STARLITE

The Award Winning Newsletter for Members and Friends of

G6OI
1938

Stourbridge and District Amateur Radio Society

G6SRS
1938

incorporating

Old Swinford Hospital School Radio Club

G4CVK

1969

ISSUE 03/2016

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STARLITE

MEETINGS

Visitors always welcome
The Society holds its full meetings on the
1st and 3rd Monday of each month at

Old Swinford Hospital School
Heath Lane
Stourbridge
(8.00pm – 10.00pm)

Additionally the shack is open during the same times on the intermediate Mondays

Telephone Enquiries to :-
Hon Secretary
John Clarke M1EJG
(01562) 700513

Or by e-mail to :-

honsec@g6oi.org.uk

All correspondence/enquiries should be addressed to the Hon. Secretary :-
STARS
c/o The Mill House
21 Mill Lane
Blakedown
Kidderminster
DY10 3ND

STARS Web Site URL :-

www.g6oi.org.uk

MESSAGE FROM THE PRESIDENT

Following on from the quiz there was a small discussion about the early history of the society, the following is taken from Starlite May 2012.

STOURBRIDGE & DISTRICT AMATEUR RADIO SOCIETY GENERAL HISTORY

The present Society was founded in 1938 by Alec Higgins G8GF and Donald Rock G8PR with support from J Timbrell G60I

Meeting Venues

The 1938/39 Meetings were held in the Toc'H' Club Room just off Lower High street, Stourbridge opposite King Edward Vl School
No meetings were held during the war but Alec and Donald kept in touch.
In early 1946 after one meeting in the Toc'H' premises the meetings were held in the Science Block King Edward Vl School.
In October 1957, because of increased room charges, the meetings were transferred to the Brotherhood Hall, Scotts Road, Stourbridge.
In March 1961, due to accommodation difficulties at the Brotherhood Hall, the meetings were transferred to Fo1ey College of Further Education, Hagley Road, Stourbridge.
In November 1965, notice to terminate tenancy was given by the Foley College and meetings were transferred to Longlands School, Brook Street, Stourbridge.

The complete article can be found in http://www.g6oi.org.uk/starlite/May2012.pdf

I hope that you all enjoyed the quiz complete with my eclectic set of questions - well done to Nick and Tim for scoring 19 out of 30. Nick then won the tie breaker question by guessing the number of pupils at Old Swinford. Thanks also to Peter who had a read through of the questions prior to the Quiz.

Congratulations also to Mark for his winning entry in the constructors competition. Mark built a signal generator from the assembly of several discrete component / systems into a working end product. A mention must also go to Dr Alan, Geoff and Mike for their entries - all works from scratch (rather than kit builds etc) Thanks also to Wayne (last years winner) for being judge.

For those who remember Richard M1DBC - he is now a proud grandfather to Thomas - born 15th Feb.

The AGM is **very** fast approaching and takes place on **Monday 21st March - 8pm prompt start**. Please highlight this in your diary and make **every** effort to attend. It's your society and your chance to have your annual say in the running and who will run the society for the next year. At least **12 members** need to be in attendance before the meeting can go ahead. As I have previously said I will be standing down as president - also I know Adrian - newsletter editor wishes to pass the keyboard over to new blood!

Continued on next page … … …

Monday 18th April 2016 - Giles Herbert G0NXA, DRM54 (RSGB area representative) will be in attendance with his official RSGB hat on. If you have any questions for him then please send them to Hon Sec John.

Other calender dates:-

Monday May 16th Talk by Steve Turner, Medical Imaging Technology

Monday June 20th Sheepwalks BBQ

No meetings on

28 March	Monday	Easter Monday
2 May	Monday	Early May bank holiday
30 May	Monday	Spring bank holiday

STARS CONSTRUCTORS COMPETITION - 2016 WINNER

HF Signal Generator

1/2/2016 M0TCG Constructors Competition Entry

1 – 30MHz VFO

Based on the AD9850 DDS Module

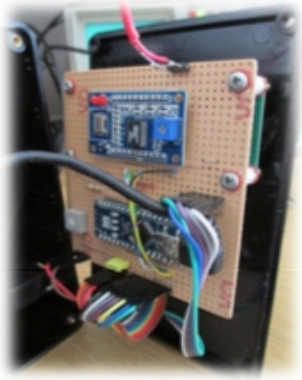
After passing the full license in 2015, I was keen to start experimenting with simple filters and tuned circuits. Talking to other club members it soon became obvious that what I needed was to build a low-cost RF signal source.

Shopping List

- *16 x 2 line LCD ~£2*
- *AD9850 DDS module ~£5*
- *Quadrature rotary encoder £1*
- *Arduino Nano clone ~£2*
- *BNC plug (chassis)*
- *USB mini to USB-B(chassis)*
- *Large expensive knob ~£4*
- *Box*
- *Printed label.*
- *Strip board and a few passives and headers from the junk box.*

All of the components were ordered via ebay.

The output from the module is around 1Vp-p up to a few MHz, but this tails off to a few hundred mV at 30MHz due to a crude low pass filter built into the DDS module. There are a couple of resistor values which can be changed to boost the output although a better option would be to fit a buffer stage.



Inspiration

I spotted the DDS module in the RSGB Radio communications Handbook 10th Edition (chapter 4) written by Peter Goodson G4PCF. On Page 4.19 there is a nice VFO project by Andy Talbot G4JNT which first appeared in RadCom Nov2000.

Andy's design used a PIC16C84 which later evolved into the popular 16F84 electrically erase-able version based on FLASH technology. This chip still needed a voltage regulator, clock and RS232 level shifter to be useful in this application. So, to update Andy's design I used an Arduino Nano(clone) direct from China for around £2 including free postage from China. The PC software and libraries are free to download and come with many examples to get you started.

This was as far as I got for the competition deadline. However further work is planned to turn it into a VNA.

Further reading:
Richard Visokey (AD7C)
Beric Dunn (K6BEZ)

FREQUENCY HOPPING SPREAD SPECTRUM

Origins

The technique of Frequency Hopping has been around for some time. Frequency Hopping is where a receiver and corresponding transmitter switch frequency of operation in quick succession. The number of frequencies involved may be two but in practice is often more. The technique is far from new and was suggested by Nicola Tesla at the start of the 1900's.

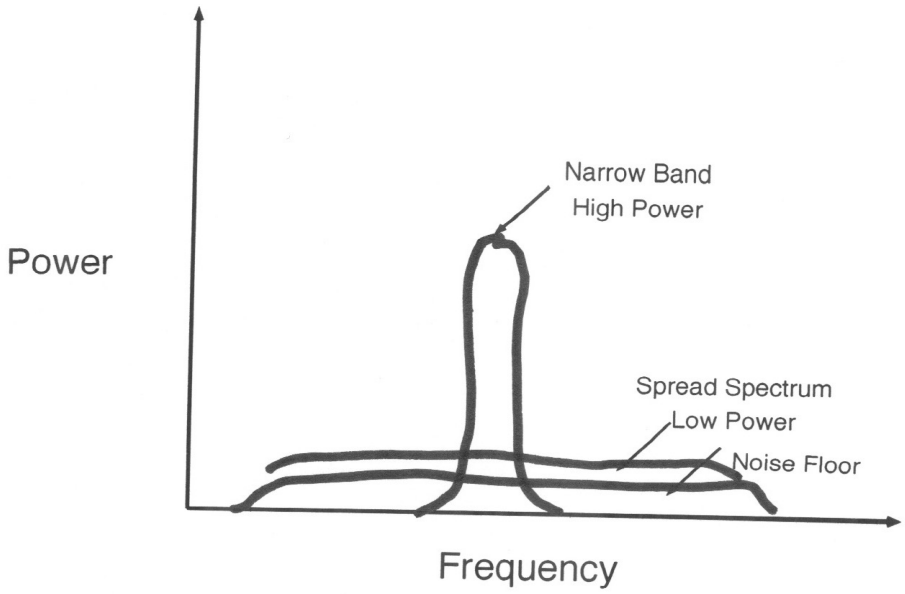
Somewhat unexpectedly the film star of the 1940's and 1950's Hedy Lamar took out a joint patent for frequency hopping spread spectrum along with George Anthiel. The method was to be used as a means of creating an unjam-able radio signal for a torpedo guidance system. The frequency hopping was to be achieved by using a paper roll similar to that used in a pianola. The value of the patent was overlooked at the the time (1941) and rejected as non-viable by the United States Navy. Hedy had previously been married to an Austrian arms dealer who was apprehensive about leaving his attractive wife at home and took her along on business trips which would include meetings with Benito Mussolini and Adolf Hitler. Her husband bribed his domestic staff to spy on Hedy, but Hedy employed a maid who was similar looking to herself. By using her maid as a decoy Hedy was able to escape to London and hence to the USA to pursue a career in films. One of her claims to fame was to be the first person to appear naked in a general circulation film. This would have been scandalous for the time, but would not be considered so by today's standards. I would not have expected Hedy to be the sort of person to pick up a soldering iron in her spare time, but appearances can clearly be deceptive.

Frequency Hopping and Spread Spectrum

Conventional methods of radio propagation such as CW, SSB, AM and FM modulate a radio signal on a narrow part of the radio spectrum, the perceived benefit being that narrower band signals can accommodate more radio users for a given part of the radio spectrum. These types of narrow band signal are said to have a high spectral density. Another feature of a conventional narrow band signal is that it stays on an agreed frequency and does not alter during normal operation. This is standard operating practice and is necessary to correctly tune in a signal. As a side issue such signals are easy to detect in a hostile environment and are easy to jam or interfere with. As far back as WW1 the Germans were able to avoid having the British eavesdrop on their radio signals by using frequency hopping. Contrast this situation with a Frequency Hopping signal which changes its radio frequency during transmission. Spread Spectrum is a radio signalling method whereby a signal is deliberately spread out over different frequencies. As such frequency hopping is a pre-requisite for spread spectrum operation.

The spread spectrum signal often uses much lower power than its conventional counterpart, often in the order of only one percent of that of an equivalent narrow band signal. The spread spectrum

signal is often at level that is above the noise floor of the part of the radio spectrum it is using. However raising the level of our signal well above the noise floor for a conventional narrow band signal requires more power. A spread spectrum and conventional signal are illustrated below



Spread Spectrum signals are said to have a low spectral density and as such are using more of the radio spectrum to send a signal from sender to receiver. Taken at face value this sounds like a backward step, however the transmission may only send a signal for a fraction of a second at a much lower power before it moves on to the next frequency. The transmitter and receiver need to be able to continually 'know' which frequency to tune to next to be able to receive the whole message content. To work effectively a spread spectrum signal needs to use all the available frequencies allocated to it. In this way it will reduce the number of times it interferes with other signals that happen to be in operation and conversely how much other signals can interfere with it. The combination of lower power signals and the movement of a signal has the effect that the Frequency Hopping Spread Spectrum is less easy to detect and it is this property that made the technique attractive for military use compared to a conventional signal. To be able to determine which frequency is to be used next a pseudo random sequence is used by both parties.

Current uses of Frequency Hopping Spread Spectrum (FHSS)

As stated above Frequency Hopping Spread Spectrum techniques were initially developed for the military however it has diversified into use for mobile telephones, cordless phones, wireless LAN devices and more.

FHSS has advantages for privacy, however the technique only provides a weak form of encryption. In practice the transmitted FHSS signal can be at a level such that it is below the noise floor. There is a considerable amount of reading material available on the Internet in tutorial format Youtube and lecture notes and the RSGB is a handy source of reference. Often with the hobby of amateur radio there is a temptation to aspire to high powered signals and large distances as the ultimate pinnacle of our ambition, when low power, high frequencies and short ranges may provide greater opportunity for experimentation and self training. Almost all current developments in radio are taking place at the higher frequency end of the radio spectrum and not in HF. (AB - G0NLA)

ADVERTISEMENT - ITEMS FOR SALE

Selling On Behalf of G0BHR

A Google search will provide more detailed information

Trio TS830M HF Transceiver 160 – 10 metres
100 Watts Output AM/SSB/CW Manual Included. GWC
£325 o.n.o

AZDEN PCS5000. 2M FM Transceiver 5/25 Watts Output
No CTCSS. Manual Included. GWC £100 o.n.o

Alinco DJ-175 2M FM Hand Held 0.5/2/5 Watts Output
Programmable. CTCSS, DTMF Keypad, Charger
Ext. Speaker/Mic Manual Included. GWC £40 o.n.o.

Contact: Bob G4XOM Telephone: 01384 918827

STARLITE

YOUR COMMITTEE

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	TIM	G7TAC	
	MALCOLM	G8BOP	
	WAYNE	M5LLT	
Starlite Editor	ADRIAN	G0NLA	

CALENDAR OF EVENTS

It should be noted that the Shack will be open every Monday evening unless shown otherwise in the Calendar

2016		
March	Mon 21st	AGM
April	Mon 18th	Visit from Giles Herbert (G0NXA), DRM54 (RSGB Area Representative) Questions in advance to Hon. Sec. John
May	Mon 16th	Steve Turner – Medical Imaging Technology
June	Mon 20th	Sheepwalks BBQ

Please note in future :-

There will be £2 admission charge to non-members for attending main meeting talks / events. This is refundable against joining the society.