



THE PROPAGATOR

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY.

P.O. Box 1838. WOLLONGONG. N.S.W. 2500.

IARS is a Member Club of the Wireless Institute of Australia.

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MONTHLY MEETING Held on the Second Monday of each Month, at 7.30pm,
at the Wollongong Town Hall Meeting Room.

CLUB STATION - VK2AMW. CLUB REPEATER - VK2RAW, 2m, Channel 5.
VK2RUW, 70cm, Channel 1.

IARS MONTHLY BROADCAST

The Monthly Broadcast takes place on the Sunday preceeding the Meeting Night each month, at 1900 Hours EAST.

Frequency used by VK2AMW for the broadcast is -
Repeater Channel 5, or Simplex Channel 40.
Relay on 28.460 MHz, 20 cm Channel 1.

LARS CLUB NETS

6 Metre. 8.30am Sunday, 52.525 MHz FM.
10 Metre. 3.00pm Sunday, 28.460 MHz USB.

AUGUST
AUGUST
AUGUST

1979

Members are advised that the Monthly Meeting of the Illawarra Amateur Radio Society will be held at the Wollongong Town Hall Meeting Room at 7.30pm on

MONDAY, August-13th.

VISITORS ARE MOST WELCOME TO ATTEND.

This month we are priviledged to have a representative from SCALAR present at the meeting to demonstrate a range of Amateur antenaes.



MACELEC PTY. LTD.

Professional & Industrial
Electronics



* * NEW PRODUCTS * * - * * NEW LOW PRICES * *

<u>KENWOOD</u>	TS520S - H.F. Transceiver.....	\$ 650.00
<u>KENWOOD</u>	TS820S - H.F. Transceiver.....	\$ TBA.
<u>KENWOOD</u>	TS120V - H.F. Mobile 10watt output.....	\$ 530.00
<u>KENWOOD</u>	TS120S - H.F. Mobile 100watt output.....	\$ 760.00
<u>KENWOOD</u>	SM220 - Station Monitor.....	\$ 375.00
<u>KENWOOD</u>	AT200 - Antenna Tuning unit/SWR.....	\$ 185.00
<u>KENWOOD</u>	AT120 - Antenna Tuning unit/SWR.....	\$ 120.00
<u>KENWOOD</u>	R599 - H.F. Receiver.....	\$ 235.00
<u>KENWOOD</u>	TR7200G 2M 10watt Mobile c/w ch 2,4,6,8,40,50..	\$ 175.00

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<u>KYOKUTO</u>	2M Mobile 15 Watts - 4 memories - Auto Scan - Digital P.L.L. -RIT.....	\$ 360.00
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<u>DRAKE</u>	"Century-21" Communications Receiver 0.5 to 30MHZ -AC/DC AM CW SSB.....	\$ 325.00
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<u>DRAKE</u>	UV3 VHF-UHF FM Fully Synthesized System. 5KHZ Steps - Double Conversion 10.7MHZ - 455 KHZ 6 pole Crystal Filter @ 10.7MHZ and 8 Pole Ceramic Filter @ 455 KHZ. 25 Watts Output VHF 10 Watts UHF. Model 1340 144-148 MHZ.....	\$ 760.00
	Model 1345 144 and 432 MHZ.....	\$ 1070.00

* * * * *

<u>NAGARA</u>	V5JR 80-10M Trapped Vertical.....	\$ 150.00
<u>CUSHCRAFT</u>	2 Metre Ringo Ranger.....	\$ 49.00

We Also Stock A Wide Range Of Test Equipment. Power Supplies,
Technical Books etc.
We are now South Coast Distributors for SKYBAND Antennas.



PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



Dities.....

Here's to your local amateur
With his TVI and all,
And his tribander out in the garden,
And his map of the world, on the wall.

Here's to unending patience
And skill, and "make-do" and guile,
As he sits in the glow in the darkness,
Lit up by the lamps in the dials.

Chasing DX in the small hours,
Searching for foreign awards,
Pinning each new country up on the map,
And working his goal towards.

Or maybe it's UHF and above,
With dishes, and sporadic E.
And watching the weather for highs and lows,
Hand poised on his trusty morse key.

No matter what his special field
He's not quite your ordinary chap,
With receivers, transceivers, antennas and such,
As he talks with a Killowatt Jap.

On SSTV or RTTY
He's in touch with a world of his own,
Enjoying fellowship with radio hams,
That outsiders have never known

Who else builds a tower at 2am,
Or climbs trees in a single bound?
To put a multiband trap-dipole up,
Just to work the world longpath around?

So here's to your local amateur
With his TVI and all,
And his late night cigarettes and coffee
And his map of the world, on the wall.

.....by Ned VK2VEK.

For Sale

KENWOOD TS520S, only 3 months old, unmodified,
unmarked, 6 months warranty, \$700. Also
AT200 Tuner \$150. David Vohradsky VK2YJD ph:611635.

50 m/m Oscilloscope, A.C./D.C. (rechargeable batteries.)
D.C. to 10 MHz. Good condition.....\$195.00
Contact Barry Hartley VK2FE home-842439,work-291455.

Kenwood TS7500 2 Metre mobile. AS NEW (PLL-VCO)
Contact Barry Unsworth VK2BUB home-377168,work-611388.

SIMPLE 70 cm TRANSVERTER FOR PORTABLE EQUIPMENT

by J. Reithofer, DL 6 MH

Two meter portable transverters can be extended for operation on the 70 cm band with the aid of this transverter. The transmit signal is tripled with the aid of a varactor diode which is able to handle CW, AM and FM signals (reduce the frequency deviation of FM). The same varactor diode is provided with a 288 MHz crystal-controlled signal in the receive mode so that it operates as a mixer diode and converts the 70 cm input frequencies to an intermediate frequency band of 144 to 146 MHz. All operating modes can be received on the receiver for which it is equipped (even SSB).

A similar transverter has already been described in (1). The described transverter is built up on a printed circuit board so that the construction is greatly simplified. Coaxial line circuits are somewhat difficult to manufacture and have been avoided in this case by using printed stripline circuits. When using the economic tuning diodes of UHF television tuners, a peak power of 3 W can be handled. With amplitude modulation, the unmodulated carrier level should amount to a quarter of this.

Approximately 30 to 40% of the input power is available on the 70 cm band. The sensitivity of the receiver corresponds to this power level. From good locations, communication has been made using a 4-element antenna to stations located more than 150 km away. The described transverter is extremely suitable for portable operation and the operator will be surprised how many stations can be worked with it.

Of course, the transverter is also suitable for local contacts. The main idea of this article is to assist VHF amateurs to become active on the 70 cm band.

Figure 1 shows the author's prototype with the cover removed.

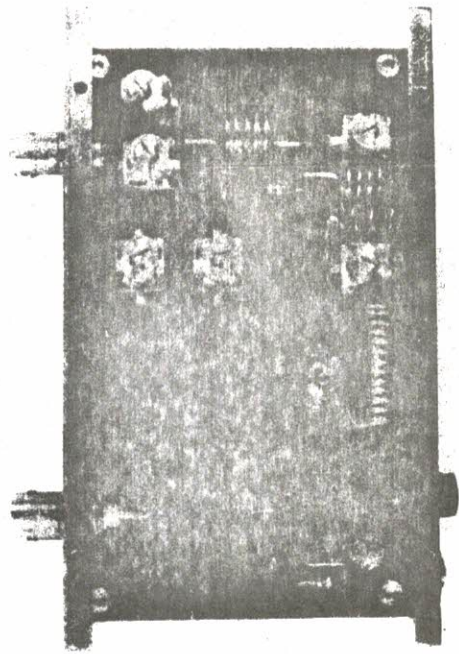


Fig. 1: A photograph of the 70 cm stripline transverter

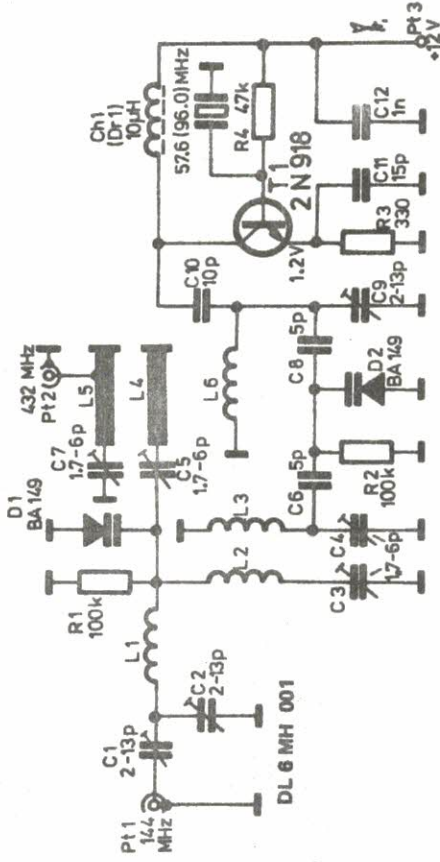


Fig. 2: Circuit diagram of the 70 cm transverter

1. CIRCUIT DETAILS

The circuit diagram of the 70 cm transverter is given in Figure 2. The varactor tripler will be seen upper left with a matching network tuned to 144 MHz (C 1, C 2 and L 1), a 432 MHz stripline bandpass filter (C 5/L 4 and C 7/L 5) at the output, and the idler circuit (L 2/C 3). The idler circuit is tuned to the first harmonic of 144 MHz, e.g. 288 MHz, where it represents a series resonant circuit shorting this frequency to ground. This virtually suppresses this unwanted frequency. In addition to this, the high short circuit current at 288 MHz improves the efficiency of the tripling process.

In the receive mode, varactor diode D 1 receives a local oscillator frequency of 288 MHz via the idler circuit. This means that the 432 MHz input signal is mixed with the local oscillator signal of 288 MHz so that an intermediate frequency of 144 MHz results. The auxiliary frequency is taken from a transistor oscillator which is controlled from a 57.6 MHz crystal. The resonant circuit at the collector (L 6/C 9) is connected to a varactor tripler via the small capacitance of C 8. This tripler operates in a similar manner to the tripler in the transmit branch but is, for simplicity, not provided with an idler circuit. If a 57.6 MHz crystal is used, the oscillator frequency will be multiplied five times. On the other hand, if a 96.0 MHz crystal is used it will only be necessary for the frequency to be tripled. The parallel circuit comprising inductance L 3 and trimmer capacitor C 4 is inductively coupled to the idler circuit. This parallel circuit is tuned to 288 MHz immaterial whether a 57.6 MHz or a 96.0 MHz crystal is used. It is only necessary for the resonant circuit of the oscillator (L 6/C 9) to be modified to suit the crystal frequency. The transistor oscillator only requires 8 to 12 mA which means that it can continue to oscillate in the transmit mode. Since the 70 cm antenna is connected to the 432 MHz output/input, it is only necessary for the 2 m station to be switched between transmit and receive.

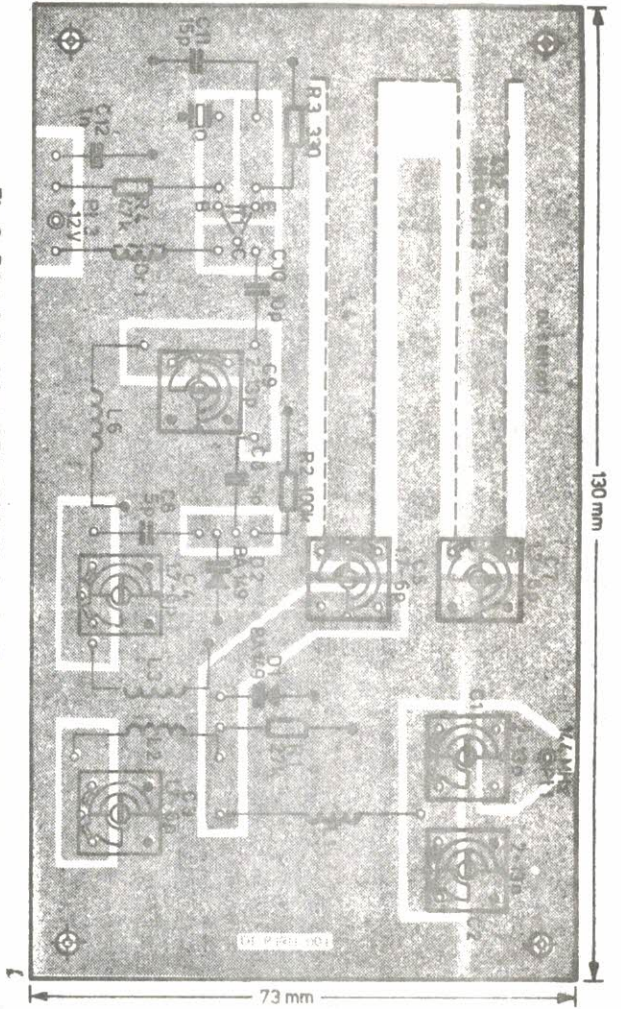


Fig. 3: Printed circuit board DL 6 MH 001 showing the component locations

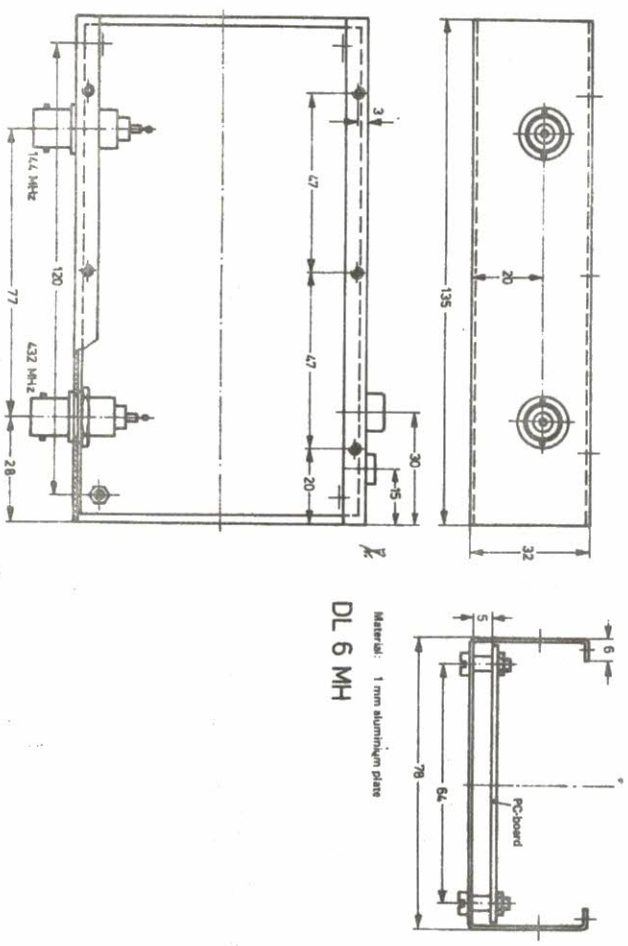


Fig. 4: Metal casing for the 70 cm transverter

2. CONSTRUCTION

The whole transverter circuit is built up on a single-coated printed circuit board having the dimensions 130 mm x 75 mm. Figure 3 shows the printed circuit board and the location of the components. The PC-board is mounted in a simple aluminum case whose dimensions are given in Figure 4.

An U-shaped cover, which is not shown, can be used to enclose the unit. A note to the ground connections is deemed necessary: Although the ground surface of the printed circuit board is grounded via the four mounting screws to the metal casing, it is necessary for an additional, low-inductive ground connection to be made to the two coaxial sockets. This is done by placing a piece of silver-plated copper wire around each coaxial socket and fixing it under the appropriate nut. Both ends of the wire are connected in the shortest possible manner to the ground surface of the printed circuit board, and without bend.

2.1. SPECIAL COMPONENTS

- T 1: 2 N 918, 40 405, 40 519 (RCA)
- D 1, D 2: BA 149 or BAY 70 (AEG-Tk), BA 110 (ITT-Intermetall), 1 N 5462 A Crystal: 57.600 MHz or 96.000 MHz in HC-6/U or HC-25/U holder
- Inductances L 1, L 2, L 3, L 6 are made from 1.0 mm to 1.3 mm diameter (16-18 AWG) silver-plated copper wire. Turn spacing = wire diameter. Self supporting.

- L 1: 5 turns on a 8 mm former
- L 2: 4 turns on a 6 mm former
- L 3: 3 turns on a 6 mm former, coil length extended to 17 mm
- L 6: 12 turns on a 8 mm former (9 turns with a 96 MHz crystal)
- L 4 and L 5: are printed striplines

Ch 1: 5-10 μH ferrite choke (Delevan) or ferrox beads with approximately 5 turns of approx. 0.2 mm (32 AWG) enamelled copper wire pulled through in the longitudinal direction.

- C 1, C 2 and C 9: 2-13 pF air-spaced trimmer
- C 3, C 4, C 5 and C 7: 1.7 - 6 pF air-spaced trimmer

Two BNC coaxial sockets for single hole mounting (UG 1094/U).

3. ALIGNMENT

The alignment is commenced with a preliminary alignment of the transmit branch. A good terminating resistor or 70 cm antenna, as well as RF output meter are required. The reflectometer described in (2) is very useful. A 70 cm bandpass filter, e.g. (3) connected between the transverter and the reflectometer simplifies the alignment considerably. After this measuring arrangement has been set up, it is only necessary for trimmers C 1, C 2, C 3, C 5 and C 7 to be aligned for maximum reading. If a bandpass filter is not available, it will be necessary for a dip-meter tuned to 288 MHz or an absorption wave-meter to be used to check whether it is this frequency that is present at the output. If this is the case, it is necessary for the transverter to be aligned so that the output power is available at a different position of trimmers C 3, C 5 and C 7.

A weak 70 cm signal (harmonic of a 2 m transmitter or a crystal oscillator fed to the input via an attenuator and, if possible, a bandpass filter) is used for the alignment of the receive branch. It is important that the signal only reaches the transverter via the antenna input socket and not directly. The 57.6 MHz oscillator is aligned with the aid of the dip-meter. If the 96.0 MHz crystal is used, the signal can be checked on a VHF-FM broadcast receiver. The oscillator must commence oscillation immediately on connecting the operating voltage. If this is not the case, the resonant circuit should be tuned with the aid of trimmer capacitor C 9 on the flat resonant slope. After this, the 288 MHz circuit should be tuned with trimmer C 4 for the best reception of a 70 cm signal which is continuously reduced in strength. The idler circuit with C 3 as well as the 432 MHz and 144 MHz circuits require a fine alignment. Finally alternate tuning in the transmit and receive modes should be made to find the best compromise. It may be advisable to finally align for best reception since the small loss of transmit power is not noticeable in practice.

4. REFERENCES

- (1) L. Wagner: 144 MHz/432 MHz Transverter for Low Power and Field Day VHF COMMUNICATIONS 1 (1969), Edition 1, Pages 32-35
- (2) R. Griek: Simple Stripline Reflectometers for 144 and 432 MHz VHF COMMUNICATIONS 3 (1971), Edition 2, Pages 89-92
- (3) J. Reithofer: A Stripline Bandpass Filter for 70 cm
in this edition of VHF COMMUNICATIONS

INEXPENSIVE "VARACTOR DIODES" FOR FREQUENCY MULTIPLIERS

It was mentioned at the 1971 annual UHF-SHF Amateur Meeting in Munich, West Germany that several amateurs were successfully using overlay power transistors instead of varactor diodes in frequency multipliers. Since only the collector base diode is used, it is even possible to use transistors whose base-emitter diode has been destroyed and are therefore useless for their normal applications. Up till now, it is mainly transistor types 2 N 3375 and 2 N 3632 that have been used in frequency triplers from 144 MHz to 432 MHz. In the case of the 2 N 3632 input power levels of up to 10 W are possible.

Fundamentally speaking, all overlay transistor types should be suitable for replacing varactor diodes with input power levels in the order of the normal output power, and the multiplied output frequency as high as the usual operating frequency. The emitter remains unconnected; either the base or collector is grounded low-inductively using a metal strip.

Using this principle, it is possible for stripline triplers such as (1) and (2) to be constructed for higher power levels even if the original diodes, e.g. 1 N 5149 or MV 1806 (Motorola), BAX 11 (AEG-Telefunken), MA 4952 or MA-4953 (Microwave Associates), or BXY 14 F (Siemens) are too expensive.

REFERENCES

- (1) H. J. Franke: A Ten Watt Transmitter for 70 cm VHF COMMUNICATIONS 1 (1969), Edition 4, Pages 243-248
- (2) H. J. Franke: 70 cm-23 cm Stripline Varactor Tripler VHF COMMUNICATIONS 2 (1970), Edition 3, Pages 160-165

PAUL VK2ZQT.

Moonbounce Report - August 1979.

Minor modifications are being made to the 70cm disc feed of the dual band system to reduce reflected power.

Test gear is now available to accurately measure forward and reverse power at 1296MHz. A signal source of approx. 1 watt output is being used for the 23cm. measurements. on the high band feed system.

Microwave News.

An X band waveguide type variable attenuator has been made up and calibrated with the assistance of VK2AHC.

3cm transmitter units have been obtained by VK2's BOU and YKQ. They run with 10mw. output into a 15dB horn and are tuned to 10380MHz. Voice frequency or AM tone modulation can be used.

It is hoped that propagation path tests in the Illawarra region may now be made, using these units in conjunction with VK2ALU's portable transceiver. A 2 metre liasion channel would be used.

Lyle VK2ALU.

THE PROPAGATOR

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