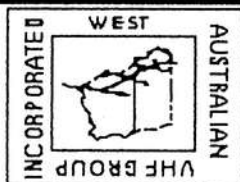


OFFICIAL NEWSLETTER FOR THE WEST AUSTRALIAN VHF GROUP (INC)
P.O. BOX 189, APPECROSS WA 6153.

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

VK6WH



VK6WH

PATRON MR. F.V. DAYSON

PRESIDENT	BOB BLINCO	VK6KRC	H 277 7049	SECRETARY	BOB PINE	VK6ZFY	H 339 3273
VICE PRES.	GLEN THURSTON	VK6ZGT		TREASURER	BERT MEUWISSEN	VK6ME	H 457 3892
COUNCILLOR	TERRY LEITCH	VK6ZLT	H 332 7008	BULLETIN ED.	COLIN MURRAY	VK6ZCR	H 331 1398
COUNCILLOR	TOM BERG	VK6ZAF	H 339 3614	MUSEUM REP	BOB PINE	VK6ZFY	
COUNCILLOR	COLIN MURRAY	VK6ZCR		MUSEUM REP.	TOM BERG	VK6ZAF	
ACTIVITIES	TERRY LEITCH	VK6ZLT		PUBLICITY	BRUCE WILLIAMS	VK6CX	
MATERIALS	COLIN MURRAY	VK6ZCR		LIBRARIAN	ILMAR BELTS	VK6AIB	

CALENDAR

OCTOBER	15 COMMITTEE MEETING	DECEMBER 17 COMMITTEE (MAYBE NOT)
	20 FOX HUNT	22 FOX HUNT (MAYBE NOT)
	22 ANUAL GENERAL MEETING	24 GENERAL (NOT LIKELY)
		XMAS PARTY DECEMBER 9 WIRELESS HILL 2.30PM
NOVEMBER	19 COMMITTEE MEETING	JANUARY 1991 21 COMMITTEE MEETING
	24 FOX HUNT	26 FOX HUNT
	26 GENERAL MEETING	28 GENERAL MEETING

SEPTEMBER / OCTOBER

THE NEXT BULLETIN WILL BE IN JANUARY 1991, SO FOR THOUGHTS OF YOU THAT CAN MAKE IT TO VHF XMAS BBQ SANTA WILL ARRIVE AT 3.30PM. PLEASE KEEP YOUR PREZY FOR THE KIDS AT APPROX. THE \$5.00 LEVEL.

73 THE COMMITTEE (89/90)

THE VHF GROUP HAS NOW GOT A CRYSTAL BANK AS PART OF THE MATERIALS LIST SO IF THERE IS A CRYSTAL THERE THAT YOU WANT COME ALONG TO THE NEXT MEET FEEL FREE TO SEE YOUR MATERIAL OFFICER AND BUY A SWAG FULL AT ONLY \$0.20 EACH.

73 YOUR MATERIALS OFFICER.

THERE IS STILL A LOT OF MEMBERS OUT THERE THAT HAVE NOT PAYED THEIR SUBS SO IF YOU KNOW OF A MEMBER THAT DIDN'T GET THEIR BULLETIN, THEN LET THEM KNOW WHY AND ASK THEM TO FORWARD THEIR SUBS TO THE TREASURER

SMARTLY. THERE IS A LIMITED NUMBER OF BACK ISSUES OF THE VHF BULLETIN IN STOCK.
73 YOUR BULLETIN EDITOR VK6ZCR.

E.M.E

MUCH OF THIS DOCUMENT WAS BORROWED FROM THE "2 METER EME PRIMER" AND IS PROVIDED HERE FOR YOUR CONVENIENCE COURTESY OF DAVE BLASHCHKE, W5UN. PORTIONS HAVE BEEN EDITED TO ALLOW COMFORTABLE TRANSMISSION OVER OUR PACKET RADIO NETWORKS. JUST FOR YOUR INTEREST, DAVE HAS BUILT THE LARGEST PRIVATE 2M EME ARRAY IN THE WORLD AND IS EASILY WORKABLE BY MOST 2M CW STATIONS. IT IS HOPED THAT THIS INFORMATION WILL ENCOURAGE STATIONS IN SOME OF THE RARER COUNTRIES TO GIVE 2M EME A TRY. THERE IS NOTHING MAGIC OR SACRED ABOUT THIS MODE AND BY MAKING A FEW SIMPLE IMPROVEMENTS TO YOUR STATION YOU TOO CAN WORK STATIONS "VIA THE MOON".

GARY, HLSTG, TOOK THE CHALLENGE AND MANAGED TO WORK SEVERAL STATIONS BY USING MINIMAL EQUIPMENT AND POWER. IF HE CAN DO IT, SO CAN YOU! READ ON...

THE EME PRIMER IS FOR ANYONE WHO IS INTERESTED IN THIS MODE, BUT MAY NOT KNOW JUST HOW TO BECOME INVOLVED. IF YOU ARE SUCH A PERSON, THIS PRIMER WILL HELP YOU GET STARTED. BY FOLLOWING THE INSTRUCTIONS GIVEN HERE, YOU SHOULD BE ABLE TO DETERMINE WHAT STATION IMPROVEMENTS YOU WILL NEED TO MAKE IN ORDER TO BE ABLE TO HEAR AND WORK OTHER EME STATIONS. YOU WILL ALSO FIND BASIC OPERATING INFORMATION AND PROCEDURES THAT YOU WILL NEED TO USE. IF YOU HAVE NEVER BEEN INVOLVED WITH EME, YOU MAY BE SURPRISED JUST HOW EASY IT IS. EME (EARTH-MOON-EARTH) COMMUNICATIONS

EXPERIMENTS WERE FIRST CONDUCTED BY AMATEUR RADIO OPERATORS IN THE LATE 1940'S. IT REMAINED A CURIOSITY AND EXPERIMENTERS MODE FOR MANY YEARS AFTERWARDS, DUE TO THE FACT THAT MOST 2 METER STATIONS HAD POOR ANTENNAS AND NOISY RECEIVER FRONT ENDS. ALL OF THAT HAS CHANGED IN RECENT YEARS. NOW, ALMOST ANYONE CAPABLE OF PUTTING TOGETHER A REASONABLY SIZED STATION ON 2M CW CAN CAN SHARE IN THIS EXCITING AND CHALLENGING FORM OF COMMUNICATIONS. ANYONE USING MORE THAN 600-700 WATTS OF POWER OUTPUT AND AN ANTENNA WITH 16 ELEMENTS OR MORE CAN MOST LIKELY MAKE A FEW EME QSO'S ON MOON RISE OR SET, WITHOUT FURTHER STATION IMPROVEMENTS. SMALLER STATIONS WHO CAN RUN 100 WATTS OUTPUT OR SO, AND A GOOD ANTENNA (WHICH CAN BE INEXPENSIVELY BOUGHT OR

CONSTRUCTED), ARE PROBABLY ALSO EME CAPABLE WITH MINIMAL IMPROVEMENTS.

SEVERAL HUNDRED AMATEURS THROUGHOUT THE WORLD ARE CURRENTLY ACTIVE AND OPERATE REGULARLY ON 2M EME. MANY OF THE STATIONS ARE LOCATED IN EUROPE. NEW STATIONS ARE APPEARING ALMOST DAILY. STATIONS WITH LARGE ANTENNAS AND HIGH POWER, SUCH AS W5UN, MAKE IT POSSIBLE FOR MOST ANYONE TO ACHIEVE 2-WAY EME QSO'S TODAY.

AFTER QST PUBLISHED THE ARTICLE ABOUT W5UN'S "TEXAS MBA (MIGHTY BIG ANTENNA)", HE BECAME DELUGED WITH REQUESTS FOR INFORMATION AND SCHEDULES FROM AMATEURS THAT HAD NEVER TRIED EME COMMUNICATIONS. MOST WHO WROTE OR CALLED HIM NEVER LISTENED FOR RETURN COMMUNICATIONS (ECHOS).

EME COMMUNICATIONS REQUIRES A BIT MORE STRUCTURED OPERATING PROCEDURE THAN THE USUAL TYPE OF AMATEUR OPERATING. ANTENNA AND RECEIVING IMPROVEMENTS ARE ALSO RECOMMENDED. THIS PRIMER CONTAINS SUCH INFORMATION AND HOPEFULLY IT WILL SAVE W5UN THE TIME OF ANSWERING LETTERS AND PHONE CALLS ABOUT EME. W5UN IS WELL ON THE WAY TO COMPLETING HIS DXCC ON EME AND HOPES THAT YOU WILL TRY TO GIVE EME A TRY.

THIS DOCUMENT IS BY NO MEANS THE COMPLETE STORY ABOUT 2M EME, BUT SHOULD PROVIDE ENOUGH INFORMATION TO GET YOU STARTED. FOR MORE EXPLICIT INFORMATION, IT IS SUGGESTED THAT YOU CHECK INTO THE WEEKLY SESSIONS OF THE "TWO METER EME NET", WHICH MEETS AT APPROXIMATELY 1730Z, ON WEEKENDS. THIS WILL BE SATURDAY/SUNDAY STATESIDE

TIME, AND SUNDAY/MONDAY IN THE FAR EAST. THE FREQUENCY IS 14.345 MHZ AND LOOK FOR NET CONTROL STATION VE7BQH. THE 2M EME NET BEGINS DIRECTLY AFTER THE 70CM EME NET STOPS, WHICH IS BETWEEN 1700 AND 1730Z, BOTH DAYS. SEE YOU THERE!

STATION EQUIPMENT

THE FIRST AND MOST IMPORTANT PIECE OF EQUIPMENT NEEDED FOR EME WORK IS AN ACCEPTABLE ANTENNA SYSTEM. SUCH A SYSTEM IS DEFINED HERE AS ONE HAVING SUFFICIENT ELEMENTS, PROPERLY SPACED AND PHASED TO YIELD ENOUGH GAIN FOR SUCCESSFUL EME COMMUNICATIONS. THERE ARE MANY FORMULAS RELATIVE TO PATH LOSS EXPERIENCED IN EME, BUT IT IS NOT NECESSARY TO DISCUSS ALL OF THAT HERE. WHAT THE FORMULAS INDICATE AS RELATES TO ACTUAL RESULTS IS QUITE ASTONISHING. IT SEEMS IMPOSSIBLE TO COMMUNICATE VIA THE MOON WITH LOW POWER AND A SINGLE ANTENNA, ACCORDING TO THE FORMULAS, BUT IT DOES HAPPEN, AND QUITE ROUTINELY AT THAT. HLSTG HAS WORKED W5UN AND KB8RQ, AND HAD A PARTIALLY COMPLETED QSO WITH VE7BQH DUE TO LACK OF TIME DUE TO OBSTRUCTIONS IN THE IMMEDIATE AREA OF THE SHACK. HLSTG WAS ONLY RUNNING 80W OUTPUT TO A SINGLE YAGI AT THE TIME!

TO COMMUNICATE VIA THE MOON ONE MUST BE HEARD AS WELL AS BE ABLE TO HEAR OTHER MOON REFLECTED SIGNALS. IT IS NOT PRECISELY KNOWN WHAT MINIMUM ANTENNA GAIN IS ACCEPTABLE, BUT W5UN INDICATES FROM HIS EXTENSIVE OPERATING EXPERIENCE THAT ABOUT 13DBD TRUE GAIN IS REQUIRED WHEN YOUR TRANSMITTER POWER IS 150 WATTS OUTPUT OR MORE, AND THE RECEIVER HAS A FRONT-END NOISE FIGURE OF 2 DB OR LESS.

MANY DIFFERENT ANTENNA TYPES CAN BE USED, HOWEVER, THE MOST POPULAR AMONGST ACTIVE EME'ERS IS THE LONG-BOOM YAGI. BY LONG BOOM I MEAN BOOM LENGTHS GREATER THAN 4 WAVELENGTHS (APPROXIMATELY 27 FEET). SEVERAL LONG-BOOM YAGIS ARE SOLD COMMERCIALY. A FEW THAT COME TO MIND ARE THE CUSHCRAFT 4213XL, CUSHCRAFT 32-19, KLM 17LBX, CU-DEE, F9FT, AND M-SQUARED. ALL OF THESE PLUS SEVERAL OTHERS UN-NAMED HERE ARE ROUTINELY USED BY STATIONS TO MAKE EME CONTACTS.

YOU MUST KEEP YOUR FEED LINE THE SHORTEST AND USE THE BEST HIGH QUALITY, LOW LOSS COAXIAL CABLE THAT YOU CAN AFFORD. YOUR FEEDLINE LOSSES SHOULD BE KEPT TO LESS THAN 1 DB. AS A RULE OF THUMB, BELDEN 9913 IS OK UP TO 50 FEET. 1/2 INCH HARDLINE (HELIAX) IS OK UP TO 75 FEET. 3/4 INCH HARDLINE (HELIAX) WILL WORK WELL UP TO 175 FEET. BEYOND THAT, YOU WILL NEED BIGGER CABLE. W5UN USES 190 FEET OF 1-5/8TH INCH HELIAX FROM THE AMPLIFIER TO THE ANTENNA. THE LOSS OF HIS CABLE IS LESS THAN 4/10TH OF ONE DB.

ALSO, BE VERY CAREFUL ABOUT CONNECTORS. LOSSES WILL INCREASE IF POOR CONNECTIONS OCCUR, OR IF WATER GETS INTO THEM. FOR BEST RESULTS AVOID THE CHEAP ECONOMY CONNECTORS USED ON H.F. AND C.B. INVEST IN SOME QUALITY BRAND NAME CONNECTORS FOR MAXIMUM POWER TRANSFER.

AMPLIFIERS

FOR CONSISTENT RESULTS, THE MINIMUM POWER THAT SHOULD REALISTICALLY BE CONSIDERED FOR EME WORK IS APPROXIMATELY 150 WATTS OUTPUT. SOME OF THE COMMERCIALY AVAILABLE AMPLIFIERS, SUCH AS THE RF CONCEPTS SERIES, DELIVER AS MUCH AS 170 WATTS OUTPUT, AND HAVE GAASFET PREAMPLIFIERS BUILT IN.

THE OUTPUT OF TWO BRICK CAN BE COMBINED TO DOUBLE THE POWER OUTPUT. THIS CAN BE TRICKY, SO IF YOU PLAN TO DO THAT, FIRST FIND THE PROPER INFORMATION. FOR A MORE SERIOUS EME EFFORT, A POWER OUTPUT OF 500 WATTS OR MORE IS RECOMMENDED. COMMERCIAL AMPLIFIERS ARE READILY AVAILABLE THAT WILL DELIVER POWER

OUTPUTS OF 1 KW AND MORE, IF YOU ARE READY FOR THAT APPROACH. MANY EME OPERATORS BUILD THEIR OWN AMPLIFIERS. THE ARRL HANDBOOK IS A GOOD REFERENCE FOR HOME CONSTRUCTION INFORMATION. ALSO, KITS ARE SOMETIMES AVAILABLE IN THE CLASSIFIED SECTIONS OF AMATEUR RADIO MAGAZINES SUCH AS QST, 73, AND CQ. REMEMBER, YOU DO NOT NEED HIGH TRANSMITTER POWER TO GET STARTED WITH LISTENING FOR EME SIGNALS ON 2 METERS, OR TO MAKE SUCCESSFUL CONTACTS WITH SOME OF THE LARGER STATIONS.

OPERATING PROCEDURES WHERE AND HOW TO LISTEN

EME WORK ON 2 METERS IS PRIMARILY DONE ON CW. SIGNALS ARE VERY WEAK ECHOS REFLECTED FROM THE MOON'S SURFACE. TO HEAR SUCH SIGNALS ONLY REQUIRES A RECEIVER WITH A REASONABLY LOW NOISE FRONT END. MOST COMMERCIAL RIGS ARE NOT GOOD ENOUGH AS THEY COME OUT OF THE BOX, BUT CAN BE SUFFICIENTLY IMPROVED BY ADDING A LOW-COST RECEIVER PREAMPLIFIER. A WELL DESIGNED ANTENNA, WHICH IS IN GOOD WORKING CONDITION, MUST BE POINTED AT THE MOON. IN THE CASE OF A SINGLE ANTENNA, YOU SHOULD NOT USE ELEVATION. THERE IS USUALLY ABOUT ONE HOUR OF MOON TIME AVAILABLE AT MOONRISE AND MOONSET TO ALLOW SUCCESSFUL QSO'S WITH A SINGLE ANTENNA THAT IS ROTATED IN AZIMUTH ONLY. USING THIS METHOD ALLOWS UTILIZATION OF GROUND GAIN, AN ENHANCEMENT OF SIGNALS USING THE EARTH'S SURFACE TO THE REAR OF THE ANTENNA AS A REFLECTOR. IF YOUR HORIZON IS RELATIVELY CLEAR AND FLAT, GROUND GAIN ENHANCEMENT IS POSSIBLE DURING RISE AND SET PERIODS. MODERATE EME ACTIVITY OCCURS OFTEN ON WEEKENDS WHEN THE MOON IS IN A FAVORABLE SKY POSITION. ACTIVITY PEAKS WHEN THE MOON IS WITHIN VIEW OF BOTH EUROPE AND NORTH AMERICA. RANDOM ACTIVITY CAN BE FOUND BETWEEN 144.00 MHZ AND 144.02 MHZ. SCHEDULES ARE USUALLY RUN BETWEEN 144.02 AND 144.10 MHZ. SSB

VOICE EME, FOR THOSE RUNNING GOOD ANTENNAS AND HIGHER POWER, IS SOMETIMES HEARD ON 144.105. W5UN USUALLY OPERATES CW ON 144.008 MHZ DURING SUCH TIMES, AND ALSO ON WEEKDAYS AFTER WORK. MANY CQ'S ARE CALLED BY W5UN AND OTHERS DURING THIS TIME.

WHAT AND WHEN TO TRANSMIT

MOST 2 METER EME OPERATING IS BASED ON THE 2 MINUTE SEQUENCE INTERVAL. JUST ABOUT ALL SCHEDULED CONTACTS ARE CONDUCTED IN THIS FASHION. TO SIMPLIFY DETAILED DISCUSSION ABOUT THE 2 MINUTE SEQUENCE, A SAMPLE SCHEDULE IS SHOWN BELOW. THIS WILL INVOLVE A STATION AND ANOTHER EAST OF HIM. STATIONS ARE DESIGNATED EITHER EASTERN OR WESTERN. IF YOU ARE ATTEMPTING A QSO WITH A STATION EAST OF YOU, THAT STATION IS THE EASTERN STATION. CONVERSELY, YOU WOULD BE THE WESTERN STATION. THE EASTERN ONE BEGINS TRANSMITTING AT THE BEGINNING OF THE HOUR, AND WOULD TRANSMIT FOR ALTERNATING 2 MINUTE PERIODS. YOU WILL BE LISTENING THE FIRST TWO MINUTES. THEN, AT 2 MINUTES PAST THE HOUR, YOU WILL BEGIN TRANSMITTING, AND THE OTHER GUY WILL BE LISTENING. THIS 2 MINUTE SEQUENCE WILL CONTINUE UNTIL THE SCHEDULE IS SUCCESSFULLY COMPLETED OR YOU RUN OUT OF TIME.

THE ONLY INFORMATION REQUIRED FOR A SUCCESSFUL 2 METER EME QSO IS CALLS, O'S, RO'S, AND R'S. 73'S ARE OPTIONAL. AS IN THE EXAMPLE, W4ZD IN FLORIDA HAS SCHEDULED ZD8MB IN ASENCION ISLAND. THEY HAVE AGREED ON A ONE HOUR SCHEDULE STARTING AT

1000 UTC. ZD3MB IS THE EASTERN STATION, SO DURING THE FIRST TWO MINUTES ZD3MB WILL SEND CALLS OVER AND OVER FOR THE FULL 2 MINUTES (W4ZD DE ZD3MB). W4ZD WILL BEGIN SENDING AT 1002 UTC. IF W4ZD HEARD CALLS WHILE HE WAS LISTENING HE WILL SEND ZD3MB DE W4ZD FOR THE FIRST 1-1/2 MINUTES AND O'S FOR THE LAST 1/2 MINUTE. IF W4ZD DID NOT HEAR BOTH CALLS, WE WILL SEND CALLS ONLY FOR THE FULL 2 MINUTES. THIS CONTINUES UNTIL EITHER STATION HAS HEARD BOTH CALLS AND O'S. ONCE AN O IS HEARD, RO IS SENT IN RESPONSE FOR THE FULL 2 MINUTES. THE STATION COPYING RO HAS RECEIVED SUFFICIENT INFORMATION FOR HIS PART OF THE QSO. WHEN THE STATION TRANSMITTING RO'S HEARS AN R, HE HAS RECEIVED SUFFICIENT INFORMATION FOR HIS PART, AND THE QSO IS ESSENTIALLY COMPLETE. MOST STATIONS UPON HEARING R'S WILL RESPOND WITH R'S AND 73'S TO LET THE OTHER STATION KNOW THAT THE R'S HAVE BEEN RECEIVED.

HERE IS AN EXAMPLE OF HOW THAT EME SCHEDULE MIGHT HAVE PROCEEDED:

TIME	FIRST 1-1/2 MINUTE	LAST 1/2 MINUTE	COMMENTS
1000-1002	W4ZD DE ZD3MB	W4ZD DE ZD3MB	INITIAL TRANSMISSION
1002-1004	ZD3MB DE W4ZD	ZD3MB DE W4ZD	NOTHING HRD BY ZD
1004-1006	W4ZD DE ZD3MB	O O O O O	MB HRD CALLS FROM ZD
1006-1008	ZD3MB DE W4ZD	ZD3MB DE W4ZD	ZD DIDN'T HEAR CALLS
1008-1010	W4ZD DE ZD3MB	O O O O O	MB STILL NEEDS RO'S
1010-1012	ZD3MB DE W4ZD	ZD3MB DE W4ZD	ZD GOT O'S, NO CALLS
1012-1014	W4ZD DE ZD3MB	O O O O O	MB WAITING FOR RO'S
1014-1016	RO RO RO RO RO	RO RO RO RO RO	ZD GOT CALLS AND RO'S
1016-1018	W4ZD DE ZD3MB	O O O O O	MB DIDN'T HEAR RO'S
1018-1020	RO RO RO RO RO	RO RO RO RO RO	ZD WAITING FOR R'S
1020-1022	R R R R R R R R	R R R R R R R R	MB HEARD THE RO'S
1022-1024	R R R R R R R R	73 73 73 73 73	ZD COMPLETES THE QSO

A PRE-PRINTED TIME SEQUENCE SHEET IS HANDY TO DETERMINE WHO SHOULD BE TRANSMITTING AND WHO SHOULD BE

LISTENING AT ANY TIME DURING A SCHEDULE. WHENEVER YOU GET CONFUSED, LOOK AT THE SHEET TO SEE WHOSE TURN IT IS TO CLEAR IT UP.

YOU MIGHT HAVE SEEN SOME OTHER REFERENCES TO THE USE OF M'S AND T'S BEING USED IN EME WORK. M WAS MEANT TO LET A STATION KNOW THAT SOME CHARACTERS OF THE CALLSIGNS WERE BEING COPIED, BUT NOT ENOUGH TO RESPOND WITH O'S. T'S WERE SENT IF SOMETHING WAS HEARD IN THE NOISE, BUT NO CHARACTERS COULD BE DISTINGUISHED. M'S AND T'S ARE NO LONGER USED BY 2 METER EME OPERATORS. IF HAS BEEN DETERMINED THAT THEY CAN COMPOUND CONFUSION, ESPECIALLY WHEN BOTH STATIONS ARE HAVING A DIFFICULT TIME HEARING EACH OTHER. AS A GENERAL RULE, M'S AND T'S SHOULD NOT BE USED. RANDOM QSO'S HAVING READ ALL ABOUT 2 MINUTE SEQUENCES, YOU WILL FIND THAT A LOT OF RANDOM ACTIVITY IS CONDUCTED USING ONE MINUTE SEQUENCES. IN FACT, NEARLY ALL RANDOM QSO'S MADE BY W5UN ARE ONE MINUTE SEQUENCE BASED. THE REASONING HERE IS THAT IF STATIONS ARE HEARING EACH OTHER WELL ENOUGH TO COPY RANDOM CALLS, THEN THE ADDITIONAL TIME IS NOT NEEDED TO GET THE REQUIRED QSO INFORMATION PASSED.

RANDOM ACTIVITY IS QUITE A CHALLENGE FOR THE SMALLER EQUIPPED STATION. HOWEVER, BY ANSWERING THE CQ'S OF LARGER STATIONS WHO ARE OFTEN TRANSMITTING ON THE BOTTOM 20 KHZ OF 2 METERS, IT IS POSSIBLE TO MAKE QSO'S THIS WAY. IT IS A KNOWN FACT THAT THE SIGNAL LEVEL OF A SCHEDULED STATION CAN BE SEVERAL DECIBELS LESS THAN THAT OF THE WEAKEST IDENTIFIABLE RANDOM CALLING STATION. ONE REASON FOR THIS IS THAT A LISTENING OPERATOR CAN MENTALLY FILL IN THE MISSING PARTS OF A VERY WEAK STATION'S CALLSIGN WHENEVER HE KNOWS WHAT THE CALL WILL BE IN ADVANCE. A SECOND REASON IS THAT WHEN IT IS KNOWN THAT A CERTAIN STATION WILL BE CALLING ON

SCHEDULE, THE LISTENING OPERATOR SHIFTS HIS EARS AND BRAIN INTO A MORE FOCUSED FILTERING MODE IN ORDER TO DIG THAT STATION OUT OF THE NOISE. FOR THIS REASON, VERY SMALL STATIONS

ARE URGED TO MAKE ADVANCED SCHEDULES WHENEVER POSSIBLE. HOWEVER, DO NOT GIVE UP ON ANSWERING RANDOM CQ'S, BECAUSE ONE NEVER KNOWS UNLESS ONE TRIES. IT CAN BE A VERY SATISFYING EXPERIENCE (OR FRUSTRATING ONE, IF YOU ARE NEVER HEARD). CONDITION EFFECTS A SIGNAL OF CONSTANT STRENGTH TRANSMITTED FROM EARTH AND THEN REFLECTED BACK NEVER YIELDS THE SAME SIGNAL LEVEL IN A RECEIVER FROM ONE MOMENT TO THE NEXT. THERE ARE MANY FACTORS WHICH CAN CAUSE THIS PHENOMENON. SOME OF THESE FACTORS ARE WELL UNDERSTOOD AND ARE NOT SO PREDICTABLE. SOME ARE ONLY PARTIALLY UNDERSTOOD AND ARE NOT SO PREDICTABLE. OTHERS HAVE NOT EVER BEEN THOUGHT OF YET. SOME OF THE SIGNAL VARIATIONS ARE SHORT TERM (SUCH AS THOSE CAUSED BY EARTH/MOON LIBATION), AND SOME ARE LONG TERM, SUCH AS THOSE CAUSED BY EARTH/MOON SEPERATION. LIBATION EFFECTS ARE VERY SHORT TERM (MILLISECONDS) AND ARE OF LITTLE INTEREST TO EME OPERATORS. LONGER TERM FACTORS ARE OF GREAT INTEREST, BECAUSE EME SCHEDULING AND OPERATION TIMES ARE CHOSEN BASED ON A SET PF SUCH PREDICTABLE FACTORS. THESE FACTORS WILL BE EXPLAINED SHORTLY. THERE ARE ALSO SOME OTHER FACTORS WHICH CANNOT BE PREDICTED IN ADVANCE, BUT WHICH ALSO CAN GREATLY AFFECT EME

COMMUNICATIONS. THOSE WILL ALSO BE BRIEFLY DISCUSSED SHORTLY.

THE DISTANCE OF THE MOON FROM EARTH, THE POSITION OF THE MOON IN THE SKY, (THAT IS, THE BACKGROUND SKY WHEN LOOKING AT THE MOON), AND THE PHASE OF THE MOON DURING ITS 29 DAY CYCLE ALL HAVE WELL KNOWN EFFECTS ON REFLECTED ECHO STRENGTH, RELATIVE TO SYSTEM NOISE. DURING THE 29 DAY CYCLE, THE MOON RANGES FROM APOGEE (FARTHEST FROM EARTH) TO PERIGEE (NEAREST TO EARTH). AT APOGEE THE STRENGTH OF A RETURNING ECHO WILL BE ABOUT 2 DECIBELS LESS THAN IT WILL BE AT PERIGEE, ALL OTHER THINGS BEING EQUAL (WHICH THEY SELDOM ARE). ALSO, DURING THE 20 DAY CYCLE OF THE MOON, THE BACKGROUND SKY NOISE LEVELS ON 2 METERS WILL VARY FROM 175 DEGREES K TO OVER 2000 DEGREES KELVIN (THE HIGHER NOISE OCCURS WHEN THE MOON IS POSITIONED AGAINST THE GALACTIC PLANE, WHICH HAPPENS NEAR THE MOON'S SOUTHERLY MOST DECLINATION). THIS NOISE EQUATES TO DECIBEL READINGS FROM 1.75 DB TO OVER 10 DB, BASED ON AN ABSOLUTE SCALE. THESE ARE KEY ELEMENTS USED BY EME OPERATORS TO DETERMINE THE BEST OPERATING TIMES DURING THE MOON CYCLE. LANCE COLLISTER, WA1JXN, WROTE A MOONTRACKING PROGRAM FOR THE IBM PERSONAL COMPUTER, WHICH IS USED BY MANY EME OPERATORS FOR FINDING THE MOON'S AZIMUTH AND ELEVATION FROM ANY GIVEN POINT ON EARTH AT A GIVEN TIME. IN ADDITION TO MOON POSITION, THIS PROGRAM GIVES MOON APOGEE AND PERIGEE INFORMATION FOR EACH DAY AND MOON BACKGROUND NOISE ESTIMATES FOR EACH AZEL CALCULATION TIME INTERVAL. THE PROGRAM ALSO COMPUTES A COMPOSITE NUMBER WHICH COMBINES THE EARTH/MOON DISTANCE PATH LOSS WITH BACKGROUND SKY NOISE, AND PRINTS THIS NUMBER IN TERMS OF DECIBELS. THE LOWER THIS NUMBER IS, THE BETTER COMMUNICATIONS IS PREDICTED TO BE. IF YOU WANT TO GET MORE SERIOUS ABOUT OPERATING EME, THIS PROGRAM OR ONE SIMILAR TO IT IS A MUST HAVE ITEM. ONE OTHER THING THAT CAN EFFECT EME COMMUNICATIONS DURING THE MOON

CYCLE IS THE NEW MOON. NOISE FROM THE SUN WILL MASK WEAK SIGNALS DURING NEW MOON. THE MOON IS NOT USABLE FOR EME WORK FOR ABOUT 2 DAYS CENTERED AROUND THE NEW MOON DATE. THERE WILL BE MANY DAYS DURING THE CYCLE WHEN THE MOON CANNOT BE SEEN BECAUSE IT IS UP DURING DAYLIGHT. EME COMMUNICATIONS IS QUITE POSSIBLE MOST OF THESE DAYS IF YOU CAN AIM YOUR ANTENNA WITHOUT SEEING THE MOON.

FACTORS AFFECTING THE MOON WHICH ARE NOT SO EASILY PREDICTABLE ARE THE EFFECTS CAUSED BY THE EARTH'S GEOMAGNETIC FIELD AS THE SIGNALS PASS THROUGH IT ON THE WAY TO AND FROM THE MOON. ONE SUCH EFFECT IS FARADAY ROTATION, WHICH CAUSES THE POLARITY OF SIGNALS TO ROTATE FROM HORIZONTAL TO VERTICAL AND BACK. FARADAY ROTATION CAN CAUSE A SIGNAL TO NULL OR PEAK, DEPENDING UPON WHAT TYPE OF POLARITY YOUR ANTENNA HAS. POLARITY SEEMS TO ROTATE QUITE NATURALLY AT ABOUT 15 MINUTE INTERVALS WHEN THE GEOMAGNETIC FIELD IS NORMAL. HOWEVER, THINGS ARE SELDOM NORMAL WITH THE GEOMAGNETIC FIELD, DESPITE WHAT WWV SAYS. SOMETIMES ROTATION LOCKS UP FOR LONG PERIODS OF TIME. ANOTHER SITUATION CAUSED BY GEOMAGNETIC ACTIVITIES IS WHERE SIGNALS SEEM TO BE DISPERSED, RATHER THAN ROTATED. AT SUCH TIMES IT DOESN'T SEEM TO MAKE ANY DIFFERENCE WHAT YOUR ANTENNA POLARITY IS. EVEN IF YOU COULD ROTATE POLARITY, AS SOME STATIONS CAN, IT WOULD NOT HELP. SOMETIMES SIGNALS ARE ALSO HEARD WHICH ARE GREATLY ENHANCED IN STRENGTH WHEN THE GEOMAGNETIC FIELD WAS DISTURBED, ALTHOUGH MANY TIMES WHEN THIS HAPPENS, COMMUNICATIONS IS ONE-WAY, AND STATIONS AT MORE NORTHERN LATITUDES WILL HEAR NOTHING FOR LONG PERIODS OF TIME. THEN THE SITUATION REVERSES AND THE SOUTHERN STATIONS ARE LOCKED OUT. SO, IT IS DIFFICULT TO

DETERMINE IN ADVANCE JUST WHAT THE EFFECTS WILL BE FOR A GIVEN TIME AND CONDITION. THERE IS STILL A LOT TO BE UNDERSTOOD ABOUT SUCH EFFECTS ON EME COMMUNICATIONS BEFORE PREDICTING METHODS CAN TAKE THEM INTO ACCOUNT.

A FEW OTHER "RULES OF THUMB" ABOUT EME OPERATING CONDITIONS ARE THAT, OVERALL, NIGHT-TIME SEEMS TO BE BETTER THAN DAYTIME OPERATION (PERHAPS BECAUSE PARTICLE IONIZATION BY THE SUN, AND RESULTING ABSORPTION IS LESS OF A PROBLEM). ON THE OTHER HAND, SOME VERY GOOD CONDITIONS HAVE BEEN EXPERIENCED DURING DAYLIGHT SO DO NOT GIVE THIS TOO MUCH WEIGHT. WINTER, IN THE AVERAGE, SEEMS TO EXHIBIT BETTER EME CONDITIONS THAN SUMMER, PROBABLY FOR SIMILAR REASON.

IF YOU ARE A NEWCOMER TO EME, YOUR BEST BET FOR SUCCESS IS TO RELY ON THE MORE EXPERIENCED STATIONS THAT YOU WILL BE SCHEDULING TO PICK A GOOD TIME TO RUN, AT LEAST UNTIL YOUR EXPERIENCE LEVEL GIVES YOU SOME COMFORT IN DOING THE CHOOSING FOR YOURSELF.

IN CLOSING, I WANT TO SAY THAT I HAVE ENJOYED SUPERB RESULTS ON 2M EME WITH VERY MINIMAL EQUIPMENT. IT HAS GIVEN ME A SHARE OF DISAPPOINTMENTS DUE TO POOR CONDITIONS AND THE LIKE, BUT THE OVERALL END RESULT HAS BEEN QUITE REMARKABLE WITH MY VERY SMALL STATION. NOW THAT I HAVE BEEN "BITTEN BY THE 2M EME BUG", I PLAN TO RESURRECT AN OLD 4CX250F X 2 AMPLIFIER AND PURCHASE THREE MORE CUSHCRAFT 4218XL BOOMER ANTENNAS TO SET UP A MORE SERIOUS 2M EME STATION FROM MY HOME CALL, 73 HL9TG

V.H.F. GROUP CRYSTAL BANK

FREQUENCY IN KHz

ALL \$0.20 EA

1361.000	3460.500	4845.000	6320.000	6965.000	8896.000
1655.000	3463.000	4889.900	6335.000	6973.541	8896.500
1670.000	3478.500	4918.000	6350.000	6995.000	8913.500
1955.000	3520.000	4960.500	6360.000	6998.000	8917.000
2020.000	3575.000	4980.000	6370.000	6999.000	8922.000
2065.000	3590.000	4990.000	6390.000	7010.000	8930.500
2112.000	3708.000	5020.000	6390.000	7029.500	8938.000
2118.888	3715.000	5070.000	6420.000	7065.000	8939.000
2140.555	3720.000	5110.000	6426.000	7067.000	8952.000
2158.888	3740.000	5145.000	6470.000	7107.000	8965.000
2165.555	3776.000	5270.000	6480.000	7138.000	9215.800
2182.000	3859.500	5300.000	6490.000	7164.000	9275.000
2182.000	3865.000	5440.000	6505.000	7230.000	9393.000
2220.000	3868.000	5440.000	6515.550	7265.000	9394.000
2251.666	3873.000	5498.000	6520.000	7270.000	9665.000
2337.000	3890.000	5499.000	6533.000	7280.000	9743.900
2475.000	3915.500	5505.000	6540.000	7320.000	10012.500
2638.000	4045.000	5506.500	6540.000	7345.000	10245.000
2656.000	4055.550	5554.000	6574.500	7362.500	10371.000
2701.850	4061.110	5603.000	6575.000	7400.000	10396.500
2760.000	4095.000	5604.000	6589.500	7414.000	10413.500
2792.000	4117.200	5630.000	6590.000	7465.000	10438.000
2816.000	4129.900	5638.000	6610.000	7685.000	10439.000
2836.000	4142.777	5641.500	6612.000	8033.000	10497.000
2861.000	4142.777	5660.000	6645.000	8040.000	10530.000
2868.000	4267.777	5664.000	6679.500	8074.500	11228.000
2940.000	4275.000	5666.000	6693.000	8075.000	11294.285
2945.000	4311.000	5671.500	6794.166	8110.000	11299.500
2979.000	4318.000	5673.000	6800.000	8112.000	11467.000
2987.000	4350.000	5680.500	6812.000	8116.666	11796.000
3008.000	4397.770	5682.000	6815.000	8152.000	12700.000
3023.500	4508.000	5825.000	6825.000	8165.000	12768.660
3046.000	4525.000	5828.000	6845.000	8166.670	13058.300
3158.000	4535.000	5865.000	6860.000	8210.800	13116.660
3176.000	4558.000	5945.000	6865.000	8223.500	13288.000
3196.500	4572.770	5950.000	6880.000	8305.800	13296.000
3215.000	4584.900	5954.000	6889.166	8345.000	13304.000
3239.000	4596.111	6100.000	6890.000	8446.000	13304.000
3245.830	4620.000	6120.000	6895.417	8460.000	13304.500
3260.000	4626.111	6126.500	6905.000	8465.000	13336.000
3265.000	4634.444	6130.000	6925.000	8773.600	13344.500
3382.500	4642.777	6238.000	6930.000	8820.000	13522.220
3404.500	4645.000	6245.000	6939.166	8845.500	14788.000
3418.000	4652.000	6280.000	6945.000	8847.000	23570.000
3435.000	4665.000	6280.000	6945.000	8862.500	33975.000
3455.000	4706.111	6280.200	6948.888	8871.000	42133.330
3460.000	4719.440	6311.660	6960.000	8879.500	

WA VHF GROUP
Materials Listing

Partnumber	Description	Qty	Price \$
1" VIDICON	VIDICON	12	15.00
1.8-22PF	TRIM CAP(SMALL GRN)	73	0.45
100N	DISC CERAMIC	266	0.10
100N	GREENCAP	100	0.06
10N	DISC CERAMIC 63V	23	0.03
10N	DISC CERAMIC 100V	393	0.15
10N	MIN. PLATE CERAMIC	908	0.10
1N	FEED THRU (BOLT TYPE)	5	0.40
1N5344	8V2 5W ZENER	17	0.30
1N5370	56V 5W ZENER	24	0.30
1N914	SWITCHING DIODE	40	0.03
1N917B	27V 0.4W ZENER	81	0.10
2N2906	PNP AUDIO GEN PURP	7	0.05
2N4091	NJD FET RF SWITCH	5	0.10
2N5770	NPN UHF SWITCH	276	0.15
BC548	NPN GENERAL PURP.	611	0.15
BFY90	NPN 1GHZ AMP	54	2.00
BK 5-85PF	TRIM CAP (LARGE YELL)	29	0.45
BNC	PLUG	46	3.00
BNC	SOCKET	11	2.70
F28	NEOSID SLUG	446	0.08
F29	NEOSID SLUG	127	0.08
FT 2-10PF	TRIM CAP (SMALL YELL)	71	0.45
LED	5MM GREEN	52	0.20
MFE131	NMD MOSFET VHF	18	2.20
MID 1.4-3.5PF	TRIMCAP (SMALL WHITE)	108	0.45
MRP901	NPN 1GHz 2.5db NOISE	22	3.00
MV2200	33PF VARICAP DIODE	34	0.45
OC960		89	0.05
OC971		104	0.05
PCB LAYOUT TAPE	VARIOUS SIZES	10	4.00
QOE03/20	UHF VALVE 20W	2	5.00
TO3	HEATSINK	13	1.00
TO66	HEATSINK	35	1.00
XTAL OVEN	HOLDS 2,3 OR 4 ? HC33	5	1.00

Specials:

BC548 20 FOR \$2.50
10N DISC CERAMIC 100V 20 FOR \$2.50

WELL WELL HERE WE ARE AGAIN ,IT'S ALMOST XMAS AGAIN. I WOULD LIKE TO CONGRATULATION TO OUR GROUP SECRETARY BOB PINE VK&ZFY FOR BECOMING OUR NEWEST LIFE MEMBER. GOOD ON'YA BOB FOR SUPPORTING THE CLUB ALL THESE YEARS.

WE HAVE ON RECORD THIS 8/10/1990
16 LIFE MEMBERS
7 SPECIAL MAILINGS
37 ORDINARY MEMBERS
TOTAL 60 MEMBERS

W.I.A. BOOKSHOP WILL HOPEFULLY
BE AT THE OCTOBER MEETING SO
COME ALONG AND SEE WHAT THERE
IS FOR SALE.

LAST YEAR WE HAD 95 MEMBERS TOTAL SO WHAT HAPPENED TO THE OTHER 35 ORDINARY MEMBERS WELL 2 RESIGNED OTHERS JUST DIDN'T GET AROUND TO SEND THEIR SUBS IN.

THE WEST AUSTRALIAN V.H.F. GROUP BULLETIN

OCTOBER 1990

**SURFACE
MAIL**

POSTAGE PAID
WILLETTON W.A.
6155

The West Australian V.H.F. Group (Inc)

P.O.Box 189 Applecross W.A. 6163

Registered with Australian Post-Category "B" Registered Number WBH0635

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