DERBY AND DISTRICT AMATEUR RADIO SOCIETY

Incorporating Derby Wireless Club (1911)

FUTURE TALKS

The Club asked John Hastings-Thomson to give a talk on the 'Patriot' railway locomotive to be named the "Unknown Warrior" on Tuesday 15th October in our Clubroom.

Richard G3VGW will give a talk on 'Aerials & Feeders' - the basics on 22nd October .

Martin G3SZJ will give an illustrated talk on 'Hawaii'

INTRODUCTION

Hello and welcome to the September issue of the Derby and District Amateur Radio Society newsletter. The last few months were very busy and as a consequence, the June edition of the newsletter was delayed. So if you are wondering - yes, the last newsletter was the March 2013 edition which now seems a long time ago.

As well as the regular events such as '*night on the air*' and '*junk sales*', club members were treated to a number of talks on a range of different topics. On 20th August, we received an excellent talk from Amanda Higton the deputy regional manager for Region 13 (from SNADARC) on "Antennas and Planning". This, as expected, caused a heated discussion. As a bonus, Steve Boden (G4XCK), the regional manager for Region 13, also gave a thought provoking and excellent talk on wire antenna for HF.

Another well received talk was the history of the Ecclesbourne Valley Railway by John Hastings-Thomson. The radio club runs regular stations from the EVR station at Duffield and so this talk was particularly relevant and interesting.

Ecclesbourne Valley Railway

Snow and freezing weather put an end to the planned exhibition station from Ecclesbourne Valley Railway in Duffield during Easter. The plan was to operate from a guards van parked in the platform area. This was not available and it was too cold for a marquee.

Fortunately, the weather was better in May enabling the Club to setup and operate a station during the Wirksworth Carnival Weekend on Saturday 25th May. Trains from Duffield link with Wirksworth and as promised we operated from a parked guards van in Duffield station.

Dave, G1VAB provided a blow by blow account of the occasion on the DADARS web site. Look for the link: "Wirksworth Carnival - 2013"

Junction 28 QRP Rally

The club supported the Junction 28 QRP rally at Alfreton Leisure Centre on Sunday 6th June. The club booked two stands and had a successful day selling surplus items on behalf of the club and club members.

International Museums Weekend

International Museum Weekend takes place over two weekends. The club supported the event by operating from the Derby Royal Crown factory museum in Derby on Saturday 15th June.

Royal Crown Derby Visitors Entrance

Unfortunately, due to lack of support, the other three days were not covered. However, the people attending enjoyed the event and plan future events from the site. Dave, G1VAB provided a full account of the occasion that can be found on the DADARS web site.

Mills on the Air

DADARS members assisted Nunsfield House Amateur Radio Group on Saturday 11th May 2013 by operating from Heage Windmill near Belper about 10 miles North of Derby. The team used the call sign GB5HW .

Thanks go to friends at NHARG for inviting the members of DADARS to assist with the running of the station again and making us welcome once more.

Dave G1VAB provided a full account of the occasion on the DADARS web site.

CLUB DONATION

The club received a car full of computer equipment as a gift from one of our members, who moved and set-up business in France.

Tim Kay, G7GFW, who resides in the Cholet area of western France, rang Martin and Jenny and asked if they would welcome some items for that nights Junk sale. They agreed.

Tim arrived in his French registered estate car and promptly unloaded a significant quantity of brand new components from the shop he owns in the Stoke area. Also in his car were some amateur radio bits and bobs which he had promised elsewhere. Martin tried very hard to get his hands on it for the Club, but the answer from Tim remained the same: "No way".

G7GFW says because of all the noisy overhead power lines (which are typical of the France villages) amateur radio is impossible and he has now no gear left. Hence we were not able to arrange any contacts.

Martin and Jenny took some of the parts to the Club Junk sale that evening and disposed of small amounts. Bill, 2E0PBB, took the remainder the following Sunday to the Junction 28 rally in his people carrier. The Club managed to sell a small amount but there is still plenty to keep us busy at the National Ham Fest in September at which we have provisionally reserved two tables.

The Club always welcomes equipment to sell at the rallies, etc, at which we have stands, but it is felt this is the longest distance we have received items, Thank You Tim.

CLUB EQUIPMENT

The club is hoping to get our 4m co-linear mounted on the rear of the church building at a reasonable height. The only problem is that we do not have a transmitter or receiver capable of covering that band.

One possible solution is the purchase of a new transceiver for the club that covers all amateur bands from 160m to 70cm including 50MHz and 70MHz. The new ICOM IC 71000 seems like an excellent choice and has received favorable reviews from other amateurs and organisations. The equipment also includes built-in digital modes such as D-Star and RTTY demodulation and decode.

The clubs existing transmitters: the FT897 and FT990 are both quite old and technology has move on considerably. This may be a chance for club members to experience more modern modes and digital technology. Please let the committee know your thoughts.

OTHER NEWS

Beefstock 2013

Unfortunately, the Beefstock 2013 festival could not proceed this year. In the past, DADARS supported the event and members had a good but noisy day out. Hopefully if the event runs during 2014, then we may be able to attend.

Club Nets

Over the Christmas period we propose organising a couple of Club nets on 2m. We miss two Club meetings on Tuesdays as December 24th falls on Christmas Eve and December 31st is New years eve and, of course, members will be partying all

through the night! Therefore, we propose the following nets on 145.450MHz at 2.30pm.

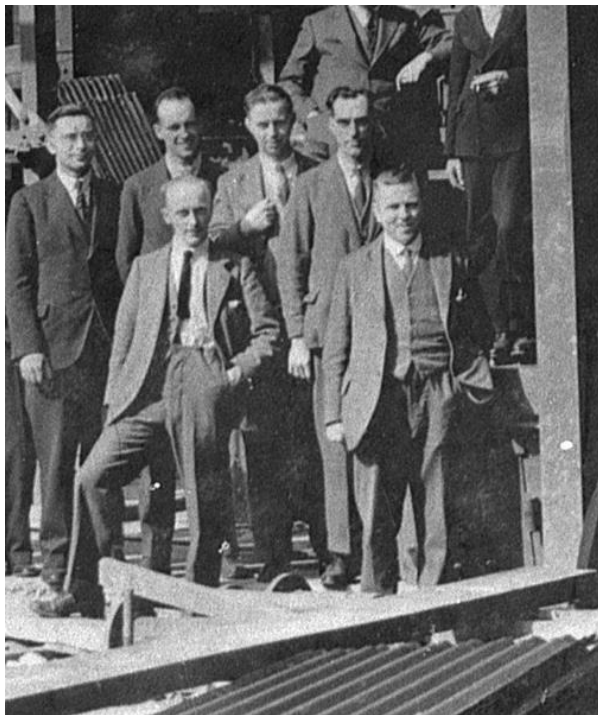 Tuesday 24th December 2013

 Tuesday 31st December 2013

If you can make it please come on. It should be a nice distraction from all the other seasonal nonsense.

We could, of course hold a club net at other times and on other bands if you want. Please make your choice known and I am sure other members will adapt accordingly.
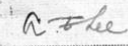
HISTORY OF ALAN TREVELYAN-LEE (DENNIS R HILL)

Some Club members may be aware that the committee received an email from Dennis R Hill who lived in Etwall, Derby in 1942. He was only 8 years old at the time and like so many wartime children he was evacuated from London and billeted at an unfamiliar house in Etwall with a 'Mrs Lee'.

Mrs Lee told Dennis stories about her husband "Wing Commander Trevelyan-Lee" and his involvement in attempts to cross the Atlantic by Aeroplane. You may have guessed it - Mr Trevelyan-Lee is the founder member of the Derby Wireless Club.

AT Lee Front Right and E V R Martin G2TL in a visit to Ferranti Ltd in the early 1930's

Dennis was called up into the Royal Air Force and later qualified as a Medical Physicist over the period 1956 to 1997. He never got the chance to revisit the 'Lees' in Etwall after leaving in 1943.

By chance, Dennis found a reference to Trevelyan-Lee on our Derby Wireless Club website history page and recognised some of the references, particularly a description of a model railway that ran around the garden in Etwall.

Dennis very kindly wrote a historical summary of the events from 1942 and outlined his attempts to research into the history of the Lee family. His work reveals a new insight into our founder member and is a very interesting read. The document from Dennis is too large to put in the newsletter. A better and more long term home is the Derby Wireless Club website. The document is now available on the link:
http://www.derbywirelessclub.org.uk/history_Lee.htm

As stated by Dennis in his document *"It is surely time that DADARS recognises that one of its early members, namely Alan Trevelyan Lee, was a more illustrious person than even given in their historical record."*

FUTURE EVENTS

Just a reminder that the National Ham Fest at Newark, Nottinghamshire is looming and the Club requires volunteers to help transport equipment, man the stands and make tea. The key dates this year are:

Thu 26 Sept – Setting up the Club stand at the National

Fri 27 Sept – National Ham Fest – first public day.

Sat 28 Sept – National Ham Fest – second public day.

We need to coordinate volunteers to cover the three days so if you want to help please let Dave (G1VAB) or Martin (G3SZJ) know in advance.

Other events include:

Saturday 14 Sept – Churches on the Air. GB1SOC operating from St Osmunds Church, Wilmorton, Derby.

Saturday 21 - 22 September - Railways on the Air. GB2WS operating from 'West Shed', home of the Princess Royal Class Locomotive Trust at Swanwick near Ripley, Derbyshire.

We've nothing planned in the way of SESs for October (good to have a wind-down after a hectic September) so after that it will be the bonfire in November and then the much-awaited fish and chips with mushy peas supper in December.

DADARS 1975 LOAN TO THE SCIENCE MUSEUM

Back in 1975, Fred Ward loaned the London Science Museum a transmitter and receiver from the Clubs museum collection. They were constructed by Alan Trevelyan Lee (2DJ) in 1922 and used in conjunction with similar equipment made by Sandcroft Grimwood Taylor (2IX), for experiments with underground communication at Denby Colliery in October 1922.

The Receiver and Transmitter

The exercise was written up in the Wireless World Magazine of the 2nd December 1922 (Copy of the article is on the next page). During the 1970's the Education Commit-
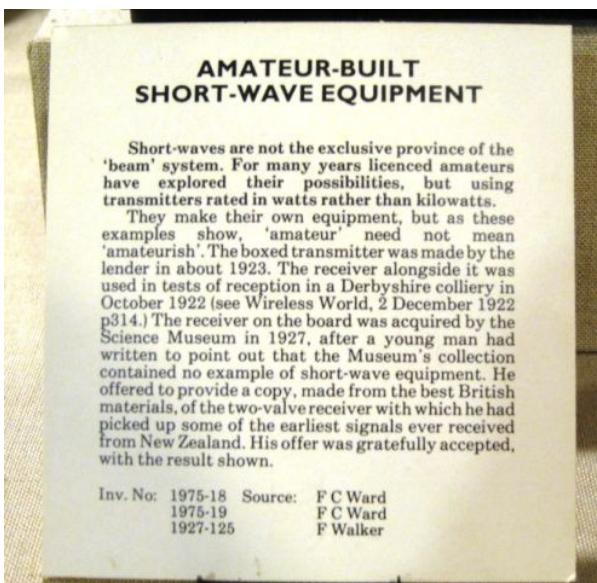
Science Museum Labels

Photographs of the Receiver and Transmitter Pair

tee of the RSGB gave lectures on radio at the Science Museum each Easter, aimed at the visiting school children. Both Fred Ward G2CVV and Jack Anthony G3KQF were active members of the Committee at that time and participated in the lecture scheme. It was their association with the museum that prompted the loan of the equipment.

The Society received an email from the Science Museum informing us of their intent to completely revamp the Communications section in 2014 and asked if the Society is prepared to hand-over ownership of the Transmitter and Receiver to the museum.

In the dealings with the Science Museum, I was able to correct one or two inaccuracies in the information the museum held. For example, the original museum label stated that Fred Ward constructed the equipment in 1923, which is clearly incorrect.

Enclosed in this article is a photograph of the information label from the Museum display and photographs of the 1922 receiver and transmitter. I would prefer better photographs, but regrettably these were all that the Science Museum provided. Reproduction of these photographs is with Science Museum permission.

The Committee discussed the handover of ownership in great detail over three months and asked the staff at the Museum many questions about the input we would be able have, also the about the care which would be given to the two items. It was found that the Science Museum had quite strict handover conditions; basically the donor had no rights or input after completion of handover although the donor's wishes would be noted.

The handover documents were signed by the Chairman and Secretary and ownership passed to The Science Museum.

If you visit the Science Museum please view the Communications section and let me know if the Transmitter and Receiver are still on display.

Martin Shardlow G3SZJ

Over the page is an extract of the Wireless World Magazine of 2nd December 1922. A photograph of the original document is difficult to read and so we decided to provide the text version.

DADARS 1975 LOAN TO THE SCIENCE MUSEUM

FURTHER COLLIERY EXPERIMENTS

Extract from 'Wireless World' Magazine dated 2nd December 1922

"Mr. A. Trevelyan Lee (2 DJ) experimented recently with Mr. S. Grimwood Taylor (2 IX) at the Denby Colliery, near Derby. Tests were made early in October. A temporary single wire aerial was erected at the top of two ladders, with a bare copper wire lying on the ground for an earth. One set was placed in a tub, lined with boards, and sent down the shaft. The aerial down below was suspended from the roof with string. Communication was immediately established with the station at the colliery office on top, speech and gramophone music coming through loudly and distinctly. This station was about 100 yards from the foot of the shaft.

The tub was then pushed along the rails for about a mile, and communication was again easily established, but the signals from below were less clear. Mr. Lee said he understood that the strata above the coal consisted of iron deposits in nodule form. The power employed did not exceed 5 watts, and was derived from one of Newton's Bros. generators, working off a 12-volt accumulator. One of the sets used choke control and the other grid control. Three valves were used for reception, one being the resistance-capacity coupling (long wave type) and the other tuned choke and L.F. The wavelength was 440 metres. During discussion at the Derby Wireless Club it was suggested that a much longer wave might be found more satisfactory, and it was understood that this had been found to be so in submarine work."

SOLUTION TO THE LAST CROSSWORD

D	E	L	T	A		V	A	L	V	E
A		B		U			N			V
D	I	A		D	I	C	T	A	T	E
A		N		I			E			N
R	A	D	I	O		I	N	F	O	
S			L				N			C
	V	O	L	T		R	A	D	A	R
R			E			U		R		A
S	L	O	G	A	N	S		I	O	N
G			A			T		L		K
B	U	I	L	T		Y	E	L	L	S

Thanks to Jenny G4EYM for providing an excellent radio centric crossword in the last issue of the newsletter (March 2013).

Sorry you had to wait six months for the solution although I am sure Jenny would help if a particular answer remained illusive.

Unfortunately, I do not have a puzzle for this newsletter. If anyone feels like rising to the challenge to create a puzzle for the next newsletter, please have a go and send it to the Secretary. It does not have to be a crossword, any radio puzzle will do.

LTSPICE CIRCUIT SIMULATION—TECHNICAL ARTICLE

Most amateurs keep a stack of useful software. In many cases, it gets moved and copied from machine to machine over the years. One of my favourite packages was circuit simulation software that I purchased from a commercial company years ago. After recently upgrading to a 64 bit Windows 8 machine, I found I could no longer install it because it was 16 bit and not a 32 or 64 bit package. That was a shock.

After looking around the web, I came across LTSpice IV that is very similar, very competent and free(!). If you have never tried circuit simulation, you should. It is not particularly difficult to use but it is very powerful. You can replace hours of messing around in the shack with hours of messing around with a computer.
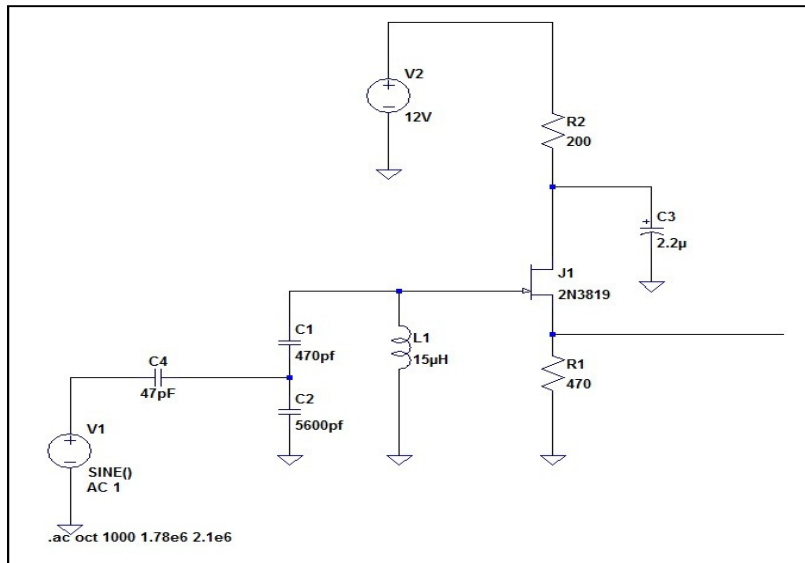
Schematic to be simulated - RF Amplifier

I wanted to demonstrate a simple circuit and show how SPICE can be used effectively. I eventually came up with a simple RF tuned amplifier that is not exactly state of the art but simple enough for this purpose. It demonstrates the use of passive components, active components, signal generators and power supplies. The circuit provides approximately 22dB of gain and resonates at 1.97MHz. The tuning is very sharp with the –6dB response only a few kHz wide. I chose the 2N3819 JFET configured as a 'source follower' because it is a common arrangement seen in amateur radio. The output across R1 follows closely the gate voltage which sits across the tuned circuit. In this circuit, the FET exhibits unity gain but the overall circuit provides voltage gain due to the high Q tuned input. At resonance, the parallel tuned circuit exhibits high impedance resulting in voltage multiplication. In effect, the FET converts high impedance voltages into lower impedance voltages at the output. This behaviour is easy to see in the simulation by plotting the frequency response of the gate and source, which is very easy to do. The Drain resistor R2 is included to demonstrate the relatively poor performance of the 2.2uF tantalum decoupling capacitor. Capacitors C1 and C2 provide a method of tapping a low impedance source, such as a generator into the tuned circuit without killing the Q. Once you have the simulation working, you can spend hours messing around with different component combinations.

The software is written and distributed by Linear Technology Corporation who manufacture and market high performance analog integrated circuits. To start it is necessary to first install LTSpice IV. This is available from their web site: http://www.linear.com/designtools/software and will install on a Windows machine or on a Mac. Follow the installation instruction - it should be very straight forward.

When executed, LTSpice IV shows an empty window and a mostly greyed out tool bar. First it is necessary to create a new schematic from the 'File' menu. This results in a clear screen and activation of the tool bar that were previously greyed out. At this stage it is best to save the schematic using 'SaveAs' from the file menu. I saved the schematic as "newsletter1.asc" in 'My Documents' but you can call it anything you want and put it anywhere.
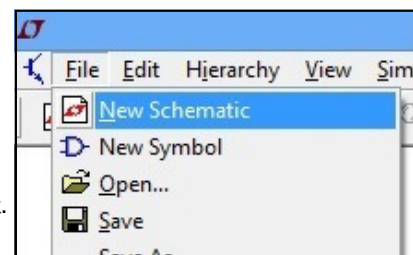
Create a new Schematic

Components are added to the new schematic using the tool bars. Place your mouse on the resistor tool bar button and press the left hand mouse button and the move the component into position on the page by moving the mouse. To fix the resistor on the diagram press the left hand key again. The + and - magnifying glass makes the diagram bigger or smaller respectively. Two very useful key strokes are the esc key that help you get out of an active mode. For example, after fixing a resistor using the left hand mouse key, another resistor will automatically appear to allow a second component to be positioned. This is useful when fixing large numbers of resistors. To get out of this just press the esc key. To delete a component, just press 'delete' on your keyboard and a pair of scissor will appear as the mouse pointer. Anything clicked will disappear. Press esc to get out of that mode.
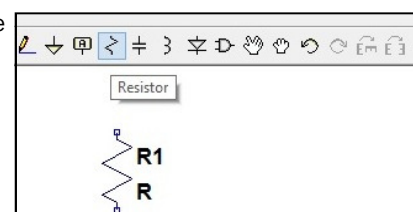
Insert a resistor

L T S P I C E   C I R C U I T   S I M U L A T I O N – T E C H N I C A L   A R T I C L E

Capacitors, resistors and inductors are all positioned and placed in the same way.

The FET is selected by positioning the mouse on the 'component' tool (This looks like a logic gate - see the upper diagram opposite). Left clicking brings up a Dialogue box called "Select Component Symbol". The FET is selected by clicking on "nfj", which stands for "N-Channel JFET". Pressing 'OK' causes a JFET to appear on the screen.

This same box is also used for selecting the 'voltage' generator for supplying 12V DC and for creating an AC oscillator at the tuned circuit input. As you would expect, this is called "voltage" (You need to scroll the list along).

Another essential component needed before the simulation will run is an earth terminal. This is found on the tool bar and looks like an inverted triangle. Drag these to the bottom of each component that connects to the earth or common rail.

Select the earth connection
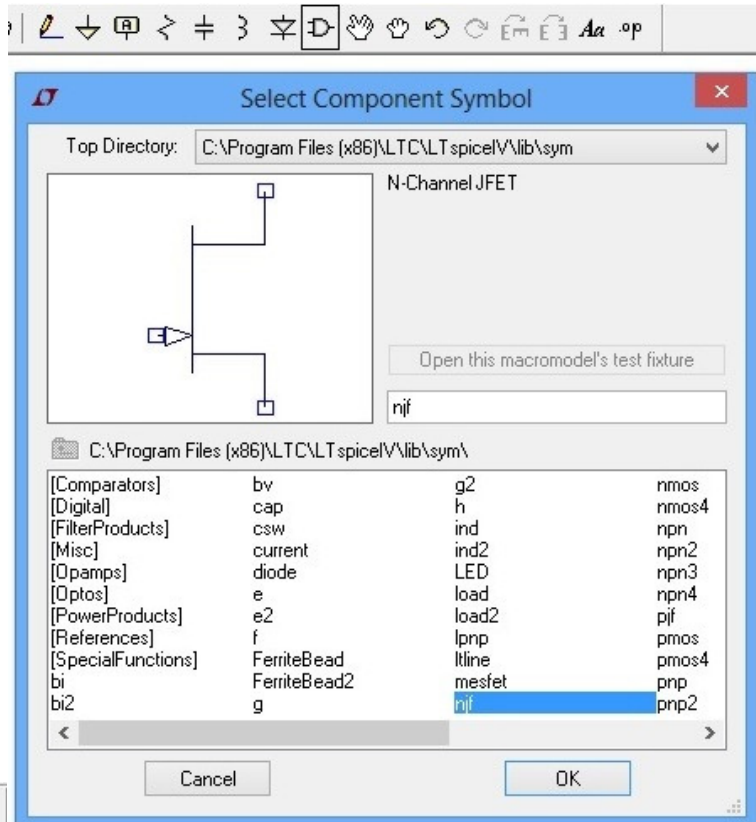
Create a new FET device - Select NJF from 'Component'

The component values are inserted by right clicking on each component and writing in the correct value. Remember, capacitance, inductance and resistance are measured in Farads, Henrys and Ohms respectively. LT Spice recognises k, M, u, p etc so for example 15uH can be inserted as 15u, 15uH or 15e-6. The software accepts the letter 'u' as a 'Mu'. Similarly a 200 Ohm resistor goes in as '200'. A 3300 Ohm resistor could be 3300, 3.3k, or 3.3e3. The 5600pF capacitor goes in as pF where the 'p' is the letter 'p' from the keyboard.
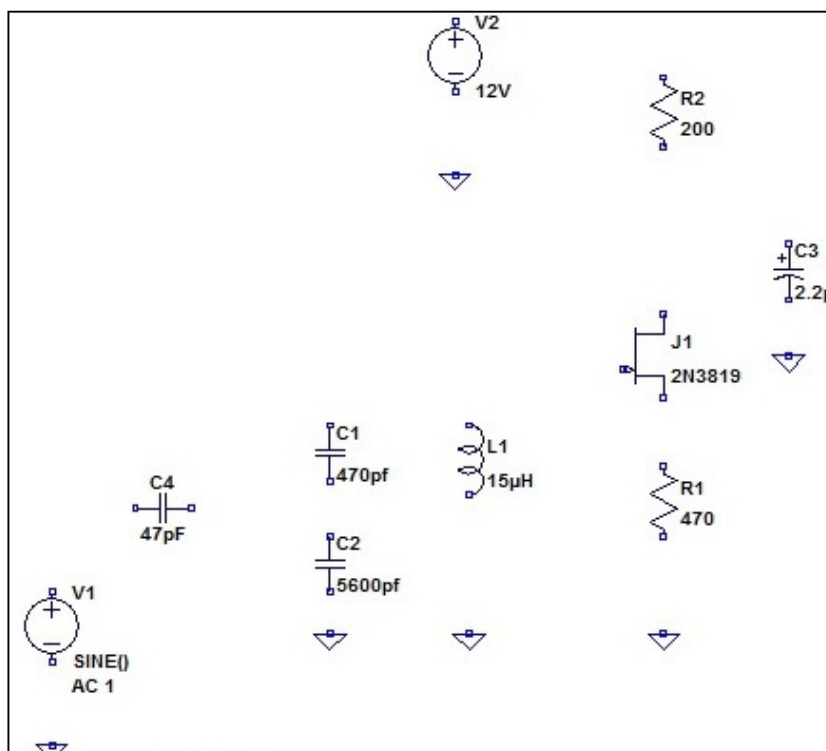
For resistor, capacitors and inductors, the dialog box may contain several property boxes. For example, the Capacitor value dialog box contains 7 properties. For simple simulations only the value is required.

When you right click on the power supply 'generator' insert 12 or 12V into the 'DC value[V]'. Leave the other box (serial resistance) blank.

By now the diagram should look similar to the adjacent diagram. This should look like a list of floating components complete with values. The FET value is also selected by right clicking on the FET symbol. You will need to press "Pick new JFET" after which a list of JFETs will appear.

L T S P I C E   C I R C U I T   S I M U L A T I O N — T E C H N I C A L   A R T I C L E

I chose the 2N3819 at the top of the list.

The signal generator is more tricky. First, right clicking on the generator symbol brings up the usual dialog box "Voltage Source" as shown. Press "Advanced" to bring up the next dialogue box. For a simple frequency scan, only the amplitude in 'Small Signal AC Analysis' is required. I used 0.01 to represent 10mV drive but in reality, it does not matter that much. It must be remembered that SPICE will not model component failure unless specifically programmed so dissipating 1 kW in a 1/4 Watt resistor will work fine without any complaints or warnings!

Right Click the Generator - Press Advanced

So summarising:

1.   We positioned the components

2.   Input component values

3.   Define generators

4.   Installed earth points

The next stage is to wire up the components. Actually, you can perform any of the above activities in any order. Sometimes I build and wire the circuit first and set the component values last.
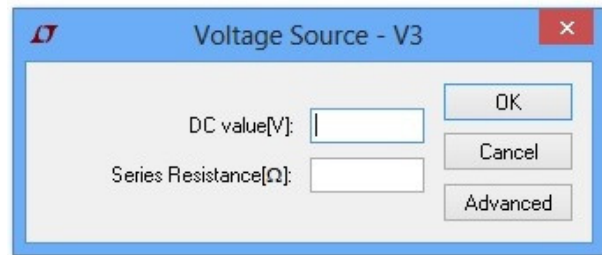
The wiring is a bit fiddly. Click on the wiring menu button (This is shown below). Position the mouse where the wire starts and click (Left) then position the mouse where the wire needs to end and click again. This leaves a black line connecting the components together. It takes some practice but the

For a Frequency scan, only the amplitude is needed

idea is relatively simple. It helps if the components are positioned well. Do not forget, the components can be moved around using the 'hand' control on the tools menu. Wiring can go vertical or horizontal but not slanting (thank goodness). Components and wiring snap into place making it easy to complete. When finished it should look like the schematic at the beginning of this article. Only one thing is left to do: you must tell the software what to do. In general, SPICE performs two types of analysis: Frequency scans and time domain scans.
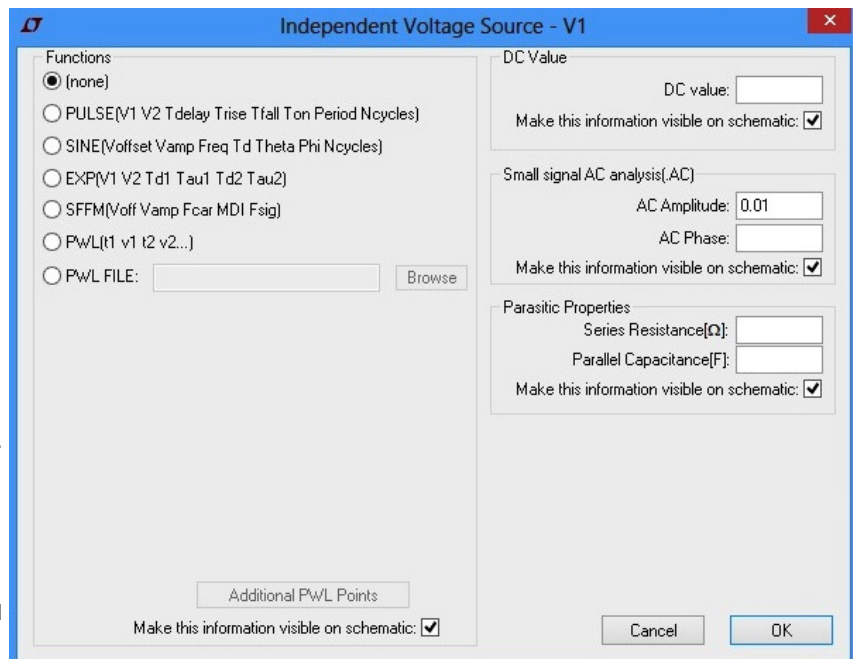
This example is a simple frequency scan hence it is necessary to define the start and stop frequency and the number of steps.

From the 'Simulator' menu, select the drop-down item "Edit Simulation cmd' which brings up the dialog box (shown on the next page).

The start frequency is set to 1.78e6, which is the same as 1.78 MHz and the stop frequency set to 2.1e6 or 2.1 MHz. I set the number of frequency steps per octave to 10,000 to provide smooth

Wire up the components

graphs. In practice, when playing with circuits, it is normal to keep changing values around in an iterative way. For example, it took me a while to find the resonant frequency of the circuit - initially I was looking around 3.5MHz!

To start the simulation, click on the 'man running' on the tool bar. Alternatively, right click and select 'Run'. One of two thing will happen: You will get an error message(!!!). This happens if you forget to give a component a value or forget something. Go back and check. If all goes well, the page will divide into two and the circuit diagram appear at the bottom and a graphs will appear at the top. To make plots appear on the graph, you need to click on the circuit diagram using the mouse. As you get close to a wire the pointer turns into a probe. Clicking on a wire will show the voltage at that point. Clicking on a component shows the current flowing through it.

L T S P I C E   C I R C U I T   S I M U L A T I O N – T E C H N I C A L   A R T I C L E

Hopefully, a graph similar to the one shown below will appear. The default colour for the graph is a black background that looks good. I changed the background to white for this newsletter simply because with an ink jet printer, black backgrounds get very heavy and soggy!

The graph below is a plot of the voltage on the JFET gate and the voltage across the 470 Ohm source resistor. As expected, the two are at similar levels. Remember, the graph vertical scale is logarithmic.

LT Spice is like an onion - it has layers of complexity allowing a casual user to use it in a simple way. Expert users can exploit the more advance features. This example of LT Spice use is definitely introductory.

The most powerful feature of LT Spice is time domain analysis that allows circuits to be analysed in time starting at say t=0 and incrementing in small time steps. Complex non-linear circuits can be analysed in this way.
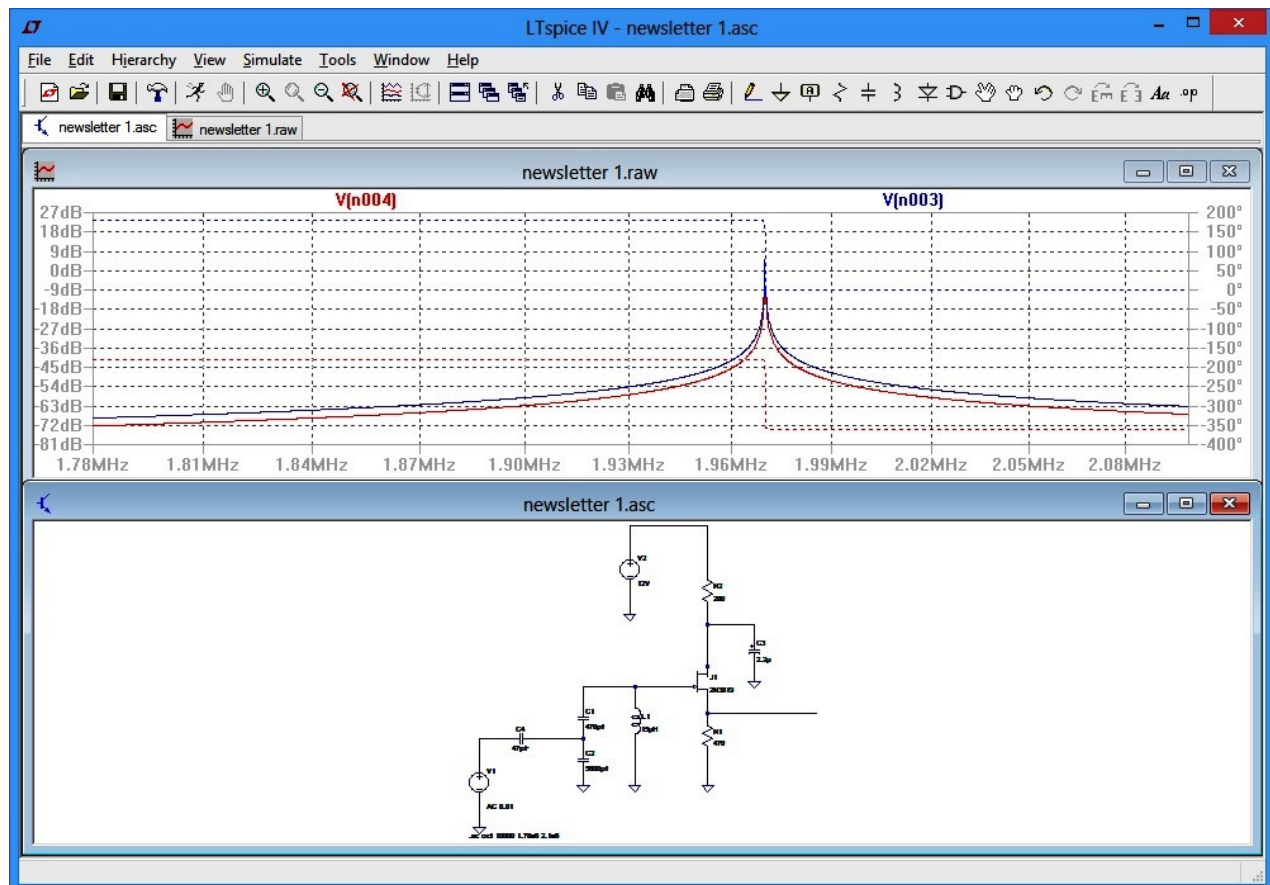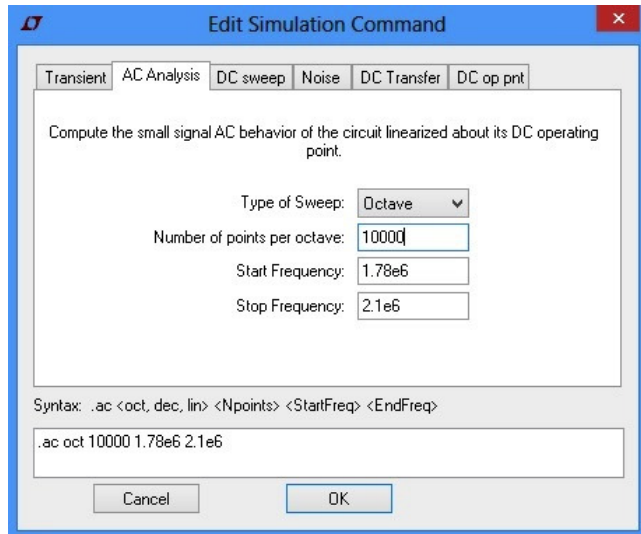
LT Spice can be used to simulate almost any circuit. Once you get used to the interface and read a few tutorials it all becomes more simple. It is best to start with simple circuits and build up.

Have Fun

Chris G4AKE

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Well that's enough for this quarter. The next newsletter will be after Christmas. See you then - Chris G4AKE