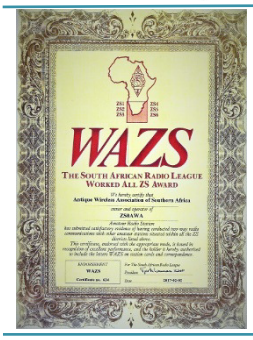
# Newsletter

The Antique Wireless Association of Southern Africa

**# 155**

**June 2019**

A Member of the SARL




Inside this issue:





## Reflections:

Just the other day we were talking about recovering from the Silly Season and all the money that had been spent on going away on holiday instead of buying that R20k rig that you have been promising yourself for the last 20 years and look where we are already. Nearly time to start dreaming about that rig again and how you going to get it for yourself for Christmas, but just remember its now gone up by at least 30% with the Rand/Dollar exchange, the cost of imports and everything else that goes with it.

The next best option of course is to buy yourself two old valve radios, spend a quarter of that amount on buying new valves and components and have a wonderful time restoring the rigs to their former glory. Much more satisfying than having a plug and play thing that doesn't even talk to you. And you cant watch Youtube on.

Now don't get me wrong, I am certainly not saying that technology isn't good. I class myself as one of those who is fairly well enlightened in the modern world of technology and digital communication. I have a reasonably high tech smart phone that does it all for me, I love computer software and apps that give you access to so many things on the internet. I delve into FT8 and digital comms. But I love valve radio. There is just something about tuning up an old rig yourself, instead of pushing a button and watching it do it on its own, that makes radio so much more satisfying.

I know all about loading a rig and setting the plate to get maximum smoke, while so many look at you and say "what's that ?"

I know about turning down the RF gain and bringing up the AF Gain to get rid of noise on the band instead of turning on an electronic device that does it for me.

I also know the joy of having cleaned the chassis on a rig and washed it in luke warm soapy water to get all the grime and grit off of it and then cleaning up the bits and pieces and testing valves and capacitors to make sure they are in working order at the right values, instead of having to change an entire board that is full of microchips, and you don't know which of them is faulty, so minute that if you bring a soldering iron near them they disintegrate.

Here's to another 100 years of tubes and the warmth of their glow in the dark technology.

Best 73

DE Andy ZS6ADY

# WIKIPEDIA

**Modes of communication**:

**Digital:**

**Digital mobile radio** (DMR) is an open digital mobile radio standard defined in the European Telecommunications Standards Institute (ETSI) Standard TS 102 361 parts 1–4 and used in commercial products around the world. DMR, along with P25 phase II and NXDN are the main competitor technologies in achieving 6.25 kHz equivalent bandwidth using the proprietary AMBE+2 vocoder. DMR and P25 II both use two-slot TDMA in a 12.5 kHz channel, while NXDN uses discrete 6.25 kHz channels using frequency division. The standard has become popular within the amateur radio community due to the relative lower cost and complexity compared to other commercial digital modes.DMR was designed with three tiers. DMR tiers I and II (conventional) were first published in 2005, and DMR III (Trunked version) was published in 2012, with manufacturers producing products within a few years of each publication.

The primary goal of the standard is to specify a digital system with low complexity, low cost and interoperability across brands, so radio communications purchasers are not locked into a proprietary solution. In practice, many brands have not adhered to this open standard and have introduced proprietary features that make their product offerings non-interoperable.

## *HF Happenings:*

**The results of the second Wednesday 80 m Club Sprint**

Let us try again! MWeb have a "fantastic" spam filter on their system – that which it must catch, it lets through and that which must go through is caught!

The contest Committee received 38 logs for the second leg of the SARL 80 m Club Sprint, even though propagation was not very favourable. During the March leg, 744 QSOs were made compared to 296 QSOs for the May leg. Seven (7) Clubs are represented in the results.

The third leg of the Wednesday 80 m Club Sprint takes place from 17:00 to 18:00 UTC on Wednesday 17 July 2019.

1st the West Rand ARC – 401 points (11 logs)
2nd the Bo-Karoo ARC – 268 points (11 logs)
3rd the Boland ARC – 177 points (8 logs)
4th the Highway ARC - 77 points (3 logs)
5th the Midlands ARC – 57 points (1 log)
6th the Hibiscus Coast ARC – 45 points (3 logs)
7th the Secunda ARC – 7 points (1 log)

The Results after the second leg of the Wednesday 80 m Club Sprint

1st West Rand ARC – 836 points
2nd Boland ARC – 651 points
3rd Bo-Karoo ARC - 588 points
4th Highway ARC - 416 points
5th Bloemfontein ARC - 195 points
6th Midlands ARC - 161 points
7th Hibiscus Coast ARC - 134 points
8th Sandton ARC - 85 points
9th Cape Town ARC - 54 points
10th PEARS - 50 points
11th Sandringham Scout Group - 44 points
12th Secunda ARC - 32 points

Calendar:

June
1 - West Rand Flea Market
3 to 5 -Footprint Festival, Morgan's Bay
4 - Eid al-Fitr
5 - World Environment Day
7 - World Oceans Day
7 to 17 - Hermanus Fynarts Festival
8 - SARL VHF/UHF QSO Party
9 - Pentecost; Hammies Sprint; Comrades Marathon
14 - Provincial Schools close
15 - SARL Youth Sprint
16 - Youth Day; Father's Day;
17 - Public holiday; World QRP Day; Closing date for Hammies logs;
18 - Highway ARC monthly meeting
20 to 24 - SARL Top Band QSO Party
21 - Winter Solstice
21 to 23 - Ham Radio 2019 in Friedrichshafen
21 to 30 – Knysna Oyster Festival
22 – the AGM of the Namibian Amateur Radio League
22 – the Drakensberg Polar Bear Swim Challenge, Dragon Peaks Dam
22 and 23 – ARRL Field Day
26 to 30 - Innibos Fees, Nelspruit
28 to 30 - Kirkwood Wildsfees
29 – the 24th Polar Bear Swim at the Bundu, Ventersburg
30 - End of the SARL Financial Year; International Asteroid Day

**LoTW News**

The ARRL Web page reported on 23 May: LoTW Now Accepting FT4 Contacts. The latest TQSL update (Config.xml version 11.8), released on 22 May, includes FT4 as a sub mode of MFSK. It also adds AISAT-1 and PO-101 in the satellite category.

As of 23 May, 1 048 281 611 contact records have been entered into the system, resulting in 200 387 247 contact confirmations. LoTW has 118 328 users.

**World Castles Weekend**

The World Castles Award Programme's tenth anniversary will be celebrated during an extended activity weekend that will run from 1 to 30 June. A large number of special event stations (4X10WCA, 9A10WCA, DR10WCA, EM10UCF, EN10UCF, ES10WCA, EV10WCA, HB10WCA, HG10WCA, LY10WCA, LZ10WCA, OE10WCA, OH11WCA, OL10WCA, OR10WCA, OS10WCA, OT10WCA, PA10WCA, PB10WCA, PC10WCA, PD10WCA, PE10WCA, PF10WCA, PG10WCA, PH10WCA, RZ1CWC, S510WCA, SP10WCA, TM10WCA, YT10WCA, YU10WCA, Z310WCA and possibly others) are expected to participate in the celebrations. Complete detailed information on WCW-2019 can be found at
http://wcagroup.org/.
What about South African Castles?

**N1MM Logger+**

*N1MM Logger+,* representing over 60% of nearly any contest's "market share" for loggers, has a new website http://n1mm.com/. Larry, K8UT, pointed to a summary of the changes, but the most significant are fewer number of pages, better search capabilities, better bug/issue tracking visibility and reporting, and a "single sortable/ searchable table listing all supported contests https://n1mmwp.hamdocs.com/new-website-features/."
Other amateur radio software projects should take note: the ability for website visitors to easily see the status of issues and reported bugs is a feature that helps the development team by reducing the volume of messages of duplicate reports for a single common issue.

**RBN Competition**

There is a "kind-of" competition between RBN receiving stations to receive all 18 NCDXF beacon stations over a 24 -hour time period. Jose, CT1BOH, sent e-mail to the Reverse Beacon Network (RBN) operators on 14 May: "13 May was a good propagation day, and both CT1BOH and ON5KQ Skimmers have copied all 18 NCDXF Beacons, with KH6RS being the last one for both of them." This is a good competition, because on the days that the receivers "win" because of good propagation it's more likely you'll make more DX contacts.

**The RT4500HD Heavy-Duty Antenna Mast Rotator**

DX Engineering announced their first antenna rotator they've ever manufactured, the RT4500HD Heavy-Duty Antenna Mast Rotator. It boasts of improved reliability, improved wind load handling, and easier maintenance among its many features.
https://www.dxengineering.com/techarticles/dxepressreleases/dx-engineering-introduces-new-heavy-duty-antenna-mast-rotator-at-dayton-hamvention-2019.

**RF2K-S HF + 6 m amplifier**

RF-KIT's new solid-state legal-limit RF2K-S HF+6m amplifier will be available from DX Engineering in the northern hemisphere autumn of 2019 in both kit and FCC-certified assembled forms. Features include silent PIN diode switching, a 7-inch colour touch screen, internal antenna tuner, and CAT/LAN/Wi-Fi connectivity, along with software updates via the Internet. "RF-KIT is widely recognized around the world for its competitively priced, high-performance amplifiers. We're proud to be the company responsible for getting the new RF2K-S into the hands of customers in North America--fast and conveniently" states Tim, K3LR, CEO of DX Engineering.
https://www.dxengineering.com/techarticles/dxepressreleases/dx-engineering-named-the-exclusive-north-american-retailer-of-rf-kit-s-new-amplifier.

**Word to the Wise**

Macro - a macro is a fragment of a message sent by a computer logging program during a phase of a contest contact. The macro is the part of the message that the computer may fill in with specific information such as call sign or serial number. Macros can also be "silent" but perform some logging operation such as clearing an entry field. An example message containing a macro is "CQ TEST {MYCALL} {MYCALL}."

**The (Elecraft) K4**

Max, NG7M "cornered Eric, WA6HHQ, for a few minutes and did a quick Q&A on the (Elecraft) K4.... https:// www.youtube.com/watch?v=RehH4xYt2Ls. Eric gives a quick overview of the three different version of the K4, K4 HD and the K4 HD with the Superhet module, plus touches on several other topics based on my random questions.

**Everything You Need to Know About USB and Serial Interfaces**

Bob, N6TV, has uploaded a presentation entitled "Everything You Need to Know About USB and Serial Interfaces" https://bit.ly/USBserial. He presented this at the Dayton Contest University (CTU) last week. He has also updated his presentation "The Advantages of Waterfall Displays for Contesting and DXing https://bit.ly/ UsingWaterfall2019."

# The History Behind The R.L. Drake Company

**Written by Bill Frost (WD8DFP)**
**Service Department Manager, R. L. Drake Co.**

The R. L. Drake Co. was founded by Robert Lloyd Drake Sr.. He was the eldest son of four children and also the father of four children. Born in Cincinnati, Ohio, he attended the University of Cincinnati after graduating from high school. At that time, the university was a city college and he lived at home while attending college.

Graduating in the early 1930's, Mr. Drake was first employed by Dayrad (Dayton Radio Co.) in the Engineering Department. He later went to work for the Bendix Corp. in their Aviation Department. Mr. Bill Lear, of Lear Jet fame, hired Mr. Drake to work for his company, which was Learavia, in the Engineering Department.

Mr. Drake's hobby was amateur radio. He enjoyed talking to other amateurs on the "wireless" and had tinkered with the design of different filters to help improve his reception, as well as his transmitted signal. The amateur radio operators at the other end of the wireless radio, were very interested in obtaining these filters for their own equipment.

In 1943, Mr. Drake decided to start his own company and leave his secure position at Learavia. He gathered three other people to help him design, and build his products. One of the individuals was Katherine "Katy" Quake, who worked for the company until 1988. Another was Milton "Milt" Sullivan, a fellow Engineer and amateur radio operator. The company began at 11 Longworth St. in Dayton, Ohio. The upper level of the building was rented to a manufacturer of coat hangers.

Products at the time were mainly low pass filters and high pass filters for the amateur radio operator and for military use. Filters for amateur radio use were a part of the company's product line for over forty years. A tank jamming device was also produced for the US military. The military also wanted a filter designed to eliminate the jamming, but this could not be done due to the method Mr. Drake had designed. He had a difficult time convincing the government officials that it could not be done. The tank jamming equipment was successfully used in major events of WWII such as Normandy Beach on June 6, 1944.

The recession that followed WWII meant difficult times for everyone, the R. L. Drake Co. included. The Company managed to survive the hard times by continuing the production of filters and by doing small jobs for larger companies. This included making table lamps for S. S. Kresge, spring contacts for General Electric, winding coils and chokes for Delco Electric, and assembling communication cables for an airplane manufacturer.

Ten years later, in 1953, the company moved its 10 to 12 employees to Miamisburg, Ohio. The new location was in the once famous Baum Opera House. This building later became the home of Star City Marine. They say, that if you stand in Market Square and catch the sun just right you can see the name, Baum Opera House showing through the faded paint on the building.

The product line now included more accessories for amateur radio operators, such as Q-multipliers for HRO and National receivers, product detectors for Collins Radio receivers, and the Drake High Patch phone patch. Being an amateur radio operator himself (W8CYE), Mr. Drake had modified his own Hammarlund receiver for single sideband reception. However he was not totally satisfied with the receiver's performance and knew that he could design a "better mouse trap."

While recovering at home, from a bad case of hives, partially due to worry about the survival of the company and its employees, he began the design of the 1-A single sideband receiver. The receiver was long, thin, and tall like a mailbox. It was very different to the large box like conventional receivers that were on the market. This receiver was destined to be the first receiver designed solely for single sideband reception. All other receivers for amateur radio use received only on AM (Amplitude Modulation) or were old military AM receivers, which were then modified by the amateur radio operator for SSB (single sideband) reception. Single sideband was in its infancy and many amateur radio operators said it was only a fad and would never last and certainly would never equal AM operation.

Once the 1-A was finished, he was unsure that he could mass produce such a product, let alone finance it. He decided to offer his design to well known receiver manufacturers such as National, Hammarlund, and Hallicrafters. After many letters were mailed back and forth neither party was able to reach any type of agreement. A turning point came when Francis R. Gibb or "Gibby" as he was known to his amateur friends said "You build'em and I'll take the first hundred." Gibby was a good friend of Mr. Drake and he was a well known supplier of amateur radio equipment, as he owned and operated Universal Service in Columbus, Ohio. Another amateur radio equipment supplier, Hyde "Rube" Rubel, of Srepco in Dayton, Ohio, also supported the 1-A receiver concept and urged production of the first single sideband receiver.

The first ten or so 1-A receivers were built at the old Baum Opera House location, then in 1958 the company moved to the present 540 Richard Street address, as more room was needed. The production of the 1-A was then put into full force. The 1-A design was based on a simple to operate concept, no bells, no whistles, easy to service, high

quality, and high performance. Cosmetically, it was plain, the front panel was black, the cabinet was black, and it was soon dubbed "The Black Box" among amateurs. Receivers prior to the introduction of the 1-A were large, bulky, had large knobs, large meters, and were often called "Boat Anchors."

The 1-A receiver was a success, as it was well received by amateur radio operators. However, amateurs wanted a receiver that had both AM reception and SSB reception, built with the performance of the 1-A. AM was still the most popular mode of communication between amateurs, but SSB was slowly growing in popularity. The 2-A was designed and produced to meet this requirement. It was soon followed by the design of the 2-B receiver, which included several improvements. Mr. Drake offered the 2-B receiver design to radio receiver manufacturers such as Globe Radio and Hallicrafters, as he felt uneasy about increasing the size of the company. Unable to come to terms, it was decided in 1961, to proceed with production of the 2-B under the R. L. Drake Co. name.

In 1963, the company introduced its first transceiver and named it the TR-3. The TR-3 was a tube type unit, as were all Drake products at that time. It used a 9.0 MHZ IF, tube type VFO (Variable Frequency Oscillator), and three 12JB6 sweep tubes as the final output tubes. The sensitivity was excellent and the 300 watt PEP final output stage gave it the punch needed by the amateur radio operator. The demand for the TR-3 was tremendous and its popularity grew as did the name Drake.

In 1965, the Inland Testing Laboratory ( a division of Cook Electric, Chicago, Illinois) was purchased by Mr. Drake. The name was changed to Dayrad, a name familiar to Mr. Drake as helping him start his earlier years. Unfortunately, a few years later, the equipment was sold and the company was dissolved, as there was not enough work to keep the employees busy. Some employees were transferred to the Miamisburg plant.

Then in 1966 a completely new line was designed and introduced, which became known around the world as the "Drake Twins." The receiver was the R-4 and the mating transmitter was the T4-X. Also produced were accessories such as the W-4 wattmeter, the MN-4 matching network, the MS-4 matching speaker, and the AC-4 power supply. The R-4A soon replaced the R-4 and the L-4 linear amplifier was introduced along with the MN-2000 matching network. The L-4 and the MN-2000 proved to be two of the most desired products by amateurs around the world. These two products are still sought after by amateurs today.

Shortly after the R-4A had reached the market, the company was approached by Radio New York Worldwide to build a low cost International Shortwave receiver for their own use. The SW-4 was designed primarily from the R-4A concept and was to receive AM only. The front panel stated "Designed especially for Radio New York Worldwide." Again, not wanting to expand beyond the companies means, the receiver was offered to RCA. Who, at the time, was a leader in communications type receivers. RCA was at the time producing the CRM-R6A receiver for the world communications market and declined the offer. The SW-4A short wave receiver soon followed the SW-4 with several improvements and with more solid state devices being used instead of tubes.

The C-4 station console was introduced in 1966 and was another first in amateur radio equipment. The unit was engineered and designed by Ronald E. Wysong, who was later to succeed Peter W. Drake as president and CEO of the R. L. Drake Company. The unit housed a phone patch, rotor control, wattmeter, equipment control switch, ID timer, 24 hour clock, remote antenna selector, and it could also control the AC power to other units in the "Ham Shack." Thus turning off the C-4 could turn all of the amateurs' equipment off. It also grounded the amateurs antenna coax lines to help protect the equipment from the dangers of a lightning strike.

Also in the year 1966, Ron Wysong was interested in cameras and photography as a personal hobby. He learned that printed circuit boards involved photography and negatives. He persuaded the company to invest in the first steps toward a printed circuit board department. He made an etching table out of plywood and 2x4's, mounted a motor to vibrate the table top, and was soon making progress. The first printed circuit board to be used in a product was the audio board of the R4-B receiver. This was the start of the PC Fabrication Department.

In the year 1967, the 2-C receiver and the 2-NT CW transmitter were introduced which filled the need of a good low cost novice station for many beginning amateurs. The TR-4 transceiver replaced the TR-3 with several improvements, including a solid state VFO, and a BFO circuit.

The R4-B, T4-XB and the L4-B were improved versions of the earlier products and were introduced in late 1967. The production rate was averaging four to six units per day of most products. More room was needed and an addition was made to the building to provide office space, an Engineering Department and a lunch room area. The Engineering Department was sharing space with the Machine Shop in a small building across the railroad tracks from the main plant. The new addition would give the entire building to the Machine Shop.

The SPR-4 was introduced in 1970 as a replacement for the ever popular SW-4A. The receiver was all solid state, could receive both SSB, AM, CW, and RTTY. Crystals could be added to extend the listening range to meet the needs of the owner. The two meter FM (Frequency Modulation) band was gaining in popularity and the ML-2 two meter FM transceiver was introduced. This was the first unit to be imported and sold bearing the R. L. Drake Co. name. This lead to the import of the TR-22 portable 2 meter transceiver and the TR-22M portable transceiver. The

TR-22M was a marine transceiver which allowed the company to enter into the marine communications market. The introduction of the TRM single sideband transceiver followed and its use ranged from small shrimp boats to the larger oil tankers. The TR-22C was imported to replace the TR-22, which was later replaced by the TR-33C. All three units required crystals for each channel, unlike the synthesized handheld units of today.

The DSR-1 receiver was introduced in late 1971. It covered the complete HF spectrum and used "nixie" tubes for the digital display. It also allowed reception of independent sideband as well as single sideband and AM. It was followed by the MSR-1, a 19 inch rack mount commercial type receiver. The MSR-1 was used aboard ocean going ships as the mains receiver or primary receiver. The DSR-2, MSR-2, and the MSR/FMP succeeded the DSR-1 and MSR-1. These units contained gold plated switch contacts to minimize contact failure in the salty air.

The ever popular C-line was introduced in 1973 to replace the B-line twins. The C-line units made use of more solid state components, a dual dial VFO, a plug-in antenna change-over relay in the T4-XC, and crystal filters replaced the old reliable Pass Band Tuner in the R4-C. The R4-C receiver and the T4-XC transmitter are still sought after by many amateurs and held as prize possessions by others. Accessories included the TC-2 two meter transverter and the SC-2 receiving converter, the TC-6 six meter transverter and the SC-6 receiving converter. The TR-6 six meter transceiver was also introduced.

The SSR-1 receiver was imported and added to the shortwave receiver line as a low cost unit covering the complete spectrum from the broadcast band through 30 MHz. A whip antenna and a compartment for eight D-cell batteries made it portable.

In 1975 amateur radio operators across the world were in mourning as word spread that R. L. Drake Sr. had passed away. They had lost a very dear friend, a fellow amateur, and a pioneer of Amateur Radio. The operation and management of the company was turned over to Peter W. Drake, as Mr. Drake had been training his son to assume his position for some time.

Drake amateur radio equipment can be found on every part of the globe. If the equipment is not there, the name Drake is known and respected. Amateur Radio operators come in all walks of life and at one time or another have owned, wanted, or used a piece of radio gear manufactured in Miamisburg, Ohio. King Hussein of Jordan has used Drake gear, as well as Barry Goldwater, Roy Neal, and Ronnie Milsap.

The amateur radio station aboard the Queen Mary was once a complete line of Drake equipment. The R. L. Drake Co. amateur radio equipment has been use in hot air balloon flights trying to fly non-stop across the country or around the world. An around the world attempt on a sailing yacht used Drake gear, the details were outlined in an issue of the Smithsonian Magazine. The non-stop flight of the Voyager was aided with Drake gear. Many far away and remote islands have been temporary home of DX-peditions using Drake gear to contact their fellow amateurs. A complete 7-line was taken to China as international goodwill by a California University. Famous amateurs include James Stewart, Chet Atkins, Joe Walsh, and Astronauts such as Owen Garriot and Tony England. Marlon Brando, at one time, wanted to use Drake amateur radio equipment as a communications link on his island.

In the year 1977, land was purchased in Franklin, Ohio, just off Route 123, to build a new production facility. The production facility was to be completed in three phases. The first phase of the building provided 42,500 feet and was completed in 1978. The Machine shop, PC fabrication department, production lines, and component assembly lines were moved to this new facility. The office staff, Sales department, Engineering department, and the Service department remained at the Miamisburg plant.

Production now included the TR-7, a completely solid state transceiver and a companion receiver, the R-7. Complementary accessories included the L-7 linear amplifier, WH-7 wattmeter, and the MN-2700 matching network, to mention a few. The UV-3 was introduced in 1978, and was another first in amateur radio. It was a single unit housing a 146 MHz band transceiver, a 220 MHz band transceiver, and a 450 MHz band transceiver all in a compact, rugged package. It was designed for mobile operation or for base station use. The MRT-55, designed from the UV-3, proved to be a viable product in the marine radio market, and led to the production of the MRT-55C. The RR-3 was introduced in 1981 to replace the RR-2 which had replaced the RR-1 earlier. The RR-1 had gained popularity as being a very reliable, low cost secondary receiver aboard ocean going ships.

The TR-4310 transceiver and the R-4245 receiver were also introduced as primary units for ocean going ships. These were redesigned TR-7 and R-7 respectively with a VRTO (variable rate tuning oscillator), full transmit coverage, and with all crystal filters installed. They were also standard 19" rack mount units built for rugged duty. Radio Monaco at one time used four complete rack mounted stations, consisting of the TR-4310, R-4245, L-77, and the MN-4438. The L-77 and the MN-4438 were built on the lines of the L-7 and MN-2700 with a face lift to match the TR-4310 and R-4245.

In the year 1981, it was decided to enter the home satellite receiver market. This meant a completely new product, which means engineering time, drawings, board layouts, ordering parts, market analysis, marketing forecasts and advertising brochures, all of which take time. It is usually two years or more before all of the pieces fit together and

a product is actually on the shipping dock. The ESR-24 design and production set new standards, as it was in the shipping department within eight months. Design of the ESR-24 (Earth Station Receiver - 24 channels) began in May, the first prototype unit was shown at the Omaha, Nebraska home satellite show in August, and the first units left the shipping dock in November of 1981. The ESR-24 was the first cosmetically appealing, professionally built consumer receiver for home satellite reception. The competition units were either built in a back room or in a garage. It was designed especially for the home dish owner. It soon became a leader in a very new and exciting market.

The ESR-24 brought new fame to the company, so instead of offering the design to other manufacturers, the company was approached by other manufacturers to produce receivers under their name. The OEM accounts included Channel Master, Winegard, Conifer, and National Microtech.

In July of 1983, the upper level of a building on Springboro Pike was leased to the company. The office staff, Sales staff, and the Engineering department were moved to this new address to become the Corporate Office. This provided the much needed room for all three departments, which were expanding rapidly.

The second phase of the Franklin plant became reality in 1984. An addition of 50,000 square feet was added, which gave an overall building size of 92,500 square feet. This addition provided the much needed room to move the Engineering department into the same building with the Production department as well as providing more area for production lines. The PC Fabrication department now consumed 11,000 square feet of the building. The equipment was of the latest technology. It's waste water treatment plant could treat 80 gallons a minute, removing all heavy metals, and automatically adjust the pH balance properly before being released.

The postponed, but eventual decision was made to cease production of amateur radio equipment. The market had all but disappeared, there was a lack of FCC deregulation, the foreign competition was increasing more and more, and the dollar was strong.

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# Using Solid-State Transceivers With Older Tube Amplifiers

(some Hints and Kinks on the Heath SB-220/200 that can be useful in your application)

Using The SB-220 Amplifier With Solid-State Transceivers

QST January 1988, p. 45

The Heathkit SB-220 is one of the most popular amplifiers ever sold. It was designed in an era when most amateur equipment was based on vacuum-tube technology. Because of this, special care is needed if the SB-229 is to be used with a solid-state transceiver.

The SB-220 goes into the transmit mode when the hot contact of its rear-panel ANT RLY jack (Jl in Fig. lA) is shorted to ground, actuating Kl, the SSB-220 antenna relay. The open-circuit de voltage at this jack is 125; the short-circuit current is 25 rnA. Vacuum-tube-based exciters usually have no trouble switching power at this level. Solid-state rigs are a different story.

My ICOM IC-740 transceiver can't switch 125 V at 25 rnA because the maximum ratings for this amplifiercontrolled relay contacts are 24 V/l A dc. Other solid-state transceivers likely use relays or open-collector transistors of similar ratings for amplifier control. The switching problem is complicated by the fact that the SB-220 antenna-relay solenoid is not shunted by a spike-suppression diode. The transient voltage developed by a solenoid's collapsing magnetic field can exceed the supply voltage. (If you've never gotten a poke from relay-solenoid back EMF, you know that this voltage is not just theoretical!) With the 24-V rating of the IC-740's control contacts in mind, a direct amplifier-control connection between the SB-220 and the IC-740 seemed to invite trouble.

Fig IB shows my solution to this problem. With Q 1 and Q2 handling the actuation of Kl, voltage at Jl is reduced to approximately +12. Short-circuit current through Jl is about 2 mA. Because the SB220 must be opened to make this modification now's a good time to install an OPERATE/STANDBY switch, SI, to save switching the SB-220's tube filaments on and off.

There's plenty of room under the SB220 chassis for mounting the switching components; the entire circuit can be assembled on a tie strip and mounted to an available under-chassis screw. I installed my version of the Fig. IB circuit next to the SB-220's 125-V de supply, just behind the SSB/CW rocker switch. (Take proper high-voltage safety precautions when you make this modification. Lethal voltages exist in the SB-220.) Dress the wiring for minimal coupling to RF circuits under the chassis and near the antenna relay. As installed in my SB-220, this circuit shows no susceptibility to RFI. - James Herbert, K8SS

I encountered a problem similar to that discussed by James Herbert ("Using the SB-220 Amplifier with Solid-State Transceiv-

ers," QST, Jan 1988, p. 45, when I sought to drive my Heath SB-200 amplifier with a newly acquired Kenwood TS-940S transceiver. The hot contact of the SB-220's relay-control jack exhibits an open circuit voltage of -130 to ground; the short-circuit current of the SB-200's relaycontrol circuit is 50 rnA. The open-circuit voltage could rise to as high as 170 under fault conditions in the SB-200. The Kenwood manual states that the TS-940's control relay is intended for low-current applications; I infer that "low current" also means "low voltage." As a result, I did not want to connect the SB-200's 130-V control line to my TS-940S. Instead, and in order to get on the air quickly, I used a relay between the TS-940S and the SB200. I wasn't satisfied for long: It seemed ridiculous - and rather noisy - to use the transceiver relay to drive another relay that finally switched another relay in the SB200.

To solve this problem, I designed an interface circuit (Fig 2) that uses a high voltage, P-channel MOS power transistor - an IRF9612 - as a switch. The IRF9612 has a source-to-drain breakdown voltage of 200, can switch up to 1.5 A, exhibits a channel resistance of 4.5 Q when turned on, comes in a TO-220 plastic package, and costs $3.50/unit* in small quantities. The IRF9612 also includes an integral drain-to-source protection diode capable of clamping transients that can result from switching inductive loads.

The circuit is powered by a 9- V battery, which provides enough voltage to drive the MOSFET in this low-current switching application. The I-ill resistor limits the peak current flowing in the transceiver relay to approximately 9 rnA and sets the MOSFET turn-on time to approximately 0.3 us (this assumes that the MOSFET's effective input capacitance is 300pF). The 470-kQ resistor sets the turn-off time constant to 140 us and limits the closedcircuit current to 20 /lA. The 15- V Zener diode protects the transceiver should the MOSFET develop a gate-to-drain short circuit. (In that unlikely event, the Zener diode will limit the voltage applied to the transceiver to -24. If you intend to substitute a diode with a different Zener voltage for this part, remember that the Zener diode's breakdown rating must comfortably exceed the battery voltage [9 in this application]).

I built the circuit on a piece of perfboard, mounted the board in a small metal box, and used shielded cable for connections between the interface box, amplifier and transceiver, Stray-RF problems have not occurred with this arrangement. Because the interface circuit is self-contained, the SB-200 and TS-940S need not be modified for operation with the interface. - Richard C. Jaeger, K4IQJ

More on Interfacing Solid-State Transceivers and the SB-220 Amplifier:

A Power-MOSFET Source QST January 1991, p. 37

My circuit for interfacing the TS-940S with the SB-200 has generated a lot of interest. But many people are having trouble finding the IRF9612 power MOSFET I used. The IRF9612 is an International Rectifier product sold under the trademark HEXFET. The IRF9610, 9620, 9630 and 9632 can all be used in place of the 9612, although they are slightly more expensive. My source is Digi-Key Corp**. - Richard C. Jaeger, K4IQJ

*check current prices and availability ** check TIS find database for contact information

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## RESULTS OF THE AWA VALVE QSO PARTY

The results of the AWA Valve QSO party held on the 4th and 5th May are as follows:

AM:

First place Johan ZS4DZ—Yaesu FT857

Second place Barry ZS2NF—Solid State

SSB:

First place John ZS1WJ—Collins KWM2-A

Second place Nico ZS4N—Yaesu FT101

Third place Theunis ZS2PE—Yaesu FT450

Once again, the poor band conditions did not make using AM easy, but there were a few stations out there trying their hand.

A total of 8 logs were received and there were a good number of participants in the SSB section even with the poor band conditions.

**CONTACT US:**

P.O. Box 12320
Benoryn
1504

Mobile: 082 448 4368
Email: andyzs6ady@vodamail.co.za

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## Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

# Notices:

**Net Times and Frequencies** (SAST ):

Saturday 06:00 (04:00 UTC) —AM Net—3615
Saturday 07:00 (05:00 UTC) —Western Cape SSB Net— 3630
Saturday 08:30 (06:30 UTC)— National SSB Net— 7140; Sandton repeater 145.700
Echolink—ZS0AWA-L; ZS6STN-R
Relay on 3615 for those having difficulty with local skip conditions.
Saturday 14:00 (12:00 UTC)— CW Net—7020; (3550 after 15 min if band conditions not good on 40)
Wednesday 19:00 (17:00 UTC) — AM Net—3615, band conditions permitting.