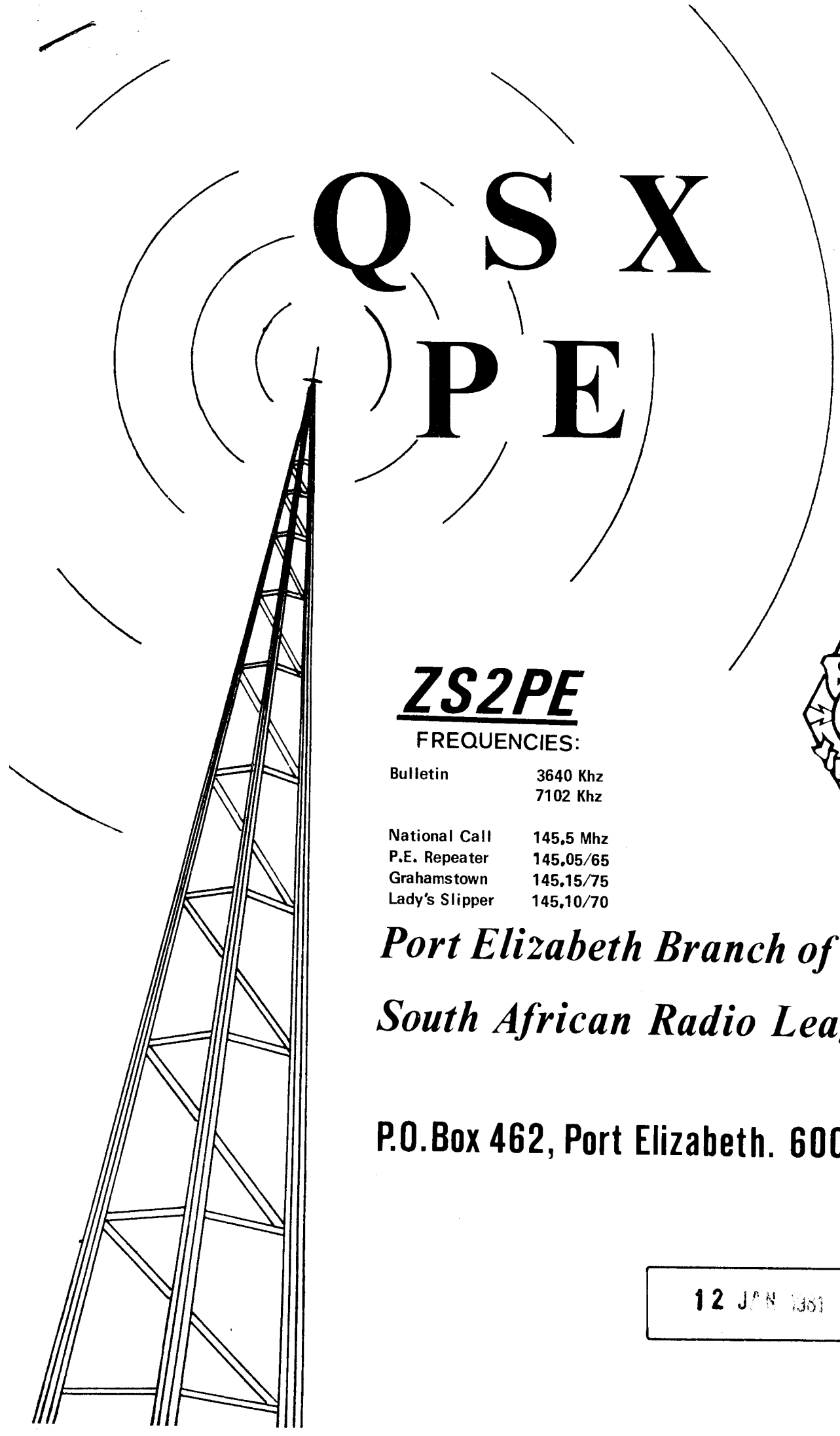
# QSX PE



## ZS2PE

FREQUENCIES:

| | |
|---|---|
| Bulletin | 3640 Khz |
| | 7102 Khz |
| National Call | 145,5 Mhz |
| P.E. Repeater | 145,05/65 |
| Grahamstown | 145,15/75 |
| Lady's Slipper | 145,10/70 |

***Port Elizabeth Branch of the South African Radio League***

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

# PORT ELIZABETH BRANCH.

THE NEXT MEETING OF THE PORT ELIZABETH BRANCH WILL TAKE PLACE ON FRIDAY 16TH JANUARY, 1981, AT THE Y.M.C.A., HAVELOCK STREET, PORT ELIZABETH AT 8p.m.

The Committee will meet at 7.30p.m. - just before the General Meeting.

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MINUTES OF THE GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT THE Y.M.C.A. PORT ELIZABETH ON FRIDAY 21st NOVEMBER, 1980.

PRESENT: 36 members and visitors.

APOLOGIES: ZR2CF, ZS2KT, Langley Lookwhy.

The Chairman welcomed all to the meeting, especially the ladies, Harry Winch, Cliff Barrow, Fred Bonthuys, John Watson, John McGee and Johan

MINUTES: The Minutes of the Meeting held 17th October, 1980, having been published in QSX-PE, were taken as read, proposed by ZS2SS and seconded by ZS2AB.

ARISING: With regard to the T.V. games modified by Branch members, the Hypermarket concerned had been sent an invoice. It was hoped that they would pay promptly. The money would help the Branch funds.

CORRES: Copy of Letter to Algoa Branch - invitation to Film Show.
Letter from Algoa Branch in reply.
Letter of thanks from SAAMSAT for donation.
Brochue from ZS6BPE.

FINANCE: No report.

GENERAL: The Chairman said that Great Circle Maps were available and that more would be ordered.
It had been decided that some work should be done to the antenna on the Lady's Slipper Repeater and several members would be going up on Sunday 23rd at 10 a.m. Members were invited to attend to give a hand with the project.
If anyone wished to submit motions for the League Annual General Meeting these were to be submitted to the Secretary before the end of December,1980.
The Chairman explained that the colour on the video tapes was not very good, but that the film "Hams Wide World" plus two other shorts would be shown after the business of the meeting was concluded. Brian ZS2ABw would also show the slow scan pictures which he had received from the Space Laboratories in Pasadena, California.
Brian ZS2TY said that he hoped to go up the Strydomsberg for the VHF weekend on 7th December, and he was making arrangements for this.

There being no further business, the meeting was closed at 8.30p.m. and tea was taken. Thereafter the video films were shown and also the slow scan pictures of Saturn from Voyager 1.

The Chairman reminded members of the Christmas Party, which was taking the form of a Travelling supper and asked all those who would be attending to let the Secretary know as soon as possible so that catering arrangements could be made.

sgd:
R.W. Schönborn ZS2RS
Chairman

sgd
M.T. Colson ZS2OB
Secretary

# Application of Broad-band Balun Transformers

BY R. H. TURRIN,* W2IMU

***New low-loss ferrite materials used for toroidal cores can provide efficient and compact balun transformers for broad-band r.f. work at wide power ranges. Presented here are some new and useful applications.***

THE ferrite-core broad-band transformer has been with us ever since the development of low-loss, high-permeability ferrite materials. The term "broad-band" is relative. Typically, ferrite toroidal-core baluns have bandwidths of 10 to 1, such as for the frequency range from 3 to 30 MHz. However, for some applications much greater bandwidths may be obtained. These transformers are low loss and may be constructed sufficiently large to handle the full legal transmitter power level, if desired. They must be terminated resistively for proper operation, at impedance levels from 5 to 1000 ohms. The higher-resistance terminations tend to decrease the useful bandwidth. The application of balun transformers to antenna problems has been covered by a number of others.[1,2] McCoy has thoroughly discussed the need for baluns in antenna systems.[1] This article will describe other forms and uses for broad-band ferrite transformers.

Fig. 1 shows some basic transformers and a few applications. Figs. 1A and 1B show the basic 1:1 and 4:1 baluns. The 1:1 balun has been modified slightly from previous designs in that the third winding has been separated on the core from the bifilar winding. This modification results in improved balance at the higher frequencies with no change in other characteristics. The third winding is a core magnetizing winding which is effective only in extending the low-frequency range of the balun. The third winding may be omitted entirely if operation is confined to frequencies above about 10 MHz.

Fig. 1C is a two-stage transformer wound on a single core, and has an impedance step-down ratio of 4:1, unbalanced-to-balanced. This version may be very useful in feeding close-spaced beams where the driven-element impedance can be lower than 20 ohms.

*Box 45, R.R.2, Colts Neck, N. J. 07722.

[1] McCoy, "Is a Balun Required," *QST*, December, 1968.
[2] See other references listed at the end of this article.

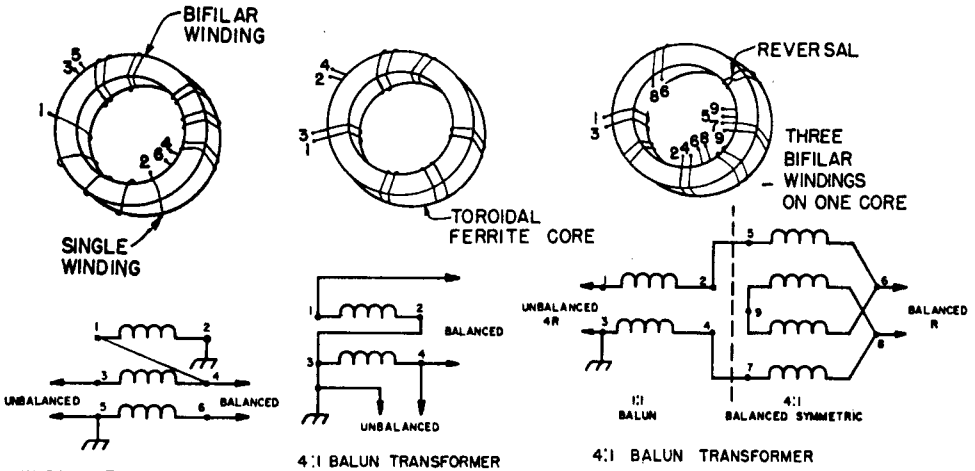


Fig. 1—Basic broadband balun transformers and a few applications. Bifilar windings are six to ten turns, depending on the ferrite-core permeability. In the formulas associated with Figs. 1D and 1F, *k* equals the ratio of the number of tapped turns to the total number of turns in the tapped winding. A suitable ferrite material is Ferramic $Q_1$ with a permeability of 125. Very small size cores may be used for receiving and low power applications. For full-power applications a 2½-inch o.d. Ferramic $Q_1$ core with ½-inch cross section wound with No. 14 Formex copper wire, seven turns per winding, is recommended. See text for discussion of applications.

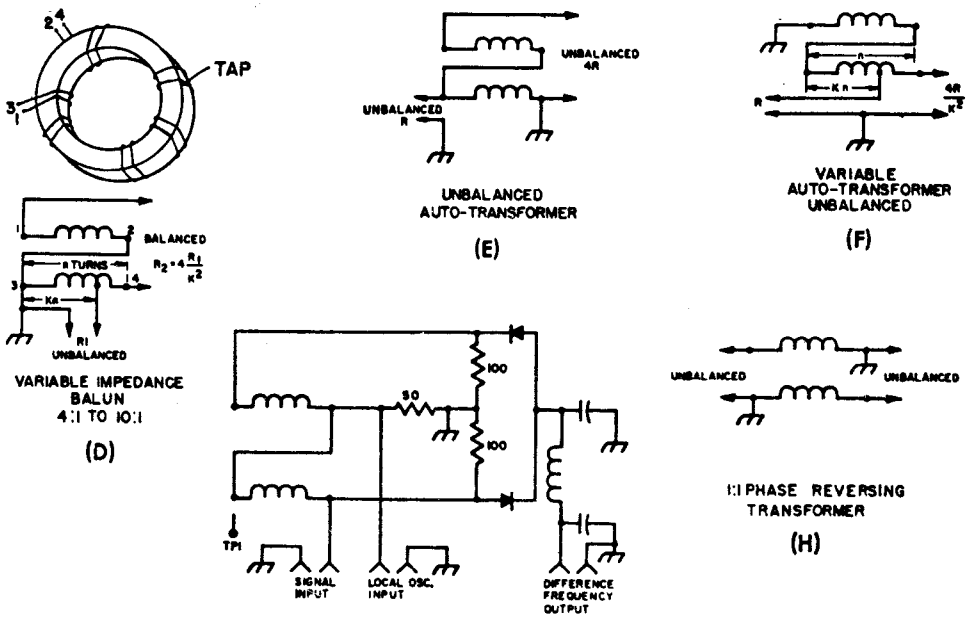


Fig. 1 (Cont.)

Fig. 1D is an innovation combining a variable-impedance transformer and a balun onto one core, and resistive ratios of from 4:1 to 10:1 may be obtained with this arrangement. Although still higher ratios may be obtained, the bandwidth will suffer. For single-band operation, the number of turns on the windings may be altered for minimum reactance.

Impedance ratios in the range 1:1 to 4:1 may be obtained by replacing the 1:1 balun portion of Fig. 1C with the variable-impedance balun of Fig. 1D simply by changing the wiring connections in Fig. 1C.

Fig. 1E shows the 4:1 balun transformer connected as an unbalanced autotransformer. This arrangement is especially useful as a broad-band interstage transformer between transistor amplifier stages, and as an input or output line-matching transformer.

Fig. 1F is a variable unbalanced autotransformer. For balanced impedance levels less than the unbalanced levels, it will be necessary to employ a cascade of two transformers on separate cores. Figs. 1F connected to the unbalanced end of the transformer in Fig. 1C will give transformation ratios of 1:1 down to 1:4.

Another use of the 4:1 balun transformer is shown by Figure 1G. Here the transformer is used as a 180-degree hybrid transformer in a balanced mixer, modulator, or phase detector. For best broad-band operation, terminating resistors are included. Similarly, the 4:1 balun transformer may be employed as a 3-db. power splitter and phase-reversing transformer. The common or balanced terminal of the transformer, shown as $TP_1$, has interesting uses. For instance, a detector connected between this terminal and ground will serve as an indicator of parallel-mode currents on a balanced transmission line when the transformer is used to connect a coaxial line to a balanced two-wire transmission line.

Finally, Fig. 1H shows a 1:1 polarity-reversing transformer with d.c. isolation between input and output. This transformer is useful in phasing problems with both circuits and antennas.

Because these transformers are broad-band, they are all useful in short pulse application with MHz. repetition rates.

A few variations of the ferrite-core balun transformer have been shown along with applications. Fig. 1 is presented as a guide and reference for these transformers. It is suggested that for further construction details of the cored transformers, the reader consult the references. QST

### *References*

Orr, "Broadband Antenna Baluns," *Ham Radio*, June, 1968.
DeMaw, "Toroidal-Wound Inductors," *QST*, January, 1968.
Turrin, "Broad-band Balun Transformers," *QST*, August, 1964.
Ruthroff, "Some Broadband Transformers," *Proceedings of IRE*, Vol. 47, August, 1959, p. 1337.

Thanks to Dudley ZS2AW for this.
QST April 1969

## ELECTRONIC WIZARDY IN AIRCRAFT.

This is one of a series of articles on electronic units used in large passenger aircraft for navigation communication and entertainment.

DME, distance measuring equipment, is a system used in aircraft for determining the line of sight, or slant, distance to ground station.

This is done by measuring the time taken for the signal to travel from the aircraft to the ground station and back. This is converted into a continuous decimal readout in nautical miles.

It gives the pilot an indication in nautical miles of the exact distance to the ground station, which can be used for landing and navigation.

The DME transmits two coded pulses to a ground station. The ground station receives these pulses, waits 50 µS and retransmits the pulses back to the aircraft.

The time is measured from the time the pulses are first transmitted by the aircraft to the time they are received back by the aircraft. The same antenna is used for Tx and Rx.

The unit uses the following formula to compute the slant range:

$$D = \frac{T - 50\ \mu S}{12{,}359}$$

Where:
D = slant distance in nautical miles
T = time in uS between Tx and reply
50 µS = delay at ground station before retransmission
12,359 = time taken for RF to travel 1 radar mile (1 nautical mile there and 1 back i.e. 2 Nmi)

Each DME ground station can be aurally identified by a morse code transmission every 30 sec. e.g. Jan Smuts, J S V in morse.

TheTx frequency is between 1025 and 1150 MHz with 1 MHz spacing, and the Rx is 60 MHz higher or lower depending on which channel is selected.

There are 252 channels; the Tx power is 1 kW pulse power. The range is up to 194 Nmi with an accuracy of 0,2 Nmi.

The antenna is a monopole antenna mounted at the bottom of the fuselage.

Acknowledgements and thanks to Douglas Kennaugh ZR6WO

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# PEOPLE TOPICS

Well, the Christmas Travelling Supper is now a thing of the past and from all accounts seems to have been enjoyed by all. Right from the very potent "Punch-off" things went with a swing and after the soup course held at Colin ZS2AO and Marlene's QTH, the bus trip via Saturn to Brian ZS2AB and Brigid's QTH was quite hilarious. From the singing, the streamer throwing, the quips and jokes, especially from the back seats, it was evident that all were having a good time, and we have pictures to prove it, too! The slight drizzle did nothing to dampen spirits and after a delicious fish course, everyone piled back into the bus for a further trip to Sunridge Park via the planets of Cape Road and Stella Londt to the QTH of Athol ZR2CN and Tess for an equally delicious main course of Cold meats and salads in abundance. Much laughter and pulling of crackers, before the trip back to the starting point. Remarks heard were "Hope the puddings aren't too nice, we've had enough already", but it didn't take too long for the range of nine desserts to disappear. Many, many thanks to all those who helped in any way to make it the success it was.

Several members were out of town during various times during the holiday season. Peter ZS2PS and family took a trip to Durban, Colin ZS2AO and family were down in Port Alfred, Peter ZS2PD holidayed with brother Glen in Johannesburg before travelling back via Div. 5. Brian ZS2AB and family spent the New Year weekend caravanning at Sundays River mouth before the gale blew them back again.

Also away for a time during the holidays were Trevor ZS2AE and family in the Kenton on Sea/ Bushmans river area and Neil ZS2AI and family down in East London.

Mike and June ZS2MJ/JJ have been very busy trying to arrange for reciprocal guest licences for their trip to the States and Canada sometime this year, and we hope you manage to do something about it.
Talking about guest licences, the first W operator to get a ZS guest licence is Bob, W2TK who will be visiting Alan ZS6BTI and Nadine in Johannesburg for a while and then doing a trip down to Cape Town.
There have been several visiting hams on yachts to the P.E. Yacht Club recently, including ZD7DJ/MM, Richard and Robyn on "Walu", whose two girl crew decided to go to Knysna by road from here, where their new-found loves were waiting for them on other yachts. Marge ZS2OB had been keeping in contact with them for quite a while and went to visit them on New Year's Eve. The result of it all was that Mark, her son has gone down to Cape Town with them to act as crew. I know a few who are rather envious about this. "Walu" is a forty-eight footer with even two bathrooms!

# CONGRATULATIONS:

are due to several members for various reasons:
To Basil ZS2PG and XYL Ros who have been taking flying lessons and who both went 'solo' recently.
To Colin ZS2CT for having passed his First year exams at Cape Town University.
To Fred Bonthuys, Waldie Bartie, Charles Oertel (who incidentally got an 'A' average) and Ron Harvey who passed the P.M.G.'s exam in November. Many happy hamming years to you all. Thanks to Viv for all the hard work.

# WELCOME

WELCOME to the following new members and may they have a long and happy association with the League and the Branch:
John Watson ZS2KD and Graeme Meineke, ex-Div 5, who has passed the P.M.G.'s exam but is hoping to get a ZS call straight away. Graeme is up to about 8 words a minute and is looking for someone to help him get the rest of the way.

FATHER CHRISTMAS has been particularly kind this year and those who got new rigs or beams are Andre ZS6UF - Kenwood TS 830 S; Lionel ZS2DD, who is eagerly awaiting the arrival of an 830 S; Dick ZS2RS and Marge ZS2OB who both got Kenwood TS 130 S, and Gus ZS2MC who got a beam. Lots of happy dx-ing. Marge managed to work 20 countries in the first week and has been challenged to work DXCC before the end of May!

CALLSIGNS:

We all get issued callsigns of which we're justly proud.
With strict instructions how to use when talking to the crowd..
The callsign must be used in full each time you're on the air
With a phonetic alphabet to help us get it there.
But there are those among us - we hope we won't offend
Who leave the prefix off the front and only use the end.
Apart from being sloppy, this is illegal too,
And contravenes the license, if you care to read it through.
So when you're in that local net and chatting to your mates
Remember all your listeners, the impression it creates.
And set a good example chaps, it's really done with ease,
Just quote your callsign fully and act professional, please. GM8HBT.

"Must go and eat dinner, now . . . been called three times!"

"Now I'm working out well, since I got rid of the TV!!"

A PLEDGE:

I will be an active member
The kind that will be missed.
I will not be just contented
that my name is on the list.

I will attend each meeting
And give the branch some fun.
And will not stay away at home
And criticise what's done.

I will always go and visit
A member who is sick
And will not leave the work to just a few
And moan about the Clique.

I will come to meetings often
And help with hand and heart
And will not be just a member of the Branch
But, take an active part.

Now think it over members
And please forgive my song.
Are you all active members,
Or do you just belong?

(Acknowledgments to JHB. Branch).

WHY WORRY.

THERE ARE ONLY TWO THINGS TO WORRY ABOUT
EITHER YOU ARE WELL OR YOU ARE SICK
IF YOU ARE WELL THERE IS NOTHING TO WORRY ABOUT

EITHER YOU WILL GET WELL OR YOU WILL DIE
IF YOU GET WELL THERE IS NOTHING TO WORRY ABOUT
IF YOU DIE THERE ARE ONLY TWO THINGS TO WORRY ABOUT
EITHER YOU WILL GO TO HEAVEN OR HELL

IF YOU GO TO HEAVEN THERE IS NOTHING TO WORRY ABOUT
BUT IF YOU GO TO HELL YOU WILL BE SO DAMN
BUSY SHAKING HANDS WITH FRIENDS
YOU WON'T HAVE TIME TO WORRY.

PINDER ZS6AJ.

PS-30 SP-120 TS-130S VFO-120

## DFC-230
Digital Frequency Controller

**The very compact DFC-230 Digital Frequency Controller provides maximum efficiency and flexibility for mobile and fixed operation, by combining a 20 Hz step digital VFO with four memories.**

FEATURES

• 20 Hz step digital VFO: Highly stable, with smooth tuning • Four memories: Frequency can be transferred from VFO to memory or from memory to VFO. An audible "beep" indicate memory input and recall • Built-in digital display: Shows digital VFO or memory frequency. The display range is selected automatically to cover 900.0–599.9 or 400.0–099.9, according to the band • Compact size: Only 148 (5.9) W x 51 (2) H x 166 (6.6) D mm (inch). Perfect for mobile installation • UP/DOWN manual scan: Frequency can be shifted with UP/DOWN microphone (supplied with DFC-230) or with FAST STEP switch on front panel. Scan speed is selectable in single, slow, or fast continuous 20 Hz steps from the UP/DOWN microphone • Cross-operation switch: Allows split-frequency operation with transceiver VFO on transmit and DFC-230 (VFO or memory) on receive, or vice versa • RIT (receiver incremental tuning): Wide frequency range with either digital VFO or memory, using the main tuning knob, UP/DOWN microphone, or FAST STEP switch, while RIT switch is on • Expanded frequency coverage: About 100 kHz above and below each 500 kHz band, for MARS and other applications • RIT, VFO, and MEMO indicators: LEDs show functions in operation • Compatibility with TS-830S, TS-120S/V and TS-130S/V.

SPECIFICATIONS

• Oscillating Frequency: 5.4–6.1 MHz • Frequency Stability: 1 x $10^{-5}$ (at normal temperature), 3 x $10^{-4}$ (0–50°C) • Output Signal: 0.2V $^{+3\,dB}_{-1\,dB}$ • Power Requirement: 9V DC, 30 mA, 13.8V DC, 300 mA (supplied from TS-130S/V, TS-830S, or TS-120S/V) • Dimensions: 148 (5.9)W x 51 (2)H x 166 (6.6) D mm (inch) • Weight: 1.3 kg (2.9 lbs)

## VFO-120
Remote VFO

**Allows split frequency operation when DX chasing, net monitoring, and finding an unused frequency while retaining the original frequency.**

**The VFO-120 also incorporates T.F. set switch which prevents transmitting on the wrong frequency during split-frequency operation and also allows quick setting of transmit frequency. LED indicators show VFO functions at a glance.**

SPECIFICATIONS

• Oscillator Frequency: 5.50–6.00 MHz • Oscillator Circuit: Clapp • Output Voltage: 0.2V ±1 dB (across 470Ω load) • Frequency Stability: Within 100 Hz per 30 minutes after 3 minutes warm-up (at room temperature) • Solid-state Complement: FET; 2, Transistor; 2, Diode; 6 • Power Source: From TS-130 Series • Dimensions: 123 (4.9)W x 96 (3.8)H x 235 (9.9)D mm (inch) • Weight: 2.5 kg (5.6 lbs)

## PS-30 (for TS-130S)
Power Supply

**Supplies regulated 13.8V DC at 20A intermittent load with complete ease and safety due to the use of generous heat sinks and an automatic reset electronic overload trip.**

SPECIFICATIONS

• Power Consumption: Approx. 600W • Output Voltage: 13.8V DC • Output Current: 20A (intermittent load 50% duty cycle), 15A (continuous load current) • Output Voltage Fluctuation: Within ±700 mV (at 20A load current), Within 400 mV at 2–20A load current • Ripple Voltage: Less than 20 mV at 13.8V DC 20A • Power Requirements: 120/220/240V AC • Dimensions: 180 (7.2)W x 133 (5.3)H x 287 (11.5)D mm (inch) • Weight: 8.9 kg (19.6 lbs)

## PS-20 (for TS-130V)
Power Supply

**Supplies regulated 13.8V DC at 4A continuous, 4.5A intermittent load with complete ease and safety due to the use of generous heat sinks and an automatic reset electronic overload trip.**

SPECIFICATIONS

• Power Consumption: Approx. 100W • Output Voltage: 13.8V DC • Output Current: 4.5A (intermittent load 50% duty cycle), 4A (Continuous load Current) • Output Voltage Fluctuation: Within ±50 mV (at load current 4A), Within 0.1V at 0–4A of load current • Ripple Voltage: Less than 5 mV at 13.8V DC 4A • Power Requirements: 120/220/240V AC • Dimensions: 123 (4.9)W x 96 (3.8)H x 235 (9.4)D mm (inch) • Weight: 3.8 kg (8.4 lbs)

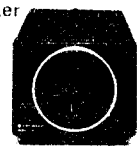
## AT-130
Antenna Tuner

**The AT-130 is a compact and lightweight antenna tuner designed for base or mobile use (Includes the new three bands).**

SPECIFICATIONS

(Antenna Coupler) • Frequency Range: 8 amateur bands from 3.5 to 29.7 MHz • Input Impedance: 50Ω • Output Impedance: 20 to 300Ω, unbalanced • Through Power: 150W max. (3.5 MHz band, 120W) • Insertion Loss: Less than 0.5 dB at optimum match (SWR Meter) • Frequency Range: 3.5 to 29.7 MHz • Max. Power: 150W • Measurable Range: 1:1 to 10:1 • Min. Power Required: 2W (General) • INPUT Connector: UHF type (50Ω) • ANT Connector: UHF type (50Ω) GND: Wing nut and STUD • Dimensions: 152 (6.1)W x 60 (2.4)H x 159 (4.9)D mm (inch) • Weight: 1.6 kg (3.5 lbs) approx.

## SP-120
External Speaker



**A good looking compact speaker matching the TS-130S/V styling and designed for home station use. A low distortion speaker unit provides clear reproduction of the TS-130S/V high quality audio.**

SPECIFICATIONS

• Speaker Diameter: 7.5 cm • Max. Input Power: 1W • Input Impedance: 8 ohms • Frequency Response: 300 Hz to 5 kHz • Dimensions: 123 (4.9) W x 96 (3.8) H x 235 (9.4) D mm (inch) • Weight: 1.3 kg (2.9 lbs)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