

Numero 5/98

Joulukuu 1998 Vuosikerta II

Tässä numerossa :

- **KC1XX CQWW CW 1998**
multi-multi by Dave Pascoe, KM3T
- **Mongolia JT1A by Martti Laine, OH2BH/BY1**
- ***International CCF Contest Meeting the 23rd January, 1999***

PileUp!



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PÄÄTOIMITTAJAN PALSTA

Uusi vuosi ja uudet kujeet?

CCF järjestää taas jo "perinteeksi" tulleen Contest Meetingin 23. tammikuuta, lue lisää lehden loppupuolelta. Tällä kertaa paikalle saapuu melkoinen kavalkaadi ulkomaalaisia vieraita - ja suurin osa heistä on todella tuttuja aktiiviselle kontesterille. Tämä PileUP!:n numeroa jaetaan Espoossa - siitä syystä meillä on tällä kertaa runsaasti englanninkielistä materiaalia.

CCF Contest Meetingiä ei kannatta missata. Tule mukaan Espooseen ja ota naapurin hamssikin mukaan!

Kansikuva:

Ilkka Korpela, OH1WZ
(photo by OH7MA)

PileUP! :n painopaikka muuttui viime lehdessä - se on nyt Karhu-paino Porissa. Sikäli päätoimittajalle ihanteellinen tilanne, että ko. firma on aivan "nurkan takana". Aikaisempaan värikansi formaattiin palaamista harkitaan: se vaatisi muutamia mainoksia/lehti. Jos voit auttaa mainoshankinnassa ota yhteys allekirjoittaneeseen!

73 !

Timo OH1NOA, OH0NOA

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Myyimme myös mainostilaa. Mediatiedot pyydettyäessä!

Kerhon WWW-sivu löytyy osoitteesta: <http://www.contesting.com/ccf>



KC1XX CQ WW 1998 CW STORY

*Edited by Dave Pascoe, KM3T
Contributions and stories by the KC1XX ops*

CQ WORLD WIDE DX CONTEST -- 1998

Call: KC1XX Country: United States
Mode: CW Category: Multi Multi
Zone: 5

BAND	QSO	QSO	PTS	PTS/QSO	ZONES	COUNTRIES	OP
160	248	516	2.08	22	80	T93M	
80	1020	2771	2.72	30	115	N1RR	
40	2156	6257	2.90	37	143	N2IC	
20	2282	6588	2.89	38	158	K1GQ, KM3T	
15	1843	5281	2.87	39	146	K1DG	
10	1630	4677	2.87	35	135	KC1XX	

Totals 9179 26090 2.84 201 777 => 25,516,020

(NEW CLAIMED USA M/M RECORD)

THE TEAM (alphabetically): K1DG, K1GQ, K1TR, KC1XX, KM3T, N1RR, N2IC, T93M, Christine

Antennas & Equipment

160: 1/4-wave elevated feed vertical w/raised resonant radials
 80: Delta loops (NE/SW and NW/SE) top at 200'
 160/80 rx: 1100' & 580' Beverages (EU) 1000' Beverages (west & south)
 40: 4el yagi@130' (K3LR design) + 2el yagi@200'
 20: 4/4/4/4el Cushcraft yagis w/top@200', 4/4el@45'/90'(JA), 3el south
 15: 4/4/4/4/4/4el Cushcraft yagis w/top@200', 4/4el south, 4el W2PV @90'
 10: 4/4/4/4/4/4/4/4el Cushcraft yagis w/top@200', 5el@90'(W2PV),
 4el rotary yagi @ 200', 8el long boom yagi @ 35' (EU)
 20-10: Cushcraft R5 vertical

160: Kenwood TS-940S + Ameritron AL-1200
 80: Yaesu FT-1000 + Alpha 87
 40: Icom IC-781 + Ameritron AL-1200
 20: Yaesu FT-1000MP + Alpha 77
 15: Yaesu FT-1000 + Alpha 76
 10: Icom IC-781 + Ameritron AL-1200
 Mult station: Icom IC-765 + SB-220 + R5 vertical



INTRO (by KM3T)

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Preparation

After our CQWW Phone Multi-Single operation, Bill (K1GQ) and I were unsure that we'd be able to help Matt put together a Multi-Multi for CW. But Matt was determined to pull it off. His drive and "just get it done" is nothing short of amazing. So we just forged ahead, deciding to do whatever it took to get everything ready and a final team assembled. Bill helped us with a lot of the technical details, and Matt and I concentrated on recruiting a top-notch team.

Matt, Bill, and I (with some help from Danny, T93M) spent a couple of Saturdays before CQWW preparing the station. Putting a Multi-Multi together is A LOT OF WORK. Fortunately, many of the technical components from last year were still around. Zillions of cables, Beverage splitters, CT network stuff, etc., etc. That helped a lot. But many cables had to be rerouted since Multi-Multi spans two operating rooms, 80/160 in one room and 40-10 in the "main room." And making each operating position at least minimally ergonomic is an additional chore.

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Photo: The KC1XX Team (left to right, standing): Matt (KC1XX), Steve (N2IC), Doug (K1DG), Dave (KM3T), Bill (K1GQ). Seated (left to right) are: Danny (T93M) and Charlie (N1RR).
(Edessä tutunoloinen ... Mr. Carlsberghan se siinä! / pt. huom)



Matt and I are ridiculously busy in our personal and work lives. So Bill K1GQ has been a godsend this year. His vast experience, technical knowledge, and operating skills have been a big factor in this year's KC1XX operations. It's great to have him on the team. We're lucky to have him.

Propagation

What an amazing weekend! It was full of outstanding propagation that didn't overly favor any particular band. It was a rare one - some of us feel that conditions like this may not happen again for some time, if ever.

We usually cringe on Friday as the A & K indices always seem to take off. Not this time. Finally! The excellent propagation we observed all week continued through the weekend.

In New England we enjoy a distinct propagation advantage to Europe. This is difficult to debate. At least in CQWW CW, the bands open earlier and provide slightly longer "running time" to Europe. This alone isn't enough to win a contest, though. You still must have a sharp, alert TEAM that knows how to work together to exploit the propagation advantage....they need to know how to run fast and pass their brains out.

Some comments on winning and setting records

A team of single-band experts who can't work as a team would probably not win a contest like CQWW. Not these days. Why? The competition is getting tougher all the time. Operators and technology are getting better and better. And part of what really distinguishes the winning team is the constant passing of multipliers and QSOs. Every op has to be acutely aware of not just the needs of his band, but the needs of the other bands. He has to know what other bands might be open if a 4S7 calls in on his band. And he has to act on it, quickly, before the 4S7 spins the VFO and gets away. And each op has to do this, all weekend, to achieve an optimal score.

I've been helping to build big multi-op stations (N2RM, W3LPL, K1EA/AR and KC1XX) and put multi-op teams together for 15 years now. I've been part of many winning and sometimes record-setting operations. But it never ceases to amaze me how challenging it is to win. And even if you do, how much winning has to do with antennas, location, propagation, and luck. But, above all, a huge factor in winning is THE TEAM. We couldn't have done much better in any of those categories.

I feel fortunate to work with such a great team at such a great station. And to compete within a circle of the best (W3LPL, K3LR, N2RM, K1KI, and others). Thanks guys! Thanks Matt!

New Antennas & Stuff for 1998

R5 vertical - this was a secret weapon this year - trx K1EA for the idea. Matt put this together and mounted it on a 10-foot section of some tower or another and strapped it to the kids' swing set. Instant 20dB of isolation due to polarization difference alone. Mounted far away from other



high-band antennas. Hooked it up to an IC-765/SB-220 station with K1GQ's Top Ten decoder box and Dunestar bandpass filter gizmo. Almost instant band switching. Used this as a searching station to work mults and stuff.

Turned 4/4el 20m stack from EU to JA. Seemed to work pretty well. Usually useless to EU so figured we'd give it a try.

8el 10m "Elephant gun" Yagi fixed on EU at 35' (what a monster)

"The Can" - I brought a can of cashews over...once the can was empty, Matt (or someone) picked it up and dropped it. It made kind of a cool sound. Almost like a CO station sending CW. So we decided to pick it up and drop it every time a new mult was worked. It's a keeper. Contester bonding at its best. (Not to be used next time from 0300Z to 1200Z, though - the noise might be loud enough to wake Christine and the little girls)

BLOW-BY-BLOW COMMENTARY

160 meters by Danny T93M

Main op: Danny T93M (also member of T9DX/T9A & ex-YZ4Z/YU4EXA clubs)

Well, first of all, contesting on 160 from US and EU is totally different, but my previous experience on Top Band from T9-land helped me a lot. Small things like choosing clean frq. for CQing below 1812 kHz where I got A61AJ and 6V6U and many EU's and searching for multipliers over 1860 kHz where I got A45 and LX4B, ER2 etc. were good tactics toward getting 22 zones and 80 countries. Of course, there is also pure luck on which we all rely on. I also missed working NL7Z and EU1AZ and couple of other EU's but there is always next time. Finally I've heard those big sigs from EU like S50U, DF0HQ and YZ6A (who probably used mountain peak for his location to generate big signal) to get picture how it sounds from this side of the Atlantic.

80 meters by Charlie N1RR

Main op: Charlie, N1RR (ex-WZ1R)

I have enjoyed two previous WW Phone weekends at Matt's but had not operated CW with him and his team before. There was a real pressure to defend their previous title. E-mail lists and planning as always but it all seemed more focused on the goal: WE MUST DEFEND OUR TITLE!

The 80m and 160m stations are side-by-side in a separate room. All Beverages are shared between 80m and 160m. Two Beverages were available for Europe, a short 500-footer and a longer one (1200 foot). There was also a west Beverage. The south Beverage had last been used during WW Phone and would have to be rolled out this afternoon. We decided to move the feedpoint further north, since the south neighbor was working in his yard near the usual place for the south Beverage. KM3T and I ran it up to where the neighbor was working and



terminated it there. Later it was noticed that the south Beverage was too short for 160m. It worked fine on 80m.

Preparations on Friday revealed that the old Alpha 78 was not up to the task on 160m but was perfectly capable of 1500 watts on 80m. KM3T and I moved the AL-1200 over to 160m without cutting AD1C's line cord off! No compromises permitted this weekend! Driven by an FT-1000D, the amp tuned well, but the two loops offered different loads. It wasn't until early Saturday morning that I had a comfortable system in place to change between the loops without changing the settings on the amp.

Europeans are audible from 1930Z but can not be worked until nearly 2100Z. Spent some time before the start to become comfortable with the FT-1000 and switch Beverages and TX antennas. The CT network was up and all was set. We all spent some time completing the 160m station and testing.

As Danny, T93M was settling into 160m, I was working Dean N6BV at 6Y2A. Dean was working Europeans and we chatted for just a moment. He'll make a lot of QSOs this weekend, especially with a pair of N6BT Force 12 verticals! The band is relatively empty up until even 2345Z!

I work 6Y2A at the start and jump around and work a few stations. Suddenly I find a real weak one who is calling CQ but not being answered by anyone! He works a European and gives him 599-22! I'm gonna stick around for this one, it may be my only opportunity for Zone 22 all weekend! 8Q7DV. I call and he gives me a report right away! As soon as the 8Q7DV 80 QSO makes it around our CT network, the rest of the KC1XX team roars! ALT-F3 and it's out on packet for everyone. A great way to start the weekend!

I dash around for a few more minutes working everyone, knowing that I must settle in for some CQing. At 0016Z I start CQing on 3502 and would stay there for nearly the next two hours. Jumps for packet multipliers are required if you want to "win the band": J6DX, EA9EA, T11C, YT0A, P3A, and Robert, EK6GC, J3A, Z31JA, LX, 4U1VIC are all logged thanks to packet. During this time 160m is beginning to produce some Europe. I will be sending as much as I can there, but the band has to be good!

>From 0200Z until 0430Z the band is full! Plenty of spots, 70 kHz of CQers and slower rates on my CQs cause me to stop CQing and start calling! EA8, IS0, 4X, Papa Forty Weezer, 5V7A, V47KP, CT3FN, RW2F, PY, HB, T9, ER, ES, OH0, OZ, FG, HI, and CU are among the new countries for 80m. Chris, ZS6EZ is worked on 160m and I yell to Danny to move him to 80m. Thanks Chris!

I find a hole at 3506 from 0426 until 0600Z and work over 100 stations. Packet spots are used to work: SV9, J45, UT, 3V8, 8P, EA6, VP2V, KH6 (at 0526Z), GU, 3E1AA, ZF. Several good mults are moved to 160m, but many are not. I decide to dash around the band for dozens of European spotted QSOs before the end of their darkness. At 0630Z I'm back calling CQ, but this time on 3532. During this run several good multipliers call. XR1X is sent to 160m - not



heard.

By 0725Z there are enough QSOs in the packet window to stop CQing again to check the band. HC8N is worked for a double multiplier and D44BC has a huge pileup but is going slowly. I find 3500 empty at 0818 but it is near the end of the propagation to Europe! I log a dozen G's and F's. By 0830Z there will be very little to CQ to..and the slow time begins. I cannot let LPL or LR get too far ahead now. No breaks and I must work everything I can hear.

TF3IRA is spotted for a double mult. Other multipliers: OY,PZ, CE3F answers a CQ but is not heard when passed to 160m. Herb KV4FZ appears and I spot him. Although others spotted JA earlier, my first JA is logged at 1058Z. I struggle to pull UA9JLJ through from Zone 17 at 1111! Wow! Minor roar from 40m and 20m ops. There was very little activity and I question whether I've had the same propagation as the western stations. Only 27 QSOs between 0830Z and our sunrise! I've been up since FRIDAY at 7 AM, I'm tired. 385 QSOs, 24 zones and 92 countries. I'm very pleased by the multiplier, but the QSOs are very low! I must CQ more tomorrow! But instead of sleeping, I help the high band second station and then sleep 10AM to 2PM. I did not get enough rest, but I know that K1TR is coming tonight! I start CQing on 3508 from 2140Z to 2213Z. My 4th QSO on 3508 is a strong XZ1N! I'm floored but copy it the first time and ask him to go to 40m. (That's exactly how it happened to me in 1996 at KS9K on 80m!) What a way to start the second day! I now have 25 zones on 80m! Tonight will also be the night to pass everything to 160m: QSOs and multipliers! 3508 becomes a bad place to stay and I find 3513 is clear. I stayed on 3513 until 1100Z!

2304Z: ON7TK sent to 160. OX3SA calls in, but no luck with 160m. 4L2M, UN9LM and L36E call in. 100th country at 0213Z! 5-Band DXCC in 26 hours and 13 minutes!

0234Z: JY9QJ calls in and is sent to 160m on 1.810. He is there quickly and there is a second roar from the 20m and 40m ops for this double mult and pass. (The 10m and 15m part-timers are already sleeping!) While JY9QJ is working KC1XX, A61AJ hears us, and calls Danny for the double mult! A third roar can be heard.

0320Z: 4K9C calls in.

Every UA and UT is sent to 1.810 and every other QSO I ask them to try 1.810. Unfortunately we did not have propagation to UA/UT on 160m. RM6A was heard but not worked.

Beginning about 0600Z, I started to feel tired and sleepy. A short walk. A short walk outside. As I get sleepier, I call for help. The rate is still nearly 60 QSOs per hour and N2IC and KM3T love the band! I take a 2 hour nap on the floor. At 0800 KM3T wakes me up. He has to go to watch 20. The last European caller was G4CGE at 0833Z, or so I thought. With Steve and Dave's help we manage hours of: (22Z to 08Z) 16,34,59,63,50,58,54,61,70,62,13 QSOs.

I take over at 0835. Now: 933 QSO / 26 zones / 105 countries! No one is calling and I'm still waking up. I chat with Marty W1MD (ex-NB1H) who's out at K8AZ's doing M/S. Then, like in a dream, V63X calls! I hear the callsign, and type it in, but I don't know what to do next! Finally I push the right keys and pass him/her to 160m. No luck there. Surprised to have GM3JKS call



in at 0923Z!

This is the last morning for 80m and at this point we are missing: Zones 1,30,32 Countries: ZL,VK

I'm a little concerned. Yesterday morning was so bad, that I'm glad that I napped! First VK2AYD gets spotted at 0940Z, then T32IW, and a few get mad at me for even suggesting that he go to 1810! VK9LX is cranking away on 3.503 TF3NX answers my CQ and is moved to 1840 for a double mult. Ten minutes later VK5GN calls Danny on 160m! Too early for VK5 on 80. Worked VK5GN an hour later. Several other VK's make it into the log and now, with over 950 QSOs in the log, I'm starting to look ahead to what might happen during the last few hours. Looks like they only worked 15 QSOs during the last few hours last year. That means I better not go to sleep until I have 1000 QSOs this morning! This becomes the new short-term goal. W3LPL, K5NA, W7RM are worked. VK6HD calls Danny on 160m (ROAR) but pass to 80m is unsuccessful. JA6ZPR at 1118Z is the only new JA heard. RA0CG is on again today, but he still cannot hear anyone calling him. KL7Y is spotted at 1128Z and then logged for the double mult. Now: 958/29/110 Things are slower now. I call CQ and then tune some more, then CQ again. AH2R is spotted on 3.529 but is too weak for a QSO. Must wait. KH8 is spotted but too weak also and has huge pile up with no one from the east getting through. Must wait.

Hear several W2's and 3's work AH3R then several 1's. K1ZZ calls but does not stay. Finally near 1155Z his signal begins to rise. I copy a 5NN-27 solidly! Next transmission I can hear his call completely. I begin calling. After a few calls he sends a question mark. Our QSO takes 3 minutes but is completed at 1157Z. There is a roar from the "day-timers" and a slap from Danny! But there's more to work!

Back to the KH8. Don is a better SSB operator than CW, so speed won't do it and he'll move his RX freq around to hear. K1AR and I work him close to the bottom of his listening range, within a few minutes of our sunrise of 1215Z! Another roar is heard from the busy "RATE OPS" in the next room. Now: 960 / 30 / 112 but I can't stop now! There's still time and 80m could stay open for up to an hour after sunrise.

ZL6QH gets spotted on 3.505 at 1220Z - another country! That's 113! I get back to CQing and trying to log enough QSOs to make my goal. With no other new stations heard, I take a break at 1300Z to encourage the "high-banders" and I help dish out the "breakfast a la Christine."

Everyone is surprised when I'm back logging American zero-pointers and an occasional VE! Some even ask me to head off to bed. They are reminded of "the 80m goal." I'm on for an hour and a half then off for a 30 minute nap. I find a VE slow speed net and work everyone. Matt is going to be receiving all kinds of cards asking for pictures of his 200 foot high full-wave loop antenna! During this time I lose the TX antenna switch. The switch is replaced but a relay is failing. Cannot listen to the loops anymore, just the Beverages.

By 1900Z I work WO1N at K1TTT/KY1H and now: 986 / 30 / 113. I'm back on 3513 and YV1NX calls and is sent to 160m - skeds with 2 LU stations and a CE are sent to 1.810 but it is too



early. Danny hears several Europeans, but no DX QSOs. HB0 is worked for #115. End: 1021 / 30 / 115

40 meters by Steve N2IC

Main op: Steve, N2IC

Matt (KC1XX) and Dave (KM3T) were very persuasive in convincing me to return to Matt's super station for CQWW CW. Actually, it was an easy decision - Matt's New England QTH combined with his fantastic 4 element 40 meter beam (K3LR design) makes 40 meters a quantum above anything I have ever experienced from Colorado.

The first 30 minutes of the contest were very unsettling for me. I was totally unprepared for the depth of the Europe pileup that greeted me. It wasn't unruly, but there always seemed to be 10 stations calling after I finished each QSO - that just doesn't happen in Colorado. I kept thinking to myself, why the pileup? Don't these guys know I'll have 30 or more hours of EU propagation over the next 2 days? I also fumbled with CT for the first 5 minutes, as I had not used CT since last year's contest at Matt's. There were also lots of interesting packet spots that tempted me, but I didn't want to lose my running momentum. I had a real knot in my stomach when I consciously ignored the 8Q7DV spot!

After the first hour, the pileup was gone, replaced by a steady stream of EU. Some good mults called during the night - 4X, 4K, 9H, GD and I aggressively went after packet spots. I was very happy to work XR1X at 0305Z, avoiding the Zone 12 fiasco I experienced last year. By Europe sunrise at 0700Z, I was real happy to have 722 stations in the log. JA4EKO was the first JA at 0736Z, but EU continued to outnumber JA by a 3:1 ratio through 0900Z. After 0900Z, condx remained reasonably good to JA short path, but the rate was way down. Worked lots of good Asian/Pacific mults - V8, KH2, JT, XX, 9M6. It's really surprising how easy it is to work these "tough" mults from New England - much easier than working EU from Colorado! A real credit to Matt's station. Sunrise came around 1200Z, with the last QSO of the night (#975) at 1318Z. I kept tuning the band, hearing (but not working) T88JA, XZ1N and EY8MM. Can't win them all!

Europe became workable around 1800Z, but it was tough going until 1933Z when the band suddenly opened, and I was off and running again. The EU activity is just amazing! Worked about 20 JA's LP around 2130Z, but then they were gone. Not sure if the propagation wasn't there, or all the JA activity moved to the high bands. HS7AC was worked LP on a packet spot at 2248Z - a zone I missed last year. The EU opening continued unabated until well past 0900Z. After 0900Z, it was a mix of EU and JA until nearly sunrise. The 11Z hour was the only slow nighttime hour of the contest. The JA short path was poor from 10Z until 12Z, improving greatly in the hour just after sunrise. Again, XZ1N showed up around 1400Z (too late for a QSO) and remained copyable throughout the daytime.

Sunday afternoon was a repeat of Saturday - EU and a little JA LP.

In summary, a great experience for a black hole resident - every bit as good as a trip to Zone 8! Thanks Matt!



20 meters by Dave KM3T and Bill K1GQ

Main ops: Bill, K1GQ and Dave, KM3T

20 is the "Energizer Bunny" band. Always has been, always will be. That's what makes it so neat. Always something to work.

(Dave) Bill started the contest. I was fixing 80/160 issues until 10 minutes before the start and hate to start frazzled. In fact, I just hate starting. Instead, I manned the 2nd station and made a bunch of 2nd station QSOs during the first couple of hours. First hour was 87/72. Bill worked XZ1N at 0026Z. Cool.

(Dave) I think I relieved Bill during the 0400Z hour which was a slow hour (7/3). At 0500Z the band started picking up..this is sunrise near Moscow. Lots of Russians go into the log from 05-07Z. Then other Europeans start calling in as the sun rose at their respective locations. Nice opening....I remember this opening from the last sunspot cycle. Things slow down a bit in the 08/09Z hours. Around 0800Z some of the deep Asians start calling. EU becomes runnable ~1020Z. Bill gets up and takes over for the morning shift. I go to check 15m for Doug since he's still enjoying his beauty rest.

(Bill) When I finally got a decent run frequency Saturday AM, Matt shoed me away because the harmonic from 14.0005 was too close to 28.0005. I ended up around 14.055. Sunday I spent 10 minutes or so trying to work 5A1A (double mult); 5A1A worked about 10 stations, moved to 10 meters, and never came back. That was a really nasty pileup. We missed zone 34 - rats!

(Bill) I found that I really like 20 meters under these conditions. The band is open to somewhere all the time. There are a few hours where rates are very good, but never frantic like 10 and 15. Except during the peak hours it's easy and fun to use the band map to work everything on the band without losing your run frequency. Lots of neat DX calls in and you get to pass it to other bands which otherwise might not work that multiplier at all.

(Dave) I've done 20m before at other multi's but have been doing 80m at XX for the last couple of years. 20m was a nice break from the low bands. The nice thing is that there's always something going on; the band is always open to somewhere. And lots of propagation surprises can happen. That's fun. Plus, we're loud on 20. As N2AA (or his shirt) says, "loud is good."

We averaged a little under 50/hour for the entire 48 hours. End result: 2282/38/158

15 meters by Doug K1DG

Main op: Doug, K1DG

Started out with some Asians and Pacific still coming in. Picked up a few mults early, but heard



lots I just could not work.

Saturday's opening was strange. Clearly the MUF was headed well past 21 MHz, since I was hearing loud steady signals from Zone 18 stations, and the Zone 14/15 guys had enormous multipath echoes. The 11Z hour was 140...started out faster, but slowed down as people went to 10 I guess. Also had a problem when XZ1N landed on my frequency and started his own European pileup. I knew I wouldn't win that argument, and had to move. The single Yagi at 90 feet was louder than the big stack until about 1700Z, when the stack took over. Saturday afternoon was a struggle to the Pacific - was left behind in many pileups and did not manage a QSO with V63X (every other W1, 2, and 3 seemed to make it though). Listened to XX9X off and on for over 2 hours, never once getting through.

Sunday was different - less multipath, and the stack was best all day long. I had a terrible start in the morning - I was right on the bottom of the band, but rates were awful. Moved up higher (21068) and the rate came back up to the 70s for most of the day (peaked at 100 just at European sunset). I was worried that I might be too high in the band, but there were stations running all the way to 21140! I had 37 zones (missing 23, 24, and 26) with a couple of hours left, and when the JAs starting to peak up over S9, I figured there was a chance for a sweep (all 40 zones), which I've never done on 15. In fact, my records show that only 6 15M sweeps have been accomplished on CW, and none from the U.S. Could this be the year?

By 2300, the JAs were 10 over 9, and the band was littered with other Asians. I took a 20-minute tune through the band, and managed to snag V63X, VP9, and some DUs. I was surprised to hear the UA9As in Zone 17 and UA0As in Zone 18 - unusual to hear them on that path. Could not find any of the zones I needed, so I went back to CQing, hoping to get them to call in.

At 2340, I told 20m op K1GQ to find Brett, VR98BG (single-band-20 from Zone 24) and ask him nicely to come to 15. Five minutes later, Dave KM3T found him on the multiplier station (running an R5 vertical) and Dave had K1GQ (on the big antenna) ask, and BG agreed. I got real excited, and called another CQ, knowing a mult was on the way. Down in the noise, I hear a signal - sounds like somethingW5somethingM. A quick mental Super-Check-Partial and...could it be 3W5FM? Yup - it's him, for a double mult from zone 26. Wow! A quick TU, sign the call, and there's Brett. Bingo! Back-to-back doubles and 10 minutes left to go! I look at the map on the wall, and zoom in at Asia. The band is open to the whole continent, East-to-West, and North-to-South. And right there in the middle is Zone 23 taunting me. I concentrate real hard, figuring some karmic force might lure a Zone 23 station to my frequency. I think about the letter I got from the JT1KAA club station a couple of years ago. I focus on the concert tour of the the Tuvan (UA0Y) throat singers a few years back. Every time a JA calls, that J at the beginning of the call gets my hopes up for an instant, but the second letter is never a "T". A UA0 calls, and I wait for the "Y" that never comes. It was a long, tense 10 minutes, and alas, I am left with 39 zones when those 0s roll up on the clock.

After the contest ends, it appears that K3RV and K6AW operating at W3LPL have done the deed and swept 15m. I take comfort in my higher QSO total and the team win, but still... maybe



next year.

10 meters by Dave KM3T (based on KC1XX's log and personal observations)

Main op: Matt, KC1XX

The first night was pretty uneventful, as usual: 10 QSOs with W's and South America. Yawn. Band dead by 0100Z. Matt hung around for a little while and then headed off to bed. He would need a good night's rest to concentrate on the high 10m rates that he hoped would come Saturday morning.

During the week prior to the contest we observed EU signals as early as 1000-1030Z. So Matt rose early. On Saturday he started working Europeans S&P at ~1100Z. By 1125Z the runs started. The 11Z hour produced 75/35 and the 12Z hour produced 182/25 (!), followed by hours of 151/24, 141/9, and then 99/11, 87/6, and then some 20something hours as the sun set across Europe. Matt started on 28.002, moving to 28.001 for the rest of the EU run. No trouble maintaining a frequency - I assume the backscatter signal combined with the strong signal in Europe help. This is the first contest in which the big 10m stack (8x4el Yagis stacked vertically) really showed what it can do. Matt also had put up an 8el "Elephant gun" yagi at 35' (fixed on EU) this past summer, in anticipation of the high-angle propagation that was sure to come. There is also a 5el W2PV Yagi at 90'(rotary). The stack was still best most of the time.

By 1730Z Pacific stations start to appear. KH8/N5OLS goes in the log at 1746Z, followed by KH6, A3, ZL, VK9N, VK, V6, FK, T32 and KH2 over the next couple of hours. The JAs start to appear just before 2200Z, with JK1ASO the first to be logged. VK6AJ calls in the middle of the JA "run" and goes in the log at 2207Z. Matt ran JAs until a little after 2300Z, after which the band closed. Hard. Matt goes night-night after bonding with "the boyz" for a while. The first day yields 924 QSOs and 148 countries. Not bad for a day's work!

Sunday morning comes and the band becomes runnable around 1120Z. LY2BTA goes in the log and Matt is off to the races again.

11Z 58/2
12Z 131/4
13Z 123/1
14Z 105/8
15Z 101/0

By 1600Z the sun is setting over Western Europe and the rate starts to drop quickly:

16Z 52/2
17Z 28/1

From 1700-2200Z it's the typical South America/Canada/North America stuff. The last European station logged is SL3ZV at 2007Z. JA4EKO calls in just after 2200Z. KM3T then relieves



Matt to work JAs until the end of the contest. About 65 more JAs go into the log. N7ET/DU7 calls in at 2248Z for the final 10m mult!

It's still true - there's no meters like 10 meters! It's only going to get better, folks.

Random Murphy events:

- Oil leak in K1GQ's Alpha 77. (Does anyone know if Peter Dahl or somebody might know how to repair oil-filled caps? Alpha wants \$300 for a new one!)
 - Possibly flaky transfer relays in the 80m Alpha (intermittent receive, no sign of transmit intermittent).
 - Broken 15m ICE filter
 - Bad 2-way RF switch (mis-aligned innards due to twisted UHF connectors)
- See you next year! QSLs for this operation (and many of our others) will appear eventually.



Photo: #2:

Danny (T93M) on 160 (left) and Charlie (N1RR) on 80 (right)



MONGOLIA - A LAND OF BLUE SKIES... DESTITUTE OF MONEY BUT FREE!

Martti Laine, OH2BH

Today Mongolia is free, democratic and energetically rediscovering its past. Only recently, the Mongolians paid a heavy price for their dependence on the USSR. The bubble burst in 1991 when subsidies from the Soviet Union ceased. The JT-land is now free but short on cash.

The current government, full of educated young men, must urgently revive the economy, encourage foreign investment and preserve its independence in the face of omnipotent neighbors, China and Russia. This nation of some 2.3 million people is ready to proceed.

Here, in one of the top-altitude countries in the world, with an average elevation of 1,580 meters, we found a jolly good group of serious hams ready for action. Here, we teamed up with the gang at JT1KAA and entered its abbreviated callsign - JT1A - in the multi-multi category, dedicating our hearts and souls to a good cause. The rare zone 23 was within everyone's reach!

It was a time of suffering in freezing temperatures, assembling beam antennas and struggling through a 48-hour run with three stations to provide you with 9,000 JT1A QSOs worth 12.7 million points. We knew the Mongolian hero - the great Chingis Khan - would have been proud of this effort. It was no surprise that we, wearing his ubiquitous face, decided to draw three bottles of Mongolian vodka among those who made it with us on six bands.

We are grateful to the Mongolian Radio Sport Federation and their President, Dr S. Ganbaatar, and to JT1AS, JT1BV, JT1CD, JT1CM, JT1CJ, JT1CF, JT4LM, JT5AB for putting us up at JT1KAA. We acknowledge Yaesu Musen Co. Ltd, Nokia Corp. and RF-Electronics of Finland who assisted us with equipment and other necessities which served the purpose extremely well at that remote DX outpost in Ulanbaatar.

JT1A - Joint Finnish-Mongolian DXpedition 1998.
ULANBAATAR, MONGOLIA, Grid Loc ON37KV

Operators:

S. Surenjav, JT1BH
T. Naranbaatar, JT1BV
N. Khosbayar, JT1CD
J. Hayrynen, OH1RX
M. Laine, OH2BH
J. Keskiaho, OH8PF

Equipment:

Yaesu FT1000MP (2) and Yaesu FT847
Alpha 91B (3)
3-L beam antennas 10/15/20M
Sloping dipoles 40/80/160M

QSL via SCSDXT, Jouko Hayrynen, OH1RX



In the lucky-draw for three bottles of Mongolian vodka, the the following three stations won: JA3YKC, JJ1VRO and ON5NT

STATIONS WITH 6-BAND QSOs WITH JT1A:

A61AJ, AH2R, DF0HQ, DJ7UC, DK0EE, DL2NBU, DL7ON, DL7VEE, JA0DAI, JA1YXP, JA2BY, JA3YKC, JA4EKO, JA5BJC, JA6ZLI, JI3BFC, JJ1VRO, JK1ASO, JL1ARF, LY7A, OH2U, OH3YI, OH5PT, OH7M, ON5NT, RK9CWW, RK9CXM, RN3D, RW2F, RZ9OO, SL3ZV, SM3EVR

PILEUP! ILMESTYMINEN VUONNA 1999

stopdate = päivä, jonka aamuna kaikki lehteen tuleva aineisto pitää olla päätoimittajalla

ilmestyminen = viikko, jolloin jäsenet viimeistään saavat lehden postissa kotiinsa

numero	stopdate	ilmestyminen
1/99	6.3.99	viikko 11
2/99	23.4.99	viikko 18
3/99	20.8.99	viikko 35
4/99	8.10.99	viikko 42
5/99	10.12.99	viikko 51



Photo:

Editor-in-charge, OH1NOA operating from Sri Lanka with Kamal, 4S7AB, June 1998. From Finland OH2YL and OH8OR were logged. Look for OH1NOA from CN8 between the 16th February and 3rd March!



KILPAILUKALENTERI ALKUVUODELLE 1999

*PileUP!:*a varten OH3WW:n kokoamista infoista editoi OH1NOA

Alkuvuoden tärkeimmät koitokset:

Pvm	Kisa	Mode	Huom!
La/Su	09/10.01. NRAU	CW/SSB	uudet OH kertoimet
La	16.01. HA DX	CW/SSB	hyviä CW-miehiä on kiva workkia
Pe/Su	29/31.01 CQ 160M	CW	muista kerhokilpailu!
La/Su	30/31.01 REF	CW	vähemmän hyviä CW-miehiä...
La/Su	30/31.01 UBA	SSB	erittäin suosittu kisa
Su	07.02. SRAL Peruskisa	CW/SSB	
La/Su	13/14.02. WPX	RTTY	Kilpaseuran kiinnitysmahdollisuus!
La/Su	13/14.02. PACC	CW/SSB	runas aktiviteetti PA-maasta
La/Su	20/21.02. ARRL DX	CW	"jenkkikontesti"
Pe/Su	26/28.02. CQ 160M	SSB	muista kerhokilpailu!
La/Su	27/28.02. RSGB 7 MHz	CW	hiipuva kisa?
La/Su	27/28.02. REF	SSB	ranskankielen harjoitusta?
La/Su	27/28.02. UBA	CW	huom: EU-maan parhaalle trophy!
La/Su	06/07.03. ARRL DX	SSB	"jenkkikontesti"
Su	07.03. SRAL Peruskisa	CW/SSB	
La/Su	20/21.03. Russian DX	CW/SSB	
La/Su	27/28.03. CQ WPX	SSB	muista kerhokilpailu!
La/Su	03/04.04 SP DX	CW?	StenkaPaveleita lokiin!
Su	04.04. SRAL Peruskisa	CW/SSB	
Su	04.04. Kalakukko	CW	
Ma	05.04. Kalakukko	SSB	
La/Su	10/11.04. JIDX High Bands	CW	All Asiania suositumpi JA-kisa
La	17.04. EU Sprint	SSB	
La	24.04. WPA	CW	Pori kisa
Su	25.04. WPA	SSB	Pori kisa
La/Su	01/02.05. ARI DX	CW/SSB/RTTY	erittäin suosittu kisa
Su	02.05. SRAL Peruskisa	CW/SSB	
La/Su	08/09.05. CQ-M	CW/SSB	tämäkin on vielä hengissä!
La	15.05. EU Sprint	CW	
La	22.05. KS Sainio	CW	
Su	23.05. KS Sainio	SSB	
La/Su	29/30.05. CQ WPX	CW	muista kerhokilpailu!
La/Su	05/06.06. SRAL/Region 1 Field Day	CW	metsään!
Su	06.06. SRAL Peruskisa	CW/SSB	
La/Su	12/13.06. ANARTS	RTTY	Kilpaseurakiinnitys mahdollisuus!
La/Su	19/20.06. All Asian	CW	- " -



HISTORIAN LEHDILTÄ - OH0W CQWWSSB 1992

Timo Klimoff, OH1NOA/OH0NOA

Löysin vanhoista muistiinpanoistani hiukan tietoja vuoden 1992 kuuden miehen multi-multi operaatiosta Brändöhön, Ahvenanmaalle. Tämä porukka ajoi voimassa olevan Skandinavian ennätyksen.

Pelit, vehkeet, miehet palleilla

160m	OH1NOA	TS440 + Alpha76 + Dipoli	675 / 10 / 55
80m	OH1JD	IC765 + SB220 + GP	1240 / 20 / 75
40m	OH2MM	TS850/TS450 + Titan + 3 el/Dipoli	2188 / 34 / 127
20m	OH1MDR		
	OH1NOA	FT1000 + LK800 + 4 el fixed US/4 el	3977 / 39 / 141
15m	OH6YF	TS940 + AL1200 + 4 el fixed US/ 5el fixed JA	2511 / 35 / 116
10m	OH6MFN	TS450 + HL2K + 5 el	<u>1960 / 37 / 120</u> 12551 / 174 / 633

Lopullinen julkaistu score: 20.871.803

"LOW/HIGHLITES"

- toisen ison maston kääntäjä mennyt päreiksi kovassa tuulella, päätetään jättää siinä olevat 20m:n ja 15m:n antennit kiinteästi jenkkeihin. Nostetaan 5 el KLM 15m:lle kiinteästi japseihin >> hyvästi Afrikan kertoimet 15 m:lla!
- ensimmäinen tunti 160m:lla peräti 120 qsoa! Taitaa vetää: myöhemmin Reiska 1TN kehuu 160m:n sinkun olevan vielä 80m:lläkin S9+ ;=) Valitettavasti operaattoripulan takia toisena yönä bandilla ei käytännössä workita ollenkaan ennen aamun tunteja.
- 20m on kusogeneraattori. Bandin pysyminen kiinni ensimmäisenä yönä pitää qsomäärän alle 4000:n
- 10m onkin hienosti auki jenkkeihin: vain zonet 1, 34 ja 40 jäävät siellä workkimatta
- OH1MDR ja OH1NOA lupaavat DX-Clusterilla pullakahvit zonesta 34 20m:llä - välittömästi OH2BBF vihjaa SU1AL/2:n 18 MHz:n SSB:llä !! "Wrong Band", kommentoi Emppu _ainoa mahdollinen eli N6SS/MM zonesta 34 ei myöskään tartu haaviin.
- OH1NOA on juuri breikkaamassa FG5BG:n ja ZD8Z:n kuson väliin samassa sulake paukattaa - hyvästi 2 kerrointa! 3 sulaketta myöhemmin Timo uskoo, että 10 A on liian vähän!
- OH2MM oppii vihdoinkin käyttämään QRZ-tehtaan puhemuistia: aikaa meni vain 1 SAC ja ½ CQ WW:ia!
- 40m:lla on uskomattomasti qsoja - viimeinen kerroin (OA) tulee kisan viimeisellä minuutilla
- 160m:lla saadaan workittua PJ1B, VD3EJ, N4CC ja VE1ZZ. Sen sijaan S9 sinkuilla tulevat HC0E, VP2EC, V47KP, KP2A ja YV2DT eivät kuule Eurooppaa.
- tekniikka toimii kohtuullisesti, operaattorit jaksavat hyvin: onneksi puhemuisteja riittää kaikille!
- lopputulos ylittää vuoden 1982 OH0W:n silloisen Euroopan ennätyksen samasta QTH:sta. Vuonna 1982 oli yli 10 mastoa ja 50 operaattoria. Vuonna 1992 oli 3 mastoa ja 6 operaattoria, ei kerroinmastoa (vain pätkivä clusteryhteys manner-Suomeen)



SCORE RUMOURS

collected from various sources by Timo Klimoff OH1NOA/OH0NOA

CQ WW DX CONTEST CW 1998

(muutamia lisäyksiä ja scoretarkennuksia viime lehteen)

PZ5JR	SOAB	7.197.858	4713	381	141
OH4JFN	SOAB	1.898.697	2203	370	121
OH6X	MS	4.396.864	3236	575	161
(ops. OH6UV, OH6MW, OH6NJ, OH6KSR, OH6MSZ)					
SL3ZV	MM	16.643.664	8854	740	204
OH1AJ	MM	2.836.624	2583	452	137
(ops. OH1JM, OH1MKT, OH1WR)					

ARRL 10 M CONTEST 1998

OH1F	CW ONLY	466.650	971	37	83
(OP. OH1NOA)					

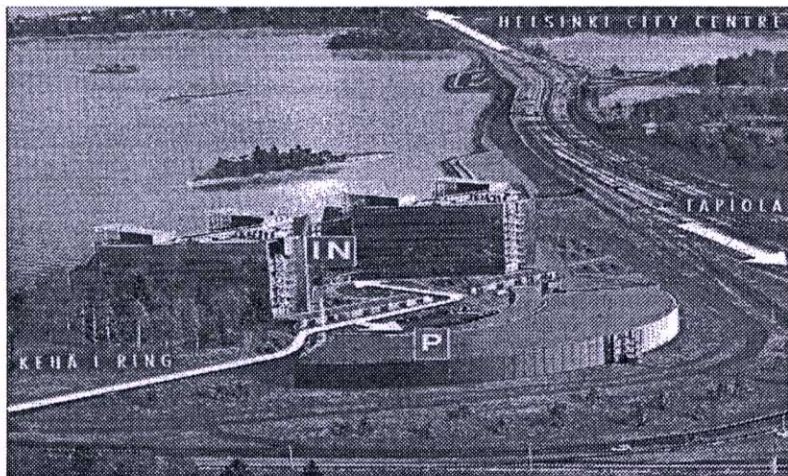


Photo: Ilmakuva CCF Contest Meetingin pitopaikasta Espoon Keilalahdessa (Nokia-talo).
Lue lisää lehden lopusta!



THE IRON MAN

by K0CS via OH1EH

Antenna War Stories From The Past

This Antenna Adventure took place back in the early 1980s at contest station AB0I. Tom, K0TLM went to the top of the 200ft tower and belted in at 9:00 am. He was going to be the guy who would attach the 7el 20m yagi to the mast.

This would be an "easy" job, since John, AB0I, had cleverly rigged a steel cable system that would enable the 350 pound, 95ft boom monster to be pulled up over the guy wires using a Toyota Pickup truck. The usual delays insued, so the work crew from the Kansas City DX Club went inside for a lunch. Tom, K0TLM was not forgotten as a nice bucket of Bumblebee Tuna sandwiches, Granola Bars and Diet Cokes were pulled up to him!

The antenna work continued, but at 5:00 pm I had to bow out of the project, as I would be conducting a meeting in Omaha, Nebraska the next day. After completing a three hour drive to Omaha and checking into the motel, I decided to call John, AB0I and see if the installation was a success.

John answered the phone and said: "I will patch you over to Tom -he is tightening the last bolt -we did it!" I looked at my watch -it was 9:15pm. Tom had been belted to the top of a 200ft tower for over 12 hours!

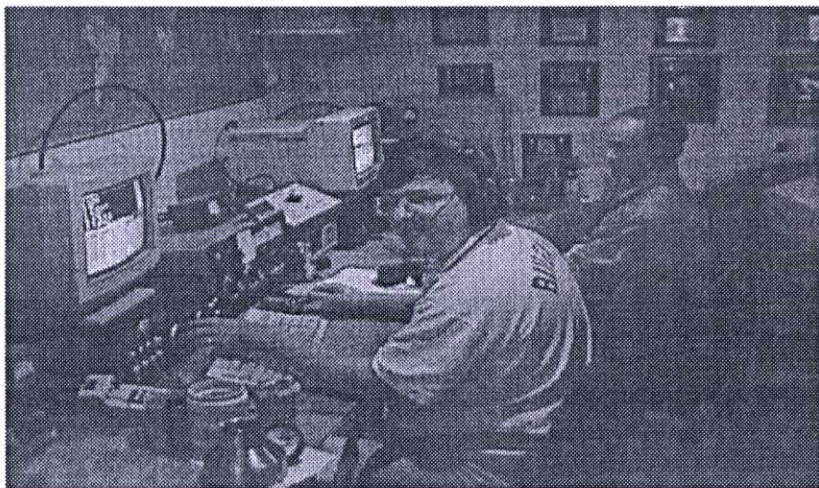


Photo: Bill (K1GQ) filling in on 40 for Steve, N2IC @KC1XX



CCF TOP BAND TROPHY

Vuoden 1997 CQ WW 160m contestissa Contest Club Finland oli ykkönen! Vuonna 1998 jäimme toiseksi, hävisimme Frankford Radio Clubille ja Slovenian Contest Clubille.

Dave, K4JRB kirjoittaa: *"CCF placed a strong third place with 4.3 million. For a new group last year those Finns are a quick learn."*

Kaikki mukaan tänäkin vuonna ja muistakaa merkitä Summary Sheetiin Contest Club Finland! Vaikka pitäis vain muutamankin qson, lokin lähettäminen on lisä CCF:n pistepottiin!

Osanottoa piristämään CCF aloitti vuonna 1998 kiertopalkintopokaalin seuraavin säännöin:

* paras CCF:n jäsenasema operointiluokasta riippumatta CW ja SSB osien yhteenlasketuin pistein voittaa haltuunsa vuodeksi CONTEST CLUB FINLAND TOP BAND TROPHY:n (luokka pitää olla sama molemmissa osissa: joko single tai multi op.)

* voittaakseen operaattorin/aseman on osallistuttava (ja lähetettävä CQ-lehdelle lokinsa) molempiin osiin

Vuonna 1998 voittaja oli **Martti Laine: OH2BH / EA8BH.**

Tulokset 1998:

kutsu	CW	+	SSB	=	mixed
EA8BH/OH2BH	1.502.076	+	68	=	1.502.144
OH1MM	251.160	+	38.200	=	289.360
OH8LAE	145.730	+	37.474	=	183.204
OH3MMH	71.040	+	53.177	=	124.217
OH6NIO	73.575	+	20.895	=	94.470
OH3JR	28.548	+	33.744	=	62.292

Muutenkin CCF oli vahvasti esillä: Martti oli ykkönen maailmassa uudella ME-tuloksella ja OHOMAM oli CW osassa multi operaattori luokassa Euroopan ykkönen! Operaattoreina olivat OH1EH, OH1JT ja OH2MAM. Pojat ajoivat Lassen, OH0RJ QTH:sta.

Keep informed !

<http://www.contesting.com/ccf>



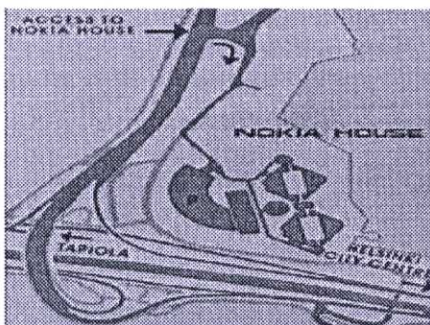
Gentlemen, you don't wanna miss this one!

Contest Club Finland's (CCF) Contest/DX Meeting in Espoo (near Helsinki) on Saturday, 23-Jan-1999.

Location: Nokia-house
Address: Keilahdentie 4, Espoo (about 10km west from Helsinki centrum).
Hosted by: Nokia Radio Clubs OH1AV, OH2AV, OH2AW, OH6AAH, OH8AV

Registration and more info:

Pasi Luoma-Aho, **OH2IW-OH6UM**, Vallikuja 10 A 8, 02600 ESPOO
Phone: 0400 - 436 543 ("24h" / text messages ok also)
Email: oh2iw@sral.fi
Please registrate beforehand !



Our foreign guests are (so far):

DL6FBL	(CN8WW in CQWW 1998 cw/ssb)
DL6LAU	(one of J3A in CQWW 1998 ssb, OJ0AU,...)
ES1QD	(ES5Q)
ES5MC	(one of J3A in CQWW 1998 ssb)
ES7RE	(?) (TM2Y,...)
F6BEE	(?) (M8T,...)
G3WGN	
HA1AG	
IK2NCJ	(one of IQ4A,...)
IV3TAN	(IV3TAN/IG9,...)
LY1FF	(LY8X,...)
N9NC	(3A/N9NC, HA/N9NC...old friend from the previous CCF Meeting)
SM0AJU	
SM0DJZ	
SM3EVR	
SM3SGP	(CE3F, SK3GW,...)
SM5COP	
SP6TPM (?)	
YL2KL	(YL8M, P38M, P3A,...old friend from the previous CCF Meeting)
YL3DW	
(?) = not sure	



Agenda (some changes still possible)

- 12:00 - 12:15 **Welcome!**
 - Nokia Radio Clubs
 - Contest Club Finland - CCF
- 12:15 - 14:15 **Contest "shorties"**
- | | | |
|---------------|----------------------|---------------------|
| - JT1A | - CQWW 1998 CW | (by OH1RX) |
| - B1A | - CQWW 1998 SSB | (by OH2KI) |
| - TI1C "ENN7" | - CQWW 1998 CW | (by OH2KI) |
| - J3A | - CQWW 1998 SSB | (by DL6LAU & ES7RE) |
| - P3A & P38M | - CQWW 1998 SSB & CW | (by YL2KL) |
| - CN8WW | - CQWW 1998 CW/SSB | (by DL6FBL) |
- 14:15 - 15:00 **PAUSE** - coffee/tea/beverages , "rag-chewing"
- 15:00 - 15:20 **Contesting in Estonia - case ES5Q** (by ES5MC)
- 15:20 - 15:40 **I finally made it! 3A/N9NC in CQWW CW** (by N9NC)
- 15:40 - 16:15 **OH2U -Information technology in contesting now and in the future**
 (by OH2XX)
- 16:15 - 16:45 **PAUSE** - coffee/tea/beverages , "rag-chewing"
- 16:45 - 17:15 **TOP scoring from Italy and "African Italy"**
- | | |
|--------------------------------------|-------------|
| - Marconi contest club (MCC) - IQ4A | (by IK2NCJ) |
| - IG9/... Lampedusa Island , zone 33 | (by IV3TAN) |
- 17:15 - 17:45 **Surfing Surinam at PZ5JR and other echoes from the Southern Hemisphere**
 (by LU/OH0XX)
- 17:45 - 18:00 **Summa summarum, final comments**
 - CCF

QSY to Helsinki centrum

- 19:30 -> ... **Spontaneous eating, beverages, "rag-chewing" etc.**
 @ Restaurant Omenapuu, Helsinki centrum
 (address: Keskuskatu 6, 2nd floor, tel. (0)9 - 630 205)
 "warm-up speech": M8T and VR2/OH6YF by OH6YF

More!

Come and pick up your 1998 B1A , BT2HC and JT1A QSLs from the meeting!

Extra!

One "lucky" attendee will win a Radio Amateur's Conversation Disc
 (sponsored by Oy HamRadio Ltd)

**Finnish Antenna LTD**

OY SUOMEN ANTENNI AB OY FINNISH ANTENNA LTD OY FINSK ANTENN AB OY SUOMEN ANTENNI AB OY FINNISH ANTENNA LTD OY SUOMEN ANTENNI AB OY FINNISH ANTENNA LTD

JP-Tribander

Tribander beam for 20 m, 15 m and 10 meters bands, plus 17 m as on dipole.

Six active full size elements.

No Traps

Direct 50 ohm feed (Balun 1:1 recommended)

No Power limits (except possible Balun)

Single feedline

Hard Aluminum

All metal parts are roster steel or aluminum

Boom length 5 meters, diam. 50 mm

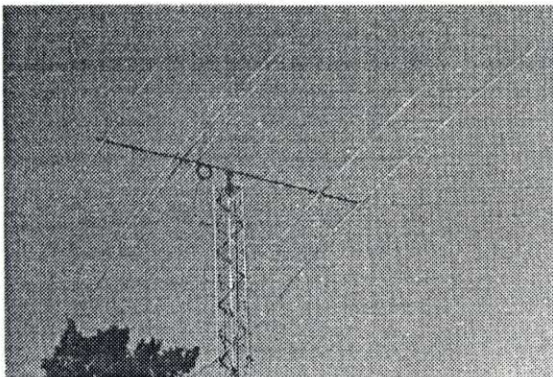
Longest element 11.05 m

Shortest element 5.01 m

Turning radius 6.1 m

Mast clamp fits 80 mm to 45 mm

Weight abt. 15 kg



	<u>Gain</u>	<u>F/B</u>
<u>Freq</u>		
14 Mhz	6.3 dBi	10.5 dB
21 MHz	6.4 dBi	10.8 dB
28 Mhz	6.7 dBi	27.0 dB
plus 17m	2.1 dBi	0 dB

(free space)

Antenna is Computer Optimized for Best performance.

Made in Finland

OY SUOMEN ANTENNI AB
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09630 KOISJÄRVI
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