

Official Bulletin



MHz to GHz

The West Australian VHF Group Bulletin

APRIL 2011

THE WEST AUSTRALIAN VHF GROUP (INC)
PO BOX 189 APPLECROSS 6953

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Trustee # 1	Wally	VK6KZ	Trustee # 2	Don	VK6HK

Please NOTE that Cec VK6AO a valued and Foundation member of the WA VHF Group became a silent key on Friday 15th April 2011. Please see Wally VK6KZ tribute on page - 2

A tribute to Cecil Andrews VK6AO

The WA VHF Group, fellow amateur radio operators and I have lost a great friend in Cecil Andrews, a technical wizard, a marvellous radio operator and he will be sorely missed by us all. He was a Life Member of the Group.

In his 57 years of amateur radio, he participated in the growth of technology from free-running unstable oscillators to extremely stable equipment locked to GPS satellites.

I met Cec in 1954 when he was granted the callsign VK6ZAZ to operate on 144 MHz. The "Z" call was the new class of licence that required a pass in theory and regulations but did not require morse code. In later years he passed the morse code examinations and took out the callsign VK6AO.

Cec was one of the founding members of the VHF Group. On 30 April 1955, in the home of the convenor Ron Mould VK6FM, a meeting of VHF enthusiasts heard a proposal from Ron that "a group be formed with the idea of furthering experimentation in amateur radio and in particular in the region of the higher frequencies, also to ensure that those interested in these higher frequencies had 'a voice in official circles'; to give to others and to accept from others assistance in difficulties and to get in touch with visitors and offer them what hospitality we could and in general make their visit enjoyable".



Cec rear row on the left



Cec on the left

Cec was a major contributor to those objectives throughout his membership of the Group. Apart from Committee membership, he remained treasurer for many years until he had to relinquish it when he had his first series of strokes. His computer database of membership and financial records made it easier for his successor than an earlier card system.

Cec was well known for his skills in construction of power supplies, receivers, transmitters, control equipment, his tower and antennas for the high frequency bands, VHF, UHF and microwaves. He documented these with intricate circuit diagrams etc –one of the very few amateurs who have done this. Examples of his skills would be his high power amplifiers using valves operating at over 1000 volts and cooled by blown air or by pumped water that were unmatched by any other amateurs in Western Australia.

In addition to construction of his own equipment, Cec was pivotal in the construction of a number of antennas for the WA VHF Group radio beacons located at Perth, Mt Barker, Esperance and Dampier. All of these have withstood the test of time despite sun and storms! Cec became a Life Member of the Group.



VK6RSW Augusta instal day.
Cabinet top down: 1296 tx, 144/432 txs
in same unit, power supply.
L-R Cec 6AO, Wal 6KZ, Don 6HK,
Bruce 6BMD.

Cec would have given many VK3, VK5 and VK7 operators their first (and maybe only) contact with Perth on 144, 432 and 1296 MHz due to the excellence of his station and his masterful operating techniques!

Cec and his wife Margaret enjoyed a number of years holidaying in Broome during the winter months. Apart from establishing a “tropical fruit orchard” next to their regular caravan spot, he also “planted” antennas and had a lot of fun working long distances to places like Japan and Europe. Typically, Cec constructed a secure “cage” for his radio equipment in the annexe to the caravan and I had the chance to admire this set up during my visit one year to Broome.

Cec was involved in regular contacts on the HF bands with amateurs in South East Asia. The amateurs involved were members of the South East Asia Net – SEANET. Cec was able to travel to gatherings of these operators in places such as Penang, Kuala Lumpur and Jogjakarta to meet the people involved.

As you know, it is not surprising to find great friendships developed with people who you may never meet. Since I posted news of Cec’s death on the Internet, I have had emails from New Zealand, and all Australian States, from people acknowledging that they had never met Cec and expressing admiration for his contributions to amateur radio and great sorrow at his passing.

Cec was a man with many skills. He built a solar hot water system. He built a diesel oil “refinery” based on used cooking oil. He modified his 4WD to run on unrefined used cooking oil. He helped Geoff VK6XB from Hong Kong with ballooning east of Perth. Cec worked for the ABC and told stories of his time at the Wagin transmitter climbing the 200 metre tall tower. He went to Carnarvon and helped the ABC achieve the first live television link between Australia and the UK. Staff who had migrated from the UK could tell their relatives of life in Australia. It was a short contact thru a drifting satellite. Compare that with today!

Cec communicated through amateur radio satellites, he locked his equipment to GPS signals to provide extremely accurate frequencies, he started to use digital techniques.

Linking his equipment to a computer and using software written by a Nobel Laureate Joe Taylor K1JT, Cec was able to transmit and receive signals over very long distances using reflections from invisible meteor trails throughout the day.

In addition to my eulogy to Cec, I want to pay tribute to Margaret who must at times despaired at hearing the white noise (resulting from no signals being heard) coming from the shack but she supported him in these activities and was able to share the satisfaction and the joy of Cec's many achievements.

In summary, we have lost a great friend who is renowned for a lifetime of quiet contribution to the WA VHF Group, Amateur Radio in WA and an operator with wide-ranging contacts and friendships in Australia and around the world.

Well done Cecil Andrews VK6AO SK

Wally Howse
VK6KZ
21 April 2011



Just to let you know what Cec's antenna array was like before being dissembled after being lowered from its operating height of 20metres

Editors Note: Terry VK6ZLT

The direction of any club is to combine the interests and activities of its members to the benefit of all of those concerned. The VHF GROUP needs to increase its membership if it is to survive and grow to assist all of the amateur radio fraternity. The VHF Group has a particular part to play especially that of maintaining Beacons across the spectrum of interest to us. Current team of members who are developing the new advanced standardised beacon are in need of assistance to speed up the progress required to replace the existing beacon assemblies which have been going strong 24/7 for years. Can you assist in any way, if you can, why not get in touch with Fritz VK6UZ.

Many occasions' current sitting members of the committee have been unable to fulfill their club commitments due to work pressures or out of state travel. So there is a definite need for an increase in volunteers who could step in and lighten the load for short periods of time. Let's hear from you if you are willing to assist.

Everybody has probably read the October 2010 issue of the Bulletin then the above paragraph looks familiar, well, believe me nothing has changed

As you may have gathered from reading the front page of this bulletin, the editor is under a lot of pressure as I have to wear many working hats, hence, I am desperate for someone to take over as Bulletin Editor. Please consider your contribution be it as editor or article contributor.

Here are some possible directions for our members.....

1. Develop the techniques of low power (50W) moonbounce operations using digital modes (JT65 etc.) on frequencies 6M and above. This direction would have a number of advantages such as stimulating interest in low noise pre-amplifiers, antenna construction and exploit the use of computer systems in conjunction with other amateurs across a number of continents. Another offshoot of this would be the refinement of terrestrial field day operations & competitions. (Note the efforts of New 2 metre Digital Record hot on the heels of last months 2497 km record-breaking contact between Derek VK6DZ (Albany West Australia & Jim VK3II (Victoria), Derek has extended the record to 2661km. On the evening of Feb 12 he worked Leigh VK2KRR using JT65b with signal reports to -2. Derek's setup is TR-9000 with a 70Watt brick amp and a 6 element Yagi at 10 metres with a site elevation of 2 metres above sea level. Leigh was running an IC-910H into a 4 x 17element Yagis and 120W.)
2. Develop the use of SDR as well as DCR systems for microwave receivers.
3. Do members have other suggestions the committee would like to hear from you. Let's hear it from you

One may ask, what can you do to share your experiences in "on air" roles in the VHF-VHF spectrum, have you built a new piece of test equipment or how successful is that mobile antenna?

The Club needs **your input** to assist the activities officer or committee member to benefit all members?

Come on everyone more input please!!!!!!!!!!!!!!!

Activities officer (Terry VK6ZLT)

The March 28th 2011 general meeting activity turned up a real surprise. Although a talk on microwave oscillators was scheduled this was sidelined as Arthur VK6CY provided an excellent show and tell of a multi-frequency variable oscillator for his HF transceiver. This unique oscillator has the potential to reach 1.4GHz. And can be pre-programmed to 100+ memories.

The Si570 Controller and Frequency Generator Kit #2

<http://www.qsl.net/k5bcq/Kits/Kits.html>

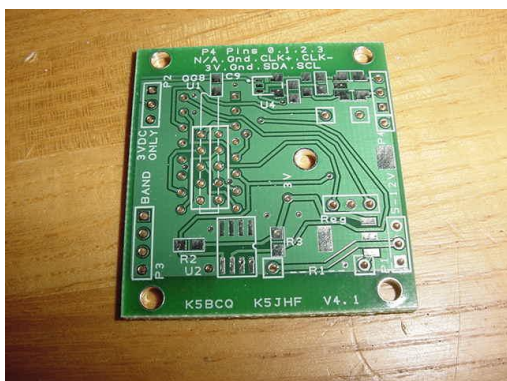
Shows an assembled Si570 Controller with 2-AA batteries. The LCD shows Memory location "36" and 14.060Mhz with the cursor in the 1Khz position.



You can see the Si570 chip soldered on the back.



This is the new V4 board with 4 mounting holes and a more convenient way to interface the I2C Bus to an externally mounted Si570.



This standalone unit (no attached PC required) has a frequency range of 3.5 MHz to 1417.5 MHz (yes, 1.4Ghz) depending on the Si570 part used. I have tested it up to 1200 MHz which is as high as my scope will go. Really an amazing, low jitter, and very low spur levels chip. You can go to the SiLabs website and look at the specifications. All setup and control is via the rotary encoder knob and its push button. Power is battery (3V) or external power (5V-12V). It's compatible with all Si570 CMOS and LVDS versions, single ended or differential output, and any default frequency. This

makes an ideal signal source for SoftRocks and many other projects. The Si570 Controller and Frequency Generator Kit includes a 12 digit LCD frequency display, a programmed MC9S08QG8 microcontroller, and a rotary encoder for tuning. It can be ordered with a CMOS Si570 chip which is spec'd at 3.5Mhz to 160Mhz. Using other LVDS Si570 parts, the frequency range can be extended up to 1.417Ghz.

Jack Smith, K8ZOA, of Clifton Laboratories has provided an excellent evaluation of the CMOS Si570 capabilities and the Si570 Controller kit at [Clifton Laboratories](#)

Sid Boyce, G3VBV, provided additional insight on how he used his Si570 Controller at [G3VBV info](#)

Features:

- Plus or minus Frequency Offset to compensate for Mixers, IF's, etc. The LCD will show the actual frequency.

- Frequency out integer Multiplier and Divisor for SoftRock (4x, etc). The LCD will show the actual frequency.
- Selectable encoder pulses per dial increment allows Variable Dial Speed.
- Dial Lock indicated by a flashing cursor. A momentary push of the PB sets/resets Dial Lock.
- Startup Memory location is selectable.
- 980 memory locations to save frequencies. The first 20 locations are Si570 Controller operational parameters.
- For best accuracy, the custom factory set registers in your Si570 chip are read and used.
- Can be powered for short periods with the 2-AA cells but the chip draws ~70ma so they won't last long and external power is advised.
- Hold knob PB in and rotate to change cursor location to selected digit, release, and tune
- Hold knob PB in for 3sec to save frequency to memory location shown. Memory will jump to next available location.
- Left most memory position provides for external BPF selection (1-8) provided via a 3 bit and Ground header (000-111) with 3V logic (memory "0xx" selects a BPF, "1xx" selects another BPF, etc).

The display is a 12x1 serial LCD (3-3/4" x 7/8") and the programmed microcontroller is a Freescale MC9S08QG8. All the parts are supplied (except the batteries) and an instruction sheet is provided.

There are many output options available ranging from normal termination resistors to isolation transformers to LVDS/ LVTTTL level converters. Some of these devices have their own frequency limitations such as the Mini Circuits RF transformers are spec'ed to 800 MHz and the FIN1002 is specified to 400 MHz. It's totally dependent on your application. The Si570 Controller board has footprint options for many alternatives. Also some of you bought Si570 parts from Tom Hoflich, KM5H, and may want to use those parts. Some of you have sample parts or parts from other sources. For that reason, the kit is offered with or without the Si570 part. The Si570 parts I supply are CMOS "C" speed which means they are specified 3.5Mhz to 160Mhz by SiLabs (although they have been observed much faster than that).

The price for of this Kit without Si570 is \$25 plus \$2 postage in the USA and \$5 postage for DX.

The price for of this Kit with CMOS Si570 (160MHz) is \$40 plus \$2 postage in the USA and \$5 postage for DX.

The price for of this Kit with LVDS Si570 (280MHz) is \$45 plus \$2 postage in the USA and \$5 postage for DX.

Options:

There are 2 optional parts available. None of these are required for an operational kit, only if you want RF isolation or LVDS conversion from differential to single ended LVTTTL.

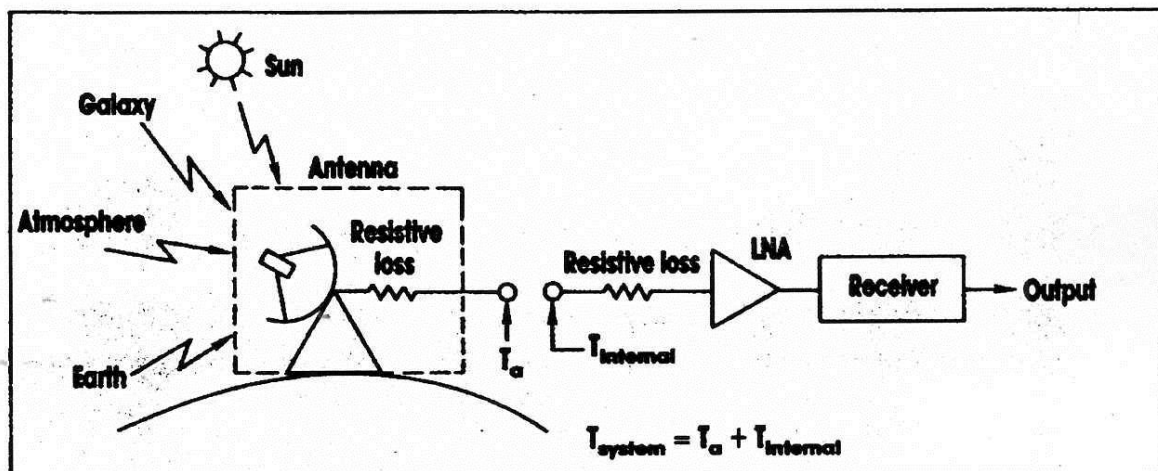
Mini Circuits TC1-1TG2+ (easier to solder than the previous TC1-1T+) RF Transformer is \$2 plus \$2 postage in the USA and \$2 postage for DX. No postage if ordered with a kit. You only need this part if you want complete DC isolation.

FIN1002 LVDS to LVTTL Converter \$1 plus \$1 postage in the USA and \$1 postage for DX. No postage if ordered with a kit. You only need this part if you are using a LVDS Si570 and you want to have an LVTTL single ended output vs the differential LVDS output.

<http://www.qsl.net/k5bcg/Kits/Kits.html>

How about some member writing an article on constructing one of these oscillators.

Aerial Pre-amplifiers 6M – 23cM



1. RF system noise is the sum of noises derived from external sources and internal components.

The Aerial + Signal + Noise.

It's a wonder that VHF –Microwave amateur radio enthusiasts have achieved so much in the face of so many obstacles of various noise sources and built in losses. The sensitivity in any receiving system is ultimately limited by noise in the system. In most RF systems, external noise enters through the antenna and adds to internal noise generated by the low-noise amplifier (LNA) and resistive losses through filters and couplers.

The main aim is to increase the signal strength at the expense of the noise (S/N ratio).

The simplest way to achieve this is to.....

1. Build the most efficient aerial for the desired frequency that you can afford.
2. Add a suitable preamplifier at the desired frequency preferably optimized for that frequency with band pass filters etc...

The array of preamplifiers available is wide and varied, and of course varies in cost and complexity. Two variants can be constructed,

1- **isolated** (with relays) usually attached directly to aerials,

2 - **non-isolated** usually installed with in the receiver itself.

One of the problems encountered with the use of aerial amplifiers is the fact that they operate in the <1 microvolt region in conjunction with a transmitter that operates in the high voltage area in comparison.

Then, the use of relays to isolate (such as depicted Fig-4) are necessary to protect the sensitive preamplifier. To enable everything to be coordinated the use of a T/R sequencer is required



TX/RX Sequencer

A simple, reliable sequencer

Fig - 4

From The VHF/UHF DX Book, page 11-30

This sequencer is suitable for a line up of HF transceiver - VHF/UHF transverter - PA, but it can be adapted for other systems too. It allows key-controlled changeover or direct PTT without damage to the preamp, the coax relays contacts or the PA. I've used this sequencer for about 18 years with never a single failure.

The sequencer uses two DPDT relays. RL2 is a 12V DC relay and operates at normal "fast" speed. RL1 is the "slow" relay - a 6V DC relay with a dropping resistor R1 approximately equal to the coil resistance of RL1. Electrolytic capacitor C1 slows both the make and the break of RL1 by a few hundred milliseconds. Choose C1 so that the two relays produce an audible double "ker-lick" when the PTT line is grounded and ungrounded (about 470uF).

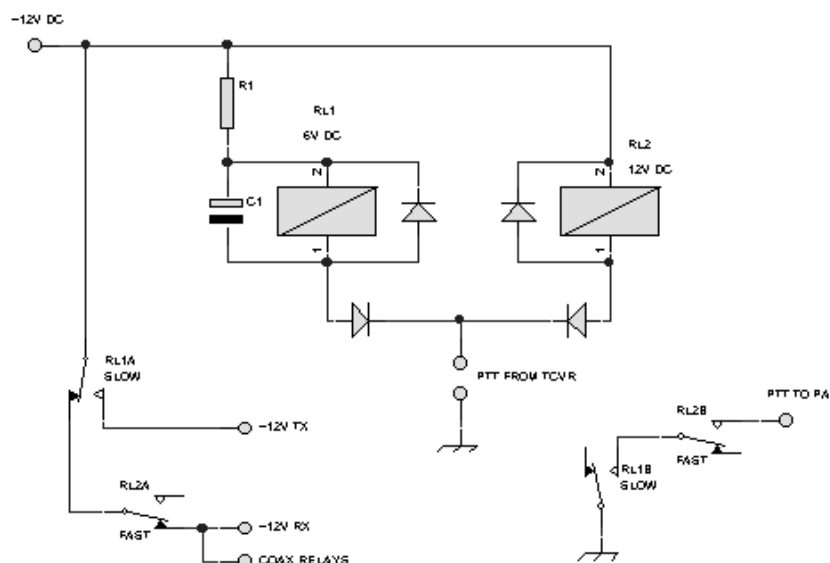
The way you interlink the "fast" and "slow" contacts on the two relays depends on your switching requirements. The sequence must be:

RX to TX

1. Mute receiver
2. Change over coax relays **quickly**
3. **Wait** for relay contacts to stop bouncing
4. Enable the PA
5. Apply RF drive

TX to RX

1. Remove RF drive **quickly**
2. Disable PA
3. **Wait** to be sure RF has gone
4. Change over coax relays
5. Enable receiver.



The diagram shows a system where the coax relays are **energized on RECEIVE**. This has the advantage that the preamp is disconnected and protected whenever the whole system is powered down, and if a masthead coax relay fails you can still use the antenna.

Interlinking the relays contacts as shown above will give the right sequence of changeover. The receiver and TX driver are enabled through the 12V RX and 12V TX lines.

You key the transceiver in the normal way, and the sequencer gets its PTT signal from the accessory socket on the rear of the transceiver. The PA gets a delayed PTT signal through RL1B and RL2B, and also the 12V TX line is delayed, so no RF can reach the coax relay until it has had plenty of time to change over.

When you release the main PTT, the transceiver cuts off the RF drive and releases the PTT to the sequencer. RL2B quickly disables the PA. The 12V TX line is still on, but that doesn't matter because there is no RF drive from the transceiver. After a short delay, the coax relays change over, the 12V TX line goes off, the 12V RX line comes on, and the receiver is working again.

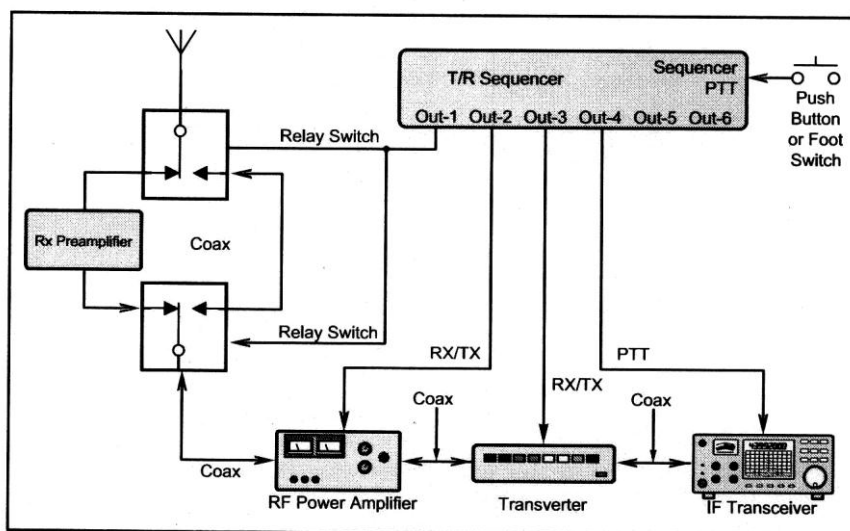


Figure 1 — A typical Amateur Radio setup requiring a TR sequencer.

The preceding circuit although simple & effective, is inhibited by the amount of usable contacts available on each of the relays. Many vhf/microwave setups require a more sophisticated and multiple circuit operation to be installed. Such a device is available in Australia from the likes of Mini-Kits of South Australia.

[TRANSVERTER SEQUENCER KIT](http://www.minikits.com.au/kits3.html#eme66) <http://www.minikits.com.au/kits3.html#eme66>

The EME66 Sequencer is one of the most popular Kits that we have ever sold. It has been designed to fully control a Transverter & various other components like, antenna relays, power amplifiers, & preamplifiers etc. The Sequencer has 3 delayed TX output switching voltages, & a single RX output switched voltage. The Sequencer has the option of either RF or voltage RX to TX switching from a 28-430MHz Transceiver, & can handle up to 3W max input. TX output power from the sequencer can be adjusted down to 0dBm (1mW), with 3Watts input for driving a Transverters mixer direct. The receive I/F signal path has an adjustable trim pot attenuator to set the maximum gain required for the receive conversion & transceiver used. Unit requires a box & miscellaneous hardware to complete.

Specifications: I/F TX Input: 28MHz - 144MHz Up to 3Watts Maximum Input

TX/RX Delay: 200mS 10uF Capacitor / 10kohm Resistor

Switched Inputs: (PTT) +12v to TX (FT290R), 0v to TX (IC202)
RF Sensed RX/TX Switching

Switched Outputs: Delay1, RX +12v, TX 0v (RX Power supply)

Delay2, RX 0v, TX +12 to 28v (Coaxial Antenna Relay)

Delay3, RX 0v, TX +12 to 28v (Power supply to TX Power Amplifier)

Delay4, RX 0v, TX +12v (TX Stages Power supply)

Power supply: Voltage required +8 to 15v DC

Current, RX mode 40mA, TX mode 70mA (Includes Relay)

If you have had experiences with any of the preceding material why not drop us a line or two and share with other members.

SIGNAL CHATTER

4th March a successful QSO @ 0922Z between Wally VK6WG and Phil VL5AKK with a good 5 x 7 on 2M and 5 x 9 on 70cm over a path of nearly 1900KM. Phil's vigilance payed off, in monitoring the Esperance beacon VK6REP. Well done Wally

NOTICE to all field day enthusiasts.

MARK your diary/calendar in BIG LETTERS the weekend of

Saturday and Sunday 18 and 19 JUNE 2011 the Winter VHF-UHF FIELD DAY CONTEST

Rules in AR Page 42 or see contest page in WIA website.

Activity for the May 23rd Meeting is "Getting to know your Radio Beacon" a "hands on" night to enable preparation of back up beacon units should any operational beacons cease to function.