STARLITE

THE JOURNAL FOR THE STOURBRIDGE AND DISTRICT A.R.S.

G6OI

G6SRS

ISSUE: JANUARY 2025

STOURBRIDGE & DISTRICT AMATEUR RADIO SOCIETY

INFORMAL MEETINGS ARE HELD AT:
NORTON SOCIAL CLUB,
OSMASTON ROAD, STOURBRIDGE, DY8 2AL
[8:00 TO 10:00 PM]

MAIN MEETINGS (3RD MONDAYS) ARE HELD AT:
NORTON COMMUNITY CENTRE
KEMPTON WAY, STOURBRIDGE, DY8 3AP
[8:00 TO 10:00 PM]

VISITORS ALWAYS WELCOME

RSGB AFFILIATED SOCIETY

The views expressed in STARLITE may not be those of the Committee – Stourbridge and District Amateur Radio Society

STARLITE

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https://www.facebook.com/groups/stourbridge.ars/

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c/o 188 The Broadway
Stourbridge
West Midlands
DY8 3HZ

Forthcoming Meetings

January 6th	Club Meeting at Norton Social Club. 8pm
January 13th	Club Meeting at Norton Social Club. 8pm
January 20th	Club Meeting at Norton Community Centre. 8pm
January 27th	Club Meeting at Norton Social Club. 8pm
February 3rd	Club Meeting at Norton Social Club. 8pm
February 10th	Club Meeting at Norton Social Club. 8pm
February 17th	**CONSTRUCTORS' CONTEST @ Norton Community Centre. 8pm**
February 24th	Club Meeting at Norton Social Club. 8pm
March 3rd	Club Meeting at Norton Social Club. 8pm
March 10th	Club Meeting at Norton Social Club. 8pm
March 17th	**ANNUAL GENERAL MEETING 2025 @ NORTON COMMUNITY CENTRE. 8PM START**
March 24th	Club Meeting at Norton Social Club. 8pm
March 31st	Club Meeting at Norton Social Club. 8pm
April 7th	Club Meeting at Norton Social Club. 8pm

From The Editor's Desk [Editor: g4xom@g6oi.org.uk]

Following a period of self-deliberation, I have made the difficult decision to retire from my position as Starlite editor. I've been editor for several years (also, an extensive period in the 80s and 90s) and feel that the time has come to pursue other interests, one being editing 30 year old videos, which will take quite a long time. Also, motivation to find content is an increasing issue. As you know, nothing lasts forever, so my final contribution will be the March 2025 issue of Starlite.

For newer members.licensees: Never heard of a wavemeter or GDO? I suggest you have a word with one of the OG, who would have used them in the past.

In this issue:

Absorption Wavemeter
Grid Dip Oscillator
Foundations Of Amateur Radio
FREE Aerials!
Dxpeditions

Absorption Wavemeter

An **absorption wavemeter** is a simple electronic instrument used to measure the frequency of radio waves. It is an older method of measuring frequency, widely used from the birth of radio in the early 20th century until the 1970s, when the development of inexpensive frequency counters, which have far greater accuracy, made it largely obsolete. A wavemeter consists of an adjustable resonant circuit calibrated in frequency, with a meter or other means to measure the voltage or current in the circuit. When adjusted to resonance with the unknown frequency, the resonant circuit absorbs energy, which is indicated by a dip on the meter. Then the frequency can be read from the dial.

Wavemeters are used for frequency measurements that do not require high accuracy, such as checking that a radio transmitter is operating within its correct frequency band, or checking for harmonics in the output. Many radio amateurs keep them as a simple way to check their output frequency. Similar devices can be made for detection of mobile phones. As an alternative, a dip meter can be used.

There are two categories of wavemeters: *transmission wavemeters*, which have an input and an output port and are inserted into the signal path, or *absorption wavemeters*, which are loosely coupled to the radio frequency source and absorb energy from it.

HF and VHF

The most simple form of the device is a variable capacitor with a coil wired across its terminals. Attached to one the terminals of the LC circuit is a diode, then between the end of the diode not wired to the LC circuit and the terminal of the LC circuit not bearing the diode is wired a ceramic decoupling capacitor. Finally a galvanometer is wired to the terminals of the decoupling capacitor. The device will be sensitive to strong sources of radiowaves at the frequency at which the LC circuit is resonant.

When the device is exposed to an RF field which is at the resonant frequency a DC voltage will appear on the terminals on the left hand side. The coil is often outside the case of the unit so it can be brought close to the object being probed.

UHF and SHF

At the higher frequencies it is not possible to use lumped components for the tuned circuit. Instead methods such as stripline or resonant cavities are used. One design for ultra high frequencies (UHF) and super high frequencies (SHF) is a resonant λ/4 (quarter wave) rod which can vary in length. Another design for X-band (10 GHz) is a resonant cavity which can be changed in length.

As an alternative for UHF, Lecher transmission lines can be used. It is possible to measure roughly the frequency of a transmitter using Lecher lines.

Grid Dip Oscillator

"Dip meter" can also refer to an influential early commercial expert system called Dipmeter Advisor; or may refer to an instrument that measures the magnetic dip angle of Earth's magnetic field, the field line angle in a vertical plane.

Grid dip oscillator (**GDO**), also called **grid dip meter**, **gate dip meter**, **dip meter**, or just **dipper**, is a type of electronic instrument that measures the resonant frequency of nearby unconnected radio frequency tuned circuits. It is a variable-frequency oscillator that circulates a small-amplitude signal through an exposed coil, whose electromagnetic field can interact with adjacent circuitry. The oscillator loses power when its coil is near a circuit that resonates at the same frequency. A meter on the GDO registers the amplitude drop, or "dip", hence the name.

Dip oscillators have been widely used by amateur radio operators for measuring the properties of resonant circuits, filters, and antennas. They can also be used for transmission line testing, as signal generators, and for measuring inductance and capacitance of components. Measurement with a GDO is called "dipping" a circuit.

Principle of operation

Central to the dip meter is a high-frequency variable-frequency oscillator with a calibrated tuning capacitor and matching interchangeable coils, as shown in the circuit diagram. Resonance is indicated by a dip in amplitude of the signal within the GDO, by a meter on the device.

When the oscillator's exposed coil is in the vicinity of another resonant circuit, the coupled pair behaves as a low-Q transformer whose coupling is most effective when their respective resonant frequencies match. The degree of coupling affects the frequency and amplitude of oscillation in the dip meter, which is sensed in any of several ways, the simplest and most usual of which is a built-in microammeter. The distance between the coil and the tested circuit needs to be adjusted carefully so that the GDO amplitude *is* significantly affected by the coupled circuit, but its frequency is not.

History

Grid dip oscillators were first developed in the 1920s and were built with vacuum tubes. The devices displayed the amplitude of the tube's grid current, hence GDO.

Modern dip meters are solid-state devices, and are sometimes called **gate dip oscillators** or **emitter dip oscillators** in reference to the analogous part of the transistor whose current is measured instead of a vacuum tube grid. Solid-state versions of the grid dip oscillator are more versatile, since they can operate at higher Q and lower amplitude, and are not tethered by a power cord.

Dip meters of all types are being supplanted by antenna analyzers, which are more complex, but perform many of the same functions more conveniently, and require less dexterity.

Operation

The dip meter can be used either to measure the relative power lost *to* a nearby circuit (in which case the amplitude shown on the meter "dips") or to measure the relative power absorbed from a nearby powered circuit (in which case, the meter amplitude peaks). In either mode of operation, some experimentation is needed to find a distance between the pickup coil and the circuit under test, to ensure that the two circuits are close enough to transfer power, but not coupled so closely that the circuit supplied with power overwhelms the responding circuit, and forces it to oscillate regardless of the frequency.

Coupling distance

The heart of the instrument is a tunable LC circuit whose exposed external coil will loosely couple to the measured resonant circuit when held moderately close by. The measuring distance must be skillfully adjusted to be close enough to provide sufficient coupling for the dip to show clearly, but far enough that the meter and the tested circuit oscillate independently, so neither device's frequency is significantly distorted by the other, and so that power lost to the external circuit does not swamp the dip meter's oscillator.

The coil and the test circuit can either be inductively or capacitively coupled: Coupling is inductive if the coil wires are held parallel to the nearest wires of the circuit being tested, capacitive if the coil wires and the circuit wires are held perpendicular. Depending on the context desired for the measurement, the circuit under test can be temporarily disconnected from its surroundings to avoid distortion by the parts it is normally attached to, or left wired in place to measure the response of the combined system.

Emission frequency meter

In ordinary use, only the oscillator in the dip meter is powered, and the circuit under test's only power is what it drains from the signal in the GDO coil. When both circuits are resonant at the same frequency, power transfer from the coil to the adjacent tested circuit reaches a maximum, consequently the dip meter's oscillator amplitude reaches a minimum due to the power lost to the circuit under test.

The operator adjusts the frequency of the GDO until its meter shows its lowest reading (the "dip"). The frequency is read from the dial on the GDO, or the frequency can be measured by finding the dip meter's signal on a well-calibrated radio receiver. Some modern GDOs have a built-in frequency meter, which makes over-coupling somewhat less troublesome.

Absorption frequency meter

Some dip meters can be used in reverse, as ultra-short-range, tuned field strength meters. The operator finds the frequency at which the highest *rise* in meter power occurs in the unpowered GDO, when its coil is held near the wires of an active resonant circuit. Since the power in the circuit under test must be high enough to register on the meter, this uncommon method is risky both for the operator and the equipment.

Foundations of Amateur Radio

The origin of our amateur bands

It's hard to imagine today, but there was a time when there was no such thing as either the 80m or the 20m amateur band, let alone 2m or 70cm.

Picture this. It's the roaring 20's, the 1920's that is. Among a Jazz Age burst of economic prosperity, modern technology, such as automobiles, moving pictures, social and cultural dynamism, the peak of Art Deco, we're also in the middle of a radio boom where the world is going crazy buying radios as fast as they can be constructed, there are hundreds of licensed broadcasters, the bands are getting crowded, radio amateurs have been banned from the lucrative radio spectrum above 200 meters, and can only play in the "useless short waves" using frequencies greater than 1,500 kHz. And play they did.

On the 2nd May 1925 amateurs proved they could communicate with any part of the world at any time of the day or night when Ernest J. Simmonds G2OD and Charles Maclurcan A2CM made a daylight contact between Meadowlea, Gerrards Cross, Buckinghamshire, England, and Strathfield, Sydney, New South Wales, Australia on what we now call the 20m band. This contact occurred not once, but regularly, for several days, using 100 Watts.

To give you a sense of just how big news of this feat was, on the second scheduled contact the Prime Minister of Australia, Stanley Bruce, sent a message to England's Prime Minister, Stanley Baldwin: "On occasion of this achievement Australia sends greetings."

If you recall, the IARU, the International Amateur Radio Union, was a fortnight old at this point. Less than a year later contact was made using voice.

Between the banning of radio amateurs from frequencies below 1,500 kHz at the London International Radiotelegraph Conference in 1912 and the Washington International Radiotelegraph Conference in 1927 the world had irrevocably changed. In 1912 the discussion was almost all about ship to shore communication. By 1927, the world had tube transmitters, amplitude voice modulation, higher frequencies and what the 1993 IARU President, Richard Baldwin, W1RU calls, "literally an explosion in the use of the radio-frequency spectrum".

In 1927 individual countries were beginning to control the use of spectrum, but there was no universal coordination, no international radio regulation and as we all know, radio waves don't stop at the border.

Richard W1RU, writing in 1993 says: "In retrospect, the Washington conference of 1927 was a remarkable effort. It created the framework of international radio regulation that exists even today. It had to recognize and provide for a multitude of radio services, including the Amateur Service. It was at this conference that amateur radio was for the first time internationally recognized and defined. Bands of harmonically related frequencies were allocated to the various radio services, including the Amateur Service."

While the IARU was two years old, it really hadn't represented amateur radio on the international stage, until now.

The 1927 conference defined an "amateur" as a "duly authorised person interested in radio electric practice with a purely personal aim and without pecuniary interest."

The harmonically related frequencies that were allocated to the Amateur Service are recognisable today. I'll use current band names to give you some context.

1,715 kHz to 2 MHz, or 160m, 3.5 to 4 MHz, or 80m, 7 to 7.3 MHz or 40m, 14 to 14.4 MHz or 20m, 28 to 30 MHz or 10m, and 56 to 60 MHz or 6m.

Of those, the 20m and 80m bands were exclusive to amateurs. The 10m and 6m bands were shared with experimenters and the 160m and 80m bands were shared with fixed and mobile services. You'll notice the absence of bands we use today, the 2m and 70cm bands, 15m and the so-called WARC bands to name a few.

The final ratified document goes into great detail about the requirements, the restrictions, how to deal with interference, how to allocate frequencies and numerous other provisions, many of which will look familiar, almost a hundred years later, if you've ever looked at the rules and regulations under which you operate as a licensed amateur today.

There were various radio amateurs at the 1927 conference, but as Richard W1RU puts it: "much of the credit for the success of amateur radio at that conference has to go to two representatives of ARRL -- Hiram Percy Maxim, president of ARRL; and Kenneth B. Warner, Secretary and General Manager of ARRL."

While Richard points to their roles in the ARRL, you might recall that Hiram was elected international president of the IARU and Kenneth its international secretary-treasurer.

Whichever way you look at it, whichever organisation you credit, today we have amateur bands thanks to those efforts made nearly a century ago.

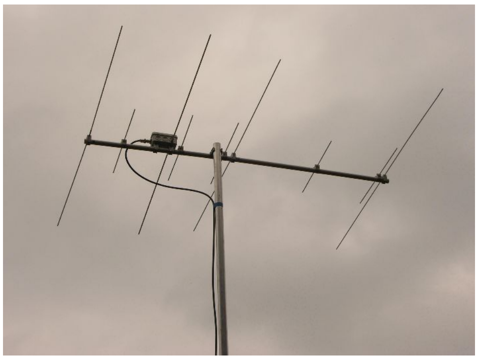
I'm Onno VK6FLAB

This article is the transcript of the weekly 'Foundations of Amateur Radio' podcast, produced by Onno Benschop, VK6FLAB who was licensed as radio amateur in Perth, Western Australia in 2010. For other episodes, visit http://vk6flab.com/. Feel free to get in touch directly via email: cq@vk6flab.com

FREE Aerials To Anyone Interested

In my garage I have three aerials which I am willing to pass on to any interested user(s). I am asking no fee – yes, they are **FREE** to take away. If I can't pass them on, sadly they will be scrapped.

First up for grabs is a DK7ZB design 2m/70cms dual Yagi.



It is 4 elements on 2m and 5 elements on 70cms with a single feedpoint.

Forward gain:

2m is about 6.1dbd

70cms is about 8.5dbd

Full design details can be seen on the DK7ZB website at https://www.qsl.net/dk7zb/start1.htm

Second is a Jaybeam 24-ele long Yagi for 70cms. It is about 4.5m in length when in use, but is disassembled into 4 parts for transport or storage. With this aerial, I made many contacts into Europe (best ones were western Czechoslovakia and southern Sweden), together with many counties in the UK and Eire. Forward gain is about 14.5dbd and the beam width is in the order of 10-15 degrees.

Finally is my homemade 10-ele Yagi for 70cms. It is 1.5 m long with a folded driven element. I used it for hill top /P work, sometimes in short UHF contests. Attaching it to a 6m telescopic pole, I was QRV within 10 minutes. With a forward gain of about 8.5dbd it is quite useful.

It certainly would be a shame to scrap them, so if you have any interest in acquiring one (or all) of them, please send me an email.

Bob G4XOM g4xom@g6oi.org.uk

DXpeditions

J75K Dominica

J75K Team will be active from Dominica, IOTA NA - 101, 26 December 2024 - 4 January 2025.

Team - FM5WD, IV3JVJ, IK3ZAQ.

They will operate on 160 - 6m, CW, SSB, FT8.

QSL via IV3JVJ direct, LOTW.

T88SM Koror Island

Mike, JA6EGL will be active again as T88SM from Koror Island, IOTA OC - 009, Palau, 10 - 16 January 2025.

He will operate on 160 - 6m, CW, SSB, Digital modes.

QSL via home call direct only.

Address for direct QSL:

Mike S. Miyake, Hakata Amateur Radio Association, P.O.Box 232, Hakata-North, 812-8799, Japan.

P40AA Aruba

Mat, DL4MM will be active again as P40AA from Aruba Island, IOTA SA - 036, 18 - 28 January 2025.

He will operate on HF Bands, CW, SSB, FT8, including activity in CQ WW 160m CW.

He will operate in Single Operator Assisted Category.

QSL via ClubLog OQRS.

5N9DTG Nigeria

5N9DTG Team will be active from Abuja, Nigeria in January 2025.

Team - Members of the Rebel DX Group.

They will operate on 160 - 6m, CW, FT8 and possible SSB.

QSL via ClubLog OQRS.

C8K Mozambique

C8K Team will be active from Mozambique during 18 January - 1 February 2025.

Team - Petr OK1BOA, Petr OK1FCJ, Palo OK1CRM, Pavel OK1GK , Ruda OK2ZA, Ludek OK2ZC, Karel OK2ZI, David OK6DJ.

They will operate on 160 - 6m, including 60m Band, SSB, CW, RTTY, FT8, FT4, PSK.

QSL via OK6DJ direct, ClubLog OQRS, LOTW.

Address for direct QSL:

David Beran, Dolni Kamenice 55, Holysov, 34562, Czech Republic.

DP1POL Neumayer Station III

Felix, DL5XL will be active again as DP1POL, from Neumayer Station III, Antarctica, 12 January - 15 February 2025.

He will be active on HF bands mainly CW.

QSL via DL1ZBO, LOTW.

Address for direct QSL:

Rainer Hilgardt, Hans-Sachs-Weg 38, 64291 Darmstadt, Germany.

TY5C Benin

Gerard, F5RAV will be active as TY5C from Benin, 10 January - 2 April 2025.

He will operate on 80 - 10m, CW, FT8.

QSL via F5RAV.

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