPEN

HRSA-SA Group Valve Bank:

The SA Group Valve Bank, containing our stock of over 20,000 valves has been relocated from the old AZTRONICS Store where it has been since February/March 2015.



Entry to the new shop is via Frederick Street.

Note the Google Maps distortion of the spelling?

The new AZTRONICS Store, is located right next door in the red brick building. However, there is not enough room to house the whole collection and provide us with a room where we can sort and test the valves we sell.

AZTRONICS will continue to be our “retail outlet” (and point of collection) for valve sales to members and the public. The stock held at the shop will be topped up from the reserve stock that is now being sorted and collated at a couple of different locations.

Cover Story:

Our Editor has been trying to reduce or eliminate hum from a couple of radios. Both radios were basically working fine after being re-capped and had voltages checked, but both had annoying hum in the output..... So, with help from a couple of fellow members and the chapter titled: *Basic Radio Troubleshooting* in the book “Old Time Radios, Restoration & Repairs by Joseph Carr, success was achieved, so here is the text that was followed.

Hum is a low-frequency oscillation, or noise in the output of a receiver. There are several different types of hum in radio receivers: (a) Power-supply ripple hum, (b) 60Hz non-tuneable hum, and (c) modulation, or tuneable hum.

Many broadcast radio receivers, amplifiers and transceivers require high voltage D.C. from the A.C. mains which is supplied to the set from some form of rectifier. But the DC output of the rectifier is not “clean”, or “perfect” and usually is pulsating D.C. which needs to be smoothed.

A ripple filter, consisting of capacitors and either a resistor, or inducer (choke), smoothes the pulsating DC into a purer form of DC. If there is a defect in this filter, then the B+ will be modulated by the 60 Hz (half-wave rectifiers), or 120 Hz (full-wave rectifiers).

Power supply ripple can be identified immediately in full-wave rectified cases because the hum will have a frequency of 120 Hz. However, if the radio uses a half-wave rectifier, then the hum will be at 60 Hz. Some technicians can distinguish power-supply hum because it is a little more raucous sounding than other forms of 60 Hz hum. The oscilloscope will also tell the tale.

Power-supply hum is most often heard when the volume control is turned all the way down. However, it might be possible at times for it to be heard only when the radio is turned up. This condition is rare, however, and is often accompanied by whistles and oscillations. Let’s consider a practical example.

Figure 10/1A (below) shows the half wave rectified DC power supply for an “All American Five” table model radio from the early to mid 1950’s. The ripple filter consists of resistor R1 and capacitors C1A and C1B. The filter capacitor is a dual tubular electrolytic capacitor (Figure 10-1B). Dual tubular electrolytic capacitors often come in aluminium cans, mounted on the chassis.

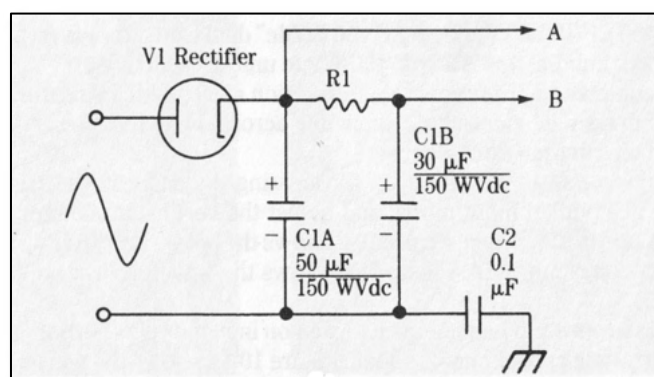


Fig. 10-1(A) A simple half-wave rectified DC power supply.

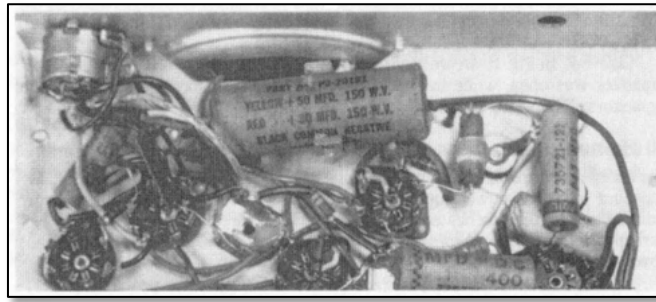
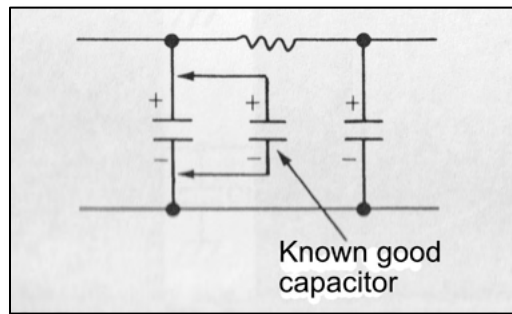


Fig. 10-1(B) The “All American Five” under-chassis showing a brown cardboard dual-section electrolytic capacitor.

The quickest way to determine if the problem is a faulty filter-capacitor is to bridge a known good electrolytic capacitor across the suspected bad section (Figure 10-2). First, turn off the power and disconnect the AC line cord. Wait a few seconds for the capacitors to discharge, and then complete the discharge process by connecting a jumper cord across the capacitor (use one that is insulated except at the tips to prevent an electric shock). Solder-tack the known good capacitor across the suspected bad section, making sure that its leads are not touching anything else, and then plug the radio back in and turn on the power, and wait for it to warm up.



If the capacitor is bad, then the radio will work normally (assuming there are no other faults elsewhere in the radio). To repair the radio, turn off the power and disconnect the set. Again, discharge the capacitors and un-solder the temporary connections. Replacing the “bad” capacitor is really the only solution, even though some electrolytic capacitors can “heal” themselves on occasion. Dual-tubular electrolytics are impossible to find today. By carefully removing the faulty capacitor, two modern, small electrolytic capacitors of the correct size can sometimes be mounted inside the old aluminium can. This is then re-mounted on the chassis with separate wiring extending below for each section. For example, a faulty (50uF x 150 vdc + 30uF x 150vdc) dual electrolytic capacitor can be replaced with (47uF x 450vdc + 35uF x 450vdc) inside the original aluminium can. Some people attempt to repair a multi-section electrolytic capacitor by permanently bridging a single, larger capacitor across the defective section. This is bad practice so don’t do it!

An oscilloscope can also be used for locating the defective section. Use the scope in the AC-coupled input mode and adjust the vertical attenuator to show a reasonable trace on the screen. Figure 10-3 shows the before and after waveforms at point A across capacitor C1A. Figure 10-4 shows the waveforms at point B, across capacitor C1B.

This radio had not been turned on in many years, so both sections of the dual electrolytic capacitor were open. Figure 10-3A shows the waveform across input filter capacitor C1A when C1A was defective. Note the extremely high ripple. When the new replacement filter was installed, the ripple dropped to the level shown in Fig. 10-3B. Likewise, in Fig. 10-4A we see the ripple waveform across C1B when the filter

capacitor was open, while in Fig. 10-4B shows the waveform when both filter capacitors are working properly.

60 Hz non-tuneable hum

The non-tuneable form of 60 Hz hum, assuming that it is not caused by a defective filter capacitor in the DC power supply, is most often caused by cathode-to-heater, or cathode to grid (in directly heated valves) short circuits inside the valves. Perhaps the most common form is the hum heard when the volume control is turned down. In this case, the most likely suspect is the audio output (AF power amplifier) stage. Check the circuit by temporarily replacing the valve with a known good one. In other cases, the cathode short will be in another valve, with slightly different effects on the output.

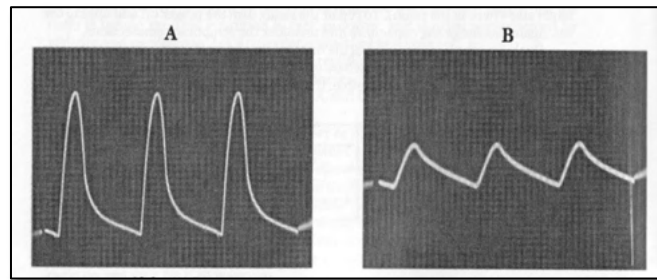


Fig. 10-3 A (left) shows ripple at output of rectifier with a bad filter. B (right) shows with a good filter

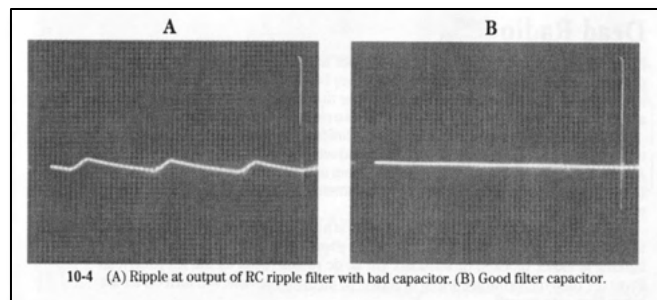


Fig. 10-4 A (left) shows ripple at output of RC ripple filter with bad capacitor. B (right) shows good filter capacitor.

A valve-testing machine with the ability to detect short circuits can be used to locate the bad valve, even though the emission and trans-conductance of the valve may be O.K.

Tuneable Hum

This form of hum, also called modulation hum, is heard only when the radio is tuned to a radio station and might disappear when the announcer quits speaking (this latter effect is only seen occasionally).

There are two main causes of modulation, or tuneable hum:

Cause 1. The AC line RF filter capacitor (C1 or C2 in Fig, 10-5) might be open circuit. Replace this capacitor with one of the same value. NOTE: The ground end of these capacitors is marked with a stripe or a dot. The term *ground end* does not refer to a polarity situation, but rather to the lead that connects to the outer plate of the capacitor. Noise and RF interference tend to be less when the ground end is actually connected to ground.

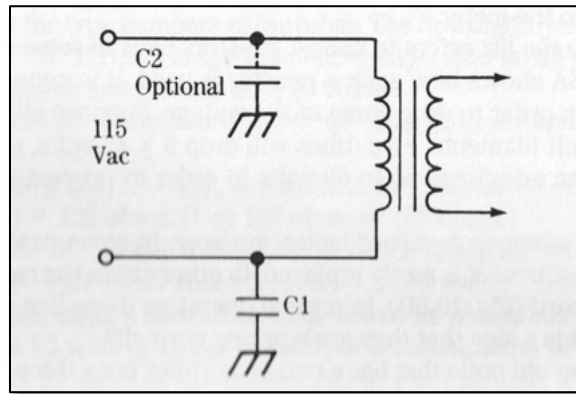


Fig. 10-5: Anti-hum capacitors on primary side of transformer. Capacitors are selected for this application should be rated at 1600 volts and be specified for continuous AC operation.

The second possible cause of tuneable hum is a cathode-heater short in the RF amplifier or converter valve, or on older sets, the local oscillators and/or mixer. As stated above, replace this valve with a known tested one.

HRSA-SA Group - Amateur Radio Call-Back Network

In 2020, when our HRSA-SA Group was unable to hold meetings due to Covid-19, a small group of licensed radio amateurs decided to hold a local call-back net.

The first broadcast was on the 26th of April 2020. Although the ban on meetings was soon lifted, the broadcasts have continued and as we approach the completion of our third year, we have had over 147 broadcasts.

While the aim is primarily for HRSA members, non-members are also welcome, the more the merrier. The group has a small band of listeners who either do not have the required licence or do not have transmitting facilities. Topics generally centre around historic radio, or activities coming at HRSA events, plus a range of widely varying content, can be heard.

For those licenced amateurs and those that would like to listen to the broadcast and have the correct facilities the details are:

Wednesday Nights (each week) – Starting at 2000 hrs.

On VK5RAD repeater (Crafers) on 147.0 MHz. (Note: We will remain with the Crafers repeater until the Houghton repeater is fully upgraded and operational.)

There are generally two full rounds and a quick “wrap-up” round.

New participants are most welcome.

So why not tune in and listen, or join in the conversation?