432 AND ABOVE EME NEWS
SEPTEMBER 2003 VOL 31 #9

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THE NL WEB VERSION IS PRODUCED BY W6/PA0ZN AND AVAILABLE AT <http://www.nitehawk.com/rasmit/em70cm.html>

CONDITIONS: On the basis of the reports you might conclude that EME activity is in a slump. But let's not jump to conclusions. Activity always seems to be down in the summer, and this summer had special problems. The concept of a skeds weekend (SW) has changed. SW is now a misnomer. SW s should be called AWs for activity weekends. Newsletter skeds are almost zeros. Skeds are now primarily made on the Internet and this summer we are seeing the effects. Internet skeds are more reliable than the old newsletter skeds that where made blind, based on requests, but not confirmed in advance. With the Internet, skeds can be confirmed at both ends. This is great for the skeds stations, but does not help over all activity, because skeds are spread out all over the month. Thus there may be more overall activity, but it is less concentrated. The solution is for each of us has to make a special effort to be on during the AW, even if we don't have any skeds. (And we should pass our skeds on to K1RQG, so that others can know when there is activity off the moon.) This Aug had another problem. There was no good date for the SW or AW in the beginning of Aug. Thus there was a 7 week break between the official AW on 5/6 July and the next AW on 23/24 Aug. In hindsight this long gap was a mistake. Many stations missed this break and were looking for activity on weekends that were not AWs! It also confused stations as to when the true Aug SW occurred. This along with the holidays and other summer activities contributed to the poor showing this past month. The next activity weekend is on 20/21 Sept and should be much better. It is the last AW before the 1st weekend of ARRL Contest on 18/19 Oct. Along with the contest, there will also be activity generated by the JW/SM2BYA dxpedition/big dish EME – see last month's NL.

7M2PDT: Shu pdt_umesan@ybb.ne.jp is now QRV on JT44 on 70 cm. He was the first station in Japan to receive permission to operate this mode on 432. He made his first JT44 QSO on 16 Aug at 1200 with K2UYH. Shu has a big station consisting of 16 x 14 el FO LR yagis with 1500 W and can be worked by most stations easily on CW. He is interested in skeds and wants to try with smaller stations.

ES8X: Tom (ES2RJ), es2rj@erau.ee sends the full story on his group's 432 and 1296 EME activities from Kinhnu Island (KO18xc) – We arrived at island as planned. The assembly, calibration of the 70 cm EME array took one full day in sunshine and +30 deg C WX. But Mr. Murphy was on the island from the very beginning. We found that the RX noise was jumping up and down at about a 1 sec period. This turned out to be the result of the local lighthouse service radiolink. It was just few hundred kilocycles below the lower edge of the 432 band, and caused IMD all over the band. The 1st day we heard many stations calling between the 70 cm skeds. Unfortunately we were able to complete only with DL9KR on random because the RX blockage was so bad. Later we were able to improve the situation. As expected, the solar noise measured around 12 dB (SFI=125), but we never heard our own echoes. They should have been about 1 to 5 dB over the noise. We were a little dissapointed by the low activity on 432 during weekdays. Here is our 432 EME log (all contacts were on CW unless JT44 is noted): on 26 July at 0850 DK3WG (O/O) sked, 0910 HB9Q (539/539) sked, 0917 DL9KR (539/549) random, 1000 OZ4MM (539/549) sked, 1120 K2UYH (449/449) sked, 1130 SM2CEW (449/559) sked, 1240 OE9ERC (559/549) sked, 1250 WA4NJP (O/O) sked and 1300 G3LTF (O/449) sked, on 31 July **at** 1700 K0RZ (O/O) sked and F2TU (O/O) sked (JT44, best –18 dB), on 3 Aug at 1700 F6KHM (O/O), 1706 UA3PTW (O/O), 1715 DF3RU (O/O), K1FO (O/O) and HB9JAW (O/O). We had planned to operate 1296 EME only on our moonset, but at the middle of our stay we desided to put the 23 cm yagi inside of 432 array. Afterwards we had elevation on 23 cm too. This decision was right and helped us to complete a couple of QSOs, one of which was on CW. It was the first ever 1296 EME QSO from Estonia. Here is our 1296 EME log: on 28 July at 1050 OE9ERC (M/M) on CW, 1144 OE9ERC (O/O) on JT44 (best -18dB) and 1246 OE9XXI (O/O) on JT44 (best-21dB). We also tried with many other stations, but without succes. Next year we will probably go to KO08 or KO07 in the western end of Saaremaa island, because of the QRM situation in Kihinu. Next year its is going to be worse because of new defence radar close to our site (about 200 m away). More details and pictures can be found at webpage http://www.vrc.ee. Take a look at our Beer Can 432 MHz broad band dipole picture. Its really works! Please QRX a little for our QSL cards. QSLs should be send directly to us.

ES8X Team with 432 EME Array in Background

G3LTF: Peter 100633.1656@compuserve.com sends sad news of the passing of a VHF and EME pioneer -- My old friend and one of the early pioneers of EME in the UK, G3CCH, passed away on July 30th. John and I were enthused by the W1BU initial QSO, but realized we had no hope of getting QRO on 1296. So we started work towards 432 EME. John built a 15' dish and made QSOs with KP4BPZ and the Crawford Hill gang. He was also a pioneer of VHF SSB and of MS in Europe in the early 60s and onwards. He built all his own gear and mentored others. RIP Johnny.

G4KLX: Jonathan (ex-HB9DRD) jonathan@mechserv.demon.co.uk is preparing for EME operation on 1296 starting with 100 W, a 3 or 4 m dish and a septum feed. He is currently awaiting a feed from OK1DFC. Eventually he will have a 350 W GS15B PA on. Jonathan has a long-standing interest in JT44, and has written a version for operation with Linux operating systems, and is working on JT44 for MAC users. His LinWSJT is available from his webpage at http://www.qsl.net/g4klx under Software.

JR4ZZS: Yoshiro (JA4BLC) ja4blc@web-sanin.co.jp reports that the new club station JR4ZZS – see report in the July NL – is now QRV on 70 cm with low power, but needs more time to be able to operate regularly. They completed a JT44 QSO with JA6AHB in late Aug. JR4ZZS used a 9 m dish and 20 W, while JA6AHB used his regular 7 m dish and 50 W.

K1FO: Steve steve@lunarlink.com has not been able to get much EME operating in during the summer. Back in July he QSO'd on 5 July KU4F and VK4AFL, on 6 July SM2CEW and on 31 July K0RZ. Steve had quite a go around making a QSO with ES8X. First Steve was away on vacation until July 31. He arranged a sked via email for Sunday 3 Aug. Unfortunately that

weekend was the ARRL UHF Contest and ES8X's sked frequency of 432.090 was in the middle of the tropo contest activity with W2SZ sitting right on .090 during the whole contest. Steve managed to move his sked to .020, but at sked time there was no ES8X. Tuning up to .090 underneath W2SZ, a pileup was heard working ES8X. [This shows the problems of international frequency coordination.] ES8X finally made it to .020 at 25 minutes into the sked, but was heard for one transmission and disappeared. Fortunately the UHF contest ended 30 minutes later, so Steve went up to .090 and started blindly calling ES8X and then made an easy random QSO. The episode made Steve late for a family get together and got his wife very upset. To top things off when he got home and checked his DXCC list, he found that he had already worked ES0M years ago, so all the effort netted only an initial, #609, and not a new country. The next episode for K1FO was a lightning strike at the end of Aug. Damage appears to be limited to his 432 system, but the following items were taken out: 1) 2nd stage pre-amp, 2) sequencer, 3) Homemade 12 VDC supply, 4) Amplifier switching transistor for 432 in TS-2000 and 5) Elevation readout. This kept Steve off of EME once again during a sked weekend. He got things patched together for a sked on Sept 6 with FY5DG. Using the time tested "clip lead to transmit" method of operation he had an easy QSO with FY5DG in spite of very high sky noise and over 4 dB of signal degradation for #610 and new DXCC.

K7XQ: Jeff k7xq@elite.net reports his station status – On 1296, I have my 3.1 m dish and 150 W 2 X 2C39 water-cooled PA going well. But my minimum dish elevation is 20 degs. Thus with my west coast location, I have a very late start during activity periods and for skeds. This is why I miss most of the activity during SWs. My initial count is now up to #22. My 432 station consisting of 2 X 9 WL yagis and 800 W 2 X 4CX400A7 is down for modifications. I am working on the power supply, so it will work with both my 432 and 1296 RF decks. I should be back on 70 cm before the end of the year. My initial count is 5.

KM5A: Stephen smw@rapidnet.com has sent some details on his EME station –- I am far from a big gun. My array is four 21 el yagis of my own design and construction with a gain of 24.2 dBi. It must be pointed by hand. The entire contraption rolls on wheels on the sidewalk, so I can clear certain obstructions. If the moon is not visible, I point using a protractor, leveling bubble, and compass. This arrangement can be unpredictable sometimes. I live in a mountain valley near Mt. Rushmore in South Dakota (DN83hu), so I have no access to the horizon. I need 25-30 degs in the southern sky and about 12 degs in the eastern sky. However, I am now a veteran of 4 QSOs. My last contact was on 23 Aug with KU4F. I recently tried with KL6M without success and am convinced that my receiving system is not working up to par. I am only measuring about 6 dB of Sun noise. I thus want to hold off any additional skeds until I solve this problem. I will probably replace my ARR P432VDG preamp and am interested in suggestions of possible replacements.

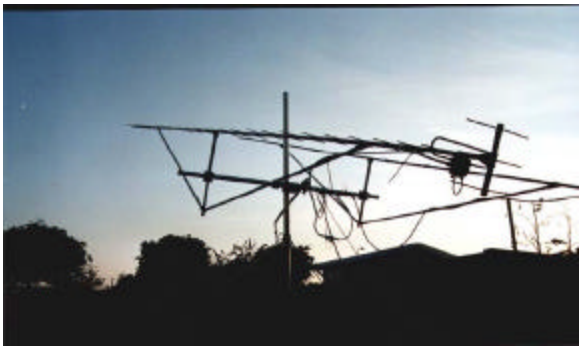
OM6AA: Rasto om6aa@stonline.sk normally has only a limited time period he can be active on 23 cm EME because of his work schedule – I can be on the air only during weekend on 27/28 Sept with windows from 1100 to 1400 and 0840 to 1420. I cannot be ready earlier, because I am installing a new coaxial cable and a new CCD camera for the position system. I am also planning to be QRV during both parts of the ARRL EME Contest.

OZ4MM: Stig's vestergaard@os.dk comments concerning his recent activity -- In last part on July I worked the ES8X expedition on 432. They really made a great effort. I QSO'd on 432 on 26 July ES8X (549V/549V) for initial #242 and DXCC 41, on 27 July KU4F (569H/569H) and F6KHM (569V/569H) and 24 Aug SP6JLW (569V/549V) and FY5DG (OV/OV) #243 DXCC 42. On 1296 I worked on 23 Aug HB9SV (589/579) and ZS6AXT (559/579). As expected there was not very high activity during the summer, but hope this improves with the end of holidays and the approach of winter. I am very interested in CW skeds on 432, 1296 and 2304.

PY5ZBU: Don py5zbu@onda.com.br wants to confirm that he is still QRV on 1296 with the same 7 m dish as for 432. I am using a YL1057 PA with approximately 900 W at the feed. I carry out quite a lot of echo testing on SSB and CW, but very little communicating except when requested. I am available for skeds on this 23 cm.

S53J: Joze joze.zitko@lek.si is QRV on 70 cm EME for CW and JT44. He QSO'd in Aug K2UYH on JT44 with very good signals that ran from –25 to - 18 dB. His equipment is 4 X M2 9 WL yagis with GS23B at only 500 W on TX and MGF1303 - SP70 -SSB preamp on RX to FT847.

SM2CEW: Peter sm2cew@telia.com continues to keep the activity up on 70 and 23 cm -- I worked the ES8X expedition on 432 MHz random at 1125 GMT on July 26. Good signals from ES8X on 432. They were running both JT44 and CW skeds on 1296 MHz; I listened to them, but could not copy at all. On July 31 I completed on 432 with KM5A for initial #395 and on Aug 1 with OM1TL #396. At that time I was reported by LY2MW on the DX-cluster. He heard me RST (529), but signals disappeared before we could complete. I was briefly on 1296 and worked HB9JAW with good signals on Aug 3. After some hard work digging a 100' long x 1' deep trench from my shack to the dish, I was able to finish the job of burying and connecting my new 1 5/8" Heliax to each of the 432/1296 feed systems. As a reward for the hard work, I was hearing my echoes stronger than before during the Aug SW. On 432 on Aug 20/21 I worked I5CTE, SP6JLW, DL0AO #397, KL6M and FY5FG #398 and DXCC #69. On 1296 I QSO'd ZS6AXT, GW3XYW, G4CCH, IK3COJ, IK2MMB and OZ6OL. On Aug 30 I was on 1296 briefly just before moonset and CWNR ON4QQ, who came back with QRZ to my CQ. I also tried to work DL7FF on JT44 (1 yagi and 150 W), but when we tried the conditions were not good at all as I was beaming with low elevation right into a strong aurora in the western sky. We should be able to complete given higher elevation and less geomagnetic activity. As I have been on holidays in Aug, I have been able to keep a record of auroras heard via beacons on 6 and 2 m. There has been an aurora every single day from Aug 1 to 31! No wonder HF conditions are poor during the EME net. After hearing that Peter, G3LTF successfully completed with ZL1KA on 1296 through tree blockage, I am now waiting for the foliage to drop from some of the trees close to my dish. I can then start testing for a possible ZL sked. I have a tremendous amount of trees a bit further away from the dish blocking my moonrise direction, but following Peters example in doing some extensive testing I may be able to find a moon position where signals penetrate the blockage and enable me to work ZL on 23 cm.



PE1ITR's 2 x 28 el 8.5 wl Yagis – Rob is looking for skeds

SM5IOT: Chris christer.robin@privat.utfors.se (JO99bx) has expanded his 432 EME array and has 12 x 25 el I0JXX yagis to GS23B PA and PHEMT LNA. But he is having problems and has not been able to figure out way his signals seem weaker than before. Tests with SM2CEW and HB9JAW yielded negative results. HB9JAW barely heard Chris when he at same time had S8 echoes back from the moon.

VK4AFL: Trevor bentont@acenet.net.au is looking for more 70 cm activity from down under – I continue to be on during the NA and Eur windows every SW, but given the activity, which is now down to just a trickle 432 EME has turned into a tough business. The most recent weekend was for me a non-event after calling CQ for about 2 hours without a single signal heard. The previous SW produced only 2 contacts with the same effort. Four or five years ago there was sometimes QRM problems, even during non-contest months. All this makes me wonder what there will be to talk about at future EME conferences. What has happened to all those stations that were regulars? I now have a Kenwood TS-2000 in service, which has lived up to expectations. The DSP and AGC circuitry are excellent, and the advice that I got from the 3 experienced operators that I communicated with prior to purchasing it has proved very accurate. At the moment I am considering a move to 23 cm, however I cannot have anything more than a 13' dish, and all I have power wise is a 100 W solid state amp, which would be mounted near the feed. This would certainly be a small station, but it should allow me to work most of the medium to larger setups and provide something of a fresh challenge. But if I do this, 432 will have to be dismantled probably for ever. In the interim though I can usually be available including the middle of my night for anything going. Skeds with previously worked initials are fine, if that's what it takes. I am looking forward to the ARRL EME Contest.

W2UHI: Frank fblumn@pathwaynet.com was active on 23 cm in Aug. During the weekend of 8/9 Aug he worked 3 stations, ZS6AXT, GW3XYW and HB9Q. Frank thought he had a tracking problem, but it turned out to be an incorrectly set computer clock.

ZS6AXT: Ivo's zs6axt@global.co.za recent activity has been limited by chores and problems -- I was quiet for a while, being busy on the house repairs/painting and my EL drive was refusing to work. The weather finally improved for few days, and I was able to get the EL working again on 2 Aug with the help of special oil. It was partially seized! After measurements of sun noise on 13 and 23 cm, I started to call on 23 cm and worked GW3XYW, OZ6OL, HB9JAW, F5VHX with weakest signal of all, G4CCH, DL1YMK, DF3RU, W2UHI and IK2MMB with my dish screened partially by my other antenna tower. All signals were strong and no other stations were copied before I closed down at 1830. The next day, 3 Aug, I called CQ for about 3 hours with nobody heard. The Aug SW was again marked with poor activity on 23 cm. I worked on 23 Aug HB9Q, GW3XYW, G4CCH, and OE9ERC – all with good signals. A sked with K7XQ was negative. Nil was heard on both sides. Sunday, 24 Aug was even worse. I worked GW3XYW at exactly same time as day before, then SM2CEW and OZ6OL. At 1000 I got strong gusty wind while somebody called me. I could not copy him. It was probably IK3COJ. Earlier, I copied G4CCH and IK3COJ. Due to the strong wind, I QRT'd after 1100. Very poor participation was found, especially from NA. I hope that activity on 23 cm will improve next month. In meantime I am preparing for tropo operation on 3 cm. My problem was to get some power 7 m up my tower with minimum losses. In the end I went for 21 mm I.D. copper pipe WG. W1GHZ's article in the Proceedings was a big help. I now have coax to WG transitions built and tuned up with a measured loss over a 5.7 m length that is about 1 dB. I hope that our weather improves, so that I will be able to start on mounts for my 2.4 m solid dish for EME. The above tropo tests will be to test my equipment in preparation for EME. I am still looking for good ideas for simple to build AZ/EL mounts for my dish.

K2UYH: I did not help with the activity problem this month. I attended the NEVHF Conference, scheduled the same weekend as the SW. There were a number of EME operators at the conference including W1JR and K1FO. W1GHZ presented a very interesting talk on feeds in which he showed the advantage of the IMU horn over a Scalar feed. (Joe, Steve and Paul agreed to do talks at the 2004 EME Conference.) I tried to promote JT44 as away of getting new stations on the moon. I did make a couple of QSOs on the off weekends. On 432, I QSO'd on 16 Aug at 1200 7M2PDT (16dB/O) on JT44 through tree blockage - I believe this was the first 70 cm JT44 QSO from Japan, and on 30 Aug at 1800 S53J (26 dB/O) on JT44 for Initial #662.

NETNEWS BY G4RGK (BASED ON K1RQG's NETNOTES): PA0PLY has a new work email address jan@comtestnl.com. This is his office email address, which is frequently used. His home email, pa0ply@amsat.org, is still ok, but Jan prefers to use his quicker office email address. **WA1JOF**'s new dish is now up and he is now working on the feed stand. **K2DH** has his 23 cm driver working again and is making plans to get back on the moon. **W9IIX** now has his 12' dish in the air. **K0RZ** reports a good QSO with ES8X on 432. **DK3WG** in Aug copied KM5A a couple of times, but did not complete a QSO. Jurgen did work ES8X on sked. **DL9KR** worked ES8X on random on 26 July. Jan reports that KJ7F was in the wrong sequence during his sked with ES8X. **WA4NJP** reports working ES8X on random. **VE4MA** is getting ready to do sun noise tests on 47 GHz. [47 GHz EME may not be far off!] **WD5AGO** is working on re-surfacing his dish and getting ready for 5.7 GHz EME. **W7MEM** is taking down his 70 cm EME array. He plans remount it lower down on the tower to enable easier maintenance. **KC4VI** has questions about the W2DRZ dish control regarding the interface with NOVA. **DL1YMK** has been QRV on 23 cm EME, but found little activity this month. In Aug he only worked ZS6AXT and G4CCH. He had a bad hail storm that caused some dish damage, which has now been repaired. **W7CI** was hit by lightening about a month ago and is just starting the recovery process. All his UHF equipment was zapped. He has 2 MMT 432/28 transverters, but the bias circuit in manual does not match the schematic. Can anyone help him?

FORSALE: OE9ERC has for sale a 5.7 GHz Linear Power Amplifier that with 10 w in gives >90 (93) W out with 13-15 Vdc (20 A max) in an Aluminum case (177x81x24 mm), with highly effective protection circuit with dc Soft Start, N-connectors and test certificate for 2200 Eur – see http://members.aon.at/oe9erc/Verkauf.htm. He also has a 5.7 GHz Linear Power Amplifier that with 200mW in gives 15-17 W out (4.8 A max), size 80x80x29 mm, with highly effective protection circuit with dc Soft Start for 455 Eur – see http://members.aon.at/oe9erc/Verkauf.htm, and a 5.7 GHz Linear Power Amplifier that with 200mW in gives 20 W out (4.8 A max), size 80x80x29 mm, with highly effective protection circuit with dc Soft Start for 550 Eur – see http://members.aon.at/oe9erc/Verkauf.htm. Anyone interested please e-mail to Erich at erich@oe9erc.com. **N4PU** n4pu@yahoo.com has a HP-431B power meter, cable and head for sale.

FINAL: Slides from an introductory talk I gave on JT44 on 70 and 23 cm are available on Rein, W6/PA0ZN's webpage at http://www.nitehawk.com/rasmit/jt44_50.html. I know not everyone agrees on the merits of operating JT44 off the moon, but I believe it is away of attracting new stations to EME. Most of these operators will end up operating CW off the moon, and everyone will benefit whether or not you are interested in JT44. ES8X's 1296 EME activity is a good example.

Plans for the Trenton 2004 International EME Conference are moving along. We have signed up a hotel that has both excellent accommodations and a good price. It's webpage and registration information should been up on the conference webpage http://www.qsl. net/eme2004 shortly. I have begun soliciting speakers for the conference. If you would like to present at talk, please e-mail me.

Please note that KD4LT the NL Email Distribution Coordinator has changed his e-mail address due to spam problems to cs@emecom.com or info@emecom.com. [Don't we all know about spam!] (Scott has been doing some tractor restoration work lately – see http://www.emecom.com/jd.htm.)

Is there any interest in a Microwave EME Contest? Not a word was heard since last month's comments on the contest.

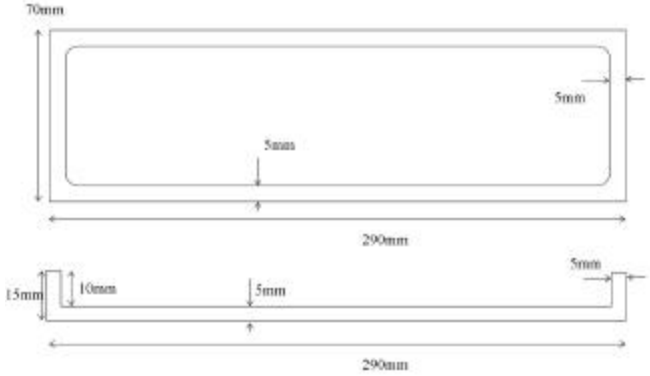
I am running out of technical material for the NL – please help! I could also use more pictures, and please keep the reports coming. I plan to be on for the AW this month, which is also the 2nd weekend of the ARRL's 10 GHz and up Contest. Is anyone considering some 3 cm EME activity during this contest? I hope to see you off the moon. 73, Al – K2UYH

ES8X's 70 cm 4 x 11 wl BVOPT 32 el Yagis EME Array

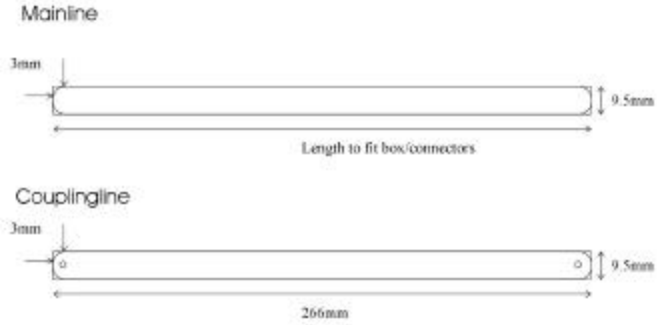
TECHNICAL: High Power, High directivity directional couplers is something we all need. The following information by PA3CSG shows how to make your own – The general idea of designing this coupler was the coupling factor being not equal over the entire frequency range. The coupler had to have more or less equal coupling over the VHF, UHF and some of the SHF amateur radio bands. The coupler should be able to handle good power and coupling should be in the -25 to -30dB range. The output should be standard connectors allowing the use of external attenuators if a higher power level should be measured. The directivity should be in the 30dB range allowing accurate SWR measurements. Designing a broadband coupler, which could be constructed with simple tools was not that simple. One tends to go to some kind of a "stepped" design. This takes a lot of cutting to be done. So the broadband design was traded against simplicity of construction. Almost equal coupling over at least 2-3 of the amateur bands could be achieved. I decided to go for 2 designs, one for 144, 432 and 1296 MHz, the second design for 1296 and 2304 MHz. Construction is fairly simple and can be done from the drawings. Care should be taken that all transitions are as "coaxial" as possible. The use of BNC connectors and the construction is probably the reason for the bad directivity on 2304. The following table shows the accuracy of the SWR measurements in relation to the directivity of the coupler. The coupler designed for 1296 and 2320 also has a very nice directivity on the lower bands. Those among us requiring a higher coupling factor on the lower bands could use this one also.

	Directivity 10dB		Directivity 20dB		Directivity 30dB		Directivity 35dB	
SWR measured	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1.2	1.0	2.37	1.0	1.47	1.13	1.28	1.16	1.24
1.3	1.0	2.61	1.06	1.60	1.22	1.39	1.25	1.35
1.4	1.0	2.87	1.14	1.73	1.31	1.49	1.35	1.45
1.5	1.0	3.13	1.22	1.86	1.40	1.60	1.45	1.56
1.6	1.0	3.41	1.30	1.99	1.50	1.71	1.54	1.66
1.7	1.0	3.71	1.38	2.12	1.59	1.82	1.64	1.77
1.8	1.0	4.02	1.46	2.26	1.68	1.93	1.73	1.87
1.9	1.0	4.36	1.53	2.39	1.77	2.04	1.83	1.98
2.0	1.03	4.71	1.61	2.53	1.86	2.15	1.92	2.08
2.5	1.25	6.84	1.98	3.24	2.32	2.71	2.39	2.61
3.0	1.45	9.88	2.33	4.00	2.76	3.27	2.86	3.15

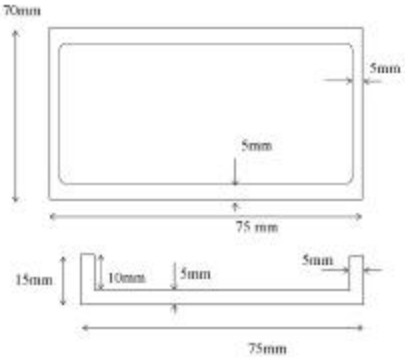
HP coupler for 144 / 432 Mhz (HP-coup1.cdr)



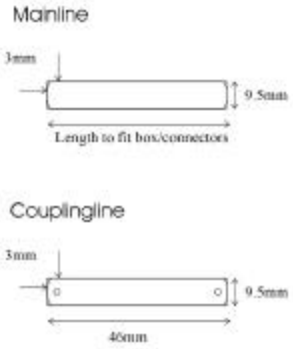
HP coupler for 144 / 432 Mhz (HP-coup2.cdr)



HP coupler for 1296 / 2320 Mhz



HP coupler for 1296 / 2320 Mhz



PA3CSG 8-1-1998
Not to scale.

PA3CSG 27-3-1998
Not to scale.