OFFICIAL NEWSLETTER FOR THE WEST AUSTRALIAN VHF GROUP(INC)
P.O. BOX 189, APPLECROSS WA 6153.

MEETINGS ON THE FOURTH MONDAY OF EACH MONTH AT WIRELESS HILL
TELECOMMUNICATIONS MUSEUM, ALMONDBURY RD, ARDROSS

VK6WH

VK6WH

PATRON MR. F.W. DAWSON

PRESIDENT	BOB BLINCO	VK6KRC H277 7049	SECRETARY	BOB PINE	VK6ZFY H 339 3273
VICE PRES	PETER TAIT	VK6ZPT	TREASURER	BERT MEUWISSEN	VK6ME H 457 3892
COUNCILLOR	TERRY LEITCH	VK6ZLT H332 7008	BULLETIN ED.	JACK BORTHEN	VK6KDX H 447 5933
COUNCILLOR	BRUCE DOUGLAS	VK6BMD	MUSEUM REP.	BOB PINE	VK6ZFY
COUNCILLOR	COLIN MURRAY	VK6ZCR	MUSEUM REP.	TOM BERG	VK6ZAF
ACTIVITIES	TERRY LEITCH	VK6ZLT	PUBLICITY	PHIL MALEY	VK6AD
MATERIALS	COLIN MURRAY	VK6ZCR	LIBRARIAN	ILMAR BELTS	VK6AIB

CALENDAR

MAY	18 COMMITTEE MEETING	JULY	20	COMMITTEE MEETING
	23 FOX HUNT		25	FOXHUNT
	25 GENERAL MEETING		27	GENERAL MEETING
JUNE	15 COMMITTEE MEETING	AUGUST	17	COMMITTEE MEETING
	20 FOX HUNT		22	FOXHUNT
	22 GENERAL MEETING		24	GENERAL MEETING

MAY 92

DONT FORGET THE MAY JUNK SALE.

THERE WILL BE MICROWAVE BITS

COMPUTER BOARDS

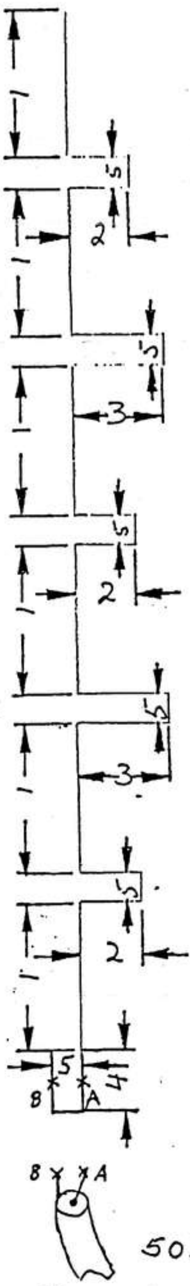
AND OTHER PRICELESS BARGAINS.

JUNE ANTENNA NIGHT

70 cm colinear

by H. Wunderlich
12-9-90
VK6YBQ

1 = 402 mm
2 = 103 mm
3 = 190 mm
4 = 200 mm
5 = 21 mm

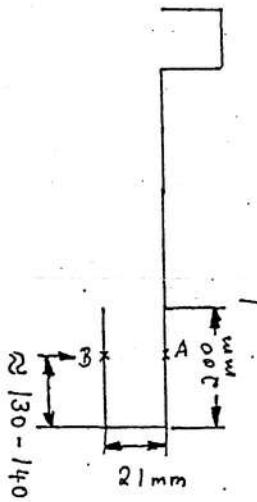


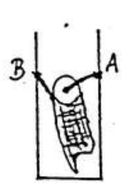
6×5/8 wavelength

#2 + 3 are coiled of e.g. material

I used 4mm Aluminium wire but should work fine with copper wire

Spacing #5 is a bit critical (rain etc. snow)





SLIDE UP and DOWN for best SWR

50Ω "RG213" "9913" Type "N" connector

GAIN ≈ 8.5 dBd

70 CMS ANTENNA

G'day OM,

Here is one of the antennas I made up, it's a 6 x five-eighth collinear for 70 cms.

You need to mount it on a wooden or PVC mast. I used 40 mm reticulation pipe(white) of 300mm length. The antenna wire is old power line aluminium wire, but I also made one of copper wire(2.5mm) without any problems.

There are better matching devices around but I like to go the easy way. I used two co-ax clamps and soldered the co-ax ends to the clamps.

I compared this antenna with a dipole and found that the gain is >> 8dB even though the literature talks about >> 9dB, but I think I lost about 1 dB in the match.

The antenna works fine, even on apogee passes of AO13 where I got good results.

You have to mount the antenna insulated from the mast to get best results , but you can ground the antenna in the middle of the match.

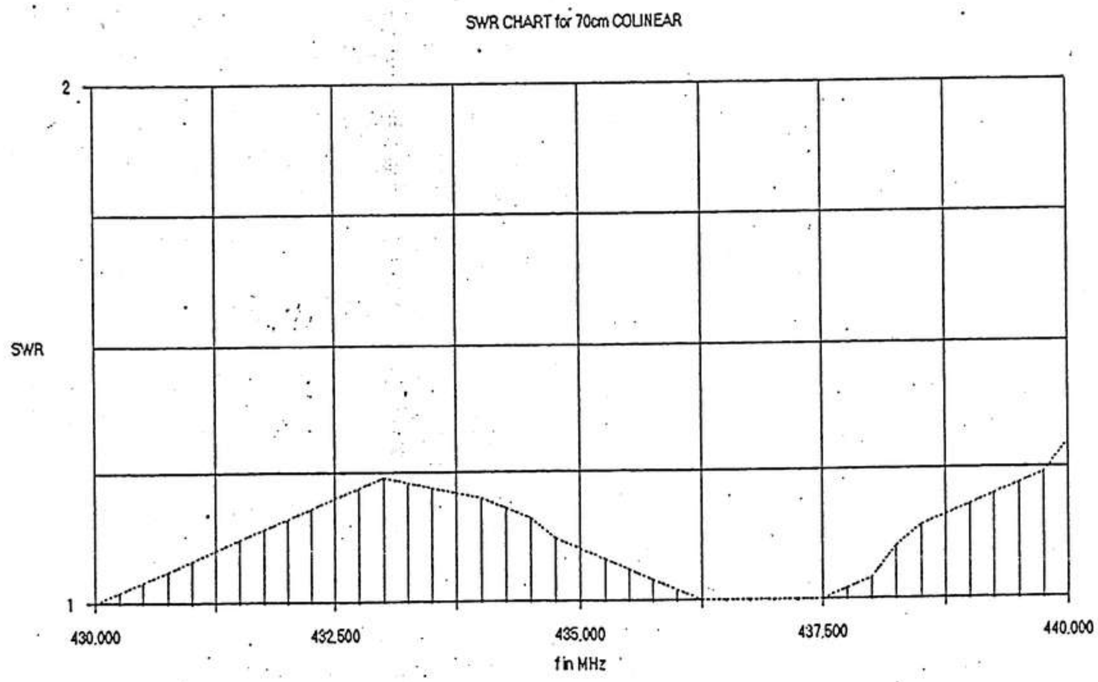
The antenna survived a couple of heavy winds, like last years storm(we lost a quarter of of our roof and half the fence) but no antennas including this one was damaged.

I had to change the RG213 I was using because it leaked water. So use a good seal to keep the water out. Now I am using a black rubber tape that vulcanises on itself.

The idea is out of the ARRL Handbook where they use a 2M two by five eighth. I also read the "Rothhammel Antenna Book" and Orr to get more information.

The project cost me About $10.00.

73 Hauke VK6YBQ



MORE ARTICLES REQUIRED

Phone on 447 5933 home 420 4989 work

FAX 325 1585

BBS VK6KDX @ VK6KS

tks Jack

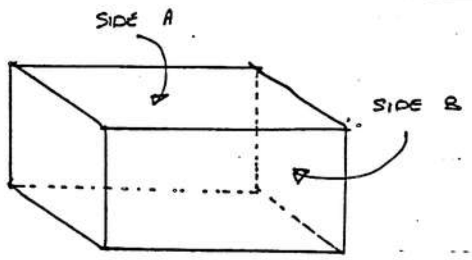
DONT FORGET

THE MAY

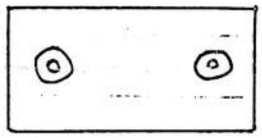
JUNK SALE.

MAKING BRACKETS.

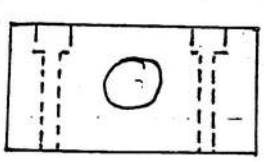
STEP 1. • CUT OFF 1 3/4" LENGTH OF SOLID ALUMINIUM BAR.



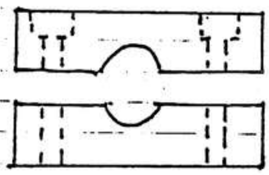
STEP 2. SIDE A • DRILL 1/8" HOLES RIGHT THROUGH
• DRILL 3/8" HOLE 1/8" DEEP TO COUNTER SINK BOLT HEAD



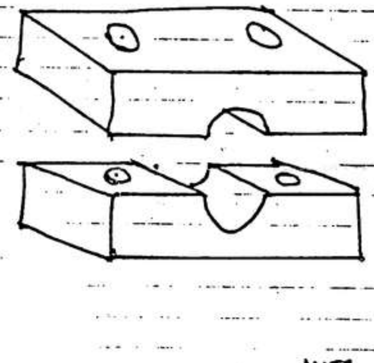
STEP 3. SIDE B • DRILL 3/8" HOLE RIGHT THROUGH (ELEMENT DIAMETER)

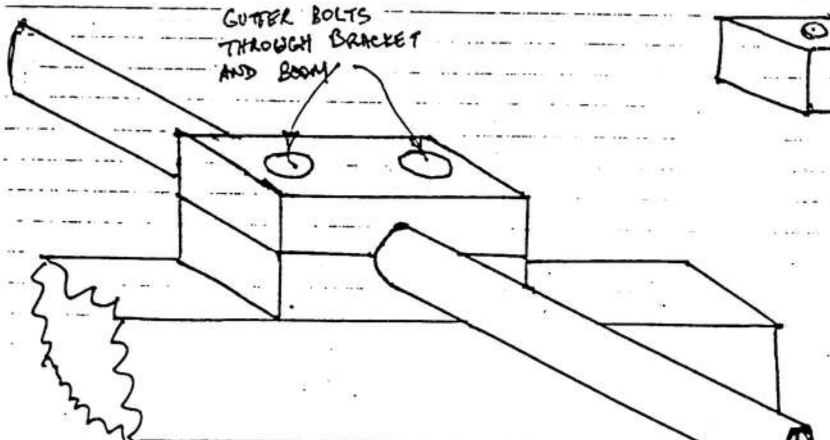


STEP 4 SIDE B • HACKSAW BLOCK INTO TWO HALVES.



GIVING A BRACKET





NOTE NOT TO SCALE

J.B. 20/2/92
VK6 KPX

GROUNDS ON MICROSTRIP SUBSTRATES

"Daisy chain" grounds which loop from place to place and then eventually are tied to the chassis or ground plane are often encountered in audio and digital hardware, but this grounding method must be avoided in microwave circuits. The paramount rule for successful microwave work is to make each and every grounded circuit or component go as directly to the ground plane as possible. Any unintentionally added lead length in a ground return adds inductance that could cause circuit instability, loss of gain, even oscillation in a microstrip amplifier.

The common lead (usually the source or emitter) of an FET or bipolar transistor can be particularly prone to cause trouble if any excess lead length is introduced in this path to ground. As a rule of thumb, one millimeter of lead length creates one nanohenry of inductance. Even this slight amount of inductance added in a device common lead can cause extreme changes in effective S-parameters at microwave frequencies.

For this and other similar reasons, circuit layout must provide very short paths to ground in each and every ground return. The object is to provide a solid ground plane on the back of the substrate, and then to ensure that all ground returns go back to this surface as directly as possible. Each device or component should be grounded independently, rather than having several devices share common paths to ground.

In the case of microwave transistors and FETs, multiple leads are usually provided for the common connection so that multiple paralleled ground returns can be used to reduce the lead inductance when grounding this critical element. Mounting methods for these active devices then must concentrate on keeping the ground paths short. One method for devices in packages such as the micro-X case is to drill a clearance hole in the substrate and mount the active part from the ground-plane side. This may shorten the emitter (or source) leads, but requires that input and output leads be bent up through the clearance hole to reach the circuit tracks on the microstrip side of the board (Fig 20). Conversely, the device may be inserted into the hole from the top, with the common leads bent to reach down to the ground plane below, while the input and output device leads lie flat on the top (Fig 21). These methods may be electrically acceptable, but bending the leads can cause strains on the device and complicate its removal because it is soldered on both the top and bottom of the substrate. It is usually better to mount the device from the top of the substrate, but avoid bending any of the device leads.

Some builders insert small copper straps through the clearance hole to bond pads on the top to the ground plane below, (Fig 22), and then solder all device leads at the top surface of the substrate. This makes parts much easier to remove.

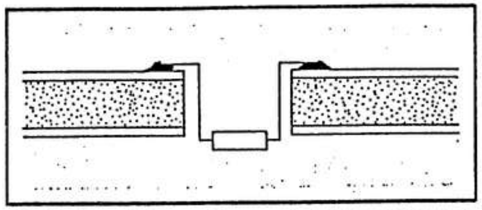


Fig 20— Transistors can be mounted on the bottom of the microstrip board. This minimizes ground lead length, but requires that the input and output leads be bent up through the board to the microstrip circuitry.

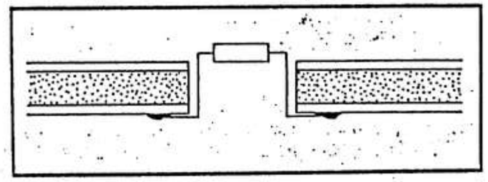


Fig 21—With the device mounted on top of the microstrip board, the ground leads must be bent down through the board to reach the ground plane.

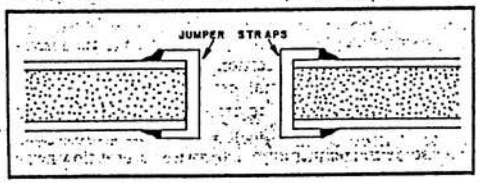


Fig 22—Ground pads on top of the microstrip board can be bonded to the ground plane with small copper straps.

In another method, (somewhat easier to implement), no circuit pads are needed on the top side for the emitter (or source), and no clearance hole is required for the micro-X package. Instead, small eyelets or rivets are inserted through the substrate where the device common leads will be located, spaced as close as possible to the body of the device. Input and output conductors are etched on the top of the substrate in the usual manner. The device is then soldered from the top, soldering the common device leads directly to the eyelets which have first been soldered to the ground plane below (Fig 23). This technique results in very satisfactory grounds on double-clad circuit-board substrates.

In the rare case where a builder is using soft substrate with a thick carrier or heat sink as the ground plane, it may be impractical to insert rivets or eyelets into the thick carrier. Some builders have successfully used small screws which are tapped into the heavy metal, with the device soldered to the screw heads. Higher-power devices are usually fitted with heat-dissipating common leads which have low-inductance flanges that are large enough to be mounted to the carrier with screws.

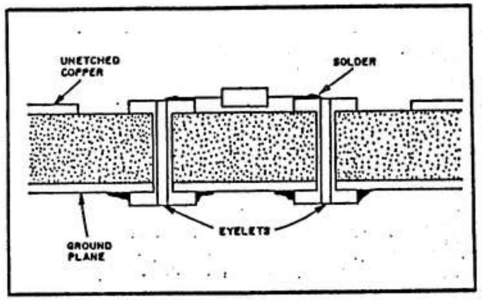


Fig 23—Active devices can also be grounded by soldering their leads to eyelets which have first been soldered to the ground plane.

Another approach to grounding to thick metal carriers is the use of roll pins that are inserted under compression into holes drilled into the metal carrier. These pins must be properly plated so they may be soldered to the microstrip conductors after insertion. When working on substrates with massive metal ground-plane structures or carriers, it may be helpful to use a temperature-controlled hot plate to heat the heat sink or metal backplate to slightly below soldering temperature. Otherwise the heat flow away from the area being soldered and into the heat sink may prevent any reasonable soldering iron from ever doing a satisfactory soldering job. These methods are a bit difficult or specialized, so it is often easier to use double-clad PC board with eyelets for ground returns, and then laminate or otherwise attach the assembled board to the heat sink or carrier if required.

Some experimenters like to introduce a ground plane on the top side of the microstrip circuit, in addition to the usual underside ground plane. This may sometimes aid in isolating or shielding various portions of the circuit, but it may also introduce losses from coupling between conductors and adjacent grounds. If ground plane is added to the top side, it must be carefully bonded to the true ground plane below. This calls for bonding ties from top to bottom at intervals less than a quarter wave at the microwave frequency of the circuit. See Fig 24. Rivets or eyelets may be inserted at such intervals and soldered on top and bottom.

If the added ground plane is near the outer edges of the board, "edgewrap" may be used to bond top to bottom. This edgewrap consists of thin copper foil which

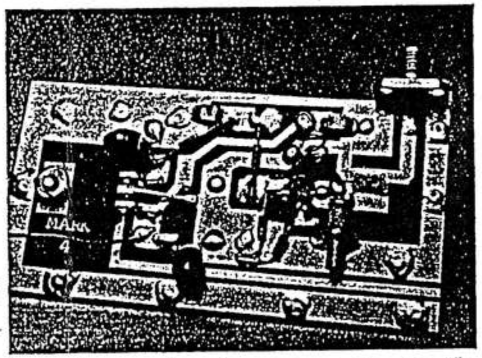


Fig 24—If a ground plane is added to the top of the microstrip board, it must be bonded to the bottom-side ground plane at intervals of less than a quarter wavelength at the operating frequency.

can be folded around the edges and soldered to both top and bottom ground planes. In effect it serves to extend the ground plane up and over the board edge to extend onto the top surface. Even with the edges wrapped, however, it may still be necessary to also add ties through the board if the extension of the ground plane projects more than a small part of a wavelength onto the top.

Although eyelets and rivets make for a neat appearance, it is also possible to use short pins of bare wire to bridge or tie top and bottom ground plane surfaces together. Snug clearance holes are simply drilled where required and the bare wire jumper inserted through the hole and soldered top and bottom, as shown in Fig 25. Once the wire is soldered, the projections of wire beyond the board surface are clipped off.

It is often possible to eliminate the need for ties through the board (called *vias*) by avoiding the use of top-side ground runs. Only circuit conductors are etched on

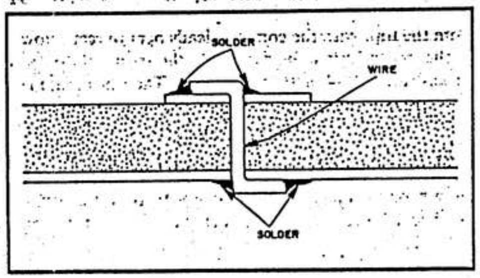


Fig 25—Short pieces of bare wire (sometimes called "Z wires") can be used to bond ground pads on top of the microstrip board to the ground plane.

BOOK REVIEW

THE ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL

This book published by the American Radio Relay League is essential reading for anybody who is half serious about our side of amateur radio. It is available from the WIA book shop and is advertised in the current AR. It also available from Stewarts Electronic Components who advertise in ARA.

I have taken the adjoining paragraphs from the publication to demonstrate the clarity and readability of its contents.

It has twelve chapters: A Brief History, Safety, Propagation, Microwave Devices, Transmission Media, Design Techniques, System Design, Microwave Fabrication Techniques, Antennas and Feedlines, Earth-Moon-Earth (EME) Communications, Getting Started in Microwave Measurements, and Tackling Microwaves with Microcomputers.

There is also companion disk of software for IBM compatible PCs available.

(3)

the top side, and all grounds are carried to the back side. This will probably result in the circuit layout with the lowest loss, besides minimizing the number of holes that must be drilled in the substrate. Common leads for active devices are then carried to the ground plane with feed-through eyelets, as previously mentioned. Some low-frequency decoupling will usually be required, and this can be done with discrete bypass capacitors. Moreover, it is desirable to keep the back side of the board free of parts to permit easy mounting within an enclosure. In this case, surface-mount components are required (or standard components modified for surface mounting, as discussed above), and assembly must be restricted to the circuit side of the substrate.

The bias feeds to the device are decoupled at microwave with microstrip chokes and stubs. Grounded stubs, chip capacitors and resistors, and any low-frequency decoupling capacitors all must also be returned to the ground plane. In the case of conventional decoupling capacitors (with wire leads) hollow eyelets are a convenient way to bring the lead to ground. Alternately, a simple clearance hole for the lead may suffice to bring the wire through to the ground plane for soldering (Fig 26).

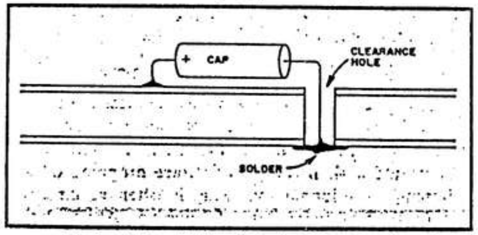


Fig 26—Hollow eyelets or simple clearance holes can be used to bring the leads of bypass capacitors to the ground plane.

To ground chip parts, it is usually necessary to etch a small top-side island to provide sufficient surface area for soldering the ground side of the component and a feed-through eyelet to connect to the ground plane, as shown in Fig 27. Stubs are grounded by inserting an eyelet at the location that produces the wavelength factor required for desired electrical function of the stub, as shown in Fig 28. It is often desirable to cut a radius on the conductor forming the stub, adjacent to the grounding eyelet, to minimize the discontinuity at the feedthrough. The effective electrical length of a stub with such a radius is found by measuring to the eyelet center.

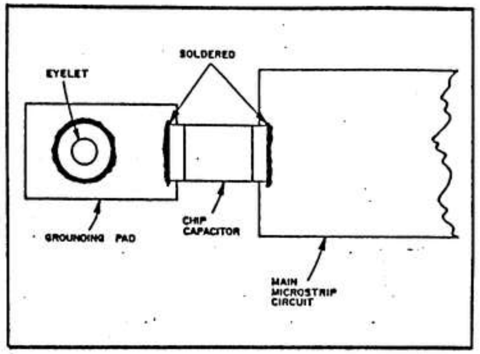


Fig 27—Chip capacitors can be soldered to a small pad; this pad is then connected to the ground plane with an eyelet.

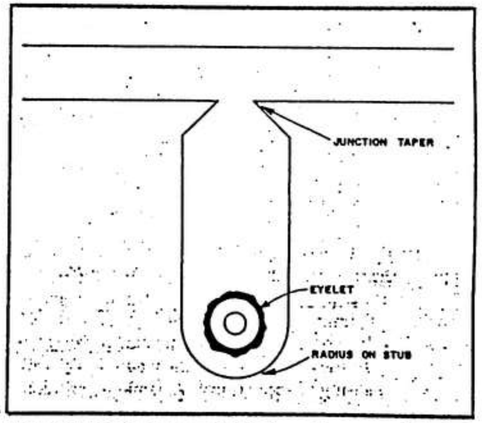


Fig 28—Stubs are grounded by inserting an eyelet at the location that produces the desired wavelength factor.

SIX METER CAPERS - DIALOG

18 March VHF Group Newsletter arrives .Editor asks for articles so here it is.

He is right , I dont like daylight saving and anybody who votes for daylight saving should have their finals removed and destroyed.

Anyhow Six Metre capers start here. All times UTC.

24 1 92	0506	48.249 TV Europe
	0507	49.750 Asia 5x9
26.1	1045	Asia 49M TV 5X5
	1253	48 M European TV 5x9
1.2.92	1149	47.750 TV
	1151	48.260 TV MALAYA
	1208	JA's heard
	1311	JA's worked 539 CW
2.2.92	0034	JA worked 599 very early in morning
5.2.92	0944	Europe 48 Mhz TV
	1222	Heard G3HBR-late DX SSb
6.2.92	0750	Heard LA9ZV 519 cw
7.2.92	0756	48 & 49 Mhz Europe tv
8.2.92	0119	Port Pirie SA TV 55
	0140	V5VF beacon 519
	0559	Hawaii big openning with ssb KH6IAA KH6HH AH6LR 59
	0638	JA7ZMA beacon
	0713	JA'S WORKED
	0726	EUROPE TV 5X5
	0814	THE BIG OPENNING
	0814	SM3BIU SWEDEN559CW
	0824	OG1ZAA FINLAND 559CW
	0905	LA9ZV NORWAY 559SSB
	1016	OZ4VV DENMARK 559CW
	1059	GM4IRS SCOTLAND 529CW
	1123	GD7HEJ ISLEOFMAN52SSB
	1134	GI0OIC N IRELAND55SSB
	1142	GW4LXO WALES 55SSB
	1143	G1EMJ ENGLAND 59SSB
	1213	EI2EFB IRELAND 55SSB
	1247	PE1JWV HOLLAND 55SSB
	1253	DL8HC2 GERMANY 559SSB

Between 0814 and 1253 GMT it was bedlam ! Hundreds of European stations calling VK6 Perth stations. Very strong signals - open for 5.25 hours. What a day, one Perth station said he couldnt handle too many of similar days. Too much heart strain. What an exciting time!

9.2.92	0530	49.750 TV
	1000	49.750 TV
10.2	0854	VK5VF BEACON 519
11.2	0834	PT PIRIE TV VIDEO
12.2	0553	49.750 TV
	0800	48.2396 EUROPE TV
	0805	48.2604 EUROPE TV
	1135	HEARD GJ4ICOJERSEY529
	1317	49.750 ASIA TV
13.2	0548	49.750 ASIA TV
	1036	48 EUROPE TV 55
14.2	1115	48 &49 MHZ ASIA TV
	1311	48 MHZ ASIA TV
15.2	0417	49.750 ASIA TV
	0951	48.2396 EUROPE TV
	1243	JAS HEARD

(Due to lack of typing resources the remainder of log is summarised)

17.2 1128 PA0OOS HOLLAND WORKED OUT OF THE BLUE ON DEAD BAND.
5.3 0657 JT1CO MONGOLIA SSB59
7.3 0557 KC6RR COUNTRY OF PELAU NEW COUNTRY FOR MANY PERTH DXERS JAS,N7EU/DU7,V85PB,HL1JQ,JS6COB WORKED.
7.4 0943 KUWAIT!! 9K2ZR & PK2WR 559 CW BUT WARBLING CW AND QRH
8.4 V85PB,VS6SIX JA'S
18/20/22/23/25/26.2 NEW ZEALAND TV.

My thanks to DIALOG for this comprehensive report on 6M activities.ED.

THE WEST AUSTRALIAN V.H.F. GROUP BULLETIN

MAY 1992

The West Australian V.H.F Group (INC)
P.O. BOX 189 APPLECROSS W.A. 6163