QSX PE

Port Elizabeth Branch of the South African Radio League

P.O.Box 462, Port Elizabeth. 6000.

P.E. Repeater	145.05/65
Grahamstown	145.15/75
Lady's Slipper	145.10/70
Cockscomb	145.00/60
Rtty Mailbox	145.35

ZS2PE

Sunday bulletin: 08h40

HF - 40M -- 7098 KHz (lsb)

80M -- 3640 KHz (lsb)

VHF - 145,700 MHz (fm)

JULY 1986

We like being your branch!

Port Elizabeth Branch

›NOTICE OF MONTHLY MEETING‹

MEMBERS ARE REMINDED THAT THE MONTHLY GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE WILL BE HELD AT ST. MARTIN'S CHURCH, GREAT WEST WAY, KABEGA PARK, ON FRIDAY 18th JULY, 1986 AT 8.15P.M.

AFTER THE BUSINESS OF THE MEETING, THERE WILL BE A VIDEO ON THE DEVELOPMENT AND CONSTRUCTION OF OSCAR 10. THIS HAS BEEN PROVIDED BY COLIN ZS2AO.

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COMMITTEE.

CHAIRMAN:	Brian ZS2AB 303498	VICE CHAIRMAN:	Lionel ZS2DD 321770
SECRETARY:	Marge ZS2OB 303498	TREASURER:	Dick ZS2RS 322111
AWARDS:	Bill ZS2-157 [illegible]12580		Trevor ZS2AE 321746
QSX-PE:	ZS2OB and ZS2AB	LIBRARIAN:	Colin ZS2AO.

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BULLETIN ROSTER.

20th July	Lionel ZS2DD	From the middle up.
27th July	Marge ZS2OB	From the top down.
3rd August	Dick ZS2RS	From the bottom up.
10th August	Trevor ZS2AE	From the middle down.
17th August	Bill ZS2-157	From the middle up.

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THIS and THAT

SUBSCRIPTIONS are now due. There has been a very good response with more than half of the subs already paid. If you have still to pay, PLEASE remember to send your renewal form you received with Radio ZS with your subs, or if you forgot to send it with your subs, PLEASE send it as soon as possible.

WELCOME We extend a hearty welcome to Dick Hardie ZS[illegible] and Barry Fennell ZS2DT who have joined the Branch and we wish you long and happy association with us.

CONGRATS to Bill Atteridge ZS2V who has been a member of the League for 25 years. Many more, Bill.

also to Noel Staples for doing so well in the May P.M.I. exam. Hope to hear you on the air soon, N[illegible].

MINUTES OF THE GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT ST. MARTINS CHURCH, KABEGA PARK, PORT ELIZABETH ON FRIDAY 20th JUNE, 1986.

PRESENT: 30 members and visitors.

APOLOGIES: ZS2DT, ZS2HB, ZS2WV, ZS2RT, ZS2PR, ZS2RG.

The Chairman welcomed all to the meeting, especially one of our newest members, Buddy ZS2CA, also to Trevor ZS2TJ and two visitors Barry ZR2AAB and Antonio. He also offered sincere sympathies to Fred ZS2JS on the recent death of his father.

MINUTES: The Minutes of the meeting held 16th May, 1986, having been published and circulated in QSX-PE were taken as read, proposed by Dick ZS2RS and seconded by Trevor ZS2AE.

ARISING: (1)No suggestions were made as to the format of a new cover for QSX-PE.
(2)Dick ZS2RS showed samples of the types of shirts which were available from the silk-screen printers. Several members placed orders for these.
(3)Members were reminded of the perspex name tags which were available.
(4)One of our members Noel Staples had done very well in the May P.M.G. exam and he was congratulated.

CORRES: (1)A letter had been sent to the S.A.P. regarding the erection of our town repeater on their new building.
(2)A letter of thanks from John Magee.
(3)Card of thanks from Marlene Ashwell.

FINANCE: (1)A number of subscriptions had been received.
(2)A supply of labels for mailing purposes has been purchased.

GENERAL: (1)The Chairman welcomed two new members to the Branch, Sam Abrahams ZS2SI and Barry Fennell ZS2DT and wished them a long and happy association with the Branch.
(2)The log file of the Mailbox had been printed out and a total of 514 calls had been made, of which 90 were by ZS2AO, 86 by ZS2DT, 70 by ZS2SP and the remainder by other amateurs in the area.
(3)Several plastic covers suitable for monitors and keyboards had been donated by Andre ZS2BK and these were available for a reasonable donation.
(4)It was mentioned that the Cockscomb repeater had first been installed on 7th June 85, failed on 7th September 85 and re-installed on 7th June 86. Everyone had been very impressed with the performance and all those who had helped in any way were thanked for their efforts. Trevor ZS2AE who had been in charge of the project said it was heartening to see how everyone had worked together, irrespective of which branch they belonged to. A letter of thanks to Sigma Electronics would be written.
(5)Brian said that the P.E. Flying Club had approached the Branch on Wednesday to help out with communications for a Navex. An express letter had been sent to the P.M.G. for permission to operate and a phone call had been received giving permission. Six outstations and one base station would be required. Several members had volunteered their help. The exercise would be over by lunchtime. There would be a briefing at the Flying Club at 8.30a.m.
(6)The Hobbies Fair was due to start on 30th June and the following confirmed they were available for duty: ZS2MG, RB, LW, MF, VM, RL, AO, MM, AE, EQ, WG, DD, BK, TJ, RS, AB, OB, ZR2AAA and ZS1VS. A roster would be drawn up so that there would be at least two on the stand at any time. Helpers would also be needed for setting up

the stand on the Saturday and Sunday. Times of the Fair were from 12 noon till 10p.m. and the stand would be set up in No. 3 pavilion. Clive ZS2RT was in the process of taking slides of various facets of Amateur Radio and these, together with some lent by Branch members, would be shown in a projector mounted on on the wall alongside the stand. On the other side would be a TV and video showing the tape obtained from Headquarters. There would be Rtty, Mailbox operation, HF and VHF rigs, S.S.T.V. and Weather satellite demonstration. Pamphlets also obtained from Headquarters would be available for handing out to those who showed interest.

The meeting was then closed and tea was taken. A most interesting and informative talk and demonstration on the use and construction of a G.D.O. was given by Lionel ZS2DD. This was much appreciated.

sgd:
B.A. Weller ZS2AB
Chairman

sgd:
M.T. Weller ZS2OB
Secretary

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HOBBIES FAIR.

Well, the 1986 Hobbies Fair is now a thing of the past and we can say that as far as the stand and decor, the Amateur Radio stand was very much of an improvement on past Fairs. The venue of the Agricultural Showground with its greater ground area suited our purposes much better in that we were able to erect a beam and other antennas, which was just not possible at the Feather Market Hall. However, the operation on hf was really not much better, due to the fact that (a) the bands are not in very good shape at the moment and (b) the amount of electrical noise had to be heard to be believed and (c)not least, a few complaints from some other computer operators set up near our stand. Well, we did warn them!
The stand itself occupied what we think used to be a band stand, with its raised platform and canopy roof which was ideal for putting up our name boards and League Badge. The back wall was taken up by a huge map of the world with dozens of QSL cards linked to their place of origin. Several certificates, magazines and newsletters were also displayed. On the one side an auto-slide projector was set up with a display of amateur activity slides with descriptive material between. On the other side, a TV monitor and video were erected, with a tape of mainly American amateur activities including the Ham in Space. On the stand, were two hf rigs, a SSTV set which unfortunately didn't get operational, a Telereader used to access the Mailbox, a vhf set and a monitor showing weather satellite pictures. Pamphlets acquired from Headquarters pertaining to Amateur activities were also given out and a number of people expressed interest. Many thanks are due to all those who worked so hard before the show, doing things like taking slides, getting shirts silkscreened to be worn at the show, getting the use of equipment, erecting antennas and preparing the stand the weekend before the show. The number of members who came to assist in all sorts of ways was outstanding and heartening and shows the good spirit in the Branch. To those who manned (or womanned) the stand at all times goes a great deal of thanks and praise, particularly those who did duty more than once, and weather conditions were not of the best; winter seemed to arrive in full force. However, attendance at the Fair were much better than before in spite of inclement weather conditions on the Friday, so it seems as if the next Hobbies Fair will be at the same venue. And as the saying goes, We live and learn", there will no doubt be additions and improvements the next time round. Once again, a very BIG THANK YOU to all those who helped so willingly. Where would the Branch be without you?

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MURPHYS LAW RE AMATEUR RADIO.

1. An important instruction or operating manual will have been discarded.
2. Original drawings will be mangled in the copying machine.
3. Any wire cut to length will be too short.
4. Identical units tested under identical conditions will not be identicalin the field.
5. The availability of a component is inversely proportional to the need for that component.
6. If a project requires X components, there will be X - 1 in the junk box.
7. If a particular resistance is needed, that value will not be available. Further, it cannot be developed with any available series or parallel combination.
8. A dropped tool will land where it can do the most damage. (Also known as the Law of Selective Gravitation.)
9. A device selected at random from a group having 99% reliability, will be a member of the 1% group.
10. The probability of a component value being omitted from a plan or drawing is directly proportional to its importance.
11. Interchangeable parts won't.
12. Components that must not and cannot be assembled improperly will be.
13. If a circuit cannot fail, it will.
14. A fail-safe circuit will destroy others.
15. A transistor protected by a fast-acting fuse will protect the fuse by blowing first.
16. A self-starting oscillator won't.
17. A crystal oscillator will oscillate at the wrong frequency - if it oscillates.
18. A PNP transistor will be an NPN.
19. A failure will not appear till a unit has passed final inspection.
20. If an obviously defective component is replaced in an instrument with an intermittent fault, the fault will reappear after the instrument is returned to service.
21. After the last of the 16 mounting screws has been removed from an access cover, it will be discovered that the wrong access cover has been removed.
22. After an access cover has been secured by 16 hold-down screws, it will be discovered that the gasket has been omitted.
23. After a rig has been fully assembled, extra components will be found on the bench.

Larry Waggoner, WØKA. Bulletin of Kansas ARPSC.
Ack. to Hams Haywire News. P.M.Burg Branch.

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VIDEO TAPE OFFER.

WE CAN STILL OFFER VHS VIDEO TAPES AT THE LOW,LOW PRICE OF R15. THERE ARE ONLY A FEW OF THESE LEFT. FIRST COME, FIRST SERVED. CONTACT MARGE ON 30-3498 OR AT MEETINGS.

USING THE GRID-DIP METER

BY WILFRED M. SCHERER,* W2AEF

With acknowledgements to CQ.

ALTHOUGH a few cumbersome versions of the grid-dip meter had been in use as far back as the early 1920's, it remained relatively unnoticed as the useful tool it is. It was not until after World-War II that it achieved its popularity and came into general use as a result of several articles published in *CQ* which described practical working models and that called attention to and demonstrated the many applications for which the grid-dip meter may be employed.[1]

* Technical Director, *CQ*.

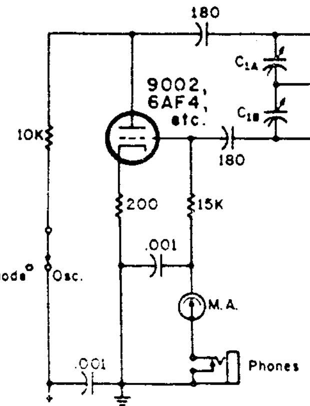


Fig. 1—Basic circuitry for the grid-dip meter. With plate voltage applied it functions as a Split Colpitts Oscillator. Grid current, indicated by M_1, dips when power is taken from the tank, C_1-L_1, by a circuit resonant at the oscillator frequency when coupled to L_1. Headphones plugged into the phone jack enable a beat to be heard from a signal picked up at the frequency of the oscillator. With plate voltage removed, the tube functions as a diode. The meter indicates the diode-load current which will rise when the circuit is tuned and coupled to a source of r.f. Various schemes are used to vary the meter sensitivity or grid current, so that a high-scale reading may be obtained on all ranges.

The supply of back copies with the references has long ago been depleted and although much of the operational data has been duplicated in the instructions accompanying many commercial models of the instrument which have since appeared, an updated repetition in respect to the device itself and its many applications might be welcome to those otherwise unfamiliar with its scope of usefulness.

Basic Functions

The basic functions of the grid-dip meter are:

1—As a GRID-DIP OSCILLATOR (g.d.o.) for determining the resonant frequency of *de-energized* r.f. circuits.

2—As an OSCILLATING or NON-OSCILLATING DETECTOR or FREQUENCY METER for determining the presence and frequency of r.f. power in *energized* circuits.

3—As an R.F. SIGNAL GENERATOR.

Principle of Operation

Figure 1 shows the basic circuit for the grid-dip meter.

For operation as a GRID-DIP OSCILLATOR, plate voltage is applied and the setup functions as a self-excited oscillator. When it is then coupled to a circuit that is resonant at the oscillator frequency, r.f. power is taken from the oscillator by the resonant circuit. This reduces the strength of oscillation with a consequent decrease in the oscillator grid current which is indicated by a meter in the grid return. Therefore, whenever the oscillator is tuned through the frequency at which

1 Scherer, "The Dipper," *CQ*, May 1947.
Scherer, "Applications of the Grid-Dip Oscillator," *CQ*, Jan. 1949.
Scherer, "The Improved Dipper," *CQ*, Feb. 1949.

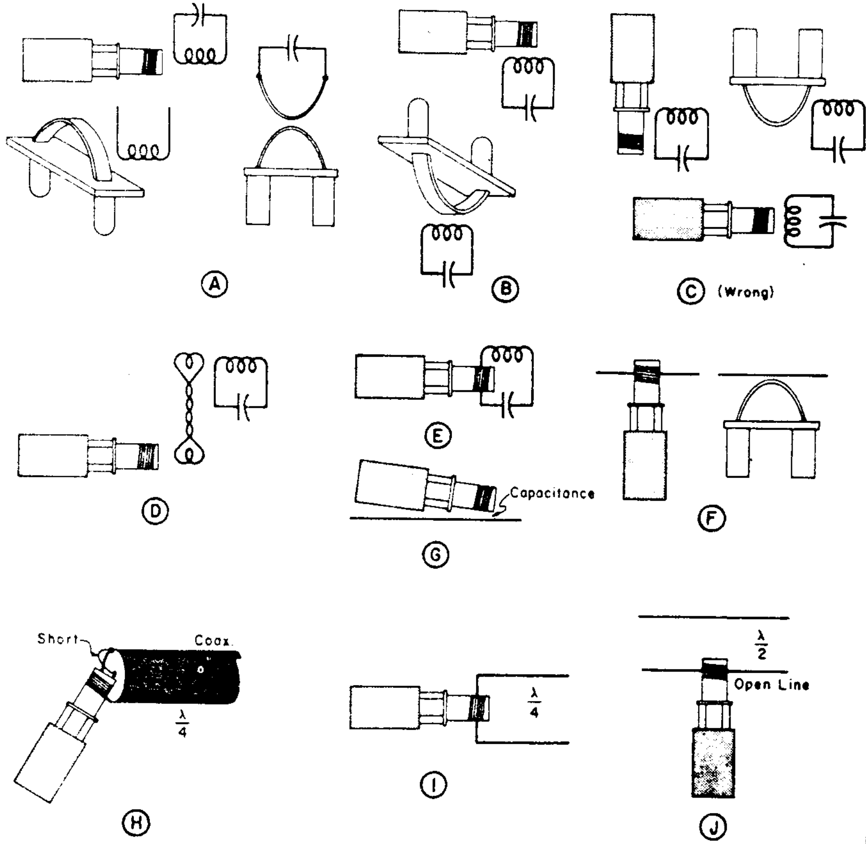
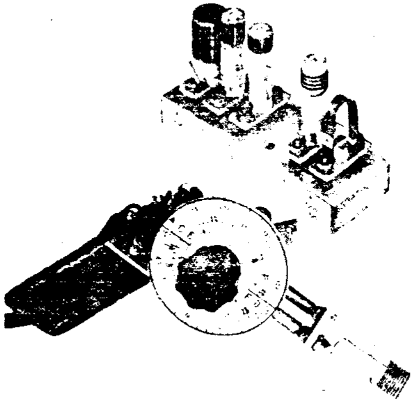


Fig. 2—Methods of coupling the grid-dip meter to circuits under test. In all cases, greatest accuracy is realized when coupling is as loose as possible, consistent with obtaining a sufficient dip indication. Best results usually are obtained using method *A*. The inductors are in line end-to-end. Note the orientation of the hairpin-type inductors. *B* may be used as an alternate where the inductors are side-by-side. Methods at *C* are incorrect. *D*—Link coupling for use in hard-to-reach places. One or two turns of the line should be wrapped around the g.d.o. inductor. The other end of the link is coupled closely to the test inductor. For this situation coupling sometimes may be made on a lead of the circuit as at *E*. At *F*—Inductive coupling to antennas or other straight wires. Better coupling is sometimes had by reversing the inductor 180° when it is plugged into the g.d.o. or by placing it below the wire lead instead of above as shown. Capacitive coupling to wires is shown at G. H—For quarter-wave shorted coax lines. *I*—For quarter-wave shorted open-wire lines. *J*—For open or shorted open-wire half-wave lines.

the circuit under test resonates, a dip will occur in the meter reading. The frequency at which this takes place is then read from a calibrated scale on the instrument.

Employed in this manner, the grid-dip meter may be used to check the resonant frequency of a circuit *without the application of power to the circuit in question.*

Circuits may thereby be checked or pretuned, before completion of a piece of gear in which they are to be used, saving considerable time and providing a definite assurance of correct frequency adjustment, or one that is at least "in the ballpark." Usually, only minor trimming will be required under actual operating conditions. Guess work or cut-and-



The "Dipper" described in one of the references. Probe-type operation was made possible by the pistol grip and small plug-in inductors. Frequency range covered 3-250 mc. Power supply and meter were separate.

try methods are eliminated. Certainty also is established as to the tuned-circuit components in equipment if it otherwise does not operate properly due to errors or failures in other portions of the circuitry. Antenna resonance and the electrical length of transmission lines also may be made with the g.d.o. function, as shown later.

For operation as an OSCILLATING DETECTOR, plate voltage is applied and the circuit oscillates as before, but this time headphones are connected in the grid return and an audible beat may then be heard when the oscillator is tuned to the frequency of an *energized* circuit to which it is coupled.

For operation as a DIODE OF NON-OSCILLATING DETECTOR, plate voltage is removed, oscillations cease and the cathode and grid of the tube allow it to function as a diode which rectifies any r.f. that is induced into its tuned circuit. The meter, which is in the diode-load circuit, then reads up-scale in response to any increase in diode current which will reach a maximum when the instrument is tuned to the frequency of a source of r.f. to which it is coupled.

Detector operation in either of the above modes thus furnishes a means of indicating the presence of r.f. and its frequency in energized circuits. Greater sensitivity is realized when the oscillating mode is used.

For operation as a SIGNAL GENERATOR, plate voltage is applied, the circuit oscillates and thus produces r.f. energy that can be used for many applications in place of the standard signal generator, except where special shielding or known r.f. voltages are needed. In this capacity it also may serve as a signal source for driving an s.w.r. or r.f. impedance bridge, or in other applications where a measurable amount of **power** is required

Construction

For most convenient operation, the grid-current meter and phone jack are built directly into the instrument which also includes a self-contained power supply. It also is desirable to provide a method that enables tuning with the same hand by which the device is held. This permits one-hand operation to allow test-circuit adjustments to be made at the same time by the other hand.

The ranges are changed by means of plug-in inductors which are wound on elongated forms of relatively small diameter to enable their use in a probe-like manner in close quarters. In order to obtain the needed low inductance, the u.h.f. inductors usually are a hairpin type made of about ¼" wide strap.

Solid-State Types

Similar type instruments may be made using transistors or a tunnel diode in place of the vacuum tube. While these provide the convenience of self-contained battery operation, their overall performance as a g.d.o. usually does not match that of the vacuum-tube version[2] and their use as a signal source is somewhat limited due to their low-power output. Then too, burn-out of the active element may result when operation is conducted near strong r.f. fields.

It is difficult to obtain sufficient current-dip indications in the solid-state circuits, so these affairs generally employ a diode, coupled to the oscillator tank, that rectifies the r.f. to actuate a d.c. meter. When a circuit, resonant at the oscillator frequency, absorbs power from the tank, the meter therefore responds accordingly as with the conventional instrument.

Because of diode loading and the low impedance of the solid-state devices, the circuit Q is lowered with a consequent loss in coupling to other circuits and a broader response, resulting in less-positive dip indications, particularly at the higher frequencies. Since no grid current is involved, these affairs are often referred to simply as a dip-meter or like the writer's early job, a "dipper."

[2] Some improvement in this respect might be experienced with the use of the field-effect transistor.

Methods of Coupling

Methods of coupling the grid-dip meter to various type circuits are described at fig. 2. With g.d.o. use, the coupling should be made initially as close as possible for the most positive indication of a meter dip, after which the least coupling should be used that will still permit a readable dip. The test circuit may otherwise "pull" the oscillator frequency, introducing an error in the readout. Where a precise evaluation is desired, the oscillator frequency (when at the dip) should be checked against a calibrated receiver.

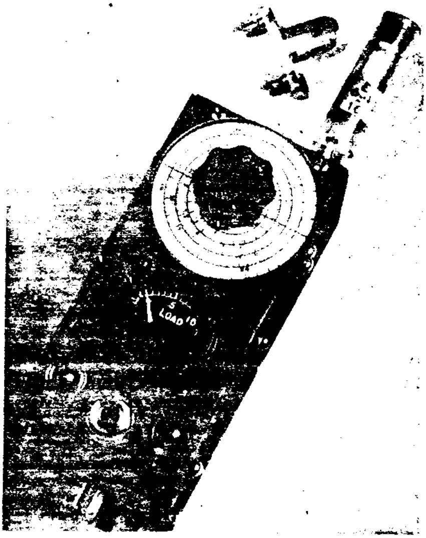
Harmonics of lumped-constant circuits (such as those made up of inductors and capacitors) will not be indicated with the g.d.o. operation; however, additional frequencies often may be indicated such as those due to other resonances caused by the inductance of circuit wiring, stray capacitance, distributed capacitance in inductors, etc. These usually will be found at a higher frequency than that of the circuit of interest. On the other hand, harmonics of antennas and transmission lines will be indicated as explained later.

In order to make sure you have located the dip for the circuit in question, touch the "high" side of the circuit inductor with a metal object or otherwise temporarily detune the circuit and note if the dip frequency changes; otherwise the indicated dip may be that of another portion of the circuit or of an adjacent one. When another inductor is in close proximity to the one under test, it may then be necessary to avoid incorrect dip readings by shorting it out or disconnecting one end of it.

When search is made for a meter dip, the current reading may gradually vary over the range; however, a resonant dip will be indicated when the meter rather suddenly drops with a subsequent rise as the tuning is made past the dip. An exception to this may be in cases where the normal grid current drops off considerably toward the end of a range, in which case the dip may appear only as a slight hesitation on the slope.[3]

It also sould be noted that the higher the circuit Q, the sharper will be the indicated dip. Consequently, a broad dip is usually found with unloaded or full-length antennas where the Q is inherently low. Broad dips also may be due to loose or inadequate coupling to the test circuit, which generally is a likely condition with antenna measurements.

[3] Unless the instrument is properly designed, inherent spurious dips, caused by internal reasonances, may be indicated.



The "Improved Dipper", a compact package described in one of the references. More convenient use was provided with a built-in meter and phone jack, self-contained power supply and tuning arranged for one-hand operation. The frequency range was 1.7-275 mc. The 110-275 mc plug-in inductor is lying at the upper left.

G.d.o. operation with lumped constant circuits provides a dip indication only when the circuit is parallel resonant. For readings on series-resonant circuits, the components must be temporarily connected in parallel using as short connections as possible.

Applications

Probably the most used applications for the instrument as a g.d.o. involve the tuned circuits in receivers and transmitters. The following procedures are a general guide line for methods used for aligning or trouble-shooting such equipment.

All tubes should be in place and r.f. circuitry associated with the tuned elements should be connected. This includes preceding and following stages that may be coupled to the circuit under test. Plate and filament power should be removed. If the latter is applied, a tube may still function as a diode, loading the circuit and making it difficult to obtain sufficient coupling to the g.d.o.

continued next month.

DISCOVERING 28 MHz.

For many amateurs the 28MHz band is that switch position on the transceiver that is only useful for a few years in every sunspot cycle. The purpose of this article is to dispel such notions and to attempt to prove that this band holds many unexpected gems that can prove to be both exciting and innovative. Positioned just below the dividing line between hf and vhf, 28MHz shares the characteristics of ionospheric propagation as well as the tropospheric, auroral, meteor scatter, sporadic-E and "spacewave" more usually associated with vhf.

It is to the detriment of the amateur fraternity that this 1,7MHz bandwidth is left empty for so much of the time. Indeed, the old adage "use or lose" is one that is particularly relevant to 28MHz. Our 27MHz bedfellows, forced to tolerate high interference levels on the crowded cb band, see our empty spectrum as fair game; indeed, several minicab firms are conducting an efficient business in the cw portion of our band. The amateur movement has always prided itself on its ability to discover and enlarge the field of knowledge in the art of radio communication, but I would venture to suggest that a fair amount of propagation traits have been stumbled upon by illicit cb stations operating on 27MHz rather than by licensed amateurs operating on 28MHz.

28MHz FM.

Due to the available bandwidth, the 28 MHz band - alone in the hf spectrum allows such wide-band modes as fm and a.m. to be used without being anti-social. During the last cycle, a worldwide movement using fm sprang up at the top end of the band, largely promoted by USA stations using converted pmr or cb rigs. A network of repeaters appeared all over the North American continent, most of which were co-sited using a uhf or vhf link between transmitter and receiver. Many American amateurs set up remote 28MHz base stations in good locations and accessed them via 144MHz mobile or handheld rigs. It was quite novel to contact a W2 station who was walking around New York city using a walkie-talkie into his remote base, which was providing a fully-quieting signal into the UK.

In 1981 the first multi-mode hf rigs had provided some fm activity on a worldwide basis, and contacts were being made between G stations and all other continents. Between 1978 and 1982 G3YPZ had worked all American call areas as well as many South American, African, Asian and Australian amateurs from the mobile installation running between 1W and 100W. FM activity on the 28MHz band is centred around the 29,600MHz calling channel. Frequencies below 29,550MHz should be avoided as this is the satellite portion of the band. Most fm activity is vertically polarised. The use of half-wave end-fed or 5/8th ground planes at a nominal 20ft should provide good communications over a 30 mile path on 4W, depending of course on terrain. Mobile to mobile using helically-loaded cb antennas should give at least 20 miles for the same power. When the band is open, the world becomes your oyster!

Possibly the one redeeming factor of legal 27MHz cb in the UK is the availability of low priced rigs and antennas that can be converted quite simply to operate on 28MHz. This has resulted in a growing spate of activity all over Britain within the last few years. It has also brought an air of experimentation back into the hobby, allowing enthusiasts to adapt and modify equipment without fear of invalidating the warranty or resell value of an expensive Japanese black box. With the cost of ready-to-go rigs offered cheaply by some companies, 28MHz fm is by far the cheapest way to get on the air and provides a viable alternative to the 144MHz band.

F-LAYER PROPAGATION.

Ionospheric reflections are the most commonly documented phenomena on the 28MHz band. Due to its high frequency the band suffers greatly from the decline of the sunspot cycle, and is only usable on this mode for about five years out of every 11. During the minimum years the band behaves totally as a vhf band, with no F-layer skip in evidence. Ionospheric signals on 28MHz rely on the F2 layer which, being the highest, also gives the longest single hop. It is a band that changes drastically with the seasons, giving good openings on the east-west path during the months from September to April, but providing paths only to the southern hemisphere during our summer months. At the height of the cycle, 28MHz offers the possibility of intercontinental dx with extremely low power on all modes, including fm. It is also the last band to open and the first band to close for dx traffic and gives its best results in the hours of daylight.

Morning time brings excellent conditions to the FarEast, the Pacific and Australia. As the day progresses, the path swings around to envelope the continent of Africa and then on to the Americas. At certain times it is possible to work stations simultaneously in every direction. Unfortunately at the time of writing, the band is at the depths of its decline and thus will not provide reliable F-layer skip for another few years.

Back-scatter propagation, which allows contacts inter-G and inter-Europe outside the normal "spacewave" range, relies on signals being reflected back from the F-layer in the direction from which they came. Scatter signals on 28MHz can often be distinguished by flutter and a phase distorted sound. The distortion renders this mode unsuitable for fm contacts. Being F-layer dependent, scatter propagation only occurs during good sunspot years.

SPACEWAVE PROPAGATION.

This is often confused with groundwave propagation as experienced on the lower frequency bands. The mode used on 28MHz for inter-G communications under flat conditions is the same line-of-sight direct propagation used on 144MHz and is subject to the same properties. The polarisation of the antennas must be matched if a usable signal-strength is to be obtained over any reasonable distance. Indeed, cross-polarisation will result in path losses in the order of 20dB or more. A low radiation angle from the antenna is of great importance if good range is to be achieved.

Unlike 144MHz the 28MHz band does not suffer to any great extent by adverse terrain. It is often possible to work from valley to valley on 28MHz where no path would be present on 144MHz. The signals on 28MHz are refracted considerably and thus tend to follow the curvature of the earth for longer distances. This gives a greater range than is possible on 144MHz. Tests carried out over the past few years would indicate that a nominal simplex mobile-to-mobile range of 10 miles on 144MHz can be doubled on 28MHz for an equivalent power. Another important difference is the apparent reduction of mobile flutter on 28MHz. Due to the greater wavelength, the peaks and nulls are much slower on 28 than on 144MHz and therefore appear as slow fades rather than the fast choppy flutter. Aircraft flutter will also be noticed on spacewave signals as reflections from the craft add to and subtract from the direct path.

Spacewave propagation is reliable and not subject to seasonal or sunspot variations and for this reason the band is ideally suited to local inter-G contacts within an 80-mile radius - assuming 100W ssb or cw and matched polarised antennas.

To be continued next month.

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THE MARKET PLACE.

WANTED by Andy ZS6EQ. Yaesu FT-223 2m rig. Contact him on 011-615-5252 or 167 Broadway, Bez Valley, 2094.

FOR SALE QSL stickers going at 5c each, probably for the last time. Log books at R2.00 and Great Circle Maps at 50c.