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Redaktion/Editorial Staff

Technical Reports, Microwave Parts:	Rainer Bertelsmeier, DJ9BV, Glücksburger Str. 20, D-22769 Hamburg
Microwave News:	John Sørensen, OZ1IPU, Rosenvej 49, DK-9300 Sæby, Denmark
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News & Comments:	Klaus Tiedemann, DL4EBY, Halskestr. 35, D-12167 Berlin

Electronic Mail & AX25 & BBS

Email-Address:	dubus01@ibm.net / tklaus@berlin.snafu.de / 0405383186@t-online.de
AX.25:	dl8laq@db0hb / dl8hcz@db0hb

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DUBUS Verlag GbR, Grützmühlenweg 23, D-22339 Hamburg, FRG.

Chefredakteur/Editor-in-Chief:

Rainer Bertelsmeier, DJ9BV, Glücksburger Str. 20, D-22769 Hamburg. Fax: (++49)40-850-8972, e-mail: dubus01@ibm.net

Geschäftsführer/Manager:

Joachim Kraft, DL8HCZ, Grützmühlenweg 23, D-22339 Hamburg, FRG, email: 0405383186 @t-online.de

Abo-Verwaltung/Circulation:

Norbert Göttsche, DL8LAQ, Tulpenweg 3, D-24568 Kaltenkirchen, Tel.: 04191/959913

Abo-Konto/Subscr.-Account:

Postbank Hamburg, Kto.-Nr. 266292202, BLZ 20010020

International Representatives

Austria:	Reinhilde Riml, OE9YTV, Marktstr. 35, A-6971 Hard
Australia:	Doug McArthur, VK3UM, Tikaluna, 26 Old Murrindindi Rd., Glenburn, Victoria 3717
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Luxemburg:	Carlo Diedert, LX1CD, 15 Op der Hobuch, L-5832 Fentange
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United Kingdom:	Roger Blackwell, G4PMK, 5 Tollgate Road, Culham, Nr. Abingdon, Oxon OX14 4NL
USA:	Russel L. Miller, N7ART, 12041 S.W. Peninsula Drive, Crooked River Ranch, OR 97760
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Technical Reports

Editor: Rainer Bertelsmeier, DJ9BV

No-Tune SSB transceiver for 10 GHz

Matjaz Vidmar, S53MV

Sergeja Masere 21, SI-5000 Nova Gorica, Slovenia

(Part IV)

1. Advantages and drawbacks of zero-IF transceivers

Zero-IF transceivers have both advantages and drawbacks when compared to conventional SSB transceivers with crystal filters and many frequency conversions. Considering the current state of technology, zero-IF transceivers are probably most suitable for the low amateur microwave bands: 1296MHz, 2304/2320MHz and 5760MHz. Therefore working radios for the above mentioned frequency bands were developed first [1].

Although the published zero-IF transceivers for 1296MHz, 2304/2320MHz and 5760MHz allow many modifications and improvements of the original design, one would like to extend the zero-IF design to other frequency bands as well. However, the transfer of a transceiver design to another frequency band may not be straightforward.

Amateur-radio SSB transceivers for 432MHz and especially 144MHz require a very high dynamic range. A 144MHz SSB receiver should both withstand local stations with kilowatt transmitters as well as achieve a low noise figure. The dynamic range requirement for a 144MHz SSB receiver is probably even more demanding than for a HF (3-30MHz) receiver.

Extending the published 1296MHz SSB transceiver design to 432MHz or even to 144MHz does not make much sense. The dynamic range of the subharmonic mixers used in the 1296MHz RTX is certainly not sufficient for the current usage of the 144MHz amateur band. Due to several high-power stations, even direct AM demodulation in the simple subharmonic mixers would become a problem. A zero-IF SSB transceiver for 144MHz requires much better mixers operating at the fundamental LO frequency.

On the other hand it is not easy to find suitable components for very high frequencies. Only components for 10GHz (transistors, diodes etc.) can be readily found on the market and

Fig. 1: VCXO and multipliers for 648MHz

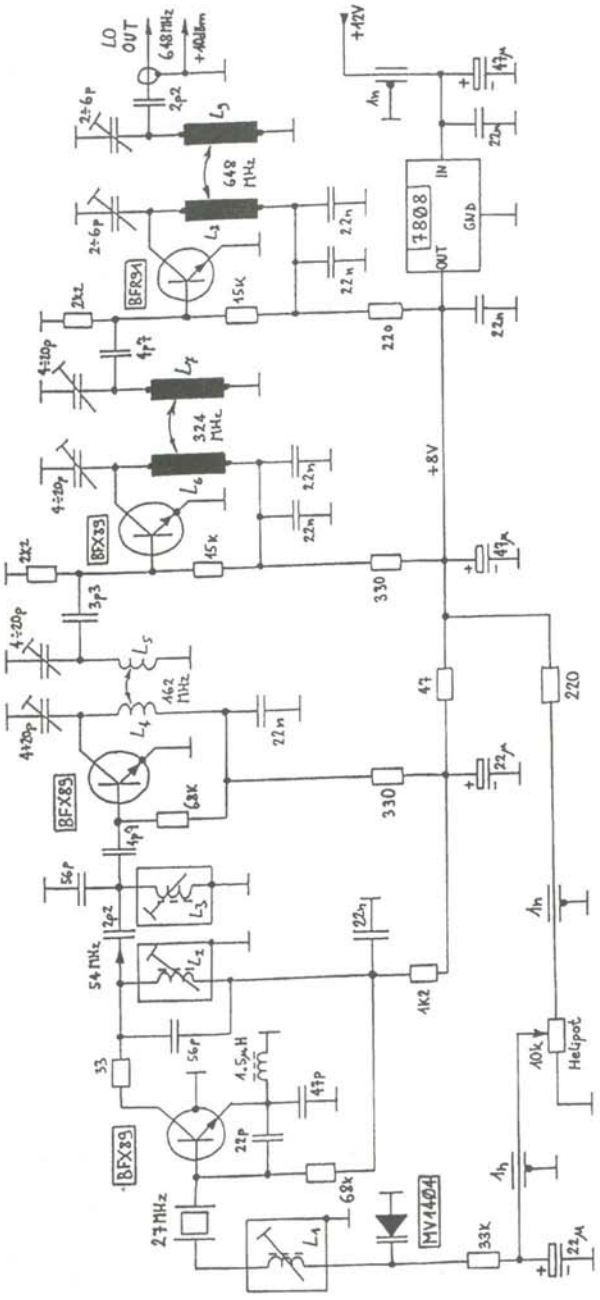
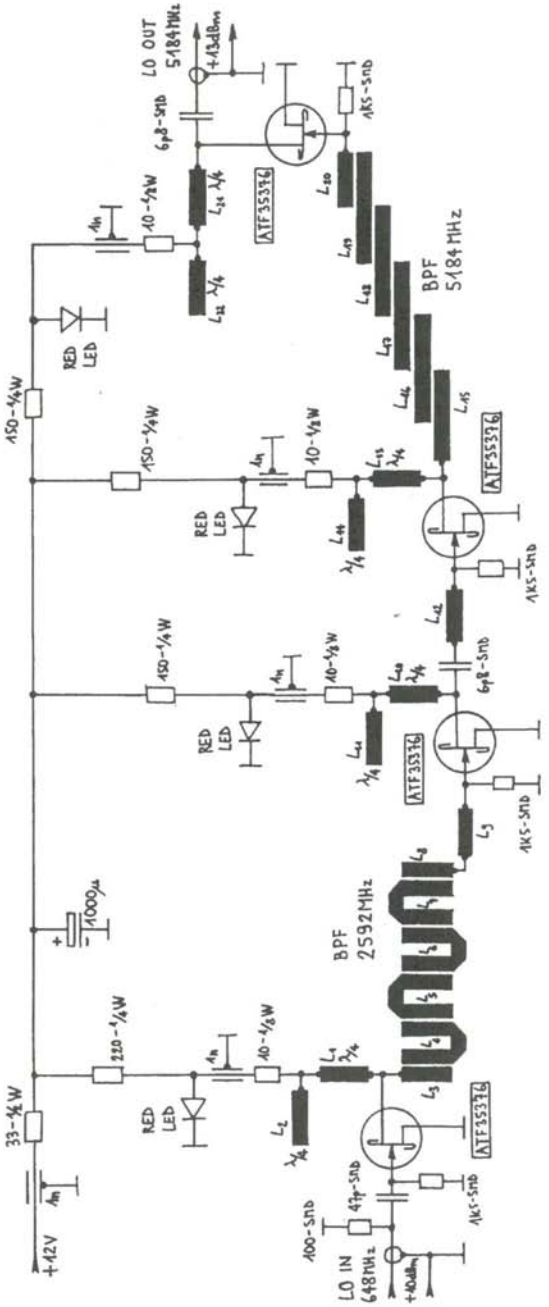


Fig. 2: Additional multiplier for 5184MHz



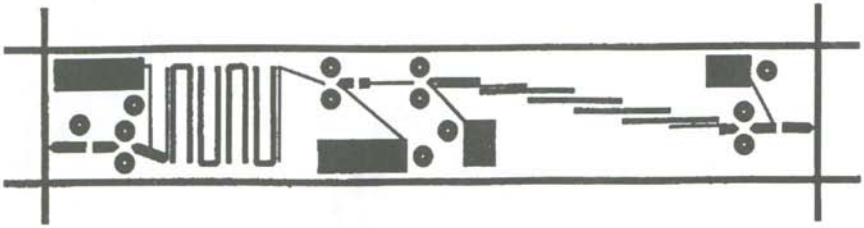


Fig. 3: 5184MHz multiplier PCB (0.8mm double-sided FR4)

it takes much effort to make them work on 24GHz. There are few parts suitable for 47GHz or higher frequencies. In addition, frequency accuracy, mixer balance and quadrature, mechanical stability and efficient shielding are more difficult to handle at higher frequencies.

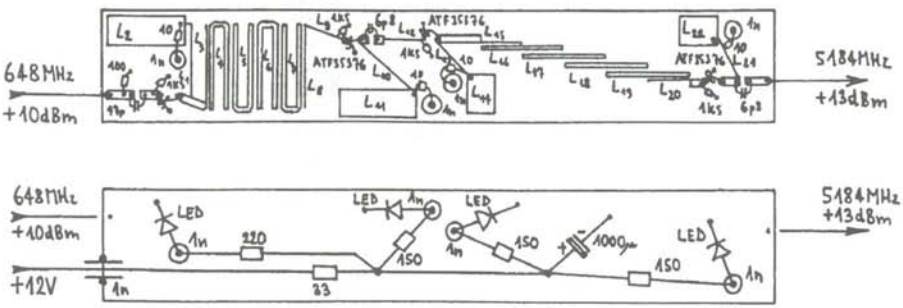
In this article a zero-IF SSB transceiver for 10368MHz will be described. The design is based on the same components as the 5760MHz transceiver: HEMTs are used as amplifiers and BAT14-099R Schottky quads are used as subharmonic mixers. Although 10GHz does not represent a problem for HEMTs yet, this seems to be the upper limit for the BAT14-099R quads. The BAT14-099R quads are packaged in the relatively large and asymmetric SOT-143 package causing severe mixer unbalance problems.

The 10GHz SSB transceiver also includes PIN-diode antenna switching. The RF front-end is built on PTFE laminate, while all other microstrip circuits are built on conventional FR4 glass fibre-epoxy, including several bandpass filters for 10GHz. The IF and AF sections are of course identical to those used in the transceivers for 1296, 2304 and 5760MHz.

2. Modified VCXO and multiplier stages

Although the radio-amateur 10GHz frequency-band allocation extends from

Fig. 4: 5184MHz multiplier component location



10000MHz to 10500MHz, most narrow band operation is concentrated slightly above 10368MHz. In the near future one may also expect narrow band activity in the satellite segment (10450-10500MHz), probably concentrated around the lower end around 10450MHz.

10368MHz is an integer multiple of many popular frequencies. For example, 10368MHz is the ninth harmonic of 1152MHz, a reference frequency that also generates 2304MHz, 3456MHz, 5760MHz and 24192MHz. 10368MHz is also the eighth harmonic of 1296MHz suggesting the use of the same VCXO and multiplier chain for 648MHz with some additional multiplier stages (X8) to obtain 5184MHz for the subharmonic mixers.

However, it makes sense to modify the VCXO itself for operation in the 10GHz transceiver. The relative crystal frequency pulling should be eight times smaller at 10GHz due to the additional multiplier stages. On the other hand, frequency stability is much more critical at 10368MHz than it is at 1296MHz.

Both requirements can be met by replacing the original VCXO using a 18MHz fundamental-resonance crystal with a modified VCXO using a 27MHz third-overtone crystal. Overtone crystals have a higher Q than fundamental crystals therefore providing better frequency stability. On the other hand, the frequency-pulling range of an overtone crystal is very restricted and it is barely sufficient for a 10GHz transceiver.

Fortunately the circuit diagrams of both VCXOs are similar and the same printed-circuit board can be used for both of them, including the multiplier chain up to 648MHz. Of course the 10GHz transceiver requires an additional multiplier for 5184MHz built in microstrip technology just like in the 5760MHz transceiver. The 648MHz input frequency is first multiplied by four to 2592MHz and then doubled to 5184MHz.

The modified VCXO and multiplier chain up to 648MHz are shown on Fig.1. A 27.000MHz crystal is required for operation at 10368MHz. The frequency-pulling range is very small in spite of the large capacitance ratio of the MV1404 varactor. The frequency coverage amounts to only 150-200kHz at the final frequency centred around 10368.100MHz.

A coverage of 150kHz is however sufficient for normal 10GHz narrowband work, provided that the frequency stability is reasonable. Fortunately the 27.000MHz crystal is used in teletext decoders inside many TV sets. Thanks to very high volume production these inexpensive crystals have an excellent frequency stability.

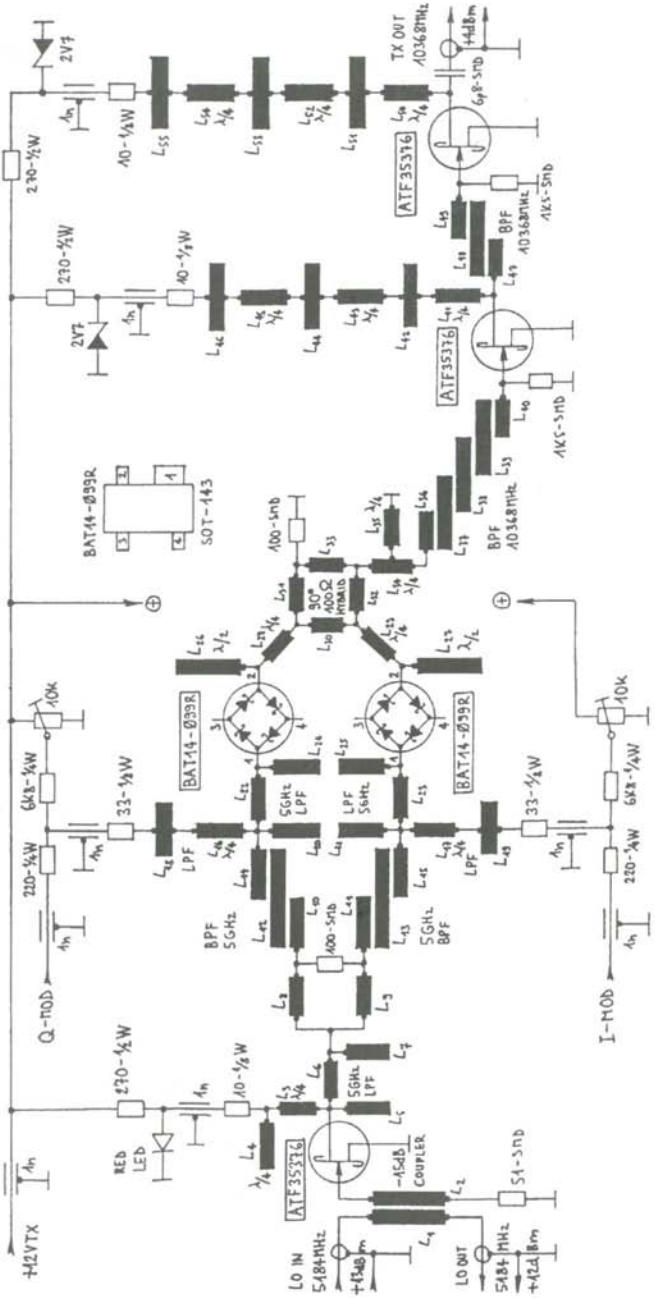
The overtone oscillator itself (BFX89) is designed to reduce the loading and therefore the heating of the crystal, to further improve the frequency stability. The VCXO is followed by two resonant circuits (L2 and L3) tuned to 54MHz. The following multiplier stages are identical to those used in the 1296MHz transceiver and are tuned to 162MHz (X3), 324MHz (X2) and 648MHz (X2).

Since the VCXO module is followed by an additional multiplier for 5184MHz in the 10368MHz transceiver, an output power of 10mW (+10dBm) is sufficient at 648MHz. Therefore the power-supply resistors of the multiplier stages inside the VCXO module are increased to 330Ω, 330Ω and 220Ω. Since the printed-circuit board is the same as in the 1296MHz version and there are just a few minor variations in the component location, the corresponding drawings will not be published once again.

The circuit diagram of the additional multiplier for 5184MHz is shown on Fig.2. The circuit includes four HEMTs ATF35376. The first HEMT is overdriven by the 648MHz signal to produce many harmonics. The following microstrip bandpass (L3, L4, L5, L6, L7 and L8) selects the fourth harmonic at 2592MHz. The second HEMT amplifies the 2592MHz signal to drive the third HEMT operating as a frequency doubler. The doubler is followed by a 5184MHz bandpass (L15, L16, L17, L18, L19 and L20) and the 5184MHz signal is finally amplified by the last HEMT to obtain 20mW (+13dBm).

The additional multiplier for 5184MHz is built on a double-sided microstrip 0.8mm FR4

Fig. 5: Quadrature transmit mixer for 10368MHz



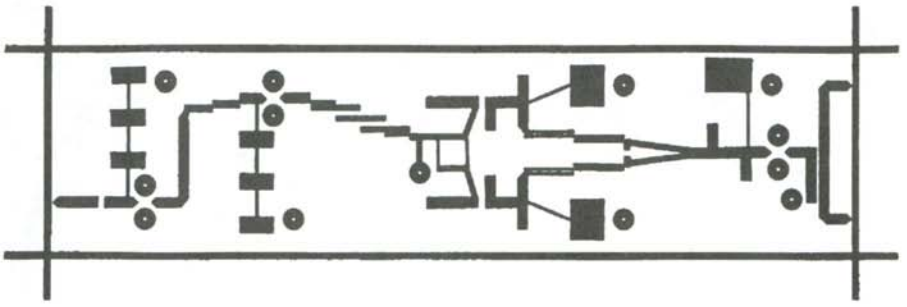


Fig. 7: 10368MHz TX mixer PCB (0.8mm double-sided FR4)

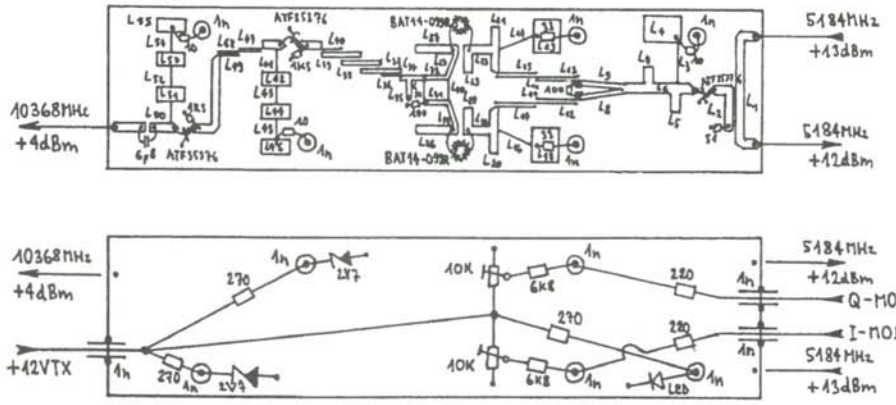
board with the dimensions of 20x120mm as shown on Fig.3. The corresponding component location is shown on Fig.4. The 5184MHz multiplier should provide the rated output power (+13dBm) without any tuning, provided that all of the components are installed and grounded correctly.

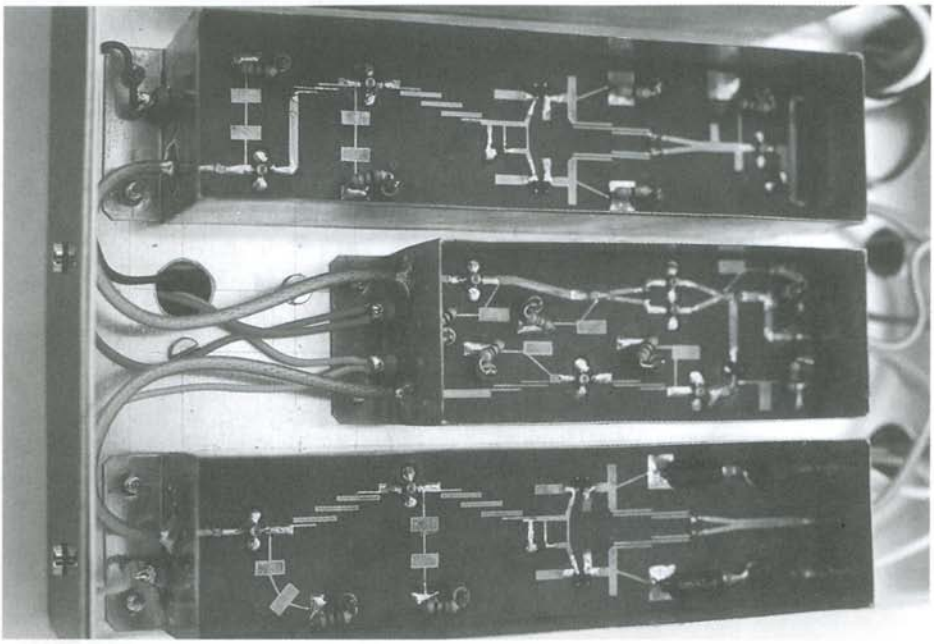
3. Quadrature transmit mixer for 10368MHz

The circuit diagram of the quadrature transmit mixer for 10368MHz is shown on Fig.5. The 5184MHz LO signal is taken from a -15dB coupler and the LO signal level is restored by the ATF35376 amplifier stage, feeding two subharmonic mixers equipped with BAT14-099R schottky quads. The 5GHz lowpass attenuates the second harmonic at 10GHz to avoid corrupting the symmetry of the mixers.

The unwanted carrier rejection of the BAT14-099R subharmonic mixers is only 10-15dB at 10368MHz. The main reason for the rather poor carrier rejection is the large and asymmetrical SOT-143 package. Pin 1 of this SMD

Fig. 6: 10368MHz TX mixer component location





10368MHz RF Boards

package is wider than the remaining three pins. Unfortunately, microwave schottky quads in suitable symmetric packages are hardly available and much more expensive than the BAT14-099R.

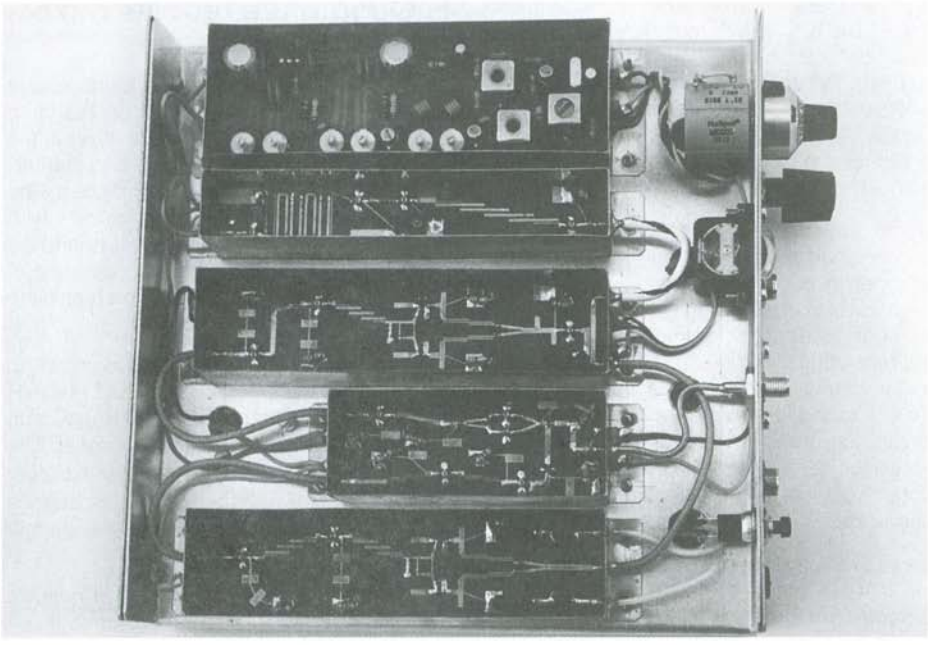
On the other hand, the subharmonic mixer balance can be corrected by a DC bias applied to the diodes. The quadrature transmit mixer for 10368MHz therefore includes two 10kΩ trimmers to adjust the mixer balance. In this way the unwanted carrier rejection can be improved to better than 30dB.

The two 10GHz signals are combined in a quadrature hybrid. The hybrid is built as a 100ohm circuit to save board space. Quarter-wave transformers are used to restore the impedances to 50Ω. The circuit diagrams of both subharmonic mixers are slightly different from those used in the 1296, 2304 or 5760MHz versions for the same reason.

The hybrid is followed by a 10368MHz band-pass filter (L36, L37, L38, L39 and L40). The latter removes the 5184MHz LO as well as other unwanted mixing products. After filtering the 10368MHz SSB signal level is rather low (around 30uW or -15dBm), so two amplifier stages with ATF35376 HEMTs are used to boost the output signal level to about 2.5mW (+4dBm).

The quadrature transmit mixer for 10368MHz is built on a double-sided microstrip 0.8mm FR4 board with the dimensions of 30x120mm as shown on Fig.6. The corresponding component location is shown on Fig.7. Since only positive bias is available through the 10kΩ trimmers for mixer balancing, the BAT14-099R packages should be oriented correctly in the circuit. In particular, one of the two packages has to be installed upside down.

Except for the balancing trimmers, the quadrature transmit mixer for 10368MHz should not require any tuning. Both balancing trimmers are simply adjusted for the minimum output power when no modulation is present.



Top View of Transceiver

This adjustment is best performed when the whole transceiver is assembled.

4. RF front-end for 10368MHz

The circuit diagram of the RF front-end for 10368MHz is shown on Fig.8. The RF front-end includes a transmit power amplifier, a receive low-noise amplifier and a PIN-diode antenna switch. Unlike the RF front-ends for 1296, 2304 or 5760MHz, all built on FR4 laminate, the RF front-end for 10368MHz is built as a microstrip circuit on 0.5mm thick PTFE laminate to reduce RF losses.

Building the microstrip circuit on glass fibre-PTFE laminate (thickness 0.5mm or 0.020", dielectric constant Er=2.55) allows an 1-2dB increase of the transmitter output power and an 1-2dB improvement of the receiver noise figure. The output power of the 10368MHz transmitter is in fact even slightly higher than the output power of the 5760MHz transmitter. Although both transmitters use the same semiconductor devices (HEMTs), the latter is built on lossy FR4 laminate.

The transmitter power amplifier is designed with inexpensive HEMTs, so the output power is limited to 100mW (+20dBm) on the antenna connector. The amplifier includes an ATF35376 HEMT driver stage followed by two ATF35376 HEMTs in parallel in the output stage. The 100Ω resistor between L5 and L6 improves the power dividing and prevents push-pull parasitic oscillations of the output stage.

The two output HEMTs receive a positive bias on the gates both while transmitting and while receiving. During transmission the transistors generate a self bias just like in the 5760MHz transmitter. Of course the +4VTX supply line requires a current-limiting resistor.

The antenna switch is using a single shunt PIN diode just like the 5760MHz counterpart with the PIN diode BAR80. However, the parasitic capacitance of the BAR80 is far too

high for operation at 10368MHz, so the new diode BAR81 (SMD component marking "ABs" or "BBs", same MW-4 package) has to be used. The parasitic capacitance of the new BAR81 PIN diode is less than half that of the old BAR80. The insertion loss of the BAR81 is reduced by applying a negative bias (+- PIN) while receiving.

During transmission, the BAR81 is turned on and the short circuit is transformed by L15 into an open circuit at the summing node. The insertion loss of the BAR81 in the receive path exceeds 20dB and this is sufficient to protect the receiver. During reception, the two transmitter output HEMTs act as short circuits thanks to the positive gate bias. The short circuit is transformed through package parasitics, L7, L8 and interconnecting lines (total electrical length 3/4 lambda) into an open circuit at the summing node.

Since there are no strong signals expected in the 10GHz band, the LNA for 10368MHz includes two stages with ATF35376 HEMTs. The total insertion gain including the losses in the antenna switching network and the two 10368MHz bandpass filters amounts to about 23dB.

The RF front-end for 10368MHz is built on a double-sided microstrip 0.5mm glass fibre-PTFE board with the dimensions of 30x80mm as shown on Fig.9. The corresponding component location is shown on Fig.10. A low-loss PTFE laminate allows a higher output power and a better noise figure. On the other hand, a low-loss teflon laminate does not suppress the parasitic oscillations of HEMTs in the millimetre frequency range. These oscillations have to be controlled by damping resistors, usually 100Ω connected between gate and source.

The RF front-end for 10368MHz includes a single tuning point. A capacitive tuning stub (a 2x3mm piece of copper foil) is added to L13 to improve the antenna matching, which in turn depends on the installation of the antenna cable and connector. This matching stub will improve the output power by about 1dB or in other words, the output power may be as low as 80mW without any tuning.

5. Quadrature receive mixer for 10368MHz

The circuit diagram of the quadrature receive mixer for 10368MHz is shown on Fig.11. It differs from the similar 5760MHz mixer in the design of the quadrature hybrid and subharmonic mixers with BAT14-099R diodes. The module includes two RF amplifiers with ATF35376 HEMTs, two 10368MHz bandpass filters, two subharmonic mixers operating in quadrature and two identical IF preamplifiers with BF199 transistors.

The subharmonic mixers are identical to those in the transmitter using BAT14-099R schottky quads. Both mixers are supplied in phase (L49 and L50) with the LO signal. The RF input signal is split by an 100Ω quadrature hybrid (L25, L26, L27 and L28). Impedance matching is provided by quarter-wavelength lines L23, L29 and L30.

The mixers are followed by two IF preamplifiers with BF199 transistors identical to those used in the 1296, 2304 and 5760MHz receivers. The 3.3mH chokes can be replaced by lower values, since powerful signals (both amateur and out-of-band) are not expected in the 10GHz band. Lower value chokes are less sensitive to disturbing low-frequency magnetic fields, including disturbing fields generated in the transceiver itself.

The quadrature receiving mixer for 10368MHz is built on a double-sided microstrip 0.8mm FR4 board with the dimensions of 30x120mm as shown on Fig.12. The corresponding component location is shown on Fig.13. In the 10GHz band, a quarter wavelength is only 4mm long on FR4 or 5mm long on PTFE boards, so more complicated microstrip circuits can be used. For example, the supply/bias chokes are built as two-section lowpass filters on the RF-front-end PTFE board and as three-section lowpass filters on both mixer FR4 boards. These improved RF chokes introduce less insertion loss and allow a a lower crosstalk.

The receiving mixer for 10368MHz requires no tuning. However, the BF199 IF preamplifier transistors should be selected for the

lowest noise. It seems that these transistors do not have a guaranteed "1/f" noise specification. In all of the prototypes built the Philips BF199 transistors produced the least amount of noise.

6. Construction of the zero-IF SSB transceiver for 10368MHz

The SSB/CW transceiver for 10368MHz is using the same quadrature modulator, IF amplifier and demodulator as the similar transceivers for 1296, 2304/2320 and 5760MHz. Since the same semiconductors are used as in the 5760MHz version, the current-limiting resistor in the SSB/CW switching RX/TX module has to be set to 82ohm, 1W.

The new PIN diode BAR81 also requires the small PIN driver module also used in the 5760MHz transceiver. Since the new BAR81 is much improved with respect to the old BAR80, the resulting receiver sensitivity loss amounts only to a few dB if no negative bias is provided (no PIN driver used) and the +-PIN line is simply connected to +12VTX. It therefore makes sense to use the new BAR81 also in the 5760MHz transceiver, while the old BAR80 is good enough for 1296 or 2304/2320MHz.

In the 10GHz frequency range, even small SMD components are rather large when compared to the wavelength of only 29mm. The size of the SMD resistors and capacitors is usually indicated in hundredths of an inch (0.254mm). The first SMD resistors and capacitors were of the size 1206 (about 3x1.5mm). Today, most SMD components are available in the sizes 0805 and 0603, while the newest components are of the size 0402 (dimensions 1mmX0.5mm).

Large 1206 SMD capacitors should not be used in the 10368MHz transceiver, since they have parasitic internal resonances in the 10GHz frequency range. The resonant frequencies are further decreased by the high dielectric constant of the ceramic used to build these capacitors. In the 10368MHz transceiver only 0805 or smaller SMD parts should be used.

In the 10GHz frequency range it makes sense to use small-value capacitors (mainly 6.8pF in the circuit diagrams), since they are built from low-loss WHITE ceramic with a moderate dielectric constant and internal resonances above 18GHz. Higher-value capacitors made from coloured ceramic (purple or brown) have higher RF losses and lower resonance frequencies. Finally, the newest and smallest 0402 resistors and capacitors are useful even at 24GHz.

The main building block of the RF circuits operating at 10368MHz are the ATF35376 HEMTs, although there are many similar devices produced by other manufacturers that offer the same S-parameters at similar bias conditions. When selecting these devices one should take care of the Idss, since most of these transistors operate at zero bias for circuit simplicity.

An Idss of about 30mA is desirable. Devices with higher Idss are only useful in the transmitter output amplifier. If devices with a sufficiently low Idss can not be obtained, then the 270Ω 1/2W (or similar) resistors should be reduced to allow proper operation of the zener or LED shunt regulator. Lower NF selections of the same device, like the ATF35176 or the ATF35076, usually have a higher Idss!

The intermediate/audio frequency section of zero-IF or direct-conversion transceivers also requires a careful selection of active devices with low "1/f" of "popcorn" noise. Experience accumulated by building many transceivers for 1296, 2304/2320, 5760 and 10368MHz shows that Philips BF199 transistors perform best in the IF preamplifiers. However, several very noisy samples of the BC238 transistors had to be replaced in the quadrature IF amplifiers as well. It seems that factory rejects fairly exceeding the "1/f" noise requirements are sent to hobbyist shops. On the other hand, industrial leftovers found at flea markets perform best, since these devices had to go through severe input quality controls.

Fig. 8: RF front-end for 10368MHz

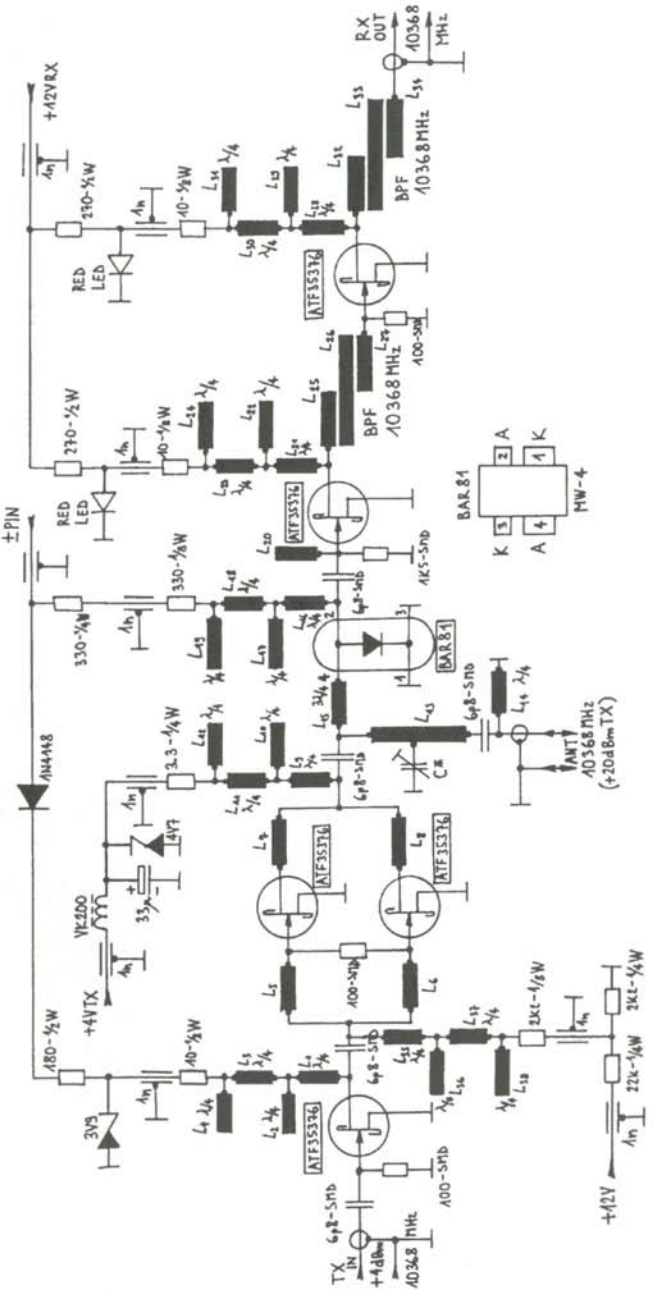
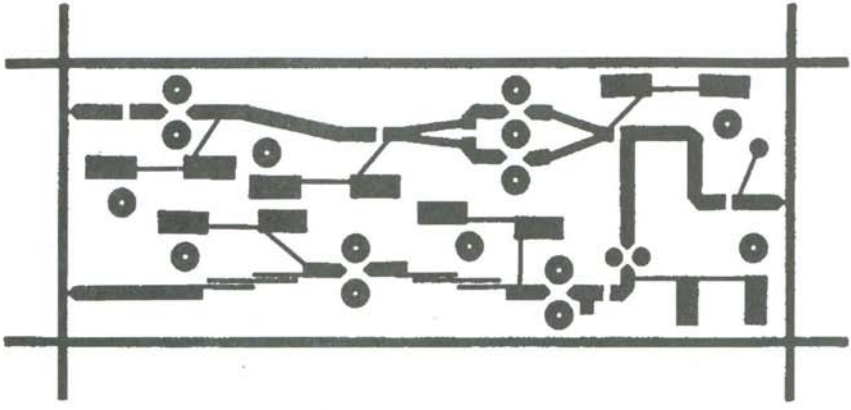
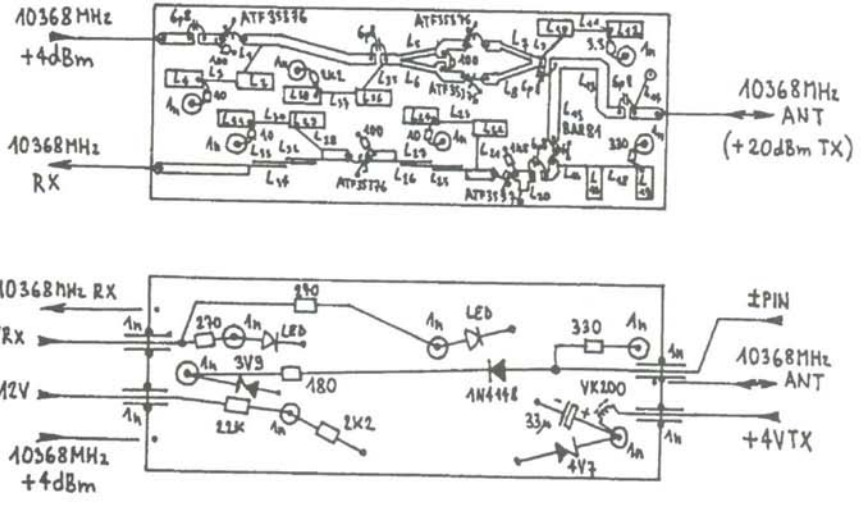


Fig. 10: 10368MHz RF front-end PCB (0.5mm PTFE)



The RF modules of the 10368MHz SSB transceiver have the same dimensions as the corresponding units of the 5760MHz counterpart, but the exact locations of the electrical connections are slightly different. Their shielded enclosures should be carefully manufactured out of thin brass sheet, since the 10368MHz SSB transceiver is even more sensitive to microphonics and RF leakage. Both transmit and receive mixers and the RF front-end require 1cm thick microwave absorber foam (anti static foam) installed under the covers of the shielded enclosures.

Fig. 9: 10368MHz RF front-end component location



The VCXO module does not require a bottom cover like in the 1296MHz version, since 10368MHz is only the sixteenth harmonic of 648MHz. On the other hand, the additional multiplier for 5184MHz and the RF modules should be accurately shielded. Efficient feedthrough capacitors should be used elsewhere. All internal RF connections should be made with double-braid flexible PTFE coax or UT085 semirigid.

The complete 10368MHz SSB transceiver can be installed in the same enclosure as the 1296, 2304 or 5760MHz versions with a central chassis and internal dimensions of 60mm (height) X 180mm (width) X 180mm (depth). The module location within the enclosure is the same as in the 5760MHz version, including a similar wiring among the modules.

The loudspeaker should not be installed in the same case to avoid microphonics. Microphonics could perhaps be reduced by using machined enclosures for the RF modules. Mechanical vibrations can also be controlled by inserting pieces of plastic foam between the modules to act as an acoustic absorber.

7. Checkout of the zero-IF SSB transceiver for 10368MHz

The check-out of the transceiver should start with the alignment of the VCXO and multiplier stages. The VCXO should be adjusted for the desired frequency coverage. The multiplier stages are simply adjusted for the maximum output at the desired frequency. The maximum is observed as the rectified voltage drop on the base of the following transistor, measured through a suitable RF choke. The maximum on 648MHz is measured as the drain-current dip of the 2592MHz multiplier. Although the additional multiplier does not require any adjustments, the output signal level (+13dBm at 5184MHz) should be checked.

Since the receiver does not require any tuning, it should already work. First, the overall amplification should be checked. The output noise should drop when the supply to the LNA is removed. When the IF preamplifiers are disconnected, the noise should drop almost to zero.

Next the receiver is connected to an antenna and tuned to a weak unmodulated carrier (distant beacon etc.). Besides the desired signal its rather weak image should also be heard in the loudspeaker. The image can be detected since its frequency changes in the opposite direction when tuning the receiver. The image is then attenuated by adjusting the two trimmers, phase quadrature and amplitude balance, in the IF amplifier.

The transmitter should be first checked for the output power. The full output power should be achieved with the trimmer in the modulator at about 1/3 resistance in CW mode. The DC voltage across the PA transistors should rise to the full voltage allowed by the 4V7 zener. Finally, the output power is optimised with the tuning stub on L13.

The transmitter is then switched to SSB to adjust the balance of both transmit mixers. The two 10kΩ trimmers are simply adjusted for the minimum output power with no modulation. Unfortunately this setting is sensitive to the mixer-diode temperature and 5184MHz LO drive level, so the carrier suppression may not stay as good as it was adjusted during the check-out of the transceiver.

The SSB modulation should be checked in a radio contact with another amateur station on 10368MHz. In particular the correct sideband, USB or LSB, should be checked, since the I and Q modulation lines are easily interchanged by mistake. The other station should also check the carrier leakage or transmit mixer unbalance, heard as a 1365Hz tone added to the modulation.

Finally, the shielding of the transceiver should be checked. Waving your hand in front of the antenna usually causes a 1365Hz whistle in the loudspeaker of the receiver. The latter is caused by local oscillator leakage, frequency shifted by the Doppler effect of the moving hand and finally collected by the antenna. While this effect can not be eliminated completely with the suggested mechanical construction, it should be small enough to allow normal use of the transceiver. Of course, the receiver sensitivity and shielding can also be checked with a mains-operated fluorescent

tube as described for the 1296, 2304 and 5760MHz transceivers.

The current drain of the described 10368MHz transceiver should be around 390mA during quiet reception at a nominal supply voltage of 12.6V. The current drain of the transmitter is inversely proportional to the output power and ranges from 550mA (CW or SSB peak power) up to 580mA (SSB no modulation). The current drain could be reduced substantially if a more efficient regulator were used to power the several HEMT stages with an operating voltage of only 2V.

Deutsche Fassung

1. Vor- und Nachteile von 'Zero-IF'-Transceivern

Vergleicht man 'Zero-IF'-Transceiver mit konventionellen SSB-Transceivern nach der Filtermethode ergibt sich als bevorzugtes Anwendungsgebiet die Mikrowellenfrequenzen von 1 .. 6GHz. Daher wurden funktionierende Schaltungen zuerst für die Amateurbänder 1296, 2320 und 5760MHz entwickelt [1].

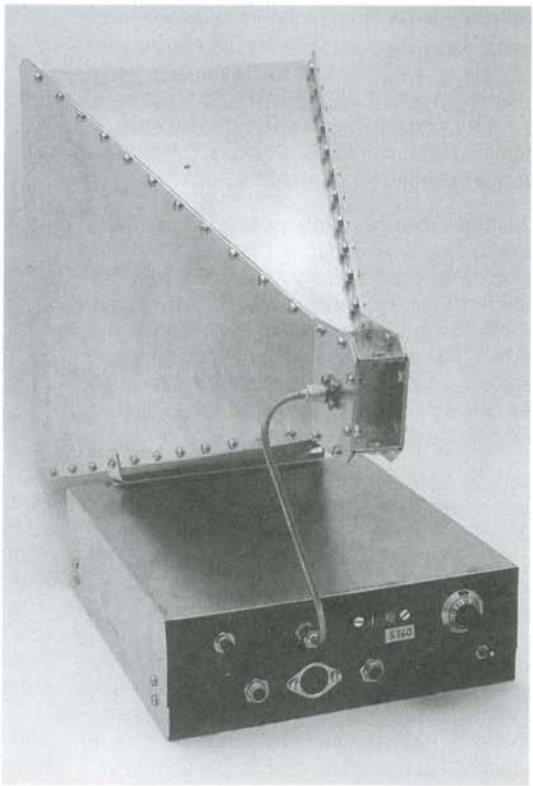
Will man dieses Prinzip auf andere Bänder übertragen, muß man die spezielle Situation auf diesen Bändern betrachten. Z.B. ist für SSB-Transceiver auf 144MHZ und 432MHz ein sehr hoher Dynamikbereich notwendig. Bei der Anwesenheit von Stationen mit hoher Leistung ist sowohl eine sehr niedrige Rauschzahl als auch ein großer intermodulationfreier Bereich erforderlich.

Der Dynamikbereich der harmonischen Mischer, wie sie auf 23cm verwendet werden, ist auf 2m und 70cm nicht ausreichend. Ebenso muß man mit direkter AM Demodulation bei großen Signalen rechnen. Daher ist von einer Verwendung auf 2m und 70cm abzuraten.

Auf höheren Frequenzen kann man noch günstig Komponenten für 10GHz bekommen. Dieses gilt nicht mehr für 24GHz. Weiterhin sind die Anforderungen an die Symmetrie der Mischen, die Phasen-Quadratur und die effektive Abschirmung auf hohen Frequenzen nicht mehr zu realisieren.

Daher wurde in Anlehnung an den 6cm-Transceiver noch ein 10GHz Transceiver entwickelt. Während die verwendeten HEMT's noch gut auf 10GHZ funktionieren, sind die Schottky-Dioden BAT14-099R nur noch bedingt tauglich, da ihr unsymmetrisches SOT-143 Gehäuse die erreichbare Trägerunterdrückung der Mischer reduziert.

Der 10GHz Transceiver enthält auch einen Sende-/Empfangsumschalter mit PIN-Dioden. Das HF-Teil ist auf PTFE-Substrat realisiert, während sich alle übrigen Schaltun-



Portable Staion with Horn Antenna

gen auf FR-4 Leiterplatten befinden. Das ZF- und Audioteil sind mit den bisher verwendeten identisch.

2. VXCO und Vervielfacher

Obwohl das 10GHz Band von 10,0 bis 10,5GHz freigegeben ist, konzentriert sich die Schmalbandaktivität um 10,368GHz.

Man kann daher die bisher beschriebenen Schaltungen benutzten, um ein LO-Signal auf 5184MHz zu erzeugen. Das geschieht durch Verachtfachung einer Frequenz von 648MHz. Da wegen dieser Vervielfachung der erforderliche Hub achtmal kleiner sein kann und die Anforderungen an die Stabilität auf 10GHz sehr viel höher als auf 5760 MHz sind, wurde der VCXO mit einem 27MHz Quarz, der im 3. Oberton betrieben wird, realisiert. Oberton Quarze sind wegen ihrer höheren Güte frequenzstabiler als Grundwellenquarze. Allerdings ist ihr Ziehbereich auch etwa 3x kleiner. Daher ergibt sich schließlich auf der Endfrequenz von 10,368GHz ein Abstimmbereich von 1500...200kHz. Die Mittenfrequenz liegt bei ungefähr 10,3681GHz.

Das Schaltbild des 27MHz VCXO's ist ähnlich dem bisher verwendeten 18MHz VCXO. Es kann daher die gleiche Leiterplatte verwendet werden. Das Schaltbild des VCXO's und des Vervielfachers auf 648MHz ist in Abb. 1 zu sehen. Für den 27MHz Quarz können preiswerte Quarze aus Fernsehgeräten verwendet werden. Dort sind sie in dem Teletext Dekoder enthalten.

Der Oszillator ist mit einem BFX89 bestückt und arbeitet mit einem geringen Pegel am Quarz, um Aufheizeffekte zu reduzieren. Die folgenden Vervielfacher sind auf 54MHz(x2), 162MHz(x3), 342MHz(x2) und 648MHz(x2) abgestimmt.

Da noch der Vervielfacher auf 5184MHz folgt, ist einen Ausgangsleistung von 10dBm auf 684MHz ausreichen. Darum wurden entsprechenden Widerstände im Vervielfacher auf 330Ω, 330Ω und 220Ω erhöht. Die Leiterplatte ist identisch mit der 1296MHz Version. Es gibt nur wenige Änderungen im Bestückungsplan.

Die Schaltung des zusätzlichen Vervielfachers auf 5184MHz ist in Abb. 2 zu sehen. Die Schaltung benutzt vier ATF35376 HEMT's. Der erste ATF wird hart angesteuert, um die 4.te Harmonische zu erzeugen. Das Mikrostreifenleitungsfilter mit L3,4,5,6,7 und L8 siebt die 4.te Harmonische auf 2592MHz aus. Der zweite ATF dient als Linearverstärker, um die dritte Stufe, die als Verdoppler arbeitet anzusteuern. Das Bandfilter mit L15,16,17,18,19 und L20 siebt die Endfrequenz von 5184MHz. Der letzte ATF verstärkt schließlich den Pegel auf ca. 13dBm.

Der Verachtfacher ist auf 0,8mm dickem FR-4 realisiert. Die Abmessungen der Leiterplatte sind 20x120mm (Abb. 3). Den Bestückungsplan zeigt Abb. 4. Die gesamte Schaltung ist abstimmfrei.

3. Quadratur Sendemischer für 10368MHz

Abb. 5 zeigt das Schaltbild des Quadratur Sendemischer für 10368MHz. Das LO-Signal wird über einen 15dB Richtkoppler ausgekoppelt und wird von einem ATF35376 Verstärker wieder auf den erforderlichen Pegel gebracht. Damit werden zwei harmonische Mischer mit der BAT14-099R gespeist. Ein 5GHz Tiefpaß unterdrückt die zweite Harmonische auf 10GHz.

Die Trägerunterdrückung der Mischer ist nur 10...15dB. Der Grund dafür liegt in dem Gehäuse der BAT14-099R. Es ist groß (SOT-143) und unsymmetrisch. Dioden in besseren Gehäuse sind leider sehr teuer und schwer zu bekommen.

Man kann die Symmetrie des Musikers durch eine Gleichspannungseinstellung verbessern. Der Sendemischer enthält zwei 10kΩ Potentiometer. Damit läßt sich die LO-Unterdrückung auf Werte von ca. 30dB bringen.

Die zwei 10GHz Kanäle werden in einem 90° Hybrid zusammengefügt. Er ist als 100Ω Schaltung aufgebaut, um Platz zu sparen. Mit Viertelwellen-Transformatoren wird die Impedanz wieder auf 50Ω transformiert.

Auf den Hybrid folgt ein Bandfilter auf 10368MHz mit L36,37,38,39 und L40. Damit werden das 5184MHz LO-Signal und unerwünschte Mischprodukte entfernt. Nach dem Filter wird das Signal von -15dB mit zwei ATF35376 auf +4dBm verstärkt.

Der Quadratur Sendemischer für 10368MHz ist auf einer 30x120mm großen Leiterplatte aus 0,8mm starkem FR-4 realisiert (Abb. 6). Der Bestückungsplan ist in Abb. 7 zu sehen. Die BAT14-099R müssen richtig eingebaut werden. Ein Quartett wird verkehrt herum (über Kopf) eingebaut.

Mit Ausnahme der Symmetrierung brauchen die Mischer keinen Abgleich.

4. HF-Teil für 10368MHz

In Abb. 8 wird das Schaltbild des HF-Teils gezeigt. Es enthält einen Sendeverstärker, einen Empfangsvorverstärker und die Sende-/Empfangsumschaltung mit den PIN-Dioden. Um Verluste zu reduzieren, ist diese Schaltung auf einem PTFE-Material mit 0,5mm Stärke aufgebaut. Damit wird die Leistung des Senders 1...2dB höher und die Rauschzahl des Empfängers 1..2dB besser als mit einem Substrat aus Epoxy.

Der Sendeverstärker enthält eine Treiberstufe und eine Parallelendstufe mit insgesamt 1+2=3 ATF35376 HEMT's. Der 100Ω Widerstand zwischen L5 und L6 verhindert Gegentakt-Schwingungen.

Die zwei Ausgangs-HEMT's haben dauernd eine positive Vorspannung auf den Gates. Während des Sendens erzeugt die HF-Leistung durch Gleichrichtung an der Gate-Diode eine negative Vorspannung. Die Versorgung auf den Drainanschlüssen enthält einen Widerstand zur Strombegrenzung.

Die Antennenumschaltung benutzt eine einzelne Parallel-PIN-Diode. Diese ist eine BAR-81, die nur die halbe Kapazität wie eine BAR80 hat. Außerdem wird während Empfang eine negative Sperrspannung auf die BAR-81 geführt, um die Empfangsverluste zu minimieren.

Während des Sendens wird die BAR-81 durchgeschaltet und der Kurzschluß am Ende durch L15 in einen Leerlauf am Summenknoten transformiert. Die Isolation zum Empfänger ist besser als 20dB. Das reicht aus, um den HEMT's zu schützen. Während Empfang wirken die zwei HEMT's im Sendeverstärker als Kurzschluß, da sie positive Vorspannung auf dem Gate haben. Dieser Kurzschluß wird durch L7, L8 und die $^3/_4\lambda$-Verbindungsleitungen in einen Leerlauf am Empfängereingang transformiert.

Da im 10GHz Band keine starken Signale zu erwarten sind, kann man den LNA zweistufig mit ausreichender Verstärkung aufbauen. Sie beträgt abzüglich der Verluste der zwei Bandfilter und des Antennenschalters ca. 23dB.

Das HF-Teil ist auf einem 0,5mm dicken PTFE-Glasfiber-Substrat mit den Abmessungen 30x80mm aufgebaut (Abb. 9). Der Bestückungsplan wird in Abb. 10 gezeigt. Das PTFE-Basismaterial unterdrückt nicht wie FR-4 die parasitäre Schwingneigung im Millimeterbereich (>20GHz). Dafür sind die 100Ω Widerstände vom Gate zur Source vorgesehen.

Das HF-Teil benutzt eine Abstimmmöglichkeit, um die Einflüsse des Antennenkabels zu eliminieren. Diese besteht aus einer 2x3mm großen Kupferfolie, die an L13 angebracht wird. Ohne diese Hilfe kann die Ausgangsleistung nur 80mW betragen, mit dagegen über 100mW.

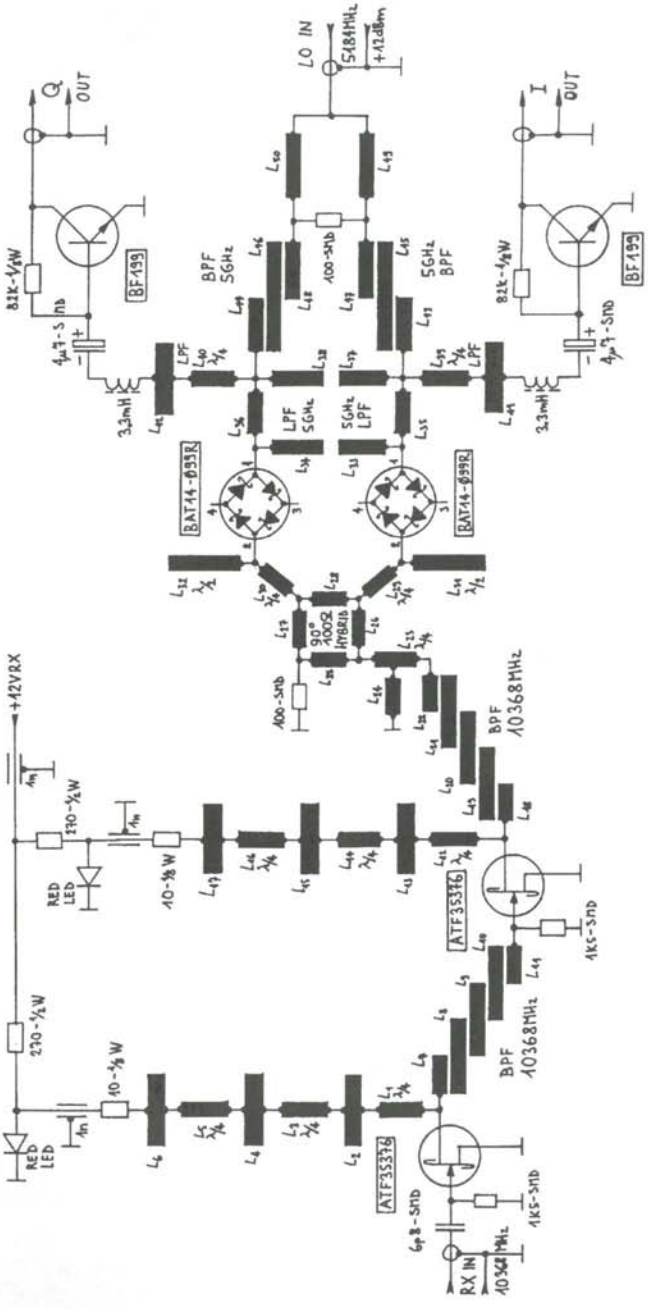
5. Quadratur Empfangsmischer für 10368MHz

Das Schaltbild ist in Abb. 11 zu sehen. Das Modul enthält zwei HF-Verstärker mit ATF35376, zwei Bandfilter auf 10GHz, zwei harmonische Mischer in Quadratur und zwei ZF-Verstärker mit BF199 Transistoren.

Die Mischer sind baugleich mit denen im TX-Modul. Durch einen Wilkinson-Teiler (L49,50) werden beide Mischer phasengleich mit dem LO-Signal gespeist. Ein 100Ω-Hybrid spaltet das HF-Signal in zwei Quadratur-Signale auf.

Auf die Mischer folgen zwei ZF-Verstärker mit BF199 Die 3,3mH Drosseln können durch

Fig. 11: Quadrature receive mixer for 10368MHz



solche mit niedrigen Werten ersetzt werden. Niedrige Werte für die Drosseln verringern auch die Empfindlichkeit gegen magnetische Einstreuungen.

Der Mischer ist auf einem 0,8mm dicken Substrat aus FR-4 Epoxy realisiert. Die Abmessungen betragen 30x120mm. Der Bestückungsplan ist in Abb. 13 zu sehen. Wegen der kurzen Wellenlänge können die Drosseln für die Betriebsspannung als Mehrfach-Tiefpaßfilter realisiert werden. Das erhöht die Übersprechdämpfung und verringert die Einfügedämpfung.

Der Empfangsmischer erfordert keinen Abgleich. Für die BF199 sollten Typen von Philips eingesetzt werden. Diese haben das geringste 1/f-Rauschen.

6. Konstruktionshinweise

Der SSB/CW-Transceiver für 10GHz benutzt die gleichen Module wie die Transceiver auf 1296MHz, 2320MHz und 5760MHz. Die Strombegrenzungswiderstände müssen wie in der 5760MHz Version 82Ω betragen.

Die PIN-Diode BAR-81 braucht den PIN-Treiber-Modul wie in der 5760MHz Version. Die BAR-81 kann auch in dem 6cm Transceiver eingesetzt werden.

Wegen der kleinen Wellenlänge müssen SMD-Bauelemente mit kleinen Abmessungen eingesetzt werden. Kondensatoren mit der Baugröße 0805 (80x50mil=2x1,27mm) oder kleiner sind völlig ausreichend. Der Wert der Kondensatoren ist mit 6,8pF gewählt. Diese Kondensatoren haben eine weiße Keramik. Diese haben Resonanzen oberhalb von 18GHz. Größere Werte benutzten eine andere Keramik mit höherem ε_r und haben eine braune oder purpurne Farbe. Sie haben geringere Resonanzfrequenzen und höhere Verluste.

Der ATF35376 HEMT von HP hat sich gut bewährt. Es gibt allerdings andere HEMT's von anderen Herstellern mit ähnlichen S-Parametern. Die HEMT's werden im Zero-Bias Betrieb genutzt. Deswegen sollte man sie nach dem I_{DSS} selektieren. Werte um 30mA oder darunter sind gut.

Die ZF/Audio Sektion des Transceivers erfordert die Verwendung von Transistoren mit niedrigen 1/f-Rauschen. Hier haben sich die Muster von Philips bewährt.

Die HF-Module des 10GHz Transceivers haben ähnliche Abmessungen wie in der 6cm Version. Die Gehäuse sind aus dünnem Messing gefertigt. Die beiden Mischer-Module und das HF-Teil benötigen 1cm dicken Absorber-Schaumstoff unter den Deckeln.

Das VCXO Modul benötigt keinen Boden. Der Verachtfacher ist dagegen sorgfältig zu schirmen. Alle internen Koaxverbindungen müssen mit UT085 Semirigid ausgeführt werden.

Der komplette Transceiver wird wie bei den anderen Modellen in einem 60x180x180mm großem Gehäuse montiert.

Der Lautsprecher sollte nicht im gleichem Gehäuse angeordnet sein, um Mikrophonie zu vermeiden.

7. Inbetriebnahme

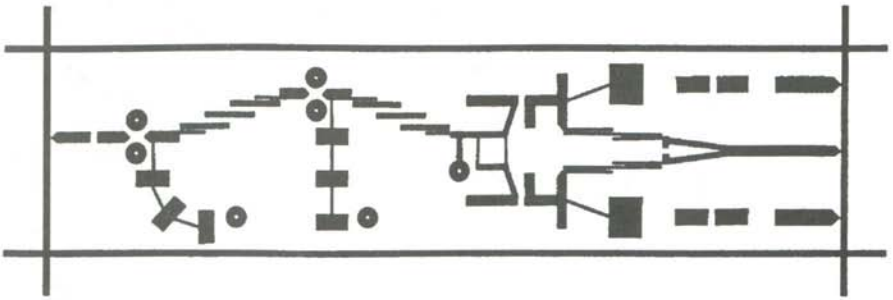
Zuerst wird das 684MHz Modul abgeglichen. dazu wird der Frequenzbereich des VCXO's abgestimmt und die nachfolgenden Kreise auf maximalen Output auf 684MHz. Der Verachtfacher benötigt keinen Abgleich. Der Ausgangspegel sollte allerdings überprüft werden (+13dBm).

Der Empfänger muß sofort funktionieren, da er abgleichfrei ist. Entfernt die Betriebsspannung der LNA's, muß das Rauschen kleiner werden. Wird der ZF-Verstärker ausgeschaltet, darf kein Rauschen mehr hörbar sein.

Dann wird der Empfänger mit einer Antenne verbunden. Ein schwacher Träger dient zum Abgleich. Meistens hört man zwei Träger, die sich gegenläufig abstimmen. Mit den zwei Potentiometern im ZF-Verstärker wird der Spiegelempfang genullt.

Die Ausgangsleistung des Senders muß erreicht werden, wenn der Trimmer im Modulator zu 1/3 aufgedreht wird. Die Gleichspannung an den PA-Transistoren muß die volle Höhe erreichen.

Fig. 13: 10368MHz RX mixer PCB (0.8mm double-sided FR4)



Nach Umschalten auf SSB werden die beiden 10kΩ Trimmer im Sendemischer auf minimale Ausgangsleistung getrimmt, wenn keine Modulation anliegt. Leider verstimmt sich dieser Abgleich mit veränderlicher Temperatur und LO-Leistung.

Die Modulation kann mit einer anderen 10GHz Station überprüft werden. Damit kann man die korrekte Seitenbandlage und die LO-Unterdrückung überprüft werden. Mangelnde Mischersymmetrie macht sich bei der anderen Station als 1365Hz Pfeifton bemerkbar.

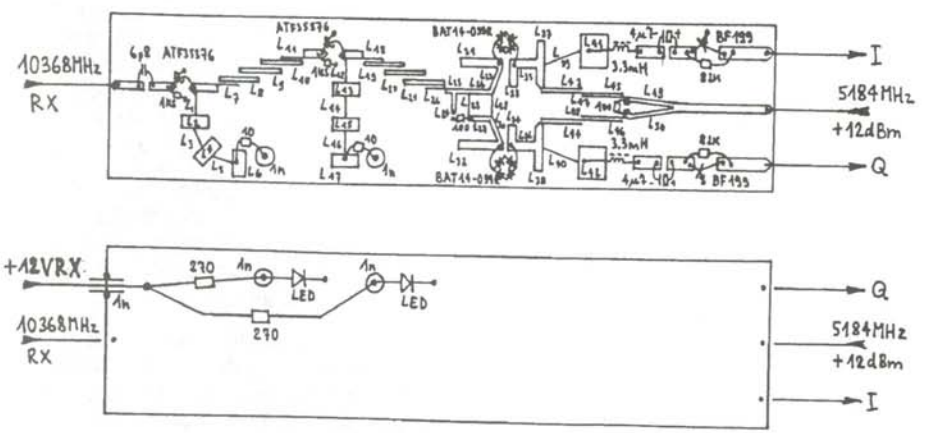
Zuletzt überprüft man die Effektivität der Abschirmung. Wedelt man mit der Hand vor der Antenne, kann man einen 1365Hz Pfeifton hören. Das wird durch LO-Einstrahlung in die Antenne und Reflexion an der Hand bewirkt. Dieser Effekt ist grundsätzlich mit diesem Prinzip verbunden und läßt sich bei dem einfachen mechanischen Aufbau nicht eliminieren.

Der Stromverbrauch des Transceivers liegt bei 390mA/12,6V bei Empfang. Bei Senden sind Werte von 550 bis 580 mA zu erwarten.

References

[1] Matjaz Vidmar, S53MV, 'No-Tune SSB Transceiver for 1.3, 2.3, 5.7 and 10GHz', DUBUS 3/97,4/97,1/98

Fig. 12: 10368MHz RX mixer component location



24GHz Transverter MKIII

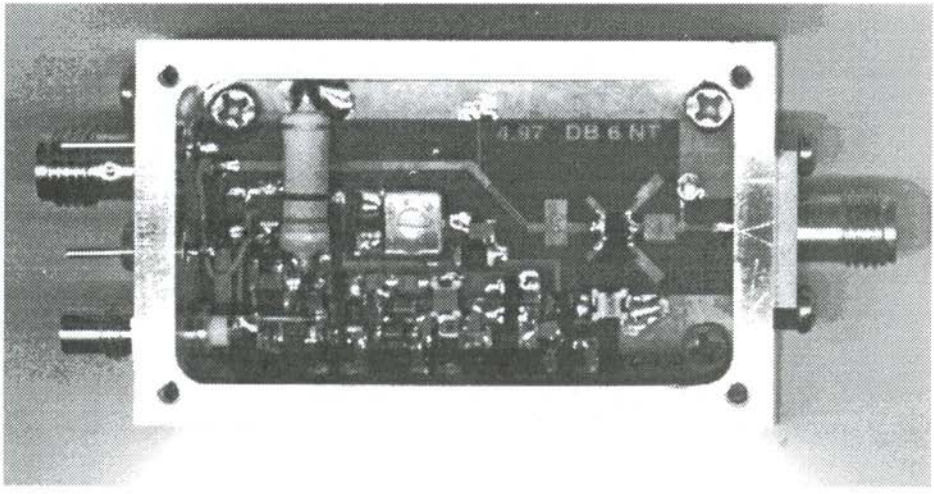
Michael Kuhne, DB6NT

Kurzbeschreibung: Der hier vorgestellte Transverter ist eine Weiterentwicklung der 1993 veröffentlichten Schaltung MK2. Ohne Abgleich ist eine Rauschzahl von <8dB DSB und eine SSB Leistung von >0,3mW zu erwarten. Die Schaltung ist voll in SMD- Technik ausgeführt und wird in ein Aluminiumfräsgehäuse eingebaut. Die mechanischen Abmessungen betragen nur 30 x 60 x 17mm. Je nach verwendeter Leiterplatte ist der 24GHz-Ausgang als R220 Hohlleiter oder Koaxial als SMA- Buchse ausgeführt.

Abstract: This transverter is an improvement of the circuit design MKII, which was published in [2]. Without tuning you can expect a DSB-Noise Figure of less than 8dB and an output power of 0.3mW. This is a SMD-Design. The box is machined from aluminium and has the dimension 30x60x17mm. You can choose between alternatives of SMA or waveguide input.

1. Schaltung

Der Transverter besteht aus einem Subharmonischen Mischer der mit 12 GHz Oszillator- frequenz angesteuert wird. Er setzt ein 144MHz TX- Signal linear auf 24192MHz um, sowie ein RX- Signal auf 144MHz zurück. Die



24GHz Transverter: Coax Version Top View

Fig. 1: Transverter Waveguide Version Circuit Diagram

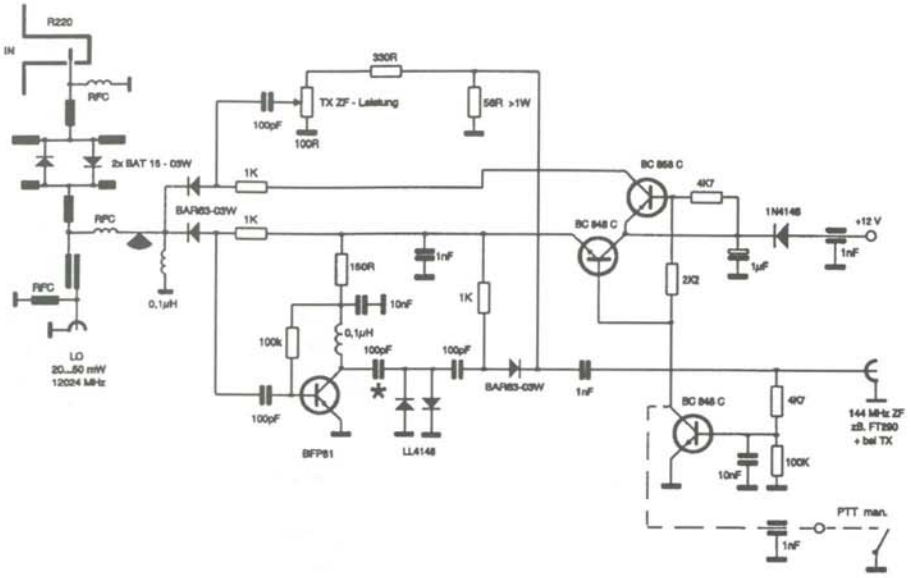


Fig. 2: Transverter Waveguide Version Parts Layout

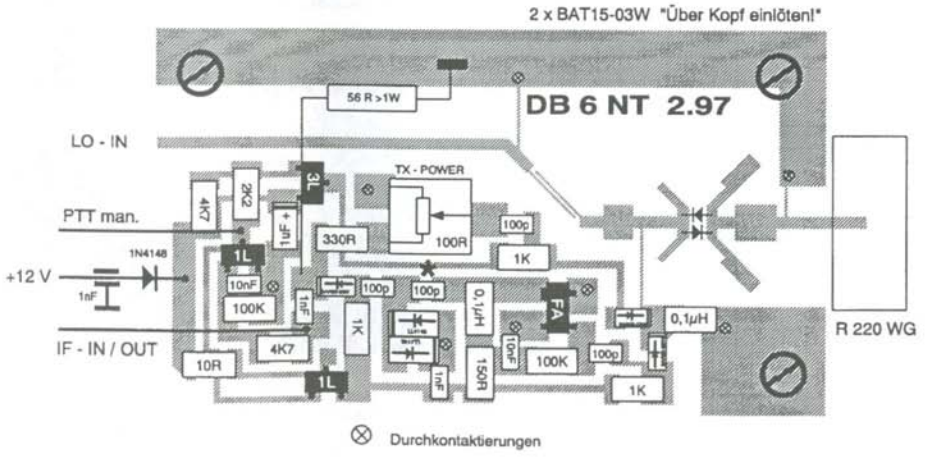


Fig. 3: Transverter Coax Version Circuit Diagram

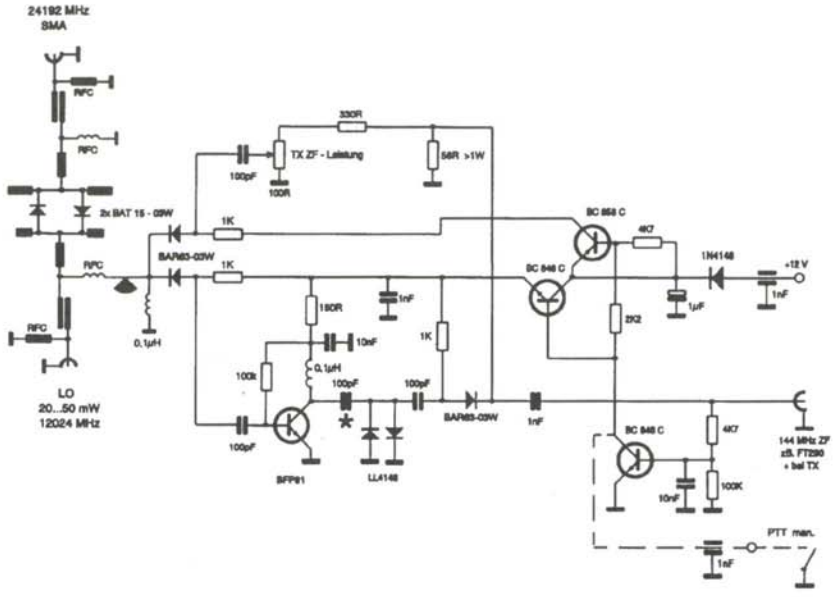


Fig. 4: Transverter Coax Version Parts Layout

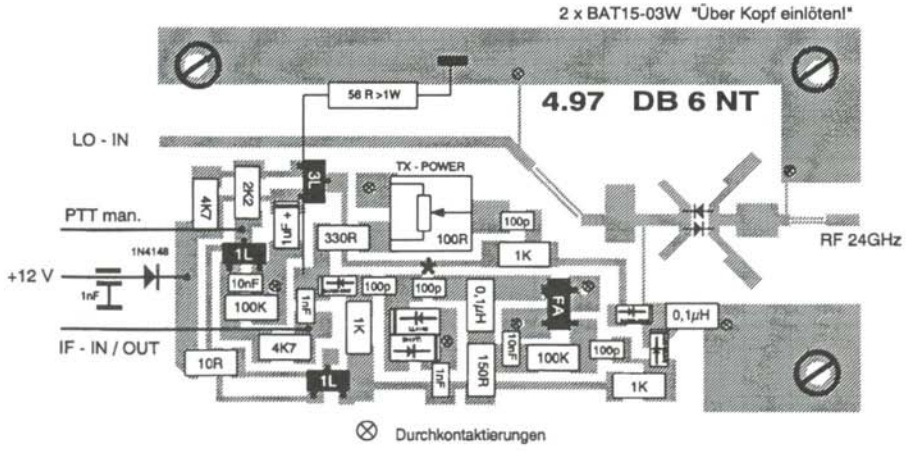
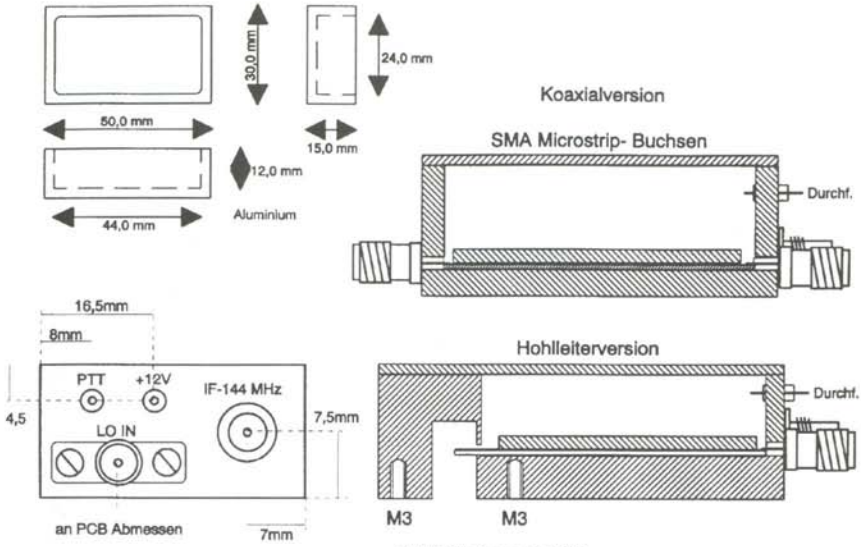


Fig. 5: Transverter Mechanical Details



Schaltung umfasst ferner einen ZF- Verstärker und ein Dämfungsglied für die ZF / TX-Steuerleistung. Die Sende- Emfangsumschaltung erfolgt über 3 PIN Dioden. Der Transverter kann direkt an einem 144MHz Transceiver mit ca. 2Watt Sendeleistung betrieben werden. Durch Veränderung des TX-Dämpfungsgliedes lassen sich auch kleinere Steuerleistungen verwenden. Die RX / TX - Umschaltung erfolgt durch Anlegen einer Gleichspannung +5...12V über das ZF- Steuerkabel vom 2m Transceiver oder durch an Masse schalten des herausgeführten PTT Anschlusses.

1. Circuit

The heart of the transverter is a subharmonic mixer, which is driven by a 12GHz LO source. The mixer is used both for receive and transmit. In transmit the input is attenuated to accommodate the usual class of 2m-Transceiver. The typical input power is 2W from an IC-202 or FT-290. The transverter senses a 5...12V DC-voltage on the 144MHz line to perform the T/R-switching. Also an external PTT facility is provided. In receive there is preamp on 144MHz. Three PIN-Diodes allow for T/R-Switching.

2. Aufbau

1. Durchkontaktieren der Massepunkte und Einpassen der Leiterplatte in das Fräsgehäuse

2. Bohren der 3x 2,2mm Löcher zur Befestigung der Leiterplatte mit M2 Schrauben im Gehäuse

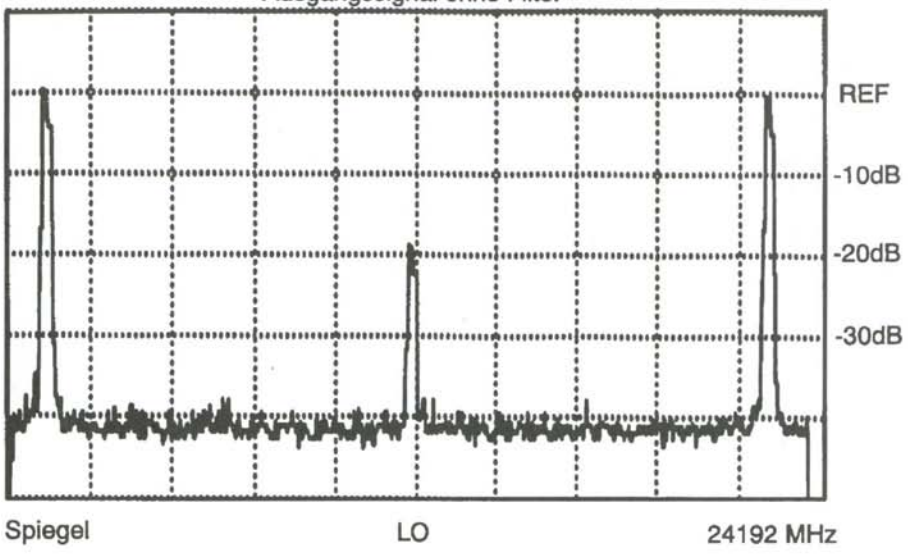
3. Bestücken der Leiterplatte mit allen SMD Bauteilen. Die Schottkydioden BAT 15-03W werden 'Überkopf' und mit nach unten gebogenen und gekürzten Anschlußbeinchen eingelötet.

Die Montage der Dioden sollte plan auf der Leiterplatte erfolgen.

Ein sorgfältiger Einbau der Dioden ist Voraussetzung für die gute Funktion des Mischers

Fig. 6: Transverter Output Spectrum w/o Filter

Ausgangssignal ohne Filter



4. Einkleben der Leiterplatte mit Silberleitkleber, um gute Kontaktgabe an den Koaxial-Hohlleiterübergängen zu gewährleisten. Aushärten!

5. Einbau der Koaxbuchsen und Durchführungkondensatoren sowie die Montage des 56 OHM Lastwiderstandes.

2. Construction

1. Make contact throughs with hollow copper rivets (0.8mm dia.). Trim the PCB to fit into the box.

2. Drill the three holes with 2.2mm diameter to fasten the PCB into the box with M2 screws

3. Mount all SMD parts

Mount the BAT15-03W with bottom and top rversed to achieve the minimum length of leads. Try to align the diodes properly to fit on the board before soldering. The quality of the diode mount is a prerequisite for proper function of the mixer.

4. Use silver epoxy cement to glue the PCB into the box.

5. Finally mount the SMA-connectors and the 56Ω power resistor.

3. Abgleich

1. Nach dem Anlegen der Betriebsspannung sollte ein deutlicher Rauschanstieg bemerkt werden (SSB-CW).

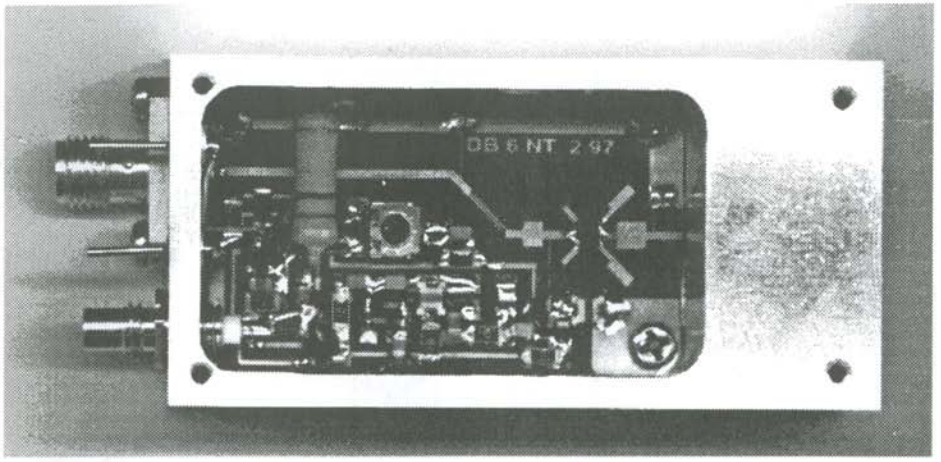
2. Anschluß der 12GHz Oszillatorbaugruppe mit 20...50mW HF- Leistung

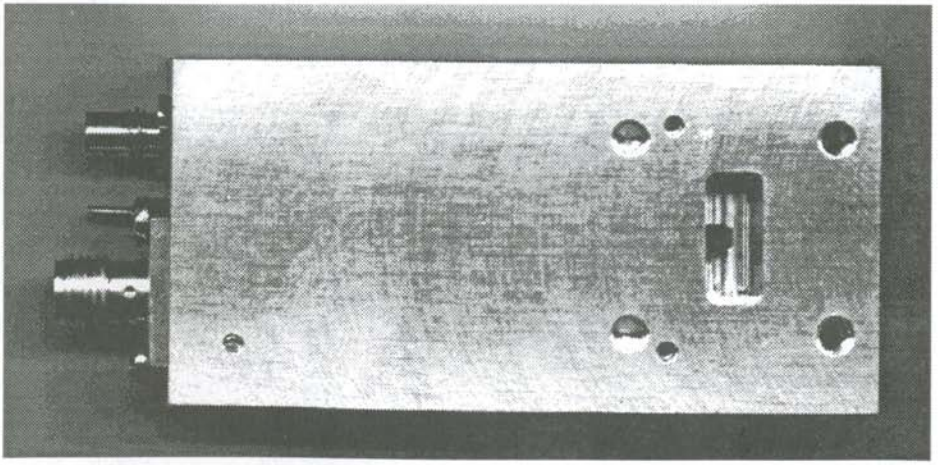
Danach wird ein weiterer kleiner Rauschanstieg beobachtet.

3. Anschluß eines 24GHz Powermeters und Einstellen des TX Gain Reglers auf maximale Ausgangsleistung -1dB.

Will man dem Transverter einen Vorverstärker hinzufügen, empfiehlt sich der Einsatz eines Hohlleiterfilters zur Unterdrückung der Spiegelfrequenz. Um die erhöhte Verstärkung zu reduzieren, kann man an der im Schaltplan mit * bezeichneten Stelle den Koppelkondensator von 100pF gegen einen Wert von ca. 5pF austauschen.

24GHz Transverter: Waveguide Version Top View





24GHz Transverter: Waveguide Version Bottom View

Die Meßwerte für drei Prototypen waren wie folgt:

Table 1: Measurements		
Feature	**Value**	**Unit**
DSB-Output	1,3	mW
SSB-Output	0,5	mW
DSB Noise Figure	8	dB
RX Gain	15	dB

3. Alignment

1. Apply supply voltage of 12V. Notice a marked increase of noise level.

2. Apply LO-signal on 12GHz with a power of 20...50mW. A further increase of noise level should be noticed.

3. Connect a power meter on 24GHz and adjust the TX-Gain pot for an output power of -1dBm.

If a preamp seems to be worthwhile to fit, a waveguide filter should be fitted to suppress the image frequency. The higher gain makes a reduction of gain in the IF-chain necessary. For this reason the coupling capacitor of 100pf at the output of the BFP81 has to changed to a value of 4.7pF or to 10pF trimmer.

Typical measurements for three prototypes are shown in table 1.

4. Literatur/References

[1] M.Kuhne, '12GHz LO' DUBUS Heft 2/1996 Seite 5

[2] M.Kuhne, 'Simple Transverter for 24GHz' DUBUS Buch IV Seite 340

[3] M.Kuhne, '24GHz Super Low Noise HEMT Amplifier' DUBUS Heft 3/1996

[4] E.Zimmermann HB9MIN, '24GHz Leistungsverstärker' DUBUS Heft 2/1994

[5] M.Kuhne, '24GHz-GaAs-FET-Verstärker für 24GHz' UKW Berichte 2/1994

5. Bezugsquellen/Parts

Gefräste Alugehäuse sind bei Hubert Krause DG 1 KBF, Berghagen 60, D-53773 Hennef Tel/Fax: 02248/4895 erhältlich.

Leiterplatten, Kits oder fertige Baugruppen beim Verfasser Michael Kuhne, Birkenweg 15, D-95119 Naila/Hölle, Tel: (+49)-9288/8232, FAX: (+49)-9288/1768
Email: kuhne.db6nt@hof.baynet.de
http://web.aurecvideo.fr/infracom/db6nt.html

Milled aluminium boxes you can get at DG1KBF.

PCBs, kits and ready made units are available from the author.

High-order Frequency Multipliers using MMIC Devices

Paul Wade, N1BWT

Abstract: Frequency multiplier performance of the new ERA series MMIC devices is empirically tested, particularly as higher-order multipliers. The data is used to design a local oscillator for a 5760 MHz transverter.

Kurzbeschreibung: Man kann MMIC's zum Vervielfachen benutzen. Die Eigenschaften werden am Beispiel eines 5,6GHz LO beschrieben und diskutiert.

1. Discussion

Frequency multipliers are one of the most difficult parts of microwave design. As the frequency is multiplied by a factor of perhaps 50 or 100 from a low frequency crystal source to the desired microwave local oscillator frequency, several stages of multiplication may be needed, along with filtering at the several intermediate frequencies. Good designs should be reproducible, but component and

Fig. 1: Output behaviour of ERA-3 Frequency Multiplier

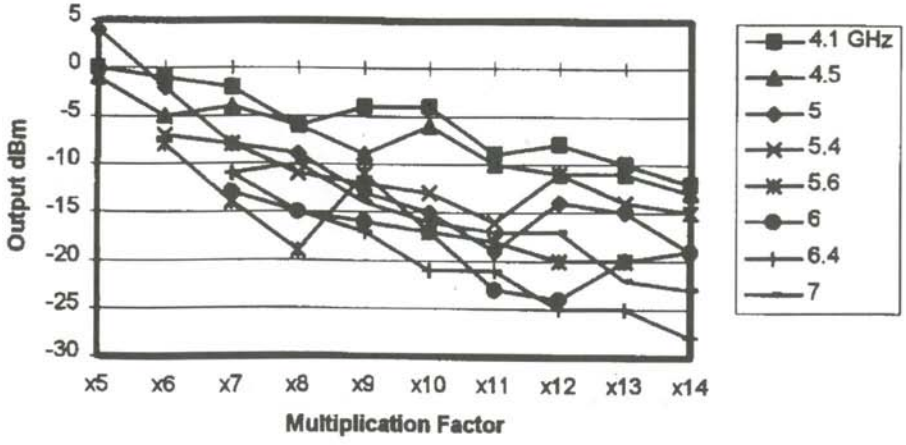
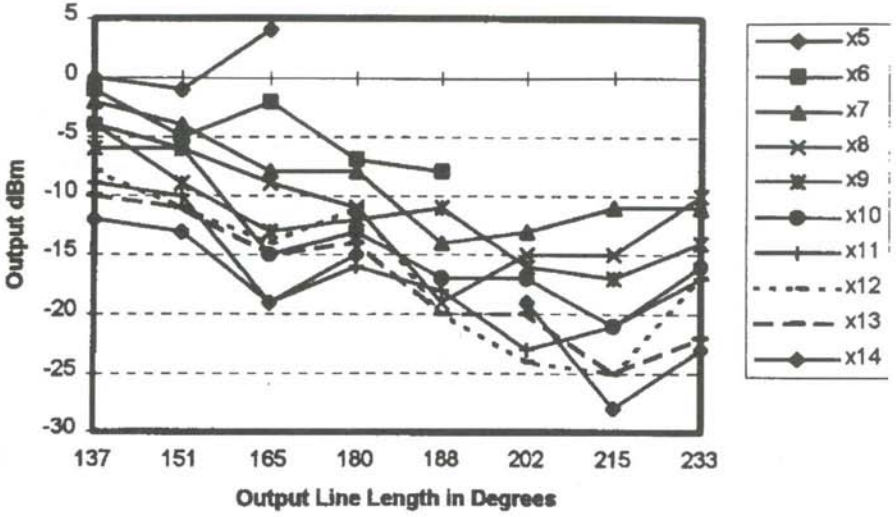


Fig. 2: Dependency on Output LIne



temperature variations and interacting alignment can produce variations in power level at each stage which cascade into large differences from unit to unit.

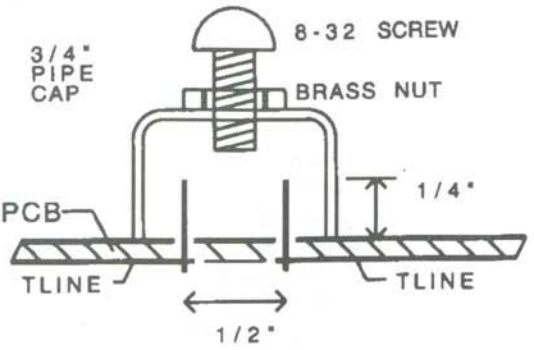
The availability of inexpensive MMIC devices for the lower microwave frequencies has made the frequency multiplier problem easier. Instead of a series of frequency doublers or triplers, a diode may be used as a higher-order frequency multiplier, followed by filtering and MMIC amplifiers to restore the power level. Even though the diode multiplier is inefficient, the untuned MMIC amplifiers provide compact and predictable gain so that the combination is simple and repeatable. The "no-tune" transverters which are popular in the USA use this approach.

Recently I developed an LO multiplier for a single-board transverter for 5760 MHz. The obvious choice for the oscillator source is the KK7B local oscillator board 1 used in lower frequency "no-tune" transverters. These boards are readily available in the USA and work so well that no alternative was seriously considered. The printed filters on these boards fix their output to between 540 and 580 MHz, so a multiplication factor of ten to 5616 MHz is needed for an LO for 5760 MHz.

A multiplication by ten has few integral factors. The combination of x5 and x2 not only requires intermediate filtering, but also needs one multiplier with a fairly high multiplication factor. Since a higher-order multipliers is required anyway, why not just go directly to a x10 multiplier and add an additional amplifier stage to compensate for lower efficiency? Linear amplifiers can be relied on to operate at varying drive levels; if the output stage is operated in compression, then the output variation will be reduced. The only drawback is that better filtering is required, but pipe-cap filters [2] can provide good selectivity with low loss[1].

1 Pipe-Cap filters were described in by DK2AB in DUBUS 1/1986, p.2, for the first time. Later in *this year DC0DA, DJ6JJ and DJ6EP used them for various microwave transverter projects, for example a LO in SMD-technique (DUBUS 1/1987, pp.1-4). WA5VJB gave word of this development to the scene in the U.S. ((3)).*

Fig. 3: Pipe Cap Filter



1. Diskussion

Die Auslegung von Frequenzvervierfacher ist eine der schwierigsten Aufgaben in der Entwicklung von Mikrowellenschaltungen. Der Grad der Vervielfachung von einer stabilen, mit einem Quarz bestückten Quelle kann einen Faktor von 50 bis 100 betragen. Dazu sind eine Menge von Stufen und Filtern notwendig. Gute Schaltungen müssen unter wechselnden Umgebungsbedingungen wie Änderungen der Temperatur reproduzierbar sein.

Durch den Einsatz von MMIC's kann man Vervielfacher mit hohen Faktoren bis zu 10 bauen. Anstatt von vielen Stufen, die nur verdoppeln oder verdreifachen, baut man wenige Stufen mit guten Filtern und den gleichen MMIC's als Linearverstärker, um den Pegel wiederherzustellen.

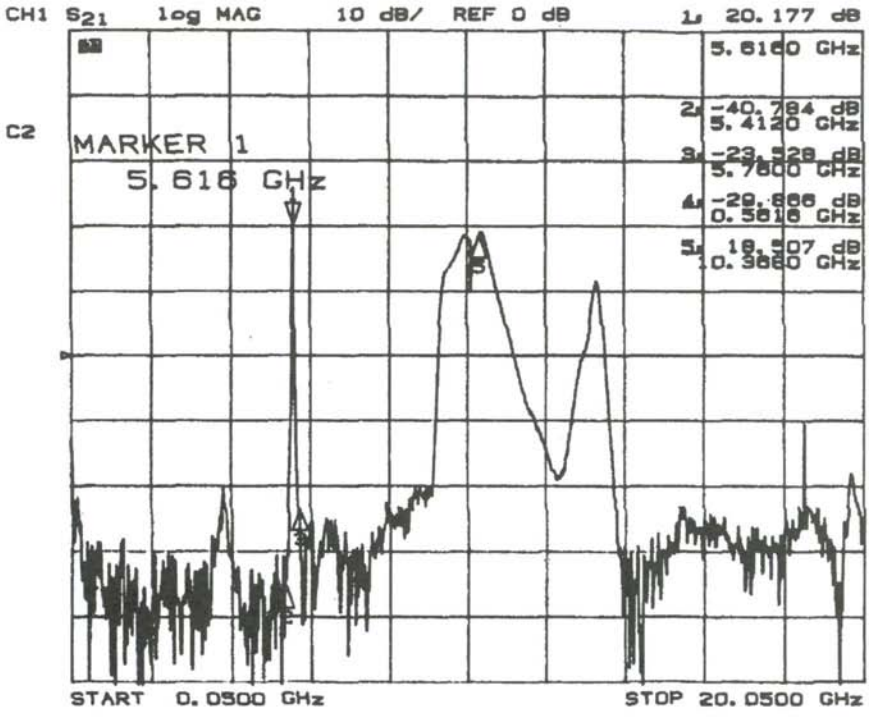
Neulich entwickelte ich einen LO für einen 5760MHz Transverter. Ein populäre Wahl für den Oszillator ist hier in den USA das LO-Board von KK7B, das eine Ausgangsfrequenz von 540MHz bis 580MHz hat und mit fest abgestimmten Filtern arbeitet. Man braucht als einen Multiplikation von 10, um die Endfrequenz des LO's zu erreichen. Dieser Faktor ist nur durch 2 und 5 teilbar. Die Auswahl der Vervielfacher ist damit begrenzt. Die Vervielfachung mit dem Faktor 5 ist schon ziemlich hoch, so daß man gute Filter im Ausgang braucht. Das ist mit zylindrischen Resonatoren [2] nicht schwer. Man kann dann auch direkt mit dem Faktor 10 vervielfachen, filtern und mit dem gleichen MMIC linear verstärken.

2. MMIC Multiplier

The new ERA series of MMIC devices from Minicircuits 3 offer usable gain up to 10 GHz at low cost, so they were obvious choices for the amplifier stages. However, an article by N7UGH ([4]) which described using the ERA-3 as a frequency multiplier for 10 GHz showed additional possibilities. Using an X-Acto knife, I made a breadboard of an ERA-3 followed by a pipe-cap filter on a scrap of Teflon PC board to test the multiplier performance. A 3/4 inch pipe-cap filter can be tuned roughly from 4 to 7 GHz, so I tuned it to several different frequencies and varied the input frequency and power with a signal generator to try various multiplication factors, from X4 to X15. The results, plotted in Figure 1, show pretty good multiplier performance. As one would expect, the output generally decreases with increasing frequency and multiplication factor, but the curves have too many ups and downs to be able to predict performance.

While I was trying to understand the data in Figure 1, Steve, N2CEI, suggested that an article [5] on MMIC frequency multipliers by WA8NLC might offer some insight. The article referred me to Hewlett-Packard application note AN-983 [6], which described how diode frequency multiplier performance is affected by the phase shift of the transmission line length between the diode and filter. Since WA8LNC showed that the same phenomenon applies to MMIC frequency multipliers, I calculated electrical line lengths for my breadboard and re-plotted the data as shown in Figure 2. Now we can see that some multiplication factors are more affected by line length than others, and we can design to optimize

Fig. 4: Output Spectrum of MMIC Multiplier



for the desired multiplication factor. Figure 2 also shows the X10 multiplication used in this transverter to be relatively insensitive to line length; the output power change with output line length can be attributed to increasing multiplication factors. Some other multiplication factors do display more sensitivity to output line length, so this data may be useful in optimizing for other applications.

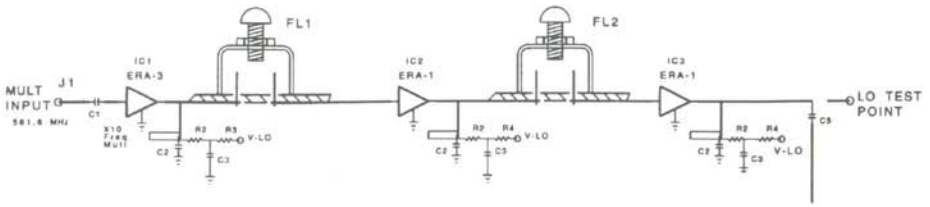
2. Vervielfacher mit MMIC's

Die neuen ERA MMIC's von Minicircuits funktionieren wegen ihrer HBT-Transistoren gut bis ca. 10GHz. Ein Artikel von N7UGH ([4]}) beschrieb einen Vervielfacher für 10GHz mit einem MMIC. Ich baute mir eine Testplatine mit einem Resonatorfilter, was ich von 4...7GHz abstimmen konnte. Die Ergebnisse in Abb. 1 zeigen gute Ergebnisse mit einem ERA-3 bis zu Faktoren von 10 und Ausgangsfrequenzen bis 7GHz.

Während ich noch versuchte, die Ergebnisse zu verstehen, erzählte mir Steve, N2CEI von einem Artikel von WA8NLC ([5]) über MMIC-Vervielfacher. Dieser führte mich dann auf die HP AN-983 Anwendungsschrift über Step-Recovery Vervielfacher. Hier wurde beschrieben, wie man durch variable Leitungslängen zwischen Filter und Diode die Leistung optimieren konnte.

Das versuchte ich nun in meiner Testschaltung. Die Ergebnisse sind in Abb. 2 zu sehen. Je nach Multiplikationsfaktor wirkt sich die Ausgangslänge der Leitung bis zum Filter

Fig. 5: LO-Multiplier from 516MHz to 5160MHz



verschieden aus. Für einen Faktor von 10 hat die Leitungslänge relativ wenig Einfluß.

3. Filters

Printed circuit filters are not suitable at 5760 MHz and above for two reasons: dimensions become very critical at bandwidths less than 10%, and radiation from them is high at higher frequencies where the board thickness is a significant fraction of a wavelength. In a recent 3456 MHz design ([7]) KH6CP (now W1VT) used thinner Teflon PC material to reduce radiation from the filters; however, this requires that dimensional tolerance also be reduced proportionally, to the point where printed patterns would not be reproducible. If high-Q structures like printed filters are eliminated from the board, then the thicker dielectric material is usable.

The pipe-cap filters ([2]) are made with readily available inch copper plumbing fixtures and offer good performance but require tuning. A sketch of a pipe-cap filter is shown in Figure 3. My previous experience ([8]) showed that a single pipe-cap filter did not provide adequate LO rejection at 5760 MHz, so multiple filters were required. I was uncertain whether it would be possible to tune up multiple filters without sophisticated test equipment, so I tested the tuning on the multiplier breadboard. I found that the tuning screw varied the frequency by 300 to 400 MHz per revolution, or about 1 MHz per degree of rotation. Also, the frequency could be set repeatably by measuring the height of the tuning screw, so it is possible to preset the tuning screws close to the desired frequency, or to easily retune the transverter from 5760 MHz to 5668 MHz for Phase 3D. The difference in tuning should only be about a quarter-turn, but the filters are sharp enough that retuning is required. Finally, since the filters are separated by amplifier stages, it is possible to tune them one at a time with minimum interaction.

The LO chain for 5760 MHz has an ERA-3 MMIC as a x10 multiplier followed by two ERA-1 MMIC amplifiers, with a pipe-cap filters before each amplifier stage. With an input of +6 to +10 dBm at 561.6 MHz, the output is +5 to +10 dBm at 5616 MHz, perfect for a mixer or dual mixers. The LO output has all products at least 60 dB down except the third harmonic at 1684.8 MHz, which is only 50 dB down.To measure the selectivity, the LO chain was operated as a three-stage amplifier, with the result shown in Figure 4. For a 144 MHz IF, the two filters provide more than 40 dB of LO rejection and at least 50 dB of image rejection. A good balanced mixer can significantly improve the LO rejection so that no additional filtering is needed in many systems. As an LO filter, with products spaced 561.6 MHz, there is even better rejection.

3. Filter

Bei der Frequenz von 5760MHz wurden die üblichen Streifenleitungsfilter nicht eingesetzt. Einmal steigen ihre Verluste bei Bandbreiten unter 10% stark an und zum zweiten gibt es Abstrahlverluste bei Substratdicken von 0,5 oder 0,8mm. Benutzt man wie W1VT ([7]) dünne Substrate (0,125mm), muß man die Toleranz der geometrischen Abmessun-

gen unter Kontrolle haben. Das ist für Amateurlayouts nicht einfach.

Die bekannten zylindrischen Resonatorfilter ([2]) kann man aus Kupferrrohr einfach anfertigen (Abb. 3). Meine ersten Erfahrungen ([8]) zeigten, daß ein Filter auf 5760MHz nicht ausreicht, um einen brauchbare Unterdrückung des LO-Signals zu erreichen. Daher setzte ich zwei Filter ein, war aber nicht sicher, ob ich sie einfach würde abstimmen können.

Messungen an meiner Testschaltung zeigten, daß die Abstimmsteilheit ca. 300...400MHz pro Umdrehung der Abstimmschraube beträgt. Daher kann man die Grobfrequenz einfach durch Bestimmung der Abstimmschraubenhöhe einstellen. Da noch ein Verstärker zwischen den Filtern war, konnte ich sie ohne große Wechselwirkung sauber abstimmen.

Die Vervielfacherkette für 5760MHz benutzt einen ERA-3 als Vervielfacher mit dem Faktor 10 und zwei weitere ERA-3, durch Filter getrennt, um den Pegel wieder zu restaurieren. Mit einer Steuerleistung auf 561,6MHz von 6...10dBm erhält man am Ausgang auf 5616MHz eine Leistung von 5...10dBm. Alle Nebenwellen mit Ausnahme der 1684,4MHz sind mehr als 60dB unterdrückt. Die Messung der Selektivität des Vervielfachers zeigt Abb. 4.

Benutzt man diese Filter im HF-Zweig ist bei einer ZF von 144Mhz die LO-Unterdrückung bereits 40dB und die Spiegelunterdrückung beträgt 50dB. Als LO-Filter bei einer um 516,6MHz versetzten Nebenwelle ist natürlich die Unterdrückung noch höher.

4. Conclusion

The new ERA series of MMIC devices offer good performance when used as high-order frequency multipliers into the microwave range. This performance is demonstrated in an LO for 5760 MHz. The experimental data presented should be useful for other designs.

4. Schluß

Mit den ERA MMIC's kann man Vervielfacher bis in den höheren Mikrowellenbereich bauen. Am Beispiel eine LO für 5616,6 MHz wurden die Eigenschaften gezeigt.

References

[1] R. Campbell, KK7B, "A Clean, Low-Cost Microwave Oscillator, QST, July 1989, p. 15. Also appears in ARRL UHF/Microwave Project Book, ARRL, 1992, pp. 5-1 to 5-9. K.

[2] Britain,WA5VJB, "Cheap Microwave Filters," Proceedings of Microwave Update '88, ARRL, 1988, pp. 159-163. Also appears in ARRL UHF/Microwave Project Book, ARRL, 1992, pp. 6-6 to 6-7.

[3] Mini-Circuits, P.O. Box 350166, Brooklyn, NY 11235-0003, 718-934-4500.

[4] D. Nelson, N7UGH, "MMIC Multiplier for 10.8 GHz Local Oscillator," Feedpoint (North Texas Microwave Society), March/April 1996.

[5] J. Davey, WA8NLC, "Frequency Multipliers Using Silicon MMICs," ARRL UHF/Microwave Project Book, ARRL, 1992, pp. 5-13 to 5-15.

[6] HP, "Comb Generator Simplifies Multiplier Design," Application Note 983, Hewlett-Packard.

[7] Z. Lau, KH6CP/1 (now W1VT), "3456 MHz Transverter," QEX, September 1996, pp.14-20

[8] P.C. Wade, N1BWT, "A Dual Mixer for 5760 MHz with Filter and Amplifier," QEX, August 1995, pp. 9-13.

Microwave Parts

Editor: Rainer Bertelsmeier, DJ9BV

Siemens PIN-Diodes

Overview

Type	Package	r_f (typ.) I_F = 10 µA f = 100 MHz	r_f (typ.) I_F = 10 mA f = 100 MHz	C_T (typ.) V_R = 0 V f = 100 MHz	τ_L (typ.) I_F = 10 mA I_R = 6 / 3 mA
BAR 14-1 BAR 15-1 BAR 16-1	SOT-23 SOT-23 SOT-23	2.5 kOhm	8 Ohm	0.2 pF	1 µs
BAR 60 BAR 61	SOT-143 SOT-143	2.5 kOhm	7 Ohm	0.2 pF	1 µs
BA 597	SOD-323	2.3 kOhm	4.5 Ohm	0.32 pF	2.3 µs
BA 595 BA 885	SOD-323 SOT-23	1.5 kOhm	4.5 Ohm	0.23 pF	1.6 µs
BAR 17	SOT-23	1 kOhm	3.5 Ohm	0.37 pF	3.3 µs
BAR 64 BAR 64-04/05/06 BAR 64-04/05/06W BAR 64-07 BAR 64-03W BAR 64-02W	SOT-23 SOT-23 SOT-323 SOT-143 SOD-323 SCD-80	600 Ohm	2 Ohm	0.3 pF	1.4 µs
BAR 66	SOT-23	85 Ohm	1 Ohm	0.35pF	700 ns
BAR 63 BAR 63-04/05/06 BAR 63-04/05/06W BAR 63-03W BAR 63-02W	SOT-23 SOT-23 SOT-323 SOD-323 SCD-80	70 Ohm	1 Ohm	0.3 pF	100 ns
BAR 65-03W BAR 65-02W BAR 65-07 BAR 81 BAR 81W	SOD-323 SCD-80 SOT-143 MW-4 SOT-343	6 Ohm	0.56 Ohm	0.6 pF	80 ns
BA 592 BA 892 BAT 18 BAR 80 BAR 80W	SOD-323 SCD-80 SOT-23 MW-4 SOT-343	10 Ohm	0.4 Ohm	1.2 pF	120 ns

Shunt type PIN-Diode BAR-81

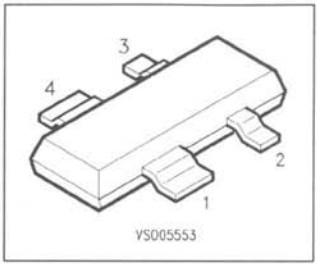
SIEMENS

BAR 81

Silicon RF Switching Diode

Preliminary data

- Design for use in shunt configuration
- High shunt signal isolation
- Low shunt insertion loss



Type	Marking	Ordering Code	Pin Configuration				Package
BAR 81	BBs	Q62702-A1145	1 = C	2 = A	3 = C	4 = A	MW-4

Maximum Ratings

Parameter	Symbol	Values	Unit
Diode reverse voltage	V_R	30	V
Forward current	I_F	100	mA
Operating temperature range	T_{op}	- 55 ... + 125	°C
Storage temperature	T_{stg}	- 55 ... + 150	

The shunt type diodes BAR-80 and BAR-81 are especially suited for T/R-switches in shunt/series configuration.

Application Notes

The following apllication notes describe porofessional applications of PIN-Diodes, which are of interest to amateurs also.

AN007: DECT (1.9GHz) Transmit-Receive PIN-Diode Switch

AN013: 800-1000MHz PIN-Diode Transmit-Receive Switch

AN014: Application Considerations for the Integrated Bias Control BCR400R and BCR400W

AN025: 1400-1600MHz PIN-Diode Transmit-Receive Switch

AN033: GSM + PCN Dual-Band Transmit-Receive Switch

XXIX, No.2: Antenna Switches with PIN-Diodes for Digital Mobile Communications

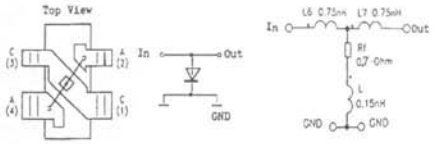
The application notes ANxxx are on the CD "Discrete&RF Semiconductors and Applications Notes". The Note XXXIX, No.2 is on CD "Applications Notes and User manuals for Siemens Semiconductors", Ordering Number B193-H6900-x1-x-7400.

Electrical Characteristics at T_A=25°C, unless otherwise specified

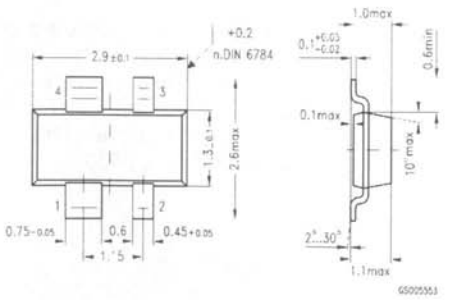
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Reverse current	I_R				nA
V_R = 20 V, T_A = 25 °C		-	-	20	
Forward voltage	V_F				V
I_F = 100 mA		-	0.93	1	
AC characteristics					
Diode capacitance	C_T				pF
V_R = 1 V, f = 1 MHz		-	0.6	-	
V_R = 3 V, f = 1 MHz		-	0.57	-	
Forward resistance	r_f				Ω
I_F = 5 mA, f = 100 MHz		-	0.7	-	
Series inductance chip to ground	L_S	-	0.15	-	nH

Configuration of the shunt-diode

- A perfect ground is essential for optimum isolation
- The anode pins should be used as passage for RF



Package



Microwave Europe

Editor: John Sørensen, OZ1IPU

1296 MHz

DL7YS JO62NM wkd: 7.2.98 DL1YMK JO31. Rig: 85w, 23 elm LY. Tks fer info Peter.

5760MHz

S51JN/p JN65XM wkd: 8.3.98 I3CLZ/3 JN55, S57UUD JN75, I3NGL JN65, IN3OTD/IN3 JN55, IZ3ALH/3 JN55, I3ZH JN55, IK3COJ JN65. Rig: 1,2m dish, Phemt ATF 35176, 200mW. Tks fer info Alojz.

10368MHz

S51JN/p JN65XM wkd: 8.3.98 IK4OMN JN64, I3CLZ/3 JN55, I3ZJL/3 JN55, F6BVA/TK JN42, F5CAU/TK JN42, S57RA JN75, S57UUD JN75, I3OPW/3 JN55, I3DRE/3 JN65, IW3FZQ/4 JN54, IZ3ALH/3 JN55, IV3FDO/IV3 JN66. Rig: 1,2m dish, NE 32484A NF 1,4dB, 1W. Tks fer info Alojz.

24192MHz

LA6LCA JO59FB heard: OZ1UHF on 24GHz the 20.4.98 with 559 in 3 hours from 20.00 GMT and on 10GHz with 599. 21.4.98 again with 419 on 24GHz and with 569 on 10GHz there is about 200km. to the beacon from LA6LCA. Tks fer info Leif.

S51JN/p JN65XM wkd: 8.3.98 I3SOY/3 JN66, IW3EHQ/3 JN66, S57UUD JN75, I3OPW/3 JN55, I3DRE/3 JN65, IW3FZQ/4 JN54, IK3HHG/3 JN55, I3CLZ/3 JN55, I3ZJL/3 JN55. Rig: 0,45m dish, NE 32584, 70mW. Tks fer info Alojz.

OZ1IPU/p JO57FJ wkd: 26.4.98 SM6FHZ JO57, heard OZ1UHF JO57FJ 599, OZ1IPU beacon on my QTH JO57GH 599, SK6MHI JO57XQ 559.

MICROWAVE NEWS

CONTEST JUNE 27th & 28th. Introduction. After the succes of the first 24GHz "IJsselmeer" contest we are proud to announce another happening on this band. Based on the various remarks we received last year we little changed the rules to adapt other GHz bands as well. Following the contest to be held on Saturday june 27th ,we will organise the 24GHz conference near Amsterdam , of course with the great BBQ and many possibilities for eyeball qso's and measurements.

The Contest. The contest rules have been changed compared to the rules used at the first 24GHz contest. Only full band Qso's will be valid for the contest points. Various sections apply for 10GHz, 24GHz and 47GHz &up, all divided into portable and fixed sections. Suitable portable locations and qra locators can be provided by the commitee. (.bmp file is available)

Details: Date: June 27th Start: 12.00 hrs - 19.00 hrs (After 17.00hrs all stations may be worked again for new points.) Frequencies: 10GHz, 24GHz, 47GHz & up.

Logs for each band must contain station description, location, operator names, RST, Time, reports and Qra. Logs can be forwarded to the contestmanager, during the next day at the beginning of the conference.

Conference & Barbeque. Sunday, june 28th is scheduled for the conference and the barbeque. The conference will start at 13.00 hrs and wind up will be around 17.00hrs. Logs for the contest must be delivered here to the contest manager. Final scores will be calculated, while prices will be presented to the winners during the conference. Measuring equipment such as noise-gain analyser, spectrum analyser and power meter will be

available. During the eyeball qso's excellent food prepared, as well as drinks will be served. Admission fee for this day will be DFl 15,= per person, which will include food and drinks. Reservations must be made to the commitee two weeks in advance of the contest!

Further details and registrations can be achieved at: Harke Smits, PA0HRK email: harke.smits@net.hcc.nl (registration) phone: +31 15 2578679 mailing adress: Koetlaan 23 2625 KR Delft

Jan Kappert, PA0PLY email: pa0ply@comtestnl.com (main organiser) phone: +31 23 5634591

Hope to see you here in Holland with your microwave rigs! Best 73's de Jan, PA0PLY

SK6MHI Beacon News

SK6MHI The multi band beacon SK6MHI is now QRV on the 2.3, 5.7, 10 and 24GHz bands.

Common data: QTH: JO57XQ Keying: CW (A1) Height ASL: 135m

13cm:

QRG: 2320.800 Power: 10W ERP Antenna: Slotted waveguide Direction: Omni Frequency accuracy: +-1kHz (OCXO)

6cm:

QRG: 5760.800 Power: 5W ERP Antenna: Sectoral horn Direction: West Frequency accuracy: +-2,5kHz (OCXO)

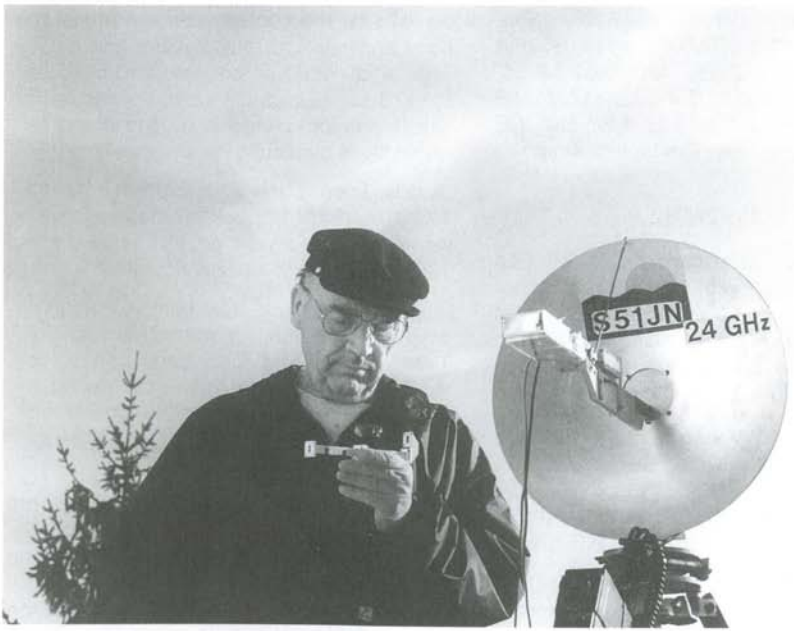
3cm:

QRG: 10368.800 Power: 5W ERP Antenna: Slotted waveguide Direction: Omni Frequency accuracy: +-2,5kHz (OCXO)

24GHz:

QRG: 24192.800 Power: 1W ERP Antenna: 2 x sectoral horn Direction: SW and NW Frequency accuracy: +-1kHz (TCXO)

This beacon, together with SK6UHF (432.925) and SK6UHI (1296.800), is run by the West Coast Microwave group. For reports



S51JN/p in JN65xm on 24GHz

or comments, please contact either SM6PGP, Hannes (Hannes.Illepe@emw.ericsson.se) or SM6EAN, Mats (mats.espling@as-comtateso.se).

73'Mats, SM6EAN

New beacons at OZ1UHF JO57FJ

Last year at the VHF-meeting in Sweden LA6LCA Leif decided that the Beacon OZ1UHF had to be renewed there was some problems with the old beacon. He started to collect parts and money for the work. He made new beacons for all bands op to 24GHz with better frequency stability, more power and new antennas on all band. The weekend he had plant to com to denmark for mounting the new beacons we hade snowstorm so it was not easy to mount the new antennas and beacons. The OZ microwaves amateurs is very happy for the work LA6LCA Leif don. Thank you Leif for the help.

OZ1UHF JO57FJ asl 150meter. The cw is A1A 432,955 6 w erp. Omi. Big wel 1296,955 15 w erp Omi. Slotted wave guide 2320,955 25 w erp Omi. Slotted wave guide 5760,955 25 w erp Omi. Slotted wave guide 10368,955 25 w erp Omi. Slotted wave guide 24192,955 0,5 w erp Omi. Slotted wave guide

The next deadline is 1. August 1998, your reports can be send to me on FAX ++45 98467877, E-mail dmteknik@post4.tele.dk or by post to my address and please if possible on a disk in ASCII-DOS text.

Vy 73 de John OZ1IPU

Microwave: World Firsts and World Records

Band (GHz)	World First QSO			World Record		
	Date	Calls	QRB (km)	Date	Calls	QRB (km)
10	1946-05-06	W2JRM-W2JN	3.3	1994-12-30	VK6KZ/p-VK5NY/p	1912
24	1975-10.14	G3BNL/P-G3EEZ/p	150	1997-10-26	F6BVA/p-F5CAU/p	398
47	1984-10-03	HB9AMH-HB9MIN	1	1994-10-05	HB9MIN/p-DJ7FJ/p	184
76	1985-12-30	HB9MIN-HB9AGE	0.5	1995-12-07	HB9MIO/p-DK4GD/p	114
145	1992-12-12	DB6NT/p-DL1JIN/p	1	1997-04-07	DL6NCI/p-DB6NT/p	53
241	1993-05-23	DB6NT/p-DL1JIN/p	0.1	1995-06-07	DB6NT/p-DF9LN/p	2.1
411	1998-01-06	DB6NT/p-DL1IN/p	0.05	1998-01-06	DB6NT/p-DL1IN/p	0.05

If you have an update or a correction, please write to:
John Sørensen, OZ1IPU, Rosenvej 49, DK-9300 Sæby, Denmark.Tel.: (++45)9846-3311

First QSO on 411GHz

Helmut Neidel, DL1IN

Am 6.1.1998 erfolgte die weltweit erste Amateurfunkverbindung auf dem 411GHz Band zwischen DL1IN und DB6NT.

Die benutzten Stationen sind unterschiedlich konstruiert.

Die Station von DB6NT geht von einem 119MHz Oszillator aus, der mit einem Thermostat stabilisiert ist. Eine Vervielfacherkette (Abb. 1) erzeugt ein Signal auf 22,84GHz mit einem Pegel von 100mW. Ein anschließender Verdoppler erzeugt eine Frequenz von 45,6GHz mit einer Leistung von 20mW. Diese wird in einen Hohlleiter eingespeist, der an seinem Ende eine Beam-Lead Mischerdiode aus Rußland enthält. Diese verneunfacht die Frequenz im Sendefall (411GHz) und dient als harmonischer Mischer im Empfangsfall. Die Antenne ist ein Parabolspiegel mit 150mm Durchmesser und einem F/D von 0,4. Ein Subreflektor leuchtet

411GHz Transverter DB6NT Style

TM8EME wrd: 01. May 1998
1632 EA6ADW 55 57 SSB
1633 W2UHI 55 57 SSB
1635 OZ4MM 58 59 SSB
1636 PA3CSG 57 58 SSB
1638 CT1DMK 56 59 SSB
1639 HB9SV 58 59 SSB
1640 HB9BBD 56 57 SSB
New dish ???
1641 DJ9YW 54 58 SSB
1642 F5PL 57 58 SSB
1643 F6CGJ 58 59 SSB
1644 LA8LF 57 57 SSB
1645 F1ANH 58 59 SSB
1646 SM2CEW 57 59 SSB
1648 DD1XF 53 58 SSB
1648 KD4LT 55 59 SSB
Not vy loud ? power ?
1653 G3LQR 56 56 SSB
1657 DL6YDH 56 57 SSB
1658 HA5SHF 57 57 SSB
1659 VE1ALQ 58 59 SSB
1701 HA6ZB 57 57 SSB
Same HA5SHF ?
1702 DH0OAH 57 57 SSB
Loud ... Where ?
1709 HA5BIE 57 57 SSB
Same HA5SHF ?
1711 OH2DG 58 59 SSB
1713 PY5ZBU 59 59 SSB
02/05
1723 ZS6AXT 579 599 CW
1723 G4CCH 549 569 CW
1725 ON5RR 549 569 CW
1727 N2IQU 589 599 CW
1728 DF3RU 559 579 CW
1730 DL8OBU 529 549 CW
1733 W4OP 579 589 CW
1735 S59DCD 569 599 CW
1736 OE9ERC 589 599 CW
1738 F5PAU 579 589 CW
1739 F6CGJ 599 599 CW
Dupe
1743 DJ5MN 569 559 CW
1746 K3HZO 559 599 CW
1748 OH2DG 569 579 CW
Dupe
1750 K9BCT 569 579 CW
1751 W2UHI 579 589 CW
Dupe
1801 DK5MV 559 559 CW
1803 DK0ED 569 559 CW
03/05
1811 OH2AXH 569 599 CW
1813 G3LTF 569 589 CW
1814 DF4MAA 559 559 CW
1815 F5AQC 589 599 CW
1819 SM3AKW 519 589 CW
Said QRP !! How much power 1821 G4DZU 559 569 CW 1823 DL0DYW 549 559 CW Said 1 antenna ! power ?
1825 PA3DZL 529 529 CW
Sri QRM F5PL then SM3AKW/QRO !
1829 IK1MTZ 529 539 CW
1832 DF6NA 549 559 CW 1 yagi 65el
1834 WA9FWD 529 559 CW
1836 VE4MA 569 579 CW
Sri for hectic CW (beers ?)
1839 IK1YWB 529 539 CW
Same IK1MTZ ?
1845 DF3RU 579 599 CW

Fig. 1: DB6NTs 411GHZ Transverter Block Diagram

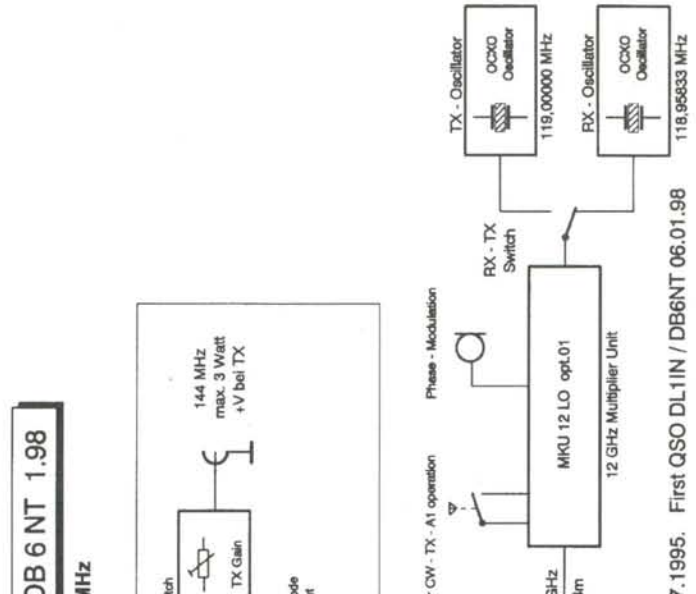
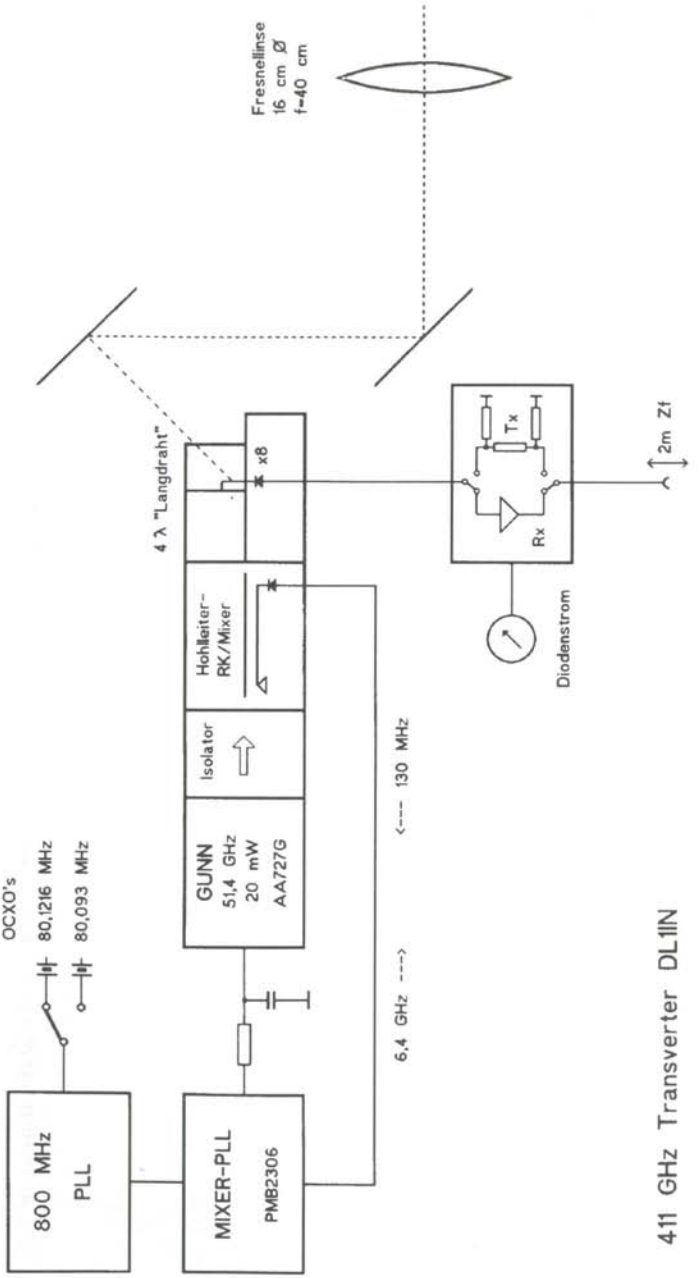
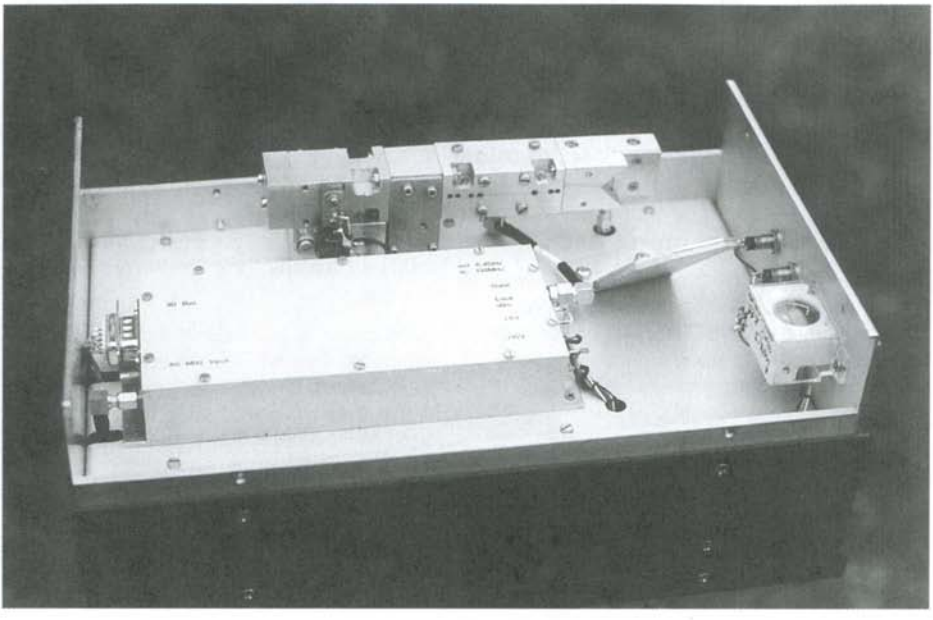


Fig. 2: DL1INs 411GHZ Transverter Block Diagram





411GHz Transverter DL1IN Style

diesen Spiegel nach dem Cassegrain-Prinzip aus.

Die Station von DL1IN dagegen benutzt einen Gunn-Oszillator auf 51,4GHz, der über einen Mischer-PLL an einen 80MHz Oszillator angebunden wird (Abb. 2). Die gleiche Beam-Lead Diode befindet sich an einem 4 Wellenlängen langem Erreger ('Langdraht') und strahlt die achtfache Frequenz ab oder mischt als harmonischer Mischer das band um die achtfache LO-Frequenz in das ZF-Band. Nach zwei Umlenkungen wird die Energie von einer Fresnel-Linse mit 40cm Brennweite gebündelt.

Die im Erst-QSO überbrückte Entfernung betrug ca. 50m. Die Stationen sind Eigenbau.

English Version

At Januray 6th, 1998, the first QSO on the 411GHz band has been achieved between DB6NT and DL1JIN on a distance of 50m. The station equipment used for this sub-millimeter wavelength was home brew.

The equipment of DB6NT uses an oven stabiliozed OCXO on 119MHz as a frequency source. Subsequent multipliers finally generates a signal on 45.6GHz with an output power of 20mW. This signal is fed into a waveguide with a Russion beam-lead Schottky diode fitted to its end. This diode serves as a x9 multiplier during transmit and as a harmonic mixer during receive. The LO-frequency is altered accordingly to achieve a 144MHz IF. The 150mm diameter dish is fed by the open waveguide end and a Cassegrain type subreflector.

The equipment of DL1IN uses a 51.4GHz Gunn-oscillator, which is synchronized with a 80MHz OCXO by means of a mixing PLL. The 51.4GHz signal drives the same type of Schottky diode, which is fitted to a 4 wavelength probe ('Longwire'). The radiation of the probe is deflected two times and finally routed to a Fresnel lens with a focus of 40cm.

Microwave Japan

Editor: Toshihiko Takamizawa, JE1AAH

47GHz record break QSO

The Nishi Niigata(West Niigata) Microwave group has been JA's most active SHF group. They recently have QSO'd on 47GHz several times with record break distance. Congratulations to operators!

JA 47GHz record.:

Date Apr. 12 1998, Distance 86Km JR0YGW (Mt. Yahiko) Operator JA0BQU, JA0DFR, JA0DWG, JA0GWB, JA0HNN Rig HB TX 3mW RX 1SS11 mixer JH0YQP(Mt. Nadate) Operator JA0BNK, JA0RGP, JA0HJC Rig Modified Pasolink junk TX 7mW RS 59 59 both end.

JA0RGP made two sets of diode mixer only system for TX and RX two years ago. They made QSO up to 30Km and decided to power up the system. Fortunately they have salvaged ex Pasolink(50GHz non licensed radio link) junk few years ago which employs 25GHz Gunn OSC with x2 multiplier to 50GHz. They modified the unit to 47GHz output which produced 7mW. Other end used

JA0RGP(left) JA0DFR(right) adjusting 47GHz antenna

JR0YGW group at Niigata beach with 5.7 thru 47G antenna

similar configuration with all HB. Core system of 23.5GHz transverter is very similar to 24GHz transverter known as JE1AAH design. This "23.5GHz transverter" drives NEC SV543 varactor x2 multiplier to 47GHz. This unit produces 3mW on RF. This "half frequency times 2 approach" is key to produce over 1mW narrow band output on 47GHz at the moment. Only exception is SSB. They used NBFM for QSO. Of course CW should be okay using this method. Both ends used separate RX which is diode mixer only system and antenna for reception. NF of the RX could not be measured. They are expecting to break over 100Km distance soon. See details on WEB-Page http://www.rim.or.jp/~ja0bqu/47G4_12.htm

Microwave contest

After a long discussion, the Microwave group in Japan has announced an Annual Microwave contest jointly supported by CQ ham radio magazine, Mobile ham magazine, several SHF amateur equipment manufacturers and JARL contest committee. It is a kind of marathon QSO contest like RSGB annual ladder or DUBUS microwave report. Since it is first year, this year's contest starts from May 1st and lasts at December 31st. Band of operation will be from 2.4GHz through 76GHz and up. We did not have Microwave contest supported by JARL for long years while we have had 6m and down contest which is only focusing SHF up to 24GHz as a part of entry. Purpose of this contest is to protect Microwave frequency from commercial intention of frequency reallocation where amateur usage is low. In JA, we do not sell our frequency like US but we have to fill up our band. Otherwise government watchers will find hams are not using the premium frequency! The frequency is not unlimited resources, even in Micro-

Yagis von WiMo

für 2 m und 70 cm

WiMo-Grillfete am 6. Juni 1998!

SHF DESIGN

Kompromißlose Dipole

Faltdipol mit Teflon-Balun komplett im Anschlußkasten, N-Buchse, Anschluß kasten kalt verschweißt und zusätzlich ausgeschäumt...

Kompromißlose Elemente

"Dicke" Elemente mit 8 mm ø, hohe Bandbreite. Material Alu, hohe Leitfähigkeit, geringe Verluste! Elemente geschraubt, hohe Kontaktsicherheit auch nach Jahren!

Kompromißlose Kreuzyagis

Boom aus Rundrohr: kein Unterzug nötig, super Richtdiagramm! Spezial-Mastschelle: Montage horizontal/vertikal ('+'-Form) oder diagonal ('X'-Form) möglich! Anschlußfertige Phasenleitungen lieferbar.

Kompromißlose Dipole

Faltdipole mit semi-rigid Balun und Teflon N-Buchse, dicht vergossen!

Modell	Frequenz	Elemente	Gewinn (dBD)	Länge (m)		Preis
WY 204	2m	4	7	1,2	Vormast	90,00
WY 207	2m	7	10	2,6		106,00
WY 210	2m	10	12,3	4,6	Unterzug	153,00
WX 208	2m	2x4	7	1,3	Vormast	151,00
WX 214	2m	2x7	10	2,6		192,00
WX 220	2m	2x10	12,3	4,6		223,00
WY 706	70cm	6	8	0,75	Vormast	110,00
WY 7010	70cm	10	11,5	1,6	Vormast	115,00
WY 7018	70cm	18	14	3,1	Unterzug	154,00
WY 7023	70cm	23	15	4,2	Unterzug	175,00
WX 7020	70cm	2x10	11,5	2	Vormast	192,00
WX 7036	70cm	2x18	14	3,4		223,00
W 3000	Duoband	3+5	5/8	1,4	Vormast	197,00
18250	D-Netz	5	7	0,6	Vormast	152,00
18251	D-Netz	12	12	1,0	Vormast	191,00

Typ	Frequenz
SHF 2328	23cm
SHF 2344	23cm
SHF 2367	23cm
SHF 1340	13cm
SHF 1367	13cm
SHF 1633	Meteosat
SHF 1658	Meteosat

Ordentliche Anleitung

Ausführl. dt. Anleitung mit Tips zum St

... und die Feinheiten:

- alle Schrauben aus Edelstahl!
- Flügelmuttern und U-Bügel auch! Der
- Einzelteil verloren? Kein Problem, alle

UKW-Rundstrahler

Kompromißlose Monobandantennen... Alle Antennen für Mastspitzenmontage. Buchse im Fuß (nicht bei Ringo), Aluminium, Schrauben V2A

	Länge	Gewinn	Preis
Groundplane, 2 m	0,9 m	0 dBd	69,00
Groundplane, 70 cm	0,3 m	0 dBd	65,00
Groundplane, 4 m	1,8 m	0 dBd	104,00
Sperrtopf, 2 m	1,5 m	3 dBd	80,00
Sperrtopf, 70 cm	0,5 m	3 dBd	73,00
Ringo, 2 m	2,7 m	6 dBd	109,00
Ringo, 70 cm	1,1 m	6 dBd	121,00

R1 Mini-Dipol

Verkürzte Dipole für 10 m bis 160 m, gut geeignet als Ergänzung zu vorhandenen Antennen. Gestreckte Länge ca. 3,4 m. Zerlegbar, Balastbarkeit 500 W, Anschluß PL-Buchse, Montage horizontal oder vertikal möglich. Verschiedene Mittelteile erhältlich; Duoband-Mittelteil für zwei beliebig kombinierbare Bänder.

R1 Mittelteil, gestreckt, mit Maststummel ... 24,00
R1 Mittelteil, gewinkelt, mit Maststummel ... 36,00
R1 Mittelteil, Duoband, mit Maststummel ... 39,00
R1 Dipol für 6 m, 10 m, 11 m, 12 m oder 15 m ... je 89,90
R1 Dipol für 17 m oder 20 m ... je 98,00
R1 Dipol für 30 m oder 40 m ... je 110,00
R1 Dipol für 80 m oder 160 m ... je 122,00

KENPRO-Rotoren

KR-450XL	627,00	KR-1000SDX	1009,00	GS-065	121,50
KR-650XL	740,00	HR-1300	1257,50	GS-680U	192,00
KR-800S	773,00	KR-500A	601,00	GC-038	65,70
KR-800SDX	908,00	KR-5400	1142,00	VA-Schrauben Satz	13,60
KR-1000S	908,00	GS-050	75,80	Rotor-Plattform	91,00

Anpaßtöpfe

Zum Stocken von gleichen Antennen. N-Buchsen, 2 kW PEP, Dämpfung < 0,5 dB.

2 m, 2fach	102,00
2 m, 4fach	133,30
2 m, 4fach, lang	200,00
2 m, 8fach, lang	234,00
70 cm, 2fach	96,00
70 cm, 4fach	129,50
70 cm, 4fach, lang	193,00
70 cm, 8fach, lang	227,50
23 cm, 2fach	89,90
23 cm, 4fach	128,00

Blitzschutz-Zwischenstecker

2-kW-Ausführungen Bu/Bu sind wasserdicht!

PL Bu/Bu, 400 W	66,00
N Bu/Bu, 200 W	74,00
PL Bu/Bu, 2 kW	85,00
PL Bu/St, 2 kW	89,00
N Bu/Bu, 2 kW	89,50
N Bu/St, 2 kW	93,00

Hühnerleiter

450-Ω-Feederleitung ... m 2,50

WINTOP

Duoband-Fensterklemmantennen

In der Neigung verstellbar, mit an der Scheibe arretierbarer Klemme aus Edelstahl. Mit Kabel und BNC-Stecker. Mit verschiedenen abnehmbaren Strahlern erhältlich.

13791: Duoband 2 m/70 cm, Länge 94 cm	164,00
13792: Duoband 2 m/70 cm, Länge 44 cm	170,00
13795: CB, Länge 94 cm	174,00

2 m Big Weel

Horizontal polarisierter Rundstrahler, 3 dBd. Zwei Stück gestockt gibt Horizontal-Rundstrahl

mit PL-Buchse ...
mit N-Buchse ...

Klebeantennen

Mobilantennen zum A
50 W kpl. mit Kabel ur
Anleitung
2-m-/70-cm-Duoband
ein Ausgang ...
dito, zwei Ausgänge,
kpl. mit Weiche ...
2 m, Länge 70 cm ...
70 cm, 0 dB, Länge 18
70 cm, 3 dB, Länge 48
D-Netz, 3 dB ...

WiMo Anter
Am Gäxwalc
Tel. (0 72 76)
e-mail: WiM
WiMo-Gesan

DXpedition to Liechtenstein / HB0

Between wednesday July 1 and tuesday July 14 1998 a team of 8 HAMS, all members of ESRAC, the Eindhoven Student Radio Amateur Club, will stay at the mountain restaurant in Malbun Liechtenstein, 2010 meters above sea level. The CALL SIGN to be used is HB0/PI4TUE. Activity is planned on the following bands:

160m through 10m. (from the restaurant), running two stations with full legal limit power output, beam for 10-15-20m., GP's for WARC bands and verticals for 160-80-40 m.

6m (from the restaurant) running 100 Watt into a 4 el. Yagi

2m EME and MS up to 4000 lpm (from the restaurant) running 1 kW into 4x11 el.YAGI and 400 Watt into 17 el. YAGI.

2m Tropo (from the Augstenberg @ 2350 m. ASL) running 35 W into 5 el. Yagi.

70cm Tropo (from the Augstenberg) running 25 W into 6 el. YAGI.
70cm Packet (@HB9GR) running 25 W into GP.
23cm Tropo + ATV (from the Augstenberg) running 10W into Yagi.

Modes of operation: SSB, CW, RTTY, ATV, PACKET.

PI4TUE-PI5EHV-Club
station esrac@ele.tue.nl

Skeds on any band or mode can be made in advance by contacting the Club station or one of its members. We are QRV on 14.345 every afternoon to take some last minute skeds. MS skeds via PE1OGF - EME skeds via VE7BQH (ve7bqh@wimsey.com) or PE1OGF (pe1ogf@iaehv.nl or AX.25 pe1ogf@pi8zaa.#nbo.nld.eu).

Any last minute details will be put on the ESRAC's home page:
http://www.esrac.ele.tue.nl or
http://www.iaehv.nl/users/pe1ogf/expediti.ht.

See you all from the mountain tops, may the propagation be with us... Aurelio PA3EZL-AA2WH

47GHZ Transceiver

waves. Let's protect our resources from commercial use.

Drake P3D converters

I have shipped many units to overseas. We still have a lot of stocks. If somebody would like to purchase, please e-mail or contact Toshi. Modification is available on Internet as follows. http://www.geocities.com/silicon valley/vista/7012/drake.htm

FLL300

Toshi's group is developing S band 30W solid state HPA which employs FLL300 from Fujitsu. It will be two and three stage HPA available. FLL171-FLL120-FLL300 FLL351-FLL300 If someone would like to have FLL300 x 2 unit, it is not difficult to design specially for you. The biggest problem is to construct a sufficient heatsink and a DC power supply to feed. Drain current for one device is 6A! Simple narrow laminate track which is not carefully concerned on PTFE board should burn out!

24GHz JE1AAH PCB and NE32984D

Recently batch process of 24GHz board was finished. Although still there is no plated through holes available, it should help your 24GHz development easier and faster. FHX35LG has demonstrated to produce 50mW which is good substitute to MGF1303. JA0 group has demonstrated 100mW output with two devices in parallel. NE32984D is still the best device for 24GHz LNA which brings NF of 2dB without long time tuning and NF measuring tools. Quantity available.

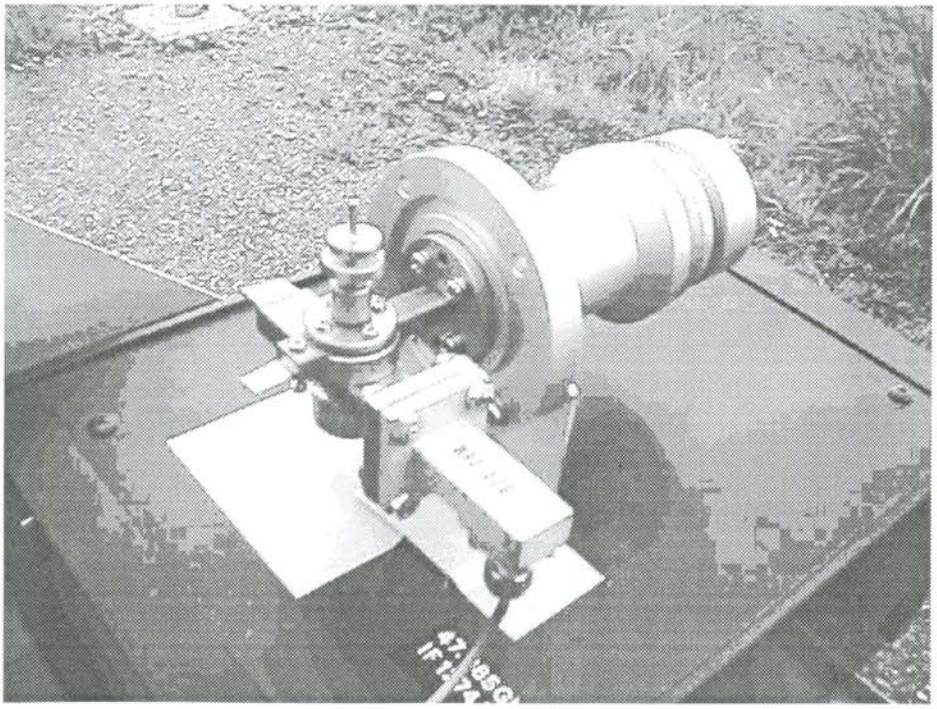
E-mail address change

OR domain to NE domain change was done to my e-mail address. New address is "toshi@kw.netlaputa.ne.jp" and "toshi@com-

puter.org" is okay to use. Postal code was also changed.

My home address is shown here. 3-28-6 Takaishi, Asao-ku, Kawasaki 215-0003 Japan

47GHz horn gain 28dB made by JA0RGP



47GHz System

EME News

Editor: Bernd Wilde, DL7APV

144 MHz

SP7DCS wkd : EU-EME contest 04/05.April '98 SM5BSZ #5 rx-H/tx-H, F3VS V/H, IK3MAC #6 V/H, KB8RQ #7 H/H, W5UN H/H, I3DLI #8 H/H, SM5FRH H/H, LA9NEA #9 H/H, I2FAK #10 V/H, OE5EYM #11 H/H all random. Cwnr were WA9KRT, K7CA, PA2CHR, OH2PO, hrd SM7BAE, UA9FAD, I5JUX. Chris reports : he is very happy with his new antenna 4x10el H + 4x10el. V cross yagi 5.25m boom stacked 3.5m. His score was better than expected. Cross yagis were useful because faraday made that he heard many stations better on vertical. Once F3VS was copied only on vertical. During a long time thre only stationb he heard was SM5BSZ, SM5FRH (both with cross yagi). Rig: FT736+DSP MFJ 784B+ preamp FHX35, 400w out, 4x10+10el 5m above ground with "armstrong" rotor on el+az. tnx fer info Chris

OK1DFC 3.8m Dish for 1296 with VE4MA feed

432 MHZ

OK1DFC reports : wkd in EU-contest JA5OVU 449/559, SM2CEW O/449, OH2PO 559/539, NC1I 449/539 #18, K1FO 559/549, VE1ALQ 559/559, #19, K4QI 449/449 #20, N2IQU 559/549 #21, hrd SM2BYA, DL9NDD, PA3CSG, YO2IS, IK5WJD; DL3EAG, I2COR mny qrz!! ON5OF K9BCT. tnx fer info Zdenek

1296 MHz

EA6ADW reports that he is qrv from march to nov. in EA6. 432/1296/2304-EME (JM19NW), but 95% activity on 1296 (5.5m/1kW). Skeds and Info via http://www.ctv.es/USERS/cerveny/ea6adw .htm. Last issues we reported EA3ADW activity and toplist, but it was incorrect. **EA3ADW is John on 144 EME!!!** and callsign for Peter is **EA6ADW 432/1296/2320 EME**. I hope confusion will stop now, sorry Peter. tnx fer info

HB9BBD reports :The first weekend with the new station was simply the most exiting experience for me after hearing my first echoes on 23cm in 1993. Every piece of equipment kept working for 3 days - except the ac in the shelter which stopped cooling the 7kw of total driver and tx-dissipation late sunday evening. The temp in the shack immediately

EME-TOPLIST

144MHz

Call	small	SQR	DX CC	US States	WAS	WAC	# initials
I2FAK	448	56	105	50	1993	1988	942
DK3WG	374	54	86	50	1992	1983	642
PA2CHR	254	43	63	48	--	1993	364
F9HS	180	33	49	27	--	1985	247
DJ7OF	150	28	30	22	--	1996	170
UA4NM	114	23	32	21	--	--	0
RA3LE	88	27	26	0	--	--	95
DL5DTA	83	21	24	15	--	--	96
HB9SUL	48	16	19	0	--	--	63
PE1OGF	46	14	16	12	--	--	55
YO2IS	21	10	6	10	--	--	31
F5HRY	20	0	8	7	--	--	21
W6/SM0PYP	19	10	8	7	--	--	21
HB9DFG	18	11	8	5	--	--	14
DL3YEE	11	6	6	2	--	--	0
SP7DCS	11	5	6	2	--	--	11
9A9B	0	0	18	8	--	--	72

432MHz

DL9KR	363	50	80	50	1987	1978	665
DJ6MB	258	39	59	43	--	1984	309
OK1KIR	229	43	62	43	--	1982	329
DK3WG	228	40	62	40	--	1991	326
G3LTF	206	0	55	47	--	--	327
F1ANH	117	24	30	23	--	--	141
YO2IS	113	23	33	23	--	--	139
RA3LE	111	26	24	23	--	1984	124
ON4KNG	110	25	34	17	--	1996	129
DL3YEE	90	22	32	15	--	--	0
G4ERG	77	21	24	19	--	--	93
OK1CA	71	24	25	22	--	1996	121
EA6ADW	64	19	23	19	--	--	65
PA2CHR	38	14	17	10	--	--	45
HB9SUL	34	12	17	9	--	--	37
OK1DFC	21	12	11	6	--	--	21
UA4NM	12	8	10	4	--	--	0
F5HRY	4	0	14	8	--	--	31
JA9BOH	0	0	45	40	--	--	260
G3SEK	0	0	54	42	--	??	275
GW3XYW	0	0	33	0	--	--	178

1296MHz

OK1KIR	112	29	34	24	--	1989	139
G3LTF	108	0	31	20	--	--	134
F1ANH	100	24	30	20	--	1994	128
EA6ADW	97	23	29	23	--	1994	129
HB9BBD	80	21	29	12	--	1994	0
F5PAU	74	24	24	15	--	--	47
OK1DFC	52	15	23	9	--	--	52
OK1CA	34	16	18	7	--	--	31
DL3YEE	12	6	9	1	--	--	0
GW3XYW	0	0	27	0	--	--	114

2300MHz

OK1KIR	31	13	17	8	--	--	32
F1ANH	16	8	11	5	--	--	17
G3LTF	13	0	12	2	--	--	14
EA6ADW	8	4	8	1	--	--	9
GW3XYW	0	0	13	0	--	--	16

5760MHz

OK1KIR	7	4	6	1	--	--	7

10368MHz

G3WDG	17	0	17	4	--	--	17
G4KGC	13	0	15	2	--	--	15
OK1KIR	11	7	10	2	--	--	11
W6/SM0PYP	4	3	3	2	--	--	6

reached 35C - something the tubes do not like, nor does the operator!! My log: May 1; F1ANH 579/569 and SSB 53/55; HB9SV 57/57; EA6ADW 52/55; OE9ERC 55/58; TM8EME 56/57; SM3AKW 579/589; LA8LF 579/no rcvd. On May2; ON5RR 549/559; JA6CZD 559/589 #93, unfortunately no SSB by JA6; DJ9YW 569/589; ZS6AXT 559/589 same- no SSB by ZS6; F5PAU 589/579; G3LQR 579/579; F6CGJ 589/579 and 56/57; DD1XF 579/559 AND 54/54; OH2DG 529/559 #94; DF3RU 529/569; G4CCH 529/549 (got the feeling of a 2.4m dish again, hi!!); S59DCD 579/579; K3HZO 529/549 #95; W2UHI 579/589; VE6TA 539/559; OE9ERC 599/579 and SSB 57/57; KD4LT 549/579 #96; N6BQ 569/579 and SSB 52/53; F1ANH 56/56; ON5RR ssb 51/52; WD5AGO 539/559; OE9ERC SSB 55/55; JA6CZD 569/589; DH0OAH 539/559 #97; LX1DB 569/579; OH2DG 539/559; LX1DB SSB 57/57; F1ANH SSB 56/56; OE9ERC SSB 57/57; G3LQR 559/569; F6CGJ SSB 57/56; F5PAU SSB 55/53; SM2CEW SSB 52/55; HB9/K0YT SSB 51/55 (guess he is HB9BHU?!, if not #98); F5AQC 579/579 SSB 55/55; SM3AKWqrp

1703 VE1XYL 58 58 SSB Same VE1ALQ
1705 HA5BGL 57 57 SSB Same HA5SHF ?
1706 HB9CW/P 58 54 SSB /P where ?
1708 OE9XTW 59 59 SSB

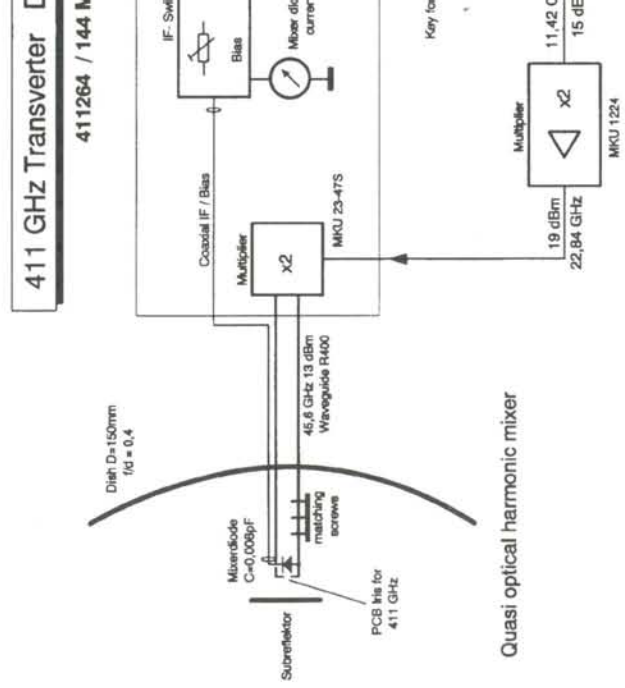
1753 KD4LT 579 599 CW Dupe
1756 EA6ADW 569 589 CW Dupe
1757 LA8LF 589 599 CW Dupe
1759 WD5AGO 569 599 CW Dupe

1848 IK3COJ - - CW NC, call ?, weak
1852 F1ANH 49 49 FM ! First FM 23cm EME ?

539/579; VE1ALQ 579/599 and SSB 54/57; WA9FWD 519/549 #98; N2IQU SSB 57/58; DJ2YW 559/54 and full SSB 51/54; PY5ZBU 549/55 #99; W2UHI 579/589; G4DZU 449/559; G3LTF 579/569 and SSB 53/54. The extended weekend brought 7 initials totalling 99 now. I do hope that not only I had lots of fun with all of you on the band, but you enjoyed it as well!! tnx for info HB9BBD Dominique

OK1DFC reports: wkd during Eu-contest OK1CA O/O #50, F1ANH O/O #51, VE1ALQ O/O, SM3AKW O/O, LA8LF O/O, K5JL 559/429, N2IQU 559/539 #52 ZS6AXT O/M, F6CGJ 559/339, OZ4MM 559/549, hrd were F2TU, W2UHI, DF9QX. Zdenek reports that hew is limited on 432 because of high qrm. rig TS790E +2x2C39BA with 150w, 3.8m dish with OE9PMJ feed and DJ9BV preamp 0.56dB, but 25m AIRCOM between (-3dB). He plans a bigger amplifier with TH338. tnx fer info Zdenek

TM8EME reports: activity 01.to 03. May, see box Our log has 66 completed QSOs for a 3x40 minutes (i.e. 2 hours) activity. This means more than 1 QSO every 2 minutes, which is rather unusual for EME ... Among these 66 QSOs, 8 are dupes. Among the 58 different calls, probably not more than 53 different rigs are listed. As always, operators appreciate to call us in both modes, or with different callsigns from the same station. We understand that the temptation is important, and a quick EME QSO frustrating, but the only result is that many weak signals were not copied in the large QRM, giving no chance to



Quasi optical harmonic mixer

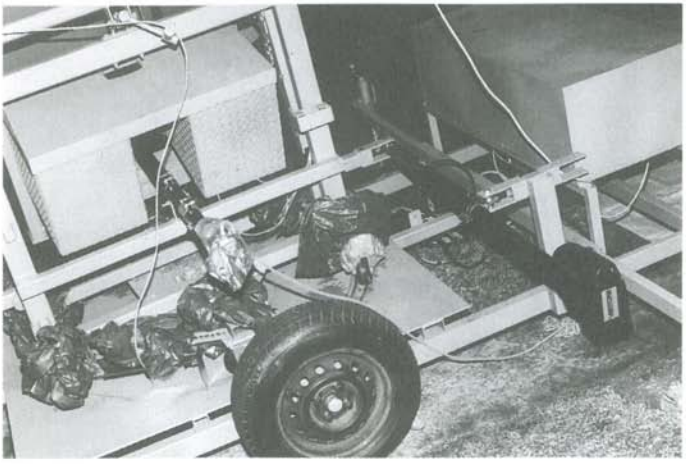
400...420 GHz is one of official German amateur radio band. DARC 10.07

them to complete their first 23cm EME contact. Is it fair for the one who put up a 4 yagi station and few tens of watts for the event ? Thus, we thank people (several big guns) who were maybe on, but did not call, and apologize to the small stations who called for a long time with no response ... Just for fun, we arranged an FM contact with F1ANH for the probable first ever FM QSO off the moon. Libration oddly pulsed the signal, making the audio quite strange ... but we completed easily. We had audio and video recordings, which will be available at the Paris EME conference, as well as QSLs. If you do not attend the conference, please send your QSLrequests to : Jean Jacques MAINTOUX (F1EHN) 30 Rue de Villacoublay 78140 VELIZY

If you pay a visit to our web pages (http://ham.ireste.fr/eme98) you will find informations about TM8EME activity, and the Nancay radiotelescope. 73's from the EME PARIS

VK2ALU's trailer mounted 3.7m dish in operation position

VK2ALU's shack in the garage under the house



details of VK2ALU's EME-trailer

1998 organization crew : F1EHN, F5MZN, F6DLA, F5HRY.

10368 MHz

VK2ALU reports: He made his first EME contacts in'96 with G3WDG and G4KGC. Lyle has a trailer mounted antenna.(see also the photos).rig : 3.7m dish linear pol. at present vertical, 25W power. Lyle has site restrictions what the reason was to put a "portable" antenna. Some factors about Lyle's antenna :
The dish can be elevated up to 60° while it is in its "stow" position on the concrete slab at the side of the house.
need to limit the dish trailer size to allow it to be laoded on to a standard car transport trailer so that it could be tranported elsewhere by road if absolutely necessary
weight limitations an axle loading and tyre load facilities to cope with loacal high winds from westerly direction for 3 months or more in the year (these also mean that EME tests cannot be carried out unless wind velocity is low)
concerns of loacal neighbours (and his wife) about an item of this size on a suburban residential block etc. etc...
first photo shows the antenna in operating position on front driveway to garage under house, antenna is pointed west, thick grawth of treas on west and north sides of ghis property whoch prevent access to a common EME window to europe from the back yard or from side of house.
secound photo shows operator's position in the garage under house, (the round brown object bottom centre of photo is a brown cap which VK2ALU has on his head!!), topü left az & el readout, middle moon noise meter, lower sheft az/el control.
third photo shows the large flat steel plate on trailer on which the six casters (2visible) run. Thees castors take the weight of the dish and its mount etc.,the top bearing of the "stub axle", on which the dish assembly rotates, can be seen abovew the cente of the large steel plate, the "slotted angle" (just visiblre under the plastic shett supports a small platform for the az remote readout unit. It contains a selsyn which has approx. 8cm dia wheel on its input spindle. The wheel runs on the large steel plate in a circle of diameter selected to give 10 turns/360° dish rotn.the elevation actuator showen o between the two balance weight boxes. az linear actuator shown mounted at one of the possible mounting arrests.
It is an unusual EME installation and very interesting. mny tnx fer info Lyle

Last

- deadline every first of Nov./Feb./May/August
- **don't forget booking for Paris!!!!**
- DUBUS mailbox is **closed** due to low activity
- my email bwilde@eac-com.de

73 Bernd DL7APV

EME Directory

Editor: Klaus Tiedemann, DL4EBY

Here is the update to our Directory for 432 MHz & above EME. It is split into two parts:

Part 1 addresses and phone numbers, sorted by call

Part 2 stations's equipment, sorted by band

The antenna design is abbreviated (normally by the suffix), so WU = DL6WU, BV = DJ9BV, FO = K1FO, FT = F9FT, etc. Normally, the length of the antenna is given by number of elements (el), an exception is the number of wavelengths (wl). The antenna also includes (at least where stations told me) the polartiy capabilities: "v" or "vert" and "h" or "hor" for linear polarized antennas, "v/h" for switchable linear systems, and "rot" for rotatable antennas, lin on 1296 stands for linear polarisation.

The activity status in the Equipment list uses a 'J' for QRV, and a 'N' for not QRV. The power is in Watts.

If you have any changes or supplements to the list, please report back to me (EMail, FAX, EME Net, etc.). The most up-to-date list may be obtained from the Internet at http://www.nitehawk.com/rasmit/eme_dir5.html.

Special thanks to JA9BOH, DK3WG and G4RGK for their help! Regards, Klaus.

Call	Loc	Name	Address (Phone)	Remarks
4X1IF	KM72KD	Ralph Rosenbaum	17 Shalom Street, Ra'anana 43561 (972-9-7717931, -3-6422979Fax)	
4X6UJ	KM72MT	ATR electronics Ltd.	Serge Svedcenko, 11 Moriah Ave., Haifa 34571 (972-4838-42870)	
7M2PDT	QM05EK	Shukou Umezawa,	7324-2 Seki, Shirako-machi, Chousei-gun, Chiba 299-42 (81-475-33 7979 +Fax)	
9H1ES	JM75	Fortunato Bonnici	Fortunato, Mosta ()	
9M2BV	OJ03UD	Mart Sakalov	4-10-5 Tivoli Villas, Jalan Medang Tandok 59100, Bangar K.L. ()	
A22BW	KG38SU	Lothar Schmidke	Box 772, Francis Town, Botswana ()	
AA4TJ		Bill Lakatosh	, ()	now W4TJ
AA5C	EM13SE	Greg McIntire	PO Box 136E, Princeton (1-972-734 6459)	
AA6WI		Ron (Hoppy) Hopkins	, ()	now N6BQ
AF1T	FN43ED	Dale P. Clement	2 Corbin Rd., Henniker, NH 03242 (1-603-224-9319)	Prefers 220/902 MHz
AL7JM		Mike Bennett	, ()	now WL7U
CT1DMK	IN50QP	Luis Cupido	Rua de Sao Joao LT5, Sta Joana, P-3810 Aveiro (351-34-315885)	
DC6UW	JO44VJ	Norbert Wrede	Habyer Str. 22, 24361 Gross-Wittensee (49-4356-351, Fax-1625)	
DD0SB		Georg Hylinski	Keplerstr. 6, 71034 Boeblingen ()	
DF0EME	JO40	DARC	c/o Römerstr.39a, D-61352 Bad Homburg ()	
DF3RU	JN59UL	Karl Schmidt	Moerswinkel 1, D-92278 Illschwang (49-9666-328 +Fax)	
DF4MAA	JN58WH	Wolfgang Glück	Michael-Ferstl Str. 2b, D-85435 Erding ()	ex DG5MIB
DF4PV	JN49QX	Günter Wertich	In den 100 Morgen 9, D-55218 Ingelheim (49-6132-85311)	
DF4UE	JN48	Johann Mitrowitsch	Bergaecker 64, 73669 Lichtenwald ()	
DF5JJ	JO31	Peter Cerveny	Andreasstrasse 77, D-47441 Moers ()	Winter only
DF6NA	JN49XS	Rainer Allraun	Trautenauer Str. 12, D-97074 Würzburg (49-931-86315)	
DF6WE	JO31GO	Ewald Demuth	Am Feldrain 30, D-46519 Alpen (49-2802-7639)	Moved to JO31GO
DF8LC	JO53GX	Lothar Beyer	Dorfchaussee 4-6, D-23623 Lebatz (49-4525-3589)	no elevation
DF9CY	JO54AL	Christoph Petermann	Pommernweg 11, D-24229 Schwedeneck (49-4308-182050)	
DF9QX	JO42HD	Matthias Cantow	Elisabethstr. 32, D-32120 Hiddenhausen (49-5221-689949)	
DF9UX	JN47	Erich Wassmer	Zum Saibling 35, D-88662 Ueberlingen, Bodensee (49-7551-3863)	
DH0OAH	JO42OB		, (49-172-6759310)	= DL6YDH, DJ9YW, DJ5QX
DH3NAN	JO50NC	Matthias Bohl	Hoehstr.14, D-96242 Sonnefeld (49-9266-329)	
DH9FAG	JN49LX	Karl Schwab	Elsaesser Str. 6a, 64832 Babenhausen ()	
DH9SAV	JN48	Christof Schurr	Hölderlinstr. 50, D-71336 Waiblingen (49-7151-28662)	
DJ5MN	JN58WH	Bernhard Dobler	Breslauer Str. 7, D-85435 Erding (49-8122-7585)	

DJ5RE	JN59WI	Thomas Höppe	Blumenstr. 5, D-92245 Kümmersbruck (49-9621-74944)	
DJ6MB	JO30NS	Uwe Mützelfeldt	Dorotheenstr.129, D-53111 Bonn (49-228-655289)	QRT 70
DJ7FJ	JN48AG	Josef Fehrenbach	Schlattstr. 1, D-77716 Haslach (49-7832-3884, Fax-7836-50190)	
DJ8QL	JN49DX	Franz Eichhorn	Auf dem Stielchen 19, D-55130 Mainz-Weisenaub (49-6131-839138)	
DJ9BV	JO43XN	Rainer Bertelsmeier	Glücksburgerstr.20, D-22769 Hamburg 50 (49-40-8503316)	
DJ9YW	JO42QA	Heinrich Reckemeyer	Schwalbennest 7, D-31860 Emmerthal (49-5155-983255, Fax-983256)	= DL6YDH, DH0OAH, DJ5QX
DK0NA	JO50IT	Michael Kuhne	Birkenweg 15, D-95119 Naila-Hölle (49-9288-8232)	
DK0TU	JO62PM	Klaus Tiedemann	Halskestr.35, D-12167 Berlin (49-30-7955467, Fax-7959814)	
DK3BU	JO33NO	Harm Kowalczik	Neuseedeicherweg 1, D-26506 Norden (49-4931-8537)	
DK3FB	JO31TD	Rüdiger Rohr, Zum Rothenstein 39, D-58540 Meinerzhagen (49-2354-12808)		DJ2PA his wife
DK3WG	JO72GI	Jürgen Fiedler	PO Box 531, D-15205 Frankfurt/Oder (49-335-540282)	ex DL3BWW
DK4JN	JN39	Alexander Neidenhoff	Box 2350, D-41554 Kaarst (49-2131-514036)	
DK7LJ	JO54CG	Per Dudek	Wolbloeken 3, D-24145 Kiel-Roenne (49-431-713678)	= DL0SHF
DK8VS	JN39NF	Werner Heydt	Tälchenring 36, D-66131 Ensheim (49-6893-6442)	
DL0AR	JO50	OV Helmbrechts (DL4NA/6NAA), Grundstück 313, D-01478 Ahornberg ()		
DL0EF	JO30KM	Klaus Schlich	Scheuerhecker Str. 3, D-53902 Bad Münstereifel (49-2257-1370)	
DL0ON	JO50	N. Rödel	Schwarzer Weg 8, D-95145 Oberkotzau (49-9286-6557)	
DL0SHF	JO54BH	Per Dudek	Wolblöken 3, D-24145 Kiel (49-431-713678)	
DL1VAA	JO61WB	Fritz Schramm	Schönfelder Landstr. 32, D-01474 Günnsdorf (none)	
DL3EAG	JO31DK	Stephan Flick	Emilie von der Loe Str. 3, D-47669 Wachtendonk (49-2836-7000)	
DL3YEE	JO42GE	Klaus Dreckshage	Schützenstr. 4, D-32257 Bünde (49-5223-5398)	
DL3YEL	JO41EV	Ulli Kratsch	Mangelsdorfstr. 10, D-33330 Guetersloh (49-5241-13543)	
DL4KG	JO31MB	Gerald Znoyek	Schöne Aussicht 3e, D-51381 Leverkusen (49-2171-768520)	
DL4MEA	JN58JD	Günter Köllner	Riedweg 10, D-86853 Langerringen (49-8232-8451)	
DL4XX	JO43XK	Andreas Lohmann	Kiefernweg 8, D-21217 Seevetal (49-4105-3422)	QRT May 98
DL5EBT	JN48UO	Ingo Lehmann	Einsteinstr. 37, D-89077 Ulm ()	Op of DL0UL/P
DL5FN	JO40FB	Dieter Naumann	Schillerstr. 30, 65439 Flörsheim (49-6145-32812)	
DL5YET	JO41EV	Markus Toppmöller	Nordhorner Str. 33, D-33335 Guetersloh (49-524125146)	ex DH5YAU
DL6NAA	JO50VF	Reinhold Völkel	Brunnenstr. 9, D-95191 Leupoldsgrün (49-9292-1525)	
DL6WU	JN49HT	Günter Hoch	Gersprenzweg 24, D-64297 Darmstadt-Eberstadt (49-6151-56505)	
DL6YDH	JO41NV	Ernst-Otto Köhne	Ölbergstr. 17, D-32816 Schieder-Schwalenberg ()	= DJ9YW
DL8OBU	JO42XI	Jürgen Kaufer	Vor den Gärten 26, D-31275 Lehrte-Ahlten (49-5132-94100)	
DL9EBF	JO31GH	Hans Peter Franken	Cornelius Str. 77, D-47918 Thönisvorst ()	
DL9EBL	JN69	Karl Schotz	Preussenstr.7, D-46149 Oberhausen 11 (49-208-666682)	
DL9KR	JO40DE	Jan Bruinier	Wittemannstr.29, D-65527 Niedernhausen (49-6127-2754)	
DL9NDD	JN59KN	Günter Kollmer	Bambergerstr. 65, D-91074 Herzogenaurach (49-9132-60871 w, -3579 h)	
EA2AGZ	IN91DV	Nicolas Garcia Vera	PO Box 35, Avda. Navarra. 63-2D, E-50500 Tarazona ()	
EA2BK	IN92ET	Jorge Raul, M. Iribarren 2-5.B, E-31008 Tamplona (34-48-264966 (18-20z))		Daglio Accunzi
EA2LU	IN92ET	Jorge Raul Daglio Accunzi, M. Iribarren 2-5.B, E-31008 Tamplona ()		
EA2LY	IN93AH	Enrique Gil Arranz, Paseo de Sanserreka 29-4-B, E-20009 San Sebastian (34-43-212084, Fax-669120)		
EA3DXU	JN11CM	José Maria Prat, Avda Onze de Setembre 60, E-08130 Santa Perpetua de Mogoda (34-3-5740234)		
EA3EHQ	JN01HR	Josep M. Parramona Mas, Ad. Santa Creu, E-2139 Menarguens ()		
EA3PL	JN11BL	Vicente Estruch	Tamarit 185 1-1, E-08011 Barcelona ()	
EA3UM	JN01XG	Magin C. Biosca, Avda. 317 No 27, E-08860 Castelldefels, Barcelona (34-3-6640386, Fax -4782818)		
EA5CJ	IM99TL	Jacinto Villaescusa Hernandez, PO Box 2347, E-46014 Valencia ()		
EA6ADW	JM19LU	Peter Cerveny, C/. Garriga 12, E-07460 Pollenca, Mallorca (34-71-534498 +Fax)		Mar-Nov
EA6FB	JM08PV	Jose Tur S.	PO Box 8, E-07830 San Jose, Ibiza (34-971-800275)	EA6IB-UHF-Group
EA6SA	JM19KO	Josep Riera Belmonte	Box 120, 07400 Alcudia, Mallorca (+34-908533933)	
EA8FF	IL18PB	Marc de Munck, PO Box 37, E-38650 Los Cristianos, Tenerife, Spain (34-89-350453)		(ON5FF)
F1ANH	IN98FG	Jean Pierre Lecarpentier, Le Haut Bignonnet, F-35490 Gahard (33-2-9955 6494)		
F1CH	JN23VF	Jacques Gibert, Le Bastidon, 348 Chemin du Matelas, F-83330 St Anne du Castellet ()		= F5SDD
F1CNE	JN28	Denis Deccooman	7 Rue des Coquelicots, F-51000 Chalon sur Marne ()	
F1EHN	JN18 ?	Jean Jacques Maintoux	30, Rue de Villacoublay, F-78140 Velizy ()	
F1FEN	JN25JC	Gilles Poulenard	16 Digue du Doux, F-07300 Tournon sur Rhone ()	
F1SDR		Jean Claude Zimmer	17 Rue des Landes, F-68730 Blotzheim ()	
F2TU	JN38LG	Philip Pierrat	BP 42, F-88102 Saint Die (33-3-2956 1236)	
F5AQC	JN05PU	Alain Coussedière	27 Ave Pierre Traversat, F-87100 Limoges (33-5-5538 1981)	
F5EAN	JN06CP	Jean Michel Suire	3 Route De Lhic, F-86170 Cisse ()	
F5ELL	JN18CX	Robert Monceau	24 Rue du Vercors, F-95100 Argenteuil (33-1-3982 6691)	
F5FLN	IN94SR	Michel Rousselet	709 Le Moulin, F-33880 Baurech (33-5-5678 7105)	
F5HRY	JN18EQ	Herve Biraud	37, Rue Pierre Brossolette, F-91600 Savigny Sur Orge (33-1-6996 6879)	
F5JJI	JO10	Gilles Carlier	5/20 Rue Verte, La Salamandre, F-59650 Villeneuve d'Asq ()	
F5KDK	JN23RH	Michel Tourbot, RCEME, 11 Place du Gaillardet les Balustres, F-13013 Marseilles ()		= F5SDD
F5MZN	IN87BU	Olivier Le Cam	Ciolex 38 BP11, F-29910 Tregunc ()	

F5PAU	IN88CB	Francis Hugon	Route de Trégourez, F-29370 Coray ()
F5PL	JN03XI	Bertrand Pinel	66 Rue de Dunkerque, F-11400 Castelnaudary (33-4-68230110, Fax-5047)
F5SGT	IN87JG	Chris Martin	Grande Rue, F-56680 Plouhinec (33-2-9736 7486) ex FD1SGT
F6CGJ	IN78	Louis Noblet	Coat Laeron, F-29290 Milizac ()
F6HKA	JN05OF	Bertrand Banlier	7 Impasse de Sologne, F-87170 Isle ()
F6HPP	JN19	Laurent Griffart	23, Rue de la Victoire, F-02200 Soissons ()
F6HYE	JN36	Patrick Magnin	Marcorens, F-74140 Ballaison (33-4-5094 1914)
F6KSX	JN18	Jean Jacques Maintoux	30, Rue de Villacoublay, F-78140 Velizy ()
F8SQ	JN18GR	Gerard Grossetete	13 Ave. de la Republique, F-91260 Juvisy sur Orge ()
F8ZW	JN38	Jean Paul Spindler	Le Rebgarten Quatzenheim, F-67117 Ittenheim ()
F9FT	JN29AG	Marc Tonna	134 Blvd Dauphinot, F-51100 Reims (33-3-2607 0047)
FR5DN	LG78QS	Philippe Mondon	20 Rue De L'Eglise, F-97425 Les Avirons (262-381-868, -939 Fax) Moved
G0BPU	JO02OB	Michael R. Johnson	23 Camden Road, Ipswich, IP3 8JW ()
G3HUL	JO02PP	Doug Mallet	45 Crown Rd, New Costessey Norwich, Norfolk NR5 0ES (44-1603-743646)
G3LQR	JO02QF	Simon J.W. Freeman	West Farm, Cransford, Woodbridge, Suffolk IP13 9PQ (44-1728-663493)
G3LTF	IO91GG	Peter K. Blair	Woodleigh, Upper Wyke, St.Mary Bourne, Andover, Hampshire, SP11 6EA (44-1264-5738251), Moved from 91RB to 91GG
G3SEK	IO91IP	Ian White	52 Abingdon Road, Drayton Abingdon Oxon OX14 4HP (44-1235-531559)
G3WDG	IO92RG	Charlie Suckling	314A Newton Rd, Rushden, Northants NN10 0SY (44-1933-411446)
G4ALH	IO90	Rob Scaife	Heyside Dodpitts Corner NWbridge, Is.of Wight PO41 0TN (44-1983-78716)
G4CCH	IO93RM	Howard Ling, 8 Spa Hill, Kirton in Lindsey, Gainsborough, Lincs DN21 4NE (44-1652-64897)	
G4DZU	IO93ES	Doug Parker, 50 Rein Road, Tingley, Wakefield, West Yorks WF3 1HZ (44-113-252 5552, Fax-9636)	
G4ERG	IO93SR	Peter Etheridge, 42 Wascana Close, Anlaby Park Rd, South Hull Humberside HU4 7BX	
G4KGC	IO92RG	Petra Suckling, 314A Newton Rd, Rushden, Northants NN10 0SY (44-1933-411446) = G3WDG	
G4KUX	IO94QW	Nick L Peckett	Fourwinds, Woodland Bishop Auckland Durham DL13 5RH ()
G4RGK	IO91ON	Dave Dibley	Brigadoon Bolter End, High Wycombe Bucks, HP14 3LU (44-1494-881654)
GD4IOM	IO74QD	Tony Ashcombe	13 Offley Rd., Sandbeach, Cheshire CW11 9AY () Expedition
GM0ONN	IO87IQ	Iain Barnetson	18 Ardivot Place, Lossiemouth IV31 6TE (44-1343-814623)
GM3JFG	IO77XR	Iain McHardy Rev. Canon, Beech Tree Cott., Navity, Cromarty, Ross-Shire IV11 8XY (44-1381-600451)	
GW3XYW	IO71XR	D. Stuart Jones, 22 Alltiago Rd., Pontardulais Swansea, W Glamorgan SA4 1HU (44-1792-882292)	
HA1YA	JN87GF	Gabi Draskovits	Karpati K.U.43, H-9700 Szombathely ()
HB9BBD	JN47EE	Dominique Fässler	Landhaus, CH-5642 Mühlau (41-56-6681944)
HB9BHU	JN37XG	Friedrich Schütz, Alpenblickweg 3, CH-4800 Zofingen (41-62-752828-1, Fax-9) see W0/HB9BHU	
HB9CRQ	JN47CF	Daniel A. Gautschi	PO Box 12, CH-5737 Menziken (41-62-7656060) no antenna
HB9CVD	JN36KW	Philippe Breguet	Rte de la Gare 49, CH-2017 Boudry () = HB9HLM, = HB9SAX
HB9DXG	JN46LA	Andrea Sonnleitner	Casa Foglia, CH-6945 Origlio () = HB9SUL
HB9JAW	JN47CE	Michel Winiger	Hotel Loewen, Luzernerstr. 43, CH-6025 Neudorf (41-41-931 0909)
HB9SUL	JN46LA	Andrea Bianchi, Via Arbostra 23E, CH-6963 Pregassona-TI (41-91-9416730 +Fax) 70cm dwn	
HB9SV	JN45LV	Enrico Ravarelli	, CH-6865 Tremona/Ti ()
HL5QO	PM45BD	Jinsun Yi Lee	, (0591-759 8123, Fax-751 2004)
HP3XUG	EJ88SS	Louis N. Anciaux, SATEL International, S.A., Apartado 417, David, Chiriqui (1-507-774 2124)	
I2COR	JN55BC	Luigi Zorzino	Piazza Roma 27, I-26100 Cremona (39-372-462217) dish down 4/98
I4CHY	JN54OK	Carlo Carini	Via Marchesini 14, I-40012 Calderara.Bologna (39-51-723184 (?))
I5CTE	JN53XG	Piero Baldelli	Cegliolo 17, I-52044 Cortona (39-575-612885)
I5MPK	JN53	Piero Moncini	Via Zizzolo 10/B, I-51016 Montocatini/PT ()
I5TDJ	JN53	Piero Moroni	Via V. Emanuele 43, I-50134 Firenze (39-55-473984)
I6PNN	JN72GL	Amato Patregnani	Contrada Macchiano 46, I-65015 Monte Silvano PE (39-85-835421)
I6QGA	JN63RJ	Gabriele Priori	Via Tamburini 12, I-60023 Collemarino Di Ancona () = IK6EIW
IK0BZY	JN61GW	Enrico Alunni Ferracci	Via Cavalca 84, I-00139 Rome (39-6-87122339)
IK0EQJ	JN61FO	Gennaro Perrone	Largo Gran Bretagna, 2, I-00040 Torvaianica, Roma (39-6-9172378)
IK1MTZ	JN35UB	Diego Sibona	Strada del Cresto 31, I-10132 Torino ()
IK2EAD	JN55EJ	Romeo Gargioni	Via Lizzera 18, I-25018 Montichiari Brescia ()
IK2OFO	JN45KL	Pirovano Roberto	Via Trieste 69, I-20010 Santo Stefano Ticino (39-2-97270721)
IK2RTI	JN55AD	Gianfranco Carubelli	Via Migliaro 13, I-26100 Cremona (-372-459035)
IK3COJ	JN65BL	Aldo Pico	PO Box 39, I-30038 Spinea Venezia (39-41-994543)
IK3GHY	JN65	Murador Glorgio	via Ca'Fornawin 57B, I-30030 Favaro U.T.O (VE) ()
IK4DCO	JN64GB	Paolo Lunedei	Via A Gramsci 6, I-47040 Veruchio Forli (39-541-679060)
IK4DCX	JN64GA	Marco Giannini	Via Martella 1932, I-47040 S. Ermete (39-541-758460)
IK5QLO	JN53FU	Andrea Ghilardi	Via di S.Alessio 1800/a, I-55100 Lucca S.Alessio (39-583-331329)
IK5WJD	JN53PS	Alex Giusti	Via Romanelli 54, I-50011 Firenze (39-55-621260 19-22z) ex IW5ABE
IK6EIW	JN63RJ	Stefano Magnarello	Via G. Marconi 48, I-62010 Montefano (39-733-850274) = I6ZAU & I6QGA
IN3HER	JN56TR	Raimund Eisenstecken	Oberdorf 99, I-39040 Vahrn (39-472-32396)
IN3KLQ	JN56RG	Giuliano Gilmozzi	Via Socce 3, I-38038 Tesero (Trento) (39-462-814542 work Fax)
IW5AVM	JN52NS	Marco Parmaggiani	PO Box 6, I-58100 Grosseto ()
IZ4BEH	JN54WL	Roberto Amadesi	, ()

JA0VI	PM95	Tsuyoshi Miyazawa,	8911 Mazumi-mura, Higashi-Chikuma-gun Nagano 399-11 (81-263-3485)
JA2JRJ	PM84MW	Tetsuro Okamoto	3-61, 5-Chome, Koike-Cho, Takahama City, 444-13 Aichi (81-556-53-0041)
JA2KRW	PM85NE	Tokuichi Aoyama	6-9 Hachimandai, Seto, Aichi 489 (81-561-84-8014 Fax)
JA2TY	PM84GS	Takuhei Matsugatani	4301-1 Shiratsuka-cho, Tsu-city Mie 514-01 (81-592-311718)
JA3IAF	PM74	Yoshifumi Tone	368 Nyukawa Kudoyama-cho, Ito-gun Wakayama 648-01 (81-736-54-2323)
JA3SGR	PM74TU	Toyoshige Kamei	3-30-23 noda Takatsuki city, Osaka 569 ()
JA4BLC	PM65NM	Yoshiro Mataka	20-12 Nanpeidai, Matsue-City, 690 Japan (81-852-24-0889 +Fax)
JA4CMZ	PM65MI	Hideki Iwata	1292 Kumano, Yakumo, Shimane-pref. 690-21 (81-852-540326 +Fax)
JA5NNS	PM63	Sho Shirakata	1-6-15 Shoenji, Matsuyama, Ehime 790 (+81-89-914 0221) op at JA5YJS
JA5OVU	PM74FC	Tom Atsusi Tatomi	Nishibun, Kamiita, Itano-Gun, Tokushima, 771-1330 (+81-886-94 3652)
JA5YJS	PM63	Sho Shirakata	1-6-15 Shoenji, Matsuyama, Ehime 790 (81-89-914 0221) op JA5NNS
JA6CZD	PM53FM	Shichiro Mori	1536-118 Kokubu-machi, Kurume Fukuoka 830 (81-942-21-4872) = JA6DGI
JA6XED	PM53	Hisao Tsukamoto	Kyo machi, Kurume Fukuoka 830 () = JA6ZHR
JA6ZHR	PM53	Hisao Tsukamoto	Kyo machi 212, Kurume Fukuoka 830 (81-942-34-3332) = JA6XED
JA7BMB	PM97WM	Hiroshi Ii	210 Higashi Funagamori, Ikki-machi, Aizu-Wakamatsu, Fukushima 965 (81-242-32-4321)
JA8ERE	QN02QX	Mikio Terui	13-2-4-51 Kawazoi, Minami-ku, Sapporo, Hokkaido 005 (81-11-571-1690)
JA8PL	QN03	Masa Sato	7-12 Hatusamu, Nishi-ku Sapporo City 063 ()
JA9BOH	PM86FA	Kimio Maegawa	67-9 Shimo Asojima, Ohno Fukui 912 (81-779-65-6059)
JF3HUC	PM74UX	Yoshitaka Takahashi	1-172 Kitafukunisi Cho3, Chome Nisikyoku Oe Kyoto (81-75-331-8065)
JH0YSI	PM85VJ	Toshio Furita	7329 Mutsuzawa, Shimojyo, Shimoina-Gun Nagano () PM85VJ/95JJ ?
JH1EFA	PM96UB	Shigeru Takeda	5-11-1 Higashi, Satte, Saitama 340-01 (81-480-435911)
JH1OFX	PM85SM	Shigeru Ohsawa	2749 Sanda, Atsugi-City Kanagawa Pref. (81-462-41-0099)
JH1WLK	PM95TR	Shigeru Motohashi	Syakujiidai 2-7-2, Nerima-ku, Tokyo 177 (81-3-3997-4128)
JH1XUJ	PM95UR	Akihiko Kodama	6-28-24 Higashi-Nagasaki, Toshima Tokyo (81-3-3958-4014)
JH3EAO	PM74KR	Takao Sugimoto	469-47 Wada Inamicho, Kakogun, Hyogo 675-11 (81-7949-2-4182)
JH4JLV	PM54LA	Kazuhiko Shimanaga,	21-19 Chofumatuodaminami, Shimonoseki, Yamagushi 752 (81-832-45-3934)
JH5LUZ	PM63FK	Yasumasa Sasaki	Edooka 2-2-15, Yawatahama-City, Ehime 796 ()
JH7PAV	QM07DI	Motoji Yoshita	4 Kita, Kawata, Mihota-machi, , Koriyama-City, Fukushima 963-01 ()
JI3GER	PM75XA	Katsumi Inagaki,	224-1-A207 Nakazawa Ritto, Kurita-gun, Shiga-Pref, 520-3025 (81-77-552 8920)
JJ1NNJ	QM06GH	Kouichi "Kho" Seki	262 Motoishikawa-cho, Mito-city, Ibaraki 310 (81-29-247 3023)
JL1ZCG	PM95UM	Nakayoshi QRP Club	4-8 Asano-cho, Kawasaki-ku, Kawasaki-City, 210 (81-44-333-6681)
JO3JJN	PM85AC	Seishin Okamoto	342-1, AOJI-Cho, Kusatsu-City, Shiga 525 () & JQ3JUG
JO3RNL	PM74TT	Kouji Nakano	Miyanosaka 3-20-7, Hirakata-City, Osaka 573 (81-720-47-9487)
JO3SBC	PM74TU	Tsutom Okamoto	34-12 Akeno-cho, Takatsuki, Osaka 569 ()
JR1EUX	PM95TO	Hideaki Ohkubo	5 Mizonokuchi, Takatsu-ku, Kawasaki-city, Kanagawa 213 (81-44-8117227)
JR1RCH	PM96SI	Katsuhiro Ohyanagi	528-7 Tanuma, Tanuma, Aso-Gun, Tochigi-Pref, 327-03 (81-283-62 1745)
JR4AEP	PM65RH	Kenichi Watanabe	1-13 Nishimochida-cho, Matsue-city Shimane 690 (81-852-23-2481)
JR4BRS	PM65	Toshihiro Nagao	400-12 Sada Rodoe-cho, Saihaku-Gun Tottori 689-35 (81-859-56-3672)
JR9NWC	PM85BW	Hideyuki Taniguchi	60-12-2 Kataya-cho, Takefu City, Fukui 915 () = JR9OCN, JR9OPJ
JS3SIM	PM74VW	Hiroshi Fujii	22-13 Nakajima-cho, Mukaijima Kyoto, 612 Japan (81-75-611 6522) Loc ?
K0DAS	EN42EB	Rod Blocksome	690 Eastview Dr., Robins, IA 52328 (1-319-393-8022)
K0RZ	DM79JX	Bill McCaa	PO Box 3214, Boulder, CO 80307 (1-303-499-1936)
K1FO	FN31QJ	Steve Powlishen	816 Summer Hill Rd, Madison, CT 06443 (1-203-421-4836)
K1OR	FN42IR	John Swiniarski	3 Wheaton Dr., Pelham, NH 03076 (1-603-898 6004) ex WA1TFH
K1RQG	FN54	Joe Demaso	HCR 78 Box 56, Bucksport, ME 04416 (1-207-469-3492)
K1RSA	FN43TP	Harry White	135 Running Hill Rd., Scarborough, ME 04074 (1-207-772-1413)
K1VYU	FN31UE	Ron Sizer	179 Malabar Dr., Westbrook, CT 06498 ()
K2DH	FN12FO	Dave Hallidy	8747 Tabors Corners Rd., Wayland, NY 14572 (1-716-728-9517) ex KD5RO
K2OS	FN13CD	Frank J. Pollino	149 Whittier Rd, Rochester, NY 14624 (1-716-594-0502)
K2UYH	FN20OF	Allen Katz	1621 Old Trenton Rd., Trenton, NJ 08691 (1-609-443-3184, Fax -1713)
K3EAV	FN10	William Blazina jr	, () nw W3XS
K3HZO	FN20AG	Harry J. Price	117 Mount Penn Road, Shillington, PA 19607 (1-610-7968543)
K3LFO	FM19	Jim Erickson	3933 London Bridge Rd., Sykesville, MD 21784 (1-410-549 1041)
K4HWG	FM18IP		, () nw W4AD
K4PKV	EM95	Dick Hattaway	450 Ridgeview Dr., Mocksville, NC 27028 (1-704-634-3751)
K4QI	FM06	Rusty Holshouser	3701 Carrington Lane, Efland, NC 27243 (1-919-304 4246) ex K4QIF
K4QIF	FM06	Rusty Holshouser	, () now K4QI
K5AZU	EM40	Ray May	PO Box 43, Natalbany, LA 70451 (1-504-345 2643)
K5GW	EM13PA	Gerald Williamson	113 Starlite Dr., Plano, TX 75074 (1-214-423 5286)
K5JL	EM15	Jay G. Liebmann	2224 Morgan Rd. NE, Piedmont, OK 73078 (1-405-373-3758)
K5WXN	DM61	Dan Hunt	10904 Middledale, El Paso, TX 79934 (1-915-821-7209)
K6HXW	CM95RD	Mike Goshay	, () now W6WE
K6IBY	DM13	Joseph F. Burke	315 University Dr., Costa Mesa, CA 92627 ()
K7WUP	DM49IG	Shirlef L. Powell	1050 E 900 N, Spring City, UT 84662 (1-801-462-3309)

K7XC	DM09BP	Tim C. Marek	360 Prestige Ct, Lemmon Valley, NV 89506 (1-702-972 4722)	ex NC7K
K7XD	CN85PR	Derek Hutter	10203 NW 20th Ave, Vancouver, WA 98685 (1-360-573 9673)	
K7XW	CN96XI	Mark S. Tucker	2131 Reeves Road, Sunnyside (1-509-837 6265)	ex KB7UWC
K8UK	EN82KN	Jack Ancona	3033 Albany Dr., Sterling Hts, MI 48310 (1-313-264-2813)	ex WA8HTL
K9BCT/4	EL96UE	Randy Terrell	12021 NW 27 Ct., Plantation, FL 33313 (1-954-472 3846)	
K9EK	EM79BF	Edward Krome jr.	1023 Goldfinch Rd., Columbus, IN 47201 (1-812-379-9433)	ex KA9LNV
K9HMB	EN52VI	Frank Miller	27087 W Nippersink Rd., Ingleside, IL 60041 (1-312-587 5080)	
K9KFR	EN71GG	Robert Johnson	3580 E 600 N, Columbia City, IN 46725 (1-219-691-3743)	
K9KL	EN	Gregg Seidl	, Green Bay ()	
K9ZZH	EN61	Richard Bennett	208 Kentucky St., Park Forest, IL 60466 (1-708-748-9414)	
KA0RYT	EN34DW	Ronald D. Bergantzel	3037 Highland Blvd., Mound, MN 55364 (1-612-472 5201)	
KA0RYT/0	EN24	Ronald D. Bergantzel	3037 Highland Blvd., Mound, MN 55364 ()	= KB0PYO, 23cm contest only
KA1OTP	FN41	Merton Whatley jr.	239 Cole Ave., Warwick, RI 02886 ()	
KA3WSZ	FM29GK	Jim Phillips	402 Durso Dr., Newark, DE 19711 (1-302-737-7966)	= KB3PD
KB0HH	EM07QD	Gary Gerber	511 S. Lincoln, Anthony, KS 67003 (1-316-842-5079)	
KB0PYO	EN24GP	Mark Brown	RR1 Box 195, Echo, MN 56237 (1-507-925 4025)	
KB2AH	FN20	Tom Dinyovsky	405 Union Ln., Brielle, NJ 08730 (1-908-223-8124)	
KB3PD	FM29DQ	Rick Phillips	402 Durso Dr., Newark, DE 19711 (1-302-737-7966)	= KA3WSZ
KB4WM	EM63	John Howard	PO Box 473, Childersburg, AL 35044 (1-205-378-6416)	FCC: PO Box 109
KB7UWC	CN96XI	Mark S. Tucker	, ()	now K7XW
KB8RQ	EN80AD	Gary L. Crabtree	1129 Kiser Lake Rd., St Paris, OH 43072 (1-513-663-5455)	
KB8ZW	EN91IJ	Bill Takacs	16724 Snyder Rd., Chagrin Falls, OH 44022 (1-216-543-4991)	
KC6A	DM03	Jim Steffen	6831 Espanita St., Long Beach, CA 90815 ()	
KD0GT/7	CN87RP	Marty Eichenberger	10611 NE 154 Place, Bothell, WA 98011 (1-206-487-1224)	
KD1DU	FN31FH	Del Schier	126 Old West Mountain Rd., Ridgefield, CT 06877 ()	
KD4LT	EM81CG	Clyde Scott jr.	293 JC Saunders Rd., Moultrie, GA 31768 (1-912-8902506, -9850864 Fax)	
KD5RO/2	FN12FO		, ()	now K2DH
KD6R	DM13NI	Gene Powers	PO Box 42, Palomar Mtn., CA 92060 (1-619-742-3374)	
KE7CX	CN85LJ	Bill Clemow	SW Laurelview Rd, Hillsboro, OR 97123 (1-503-628 1046)	
KF0M	EM17HO	John D. Lock	603 East 53rd South, Wichita, KS 67216-4504 (+1-316-554 0597)	
KJ7OG	DM42MH	Stephen Bell	1702 E. Camino Cielo, Tucson, AZ 85718 (1-502-297 1282)	
KL7FB	BP51HO	Chris Hazlitt	HC01, Box 6185-A10, Palmer, AK 99445-9801 (1-907-745 2919 ?)	Loc ?
KL7HFQ	BP51	Roger K. Hansen	PO Box 520343, Big Lake, AK 99652 (1-907-892 6365)	
KL7WE	BP51	Tim Pettis	2132 Arlington Dr., Anchorage, AK 99517 ()	Silent Key Oct 96
KN6DD	DM03	Alex Bojarski	2161 Gale Avenue, Long Beach, CA 90810 (1-310-432-3702)	ex KC6PEF
KN6M	EM13SD	Morrie Young	Rt. 5, POBox 430A2, Princeton, TX 75407 (+1-972-734 8877)	
KU3T	FN20HG	Joseph S. Keer	468 Cheswyck Drive, Harleysville, PA 19438 (1-215-256 1464)	
KU4F	EL89	Thorn Cockram jr.	6210 NW 128th St., Gainsville, FL 32606 (1-904-332-5206)	
LA8AE	JO59CC	Ole Kval jr.	Makeveien 26, N-3200 Sandefjord ()	
LA8LF	JO59BR	Anders Thorrud	Jerpeveien 20, N-3030 Drammen (47-32-884083, GSM:92641881)	
LU4DHD	GF05TE	Willy Nanni	Espania 675, Burzaco (1852), Buenos Aires ()	
LU4HO	FF78UJ	Eduardo van Ooteghem, Aconcagua, VGB 5194, Cordoba (0546-62632)		ex LU7DZ
LU6DW	GF05SF	Marc Franco	Charlone 468B, Llavallol (1836), Buenos Aires ()	
LX1DB	JN29	Willy Bauer	12 Rue Batty Weber, L-5254 Sandweiler (352-358012)	
N2HLT	FN12	Leon Ingerick Jr.	4189 bath Rd., Penn Yan, NY 14527 (1-315-5363103)	
N2IQU	FN13	Mark Gummer	7463 Canton St., Baldwinsville, NY 13027 (1-315-635-9310)	
N2NQI	FN20WW	Meg Robinson	18 Lowe Ave., Fair Lawn, NJ 07410 (1-201-796-1612)	WW2R's wife
N4GJV	EM95PS	Ron Barlow	14245 Cool Springs Rd., Cleveland, NC 27013 (1-704-278-2880)	
N4MW	FM17KN	Dave Meier	6560 Marl Springs Dr., New Kent, VA 23124 ()	was EM55 in TN
N4PZ	EN52GA	Steve Gross	602 W First St, Mt. Morris, IL 61054 (1-815-734 4255)	
N4UK	EM84XP	Ken Ramirez	, ()	SC Exped. Jan 97
N5QGH	EM13QC	Bryan Ward, 2375 Forest Grove Estates Rd., Allen, TX 75002 (1-214-542-6817)		W5LUA's son
N6BQ	CM97BG	Ron (Hoppy) Hopkins	1734 Hudson Dr., San Jose CA 95124 (1-408-264-6417)	ex AA6WI
N6ECG/7		Jim Weaver, 16611 25th St. Ct. E, Sumner, WA 98390 (1-206-891 9665)		Active in Summer 97
N6NNN		Victor Wild	5797 Honors Drive, San Diego, CA 92122 ()	
N6OVP	CM87	David La Spina	24 Parkview Circle, Corte Madera, CA 94925 (1-415-927-7614)	
N7ART	CN94	Russell L. Miller, 12041 SW Peninsula Dr., Crooked River Ranch, OR 97760-9233 (1-541-548 1221)		
N7TYQ	DN14XN	Jeremy	, ()	nw W7EME
N8AXA	EM79UP	Axel Russo	PO Box 20401, Dayton, OH 45420-0401 (none)	
N8DJB	EN81FJ	Craig Henderson	7368 Scotch Ridge Rd., Pemberville, OH 43450 (1-419-353-7570, -9987 Fax)	
N8ZAT	EM79	Lisa Palis	PO Box 401, Forrer Ave., Dayton, OH 45420 (none)	
N9AB	EN52	Andrew Bachler	28571 N. Lemon Rd., Mundelein, IL 60060 (1-708-566-0594)	
N9KC	EN52	Louis A. Eckert	403 Fairlawn Dr., Round Lake Park, IL 60073 (1-708-742-2045)	
NA4N	FM18	Greg Drzyzga, 6608 Kelly Rd., Warrenton, VA 20187 (1-540-3613681)		soon Amisville, VA 20106
NA6E	CN82	Bob Lahde, 474 Crystal Springs Rd., Grants Pass, OR 97527 (1-503-471-3044)		Locator guessed..

NC1I	FN32	Frank Potts	65 Hastings Rd., Southwick, MA 01077 (1-413-569-0314)
NC7K		Tim C. Marek	, () now K7XC
NF7P	DM09GH	Larry E. Gillespie	5060 Bobolink Cr., Reno, NV 89506 (1-702-972-7245)
NL7F	BP64DU	William J. Beam	166 City Lights Blvd., Fairbanks, AK 99712-1603 (1-907-457 2727)
NP4B	FK67	Bob K. Zimmerman jr.	P.O.Box 995, Arecibo, Puerto Rico 00613 (1-787-878 6723)
NU7Z	CN87ST	Rick N. Beatty	23115 84th Ave. W, Edmonds, WA 98026 (1-425-775-9196) = N7BNJ
OE3JPC	JN88EB	Johannes Pichler	Johann Siegmayer-Gasse 5, A-2361 Laxenburg (43-2236-718025 (07-21z))
OE5JFL	JN68RL	Hannes Fasching	J. Haydnstr. 21, A-5280 Braunau (43-7722-5291)
OE6AP	JN77SB	Alois Pendl	Hohenrainstr.146, A-8042 Graz Sankt Peter ()
OE8FNK	JN66TS	Werfried Kuneth	Politzen 28, A-9702 Ferndorf (43-4767-290)
OE9ERC	JN47VL	Erich Rupprechter	Bregenzerstr. 27, A-6922 Wolfurt (43-5574-79505, Fax-79771)
OE9FKI		Franz Kiensperger	Juexweg 6, A-6804 Feldkirch Altenstadt ()
OE9PMJ	JN47VL	Peter Riml	Markstr. 35, A-6971 Hard (43-5574-75330 Fax) & OE9YTV
OE9XXI	JN47VL	Peter Riml	Markstr. 35, A-6971 Hard (43-5574-75330)
OE9YTV	JN47VL	Riml	Markstr. 35, A-6971 Hard (43-5574-75330 Fax) = OE9PMJ
OH2AXH	KP20OK	Pertti Hohtio	Kaskela, FIN-04200 Kerava (358-0-1480 7521 OH2AUE) no English..
OH2DG	KP30CK	Eino Metsamaki	Niittykatu 3, FIN-07900 Loviisa (358-15-535693)
OH2PO	KP10XH	Matti Rouhiainen	Talvia 807, FIN-08100 Lohja ()
OH3LWP	KP11WK	Ari Vaisanen	Matinlahdentie 228, FIN-33720 Tampere (358-31-3171887, -2725409 Fax)
OH5IY	KP30HV	Ilkka Yrjölä	Jukolantie 16, FIN-45740 Kuusankoski (358-51-3743745)
OK1CA	JO70GM	Franta Strihavka	Kuttelwascherova 921, 19800 Praha 9 (42-2-81910081)
OK1DFC	JO60TP	Zdenek Samek	Okruzni 338, CZ-43513 Mezibori (+420-603-489480) = OK1CA
OK1KIR	JN79DW	Antonin Jelinek	U Dobranskych 5/271, 110 00 Praha 1 (42-601-209249)
OM1TL	JN88ND	Stefan Lazovy	Pionierska 11, 83102 Bratislava () ex OK3TL, = OM1TF
ON4ANT	JO20AR	Johan van de Velde	Rezedalaan 5, B-1770 Liedekerke, BT (32-53-664701) & ON4GG
ON4GG	JO20AR	Geert van de Velde	Rezedalaan 5, B-1770 Liedekerke, BT () & ON4ANT
ON4KNG	JO20	Peter Nagy	Rue Heideken 56, B-1083 Brussels (32-2-4263792)
ON4UV	JO20BK	Marc Gilissen	Rue Rouge Croix 6, B-7100 St Vaast (32-64-227132)
ON5RR	JO20CX	Marc Kleyn	Burchtlaan 28/3, 1785 Merchtem (32-52-373041)
ON6JY	JO20VP	Luc Halbach	Rue de Herve, 28, B-4651 Battice (32-87-661281)
OZ1HNE	JO57GG	Jorgen Kristiansen	Stidsholtvej 2f, DK-9300 Saeby (45-98-469108)
OZ1IPU	JO57GH	John Soerensen	Rosenvej 49, DK-9300 Saeby (45-9846-3311, -7877 Fax)
OZ4MM	JO55GH	Stig Vestergaard	Mollevej 7, Tarup, DK-5792 Arslev (45-65972026, Fax-76405088)
OZ7UHF	JO65ER	Soeren Pedersen	Sennepshaven 87, 1.tv., DK-2730 Herlev ()
PA0AVS	JO22	A.N. Vroom	Gramserweg 69, NL-3711 AV Austerlitz (NL-343-520132)
PA0PLY	JO22	Jan Kappert	Muiderbos 63, NL-2134SN Hoofddorp (31-23-5634591)
PA2CHR	JO22XA	Chris Ploeger	Monnikensteeg 32, NL-6823 AC Arnhem (31-26-3515999, fax-4452502)
PA3CSG	JO21WD	Geert H.M. Staams	Ittervoorterweg 60, NL-6017 BZ Thorn (31-114313552)
PA3DZL	JO21HM	Jac de Bruyn	Vinkenstraat 4, NL-4711JZ Sint-Willebrord (31-165387346)
PY5ZBU	GG54IN	Dr. Don W. Murden	Araucaria DX Group, PO Box 37, CEP 80001-970, Curitiba (55-41-3354833) G3MWM
RA3YCR	KO73DH	Viktor Belewandew	PO Box 78, Bryansk, Russia 241012 ()
RW3BP	KO85WS	Sergei Joutiaev	PO Box 462, Moscow 111555 () ex UW3FL
RW3RW	LO02RW	Valerij Butisov	Goreloje, Tambovskaja Obl, Russia 393000 ()
S50X		Silvio Obrul, Tomsiceva 43, Slovenj Gradec, 62380 (386-602-43430, Fax-45120)	Op at S59DCD
S51ZO	JN86DR	Joze Herman	Lendavska 37c, 69000 Murska Sobota, Slovenija (386-69-32171)
S52CW	JN76	Uros Hirci	Gorica 14, 64240 Radovljica (+386-64-715 554)
S53M	JN86BS	Radio Klub Murska Sobota, Borovnjakova 3, P.P. 70, 9000 Murska Sobota, Slovenija ()	
S53WW	JN76EC	Robert Vilhar	Ziherlova 41, 1000 Ljubljana (386-61-217083) ex YU3WW
S56UUU	JN76EC	Marko Cebokli	Topniska 45, 1000 Ljubljana, Slovenija () Locator unsure
S57Q	JN76PA	Tone Krajnc	Drozanjska 19, 68290 Sevnica (386-608-82077)
S59DCD	JN76NL	Silvo Obrul, S59DCD EME Team	Tomsiceva 43, 2380 Slovenj Gradec, Slov. (386-602-43430)
SM0ERR	JO89WJ	Mart Sakalov	Bjoerkebyvaegen 31, S-175 62 Jaerfaella (46-8-361905)
SM2BYA	KP07DU	Gudmund Wannberg	Duvvägen 22, S-98137 Kiruna (46-980-81148)
SM2CEW	KP15CR	Peter Sundberg	Person 8811, S-95190 Lulea (46-920-70025)
SM2CKR	KP03DT	Matts-Ula Fredriksson	Flottargatan 5, S-90421 Umea ()
SM2EKM	KP05UW	Jan Holm	PO Box 139, S-96122 Boden ()
SM3AKW	JP92AO	Karl G. Mohlin	Harnon, Notsand 1, S-87193 Haernoesand (46-611-79020 +fax)
SM4DHN	JP60VD	Lars-Bertil Karlsson	Gustavsfors 61, S-68391 Hagfors (46-563-26061, Fax-26105)
SM4IVE	JO79SD	Lars Petersson	Talby Smegarden, S-71594 Odensbacken (46-19-450223) Dish destr. 2/97
SM5CFS	JO99IQ	Bjorn Eriksson	Vestergardet PL 6992, S-76193 Norrtalje (46-176-66211)
SM5DGX	JO89NW	Anders Florin	Peterslund, S-74021 Jarlasa (46-18-391128)
SM5GEP	JO77IP	Haakan Andersson	Westmansgatan 68, 5, S-58346 Linkoping (46-13-274200) ex SM7GEP
SM5QA	JO89WJ	Karl Gosta Forssen	Banv 44, S-17561 Jerfella ()
SM6CKU	JO67	Bengt-Arne Jöckert	Allatorp 1446, S-43033 Fjärås (46-300-44389)

SM6EUP	JO57XQ	Hans Pousette	Andra Langgatan 4 C, S-41303 Gothenburg (46-31-140818)
SM6FHZ	JO57XJ	Ingolf Larsson	Svaengehallavaegen 811, S-43992 Onsala (46-300-63323)
SP5CJT	KO02OD	Mike Chominski	PO Box 135, PL-00-961 Warsaw 42 (48-22-6322700, work -349477)
SV1BTR	KM17VX	Dimitris Vitorakis	Agias Lavras 11-13, Zografou 157 73, Athens (30-1-7480100)
SV1OE	KM17VX	Costas Georgiou	Smirnis 12, Zografu Gr, 15772 Athens ()
TM8EME		via F5HRY	, () = F1HDI, =FF1EME
UA3TCF	LO26IU	Alexandr Baryschev	PO Box 155 (Posewnaja 1A kw 17), Nizhni Novgorod, Russia 603009 ()
UA4API	LO20QC	Victor Adushev	Leonova 7-29, Kamyshin, Volgogradskaja Obl, Russ. 403805 ()
UA4NM	LO48UO	Vladimir Suvorov	PO Box 850, Kirov, 610030 ()
UA6LGH	KN97LF	Viktor Bagrintsev	Koshevogo 32, Taganrog, Russia 347927 ()
UA6LJV	KN97LE	Sergey Golowin	Tkashenko 11, Taganrog -5, Russia 347905 ()
UA9FAD	LO88DA	Viktor Kotelva	Plekhanov 52 kw 51, Perm, Russia 614081 () QSL mgr: DK3WG
UA9XEA	LP63UN	Sergej Omeljanenko	Post-Box 44, Uchta-12, Komi, Russia 169400 ()
UR3EP	KN78WM	Vladimir	PO Box 447, Pavlograd 5, ()
UR4LL	KO80AD	Alex Gavva,	Lenina 8, Zolochev, Kharkov Obl, Ukraine 312220 (057-64 9 25 21) ex UB4LL
UR5LX	KO70WK	Sergej Lysenko, Zolochev Reg., Iwaschki, Kharkov Obl, Ukr. 312211 (7-5764-98638) ex RB5LGX	
UT1PA	KO21FC	Alexandr Moroz	Mira 14, Turijsk, Wolynskaja Obl, Ukraine 264970 () ex RB5PA
UT3LL	KO70WK	Valery	, ()
UT5DL	KN18EP	W.P. (Slava) Baranov	PO Box 98, Uzhgorod, Ukraine 294018 ()
UT5EC	KN78LM	Valery Petrushenko, PO Box 214, Dniepropetrovsk-59, Ukraine 320059 (++0562-793522) ex RB5EC	
UT7VF	KN68MQ	Victor Maslov	silent key (ex UB5VJF)
VE1ALQ	FN65VG	Darrell G. Ward	PO Box 576, Grand Bay, NB E0G 1W0 (1-506-738-2734 +Fax)
VE1OD	FN84	Elmer Naugler	509 Clayton Park Dr., Halifax, NS B3M-1L6 (1-902-443-4181)
VE1ZJ	FN96UC	John M. Currie	70 Causeway Dr., Sydney, NS, B1L 1C5 (1-902-562 7405) ex VE1BVL
VE1ZJ/1	FN95SV	John M. Currie	70 Causeway Dr., Sydney, NS, B1L 1C5 (1-902-562 7405) ex VE1BVL
VE3BQN	FN04BP	Ted Sparrow	RR #2, Elmvalle, ONT L0L 1P0 (1-519-657-6502)
VE3KDH	FN03CL	Kevin Hobbs	1670 Lower Base Line, RR#4 Milton, Ontario L9T 2X8 (1-905-878 9190)
VE4MA	EN19LU	Barry Malowanchuk	54 Boisselle Bay, Winnipeg, Manitoba R3X 1M4 (1-204-254-4178)
VE6AFO	DO31AC	Ken Oelke	7136 Temple Dr. NE, Calgary, ALB T1Y 4E7 ()
VE6TA	DO31AH	Grant Furnald	PO Box 3455, Airdrie, ALB T4B 2B7 (1-403-948-7555)
VE7CLD	CN89	Günter Neugebauer	4592 St Catherines St., Vancouver, BC V5V 4M5 (1-604-874-8037 +Fax)
VK1VP	QF44NR	Edwin Penikis	5 Westgarth St., O'Connor 2601 (1-616-2496348)
VK2ALU	QF55KN	Lyle Patison	98 Heaslip St., Woollongong, NSW 2500 ()
VK2BE	QF56NC	Lyell W. Louttit	17 Thompson St., Earlwood, NSW (61-2787-2958 +Fax)
VK2FZ/4	QG63KF	Adrian Pollock	295 Landsborough Road, Maleny, QLD 4552 (61-87 35 9014) Moving..
VK3UM	QF22RO	Doug McArthur	"Tikaluna" 26 Old Murrindindi Rd., Glenburn. Vic. 3717 (613-5797 8478)
VK4KAZ	QG62MP	Allan Downie, 17 Leeson Street, Boondall Heights, Brisbane, Queensland 4034 (61-7-3265 2043)	
VK5MC	QF02EJ	Chris Skeer	Heatherleigh Via, Millicent 5280 So.Australia (61-887-359014)
VO1AV	GN28QW	Ron Thompson	9 Medcalf Street, Gander, NF, A1V 1R9 (1-709-256 1179) was FP5EK
W0/HB9BHU		Friedrich Schütz Inc.	11674 Lackland Rd., Saint Louis, MO 63146 (1-341-4321998)
W0AH	DM78LX	Douglass M. Allen	PO Box 5646, Woodland Park, CO 80866 (1-719-687-3549) ex W2CRS/0
W0HHE	DM79	Al Lorenz	4410 W Vassar Ave., Denver, CO 80219 (1-303-935-0540)
W0KJY	DN70KM	Jim Starkey jr.	3845 Capitol Dr., Ft. Collins, CO 80526 (1-970-226-0669)
W0RAP	EN42EA	Robert Drake, 291 Crandall Dr. NE, Cedar Rapids, IA 52402 (1-319-377-3929) dish destroyed	
W0RRY/5	EM25BX	Charles E. Calhoun	12762 S 122 E Ave., Broken Arrow, OK 74011 (1-918-371-6059)
W0SD	EN13GQ	Ed Gray	Rt. 2 Box 151, Salem, SD 57058 (1-605-425-2354)
W1JR	FN42	Joe Reisert jr.	3 Hubbard Rd., Amherst, NH 03031 (1-603-673-5232)
W1ZX/3	FM18LG	Willy Mank	7620 Bensville Rd., Waldorf, MD 20603 (1-301-645-5584)
W2CRS/0	DM78LX		, () now W0AH
W2PGC	FN02OR	Nels H. Samuelson jr.	47 Therin Dr., Hamburg, NY 14075 (1-716-649-7795)
W2SZ	FN22	Bill Ryan, RPI Amateur Radio Club	CC140, Troy, NY 12181 ()
W2T	EL96		, () = W4OP, special call
W2UHI	EN73AI	Frank B. Lumney	6275 W 124th St., Grant, MI 49327 (1-616-834-8016)
W2WD	FN20TP	Warren Butler	2305 Morse Ave., Scotch Plains, NJ 07076 (1-908-233-4460)
W3VH	FN32HG	Rolfe Tessem	PO Box 793, Great Barrington, MA 01230 (1-413-528-5966)
W3XS	FN10	William Blazina jr	RD 3 Box 219M, Huntingdon, PA 16652 (1-814-643-5264) ex K3EAV
W4AD	FM18IP	Jack O'Mara	14104 Mt. Pleasant Dr., Woodbridge, VA 22191 (1-703-494 3321) ex K4HWG
W4DEX	EM95	Dexter (Joe) McIntyre	16164 Pless Mill Road, Stanfield, NC 28163 () ex WA4ZIA
W4HHK	EM55HA	Paul Wilson	PO Box 73, 226 Peterson Lake Rd., Collierville, TN 38017 (1-901-853-7373)
W4ODW	EM60SM	Ronald E. Monk sr.	103 Keller Ct., Niceville, FL 32578 (1-904-678-3179) Ant destroyed
W4OP	EL96	Dale Parfitt	6869 Bayshore Drive, Lantana, FL 33462 (1-407-586-8278) ex WA2YPY
W4RDI	EL96BQ	Don Carlson	16307 Horizon Rd., N Ft. Meyers, FL 33917 (1-813-543-8432)
W4TJ	FM08SC	Bill Lakatosh	735 Yorkshire Rd., Earlysville, VA 22936 (1-804-978-4853) ex AA4TJ
W4WD	DN40AM	Russell G. Wicker	12479 Janice Dr, Riverton, UT 84065 ()
W5AJ	EL29	Robert Wood	(?), Kemah, TX (1-281-474 1022)

W5LUA	EM13QC	Al Ward, 2306 Forest Grove Eatates Rd., Allen, TX 75002 (1-972-562 6018)		ex WB5LUA
W5RCI	EM44UF	Rex Turner	303 Third St., Marks, MS 38646 (1-601-326-8870)	
W5ZN	EM45DH	Joel Harrison, 528 Miller Rd., Judsonia, AR 72081 (+1-501-729 4152, Fax-5227)		ex WB5IGF
W6/SM0PYP		DM12JU	Paul Chominski5021 Via Papel, San Diego, CA 92122 (1-619-623-9693 +Fax)	
W6VPH	DM04 ?	Lawrence W. Ansley	2535 S. Myrtle, Monrovia, Los Angeles, CA 91016 ()	
W6WE	CM95RD	Mike Goshay	636 Printz Rd., Arroyo Grande, CA 93420 (1-805-489-8300)	ex K6HXW
W7BBM	DM42MB	John Molloy	5625 W Molloy Rd., Tuscon, AZ 85705 (1-602-743-7028)	ex WA7BBM
W7CI	DM41UN	Steve Wagner	2833 Oriole Dr., Sierra Vista, AZ 85635 (1-602-458-6946)	
W7CS	DM42OO	Chuck Smallhouse	POBox 1540, Oracle, AZ 85623 (+1-502-896 2891)	ex WA6MGZ
W7EME	DN14WV	Jeremy Alexander	P.O.Box 1818, McCall, ID 83638 (1-208-634 4466)	ex N7TYQ
W7FN	CN88SA	Don Q. Roberts	5880 S Pioneer Park Pl., Langley, WA 98260 (1-360-321-4615)	
W7GBI	DM43	Charles Justinak	7045 N 69th Pl., Scottsdale, AZ 85253 (1-602-948-6106)	
W7HAH	DN26XK	Francis D. Shepard	561 Groff Ln., Stevensville, MT 59870 (1-406-777-2136)	
W7ID	DN13UN	Jeff Bishop	14063 Towers Dr., Caldwell, ID 83605-8233 (1-208-323-9267)	New Loc ??
W7KK	CM88VC	David Eubanks	780 Rose Drive, Benicia, CA 94510-3655 (+1-707-7467175)	
W7QX	DM44AR	Jerry Kleker jr.	445 Rocking Chair Rd, Cottonwood, AZ 86326 (1-602-634-9522)	ex W9QXP
W7TVF	DM26	Bill Dawson	PO Box 4049, Pahrump, NEV 89041 (1-702-727-5719)	
W7VQQ	DM19 ?	Frank Turk	Rt. 2 Box 12, Round Mountain, NV 89045 ()	Or DM18 ?
W7ZRC	DN13	Rod Greene	11322 Hollandale Dr., Boise, ID 83709 (1-208-376-8136)	
W8ATH	EN80	Bob Brubaker	3188 Barber Road, Norton, OH 44203 ()	
W8IDU	EN83	Arthur Martin	731 S Fitch Rd., Carsonville, MI 48441 (1-517-479-6890)	FCC: MI 48419
W8MQW	EN72UR	Chuck MacCluer	1390 Haslett Rd., Williamston, MI 48895 (1-517-655-5153)	
W8TN	EM98CW	Clark Stewart	104 Henrietta St., Ravenwood, WV 26164 (1-304-273-4680)	
W9IP/2	FN24KO	Mike Owen	2881 C.R. 21, Canton, NY 13617 (1-315-379-9669)	
W9QXP	DM44AR		, ()	now W7QX
WA2YPY		Dale Parfitt	, ()	now W4OP
WA3FFC	FN01	Scott Mathewson	RD 2 Box 262, Brookvile, PA 15825 (1-814-849-7830)	
WA4LBT	EM95	William Pearson	728 Foxwood Dr., Concord, NC 28025 ()	
WA4NJP	EM84DG	Ray Rector jr.	3493 Holly Springs Rd., Gillsville, GA 30543 (1-770-536-5420)	
WA4OFS	EL98	Harry Conowal	2007 Peachtree Blvd., St. Cloud, FL 32769 (1-407-892-5610)	
WA4ZIA	EM95	Dexter McIntyre	, ()	now W4DEX
WA4ZTK	EM85	John W. Kmet	2148 Ridgecrest Dr., Maryville, TN 37803 (1-423-984-4190)	
WA5ETV	EM15	Gary McCormick	2804 N. Meridian Ave., Oklahoma City, OK 73107 (1-405-946-2898)	
WA5VJB	EM12LQ	Kent Britain	1626 Vineyard Rd., Grand Prairie, TX 75052-1405 (1-214-660-2810)	
WA6BJE	DM13	Jim Day	1939 Tradewinds Ln., Newport Beach, CA 92660 (1-714-642-7323)	
WA6KBL	CM97AG	Jeffrey Pawlan	14908 Sandy Ln., San Jose, CA 95124 (1-408-371-0256)	
WA6MGZ			, ()	nw W7CS
WA6YDI	DM06CT	David R. Smith	1451 E Vartikian, Fresno, CA 93710 (1-209-432 0290)	
WA7BBM	DM42MB	John Molloy	, ()	now W7BBM
WA7CJO	DM33XL	Jim Vogler	2540 E Heatherbrae Dr., Phoenix, AZ 85016 (1-602-954-0541)	
WA7TZY	CN87	Fred Telewski	24600 NE 171 St., Woodinville, WA 98072 ()	
WA8HTL			, ()	nw K8UK
WA8VPD	EN82	Robert J. Thomas	20530 Kentfield St., Detroit, MI 48219 (1-313-534-0310)	
WA8WZG	EN81OM	Tom Whitted	4641 Port Clinton East Rd., Port Clinton, OH 43452 (1-419-732-2168, -2944)	
WA9FWD	EN53	John R. Stefl	2540 N 128th St., Brookfield, WI 53005 (1-414-797-9508)	
WB0DRL	EM18CT	Pete Sias & Dean Lewis	831 S Powers Rd., Salina, KS 67401 (1-913-823-1119)	
WB0GGM	EN34EL	John Schaefer	Rt. 1 Box 71, Montgomery, MN 56069 (1-507-364-5633)	
WB0TEM	EN12RT	Marc Thorsen	331 Dakota St., Akron, IA 51001 (1-712-568-2901)	
WB2VVV	FN21XA	Chris Fagas	68 Kinderkamack Rd., Park Ridge, NJ 07656 (1-201-930-1583)	
WB4BKC	EL96XD	Andrew Rusnock	4621 NE 1st Ave, Pompano Beach, FL 33064 (1-954-782 2894)	
WB5LUA	EM13QC	Al Ward	, ()	nw W5LUA
WB6IMC	DM13	Jonathon H. Williams	26216 Frazier St., Hemet, CA 92544 (1-909-927 0666)	QRT
WD5AGO	EM26BD	Tommy D. Henderson	12476 E 13th St., Tulsa, OK 74128 (1-918-438-0099)	
WD8ISK	FM18DV	Terry Price	2702 Rodgers Terrace, Haymarket, VA 22069 (1-703-754-1347)	
WD8ISK/8	EM98VH	Terry Price	2702 Rodgers Terrace, Haymarket, VA 22069 (1-703-754-1347)VHF contests	
WE2Y	FN02SR	John Fuchs	13996 Rt. 78, South Wales, NY 14139 (1-716-457 3151)	
WE7P	DN13RP	Greg L. Sharp	687 Meadow Dr., Emmett, ID 83617 (1-208-365-2235)	ex KA7CJP
WI7Z	DN06	Gayland Kellison	49 Dekay Rd., Hoquiam, WA 98550 (1-208-383-9115)	moved to DN06
WL7U	BP51	Mike Bennett	12303 Woodward Dr., Anchorage, AK 99516 (1-907-345-3486)	ex AL7JM
WW2R	EL09RO	Dave Robinson	2543 Rim Oak, San Antonio, TX 78232 (1-210-499-0274)	ex WG3I
XE1XA	EK09	Max Bachi	Seminario No.16, Lomas de la Herradura 10DF (52-5-2943095)	
YL3AG	KO26AW	Vitauts Klimavicius	PO Box 111, LV-1069 Riga (371-2413141)	ex RQ2GAG
YL3AG/A	KO07WN		, ()	ARRL contest 96
YO2IS	KN05PS	Süli Iulius	Str. Iasi 1, R-1900 Timisoara (40-56-137981)	"Szigy"
YV5ZZ	FK60	Edgar Merlin D. Anderson, 4300 South Cochran, Charlotte, MI 48813-9109, USA ()		

ZL3AAD	RE66GR	Graham Alderson	Priors Road, R.D.1 Rangiora 8254 (64-331-37251)	vy busy..
ZS6AXT	KG33VV	Ivo M. Chladek	PO Box 3093, 1745 Kenmare (27-11-6647883)	
ZS6BTE		Ian	PO Box 825, Randpark Ridge 2156 (+27-11-7953260)	
ZS6PT		Petr Sykora	, (27-11-3161133)	

Equipment

432 MHz

Call	Antenna, Pol	[W]	Qrv
4X1IF	4x29el FO, h	900	J
7M2PDT	16x14el FO, rot	1500	J
9M2BV	4x22el FO,	1000	J
A22BW	8x19el Flexa,	700	N
CT1DMK	5.6m dish, h/v	1500	J
DF0EME	10m dish,	1300	N
DF3RU	16x8.5wl BV, hor	1500	J
DF4MAA	1y,	1000	J
DF4PV	16x20el,	800	N
DF4UE	4y BV,	800	J
DF5FN	,		J
DF6NA	4x30el WU,	800	N
DF6WE	4x25el, hor	600	J
DF8LC	4x21el FT,	1000	J
DF9CY	4x33el WU,	700	N
DF9QX	4x26el BV,	1500	J
DF9UX	6x19el,	600	N
DH3NAN	8x21el FT,	300	N
DH9SAV	2x10wl BV,	130	N
DJ5MN	1x21el FT,	1500	J
DJ5RE	4x21el FT,	500	N
DJ7FJ	4 or 8y,	1300	N
DJ9BV	4y 11wl BV,	1400	J
DK0NA	4x21el FT,	1000	N
DK0TU	8x19el WU,	750	N
DK3BU	16x24el,	1500	J
DK3FB	4x23el WU,	1300	J
DK3WG	16x27el BV,	1000	J
DK4JN	8x21el,	1500	N
DK8VS	6x21el FTmod,	750	J
DL0ON	4y,	300	N
DL1VAA	4x21el,	100	N
DL3EAG	4x21el, hor	1000	J
DL3YEE	8x35el BV,	700	N
DL3YEL	2y 10wl BV,	1000	N
DL4KG	4x23el BV,	700	J
DL4MEA	6x33el BV-OPT, hor	1000	J
DL4XX	4x35el BV,	1500	N
DL5EBT	4x21el FT,	1000	N
DL5FN	8x23el WU,	1000	J
DL5YET	2x28el,	600	J
DL6NAA	8x21,	500	J
DL6WU	6x27el WU, hor	1000	J
DL8OBU	4x22el BV,	1200	J
DL9EBF	8x21el FT,	700	J
DL9EBL	12m dish,	1500	J
DL9KR	16y KR,	1500	J
DL9NDD	4y 13wl,	1500	J
EA2AGZ	1x31el, hor	700	N
EA2LU	8x31el HG,	1000	N
EA2LY	4x39el M2,	800	J
EA3DXU	2x38el M2,	850	J
EA3EHQ	4x38el M2,	1300	N
EA3PL	4y,	1000	N
EA3UM	7m dish, hor/vert	2000	J
EA5CJ	16x31el KLM,	1000	N
EA6ADW	5.5m dish, hor	1300	N
EA6FB	4x32el M2,	750	N
EA6SA	4x33el BV,	450	N
EA8FF	16x9el WU,	1000	J
EI6GF	8x15el,		N
F/G8MBI	4y, v/h	100	J
F1ANH	8m dish, switchable	800	J
F1CH	4x26el BV,	600	J
F1CNE	,		J
F1FEN	16y 7.7wl FT,	1000	J
F2TU	6m dish,	1000	J
F5AQC	6m dish,	2000	J
F5EAN	4y BV,	300	N
F5ELL	8m dish,	3500	J
F5FLN	16x26 KR,	600	J
F5HRY	4x26el BV Opt, h	1000	N
F5JJI	2x12el Jay, circ	140	N
F5KDK	8x26el BV,	600	J
F5MZN	4x26el BV,	1200	N
F5SGT	4y BV,	1000	N
F6CGJ	8m dish,	1000	J
F6HKA	4x21el,	800	N
F6HPP	4x21el FT,	1000	N
F6HYE	8x21el FT,	1500	N
F8SQ	16x21el,	1000	N
F8ZW	16x21el,	1000	N
F9FT	16x21el FT,	1000	J
G0BPU	4x24el FO,	400	J
G3HUL	8x24el WU,	600	J
G3LQR	8y,	800	J
G3LTF	6m dish,	1000	J
G3SEK	12y LR, rot	1000	J
G4ALH	6y 7.7wl BV,	500	J
G4ERG	16x10el BV, rot	500	J
G4KUX	4x29el,	1000	J
G4RGK	8x23el BV,	800	J
GD4IOM	4x28el no elev.,	800	J
GM0ONN	4x21el FT,	800	N
GM3JFG	4x21el,	900	J
GW3XYW	6.7m dish, rot	1000	J
HA1YA	16x32el,	1500	J
HB9CVD	4x29el BV,	1000	J

HB9JAW	12.5m dish,	1000	N
HB9SV	8m dish, rot 0-90	800	J
HP3XUG	4x32el FO,	500	J
I5CTE	4x26el, hor	800	J
I5MPK	10m dish & 24y,	1000	J
I5TDJ	4x19el,	1000	J
I6PNN	4x26el,	700	N
I6QGA	8x23el FT,	1000	N
IK0BZY	1x10wl BV,	650	J
IK0EQJ	4x26el, h	1000	J
IK1MTZ	8x26el MTZ,	1000	J
IK2EAD	16x33el,	1000	J
IK2OFO	4x21el FT,	1000	N
IK4DCO	4x26el,	1500	N
IK4DCX	4x25el Sh.,	1000	J
IK5QLO	2x28el M2, h	900	J
IK5WJD	4x26el BV,	1000	J
IK6EIW	8x23el FT,	1000	J
IN3HER	5m dish,	400	N
IN3KLQ	4x21el FT, h	600	J
IW5AVM	8x25el,	1000	J
IZ4BEH	4x21el BV,	200	J
JA0VI	8m dish, rot	400	J
JA2JRJ	6m dish,	1500	J
JA2KRW	4x33el FO, hor	1500	J
JA2TY	4x33el FO, hor	1300	J
JA3IAF	16x15el, hor	800	J
JA3SGR	1x32ele yagi,	500	J
JA4BLC	6m dish, hor/vert	2000	J
JA5NNS	8x21el FO,	1500	J
JA5OVU	16x14el CD, rot	1500	J
JA5YJS	8x27el CD,	500	N
JA6CZD	7m dish,	1000	J
JA6XED	8.2m dish, rot	1000	J
JA6ZHR	8m dish,	1000	N
JA7BMB	8y,	800	N
JA8ERE	16x19 RIW,	500	J
JA8PL	3.6m dish,	400	N
JA9BOH	8x20el WU, vert	1000	J
JF3HUC	6m dish,	600	J
JH0YSI	16x22 FO twice, hor & vert		1500J
JH1EFA	4x26el FO, vert	600	J
JH1OFX	8.2m dish,	500	N
JH1WLK	8x33el FO,	500	N
JH1XUJ	16x9wl M2, vert	2000	J
JH3EAO	4.7m dish,	800	J
JH4JLV	6x24el FO, hor	1000	J
JH7PAV	8x21el FO, vert	200	J
JI3GER	4x24el,	130	J
JJ1NNJ	16x13el FO, rot	500	J
JL1ZCG	16x27el CD, hor	2000	J
JO3JJN	4x25el,	500	J
JO3RNL	4x21el RIW,	1000	J
JO3SBC	2y 20wl,	400	N
JR1EUX	4x25el FO, vert	100	J
JR1RCH	4x31el JR, hor	800	J
JR4AEP	16y RIW, hor	800	J
JR5MYC	8x27el,	100	N
JR9NWC	8x21el FO, hor	1000	J
JS3SIM	4x25el FO, vert	1500	J
K0DAS	8y RIW, hor	750	J
K0RZ	8x22el FO, vert	1500	J
K1FO	24x15el FO, rot	1500	J
K1OR	4x33el FO,	1500	J
K1RQG	4x31el WU,	1000	J
K1RSA	4x31el JR,	1500	N
K1VYU	4x22el FO,	700	N
K2DH	5.5m dish,	1000	J
K2OS	4x24el,	1500	J
K2UYH	8.7m dish, rot	1000	J
K3LFO	8x25el, rot	1500	J
K4PKV	16y KR,	1000	J
K4QI	7.5m dish, rot	1500	N
K5AZU	9m dish,	1500	J
K5GW	64x10el, rot	1500	J
K5JL	8.5m dish,	1500	J
K5WXN	16x15el RIW,	1000	J
K6IBY	4x24el FO,	700	N
K7WUP	6m dish,	300	N
K7XC	4x25 FO,	120	J
K7XD	8x22el FO,	600	J
K8UK	4x25el FO,	800	J
K9BCT/4	8x18el WU,	800	J
K9HMB	8x30el KLM,	1500	N
K9KFR	7.5m dish,	1500	J
K9KL	4x13wl M2, hor	650	N
K9ZZH	5.5m dish, rot	600	N
KA0RYT	4x24 FO / 8x19, hor/vert	1500	J
KA0Y	12.1m dish,	1000	N
KA3WSZ	16x11el,	700	N
KB0HH	9.1m dish,	800	J
KB2AH	10.3m dish,	1000	J
KB3PD	6x19el Cush, rot	1500	J
KB4WM	24x15el FO R,	1500	N
KB8RQ	8x39el M2,	1500	N
KB8ZW	16x14el FO R,	800	J
KC6A	4y LBX, circ	700	N
KD0GT/7	,		N
KD1DU	6x22el FO,	1000	N
KD4LT	9.75m dish,	1500	J
KD6R	8.5m dish,	1500	N
KF0M	2x9wl M2, vert	900	J
KH6O	16x16trns helix,	250	N
KJ7OG	2x13el,	300	J
KL7FB	9m dish,		N
KL7HFQ	KL7WE's 12x10el, rot	700	J
KN6DD	2x31el FO & 6m dish,	1000	N
KN6M	4x25el FO,	1500	J
KU3T	4x25el FO,	700	J
KU4F	13.4m dish, rot	600	N
LA8AE	4x21el FT,	1100	N
LA8LF	5m dish,	1500	J
LU4HO	4x33el 10wl BV,	500	J
LX1DB	11m dish,	1500	J
LY2BIL	1x30el,	1000	N
LY2WR	1x30el,	600	J
N2HLT	4x19el RIW,	600	J
N2IQU	14.6m dish,	1500	J
N2NQI	4x21el FT, vert		J
N4GJV	16x21el KR,	1000	J
N4PZ	8x29el WU, hor	1500	J
N4UK	8x19el RIW, hor	1500	N

N5QGH	7.3m dish, rot	1000	N	UA3TCF	8x14el,	500	J
N6NNN	4x9wl,	800	N	UA4API	4x19el KR,	500	J
N6OVP	4x22el FO,	750	N	UA4NM	4x17el FT,	1000	N
N7LQ	4x25el FO,	1000	J	UA6LGH	16x20el KR,	800	J
N8AXA	4x24el CC, hor	900	N	UA6LJV	8x16el ? 4y ?,	300	N
N8ZAT	4x28el, hor	900	J	UA9FAD	8x16el,	1000	J
N9AB	16x18el Quagi,	1500	J	UA9XEA	4y FT,	500	N
N9KC	1x30el KLM,	1000	N	UN7AX	1y,	100	J
NA4N	8x22el, hor	1200	J	UR3EP	8x10wl BV,	150	J
NC1I	48x15el FO, rot	1500	J	UR4LL	4y FO,	800	N
NF7P	4x24 FO,	100	N	UR5LX	10.7m dish,	1500	J
NU7Z	6.7m dish, rot	600	N	UT1PA	4y 7m BV,	800	J
OE3JPC	2x20el BVopt,	500	J	UT3LL	2y FT,	400	J
OE5JFL	10m dish,	1000	J	UT5DL	8x27el 7.7wl BV,	1000	J
OE6AP	8x21el FT,	500	J	UT5EC	8x27el BV,	1000	J
OE8FNK	4x20el,	250	N	UT5UAS	6m dish,	400	N
OE9ERC	8m dish 6mm,	3000	J	VE1ALQ	7.6m dish,	1200	J
OE9XXI	9m dish 10mm, h/v	800	J	VE1BVL	,		N
OH2AXH	6.4m dish,	250	N	VE1OD	6m dish,	1000	N
OH2BYJ	4x38el,	30	J	VE1ZJ	6x22el FO,	600	N
OH2DG	16x21el,	800	N	VE3BQN	8x31el FO,	1500	N
OH2PO	15.6m dish, v/h	1500	J	VE3KDH	4x38el M2,	150	J
OH3LWP	4x40el FO,	400	J	VE4MA	3m dish, rot	1000	J
OH5IY	8x21el FT,	800	J	VE6AFO	8x25el FO R,	600	N
OK1CA	10m dish, rot 30s	300	N	VE6TA	5m dish & 4x22 FO, rot	800	J
OK1DFC	4x38el M2, hor	1500	J	VK1VP	4x20el WU,	250	J
OK1KIR	5.5m dish, rot	1300	J	VK2BE	4x3el M2, h	400	N
OM1TL	8x21el,	500	J	VK2FZ/4	1x25el FO,	400	J
ON4ANT	4x38el 13wl,	150	N	VK3UM	8y 7.7wl BV,	1600	N
ON4GG	1x38el,	90	N	VK4KAZ	4x22el FO,	100	J
ON4KNG	8y 11wl BV-OPT,	1000	J	VK5MC	6m dish,	1000	J
ON4UV	5.3m dish,	500	N	VK6KCC	4x22el,	400	N
OZ1HNE	4x38el BV,	1500	N	W0AH	4y 14wl M2,	1500	J
OZ4MM	10m dish 12.5mm, v/h	600	J	W0HHE	4x32el KLM,	1000	N
OZ7UHF	7.3m dish,	600	N	W0KJY	8x14el FO,	1000	N
PA0AVS	8.5m feed horn,	1000	N	W0RRY/5	8x21el, 10m dish,	1000	J
PA0PLY	8y HM,	800	N	W0SD	9.7m dish, rot	800	N
PA2CHR	4x35el,	850	J	W1JR	,	800	N
PA3CSG	16x26el WU + dish,	1500	J	W1ZX/3	7.3m dish,	1500	J
PA3DZL	8x21el FT, h	1000	N	W2PGC	12x22el FO,	1000	N
PY5ZBU	6m dish, rot	1500	J	W2SZ	8.5m dish,	1500	N
RA3YCR	8x26el KR,	1000	N	W2UHI	8x22el FO,	1200	N
RW3RW	4x21el FT,	500	J	W2WD	1x28el, hor/vert	1000	J
S51ZO	8x33el BV,	400	J	W3VH	4x25el FO,	1500	N
S52CW	8x7.7wl BV,	300	J	W3XS	4.9m dish, rot	1000	J
S53J	4y,	100	J	W4DEX	4x19el RIW,	1000	N
S57Q	16x15el,	600	J	W4RDI	16x14el rear mt., rot	200	J
SM2BYA	8x21el FT,	150	J	W4TJ	8x19el RIW,	1000	N
SM2CEW	8m dish,	1000	J	W5LUA	7.5m dish, rot	1000	N
SM2CKR	2y,	200	N	W5RCI	16x19el RIW,	1000	N
SM2EKM	4x35el,	1000	N	W5ZN	16x22el FO,	1000	J
SM2LKW	2y,	500	N	W6MUY	1x16el,	1000	N
SM3AKW	16x21el,	1000	J	W6WE	4x39el M2, hor	700	N
SM3BYA	8x21el FT,	150	J	W7BBM	12m dish,	1000	J
SM4DHN	6m dish, circ	1000	J	W7CI	10.5m dish,	700	J
SM4IVE	13m dish,	1500	N	W7CNK	4x33el FO,	450	J
SM5GEP	8x10wl BV,	1000	N	W7CS	4x39el,	1500	J
SM6CKU	8m dish L,	1000	J	W7EME	8x M2 mod, v/h	600	J
SM6EUP	4x43el JR,	800	N	W7FN	7.3m dish, rot	1000	J
SP5CJT	8x24el KR,	250	J	W7GBI	7.5m dish, v/h	1500	J
SV1BTR	4x32 Cross BVopt, v/h	1300	J	W7HAH	12x24el FO,	1200	J

W7ID	4x30el KLMmod,	600	N
W7KK	4x22el FO, hor	900	J
W7QX	4x28el FO,	1300	J
W7TVF	8x10wl,	100	N
W7ZRC	4x33el FO,	800	N
W8IDU	8x19el RIW,	700	N
W8MQW	8x22el FO,	1500	J
W9IP/2	16x19el RIW,	1000	N
WA3FFC	8x24el FO,	700	N
WA4LBT	6y RIW,	600	N
WA4NJP	9.1m dish,	700	J
WA4OFS	8x22el FO,	1200	N
WA4ZTK	6m dish, rot	500	N
WA5ETV	9.1m dish,	1000	N
WA6BJE	8x25el FO,	1500	N
WA6KBL	4y 13wl M2,	850	N
WA6YDI	8x38el M2,	1500	N
WA7CJO	4.8m dish,	1000	N
WA7TZY	8x21el FT,	1200	J
WA8VPD	4x28el JR,	500	N
WA8WZG	4.9m dish, sw pol	1500	J
WA9FWD	16x13el, rot	1500	N
WB0DRL	8.5m dish, rot	1500	J
WB0GGM	4x22el FO,	600	J
WB0TEM	10m dish, rot	1000	N
WB2VVV	8x18el VVV/M2, hor	1000	J
WB4BKC	8x18el FO, hor	1000	J
WD5AGO	5.5m dish, rot	1500	J
WD8ISK	8x19el RIW,	1500	J
WD8ISK/8	8x19el RIW,	1500	N
WE2Y	16x12el, rot	700	J
WE7P	,		N
WL7U	4x22el FO, vert	1000	J
WW2R	4x25el FO, hor	1200	N
XE1XA	4.8m dish,	600	N
YL3AG	8x33el BV,	500	N
YO2IS	4x32el BV,	600	J
YV5ZZ	16y,	1000	N
ZL3AAD	7.5m dish,	1000	N
ZS6AXT	5m dish, hor	400	N
ZS6JON	2x35el BV, hor	0	N
ZS6PT	5.2m dish,	150	J

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AF1T	3.7m dish,	300	J
K2DH	5.5m dish,	300	J
K5JL	,		J
K7XW	3m dish,	140	J
NU7Z	4m dish, hor	250	J
VE3KDH	1x33el loop y,	100	J
VE4MA	3m dish, rot	?	J
W5LUA	7.2m dish,	250	J
WA8WZG	4.9m dish, sw pol	?	J
WD8ISK/8	,		J

1296 MHz

4X6UJ	3.1m dish,	200	J
9H1ES	2.4m dish, hor	550	J
AA6IW	5m dish,	1000	N
CT1DMK	5.6m dish, circ	500	J
DC6UW	6m dish,	1000	J
DD1XF	3.7m dish, circ	400	J
DF3RU	3m dish, circ	300	J
DF5JJ	3.5m dish,	600	N
DF6WE	2m dish,	120	N
DF9QX	5m dish,	500	J
DH0OAH	3.5m dish,	300	J
DH9FAG	3m dish,	200	J
DJ5MN	2x70el, hor	1300	J
DJ7FJ	4.5m dish, circ	300	N
DJ9YW	4.5m dish, circ	360	J
DL0SHF	6m dish IMU, circ	500	J
DL3YEE	4x48el,	200	N
DL6YDH	3.5m dish,	300	J
DL8OBU	4x5m yagis,	100	J
DL9EBL	12m dish,	999	J
EA2BK	3m dish,	150	N
EA2LY	4x35el M2,	180	J
EA3UM	7m dish, circ	1200	J
EA6ADW	5.5m dish, circ/lin	1000	J
F1ANH	8m dish LR, circ	500	J
F1CH	,	1200	J
F1SDR	6.1m dish,	600	N
F2TU	6m dish,	500	J
F5AQC	6m dish,	400	J
F5ELL	8m dish,	800	J
F5KDK	4x26el BV,	150	J
F5MZN	3.5m dish,	150	N
F5PAU	6.7m dish,	900	J
F5PL	7m dish, circ	270	J
F6CGJ	8m dish,	200	J
F6KSX	3.3m dish,	500	J
G3LQR	4.2m dish, circ	150	J
G3LTF	6m dish, lin	500	J
G4CCH	2.4m dish,	400	J
G4DZU	3m dish,	800	J
GW3XYW	6.7m dish,	500	J
HA1YA	3.2m dish,	50	N
HB9BBD	10m & 2.4m dish,	2200	J
HB9BHU	3.7m dish, circ	800	J
HB9JAW	12.5m dish,	500	N
HB9SV	8m dish, circ	600	J
I6PNN	4m dish,	400	J
I6QGA	6m dish,	600	J
IK2OFO	4m dish,	200	N
IK2RTI	4.3m dish,	230	J
IK3COJ	4m dish, circ	150	J
IK3GHY	5m dish,	100	N
IK4DCX	1.6m dish,	150	J
IN3HER	5m dish,	400	N
JA2JRJ	6m dish,	500	N
JA4BLC	6m dish,	500	J
JA6CZD	,	450	J
JA7BMB	5m dish,	200	N
JA8ERE	4m dish,	500	J
JA9BOH	2m dish,	100	N
JF3HUC	6m dish,	?	J
JH1OFX	6m dish, lin	160	N
JH1WLK	3.8m dish,	500	N
JH3EAO	4.7m dish,	200	J

JH5LUZ	5m dish,	200	J
JL1ZCG	32x30el,	300?	J
JR4AEP	4m dish,	400	J
JR4BRS	5.7m dish,	200	J
K2DH	5.5m dish,	600	J
K2UYH	8.7m dish,	400	J
K3HZO	3m dish,	200	J
K4QI	7.5m dish,	600	N
K5AZU	9m dish,	35	J
K5JL	8.5m dish,	500	J
K7WUP	6m dish,	200	N
K7XW	3m dish,	50	J
K9BCT/4	4.3m dish,	300	J
K9KFR	7.5m dish,	500	J
K9ZZH	5.5m dish, rot	200	J
KA0RYT/0	3m dish,	150	N
KA1OTP	8y loop,	200	J
KB0HH	5m dish,	250	J
KB2AH	10.3m & 6m dishes,	1000	J
KB3PD	3.2m dish, circ	140	N
KD0GT/7	3.6m dish,	200	N
KD4LT	6.7m dish,	100	J
KN6DD	5m,	1000	N
LA8LF	5m dish,	500	J
LU6DW	3.6m dish,	15	J
LX1DB	11m dish,	1500	J
N2IQU	14.6m & 8.5m dish,	400	J
N4MW	3m dish,	120	J
N6BQ	3.7m dish,	900	J
N6ECG/7	7.5m dish,	200	N
N6NNN	8x35el,	100	N
N7ART	8m dish,	500	J
N7LQ	4x25el,	30	J
N8DJB	4.5m dish, circ	125	N
NA6E	4m dish,	400	J
NL7F	3.7m dish,	350	J
NP4B	4.6m dish,	120	J
NU7Z	4m dish,	250	N
OE5JFL	10m dish,	900	J
OE6AP	2m dish, hor/vert	200	J
OE9ERC	8m dish,	2000	J
OE9FKI	3.7m dish,		N
OE9XXI	9m dish, circ	1000	J
OH2AXH	6.4m dish, circ	500	J
OH2DG	3m dish,	250	N
OK1CA	10m dish, circ	140	J
OK1DFC	3.8m dish,	170	J
OK1KIR	5.5m dish, rot/circ	250	J
ON4GG	1x55el no elev,	150	N
ON5RR	6m dish,	150	J
ON6JY	6m dish, circ	1000	N
OZ4MM	10m dish 12.5mm, circ	275	J
OZ9AAR	5m dish,	350	N
PA0PLY	6m dish,	150	N
PA3CSG	10m dish,	1000	J
PA3DZL	7.5m dish, circ	250	J
PY5ZBU	5.5m dish, circ	800	N
S51ZO	4x45el loop,		N
S53WW	3m, circ	90	N
S57Q	2.4m dish, lin	100	J
S59DCD	6.2m dish, lin	150	J
SM2CEW	8m dish,	300	J
SM3AKW	5m dish,	500	J
SM4DHN	6m dish, circ	1000	J
SM4IVE	13m dish,	200	N
SM5CFS	7.4m dish, circ	150	N
SM5DGX	4m dish,	200	J
SM5QA	2x23 loop,	150	N
SM6CKU	8m dish,	350	J
SM6FHZ	5.5m dish, circ	500	N
SV1OE	5m dish,	500	N
UA3TCF	4m dish,	20	J
UR5LX	10.7m dish,	150	N
VE1ALQ	7.6m dish,	1000	J
VE1OD	6m dish, lin		N
VE1ZJ	3.6m dish,	400	N
VE3BQN	4.9m dish,	500	J
VE3KDH	1x45el loop y,	50	J
VE4MA	3m dish,	500	J
VE6TA	5m dish,	200	J
VK1VP	,	250	J
VK2BE	4x51el M2, h	400	N
VK2FZ/4	4x50el loop,	150	J
VK5MC	6m dish,	250	J
W0KJY	3.7m dish,	500	N
W2UHI	5.5m dish, circ	500	J
W3XS	4.9m dish,	200	J
W4AD	,		N
W4OP	3.7m dish, circ	500	J
W4RDI	,		N
W4TJ	3.6m dish,	500	N
W5LUA	7.2m dish,	500	J
W7BBM	12m dish,	?	J
W7CI	10.5m dish,		J
W7CS	5m dish,	150	J
W7GBI	7.5m dish, circ	450	J
W7HAH	3.7m dish,	150	J
W7VQQ	4.6m dish,	200	N
W7XU	,		N
W8ATH	3.5m dish,	100	J
WA4NJP	9.1m dish,	100	J
WA4OFS	3m dish,	500	J
WA7CJO	4.8m dish,	1000	N
WA8WZG	4.9m dish,	100	J
WA9FWD	3.1m dish,	300	J
WB0DRL	8.5m dish,	500	J
WB0TEM	10m dish,	500	N
WD5AGO	5.5m dish,	200	J
WL7U	4x44el M2,	100	N
YL3AG/A	32m dish,		N
ZL3AAD	7.5m dish,	250	N
ZS6AXT	5m dish,	200	J

Entries for 2302MHz&Up will be published in DUBUS 3/1998

EME Contest 98

Editor: Joachim Kraft, DL8HCZ

Results European EME Contest 1998

Results 144 MHz

1	**SM5FRH**	619200	129(+ 0)	48	QRO	SIN
2	F3VS	532800	111(+ 0)	48	QRO	MUL
3	SM5BSZ	408000	102(+ 0)	40	QRO	SIN
4	K7CA	281200	76(+ 0)	37	QRO	SIN
4	I2FAK	281200	76(+ 0)	37	QRO	SIN
6	I3DLI	182400	57(+ 0)	32	QRO	SIN
7	OH2PO	168000	60(+ 0)	28	QRO	MUL
8	OE5EYM	125000	50(+ 0)	25	QRO	SIN
9	RU1AA	112500	45(+ 0)	25	QRO	SIN
10	PA2CHR	75020	34(+ 1)	22	QRO	SIN
11	7K3LGC	51000	30(+ 0)	17	QRO	SIN
12	JH2COZ	45790	24(+ 1)	19	QRP	SIN
13	S52LM	41600	26(+ 0)	16	QRP	SIN
14	I1ANP	34500	23(+ 0)	15	QRP	SIN
14	EA5GIY	34500	23(+ 0)	15	QRP	SIN
16	G3ZIG	30000	20(+ 0)	15	QRO	SIN
17	GM4JJJ	28500	19(+ 0)	15	QRP	SIN
18	JA9BOH	26000	20(+ 0)	13	QRO	SIN
19	CT1DMK	19200	16(+ 0)	12	QRP	SIN
20	W9HLY	16500	15(+ 0)	11	QRP	SIN
21	EA3DXU	15100	15(+ 1)	10	QRO	SIN
22	S53J	15000	15(+ 0)	10	QRP	MUL
23	JH5FOQ	14100	14(+ 1)	10	QRP	SIN
24	F6HVK	14000	14(+ 0)	10	QRP	SIN
25	PE1OGF	9900	11(+ 0)	9	QRP	SIN
26	9A9B	9000	15(+ 0)	6	QRP	SIN
27	SL4BP	7200	9(+ 0)	8	QRP	SIN
28	JA4BLC	7200	9(+ 0)	8	QRO	SIN
29	SP7DCS	7000	10(+ 0)	7	QRP	SIN
30	DL1EJA	6300	9(+ 0)	7	QRP	SIN
31	IZ1BPN	5600	8(+ 0)	7	QRP	SIN
32	JH0WJF	4500	9(+ 0)	5	QRP	SIN
33	UT5ER	4000	8(+ 0)	5	QRP	SIN
34	IW4BLG	3600	6(+ 0)	6	QRP	MUL

35	R0DJG	2000	5(+ 0)	4	Q	S
36	R0DAT	1600	4(+ 0)	4	QRP	SIN
37	W5UWB	400	2(+ 0)	2	QRP	SIN
37	F1DDG/P	400	2(+ 0)	2	QRP	SIN
37	EA1ABZ	400	2(+ 0)	2	QRP	SIN

Results 432 MHz

1	**OH2PO**	251600	74(+ 0)	34	QRO	MUL
1	**NC1I**	251600	74(+ 0)	34	QRO	MUL
3	K1FO	200600	59(+ 0)	34	QRO	SIN
4	OE5EYM	102500	41(+ 0)	25	QRO	SIN
5	G4ERG	28800	18(+ 0)	16	QRP	SIN
6	ON5OF	16900	13(+ 0)	13	QRP	SIN
7	F1ANH	13200	12(+ 0)	11	QRO	SIN
8	CT1DMK	12100	11(+ 0)	11	QRP	SIN
9	K4QI	10400	40(+ 0)	26	QRO	SIN
10	WE2Y	10000	10(+ 0)	10	QRP	SIN
11	JA2TY	9900	11(+ 0)	9	QRO	SIN
12	DL4MEA	8880	11(+ 1)	8	QRP	SIN
13	EA3DXU	8100	9(+ 0)	9	QRO	SIN
14	JA9BOH	8000	10(+ 0)	8	QRP	SIN
15	S52CW	6400	8(+ 0)	8	QRP	SIN
16	JH4JLV	6300	9(+ 0)	7	QRO	SIN
17	YO2IS	4900	7(+ 0)	7	QRP	SIN
18	SV1BTR	4270	6(+ 1)	7	QRP	SIN
19	JA4BLC	3600	6(+ 0)	6	QRO	SIN
20	IK5QLO	2500	5(+ 0)	5	QRP	SIN
21	JH1EFA	2050	4(+ 1)	5	QRP	SIN
22	OK1DFC	2040	5(+ 1)	4	QRP	SIN
22	DK3FB	2040	5(+ 1)	4	QRP	SIN
24	IN3KLQ	1600	4(+ 0)	4	QRP	SIN
25	ZS6PT	100	1(+ 0)	1	QRP	SIN
25	JJ3JHP	100	1(+ 0)	1	QRP	SIN
25	JJ1NNJ	100	1(+ 0)	1	QRP	SIN

Results 1296 MHz

1	**OZ4MM**	142100	49(+ 0)	29	QRP	SIN
2	F1ANH	102600	38(+ 0)	27	QRO	SIN
3	SM3AKW	98800	38(+ 0)	26	QRP	SIN
4	ZS6AXT	77000	35(+ 0)	22	QRP	SIN
5	K4QI	76800	32(+ 0)	24	QRO	SIN
6	F2TU	63800	29(+ 0)	22	QRO	SIN
7	F6CGJ	58800	28(+ 0)	21	QRO	SIN
8	CT1DMK	39780	22(+ 1)	18	QRP	SIN
9	JH5LUZ	28600	22(+ 0)	13	QRP	SIN
10	G4CCH	26600	19(+ 0)	14	QRP	SIN
11	OK1DFC	9000	10(+ 0)	9	QRP	SIN
12	JA4BLC	4900	7(+ 0)	7	QRP	SIN

Results 2320 MHz

1	**ZS6AXT**	8100	9(+ 0)	9	QRP	SIN
2	OZ4MM	3600	6(+ 0)	6	QRP	SIN
3	JA4BLC	1600	4(+ 0)	4	QRO	SIN
3	F1ANH	1600	4(+ 0)	4	QRO	SIN
5	F2TU	100	1(+ 0)	1	QRO	SIN

Results Multiband

1	**OH2PO**	830800	134(+ 0)	62	QRO	MUL
2	OE5EYM	455000	91(+ 0)	50	QRO	SIN
3	K4QI	360000	72(+ 0)	50	QRO	SIN
4	F1ANH	226800	54(+ 0)	42	QRO	SIN
5	CT1DMK	201310	49(+ 1)	41	QRO	SIN
6	OZ4MM	192850	55(+ 1)	35	QRO	SIN
7	ZS6AXT	136400	44(+ 0)	31	QRO	SIN
8	JA4BLC	70000	28(+ 0)	25	QRO	SIN
9	F2TU	69000	30(+ 0)	23	QRO	SIN
10	JA9BOH	63000	30(+ 0)	21	QRO	SIN
11	EA3DXU	45790	24(+ 1)	19	QRO	SIN
12	OK1DFC	19630	15(+ 1)	13	QRO	SIN

Congrats to the winners SM5FRH on 144MHz, OH2PO & NC1I on 432MHz, OZ4MM on 1296MHz, ZS6AXT on 2320MHz and OH2PO on Multiband. Thanks to all who did participate.

Soap Box

SV1BTR (70): Condx were bad both days. Very scarce activity from EU only during US window. I had severe QRM problems as usual which prevented me from productive random operation. Signals much weaker than on other activity weekends. Hope to have better luck next year with improved RX situation.

DL5MAE (70): Durch den gleichzeitig stattfindenden VHF/UHF-Kontest war die zur Verfgung stehende Zeit deutlich reduziert. Am Sonntag abend war ich das erste mal QRV als der Mond ber Nordamerika gut stand, davon htte ich mir wesentlich mehr erwartet. Leider hatten anscheinend die Oms dort Probleme mit Schnee und Eis.

K1FO (70): Stateside activity was very low. Condx during daylight hours was fair to poor with little polarity sharpness. Condx late at night (after 10 p.m. local) were excellent.

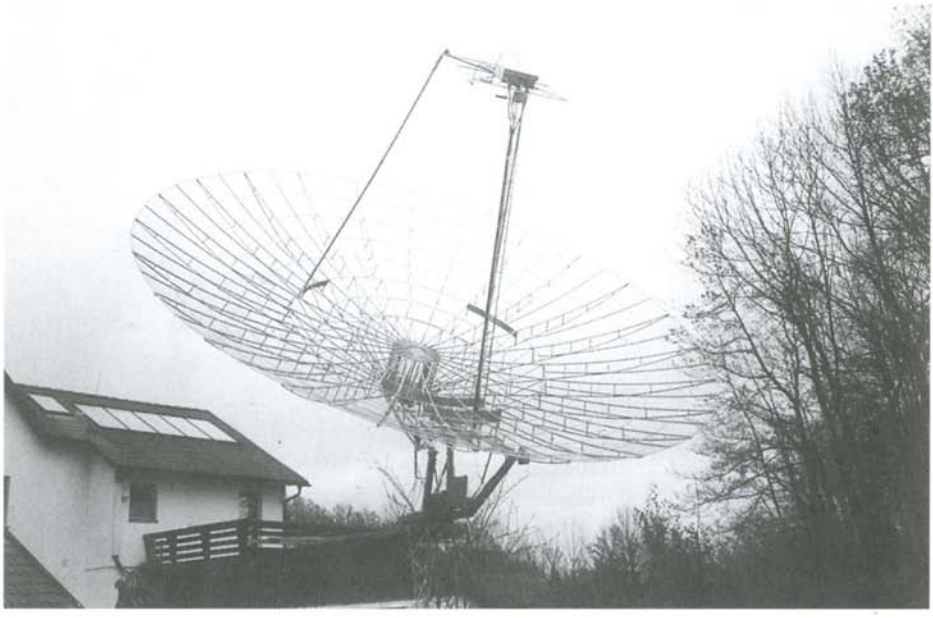
DK3FB (70): Heavy storm! Poor Condx.

PA2CHR (2): Condx on 144 not very good, from time to time I could work some station in one hour, but on Sunday it took me 7 hours to work only 5 stations. I was glad to work 4 initials and had a nice time. Sunday evening condx were good. This year I was qrv only on 2m, because in March we operated from 4U1ITU in the VHF contest.

I1ANP (2): Condx very bad during Saturday, high wind made it difficult to keep antenna positon.

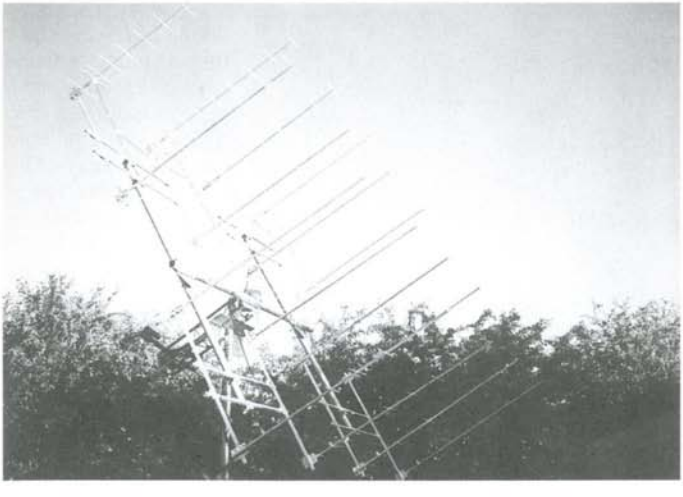
G3ZIG (2): Thank you for organizing another enjoyable moonbounce contest. Condx much better than last year. Unfortunately on the 5th 1:40z may PA supply H.T. transformer burnt out and that was the end of the contest.

ZS6AXT (23, 13): Very nice contest, with poorer participation than last year but with few new stations for me. 5 initials on 23cm and one on 13cm.



OE5EYM

F1ANH (70, 23, 13): MORE activity needed! The moon is there for quite a long time!



G4ERG on 432

S51XO (Op from S53J, 2m): My 2nd EME contest. Bad propagation. Saturday afternoon and evening QRM because of royal dartes picado machine (loud processor) in pub next door. Sunday evening QRN.

JH1EFA (70): Activity was not high in EU and NA window. Bad weather on Sunday.

OE5EYM (2, 70): This was my first contest without trouble with the 70cm equipment. But the stron winds on the 1st weekend forced me to take the antenna down in parking position several times. So most of the time I was watching the wind but not my

RX. At the 2nd weekend condx were not good and my preamp made problems.

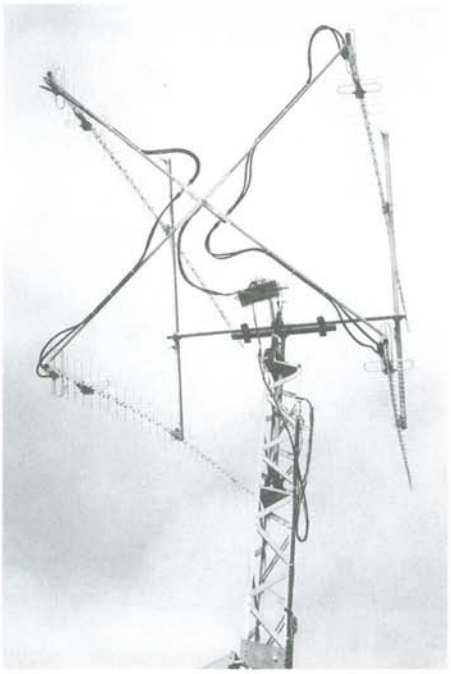
OZ4MM (23, 13): Bad relays prevented me from 432 operation this year. Also the bad weather passing EU made operation difficult in both weekends. Anyway great to work you and for the new initials. CU in 1999!

F6CGJ (23): Very poor WX during contest wind 120km/h plus rain. Low activity, no DL-station, no I, no PA was heard. I think it was one of the worst contests of the last years. Hope for 1999...

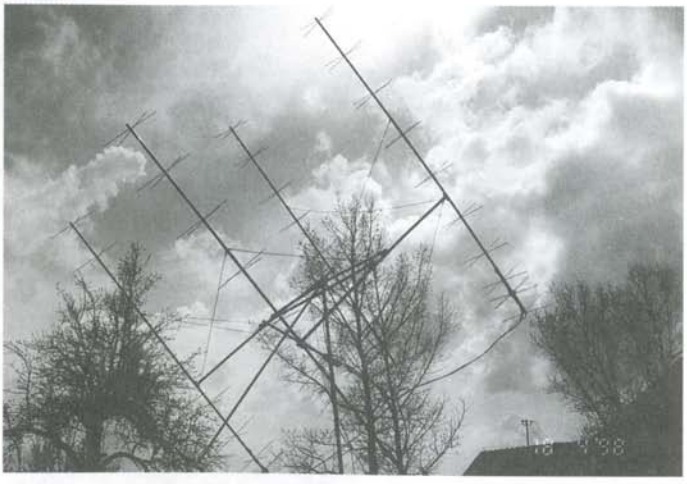
SP7DCS (2): I enjoyed the contest very much. It was my first contest with 4 yagis. I had many problems with calling stations with only 400 watts. Faraday made that I heard many Eus better on vertical polarization. One time F3VS war heard only on vertical.

EA3DXU (2, 70): Condx quite poor on 432, very low activity. On 144 heavy static noise. On daylight time better condx than on the night.

IZ1BPN (2): I did not really participate in the competition, because my 1st baby was born on March 28th! Anyway I think that the contest is a really good opportunity to improve EME activity and to have fun eith moon bouncing. Many thanks for your job and see you next year!



SV1BTR on 2



SP7DCS

GM4JJJ (2): Enjoyed the contest despite high winds and static rain on Saturday. Had a lot of fun in the contest escecially late sunday when condx peaked quite nicely for a time. The QSO witth Bob, WB5LBT, was the funniest I have had in a long time. He was obviously only copying my signal on peaks and was having a great deal of troulbe getting my callsign. Oddly he got the GM4 correct, but could not get the JJJ. He tried

GM4IPK then GM4YXI (both are not QRV). I was hoping that Bob had a copy of his EME directory handy that would show that GM4JJJ was the only GM qrv! I was really goinig to give up if he tried GM4AFF. However after 30 minutes Bob got the JJJ ok. Thanks for sticking with it Bob. We should get double points for that one!

IK5QLO (70): Only 6 hours of operating time: I found condx and the number of stations on air below the average. It is important to support every occasion and to put the maximum number of stations on the air. See you next year!

ON5OF (70): High winds Friday-Saturday made it impossible to raise the tower with the 166 yagi array above roof hight. Not many stations were qrv also.

JA9BOH (2, 70): Condx not so good, but I enjoyed it very much. Hope to add JA call areas to the multiplier list in 1999!

I3DLI (2): I found unstable condx, sometime poor. I made only 4 activity hours in the second pass. Static rain here and I was so tired that I went to bed at 9 PM. Anyway I have obtained a better score than in the previous contest. Thanks to all EME friends.

Tropo News

Editor: Joachim Kraft, DL8HCZ - Joachim@Kraft.net

2m > 700 km

DH0GHU, JN38VN wkd >650km: 18.2.98 G3JHM IO91LC 693km, G3GNR IO70WT 892km, hrd FX3THF IN88. 3.3.98 DL8UD JO44SK 664km. 8.4.98 OK1FID/p JO80EH 650km. 10.5.98 9A2AE JN86HF 713km. Rig: 150W/11el dl6wu, 300W after 01.05. Great condx at 18. february, but poor activity. tnx for info Ulrich

DL1EAP JO31IK wkd: 26.2.98 1645-2120: SP2OFW JO93AC 792km, LY2SA 559 529 KO14LL 1136km, LY2WR 559 559 KO24PQ 1288km. Heard also LY2PU KO14XW 1210km and EW1KJ KO33 with 1441km ! Heard from 1700 to 2100 many PAs working SP3/4/7/8 from JO91/92/KO12 but nothing in JO31, only JO73/93 KO14 and KO24. tnx for info

DL1EJA, JO31DS wkd: 25.-26.2.98 Nice condx on 25.-26.02.98 here in JO31DS. 2m-Band opened on Wednesday 25.2.98 direction EI at 16:00z. The beacon EI2WRB and GB3NGI were hrd both with 519-529. 1641-1929 EI3GE 52/57 IO63XD 848km, EI4DQ 52/54 IO51WU 990km, EI9IO 53/59+ IO52TA 1005km, EI6GF 59+/56 IO62RG 879km. EI3GE had a signal with 59+20dB later in the evening!!! At 21:00z SK7VHF QRB=592km was good audioble with 539. Next morning it was solide 599+20dB!! 26.2.98 0519-40 SP1EOI+FPG JO73GN 591km. 1743-2100 SP2MKO KO93CB 820km, SP4MPB KO03GS 982km, SP1RWU JO73LA 604km, SQ3DWS JO72OW 619km, SQ3VAA JO72OW 619km, SP2OFW JO93AC 809km, SP2CMB JO83SQ 786km, SP3WVG JO72OR 616km, SP3WWS JO72VR 655km, LY2SA KO14LL 1149km new Square!!! Heard also LY2WR in KO24 but lost him in QSB, sri. All QSO's with QTF=70, so not all the time direct path!! RIG: IC720A + LT2S Transverter; Pre-Amp NF=0,3dB; PA with GS35B 750W Ant: 24 ele M2 8WL 14m up and 30m ASL see you on the band! tnx for info Oliver

DL2FDL, JL40LN wkd 2m: 10.05.98 0857 UT G4SWX JO02PB hrd 43. 0951 UT G4PIQ JO01MU 55/55, tnx for info Michael LY2SA, KO14LL, wkd 2m 800km: 26.2.98 20-22UZ PA0PVW JO22VA 1172km, DL1EJA JO31DS 1150, DF2JQ JO31HL 1141, DL1EAP JO31IK 1137, 9A1CAL JN86EL 1004, DL9YEY JO41GV 1001, DL3YEE JO42GE 989, DL3ZBA JO41RF 974, OK1PGS JN69RS 833, OE3LFA JN88CH 830. Rig: 300w, 16ele. tnx for info Michael

SP2IQW JO94GM wkd: 1.9.97 SM4HFI JP70TO 698km, OH6KTL KP02OJ 888, SM3MXR JP80GR 700, SM3KJO JP92DX 940, 3xOH0 JP90, OH1MM KP11BG 779, SM3KJO JP92DX 940, SK4AO JP70TO 698, SM2GCR JP93TK 993, SM3RIU JP93IG 972, OH6BKO KP02OJ 888, SK3MF JP92FW 935, SM3AFT JP82XP 903, SK2AZ KP05RH 1210!, SM2ECL KP05RH 1210!, SM2DXH KP03CU 1041km! 22.9.97 G1ZCW JO03AG 1215km, G4PBP IO82WO 1375, GW8ELR IO71RO 1567, EI3GE IO63XD 1611km! (odx), G0KPW JO02OD 1177, G4ASR IO81MX 1451, GW4ZQV IO81LQ 1467 26.2.98 G8GXP IO93FQ 1307km, 9A2AE JN86HF 931, PA0PVW JO22VA 890, OE3LFA JN88CH 708, PE1PZS JO21DV 990, DK4RC JO50EQ 696. tnx for info

70cm>500km

DH0GHU, JN38VN wkd >450km: 18.2.98 OE5VRL/5 JN78DK 479km 7.3.98 DK0WAL JO61OA 475km 8.3.98 PI4GN JO33KK 546km, DJ9KH/p JO42OX 501km, 2.5.98 G4LIP/p JO01QD 542km, PE0MAR/p JO21BX 460km, G0EMG/p JO02QV 660km DK0WAL JO61OA 475km 3.5.98 PI4GN JO33KK 546km Rig: 75W (20W in 5/98), 18el tnx for info Ulrich

LY2SA, KO14LL wkd: 26.2.98 21-23z: DL1VAA jo61wb 719 km, DL8OBU jo42xi 892 km, OE3LFA jn88ch 830 km, SP2NJI jo92mp 329 km. tnx for info

6m News

Editor: Joachim Kraft, DL8HCZ - Joachim@Kraft.net

6m-TEP from Italy in March 1998:

March 31th wkd country: 3C5, TT8, TR8, 7Q7 at 1200-1630z (All Italy and EA; for TT8 also DL, ON, F).

March 30th wkd country: TT8, V51, ZS6, TR8, CT3, 7Q7 at 1400-1630z (IT9 area and I5, I0, I2. For TT8 also F, HB9).

March 29th wkd country: 3C, TT8, 9G at 1400-1600z - STRONG SIGNALS! (all Italy and for 9G & TT8: SV, EA, S5, 9A, OE). 7Q, Z2, V5 at 1600-1630z (into IT9 area)

March 28th wkd country: V5, TT8, ZS, 9G, 7Q7 at 1400-1800z (all Italy and for 9g & tt8 F, SV, EA, S5, 9A). TT8 & 9G WITH VERY STRONGS SIGNALS!!! BEACONS HRD: ZS6TWB / BCN at 1209z (Italy area I0) - Loc. KG46.

March 27th wkd country: TT8JE - JK72 at 1640-1700z (area I0, I5, I3, HB9, 9A and hrd working CT3) 7Q7 - (Italy area IT9, I0) at 1615-1715z TR8 - (Italy area I0) at 1620z;

March 26th wkd country: 7Q7 - (Italy area I0, I2) at 1815z TT8 - (Italy area I0, I2, I5 & HB) at 1720-1740z; BEACONS HRD: 7Q7SIX 1724z (Italy area I0)

March 25th wkd country: TR8 - (Italy area I0-IS0) at 1630z; BEACONS HRD: ZD8VHF 1800-1820z (Italy area IS0)

March 23th wkd country: PY - (Italy area I1, 12) at 1926z: PY5CC GG52 55 by IW1QD JN44. TR8 - (Italy area I0) at 1230-1330z

March 22th wkd country: V5, ZS, 7Q7 - (Italy area IT9, I5, I0) at 1430-1630z PY, LU - (Italy area IT9, I8) at 1915-2015z

March 21th wkd country: V5, TT8, ZS, 9G, FR, 7Q7 at 1400-1800z (Italy area IT9, I5, I0).

March 18th wkd country: V5: V51KC (Italy area 0, IT9) at 1415-1445z; TR: TR8XX (Italy area 5, 0) at 1315-133Oz TT: TT8JE (JK72) Italy area 5, 4, 0 at 1300-1330z BEACONS HRD: V51VHF.

March 17th wkd country: 7Q: 7Q7RM (Italy area 0, IT9 at 1630z ; Italy area IS0 at1945z); Z2: Z22JE (Italy area 0) at 1400z V5: V51KC (Italy area 0, IT9) at 1430-1500z; ZS: ZS6WB., ZS6AXT, ZR6VE, ZS6XJ, ZR6AUI etc... (all Italy area) from 1300 until 1500z BEACONS HRD: V51VHF, ZS6DN/b, 7Q7SIX.

March 16th wkd country: V5: V51KC (Italy area IS0) at 1630 Z2: Z22JE (Italy area IT9) at 1630z 7Q: 7Q7RM (Italy area IT9) at 1615z ZS: ZS6PJS., ZS6AXT etc... (Italy area 0) at 1300-1545z TR: TR8CA (JJ40) (Italy area 0) at 1430z

March 15th wkd country: Z2: Z22JE (Italy area IT9) at 1829z 7Q: 7Q7RM (Italy area IT9) at 1815z TR: TR8CA (JJ40) (Italy area 0) at 1100z

March 14th Opening from 1230 until 1730z; wkd country: 7Q: 7Q7RM (KH74MF) - QSL via G0IAS. ZS: ZS6PJS, ZS6BTE, ZS6WB, ZS6XJ, ZS6TDK/p (KG45), ZS5LC (KG50) Z2: Z21KA (KG49); TR: TR8CA (JJ40) V5: V51KC (JG88) BAECONS HRD: 7Q7SIX - BCN (KH75 - 50003); ZS6DN - BCN (KG 44 - 50050); V51VHF BCN (JG 87 - 50018);

March 13th Opening from 1400 until 1630z; wkd country: Z2: Z21KA (KG49), Z21AFR (KG49); ZS: ZS6PJS, ZS6PT, ZS6AXT, ZR6VE V51: V51KC (JG88) TR: TR8CA (JJ40) HRD BEACONS: V51VHF BCN (JG 87 - 50018) & ZS6DN BCN (KG 44 - 50050)

March 12th Good opening from 1315 until 1730z; wkd country: Z2: Z22JE (KH18), Z21KA (KG49), Z21AFR (KG49); 7Q: 7Q7RM (HK74) ZS: ZS6WB, ZS6PJS, ZS6BTE, ZS6AXT ..... TT: TT8JE (JK72) HRD BEACONS: V51VHF BCN (JG 87 - 50018) & ZS6DN BCN (KG 44 - 50050)

March 7th 7Q7RM (HK74) -WKD SARDINIA at 1918z ZS6PJS -WKD ITALY cw 1657z TR8CA -WKD ITALY cw-ssb start at 13,57z V51VHF BCN (JG 87) - HRD in ITALY (559) from 1348 until 1900z in JN61 3C5I - WKD ITALY cw-ssb start at 1225z

March 6th V51VHF JG87 hrd 579 1509z in JN61.

March 4th TT8JE JK72 wkd I +IS0 at 1325-1420z. March 1st TT8JE (JK72) wkd IW5BML, I3LLH, I0JX, IK0FTA, I0AMU, IW0BET, S5, and many other... at 1410-1510z. TT8JE QSL Manager: F6FNU - Antonie Baldeck, B.P. 14, F-91291 Arpajon Cedex. 3C5I wkd I+ SV at 1225-1430z.

TNX for this summary to IK0FTA!

DL2FDL, JO40LN wkd: 21.4.98 1730-1830UT wkd: 4X1IF 559/419 KM72

DJ3TF, JN59wk, wkd: 1.4.98 14z TT8JE JK72. 21.4.98 17245-58 4X1IF KM72, SV8DTD KM39, 5B4/EW1AA KM64, 4X6ON KM72.

Note: The UKSMG expedition to 5A1A was cancelled due to visa problems.

Aurora

Editor: Norbert Göttsche, DL8LAQ

DL1EJA (JO31DS) wkd on 144 MHz:

1998-04-26

1440 LA2AB	JO59FV	57A	55A	
1447 SM1BSA	JO97IO	57A	57A	
1456 SM7TKR	JO77MJ	55A	55A	
1459 SM6EAN	JO57WQ	55A	55A	
1504 G4SWX	JO02PB	52A	51A	
1510 GM8LFB	IO88JH	56A	57A	ssb
1516 LA5KW	JO28IO	57A	31A	
1531 SM6TFA	JO58PI	55A	55A	
1555 GW0KZG/MM	IO37RC	59A	59A	
1606 GM4CXM	IO75TW	53A	52A	
1616 SM7LZY	JO77DS	53A	31A	
1624 GM0ICF	IO75PW	53A	53A	

Rig: IC720A, LT2S, MGF1302 (0.5dB NF), GS35B (750W), 24 ele Yagi 8Lamda. Thanks for report, Oliver.

DL8EBW (JO31NF) wkd on 144 MHz:

1998-03-10

1727 MM1BUO	IO87	57A	55A	350SSB!
1726 SM7WT	JO65QQ	55A	hrd	350
1743 DF8LC	JO53	55A	55A	310!*
1747 OZ7UHF	JO65ER	55A	53A	30 *
1809 DL9MS	JO54WC	53A	52A	35 *
1812 PA3HDD	JO22FE	55A	54A	40 *
1814 PA3BIY	JO22	55A	53A	30 *
1845 DL1SUN	JO53	52A	hrd	40
1845 DJ4SO	JO44	52A	hrd	40
1910 DF8LC	JO53	55A	still hrd	45

Heard Aurora on CH R1 (49,75MHz) between 1730 and 2015 UTC with QTF 000-050!

1998-03-21

1544 SM7WT	JO65QQ	59A	57A	40 *
1546 SM7WCZ	JO66KF	57A	59A	40 ssb *

At 10UT the first signals was copied on 28 MHz (OH6-stns!). It took up to 1505 UTC that first station was detectable via AU in my QTH (hrd DF8LC, LA3BO, PE1PZS, GM0CLN, GM0TGE, OZ1FDJ, GM0CLN, DL8LAQ, G4DHF, GM4AFF, DF0TAU...)

1998-04-26

1531 GW0KZG/MM	IO37RC	41A	hrd	355
1542 DL1EJA	JO31DS	52A	hrd	350

1998-05-02

1345 OZ6ABA	JO57DJ	55A	hrd	30 ssb
1453 OZ1BUR	JO46HI	55A	55A	40 *
1455 LY2WR	KO24	55A	hrd	35
1457 DJ9YE	JO43HV	59A	55A	35 *
1501 RU1AA	KP40	51A	hrd	25

Heard also lots of SM, OZ, DL, PA and strange signals from some contesters, hi. Also many trouble with thounderstorms (QRN).

1998-05-04

1651 SM5BSZ	JO89	51A	hrd	350

Equipment: 11 ele. DL6WU, MGF1302, 250W. Remarks: * 60W! Thanks for your report, Guido.

LA0BY (JO59FW) wkd via Aurora on 144 MHz:

1998-01-31

2049 DL9MS	JO54WC	53A	53A	20
2053 DK8LV	JO44SJ	55A	55A	20
2055 OZ4UHF/B	JO75KC	hrd	41A	40
2106 LA4CQ	JP20QL	52A	55A	10

1998-02-18

1750 SK4MPI/B	JP70NJ	hrd	58A	350

1998-02-28

2010 SK4MPI/B	JP70NJ	hrd	52A	340

1998-03-04

1538 SK4MPI/B	JP70NJ	hrd	58A	340
1636 DL1SUN	JO53PN	53A	53A	20

1998-03-10

1608 SK4MPI/B	JP70NJ	hrd	56A	340
1610 DL0PR/B	JO44JH	hrd	53A	30
1614 LY2SA	KO14LL	52A	57A	40
1619 LY2FR	KO15UR	54A	55A	40
1622 GM4DZX	IO89LB	55A	56A	10
2220 LY2FE	KO05OQ	53A	59A	50
2224 SP4MPB	KO03GS	59A	59A	60
2237 LY2BAW	KO25KA	52A	55A	60
2241 SP1NQN	JO84ML	55A	59A	60
2243 DJ3XK	JO53AN	52A	55A	40
2251 SP2IQW	JO94GM	54A	59A	60 ssb

1998-03-11

1610 SK4MPI/B	JP70NJ	hrd	58A	340
1616 DL9MS	JO54WC	59A	57A	40
1630 OZ4UHF/B	JO75KC	hrd	51A	40

1998-03-13

1700 SK4MPI/B	JP70NJ	hrd	51A	340

1998-03-14

1550 SK4MPI/B	JP70NJ	hrd	51A	340

1998-03-17

2210 SK4MPI/B	JP70NJ	hrd	52A	340

1998-03-21

1416 SK4MPI/B	JP70NJ	hrd	55A	340
1432 DL5WG	JO52VK	52A	53A	40
1433 DK9OY	JO52CK	59A	59A	40
1434 LY2FE	KO05OQ	52A	57A	40
1438 DJ9YE	JO43HV	59A	59A	40
1440 DL1UU	JO62SP	57A	57A	40
1445 SK4MPI/B	JO70NJ	hrd	59A	340
1446 SK1VHF/B	JO97CJ	hrd	52A	50
1447 SK7VHF/B	JO65KJ	hrd	53A	40
1448 OZ4UHF/B	JO75KC	hrd	54A	50
1449 DL0PR/B	JO44JH	hrd	59A	50
1453 GM0TGE	IO87UJ	52A	52A	10
1457 DJ7OF	JO51HQ	59A	55A	50
1501 LY2MW	KO24PQ	55A	59A	45 ssb
1511 SM7FVB	JO76	51A	57A	45
1512 DJ3HW	JO42LH	56A	57A	45

1517 DL9OE	JO52GL	58A	52A	45 ssb
1527 OH2KW	KP20	52A	52A	40
1528 DL8LAQ	JO43XU	59A	59A	45
1534 GM0CLN	IO85MX	55A	53A	10
1610 GM0AUL	IO87BI	54A	54A	10 ssb
1618 DJ9MG	JO52TC	55A	55A	40
1621 DG5LR	JO44MM	53A	55A	40
1625 DL5ZA	JO51CH	53A	52A	40
1628 PA3GUC	JO33EE	52A	53A	20
1630 DL7ADA	JO62RK	55A	55A	40
1632 DL8BAB	JO43OB	57A	57A	40
1998-03-26				
1710 SK4MPI/B	JP70NJ	53A	hrd	340
1711 DL0PR/B	JO44JH	41A	hrd	10
1998-03-29				
1623 SM7TJC	JO67SH	52A	43A	40
1627 DJ9YE	JO43HV	57A	56A	40
1640 PA3CEE	JO33JI	53A	53A	320

LA0BY/p in JO59IX wkd via Aurora on 144 MHz:

1998-03-03				
1916 OH0AB	JP90XI	55A	55A	30
1917 OH2AAQ	KO29FX	52A	55A	30
1919 SM3UZS	JP92EW	54A	54A	30
1929 OH6QR	KP22BN	52A	52A	30

LA0BY/p in JO59IX wkd via Aurora on 432 MHz

1998-03-10				
1804 ES2RJ	KO29JM	55A	57A	30
1908 SM0DFP	JO89VL	57A	57A	30
2017 SM3BEI	JP81NG	52A	43A	30
2040 SK4AO	JP70TO	52A	53A	30

Thanks for your report, Stefan.

OZ7AMG wkd on 432 MHz:

1998-05-02				
1553 SK7CA	JO86DQ	55A	55A	
1550 DL6NAA	JO50VF	54A	55A	
1535 DL9NDD	JN59KN	57A	59A	
1530 DF9RJ	JN68GS	55A	56A	
1527 DJ6OL	JO52AO	55A	55A	
1524 OK1OKL	JO60LJ	57A	55A	
1523 DJ1JD	JO52CK	59A	59A	
1521 OL9HQ	JO70GU	56A	55A	
1519 PA3DYS	JO21JP	53A	55A	
1518 PE0MAR/P	JO21BX	57A	57A	
1515 OK1VMS	JO70GU	55A	55A	
1506 DL8OBU	JO42XI	59A	56A	
1500 PA0RDY	JO22KJ	55A	55A	
1458 OH5IY	KP30HV	53A	56A	
1451 G3LQR	JO02QF	55A	55A	
1448 SM0FMT	JO89VJ	57A	52A	
1445 SM3AKW	JP92AO	56A	57A	
1436 SM5EFP	JO79WJ	55A	57A	

Thanks for your report, Uffe (PA3HDD / OZ1DOQ).

SP2IQW (JO94GM) wkd on 144MHz (all SSB):

1998-01-31				
1938 LA8AJA	JP50OQ	56A	55A	811km
1998-03-10				
1605 SM4VQP	JO79NB	57A	56A	546km
1614 OH6KTL	KP02OJ	54A	55A	888km
1706 ES2QN	KO29DJ	59A	59A	643km
1711 ES1II	KO29IJ	59A	59A	657km
2250 LA0BY	JO59FW	54A	54A	772km
1448 SM4VQP	JO79NB	59A	59A	546km
1449 OH6KTL	KP02OJ	59A	59A	888km
1453 SM3VEE	JP81EI	57A	57A	770km
1455 LC3AN	JO59HJ	59A	59A	722km
1518 LC3SAT	JO59ES	55A	55A	762km
1520 ES2NA	KO29JL	57A	57A	668km
1526 RX1AS	KO59FX	55A	59A	936km
1555 SM5PRH	JO78SK	55A	55A	472km
1607 SM4WHF	JP70OC	57A	55A	652km
1998-04-26				
1441 LA8AJA	JP50OQ	57A	55A	811km
1446 SM3WHF	JP70OK	55A	55A	687km
1226 SM4VQP	JO79NB	59A	59A	546km
1525 PI4AJS	JO32NG	59A	59A	795km
1530 OZ6ABA	JO57DJ	59A	59A	604km
1536 PI4GN	JO33KK	59A	59A	771km
1998-05-02				
2132 SM4WHO	JP70OC	54A	54A	652km
2158 OH3KLJ	KP21PI	57A	57A	856km
2358 OH1XT	KP01UL	56A	56A	795km
0026 ES2QH	KO29LL	56A	56A	673km
0031 SM4VQP	JO79NB	59A	58A	546km
0118 ES2RJ	KO29JM	55A	55A	671km
1998-05-05				
1436 SM3VEE	JP81EI	57A	55A	770km
1445 LA2AB	JO59FV	59A	59A	769km
1453 OZ6ABA	JO57DJ	57A	57A	604km

Equipment: TR-751A, 150W, 17 ele. F9FT at 100m asl.
Thanks for your report, Michal.

Continuation from Page 83 (MS-Expedition...)

We predicted the shower maximum to 16 UTC on August 12. We expect to operate 2m MS according to the following schedule:

Day	UTC	QTF
August 11	21-23	South-East
August 12	04-06	South-East
	06-10	South
	10-16	South-West
	16-20	??? (MS & Tropo)
	20-22	East
	22-23	South-East
August 13	04-06	South-East
	06-10	South

We are not sure yet about the QTF during the maximum. As long as the shower will be above the horison we work like hell (hi). Perhaps we may need to allow for some more breaks for rest and sleep...

The operation will be mainly random, particularly during the shower peak. However, we may arrange MS skeds only with stations at distances 1800 km. Forward proposals to LA0BY (VHF-net, email la0by@qsl.net, phone +47-67139536) after July 1. During the expedition we will be QRV in the VHF-net on 14.345 MHz.

50 MHz: The callsign will be LC3SAT/p and the operating frequency 50.180 MHz. We will transmit in the first period, mainly on SSB using 1 min periods.

432 MHz: The activity on 70cm will be limited to the NAC on August 11 from 17-21 UTC. The callsign will be LA0BY/p. The operating frequency will be 432.155 MHz. We will run 120 W RF into a 11-element-yagi on a 6 m mast. Send your proposal for sked! Stefan, LA0BY

Meteor Scatter

Editor: Norbert Göttsche, DL8LAQ

Dear Readers, don't forget to send in all your reports, experiences and comments about the MS avtivity!

It happens sometimes that I can't recognize what column of your report includes the number of bursts or pings or the tx/rx report. Please don't forget to give me a short hint. In this column the order is bursts, pings and seconds. And here is again the meaning of the short cuts: c = complete, bs = backscatter, m = many, nc = not complete, nil = not in log (no reflections!), r = random, s = ssb, sc = sidescatter and t = tailend.

Send your reports to dl8laq@hamburg.roses.de or to my packet radio address DL8LAQ@DB0HB.#HH.DEU.EU.

73, Norbert

DL8EBW (JO31NF) wkd on 144 MHz:

1998-01-06
2045 2136 GW0KZG/mm IN42 26 26 8 14 1.5c
1998-01-31
1545 1550 SK4MPI JP70 27 bcn 3 5 1
1998-02-01
1732 F1NSR JN33JK 37 1 8 hrd cq
1998-03-06
0500 0542 LA4XGA JP33VC 27 26 4 8 0.5c *1
1998-03-13
0500 0532 LA4XGA JP33VC 26 26 4 6 0.8c *1
1998-04-14
0345 0430 SM2LTA JP94CW 26 - 2 2 2.0nc *2
0430 0440 SK4MPI JP70 27 hrd 2 1 0.5bcn
1998-04-18
0836 0838 CH R1 EAST hrd 1 - 120! tv *3
1998-04-20
2132 2202 YR0T KN38FC 26 26 6 4 1.0c r
1998-04-22
0400 0421 YP0T KN37TD 26 26 6 81 1.0c
2242 2307 YR0T KN26 26 26 7 7 1.0c r
1998-04-24
0410 0431 GW0KZG/mm IO37 27 27 8 m 6.0c
1998-04-25
2210 2230 LY2WR KO24QO 27 hrd m m 3.0nc *4
2300 2400 S53CO JN76HD 26 - 2 3 0.3nc
1998-04-30
0412 0450 GW0KZG/mm IO15TD 26 26 13 13 1.5c
1998-05-05
0257 0320 GW0KZG/mm IO32 26 27 12 14 0.8c
1998-05-09
0257 0402 GW0KZG/mm IO14 26 26 10 m 1.5c
0405 0456 YU7KB JN94XX 27 27 8 16 1.5c

NIL: 1998-04-22 UT2HN (1950km). Remarks: *1 Regular sked to Geir (1320 km), to test MS-condx; *2 Tailending after DH3YAK, no reflections after 04UT anymore; *3 TV carrier Channel R1 (video) - antenna direction 60; *4 Random-activity night. Every sked for MS, also with stations worked before is very welcome! Thanks for your report, Guido.

LZ1KWT (KN32IO) wkd on 144 MHz:

1997-11-17
0100 0200 DL8UD nil
0300 0400 DJ9YE 26 2 1 2 nc
0647 HB9FAP 27 2 3 nc
0709 PA0BZY 27 1 8 nc
0709 HB9FAP 27 1 5 nc
0746 I4XCC 27 1 4 nc
0757 ON4AEN 37 1 13 nc
0823 HB9FAP 37 1 10 nc
0824 DL5MCG 59 59 1 75 c
0824 PA2CHR 27 27 1 9 c
0824 DL5ME 27 27 1 8 c
0825 DF0WD 27 27 1 6 c
0825 SM4VQP 27 1 5 nc
0905 DL9MS 39 39 1 14 c
0922 ON4AEN 27 1 7 nc
1008 IV3HWT 38 1 15 nc
1040 SP4MPB 39 1 13 nc
1040 PA2CHR 29 1 8 nc
1041 DH8NAA 59 59 1 60 c
1041 DK9OY 39 39 1 18 c
1045 OZ6OL 59 39 1 68 c
1045 DL1SUZ 39 39 1 20 c
1045 SP4MPB 39 27 1 18 c
1100 DJ1SHF 37 37 1 12 c
1997-12-12
2045 2100 SP2OFW 27 nc
2142 2155 9A5Y 27 nc
2155 2235 UT8AL 27 27 c
2300 2330 UA3PTW 27 27 c
1997-12-12
0013 0055 SP2OFW 27 27 nc
0055 0110 SP2OFW 27 27 c
1715 1745 S51AT 27 27 c
1800 1820 DL8CMM 27 27 c
1810 1840 DL9MS 27 26 c ?
1845 1905 SP4MPB 27 27 c
1910 1935 DL1DUR 27 28 c
1935 1950 DK8ZJ 27 27 c
2000 2015 DL5MAE 28 nc
2015 2100 DH0LS 39 39 c
2150 2205 EU6MS 27 28 c
2209 2240 LY3GM 27 nc
2240 2255 LY3GM 38 39 c
2315 2330 UA3PTW 39 29 c
2355 0010 S57TW 27 nc
1997-12-13
0235 0300 PA3FJY 27 27 c
0315 0350 IZ1BPN 26 37 c
1740 1827 RU1AA 37 37 c
1830 1850 RW2F 27 nc

1930 1950	F8DO	27	nc
1955 2010	RW2F	28	nc
2020 2045	DL1UU	38 38	c
2045 2105	DH9NBB	28 28	c ?
2105 2130	DG5OAA	28 38	c
2200 2220	DK0OG	27	nc
2220 2310	RW2F	38 27	c ?
2345 2400	OE3JPC	27	nc
1997-12-14			
0010 0050	I4XCC	27	nc
0050 0110	S57TW	28	nc
0105 0120	S57EA	37 27	c
0140 0150	I4XCC	27	nc
0150 0220	S54AA	27 27	c
0225 0245	DL5MAE	39 39	c
0250 0320	9A5Y	28 29	c
0520 0540	DL2ARD	38 29	c
1997-12-14			
0700 0720	F8DO	27 27	c
1745 1810	IC8FAX	37	nc
1850 1930	HA7UL	27 27	c
1940 2005	DF0WD	37 27	c
2030 2050	DL1EAP	28	nc
2045 2110	DL2IAN	26 26	c ?
2120 2140	S57TW	38	nc
2150 2205	DL9AN	38 38	c
2215 2245	DH7FB	27 27	c ?
1997-12-15			
0005 0030	YU7MS	27	nc
0115 0130	I4XCC	27	nc

Thanks for report, Mitko (LZ1ZX).

LZ1ZX (KN32IO) wkd on 144 MHz:

1997-11-17							
0519	HB9FAP	27	27	1		8	c r
0519	ON4CBT	37	37	1		13	c r
0758	SM4VQP	59	59	1		60	c r
0808	DG0KW	39	39	1		18	c r
0810	DJ9YE	27		1		7	nc r
0830	S57TW	59	59	1		59	c r
0904	DL9MS	39	37	1		14	c r
0904	SP2FAX	39	39	1		16	c r
0905	DF1AN	27	27	1		8	c r
0906	OZ6OL	37	49	1		19	c r
1998-01-02							
0400 0455	IK2DDR	27	27	m	m	4	c
1200 1300	RA1QA						nil
1998-01-03							
0300 0332	RW3PF	27	27	4		3	c
0500 0540	SM5MIX						nil
0700 0745	DK1CO	27	27	13	13	5	c
0800 0900	IW1CHX	27		8	1	2	nc
0900 0920	SP4MPB	27	26	10	11	3	c
1000 1040	DF8LC						nil
1100 1117	LY2SA	39	26	m	7	19	c
1300 1420	DF8LC	27	27	m	m	8	c
1615 1635	DL1DUR	27	27	8		3	c r
1700 1720	PA3FJY	27		1		6	nc r
1725 1740	OK1GQN	27		2		4	nc r
1800 1840	G3IMV						nil
1900 1940	EA3TI						nil
2000 2040	IW5BML						nil
2100 2140	9H1PA						nil
2140 2155	UT5ER	27		1		8	nc r
2200 2240	UA3GA						nil
2300 2330	DL8UD						nil
2330 2400	UA3PTW	27		1		7	nc r
1998-01-04							
0000 0040	G3WZT						nil
0040 0440	SM5MIX						nil
0500 0540	IW1CHX						nil

Thanks for your report, Mitko.

ON4KHG (JO10WK) wkd during the Geminids / BCC MS Contest:

1997-12-11					
2137 2155	LY3GM	KO14LL	28	27	1
1997-12-12					
2035 2057	EA3DXU	JN11CM	27	27	1.5
2305 2337	9A5Y	JN85OO	28	27	1 sc
2347 0020	LY2MW	KO24PQ	27	27	4
1997-12-13					
0320 0340	LA2AB	JO59FV	28	28	1.5
0422 0435	YU7MS	KN05EF	27	28	1 sc
0555 0615	RW2F	KO04	27	27	5
2130 2145	9A4FW	JN95JG	29	38	3
2145 2205	I6BQI	JN72	29	27	11
1997-12-14					
0202 0215	S51AT	JN75GW	28	27	4 sc
0215 0227	YU7BCL	KN05PC	39	39	5 sc
0242 0255	HA7UL	JN97KK	27	38	1 sc
0302 0322	DL1MAJ	JN68AH	28	28	3 bc
0322 0340	YT4D	JN94	27	27	1.5sc
0340 0350	DL5MAE	JN58VF	39	27	5 bc
0412 0422	S53VV	JN65UM	28	28	3 sc
0422 0440	S54AA	JN76EG	27	29	2 sc
0710 0720	OH0JFB	JP90	39	39	12 new dxcc
2215 2235	SP4MPB	KO03	27	27	4

Heard: EA2LU, EA6SA, EB4GIA, F5HRY, F8DO, HA3UU, I1JTQ, I4XCC, I8TWK, IC8FAX, IK7UXY, OH2BNH, RU1A, SM3MXR, SP2OFW, TK5JJ, 4U1ITU, 9A2EW. Thanks for your report, Gatan.

MS-Expedition announcement

50 & 144 MHz MS and 432 MHz Tropo from JP51

Ivar (LC3SAT), Rune (LC1PAT) and Stefan (LA0BY) plan to be active from JP51 on 50 and 144 MHz MS during the Perseids from August 11-13, 1998. The QTH will be at 800 m asl and has good take-off in many directions.

144 MHz:

The callsign will be LA0BY/p and the operating frequency 144.155 MHz for CW and SSB. In CW we transmit with 1000 lpm and can receive up to 3000 lpm. In CW the callsign will be abbreviated to LATBYP. We always transmit the first period, using 2.5 min periods on CW and 1 min with breaks every 15 sec on SSB.

Equipment: IC706, PA 180 W RF, 2 x 9-element yagi (stacked vertically), preamplifier, ETM4C keyer and DTR.

Continuation on Page 81

News & Comments

Editor: Klaus Tiedemann, DL4EBY

The Nordic VHF-UHF-SHF meeting, 12-14 June 1998, Stevninghus Denmark.

We hereby have the pleasure to invite you to the 20th Nordic VHF-UHF-SHF meeting 1998. The meeting will be held at Stevninghus, a scout center, in southern Jutland. Stevninghus is located near the town of Kliplev and only 12 km north of the German border on E47. It is situated in some of the most spectacular nature in southern Jutland with only short distances to many tourist attractions.

The program will besides the social aspect contain lectures, miscellaneous measurements on amateur radio equipment, exhibition, flea market and more.

A special treat for people coming with car from Sealand will be the return via the bridge over the great-belt which will be opened on the 14th June.

Indoor accommodation is possible in 2 persons room, bunk beds in 9 persons dorms and on a mattress on the floor in dorms with a total of 115 places and outdoor the camping capacity limit is more than 20000 persons!. If you wish to combine the VHF-meeting with your vacation we encourage you to stay some days or weeks at Stevninghus in hostel style.

All meals and drinks are provided to the usual reasonable prices.

For further information please contact: OZ7IS, Ivan Stauning, (+45) 43523314, QRL (+45) 978222 ext. 531, EMail:is@cph.ih.dk, or OZ1FTU, Soeren Pedersen, (+45) 20160584, QRL (+45) 39640545, EMail:soeren_pedersen@chartec.dk

Beacon SK1UHF QRV

The new equipment for SK1UHF (JO97CJ), 432.950 MHz, was put in operation on 1998 April 11 at 1015z.

The beacon is situated on top of the Farmers Association grain and crop storage building in Klintehamn on the island of Gotland. The antenna is about 60 m above sea level and has a splendid view over both the sea (200 meters away) in west and the land of Gotland in east.

The beacon consists of an owen controlled crystal oscillator, multiplier, driver amplifier (PA of a former SK1UHF installation) and power amplifier. The output power is about 50 W. The beacon is keyed in A1A by a PIC-processor keyer. The antenna is an Alford slot with an omnidirectional (within 3 dB) radiation pattern. Polarization is horizontal.

Reception reports are most welcome, from occational reception or if you can hear it at all times. They are all very valuable for evaluation of the beacon performance. They can be sent to ingolf.larsson@emw.ericsson.se or to arne1mut@algonet.se

Please pass this information to your national magazines and other information sources in order to forward this information to all UHF hams that can have use of the beacon.

I would like to thank all the people that has contributed to the beacon construction and made it possible.

- SM6EUP, Hans, for the excellent antenna and for a surplus power supply.
- SM6ECM, Anders, for a surplus power amplifier.
- SM6PGP, Hannes, for measurement assistance and filter manufacturing.

- SM6MUY, Bengt, for filter components for the multiplier.
- SM6CMU, Ingo, for loan of power supply for initial beacon tests.
- SM1MUT, Arne, for all the site preparations at Gotland.
- SM1LPX, Karl-Erik, for installation assistance.
- Plus all the other SM1 hams that have put in an effort to get the beacon running.

I would also like to thank all of you that has sent reception reports and comments on the performance of the beacon during the test operation period from my QTH. 73 / SM6FHZ, Ingolf

Ergebnis der 144MHz (M)ost (W)anted (S)quare und DXCC Umfrage 1998

der VHF-DX-Gruppe DL-West in Zusammenarbeit mit dem Funk Telegramm

Hallo liebe VHF-Funkfreunde,

nach wochenlangen Aufrufen im FT, CQ-DL, FA sowie diversen anderen, auch ausl. Publikatioen, als auch via Packet-Radio und Internet, hier nun das offizielle Ergebnis der 144MHz (M)ost (W)anted (S)quare und DXCC Umfrage 98 der VHF-DX-Gruppe DL-West.

Gesammelt wurden die Daten über einen Zeitraum vom 01.12.1997 bis zum 10.02.1998. Es sei nochmals darauf verwiesen, dass sich hierbei auch viele Stationen beteiltigt haben die nicht in der Betriebsart Meteorscatter oder EME qrv sind und so manche Expedition gerne auch auf direkten Wege arbeiten w}rden. Genug der Worte. Lassen wir Daten sprechen:

Most Wanted 144 MHz DXCCs 1998

ZA (45), 3A (37), HV (36), 1A (34), 7X (29), T7 (28), SV/A (26), CN (25), SV 5 (24), R1M SV9 (22), T9 (21)

Most Wanted 144 MHz Squares 1998

KN37 KN38 (48), KO32 (45), KN35 (44), KN39 KN48 KO30 (43), KN49 KO44 (42), KN36 (41), KN47 (39), KO57 (38), KN26 (37), KN20 KO46 KO47 (36), KO43 (34), JP42 KN24 (32), KN27 KO23 (31), JN92 KM29 KO31 KO67 KO75 KP51 (30), IO42 JM87 JP31 KM09 KN28 KN30 KO42 KO74 (29), IO44 JP21 JP44 KN25 KN40 KO49 KP35 KP43 (28), JP32 JP43 JP51 KM28 KN00 KO56 KO62 KO63 KO69 KO78 KP45 (27), JM48 JP72 KM16 KN57 KN69 KO19 KO41 KO65 KO66 KO68 KO76 KO79 KP53 (26), JN84 JP74 KM19 KN10 KO50 KO54 (25).

Die Zahl (in Klammern) hinter den DXCCs bzw. Squares gibt die Anzahl der Stationen an, die eine 144MHz-Aktivierung des entsprechenden Landes oder Großfeldes begrüßen würden! Die eingehenden Informationen kamen von 84 VHF-DXern über Gesamt-Europa: (1x9A, 35xDL, 3xEA, 2xF, 2xG, 3xHA, 3xHB9, 9xI, 2xLA, 3xLY, 2xOE, 13xPA, 3xS5, 2xSM, und 1xYO).

Eine komplette Ergebnis/Locator-Aufstellung ist im PR-Netz (Rubrik @VHF) oder im Internet auf den Seiten von DK3XT, Bernd, (unter http://www.ilk.de/sites/gap/mwanted.htm bzw. //www.qsl.net/dk3xt/mwanted.htm - hier auch grafisch!) zu finden. Gegen SASE können, auch auszugsweise, Kopien aus dem Gesamt-Ergebnis bei DL8EBW angefordert werden.

Eine Ergebnisbeurteilung in Bezug zum Vorjahr ist kaum möglich, da es viel mehr Einsendungen von Funkfreunden ausserhalb DLs gegenüber dem Vorjahr gegeben hat! Allerdings fällt bei den Squares deutlich auf, daß in östlichen Bereichen noch sehr viel gesucht wird....

Recht viel Spass und Erfolg bei der Aktivierung neuer Squares und DXCC-Ländern auch in der kommenden Saison!!! Guido DL8EBW

Results of the 144Mc (M)ost (W)anted (S)quare and DXCC inquiry 1998

of the VHF-DX-Group DL-West together with the Funk Telegramm

Hello dear VHF-friends,

after several weeks of requests in newsletters like FT, CQ-DL, FA and other publications as well as via packet-radio and Internet, we are

now able to publish the official results of the 144Mc (M)ost (W)anted (S)quares and DXCC inquiry 1998 of the VHF-DX-Group DL-West. The data were collected between 01.12.1997 and 10.02.1998.

There has been a request from some stations to remind the expeditions about the fact that not everybody is active via meteor scatter or EME. They would like to also try more tropo tests while expeditions are in good ranges...

The figures (in brackets) behind the DXCCs or squares gives an info how many people wish an activity from that defined square or dxcc! We received informations from 84 VHF-DXer all over central europe: (1*9A, 35*DL, 3*EA, 2*F, 2*G, 3*HA, 3*HB9, 9*I, 2*LA, 3*LY, 2*OE, 13*PA, 3*S5, 2*SM, and 1*YO).

A complete result/locator-listing will be available via PR (board: @VHF) or at the Internet VHF pages from DK3XT, Bernd, (http://www.ilk.de/ sites/gap/mwanted.htm bzw. //www.qsl.net/ dk3xt/mwanted.htm - including grafics!). Also a printout about a special grid field is possible (eg. KP or JP) - requests with SASE to DL8EBW.

This year we received more dates from stations outside DL, so it is nearly not possible to compare the results to the last year - after all we can see again that there is still a high demand about expeditions into the east parts! We wish you good luck with your plans to activate some "rare ones" again and hope to meet you from where ever you or we will be qrv! Guido DL8EBW

144 MHz Activity DX Contest 97

Thank you very much again for the very good activity in this 1997 contest! We received 67 different logs logs from following countries: DL, EA, EA6, EA9, F, 4U, I, LZ, OE, OK, PA, SP, HA, RW and YU. Résumé of this year: Less logs, but much more points and multis! So I will hope to get more in 98, perhabs from the indifferent countries from this year.

Any comments, questions and remarks are very welcome, please send it to Wolfgang Knobus, Asbergerstr.6, D-47228 Duisburg, Paket-BBS: DL1EAP@DK0MWX or EMail: dl1eap@rtl.de

VHF-DX-Group-DL-West, DL1EAP Wolf

Soap-Box

Active Amateurs comment the VHF-DX-Contest 1997

PA3FJY: In 1997 I made very big Activity on 144Mhz from several QTH's. Also was QRV on DX-pedition in IN79/IO70. Totally i made about 5000 (!) QSOs on 144Mhz 1997. This is an personal Record, and i do not think i will do so well again in Future. Everybody thanks for the wonderful time on 144Mhz. 73 de Dick, PA3FJY.

DD0VF: Because of my Move in new QTH and bad ES-Saison i reach only 50% of the Result 1996. QSOs otherwise via ES normally 20..80 QSOs. But Highlight in 1997 was my ODX via Tropo with OY9JD about 1736 Km's. 73 de Steffen

DL1KDA: A great year for me! I started this year with 302 squares and ended it with 355 squares. Most of these 53 new one's I made in MS, because of the ufb MS Expeditions in 1997 ! But other reason are the new Digital VHF-NET and the ufb Homepage of DK3XT that helped me to complete 70 MS-QSOs in all. Finally I hope for a bit more ES and Aurora in 1998. Greatings de Alex

IW1AZJ: The past year was a middle for us. Tropo,Fai,MS was regular: main difference regarding in ES, which was very poor. Otherwise, the year was very differnt for Quality: I hab Bosnia JN84 in Tropo, first TA in MS (#DXCC60), new ODX in MS ES2RJ in random SSB 1971 km, first UA1 and OH coming after ten (!) years in ES. Totally 19 new squares for me, not too bad after 350 (now 369). Last note: difference between 1995/96 where due activity during Holidays from SV, don't done in 1997. For now , have my best 73 and I wish a lot of DX during 1998. Silvio IW1AZJ

DH8BQA: Because of my new QRL i have not much Time be QRV, anyway i be very satisfied with Result 1997, little Time but more Points! Mode: no Tropo, no Aurora and only one

You are invited to send in your reports and articles via EMail / disk

- EMail (Internet): tklaus@berlin.snafu.de
- 24h FAX: +49-30-795 98 14

Thanks, Klaus.

ES-QSO. MS was the only Mode hopeful next Year will be better. 55, deUli

EA5AAJ: This Year poor E-sporadic Propagation, but vy good Tropo gave me new grid Squares. Tropo began very early this year in March, over Mediterranean See. I made one FAI QSO from IM99 to JN86 9A2AE, and nice QSOs to Africa to 7X0AD(IM94), 7X2DS(JM16), interested for ES to Europe in 1998. Good DX de Manuel

DL8EBW: After checking my Results from 1997 i was quite happy about 28 new Squares and 2 new Countries. Hope also 1998 will bring such good activities from a lot of DX-Peditions. A big Thank to them on this Way. Will still have a Baby-Break but hopefully start on Tour agn in 99 myself. Special Thanks to DC9KZ, DF2ZC and DL1EAP which organize contest for our Group inbetween... gl for all Participants and see you in any good Condx from ever i can be qrv! 73 de Guy

Special thanks to the Funktelegramm (FT by DL8HCZ) to sponsor and spread the VHF-DX Contest 1997. Tnx for Angelo DC9KZ, who helped me agn for 1997! So my best Wishes for 1998 and see you on the Magic Band, de Wolfgang DL1EAP.

Beacon List

Editor: Joachim Kraft, DL8HCZ

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
GB3BUX	**50,000**	IO93BF	15W ERP	TURNSTILE	OMNI	460	A1A
LU8YYO	**50,000**	FF50	1,5W	VERTICAL			
VE1SMU	**50,001**	FN84	25W	11 ELE	90		
7Q7SIX	**50,003**	KH75	5W				
BV2FG	**50,003**	PL05RA	3W	5/8 V			
4N0SIX	**50,004**	KN04FU	1W	DIPOLE	N/S	400	
HV3SJ	**50,004**	JN61FV		QRT			
I0JX	**50,004**	JN61HV	4W	3 ELE	NW		
ZS2SIX	**50,005**			PROPOSAL			
EH7AH/B	**50,006**	IM67		5 ELE	280		
DX1HB	**50,008**	PK04	20W	HORIZONTAL	QRT NOW		
SV9SIX	**50,011**	KM25NH	30WERP				
OX3SIX	**50,012**		50W	PROPOSAL 1998			
9M6SMC	**50,014**	OJ85AX	3W	GP	OMNI	100	
CU3URA	**50,014**	HM68QM					A1A
S55ZRS	**50,014**	JN76HD	8W	GP	OMNI	1219	A1A
LU9EHF	**50,015**	FF95	15W				
KD4AOZ	**50,016**	EM83					
V51VHF	**50,018**	JG87MH	670W	5/8 V	OMNI		
CX1CCC	**50,019**	GF15					
GB3SIX	**50,020**	IO73TJ	100W ERP	3EL. YAGI	270	58	F1A
OZ7IGY	**50,021**	JO55VO	20W ERP	TURNSTILE	OMNI	92	A1A
4N6SIX	**50,022**	JN62		PROPOSAL!			
FR5SIX	**50,022**	LG78	1,5W	HALO	OMNI	2500	F1A
XE1KK/B	**50,022**	EK09IK	20W		OMNI		
LX0SIX	**50,023**	JN39AV	5W	HOR. DIPOLE			
SR5SIX	**50,023**	KO02PC	5W	DIPOLE	W/E		A1A
9H1SIX	**50,025**	JM75FV	25W	5 ELE.			F1A
OH1SIX	**50,025**	KP11QU	50W ERP	8 X DIPOL	OMNI	157	A1A
ZP5AA	**50,025**	GG14	VERTICAL				
SR6SIX	**50,028**	JO81HH	10W	1/4GP	OMNI	140	F1A
XE2UXL	**50,028**	DM10XL	50W	SQ-LOOP	OMNI	200	
SR8SIX	**50,029**	KN19	10W	DIPOLE	QRV NOW		
CT0WW	**50,030**	IN61GE	40W	CROSSDIPOLE	OMNI	800	F1A
CS1ACP	**50,031**	IN61					
VE6QRM	**50,031**	DO21	25WERP	4 ELE YAGI	20		
ZD8VHF	**50,032**	II22TB	25W	5 ELE.	45		
ZB2VHF	**50,035**	IM76	35W	90% QRT			
ES0SIX	**50,037**	KO18PO	15W	DIPOL	E/W	35	DOT
FP5XAB	**50,038**	GN16	15W	DIPOLE HOR.		40	
FY7THF	**50,039**	GJ35	100W	GP	OMNI		F1A
SV1SIX	**50,040**	KM17UX	30W ERP	V-DIPOLE	OMNI		
VO1ZA	**50,040**	GN37					F1A
ZL3SIX	**50,040**	RE66		2 X DIPOLE	NW/NE		
YB0ZZ	**50,042**	OI33		GP		20	
GB3MCB	**50,043**	IO70OJ					
R3VHF	**50,043**	LO16XG		PROPOSAL			
YO2S	**50,043**	KN05PS	2W	DIPOLE			
ZL3MHF	**50,043**	RE66	20W	VERTICAL			
VE6ARC	**50,044**	DO05	30W		OMNI		A1A
ZS6TWB	**50,044**	KG46RD	15W	3 ELE	330		
OX3VHF	**50,045**	GP60QQ	20W	GP	OMNI	70	A1A
4N1SIX	**50,046**	KN04OO	10W	GP	OMNI	196	
JW7SIX	**50,047**	JQ78TF	10W	4ELE	S	25	

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
TR0A	**50,047**	JJ40	15W	GP	OMNI		
VE8BY	**50,048**	FP53	30W	V	OMNI		FSK
5W1WS	**50,050**	AH46	60W	5ELE			
GB3NHQ	**50,050**	IO91VQ	15W ERP	TURNSTILE	OMNI	35	F1A
VA3BCN	**50,050**	FN03					
ZS6DN/B	**50,050**	KG44	100W	5 ELE			
LA7SIX	**50,051**	JP99	20W	4ELE	QRT NOW		
Z21SIX	**50,052**	KH52NK	3W	DIPOLE			
PI7SIX	**50,053**	JO22NC					
VK3SIX	**50,053**	QF02WH	10W	9ELE			
OZ6VHF	**50,054**	JO57EI	50WERP	TURNSTILE	OMNI	70	A1A
J3EOC	**50,056**	FK92	1.6W				
VK7RNW	**50,057**	QE38	20W	X-DIPOL			
VK8VF	**50,057**		20W	VERTICAL			
4X1IF	**50,058**	KM72	3W	HALO			
PY2AA	**50,059**	GG66	5W	GP	OMNI	850	
VE3UBL	**50,059**	FN09	8W	HORIZ	OMNI		
GB3RMK	**50,060**	IO77UO	40W	FOLDED DIPOLE	0/180	270	F1A
GB3NGI	**50,062**	IO65PA	18W ERP	DIPOLE			F1A
OZ2VHF	**50,062**	JO45FL	1W	DIPOL	N/S		
GB3LER	**50,064**	IP90JD	100W ERP				
GB3IOJ	**50,065**	IN89WE	25W ERP	TURNSTILE	OMNI	115	F1A
VK6RPH	**50,066**	OF88AA	10WERP	DIPOLE	OMNI	317	
OH9SIX	**50,067**	KP36OI	35W ERP	2 X X-DIPOL	OMNI	192	A1A
K2ZD/B	**50,068**	FN20	20W	5/8 VERTICAL	OMNI		
K6FV	**50,069**	CM87					
EA3VHF	**50,070**	JN11MV	10W	GP	OMNI		A1A
SK3SIX	**50,070**	JP71XF	10W	X-DIPOLE	OMNI	500	
ES6SIX	**50,073**	KO37MT	10W	GP	OMNI	85	A1A
EA8SIX	**50,075**	IL28GC	10W				
JY6ZZ	**50,075**	KM71	8W	5/8 V			
VR2SIX	**50,075**	OL72	30W ERP	GP	OMNI		
KD4HLG/B	**50,076**	EM73	10W	AR7			
PY2AMI	**50,076**	GG67	10W	GP	OMNI		
KE4SIX	**50,078**	EM83	5W	RINGO RANGER	OMNI		
OD5SIX	**50,078**	KM74	10W	GP			
PT7BCN	**50,078**	HI06					
VK4BRG	**50,078**	QG48	1W	TURNSTILE			
JX3SIX	**50,079**	IQ50OV	10W	5 ELE	160		QRV?
JX7DFA	**50,079**	IQ50OV		QRV 1.4.98 TO	1.8.98		
SK6SIX	**50,080**	JO57QJ		QRT??			
ZS1SES	**50,080**	JF96JC	10W	HALO	OMNI		
LZ1SIX	**50,082**	KN12	1W	TEMP. QRT	OMNI	1600	
VE9MS/B	**50,087**	FN65RR	10W	QUADLOOP	OMNI		
YU1SIX	**50,087**	KN03KN	10W	GP	OMNI		F1A
CN6VHF	**50,093**	IM64NA	6W	PROPOSAL	OMNI		
TU2VHF	**50,094**	IJ7					
CT0SMB	**50,100**	IM59SK	250MW	DIPOL	OMNI	1600	F1A
UL7JC/P	**50,150**	NN19NX					
IS0A	**50,163**	JM49NG	1W	DIPOLE			
VK0AQ	**50,200**	OC53MM	50W	3 ELE	NE		FSK
ZR1DCEZS8	**50,200**	KE82	10W	DIPOLE	N/S		
F6IKY	**50,230**	JN35AT	0,75W	5ELE	0	700	
GB3IFX	**50,275**	IO94FM	35W	2 X 6 ELE	180		
VK3RMV	**50,293**	QF12AH	15W	V			
VK6RBU	**50,306**	OF76	100W ERP		260	300	
FX4SIX	**50,315**	JN06CQ	25W	2*DIPOLE	OMNI	153	A1A
ZS5SIX	**50,321**	KG50	10W	HALO			
FC1FNH	**50,418**	IN96LD	10W	QRT NOW			
5B4CY	**50,500**	KM64HT	35W	5 ELE. YAGI	WNW	2000	A1A
SV9-RADAR	**50,521**	KM25	1KW	4 X 11 ELE			
ZS1STB	**50,904**	KF04	25W	GP			
ZS6SIX	**50,950**	KG33	10W	3 ELE			
VK4RIK	**52,445**	QH23TE					
GB3BUX	**70,000**	IO93BF	20W ERP	2*TURNSTILE	OMNI	460	A1A/3E

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
GB3REB	**70,010**	JO01GK	28W ERP	2ELE	66	65	F1A
GB3ANG	**70,020**	IO86MN	100W ERP	3EL. YAGI	160	370	F1A
GB3MCB	**70,025**	IO70OJ	40W ERP	2 EL.YAGI	45	320	F1A
5B4CY	**70,112**	KM64LU	10W	4 ELE. YAGI	WNW	117	F1A
ZB2VHF	**70,120**	IM76HE	50W	4ELE QUAD	0		F1A
EI4RF	**70,130**	IO63SN	25W ERP	2*5EL. YAGI	NE/SE	120	A1A
U6L	**144,040**	LN07BQ					
U6Y	**144,085**	LN04BO	1.5W	DIPOLE	0/180		
V51VHF	**144,115**	JG87MH	70W	11 ELE.	0	2300	A1A
UZ9UT	**144,122**	NO35BI	15W	9EL. YAGI	270	260	A1A
OE3XAA	**144,126**	JN88BA	0.5W	HALO	OMNI	840	A1A
5B4CY	**144,139**	KM64HT	40W	6+6EL. YAGI	NW	2000	A1A
UZ3MWQ	**144,157**	KO87SV	5W	TURNSTILE	OMNI	130	A1A
R9XI	**144,160**	MP06CA	5W	16 ELE.	350		A1A
UL8PWA	**144,162**	MN69					A1A
KH6HME	**144,170**	BK29GO	1200W ERP	2X7Y	TO CA	2501	
UZ3PWJ	**144,180**	KO93BD		TURNSTILE	OMNI		A1A
UA9C	**144,189**	LO96WW	3W	2*DIPOLE	OMNI	??	A1A
UB4JXN	**144,190**	KN65TT					A1A
UZ6AWA	**144,193**	KN95LB	5W				A1A
UA4NX/A	**144,199**	LO49JJ	10W	9 ELE YAGI	360	230	A1A
RL7BZ	**144,201**	MO31FW		9 ELE.	90		A1A
UT4JWD	**144,201**	KN64RO	3W		OMNI		A1A
UA9UKO	**144,225**	NO33					
UA0W	**144,244**	NO53OU		9 ELE.	270		A1A
UB4CWY	**144,245**	KN59TM	3W		OMNI		A1A
UR4CWY	**144,250**	KN59TM	5W	GP	OMNI	200	
UZ3TYA	**144,250**	LO16QT	5W	9 ELE.	SE		A1A
UZ9AWA	**144,250**	MO05QD	5W	DISCONE			A1A
UA9KK	**144,268**	MP65LN		6 ELE.	0		A1A
UL7BBT	**144,275**	MO51QE		12 ELE.			A1A
ER5C	**144,276**	KN45DU	1W	DIPOLE			
UA6XBO	**144,282**	LN13TM	5W	7 ELE	330		A1A
W6KGS	**144,288**	DM13AS				60	
UZ9AWD	**144,293**	LO93MI	5W	4*ZICKZACK			A1A
UZ9YWQ	**144,300**	NO23WJ		5 ELE.	0/270		A1A
VE1KG	**144,300**	FN84	250W	4 X 10 ELE	EUROPE		
UZ3UZA	**144,313**	LO06LX		DIPOLE			A1A
UT5EC	**144,341**	KN78MM	10W	4X YAGI	OMNI	180	A1A
UZ1OWV	**144,360**	KP94VN	0.1W	DIPOLE	130/310		A1A
UB4YWW	**144,370**	KN28XG	4W	QUAD		285	A1A
UR4YWW	**144,370**	KN28WG	3,5	TURNSTILE	OMNI	280	
UT5G	**144,370**	KN66LS	5W	DIPOLE	180/360	80	A1A
UT5U	**144,376**	KO50CG	5W	DIPOLE	OMNI	169	A1A
LY2GEZ	**144,380**	KO37MJ	5W	GP	OMNI	150	
RB4IZS	**144,392**	KN88SR	3W		135/315		A1A
UB5RXI	**144,398**	KO51HU	5W	DIPOLE	0/180		A1A
TRANSATLC	**144,400**		RESERV.	TRANSATLANTIC	BEACON		
UT3BW	**144,400**	KN29UA	8W	CROSSDIPOLE	OMNI	365	
GUARD QRG	**144,401**						
EA8VHF	**144,402**	IL28GC	10 ERP	PROPOSAL	OMNI		
OY6VHF	**144,402**	IP62NA	40W	2*4 ELE.	NE/SE	300	A1A
EI2WRB	**144,403**	IO62IG	200W ERP	5 EL. YAGI	95+180	248	A1A
UA3IFI	**144,403**	KO76WU	2W	GROUND PLANE	OMNI		A1A
EA1VHF	**144,404**	IN53UG	25W	5EL. YAGI	NE		A1A
F5XAR	**144,405**	IN87KW	300W	9 ELE YAGI	270	165	A1A
GUARD FRQ	**144,406**						
UK	**144,407**			TRANSATLANTIC	BEACON		
F5XSF	**144,409**	IN88GS	50W ERP	9ELE	90	145	F1A
DB0SI	**144,410**	JO53QP	0,5W	BIG WHEEL	OMNI	90	A1A
I1G	**144,411**	JN44VC	4W ERP	4 ELE YAGI	SE	745	QRV
SK4MPI	**144,412**	JP70NJ	200W	4*6EL. YAGI	NW+NE	520	A1A
3A2B	**144,413**	JN33RR		QRT			
DB0JW	**144,414**	JO30DU	25W ERP	5EL. YAGI	NNE	225	F1A
I1M	**144,415**	JN33UT	20W	BIG WHEEL	OMNI	300	

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
PI7CIS	144,416	JO22DC	50W	DIPOLE	W/E	40	F1A
OH9VHF	144,417	KP36OI	100W ERP	10DBD	200	310	A1A
ON4VHF	144,418	JO20FP	2.5W	BIG WHEEL	OMNI		F1A
I2M	144,419	JN55AD	10W ERP	BIG WHEEL	OMNI	46	QRT
DB0RTL	144,420	JN48OM		PROPOSAL			
OZ7IGY	144,421	JO55VO	30W ERP	BIG WHEEL	OMNI	94	A1A
DB0TAU	144,422	JO40HG					
PI7FHY	144,423	JO33WW	10W ERP	HALO	OMNI		QRV?
IN3A	144,424	JN56NB	0,1W	GP	OMNI	225	
F5XAM	144,425	JO10EQ	14W	BIG WHEEL	OMNI	99	F1A
EA6VHF	144,426	JM08PV	20W	3ELE	N		
OK0EJ	144,427	JN99IF	0.3	4 ELE	W		
PI7PRO	144,427	JO22NC	10 WERP	HALO	OMNI		QRV??
DB0JT	144,428	JN67JT	30W ERP	2*4+4 DIPOLE	W/NNW	785	F1A/B
IV3A	144,429	JN65RW	5W	2 X TURNSTILE	OMNI		
GB3VHF	144,430	JO01DH	40W ERP	2*3EL. YAGI	315	190	F1A
9A0BVH	144,431	JN85JO	1W ERP	V DIPOLE	OMNI		
9H1A	144,432	JM75FV	1.5W	TURNSTILE	OMNI	210	A1A
DB0LBV	144,434	JO61EH	0,4W	2 X DIPOLE	OMNI	234	F1
HB9H	144,435	JN46KE	03/3WERP	2 X DIPOLE	OMNI	1600	A1A
SK2VHG	144,435	KP07MV		NOT QRV!			
UL8GWW	144,435	MN83	5W	DIPOLE			A1A
I3ZJ3A?	144,436	JN55OL	50	PROPOSAL	S		
PI7NYV	144,436	JO32EH	2W	HALO	OMNI	80	
LA1VHF	144,437	JO49GT	12W	TURNSTILE	OMNI	1882	QRT
LX0VHF	144,438	JN39CP	10W	BIG WHEEL	OMNI		A1A
SK3VHF	144,439	JP73HF		TEMPORARY	QRT		
DL0UH	144,440	JO41RD	1W ERP	V-DIPOLE	OMNI	385	A1A
LA4VHF	144,441	JP20LG	380WERP	2 X 8 ELE	N	35	
I4A	144,442	JN54LG	20W ERP	2*TURNSTILE	OMNI	950	PLANNED
OH2VHF	144,443	KP10VJ	25W	9 ELE	0	76	
DB0KI	144,444	JO50WC	2,5WERP	DIPOLE	OMNI	1025	
I5A	144,444	JN53GW		PROPOSAL		1000	
GB3LER	144,445	IP90JD	500W ERP	2 X 6 ELE	NE/SE	107	F1A
OK0EB	144,446	JN78DU	0.1W	BIG WHEEL	OMNI	1083	F1A
SK1VHF	144,447	JO97CJ	20W ERP	2 X CLOVER	OMNI	65	A1A
HB9HB	144,448	JN37OE	10W	10EL. YAGI	345	1300	F1A
I0A	144,449	JN62IG	10W	2*BIG WHEEL	OMNI	300	A1A
DL0UB	144,450	JO62KK	10W	MALTESE CROSS	OMNI	120	A1A
F5XAV	144,450	JN23GX	5W	HALO	OMNI	100	F1A
LA7VHF	144,451	JP99	50W	10ELE	QRT NOW		
OK0EC	144,452	JO60CF	80MW	3EL. YAGI	E	790	F1A
GB3ANG	144,453	IO86MN	20W ERP	4EL. YAGI	160	370	F1A
IS0A	144,454	JN40QW	1W	TURNSTILE	OMNI	350	
OH5ADB	144,454	KP30NN	0.1	DIPOLE	QRT!		
DB0GD	144,456	JO50AL	1W	KREUZDIPOL	OMNI	926	A1A
EA2VHF	144,457	IN91DJ	18 WERP	PROPOSAL	OMNI		
SK2VHF	144,457	JP94TF	100W ERP	2*10 ELE.	0/200	300	A1A
F1XAT	144,458	JN15BM	25W	BIG WHEEL	OMNI	750	F1A
I0G	144,458	JN63IB	10W	4XDIPOLE	OMNI	1200	QRT
LA5VHF	144,459	JP77KI	100W ERP	2*6 EL. QUAD	15/180	260	A1A
HG1BVA	144,460	JN86CW	5W	QUAD	80	370	A1A
SK7VHF	144,461	JO65KJ	10W ERP	2*BIG WHEEL	OMNI	25	A1A
I6A	144,462	JN72FH	24WERP	2 X 5 ELE YAGI	340/180	150	
LA2VHF	144,463	JP53EG	500W ERP	10EL. YAGI	15	710	A1A
I7A	144,464	JN81EC	8W	BIG WHEEL	OMNI	685	A1A
DF0ANN	144,465	JN59PL	0,3W	V-DIPOLE	OMNI	360	
OZ4UHF	144,466	JO75KC					
HB9RR	144,467	JN47FI	0.0225W	?PROPOSAL?		904	
I8A	144,467	JM78WD	8W ERP	2*TURNSTILE	OMNI	1778	A1A
OK0ED	144,467	JN99BO	0.1W	2*DIPOLE	OMNI	560	F1A
FX7VHF	144,468	JN26IX	10 W	BIG WHEEL	OMNI	561	F1A
LA6VHF	144,468	KP59AL	100W ERP	6 EL. YAGI	225	70	A1A
UZ9XZZ	144,468	MP06CA	5W	2*9 ELE.	15/195		A1A
GB3MCB	144,469	IO70OJ	40W ERP	3 EL. YAGI	45	320	F1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
IT9A	144,469	JM67LX	10W ERP	2*BIG WHEEL	OMNI	825	A1A
OH2VAN	144,470	KP20		PROPOSAL!	OMNI		
OZ?	144,471	JO		PROPOSAL!			
IT9G	144,472	JM68QE	35W ERP	5EL. YAGI	0	150	PROPOS.
SK2VHH	144,473	JP94	50KW ER	HORIZ.	360	300	
EA3VHF	144,474	JN11LS	1W	HALO	OMNI	155	QRT
OK0EL	144,474	JO70SQ	0.004	DIPOLE	QRT?		
DL0SG	144,475	JN69KA	5W	4 X 4 ELE		1024	
LY2WN	144,475	KO25DB	5W	TURNSTILE	OMNI	95	
F5XAL	144,476	JN12LL	10 W	BIG WHEEL	OMNI	1100	F1A
DB0ABG	144,477	JN59WI	4W	BIG WHEEL	OMNI	522	A1A
LA3VHF	144,478	JO38RA	15W	16 ELE	180	30	
S55ZRS	144,478	JN76MC	1W	DIPOLE		1219	
F6KJD	144,479	JN26QE	50W ERP	BIG WHEEL	OMNI	250	F1A
IT9S	144,479	JM77NO	3W	2*BIG WHEEL 6DB	OMNI	250	PROPOS.
SR5VHF	144,479	KO02ON	0,75	TURNSTILE	OMNI		
EI3DP/P	144,480	IO41XP	25W	8 ELE QUAGI	281	488	QRV 96
GB3NGI	144,482	IO65VB	25W	2 X YAGI	45+135	508	
SR5VHW	144,483	KO02PC	3.5	CROSSDIPOLE	OMNI		
DL0PR	144,486	JO44JH	150W	6 ELE. YAGI	0/180	100	A1A
DB0FAI	144,490	JN58IC	1000W ERP	16ELE	305	590	A1A
OZ3VHF	144,500	JO55HL	0.5W	CLOVER	OMNI	35	A1A
VK6RBU	144,560	OF76	10W ERP		80	300	
YU1VHF	144,850	KN04OO	5W	2 X QUAD	N/NNW	196	
DB0INN	144,853	JN68GI				504	
CU7VHF	144,901	HM58					
OK0EA	144,927	JO70UP	4MW	2*DIPOLE	OMNI	1355	F1A
SK0VHF	144,936	JO99BM	30W ERP	4 ELE.	225	80	A1A
TF8VHF	144,940	HP84PA	40W	VERTIKAL			
YU7VHF	144,940	JN95				538	
CT0SAT	144,950	IM59SK					
YO2X	144,955	KN05OS	2W	TURNSTILE	OMNI	80	A1A
LZ1KDZ/B	144,958	KN32FR	10W	DIPOLE		1000	
OK0ET	144,978	KN08SU	0.5W	HB9CV	W	981	F1A
KH6HME	432,074	BK29GO	300W ERP	2X22Y	TO CA	2501	
S55ZNG	432,128	JN65UU	0,1W			643	
UZ3UZA	432,204	LO06LX					A1A
U6Y	432,255	LN04BO	1.5W	DIPOLE	0/180		A1A
UT5EC	432,280	KN78MM		4 X YAGI	OMNI	180	A1A
UW3JL	432,300	KO76	5W	TURNSTILE	OMNI		A1A
UT5G	432,370	KN66LS	5W	DIPOLE	180/360	80	A1A
OE3XAA	432,378	JN88BA	1W ERP	4EL. YAGI	NNE	840	A1A
UB4RXI	432,400	KO51TU	5W	3 ELE.	180		A1A
UT3BW	432,400	KN29UA	2W	CROSSDIPOLE	OMNI	365	
SR0JN	432,556	JO81SX					F1A
UA9C	432,579	LO96WW	1W	TURNSTILE	OMNI		A1A
UZ6AWA	432,579	KN95LB	3W		OMNI		A1A
PI6SHF	432,637	JO22MG	1W	6 DB	180	150	F1A
PI6UHF	432,675	JO21VX	1W	QRT FOR EVER			
UZ9AWA	432,750	MO05QD					A1A
DB0GD	432,800	JO50AL	1W	SLOT	N/S	926	A1A
IT9B	432,805	JM67LX	50W ERP	10EL. YAGI	N	825	A1A
OE3XMB	432,807	JN77TX	5W	11 EL YAGI	337 DEG	1154	A1A
DB0OB	432,810	JN69EQ	1W	SLOT	OMNI	825	A1A
GB3WHA	432,810	JO01BA	25W ERP	2*8+8EL. YAGI	NW/E	165	F1A
DL0BQ	432,815	JN49HP			OMNI	104	
SK7UHI	432,815	JO76	30W ERP	HORIZONTAL	0	120	QRT
LA8UHF	432,820	JO59DD	50W ERP	8EL. YAGI	180	30	A1A
DB0ABG	432,825	JN59WI	2W	BIG WHEEL	OMNI	522	A1A
I0B	432,825	JN61ES	40W ERP	4*MINI WHEEL	OMNI	30	A1A
OH2UHF	432,825	KP20VJ	20W	2 X DIPOLE	N/E	15	
FX1UHF	432,830	JN18KF	10W	4*HB9CV	OMNI	166	F1A
I1H	432,830	JN35SH	20W ERP	2EL. YAGI	S	625	A1A
LA7UHF	432,830	JP20LG	200W ERP	4 ELE	360	30	
ES0UHF	432,835	KO18CW	30WERP	X-DIPOLE	OMNI	105	A1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
DB0KI	**432,840**	JO50WC	10W ERP	DIPOLE	OMNI	1025	F1A
OH6UHF	**432,840**	KP13GM	7WERP	3 X BIG WHEEL	OMNI	55	A1A
DB0LBV	**432,845**	JO61EH	2W	2 X SLOT HORIZ	OMNI	234	A1A
LA9UHF	**432,845**	JP40CM	250W E	2X13ELE	33	1000	A1A
9A0BUH	**432,847**	JN85JO	1W ERP				
DL0UB	**432,850**	JO62KK	10W	MALTESER KREUZ	OMNI	120	A1A
I5B	**432,850**	JN53KN	20W ERP	2 X 10 ELE	N/W	56	A1A
LA5UHF	**432,855**	JP66WX	100W ERP	10 EL. YAGI	15	1110	QRT
SK3UHF	**432,855**	JP92FW	10W	HORIZONTAL	OMNI	200	A1A
I2B	**432,860**	JN45NT	35W ERP	2*10EL. YAGI	SE/SW	490	A1A
LA1UHF	**432,860**	JO59IX	10W ERP	MINI WHEEL	OMNI	364	QRT
F5XAG	**432,863**	IN93WC	40W	2X10 ELE	N/NE	550	F1A
FX5UHF	**432,863**	IN93WC	128WERP	2 X 12ELE YAGI	N/NE	550	
LA6UHF	**432,865**	KP59AL	50W ERP	10 EL. YAGI	200		QRT
EI2WRB	**432,870**	IO62IJ	50W	5 EL.NBS	E	248	A1A
I2H	**432,870**	JN55DN	2W ERP	TURNSTILE	OMNI	990	A1A
PI7HVN	**432,873**	JO22CW					
LZ1KDZ/B	**432,874**	KN32FR	1W	DIPOLE		1000	
I2U	**432,875**	JN45ST	30W ERP	2*TURNSTILE	OMNI	1330	A1A
SK2UHF	**432,875**	JP94WG	300W ERP	2*20 EL. COLL	0/180	445	A1A
HB9G	**432,880**	JN36BK	1W	2*CROSS DIPOLE	OMNI	1628	A1A
IV3B	**432,880**	JN65WR	4W ERP	TURNSTILE	OMNI	418	A1A
LA3UHF	**432,880**	JO38RA	29W ERP	15EL. YAGI	180	12	QRT
OK0EP	**432,885**	JO80OC	2X6W ERP	2*3EL. YAGI	W+SE	1500	F1A
OY6UHF	**432,885**	IP62NA	120W ERP	4 ELE.	SE	300	A1A
FX4UHB	**432,886**	JN06KN	50W ERP	BIG WHEEL	OMNI	144	F1A
GB3SUT	**432,890**	IO92CO	10W	2X8 EL.YAGI	0/135	270	F1A
I8B	**432,890**	JM70WO	12W ERP	2*MINI WHEEL	OMNI	250	A1A
LA4UHF	**432,890**	JO29PJ	50W	10 EL.YAGI	200	75	A1A
OZ4UHF	**432,895**	JO75KC	20W ERP	BIG WHEEL	OMNI	154	A1A
DB0YI	**432,900**	JO42XC	4W	BIG WHEEL	OMNI	480	A1A
I0H	**432,900**	JN61IS	4W ERP	2*MINI WHEEL	OMNI	373	A1A
YU1UHF	**432,900**	KN04OO	1W	2 X QUAD	N/NW	196	
DF0VF	**432,905**	JO50EU		PROPOSAL	OMNI	910	F1A
IT9S	**432,905**	JM77NO	3W	2XTURNSTILE	OMNI	250	A1A
PI7QHN	**432,905**	JO22FH	1W	GAIN 3DB	OMNI	20	F1A
SK4UHF	**432,905**	JO79LK	50W ERP	4*10EL.LOG.PER.	OMNI	270	A1A
GB3MLY	**432,910**	IO93EO	50W ERP	8+8EL. YAGI	150	600	F1A
DB0AD	**432,913**	JO30XJ	1W	2XHYBRIDQUAD	E/N	320	A1A
FX3UHB	**432,918**	IN78VC	15W	BIG WHEEL	OMNI	285	F1A
DB0UBI	**432,920**	JO42GE	12WERP	8/8 YAGI	30	125	F1A
SK7UHF	**432,920**	JO77BQ	15W ERP	BIG WHEEL	OMNI	350	QRT!
DB0JG	**432,925**	JO31GT	1W	CLOVER LEAF	OMNI	45	F1A
SK6UHF	**432,925**	JO67EH	10W ERP	CLOVER LEAV	OMNI	175	A1A
HG5FMV	**432,930**	JN97KR	0,1W	SLOT	360	690	
OZ7IGY	**432,930**	JO55VO	300ERP	9ELE	45	93	A1A
GB3BSL	**432,934**	IO81QJ	250WERP	4 X 3 ELE	90	235	F1A
OK0EA	**432,938**	JO70UP	2.5W	2*15EL. YAGI	W/SW	1355	QRT NOW
DL0UH	**432,940**	JO41RD	1W ERP	V-DIPOLE	OMNI	385	A1A
SK7UHH	**432,940**	JO86GP	100W ER	2*CLOVER LEAF	OMNI	45	A1A
DB0LB	**432,945**	JN48NV	0.2W	CORNERDIPOLE	N/S	367	F1A
DB0OS	**432,945**	JO40CW	0.7W ERP	2 EL. YAGI	W	745	F1A
HG6BUA	**432,945**	KN07AU				1050	A1A
OH9UHF	**432,945**	KP36OI	50 ERP	9DBD	200	307	A1A
CT0RIB	**432,950**	IM59SK					
DB0IH	**432,950**	JN39ML	1W	BIG WHEEL	OMNI	630	F1A
S55ZRS	**432,950**	JN67MC	1W	SLOT DIPOL		1219	
SK1UHF	**432,950**	JO97CJ	10W ERP	2*BIG WHEEL	OMNI	65	A1A
SK1VHF	**432,950**	JO97CJ	50W	3DB	OMNI	60	A1A
OZ1UHF	**432,955**	JO57FJ	10W	BIG WHEEL	OMNI	150	A1A
DF0ANN	**432,965**	JN59PL	1W	BIG WHEEL	OMNI	630	
GB3LER	**432,965**	IP90JD	2W	12 ELE	SSE		
OK0EO	**432,965**	JN89QQ	50MW	CROSS DIPOLE	OMNI	610	F1A
GB3MCB	**432,970**	IO70OJ	5W ERP	4EL. YAGI	45	320	F1A
OK0EB	**432,970**	JN78DU	50MW	3*DIPOLE	OMNI	1100	F1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
DB0JW	432,975	JO30DU	50W ERP	????	NE	225	F1A
DL0SG	432,975	JN69KA	5W	4 X 11 ELE		1024	
HG1BUA	432,975	JN87FI	0.3W	HYBRID QUAD	90		A1A
OH7UHF	432,975	KP32TW	1,5/15	6DBD	225	215	
SK5UHF	432,975	JP80SA	80W ERP	HORIZONTAL	0/180	90	QRT
F5XAS	432,978	JN12JK	50W	3 ELE	NNE	1100	F1A
GB3ANG	432,980	IO86MN	100W ERP	9EL. YAGI	170	370	F1A
OK0EC	432,980	JO60CF	80MW	10EL. YAGI	E	790	F1A
S55ZCE	432,980	JN76OH	0,07W	GP	OMNI	574	
SR5UHW	432,983	KO02OF	1,5W	DQ	OMNI	130	A1A
HB9F	432,984	JN36XN	15W ERP	CORNERREFLECTOR	N/S	3581	F1A
OZ2ALS	432,984	JO44WX	8W	2 X SLOT	OMNI	28	A1A
DB0VC	432,990	JO54IF	10W ERP	4*DOUB.HYBR.QUAD	OMNI	300	F1A
ON4UHF	432,992	JO10		INFO WANTED!			
KH6HME	1296,000	BK29GO	2500ERP	4XLY	TO CA	2501	
DF6VB	1296,004	JO31QP	0.15W ERP		S	85	F1A
DF0RB	1296,020	JO51GO	1,3	HORN	270	672	TEST
DF5EO/A	1296,025	JO31DV	0.8W	DBL.HELICAL	OMNI	170	F1A
HB9BBD/P	1296,050	JN47GA	10W	3 X DIPOLE	0	1662	F1A
S55ZNG	1296,063	JN65UU				643	
K3SIW/B	1296,070	EN52	20W	CORNER	90		
UT5EC	1296,170	KN78MM		4 X YAGI	OMNI	180	A1A
DB0VC	1296,220	JO54IF	12WERP	2 X BIGWHEEL	OMNI	300	
S55ZRS	1296,380	JN76MC	1W	DIPOLE		1219	
YU1UHF	1296,400	KN04OO	0,5W	4 X QUAD	N/NW	196	
PI6ASD	1296,642	JO22JH	1W	QRT NOW!	OMNI	30	F1A
FX6UHY	1296,739	JN38PJ	4W ERP	BIG WHEEL	OMNI	1070	F1A
DB0GD	1296,800	JO50AL	1,5W ERP	VERTICAL STACKED		926	A1A
DB0JS	1296,800	JN59GB	5W ERP	SLOT	OMNI	700	A1A
OE3XMB	1296,800	JN77TX		PROPOSAL			
SK6UHI	1296,800	JO66LJ	50W ERP	CLOVER LEAF	OMNI	230	A1A
DB0GP	1296,805	JN48WQ	4W ERP	4*5EL. YAGI	OMNI	760	F1A
DB0ZW	1296,810	JN69EQ	1W	SLOT	OMNI	825	
GB3NWK	1296,810	JO01BI	100W	2*8EL. YAGI	NNW	180	F1A
FX6UHX	1296,812	JN37NX	1W ERP	4ELE	SE	1278	F1A
DB0VI	1296,815	JN39MF	1W	13EL. YAGI	??	400	F1A
I4C	1296,815	JN54PK	4W ERP	2*MINI WHEEL	OMNI	444	A1A
SK7UHI	1296,815	JO76	20W ERP	HORIZONTAL	OMNI	120	QRT
PI7DIJ	1296,818	JO33AI	1W	9 ELE YAGI	200	20	F1A
DB0OT	1296,820	JO32QR	1W ERP	BIG WHEEL	OMNI	80	F1A
HB9G	1296,820	JN36BE	10WERP	VERTIKAL	OMNI	455	
LA8UHG	1296,820	JO59JW	10W ERP	14 ELE	160	364	A1A
DB0ABG	1296,825	JN59WI	0,5W	SLOT	OMNI	522	
DB0HF	1296,825	JO53BO	0.3W	BIG WHEEL	OMNI	65	F1A
DB0OP	1296,825	JN59WI	0.5W	4EL. YAGI	N	522	F1A
OE1XTB	1296,825	JN88	8W	4 X DIPOLE		190	
GB3MHL	1296,830	JO02PB	500W ERP	2*32ELSLOT.WAVEG	W/E	85	F1A
I1I	1296,830	JN35SH	20W ERP	SQUARECORNER	S	625	A1A
SK0UHG	1296,835	JO89WI	10W ERP	DOUBLE HELICAL	OMNI	55	A1A
DB0AJ	1296,837	JN57VX	10W	6EL. GROUP	N/W	720	A1A
DB0KI	1296,840	JO50WC	80WERP	SLOT	OMNI	1025	A1A
OH6SHF	1296,840	KP13GM	8WERP	DIPOL	OMNI	55	
DB0LBV	1296,845	JO61EH	2W	2X4ELE SLOT	OMNI	234	A1A
FX1UHY	1296,847	JN18IR	10 W	SLOT	OMNI	160	F1A
CT0MBC	1296,850	IM59SK					
DB0JH	1296,850	JO31JK	1W	MALTESER	OMNI	85	
DL0UB	1296,850	JO62KK	10W	4XKASTEN (QRT)	OMNI	120	A1A
GB3FRS	1296,850	IO91PH	3W	DISC	OMNI	120	F1A
I5C	1296,850	JN53DV	0.2W ERP	MINI WHEEL	OMNI	30	A1A
DB0JO	1296,854	JO31SK	350W ERP	4*15 YAGI	W	312	F1A
I5I	1296,855	JN53LL	10W ERP	4*MINI WHEEL	OMNI	550	A1A
OZ3UHF	1296,855	JO56CE	6W	5ELE	180	150	F1A
SK3UHG	1296,855	JP81KQ	20W ERP	HORIZONTAL	OMNI	30	
GB3MCB	1296,860	IO70OJ	3W HF	2*15ELE	ENE	300	
LA1UHG	1296,860	JO59DD	60W ERP	13DB HORN	180	30	A1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
F1XAK	**1296,862**	JN23MM	158W	SLOT	OMNI	114	F1A
FX9UHZ	**1296,862**	JN23MM	158WERP	2 X 12 SLOT WG	OMNI	114	F1A
DB0JK	**1296,865**	JO30LX	40W ERP	4 X 8 ELE	OMNI	260	F1A
HB9WW/P	**1296,865**	JN37LA	1,5W	15 ELE	120	1145	
SK7MHG	**1296,865**	JO65SO	50W ERP	SLOT	OMNI	200	
DB0IBB	**1296,870**	JO32VG	170WERP	DQUAD	S/W	200	A1A
GB3AND	**1296,870**	IO91GF	50W ERP	STACK. SLOTS	OMNI	85	F1A
GB3USK	**1296,870**	IO81QJ	250W ERP	2 X 15 ELE YAGI	90	235	
FX3UHX	**1296,875**	IN78UK	1W ERP	QUAD	E	121	F1A
LA3UHG	**1296,880**	JO48JK	1W	2*15EL. YAGI	200		A1A
ON5UHF	**1296,880**	JO10UN	10W ERP	????	OMNI	180	F1A
FX4UHY	**1296,886**	JN06BX	25W ERP	SLOT	OMNI	140	F1A
GB3DUN	**1296,890**	IO91SV	2W ERP	HB9CV	N	263	F1A
HG6BUB	**1296,890**	KN07AU				1050	A1A
DB0JC	**1296,895**	JO40RV	1.5W	4EL.SLOT WAVEG	OMNI	620	F1A
DB0AN	**1296,900**	JO31SX	1W	BIG WHEEL	OMNI	100	F2A
DB0JR	**1296,900**	JN67CR	0.2W	CORNERREFLECTOR	NNW	1560	F2A
GB3IOW	**1296,900**	IO90IO	100W ERP	ALFORD SLOT	OMNI	250	F1A
OK0EA	**1296,900**	JO70UP	0.2W	4*15EL. YAGI	W/S/N/E	1355	F1A
LX0SHF	**1296,902**	JN39BP	3W	2 X BIG WHEEL V	OMNI		
DF0VF	**1296,905**	JO50EU		PROPOSAL	OMNI	910	
IT9S	**1296,905**	JM77NO	1W	2XMINI WHEEL	OMNI	250	A1A
OH2SHF	**1296,905**	KP31OX					
OH4SHF	**1296,905**	KP31OX	15WERP	7DBD	OMNI	200	
SK4UHI	**1296,905**	JO79LK	10W ERP	HORIZONTAL	OMNI	270	
F5XAJ	**1296,907**	JN12LL	100W	SLOT	OMNI	1100	F1A
FX9UHX	**1296,907**	JN12LL	100WERP	WG-SLOT	OMNI	1100	
FX9UHY	**1296,907**	JN12LL	20	SLOT	OMNI	1100	F1A
DB0JB	**1296,910**	JN48FX	1W ERP	BIG WHEEL	OMNI	275	F1A
GB3CLE	**1296,910**	IO82RL	10W ERP	2*15+15EL. YAGI	N/SE	573	F1A
DB0UBI	**1296,915**	JO42GE	2,5WERP	8 ELE COLL	35	120	F1A
DL0UBI	**1296,915**	JO42GE	2,5WERP	COLLINEAR	30	125	
PI7QHN	**1296,917**	JO22FH	4W	GAIN 6DB	OMNI	20	F1A
DB0JF	**1296,925**	JO50CA	10W ERP	4*12 EL. SLOT	OMNI	300	F1A
DB0KME	**1296,925**	JN67HT	1W	VERTIKAL	OMNI	800	
GB3MLE	**1296,930**	IO93EO	50W ERP	CORNERREFLECTOR	SSE	600	F1A
OZ7IGY	**1296,930**	JO55VO	15WERP	BIG WHEEL	OMNI	95	F1A
DB0YI	**1296,935**	JO42XC	4W	BIG WHEEL	OMNI	480	A1A
OH5SHF	**1296,935**	KP30HV					
DL0UH	**1296,940**	JO41RD	1W ERP	V-DIPOLE	OMNI	385	A1A
PI7IVA	**1296,940**	JO22TA	1W	8 DB GAIN	OMNI	30	F1A
DB0OS	**1296,945**	JO40CW	1W ERP	6 EL. ARRAY	W	745	F1A
HB9F	**1296,945**	JN36RV	10W		N	800	
OH9SHF	**1296,945**	KP36OI	30W ERP	10DBD	200	236	A1A
FX4UHX	**1296,948**	IN94UW	50W ERP	2*BIG WHEEL	OMNI	88	F1A
DB0HG	**1296,950**	JO40HG	3WERP	BIRWHEEL	OMNI	300	
OZ5UHF	**1296,950**	JO65GQ	1W	2XCORNER	S+E	35	F1A
OZ1UHF	**1296,955**	JO57FJ	10W	BIG WHEEL	OMNI	150	A1A
HG7BUB	**1296,960**	JN97KR	0,5W	SLOT	OMNI	690	
SK4UHG	**1296,960**	JP60VA	20W ERP	2*15EL. YAGI	180	440	A1A
SK6UHG	**1296,960**	JO57TQ	10W ERP	4*BIG WHEEL	OMNI	40	A1A
OK0EJ	**1296,961**	JN99FN				1324	F1A
DF0ANN	**1296,965**	JN59PL	0,5W	4 X DQ	OMNI	630	
DL0SG	**1296,975**	JN69KA	5W	4 X DQ		1024	
HG1BSA	**1296,975**	JN87GG	2.5W	HYBRID QUAD 2X	90	370	A1A
HG1BUB	**1296,975**	JN87FI	1,5		OMNI		
OH3RSE	**1296,975**	KP11UM	10WERP	BIG WHEEL	OMNI	247	
DB0JU	**1296,980**	JO31CV	2W	HELICAL	OMNI	295	A1A
OZ3ALS	**1296,984**	JO44WX	2W	BIG WHEEL	OMNI	50	A1A
DB0FB	**1296,990**	JN47AU	4W	DIPOLE	N/S	1200	F1A
DB0JN	**1296,990**	JO31WP	0.1W	MINI WHEEL	OMNI	80	F1A
GB3EDN	**1296,990**	IO85HW	25W ERP	2*CORNER REFLCT.	NW/SE	117	F1A
DB0JQ	**1296,995**	JN68ST	5W ERP	4*DQ	OMNI	850	F2A
GB3NO	**1297,000**	JO02PP	25W ERP	SLOT	OMNI	55	F1A
DB0JW	**1297,010**	JO30DU	50W ERP	4 X 11 ELE	NE	225	F1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
DB0LB	**1297,040**	JN48NV	0.3 W ERP	BIG WHEEL	OMNI	367	F1A
K3SIW/B	**2304,020**	EN52	10W	15Y	270		
S55ZNG	**2304,040**	JN65UU	0,1W			643	
W6IFE	**2304,085**	DM14KF	2.5W ERP	6C		1958	
I1J	**2304,830**	JN35SH	20W ERP	SLOT DIPOLE	S	625	A1A
HB9BBD/P	**2308,178**	JN47GA	8W	3 X DIPOLE	0	1662	F1A
YU1SHF	**2320,000**	KN04OO	0,2W	4 X 5 ELE LOOP	N/NW	196	
SK6MHI	**2320,800**	JO57XQ	10W ERP	H	OMNI	135	
SK6UHJ	**2320,800**	JO58RG	1W	2*??EL. YAGI	S/SW	80	A1A
SK0UHH	**2320,805**	JO99BM	25W ERP	H	OMNI	90	
DB0ZW	**2320,810**	JN69EQ		PROPOSAL			
DB0IH	**2320,815**	JN39ML		TEMPORARY	QRT		F1A
DB0OT	**2320,820**	JO32QR	1W ERP	BIG WHEEL	OMNI	80	F1A
4U1VIC/B	**2320,825**	JN88FF	2W	4*2 ELE.	OMNI	290	
DB0JX	**2320,830**	JO31FF	0.1W	DOUBLE HELICAL	OMNI	115	A1A
DB0FGB	**2320,833**	JO50WB	15 W ERP		OMNI	1100	
F5XAC	**2320,838**	JN12LL	20W ERP	SLOT WG	360	1100	F1A
DB0KI	**2320,840**	JO50WC	40WERP	SLOT	OMNI	1025	A1A
GB3NWK	**2320,840**	JO01BI	2W	ALFORD SLOT	OMNI	180	F1A
DB0LBV	**2320,845**	JO61EH	1,5W	DOPPELACHT	SSW-SSE	234	A1A
DB0GW	**2320,850**	JO31JK	8W ERP	WENDEL	OMNI	80	A1A
DL0UB	**2320,850**	JO62KK	10W	5 X DIPOLE	OMNI	120	A1A
DB0SHF	**2320,855**	JN48XS	1W	DIPOLE-ARRAY(6)	260	800	
OZ3UHF	**2320,855**	JO56AJ	0.1W	14ELE 12DBD	180	150	F1A
PI7GHG	**2320,857**	JO21CV	2X3W	2*10ELE	E/W		F1A
LA1UHH	**2320,860**	JO59DD	50W ERP	13DB HORN	180	30	A1A
F1XAH	**2320,862**	JN23MM	15W	SLOT WG	OMNI	114	F1A
DB0GKB	**2320,865**	JN48JC	1W	DIPOLE-HELIX	OMNI	1000	
DB0IBB	**2320,870**	JO32VG	4WERP	10 X SLOT	OMNI	200	A1A
PI7TGA	**2320,873**	JO21WU	1W	10 DB GAIN	NW+W	75	F1A
DB0GO	**2320,880**	JO41ED	50WERP	SLOT WG	OMNI	738	F1A
DB0YI	**2320,880**	JO42XC	1W	BIG WHEEL	OMNI	480	A1A
LA3UHH	**2320,880**	JO48JK	0,7W	10DB HORN	45		
DB0INN	**2320,883**	JN68GI	1W				
PI7RMD	**2320,885**	JO22	1W	DQ	180	100	
GB3ANT	**2320,890**	JO02PP	5W ERP	SLOT	OMNI	55	F1A
DB0JB	**2320,900**	JN48FX	1W ERP	BIG WHEEL	OMNI	275	F1A
DB0JW	**2320,900**	JO30DU	25W ERP	6 ELE ARRAY	NE	225	F1A
GB3WWH	**2320,900**						
LX0THF	**2320,902**	JN39BP	0,5W	D-QUAD HORIZ	OMNI		
DF0VF	**2320,905**	JO50EU		PROPOSAL	OMNI	910	
DL0UH	**2320,912**	JO41RD	1W ERP	6XDIPOLE STACKED	N	385	A1A
DB0UBI	**2320,915**	JO42GE	0,5WERP	HORN	35	120	F1A
DL0UBI	**2320,915**	JO42GE	0,5WERP	HORN	30	125	
DB0VC	**2320,920**	JO54IF	3WERP	BIGWHEEL	OMNI	300	
PI7QHN	**2320,921**	JO22FH	0.2W	GAIN 6DB	OMNI	20	F1A
OZ7IGY	**2320,930**	JO55VO	20W	SLOT	OMNI	91	F1A
DB0GQ	**2320,935**	JO40GP	3WERP	DIPOLE HELIX	OMNI	549	
PI7PLA	**2320,935**	JO33IC	2,5W	SLOT		42	
DB0JO	**2320,937**	JO31SK	0.2W	HORN	N	312	F1A
DB0OS	**2320,945**	JO40CW	1W ERP	8 EL. ARRAY	W	745	F1A
DB0KP	**2320,950**	JN47TS	0.1W	HELICAL		440	A1A
OZ9UHF	**2320,950**	JO65HP	5W	SLOT	OMNI	30	F1A
GB3LES	**2320,955**	IO92IQ	5W ERP	ALFORDSLOT	OMNI	220	F1A
DF0ANN	**2320,965**	JN59PL	0,3W	4 X DQ	OMNI	630	
DB0AS	**2320,967**	JN67CR	0.5W	28EL. YAGI	NW	1560	A1A
DB0JL	**2320,975**	JO31MC	2W ERP	SLOT	OMNI	195	
DB0JU	**2320,980**	JO31CV	2W	HELICAL	OMNI	150	A1A
DC8EC/A	**2321,050**	JN58TB	4W	6 ELE ARRAY	NW	580	
DB0HF	**2322,825**	JO53BO	0.3W	BIG WHEEL	OMNI	65	F1A
DL0UB	**3400,009**	JO62KK	10W	12 X SLOT	OMNI	120	A1A
PI7SHF	**3400,020**	JO22JH	1W	16DBI	OMNI	75	
DB0HF	**3400,025**	JO53BO				65	
DB0KI	**3400,040**	JO50WC	50WERP	SLOT	OMNI	1025	A1A
DB0JL	**3400,050**	JO31MC	1W ERP	HELICAL	OMNI	195	F1A

CALL	QRG	WW	POWER	ANTENNA	QTF	ASL	MODE
PI7CKK	3400,160	JO33GE	5W	SLOT 10DB		55	
DF6VB	3400,170	JO31QP	0.02W			85	F1A
DB1BX/P	3400,820	JO32SV	1,2WERP	HELIX	OMNI	90	F1A
DB0GW	3400,850	JO31JK	1W	D-WENDEL	OMNI	80	A1A
DB0EZ	3456,005	JO31BS	0.1W ERP	SLOT	115	110	F1A
DL0WY	3456,115	JN67CR	80MW	12EL. GROUP	NW	1560	A1A
DB0JO	3456,155	JO31SL				312	F1A
DB0MST	3456,800	JN67IR	1W	COLLINEAR	OMNI	1800	
DB0JX	3456,830	JO31FF	0,1W	HELICAL	OMNI	115	
DB0SHF	3456,855	JN48XS	1W	HORN (12 DB)	260	800	
DB0INN	3456,883	JN68GI	1W				
GB3OHM	3456,900						
OK0EA	5760,030	JO70UP					
PI7EHG	5760,035	JO22JH		16DBI	OMNI	75	
DF0WP	5760,050	JO31QP	0.1W ERP		S	85	F1A
F1XAO	5760,060	IN88HL	10W	SLOT WG	OMNI	326	F1A
DB0JL	5760,070	JO31MC	0.8W ERP	SLOT	OMNI	195	F1A
DB0EZ	5760,090	JO31BS	1W ERP	SLOT	OMNI	110	F1A
DL0WY	5760,192	JN67CR	50MW	6DB HORN	NW	1560	A1A
HB9EI	5760,500	JN45MW	0,1W	10DB HORN	180	1628	A1A
SK6MHI	5760,800	JO57XQ	5W ERP		270	135	A1A
DB1BX/P	5760,820	JO32SV	1,2WERP	HELIX	OMNI	90	F1A
DB0JX	5760,830	JO31FF	0,08W	SLOT	OMNI	115	
I1K	5760,830	JN35SH	0.4W ERP	SLOT DIPOLE	S	625	A1A
DB0FGB	5760,833	JO50WB	15 WERP		OMNI	1100	
DB0KI	5760,840	JO50WC	20W ERP	SLOT	OMNI	1025	A1A
DL0UB	5760,850	JO62KK	0,2W	12 X SLOT	OMNI	120	A1A
SK7SHF	5760,850	JO65OR	7W ERP	HORIZONTAL	OMNI	115	
DB0SHF	5760,855	JN48XS	0.1W	DIPOLE-PATCH(6DB	260	800	
LA1SHF	5760,860	JO59DD	25W ERP	13DB HORN	180	30	A1A
DB0INN	5760,883	JN68GI	1W			504	
HB9G	5760,895	JN36BK	6.8W ERP	SLOT	OMNI	1577	
DB0CU	5760,900	JN48BI	5W ERP	SLOT	OMNI	970	F1A
DF0VF	5760,905	JO50EU		PROPOSAL	OMNI	910	
OZ7IGY	5760,930	JO55VO	15W	WG SLOT	E/W	91	F1A
OZ9UHF	5760,950	JO65HP	2W	WG SLOT	OMNI	30	F1A
OZ8SHF	5760,955	JO57FJ	8W	WG SLOT	OMNI	150	A1A
GB3IOW	10100,000	IO90IO	0.15W ERP	SLOT WAVEGUIDE	OMNI	250	F2A
GB3ALD	10120,000	IN89WR	1W ERP	SECT. HORN	NNE	90	F2A
ON4RUG	10367,985	JO11UB	0.25W	17DB HORN	NE	96	F1A
GB3SWH	10368,000						
DB0EZ	10368,015	JO31BS	1W ERP	SLOT	115	110	F1A
PE1BLE	10368,020	JO22JH		QRT NOW!			
LX1DU	10368,040	JN29XM	0,5W	1,3M DISH 40DBD	RAINSCAT		
PI7SHY	10368,040	JO21SL	1W	15DBI	340	56	F1A
DF0WB	10368,050	JO31QP	1W ERP		S	85	F1A
OK0EA	10368,050	JO70UP					
F1XAI	10368,060	JN07WT	10W		OMNI	160	F1A
FX0SHF	10368,060	JN07WT	0,2W	WG	OMNI	160	F1A
DB1BX/P	10368,070	JO32SV	1,2WERP	HELIX	OMNI	90	F1A
PA0TGA	10368,085	JO21WU	0,05W	16DB GAIN	W	75	A1A
DF6TK	10368,088	JN47TT	0,16 W	8 X SLOT	55+235	470	
KH6HME	10368,100	BK29GO	30KW ERP	1.22M DISH	60	2501	
DB0JL	10368,120	JO31MC	0.15W ERP	SLOT	OMNI	195	F1A
ON4TNR	10368,140	JO20KJ	0,1W	18DB HORN	WNW	2501	A1A
F1XAP	10368,180	IN88HL	5W	SLOT WG	OMNI	326	F1A
NY2US	10368,210	FN30	.08W	WORLD TRADE CENT	OMNI		
PI7EHG	10368,210	JO22JH				75	
DL0WY/P	10368,275	JN67BU	0.15W	SLOT	N/S	1850	F1A
PI7GHG	10368,285	JO21GW	0.25W	16 DB GAIN	NE	50	F1A
N6CA	10368,300	DM03TS	140W ERP		OMNI	427	
SK0SHG	10368,800	JO89XJ	0.5W ERP	SLOTTED WAVEGUID	OMNI	60	A1A
SK6MHI	10368,800	JO57XQ	5W ERP		OMNI	135	A1A
DB0XL	10368,805	JO53HU	.16W	2X8 SLOT HOR.	OMNI	49	A1A
F1XAU	10368,821	JN27IH	1,5 W	SLOT WG	OMNI	516	F1A

DB0HRO	**10368,825**	JO64AD	0,2W	SLOT 10DB		70	
DB0JX	**10368,830**	JO31FF	90MW	SLOT	OMNI	115	A1A
GB3MHX	**10368,830**	JO02PB	100W ERP	1.2M DISH	90	60	F1A
GB3SEE	**10368,832**	IO91XG	5WERP	SLOT WG	OMNI	177	F1A
DB0FGB	**10368,833**	JO50WB	13 WERP		OMNI	1100	
DB0JO	**10368,840**	JO31SL	1WERP	6 X SLOT	OMNI	312	F1A
DB0KI	**10368,840**	JO50WC	13W ERP	SLOT	OMNI	1025	QRT NW
DB0GG	**10368,850**	JN48NS	0,05W	SLOT	OMNI	400	
DL0UB	**10368,850**	JO62KK	0,1W	12 X SLOT	OMNI	12	A1A
SK7SHG	**10368,850**	JO65OR	3W ERP	10 DB OMNI	OMNI	115	F1A
DB0SHF	**10368,855**	JN48XS	10MW	HORN (13 DB)	260	800	
F5XAD	**10368,860**	JN12LL	2W	SLOT WG	360	1100	F1A
LA1SHG	**10368,860**	JO59DD	10W ERP	13DB HORN	180	30	A1A
F1XAE	**10368,862**	JN23MM		SLOT WG	OMNI	114	F1A
DB0JK	**10368,865**	JO30LX	200WERP	SLOT	OMNI	260	F1A
DB0IS	**10368,875**	JO51GR	40MW	SLOT	N/W	1020	A1A
DL4DTU	**10368,880**	JO61	0,5	10DB	OMNI		
DB0INN	**10368,883**	JN68GI	1W	SLOT	OMNI	504	
HB9G	**10368,884**	JN36BK	2WERP	SLOT WG	OMNI	1520	
DB0CU	**10368,900**	JN48BI	5W ERP	SLOT	OMNI	970	F1A
DB0JB	**10368,900**	JN48FX	1WERP	SLOT	OMNI	275	
OZ5SHF	**10368,900**	JO45VX	2,5WERP	WG SLOT	OMNI	210	F1A
DB0ECA	**10368,905**	JN57UV	1 W ERP		OMNI	720	
DB0HEX	**10368,910**	JO51HT	0.9W	10DB (QRG:.902)	OMNI	1250	
OZ4SHF	**10368,915**	JO65BV	10WERP	WG SLOT	OMNI	22	F1A
OZ9PRO	**10368,915**	JO65BV	10W	WG SLOT	OMNI	22	F1A
DB0VC	**10368,920**	JO54IF	10W	QRV NOW		291	
OE3XMB	**10368,925**	JN77TX		PROPOSAL		1154	
SK0SHH	**10368,935**	JO89WF	0,05W ERP	HORIZONTAL	OMNI	90	QRT
F1XAN	**10368,940**	JN09TD	1,5W	SLOT WG	OMNI	300	F1A
GB3CCX	**10368,940**	IO81WX				330	
OZ9UHF	**10368,950**	JO65HP	3WERP	WG SLOT	OMNI	30	F1A
OZ9SHF	**10368,955**	JO57FJ	0,8WERP	WAVEGUIDE SLOT	OMNI	150	A1A
SK4SHI	**10368,960**	JO79LK	8W ERP	H	OMNI	270	
GB3CMS	**10368,963**	JO01GR	25WERP	4XSLOTWG	OMNI	108	F1A
DF0ANN	**10368,965**	JN59PL	0,2W	12 X SLOT	OMNI	630	A1A
HG5FMV	**10368,970**	JN97KR	0,1W	SLOT		690	
ON4KUL	**10368,975**	JO20IV	0,1W	10DB SLOT			
OZ3SHF	**10368,975**	JO45NL	2WERP	W SLOT	OMNI	58	F2B
GB3LEX	**10400,000**	IO92IQ	1W ERP	SLOT WAVEGUIDE	SE	220	F2A
GB3XGH	**10400,000**	IO83QF	1W ERP	SLOT	OMNI	100	F2A
I5X	**10450,000**	JN54BC	0.4W ERP	15DB HORN	NW	1260	A1A
GM4ISM	**19368,055**	IO85BU	1WERP	SLOT		300	
OK0EL	**24192,050**	JO70SQ	0,01 W	SLOT	W/O	1036	A1A
DB0JO	**24192,055**	JO31SL	0,6WERP	6 X SLOT	OMNI	312	
PI7EHG	**24192,075**	JO22JH	0,1W	30DB DISH	270	75	
LX0DUF	**24192,100**	JN29XN	1,5KW ERP	DISH	SCATTER		
DB0JL	**24192,120**	JO31MC	0,01WERP	SLOT	OMNI	195	
DL0WY/P	**24192,134**	JN67BU	0.02W	E-HORN	0	1880	F1A
DB0AJ	**24192,200**	JN57	0,1WERP	SLOT	N	620	
F1XAQ	**24192,250**	IN88HL	0.05W	SLOT WG	OMNI	326	F1A
SK6MHI	**24192,800**	JO57XQ	1W ERP	H	S+W	135	
F5XAF	**24192,830**	JN18DU	0,1W	DISH	PARIS		F1A
DB0FGB	**24192,833**	JO50WB	1W ERP		OMNI	1100	
DB0JK	**24192,865**	JO30LX	1WERP	2 X H-HORN	OMNI	260	
DB0CU	**24192,900**	JN48BI	5W ERP	20 DB HORN	180	970	F1A
DB0HEX	**24192,910**	JO51HT		PROPOSAL			
DB0KI	**24192,940**	JO50WC	0.5W ERP	SLOT	0	1025	
DF0ANN	**24192,965**	JN59PL		TEMPORARY	QRT	630	
ON4LVN	**24192,975**	JO20IV	0,05W	10DB SLOT			
DB0FGB	**47088,833**	JO50WB	0,1W ERP		NE	1100	
DB0JK	**47088,865**	JO30LX		PROPOSAL		260	

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