

STARLITE

G6OI
1938

The Award Winning Newsletter for Members and Friends of
Stourbridge and District
Amateur Radio Society
incorporating
Old Swinford Hospital School Radio Club

G6SRS
1938

G4CVK
1969

ISSUE
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MEETINGS

Visitors always welcome
The Society holds its full meetings on the



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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**



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MESSAGE FROM THE PRESIDENT

Well this calendar year is very nearly over. It started off with the final months of StARS 75th year and then moved onto the possibility of losing Old Swinford as our home. Fortunately we have moved on from that and have the new shack cupboard up and running, although further work is required to complete.

The first December meeting saw a visit from the new Old Swinford Headmaster. the next paragraph is taken from the school website.

Paul Kilbride went to a British Army school in Germany before returning to England to read Modern History at Magdalen College, Oxford and then qualifying as a teacher in Birmingham. He has taught in both the maintained and independent sectors and has been, at various times during his career, a head of department, head of Sixth Form and, most recently, deputy headmaster and local authority governor. He is married to Emma with three young sons.

He appeared to know about amateur radio and our involvement within the school. He was also pleased that we have recently undertaken the CRB (DBS) review / update and all was in order. It also came to light that this is only required for frequent visitors, more than 3 times in a 30 day period. This makes things much easier for occasional visitors and also gives us something to work around for foundation courses.

We were also reminded that the entire Old Swinford campus is a NO SMOKING site, so can we all respect this.

The now traditional Christmas carvery at the Old White Horse saw only a few members but as with the surplus sale it was Quality rather than Quantity.

It will soon be the AGM and time again to elect a new committee and officers to the society. February also sees the annual constructors competition, so get building and swatting up for the 2nd year running of the Quiz!

To 2015 and beyond,

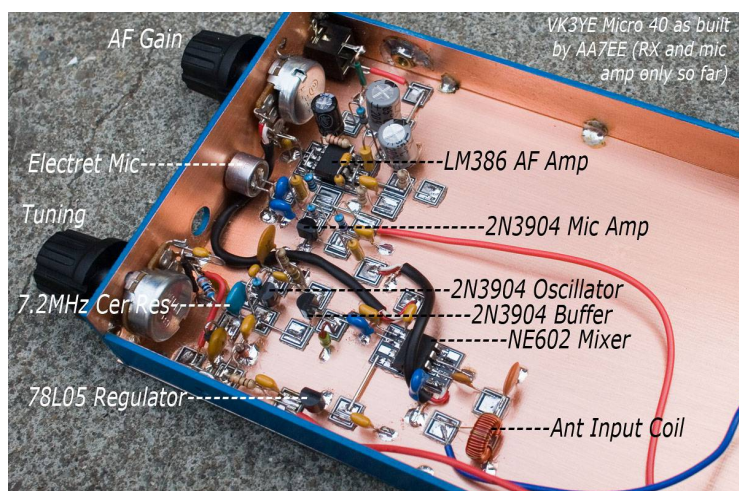
James G7HEZ



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EDITORIAL

The focus for this month is radio construction. I usually start preparing the next edition of Starlite by taking a previous copy of Starlite and removing all the old articles. By coincidence I happened to choose an article submitted by Jim showing a partially built radio. Take a while to look at the clean component layout.



Often a circuit diagram is available, but no printed circuit board. The above method using sticky pads and interconnecting components via these pads can produce a neat solution. Construction is an interesting side to amateur radio and is often the inspiration for many older club members first becoming interested in the hobby. There is a great feeling of satisfaction picking up signals on one's first receiver. The satisfaction is all the more so if you are able to make a contact on your own home brew transmitter.

One QSO I listened into some twenty years ago that makes this point, was between a Russian and an American. The Russian spoke good English and the conversation moved on from the usual signal report and working conditions. The Russian asked the American how long would he have to work to earn enough money to buy his transceiver and the American replied that it would have taken just over one month. The American then asked the Russian the same question. The Russian said that it was very expensive (at the time) to buy foreign transceivers and it had taken him 18 months to build his transceiver and he had only been able to assemble the components with great difficulty.

Adrian (G0NLA) Starlite Editor

USE IT OR LOSE IT

Thanks to Robert Egan for alerting us to the following information. Initially the information was in the RSGB monthly newsletter which points us to the Ofcom Web Site. It is easy to forget that rarely used parts of the radio spectrum which seem to have little value receive more interest as the pressure for radio spectrum comes under increasing pressure from commercial users.

See below – taken from the Ofcom Web Site



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Updating the Amateur Radio Licence - Statement

Statement published 05|12|14

This document outlines Ofcom's decision to update the terms and conditions of the amateur radio licence. This follows a consultation published in September. These updates include changes which would provide amateurs with access to some frequency bands previously available only through the variation of individual licences. The decision is further to changes announced in our April statement on Public Sector Spectrum Release. In that statement, we set out a decision to remove access for amateur radio operators to certain frequencies in the 2300 MHz and 3400 MHz ranges in order to support the release of these bands by the Ministry of Defence. This document is likely to be of interest to individuals authorised to use the radio spectrum in the UK for the purposes of amateur radio activities.

For more details follow the link :-

[http://stakeholders.ofcom.org.uk/consultations/amateur-radio-licence/statement?
utm_source=updates&utm_medium=email&utm_campaign=amateur-statement-dec14](http://stakeholders.ofcom.org.uk/consultations/amateur-radio-licence/statement?utm_source=updates&utm_medium=email&utm_campaign=amateur-statement-dec14)



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GETTING STARTED WITH RADIO CONSTRUCTION



Radio Construction and Kits

Do you recognise the cartoon, taken from the Foundation Licence NOW booklet? The advice being given is sound advice. For example, building one's own printed circuit board is not easy to do well, especially if the circuit board is small and the components are densely packed. There is plenty of scope for mistakes when transposing a circuit diagram on to a circuit board. Another difficulty is obtaining the components. One can often buy the majority of components from one supplier, but some components such as screened coils can be difficult to obtain. It is not uncommon to place an order with a components supplier and to only get your order partially fulfilled. If you can not assemble all the parts you require, you may feel like a man with a 997 piece jigsaw.

It is for the reasons stated above that buying a kit is an attractive way of getting started in radio construction. The circuit board is already supplied and all the hard to source parts have been found. If we are building a transceiver, this should ideally be of modular design as in this way one should be able to complete a module and test it before continuing. One of the advantages of belonging to a radio club is the wide range of ability amongst club members, so there is a ready source of advice available to offer guidance and help if required. If this is your first project, you may feel more confident building your kit at the club, or partly at the club. This particular article focuses on construction kits available from S9 Plus.

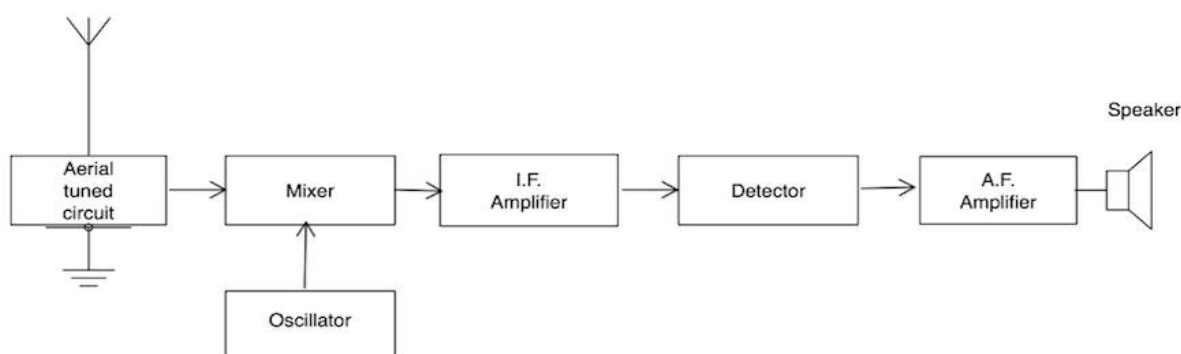
As a general rule, when undertaking a radio construction project, it is easier to build equipment for HF than for VHF and particularly UHF. It is also easier to build radio equipment for AM

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(amplitude modulation) than SSB.

The detail of how an AM radio receiver works is not covered in detail in the Foundation Licence Course, so the following may serve as a brief recap for those already familiar and helpful for those unfamiliar.

Block diagram of an AM Radio Receiver



Before continuing, let us take a quick look at the mixer/oscillator components. The incoming radio signal from the aerial and local oscillator signal are mixed. The mixing of the two signals results in heterodyning. This is where new frequencies result in mixing the two original frequencies. Two new signals are produced giving a total of four different frequencies :-

The oscillator frequency
The incoming signal frequency
Oscillator frequency + incoming signal frequency
Oscillator frequency – incoming signal frequency

The last frequency is called an intermediate frequency or IF – see diagram above. In our receiver the oscillator frequency is set such that

$$\begin{aligned} \text{received frequency} - \text{oscillator frequency} &= 455\text{kHz} \\ &= (\text{this is the intermediate frequency or IF}) \end{aligned}$$

The ability to vary the oscillator frequency gives us the ability to tune to various frequencies.

Let us take a look at a specific example

(IS) Incoming signal	= 7.5Mhz
(OS) Oscillator signal	= 7.955 MHz
Sum IS + OS	= 15.455 MHz
Difference IS – OS	= 455 kHz or 0.455 MHz

With reference back to the AM receiver block diagram, the RAT5 kit from S9PLUS (cost around £30) provides all the components necessary to build the entire receiver, however the receiver can be improved if required. In the as-supplied kit the tuning is provided by a varicap diode. It is possible to build an additional kit which will provide a digital frequency display. This replaces the supplied oscillator in the receiver.

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What follows is an introduction to an article by Martin Deeley (G4VZO) who, you may recall, brought his son along to the November 2014 Foundation training. Martin's article is about his experiences building one of the modular radio building block kits produced by S9kits. The kits give the ham radio constructor the capability of building a single conversion superhet AM radio transceiver for 160, 80 and 40 metres.

The MultiRock II is a direct digital synthesiser (DDS) which has a range of between 10 kHz to 60 MHz. It also has a frequency display adjusted to remove the IF offset. So for example we would want to see 7.5 MHz as the displayed frequency and not the 7.955 MHz oscillator frequency using the above example figures

The Multi-Rock II from Plus Kits / S9Plus.com



I recently stumbled on an interesting website following the briefest of mentions in a recent edition of the VMARS "Signal" magazine, May 2013. My old friend Dave Porter (G4OYX, Ludlow) was describing a valve based AM transmitter that he had built for 5MHz. He was using a kit based audio processor board called the FAT-MAX; now knowing Dave as I do, he isn't the kind of guy to build kits, so I knew it must be something rather special. Cutting a long story short, after a few minutes of Googling, I found the web sites of Dave GW4GTE and Eric GW8LJJ.

The FAT-MAX is part of the modular 'FAT5' 50W+ Class E solid-state AM transmitter for 160m,

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80m, 60m or 40m. The web site also describes the matching RAT5 AM receiver and a bunch of other interesting accessories and modules including the Multi-Rock II.

The Multi-Rock II is based on one of those cheap Chinese DDS modules that are currently available on eBay for around a fiver which use an AD9850 device, a complete DDS synthesizer on a chip. The kit uses the DDS module together with a custom programmed 18F2420 PIC (which handles all the clever maths needed to program the DDS module), a 16 character back-lit LCD display and two combined rotary encoders and push button switches which are all that is needed to drive it.

The kit is very versatile, designed to work as either a standalone frequency source or as the tuning section for a receiver, transmitter or transceiver with all the switching signals for TX/RX, IF offsets and 48 memory channels. Four outputs are available; sine waves (600mV p-p) at 0 degrees via a LPF and 180 degrees unfiltered, and square waves (5v p-p), at both 0 and 180 degrees.

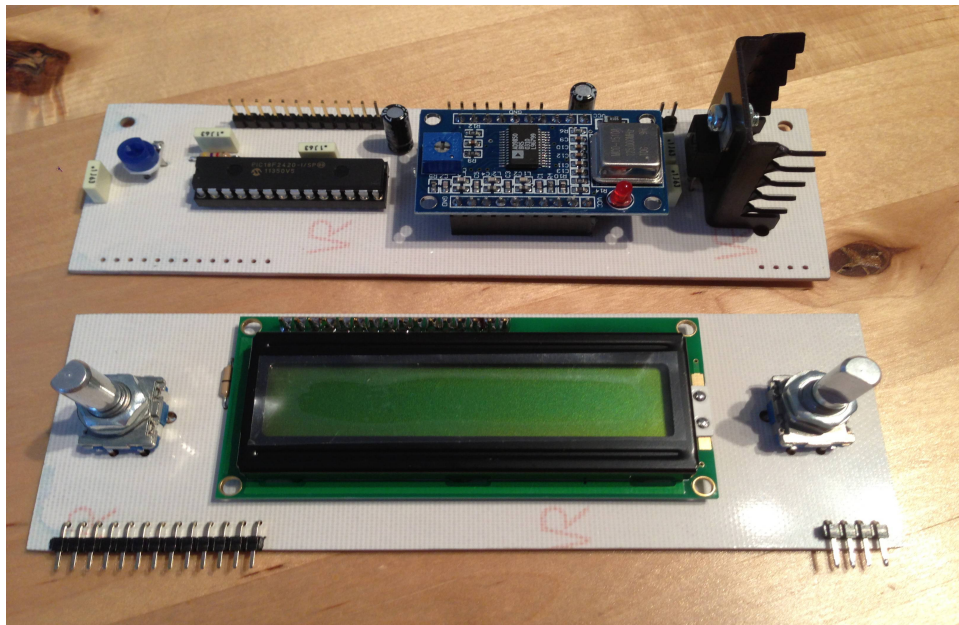
The kit comes complete with everything you will need including two well-made pre-drilled PCBs, all the components including the solder, none of that lead-free rubbish either, it's the good old 60/40 stuff that refuses to go away despite the health & safety brigade!

It took about an hour to build and quite straight forward if you follow the suggested build-order. There is some fine soldering work needed around the PIC and inter-board connectors so this probably isn't for the novice or anyone with failing eyesight.

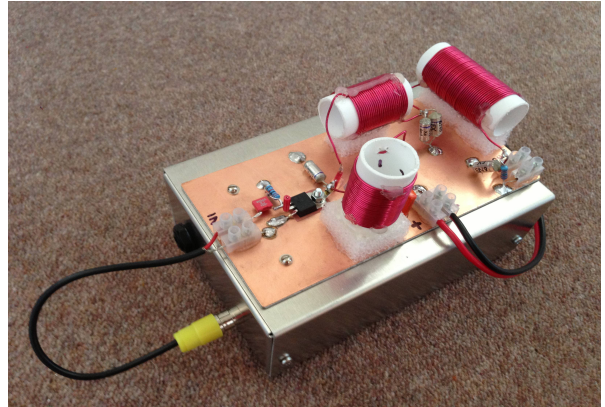
At the moment my needs are very simple; it will be built into a case and used as a signal generator and RF source for my 472KHz experiments, however I am now building the complete FAT5 transmitter for 100W pep AM on 160, 80, 60 and 40 metres.

In summary; a very nice kit which worked first time and performs exactly as described. It's a very capable RF signal generator and driver for my transmitter projects. It currently costs a little over £30, all the circuits, manuals and ordering information is available on the website (<http://www.s9plus.com/>).

Martin, G4VZO



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ADVERTISEMENT

The following advertisement is on behalf of John Palfrey

Dear Hon Sec,
My name is John, ex-G4XEN and currently EA7IT.

I have just moved into the Amblecote area and I am looking to sell a rig I bought only last year. It is an FT-817ND and if any club members are interested, I am looking for offers in the region of £295.

I bought the rig when I was considering doing Summits on the Air in Spain, but never actually used it.
As you can see from the photos, it is in pristine condition.

I also have a Yaesu G400 antenna rotator available for which I would accept a reasonable offer. (Includes many metres of 6 core cable) Controller, rotator, top and bottom brackets.

For any further information please email me (john@palfrey.org.uk) or call 0795 29 26 477

I hope to meet people at one of the club nights when we get settled in here. We only arrived this month!

I have not done any serious amateur operation for some years, as the Internet seemed to take over. Previously I have been a CW / SSB operator specialising in meteor scatter on 2 metres.

Yours sincerely
John Palfrey



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YOUR COMMITTEE

Hon. President	JAMES	G7HEZ	
Vice President	NICK	G6DQN	
Hon. Secretary	JOHN	M1EJG	(01562) 700513
Hon. Treasurer	JOHN	G8UAE	
Committee Members	MARK	G7EDZ	
	KEITH	M0HPY	
	SEAN	M3XMJ	
	PETER	M6ZXH	
	MALCOLM(Co-opted)	G8BOP	
	ADRIAN	G0NLA	

CALENDAR OF EVENTS

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

[illegible]