Become one of our volunteers !

Learn from our experts.

We can give you training in your area of interest --
electronics repair, cabinetry,
tour hosting, display construction,
radio production, and more.

For more information, contact the museum (Sundays) at: 604-777-1885, or call

PAUL	604-277-4489
BRUCE	604-299-1116 or 604-298-1038
PETER	604-294-5998
FRED	604-942-6901

SPARC's e-mail: radiomuseum@telus.net

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SPARC Vintage Radio Museum
Suite 220 – 4411 Hastings Street
Burnaby, British Columbia
Canada V5C 2K1

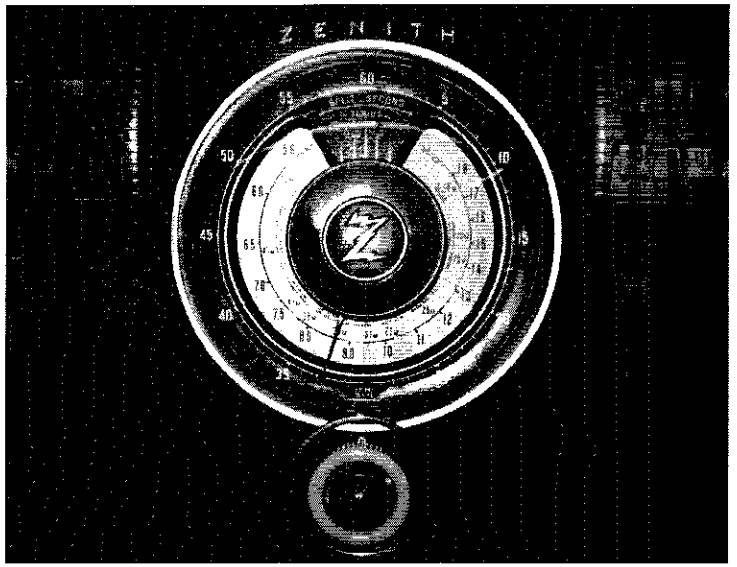
Visit the SPARC Museum
open Sundays, 10 a.m. to 4 p.m.
in the Riverview Hospital grounds.

Take exit 44 from Highway 1 onto the Lougheed Highway... Enter the grounds, turning left at the lights at Colony Farm Road... Follow Holly Drive, then turn up the hill at Oak Crescent. There are SPARC signs.

S. P. A. R. C.

NEWSLETTER of the
SPARC Vintage Radio Museum

JANUARY, 2005



Most of a Radio's Personality was
In its frequency dial!

This is one of our shutter-dial Zeniths,
set to its international shortwave band band.

Society for the Preservation of Antique Radio in Canada

Annual General Meeting !! February 20th, 1:30 pm.

The ***S.P.A.R.C. newsletter*** is published by The Society for the Preservation of Antique Radio in Canada, a charity registered under the laws of the Province of British Columbia, Canada. S.P.A.R.C. is a member of the British Columbia Museums Association.

Back Issues
http://www3.telus.net/radiomuseum/news.html

Society President
Peter Trill
sparcmuseum@telus.net

Membership
Paul Johnson
7720 Cheviot Place, Richmond, B.C.,
Canada, V7C 3S6.
604-277-4489

The Society exists for the purpose of preserving, for future generations, the electrical and radio-electronic communications artifacts that defined the 20th Century, and to pass on the rapidly diminishing expertise in their maintenance. The Society's museum is located on the grounds of Riverview Hospital, Coquitlam, B.C. Call 604-777-1885 for information and hours. Special openings with extra display interpreters can be arranged for large groups. Inquiries regarding tax-exempt financial donations and bequests should be directed to the Society's solicitors, Russell and Company, Suite 220, 4411 East Hastings Street, Burnaby, B.C., V5C 2K1

E-MAIL: radiomuseum@telus.net
WEB-SITE: www3.telus.net/radiomuseum

The President's Message

The year 2005 is significant for the SPARC Vintage Radio museum, as it is our tenth-anniversary year. Last week, I uncovered some photos from the first or second year of our existence. I poured over them very closely to see what was up for public display back then. There was a fair number of items, enough to make an interesting open-house, which seemed to have lots of visitors.

The natural thinking was to compare the presentation seen in the pictures to the overall impression a visitor receives currently. There is no comparison. About five years ago, we organized our collection into theme galleries, in each of which there are enough examples of radios and associated items to make obvious the progression of technology over the decades. Amongst the elegant classics, there are also the design failures, the cosmetically ugly, the overpriced, the impractical, the marketing flops, the unaffordable, and the outright "dodos".

The gallery layout and the variety make it possible to convey this progression in the art of radio. Now here's my call. Having established a world-class radio collection, what we're still short of is the man-hours to **manage** and **publicize** the growing collection (do we say person-hours yet?). As a member, consider how you might enjoy taking part in some of the activities. Our present lack is promotion (let's get more of the public to realize we exist), and tour-hosting (we need to be ready for the crowds that come out!). The rewards will be there!

Peter Trill - My direct address is sparcmuseum@telus.net

A "Tape Guide" ... Reel-to-Reel Basics

By Peter Trill

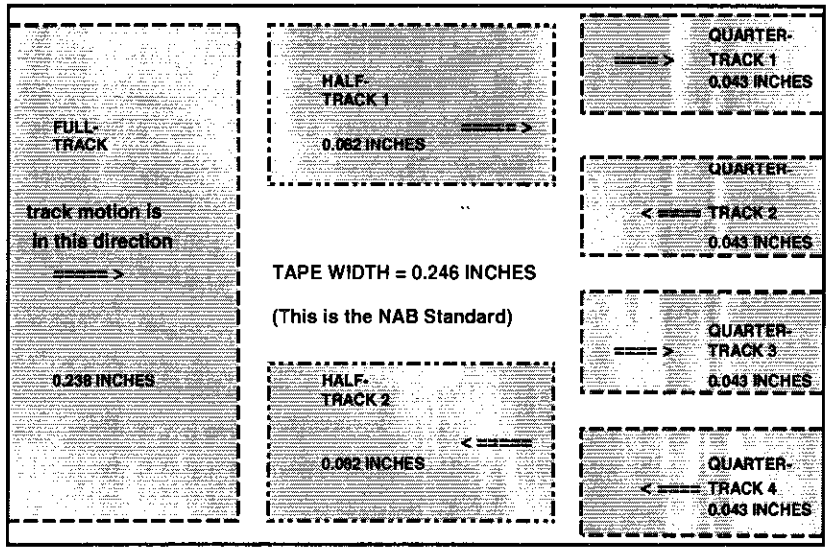
When the art of high-quality recording on tape became part of broadcasting, there was a revolution in studio operations. How this came to be is told in the Station Break column in our January, 2002 newsletter (use the NEWS button on our web home-page). Radio studios adopted the tape medium from 1948 onward, and consumer-caliber tape recorders capable of quality that surpassed wire recorders invaded the world in the early fifties.

How many of us have shelves of tapes carrying irreplaceable recordings that we are wanting to copy to CDs, or even cassettes? How does one find the right machine with which to play them back? You may own a one-of-a-kind tape that is an air-check of the Happy Gang show from the fifties. Let's find out what the hurdles are in getting back those old sounds.

The Format

The tape is certain to have a quarter-inch width, but there are variations in the format of the tracks on it. Early tape recordings were monophonic, so the recorder's erase, record, and play heads used magnetic gaps that covered the entire tape width. The

consumer machines that followed made a concession in favour of tape economy by using only half the width of the tape in one pass, allowing the user to turn the reel over and record the same amount of time with the tape moving in the reverse direction. The record head's swath was less than the expected one-eighth inch to ensure that playback would have low cross-talk from the recording on the other side of the tape. The figure here will help to visualize how these tracks are positioned in a well-aligned unit.



Now we can start to make observations. Notice that a half-track machine can play a full-track recording, but a full track unit will play both tracks from a half-track machine. If track 2 is a different program recorded in the opposite direction, it will be heard backwards, although two tracks of stereo would be heard as mono. If a tape that previously had a full track program is used to record on a half-track machine without bulk-erasing it first, the half track erase head will not get rid of the old recording in the

center part of the width. The old sound will be heard as a playback remnant on a full-track unit.

In comes stereo

For stereo, professional machines adopted the half-track format, but consumer machines placed four tracks onto the tapes. Track 1 was LEFT and track 3 was RIGHT. When the tape is turned over and used in the other direction (again, an economy measure), tracks 2 and 4 are used. Notice that because of where the recorded swaths lie relative to one another, half-track stereo played on a quarter track machine requires that you turn up the right channel (by 7 dB). The same is true playing quarter-track stereo on a half track machine, but only works if the "other side" of the tape is blank, or made blank by doing the erasing on a well-aligned quarter-track deck. Very rarely, you will find staggered half-track stereo tapes, released for machines that were either retrofitted with a second head, or made by manufacturers before they had developed heads with two in-line gaps.

It should be mentioned that the advantage in wider tracks is with noise performance. The more real estate used for recording, the more the signal will be above the hiss from the tape's magnetic particles. Notice that the full-track tape devotes about three times the real estate to the job, not two times!

By studying the figure, a person can see what can and can't be done playing back tapes, and further, predict the consequences of mixing formats when making new recordings without bulk erasing the tape.

Now that you've found a machine that has the matching track format, just hope that you discover that it can run at the speed of

the source recordings. The most common speeds are 7.5 and 3.75 inches per second (sometimes labelled 19 and 9.5 cm/second), although 1.875 ips will be found. Fifteen-sixteenths is rare. You may come up with 15 ips tapes in your collection from professional or high-end machines. If you're really stuck, a copy could be made to a second deck for speed-shifting! Always use direct audio connections! "Line Out" is preferred to "Speaker".

One ugly condition can appear now. Your tape may be "sticky", causing the played tape to squeal, or even stall!. These tape can be baked to temporarily remove this condition. The description of this process is best found by a web search for "tape baking".

Stay Tuned!

The Wireless Hall of Fame

A Series of Articles about radio's early pioneers
by Bruce Winter

Donald L. Hings - Radio Inventor passes on

Donald L Hings, developer of a portable communications device that was to become known as the "Walkie-Talkie", died February 25th 2004 at the age of 96, in Burnaby BC. He was a pioneer in the field of telecommunications, and is best known for his development of a portable two-way radio he called his Packset.

Mr. Hings was born in Leicester, England, and as a young boy moved with his family to Lethbridge, Alberta and later to North Vancouver, BC. He was to complete a two-year radio course in New Westminster before moving to Rossland.

It was while working in Rossland for Consolidated Mining and Smelting (Cominco), between 1931 and 1939, that he developed a portable two-way radio for use by the company's northern mining exploration workers. In 1937 this evolved into the model C-58 radio, whose design he turned over to the government as his contribution to the war effort. The versatile design could use a variety of antennas or power sources. It included a voice scrambler to deter enemy interception of field transmissions and an audio filter to reduce background noise. Eighteen thousand were built and shipped overseas during WW II. Prior to that time, the U.S. Army had a motorcycle mounted radio, powered by the motorcycle battery. Its use was limited to Morse code, not voice. Modestly, he liked to say his model was only part of a progression of existing technology.

After the war, Hings returned to BC from Ottawa where he had continued design developments for the Department of National Defence. He purchased a tract of land on Burnaby's Capital Hill. Here he established his homestead / laboratory / business. From the tract of land, he sold building lots to his employees to have them close at hand. His company, the Electronic Laboratories of Canada Limited, worked on contracts in communications, radar and geophysical fields.

His life work includes a wide-range of fields including antenna, radio technologies and geophysical exploration techniques using electromagnetic instrumentation that he developed. His various patents are primarily in the radio communication field but include an aircraft landing system, an electric piano, and even a golf club!

In 2001, he received the Order of Canada from Governor General Adrienne Clarkson. He was a lifetime member of the Professional Engineers Associations of British Columbia and Ontario, the American Geophysical Union and the Canadian Signal Corps where he honed his skills on the Morse Key. He was still very active into his 90's on the Amateur Radio bands with his call sign VE7BH.

More detail about this inventive Canadian, included on Microsoft's top-ten list of Canadian inventors, may be found by searching the web for "Donald Hings". A website maintained by Morgan Burke (his grandson) is apparently no longer working.

The Special Tubes and their Circuits (Part 1)

-- By Neil Sutcliffe, Tube Troll

This time we were to look at the special tubes designed for consumer broadcast radio applications. On consideration, there are only a few different types, and these have been mentioned in past articles, so here I intend to enlarge on their circuit application and features.

The Detector diode

In 1929 the diode re-appeared as a detector as the triode detectors then in fashion were found incapable of handling higher level signals without significant distortion. Initially, triodes with grid and plate connected were used as diodes, but in 1931 Grigsby-Grunow (Majestic) brought out the G-2-S dual diode detector for their own use, and this type was not available to other manufacturers until the introduction of the 6H6 dual diode in 1936. Meanwhile, the diode detector, which allowed easy implementation of AVC, was quickly supplanting triodes and, in 1931-32 the '55 was introduced. It had been found that the emission requirements of the detector diode were so minute, it was almost free to install two tiny plates adjacent to the cathode in an AF triode, and thus create a multi-function tube.

Wunderlich

Another 'special function' tube was the Acturus "Wunderlich" dual grid detector of 1932. Up to this time, the detector of a radio usually consisted of a triode with an R/C in the grid circuit from the 3rd TRF stage or final IF stage, that allowed the RF to be rectified by forward conduction of the grid/cathode and to impose this recovered modulation voltage onto the grid as a low level audio signal for amplification. A drawback of having any load current flow in a tuned circuit is that it spoils the "Q" of the circuit which broadens the bandwidth and lowers sensitivity. The Wunderlich was simply a pair of triode amplifiers with common cathode and common plate (and load). The RF (IF) was fed from the ends of a centre tapped input coil to each grid, and since each grid equally affected the plate current, a constant RF (IF) signal would cancel out since one grid would be going positive (more conduction) while the other was going negative (less conduction) so the net affect on the plate current would be zero. As each grid

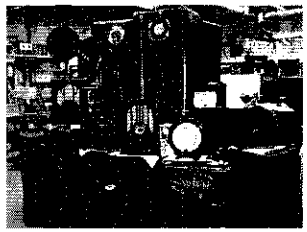
went positive enough to exceed the negative bias, it would conduct as in the single grid detector, but do so on each half cycle making it a full wave detector. Other than the inherent suppression of the 'carrier' the Wunderlich had no real advantage over the simple diode (above) which was coming into common use. As well, with this circuit it was not a simple matter to apply any of the more sophisticated AVC circuits. It was used for less than two years and then faded from the scene.

Electron Ray Indicator

With the proliferation of superheterodyne radios with very effective AVC in the market, the users had begun complaining that the sets were difficult to 'tune in' accurately because the effect of AVC appears to spread the peak of tuning. To assist the user to tune accurately, higher-end sets incorporated a meter movement, either read by a pointer, or casting a shadow on or near the tuning dial. Since meter movements were very costly then, the 'shadowgraph' was developed and is an electro-mechanical transducer in many ways like the high impedance speakers that were just going out of fashion. In this unit, used by Philco and Rogers at least, an electromagnet coil (connected in series with the B+ to the IF stage) rotated a shaft carrying a vane in the path of light shining from a panel lamp onto a opaque screen. With no station tuned in, the IF draws maximum current and the vane casts a broad shadow on the screen. As a station was tuned in and AVC begins to reduce the current in the IF, the pull of the coil on the vane shaft is reduced and the vane rotates to be more in line with the light path reducing the shadow width. In 1935 a replacement of the costly tuning meter (and less expensive 'shadow-graph' indicator), was the introduction of the 'Electron Ray Indicator' more commonly referred to as the 'tuning eye' (AKA 'magic eye') with its built-in amplifier triode. These operate by using the

negative AVC voltage and applying it to the grid of the internal triode amplifier so that when the AVC voltage increases, the positive voltage on the triode plate causes the control vane in the electron stream to 'appear' narrower and thus cast a narrower shadow on the fluorescent target which was typically located behind or next to the tuning dial. These tuning eyes came in two basic flavours, the original 6E5 with an angularly variable 'shadow' akin to the shadow meters then in common use, and the 6G5 which had a radial shadow and a broader control voltage range than the 6E5. Without a visual reference, the 6G5 was not much help in tuning, and soon was dropped in favour of the angular shadowed 6U5 which was functionally identical (thus the dual branding 6G5/6U5). Later variants added a second shadow 180° from the first (6AF6) and external twin amplifiers (6AE6) as well as a 12.6V filament octal version (1629). Another indicator that appeared about this time was the "Flash-O-Graph", a neon lamp whose illuminated length varied with the AVC voltage. Even with the availability of these less expensive indicators, their use was still confined to the higher-end models. Their use had just about faded out by the mid '50s, but the use of tuning meters reappeared in the '60s with the better transistor radios and on many HI-FI tuners.

In the next issue, Neil will explain the direct-coupled triode amplifier, and the all-important "special" tube, the pentagrid frequency-changer and its evolution.



From the Television Gallery

Fifty years ago RCA was anxious to see some return on their considerable investment in an all-electronic system of colour television. They introduced the model CT 100 in March of 1954 and called it the Merrill.

The museum has one, donated by Don Jackson. Unfortunately, it is presently non-functional. If any of our members have old magazines that may have described its introduction, and would care to donate them to the museum, please contact Peter Trill or Bruce Winter.

The Merrill had a 15-inch round metal picture tube, 36 additional tubes, consumed 475 watts and initially sold for $1000. In 1954 a 2 door Ford family sedan was under $1800. The average hourly wage was about $4. There were only a few hours a week of colour broadcasting available in the larger US cities. Sales were slow. The Merrill was about ten years too early. RCA manufactured approximately 5000 of the Merrill, however there are now only about 100 known sets remaining, and considerably fewer in operating condition, mostly because of the scarcity of working picture tubes.

Westinghouse, among others, began introducing sets in the $500 range and RCA was forced to reduce the price to $475. A major factor in lowering the price was the development of a cheaper shadow-mask picture tube with a 21-inch round metal envelope.

A chance discovery by Peter Trill led to contact with a small group of individuals (http://www.earlytelevision.org/rca_ct-100.html) dedicated to restoring these sets to operating condition.

Peter passed on the details of a letter found tucked in the back of our set, from a gentleman in Philadelphia, Pennsylvania, that had several picture tubes for sale. From his home in New Jersey, one of the group (at www.pakratz.com/ct100main) drove to the Philadelphia address. Unfortunately, the business was gone, a vacant lot being all that remained. This person did eventually track down the gentleman, who has a CT100 of his own, and another devotee was added to the list of those dedicated to the preservation of this example of early technology.

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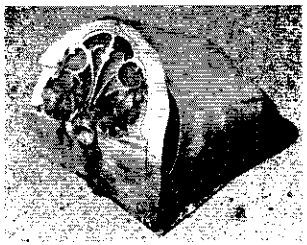
Here's SPARC's participation at a local radio swap meet.



New Additions to the Museum Floor

- In the TV section, we are running black and white sets from the early fifties -- one carries old TV programs, and another displays a period test pattern from a "flying-spot scanner".
- New examples of receivers have been added to the shortwave section. The Hallicrafters group is very complete. The SX-42 and SX 62 goliaths are on display. A National HRO-60 is there now.
- New ham radio equipment items have been donated. Several are operational in the "shack". See the KWM-1.
- The giant Ward Beck audio mixing board from CTV is now on display, in company with several new broadcast items.
- Have you seen the Philco "wreck"? We've decided that this model 20 is a better display in its time-ravaged state (see picture) than in a restored condition!
- A number of floor and table-model radios have had restoration lovingly completed (not the Philco!). The variety on the floor is steadily increasing.
- Donations continue to arrive in the periodicals section. We have a comfortable reading chair in a quiet corner of the library.