

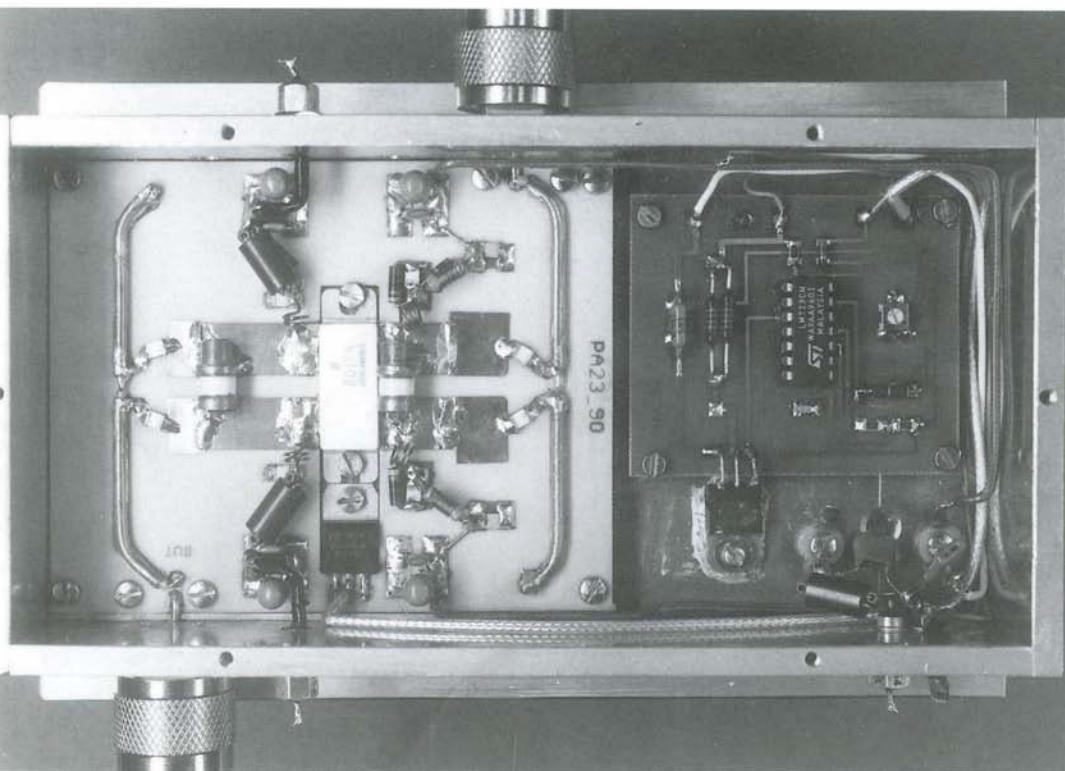
Vol. 26

# DUBUS

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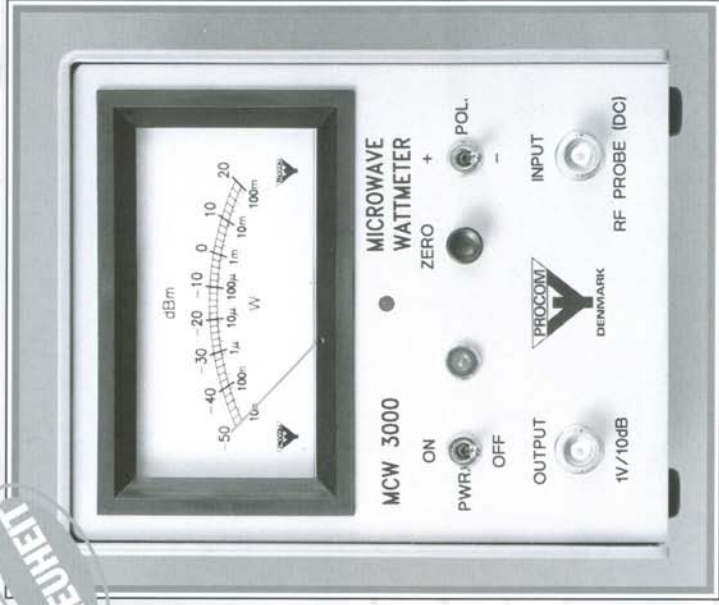
## Push-Pull PA on 23cm



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**DUBUS**

Entirely devoted to DX-ing on VHF/UHF and Microwaves (50MHz..241GHz). Fully bilingual and written by active radio amateurs for active radio amateurs.

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# Inhalt/Contents

|                                                                       |                              |
|-----------------------------------------------------------------------|------------------------------|
| <b>Technical Reports</b> .....                                        | <b>5</b>                     |
| No-Tune SSB Transceivers for 1.3, 2.3, 5.7 and 10 GHz (Part II) ..... | Matjaz Vidmar, S53MV . . 5   |
| 90W Transistor-PA für 1,3GHz .....                                    | Dieter Briggmann, DC6GC . 36 |
| Feeding a 12 inch SHF Dish on 10 GHz .....                            | Zack Lau, W1VT . 47          |
| <b>Microwave Europe</b> .....                                         | <b>49</b>                    |
| <b>Contents/Inhalt 97</b> .....                                       | <b>54</b>                    |
| <b>Microwave USA</b> .....                                            | <b>55</b>                    |
| <b>EME News</b> .....                                                 | <b>56</b>                    |
| <b>ES News</b> .....                                                  | <b>65</b>                    |
| <b>Tropo News</b> .....                                               | <b>66</b>                    |
| <b>6m News</b> .....                                                  | <b>70</b>                    |
| <b>FAI News</b> .....                                                 | <b>71</b>                    |
| <b>Aurora News</b> .....                                              | <b>72</b>                    |
| <b>Meteor Scatter</b> .....                                           | <b>73</b>                    |
| <b>News &amp; Comments</b> .....                                      | <b>83</b>                    |
| <b>DUBUS Toplist</b> .....                                            | <b>87</b>                    |

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# Technical Reports

Editor: Rainer Bertelsmeier, DJ9BV

## No-Tune SSB Transceivers for 1.3, 2.3, 5.7 and 10 GHz

Matjaz Vidmar, S53MV

Sergeja Masere 21, SI-5000 Nova Gorica, Slovenia

(Part II)

### 5. Quadrature transmit mixers

#### Common Features

All three transmit mixer modules for 1296MHz, 2304MHz and 5760MHz include similar stages: a LO signal switching, an in-phase LO divider, two balanced subharmonic mixers, a quadrature combiner and a selective RF amplifier. LO signal switching between the transmit and receive mixers is performed in the following way: most of the LO signal is always fed to the receive mixer. A small fraction of the LO signal is obtained from a coupler and amplified to drive the transmit mixer. During reception the power supply of the LO amplifier stage is simply turned off. This solution may look complicated, but in practice it allows an excellent isolation between the transmit and receive mixers. The practical circuit is simple and the component count is low as well.

#### Transmit Mixer for 23cm

The circuit diagram of the quadrature transmit mixer for 1296MHz is shown on Fig. 15. The 648MHz LO signal is taken from a -20dB coupler and the LO signal level is restored by the BFP183 amplifier stage, feeding two subharmonic mixers equipped with BAT14-099R schottky quads. The 648MHz lowpass attenuates the second harmonic

at 1296MHz to avoid corrupting the symmetry of the mixers.

The two 1296MHz signals are combined in a quadrature hybrid, followed by a 1296MHz bandpass filter. The latter removes the 648MHz LO as well as other unwanted mixing products. After filtering the 1296MHz SSB signal level is rather low (around -10dBm), so an INA-10386 MMIC is used to boost the output signal level to about +15dBm.

The quadrature transmit mixer for 1296MHz is built on a double-sided microstrip FR4 board with the dimensions of 40mmX120mm as shown on Fig. 16. The corresponding component location is shown on Fig. 17. The circuit does not require any tuning for operation at 1296MHz or 1270MHz.

#### Transmit Mixer for 13cm

The circuit diagram of the quadrature transmit mixer for 2304MHz is shown on Fig. 18. The 576MHz LO signal is taken from a -20dB coupler, amplified by the BFP183 transistor and then doubled to 1152MHz by the BFP196 transistor. The doubler output goes through a microstrip bandpass filter to feed the two subharmonic mixers with BAT14-099R schottky quads.

The two 2304MHz signals are combined in a quadrature hybrid, followed by a 2304MHz band-

Fig. 15: Quadrature TX Mixer for 1296 MHz

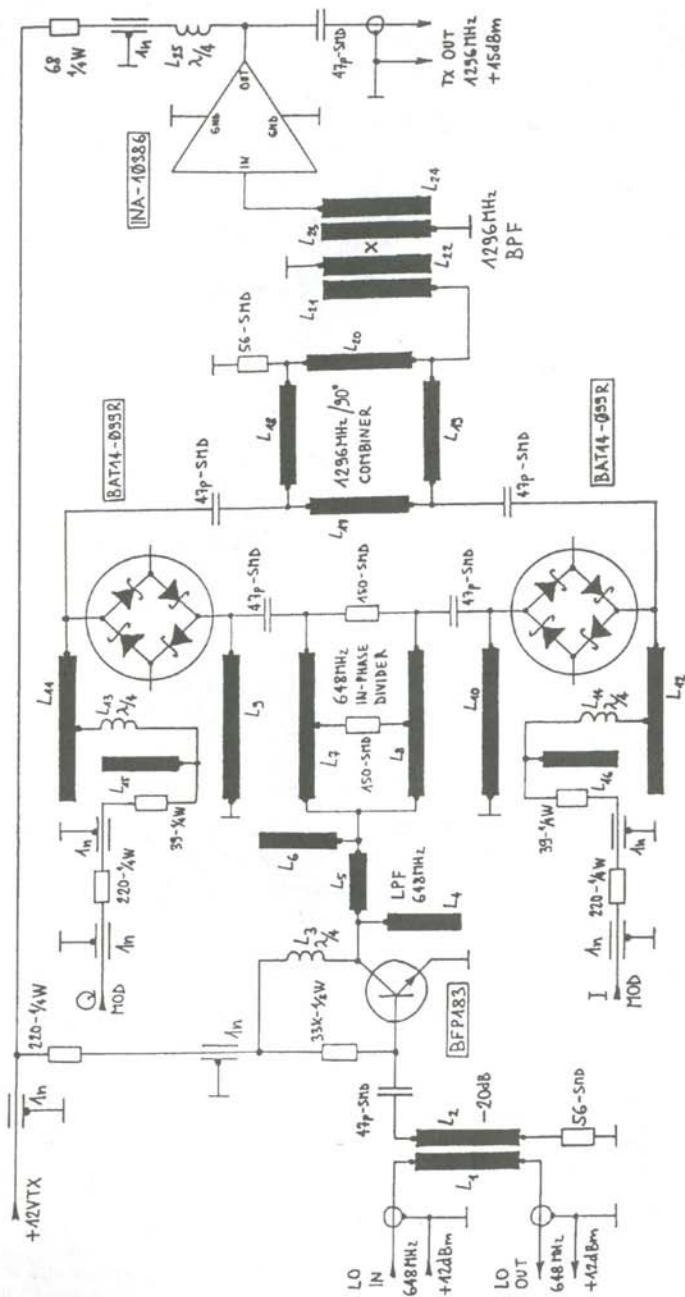
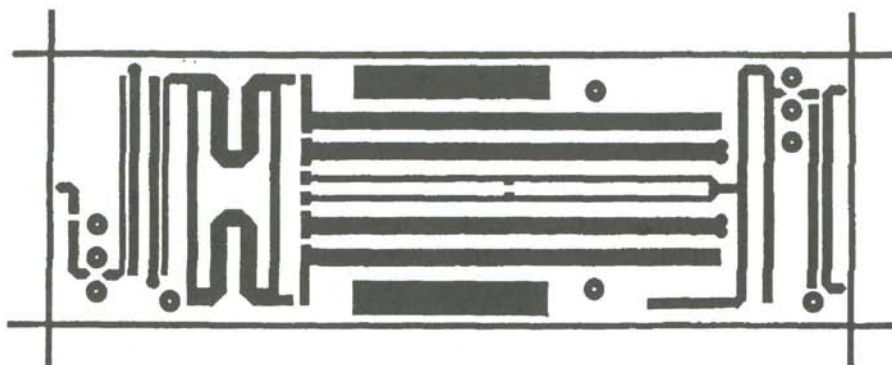


Fig. 16: 1296 MHz TX Mixer PCB



pass filter. The latter removes the 1152MHz LO as well as other unwanted mixing products. After filtering the 2304MHz SSB signal level is rather low (around -11dBm), so an INA-10386 MMIC is used to boost the output signal level to about +10dBm.

The quadrature transmit mixer for 2304MHz is built on a double-sided microstrip FR4 board with the dimensions of 40mmX120mm as shown on

Fig. 19. The corresponding component location is shown on Fig. 20. The circuit does not require any tuning for operation at 2304MHz or 2320MHz. For operation in the satellite band above 2400MHz, the LO bandpass should be readjusted to 1200MHz by shortening L7 and L8 at their hot ends.

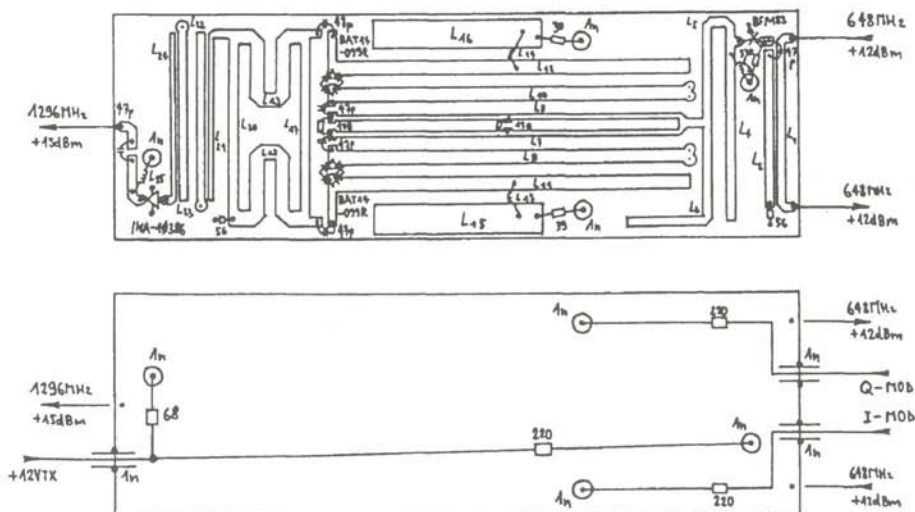


Fig. 17: 1296 MHz TX Mixer Component Location

Fig. 18: Quadrature TX Mixer for 2304 MHz

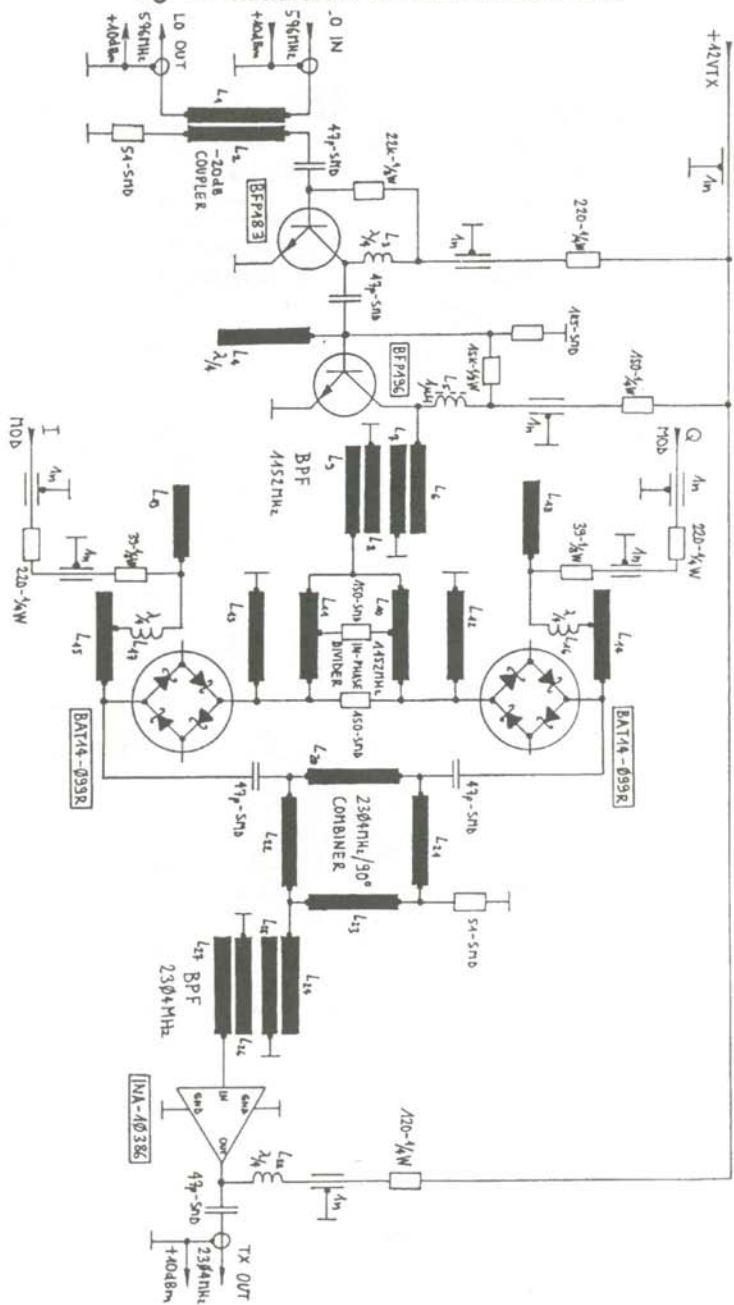
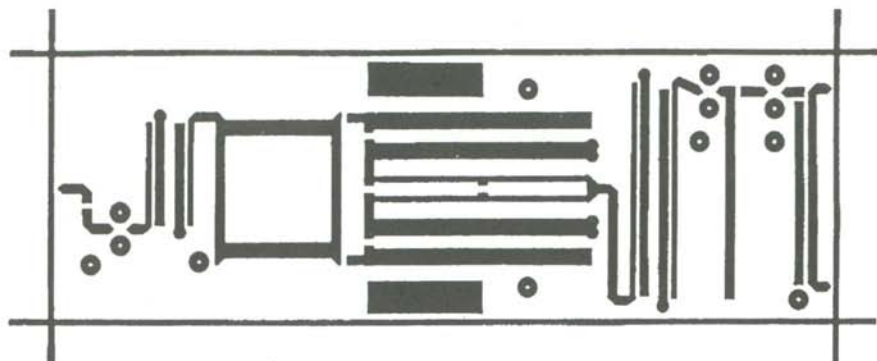


Fig. 19: 2304 MHz TX Mixer PCB



### Transmit Mixer for 6cm

The circuit diagram of the quadrature transmit mixer for 5760MHz is shown on Fig. 21. The 2880MHz 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 schot-

tky quads. The 2880MHz lowpass attenuates the second harmonic at 5760MHz to avoid corrupting the symmetry of the mixers.

The two 5760MHz signals are combined in a quadrature hybrid, followed by a 5760MHz band-pass filter. The latter removes the 2880MHz LO as well as other unwanted mixing products. After

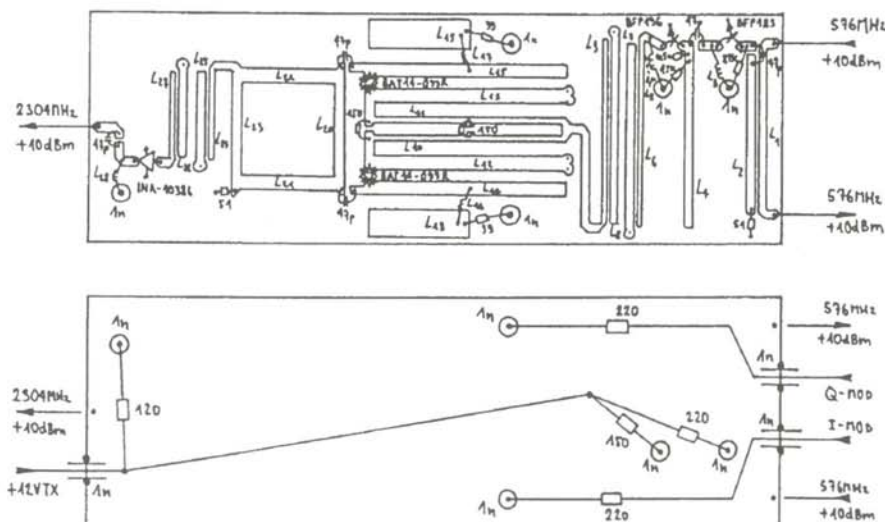


Fig. 20: 2304 MHz TX Mixer Component Location

Fig. 21: Quadrature TX Mixer for 5760 MHz

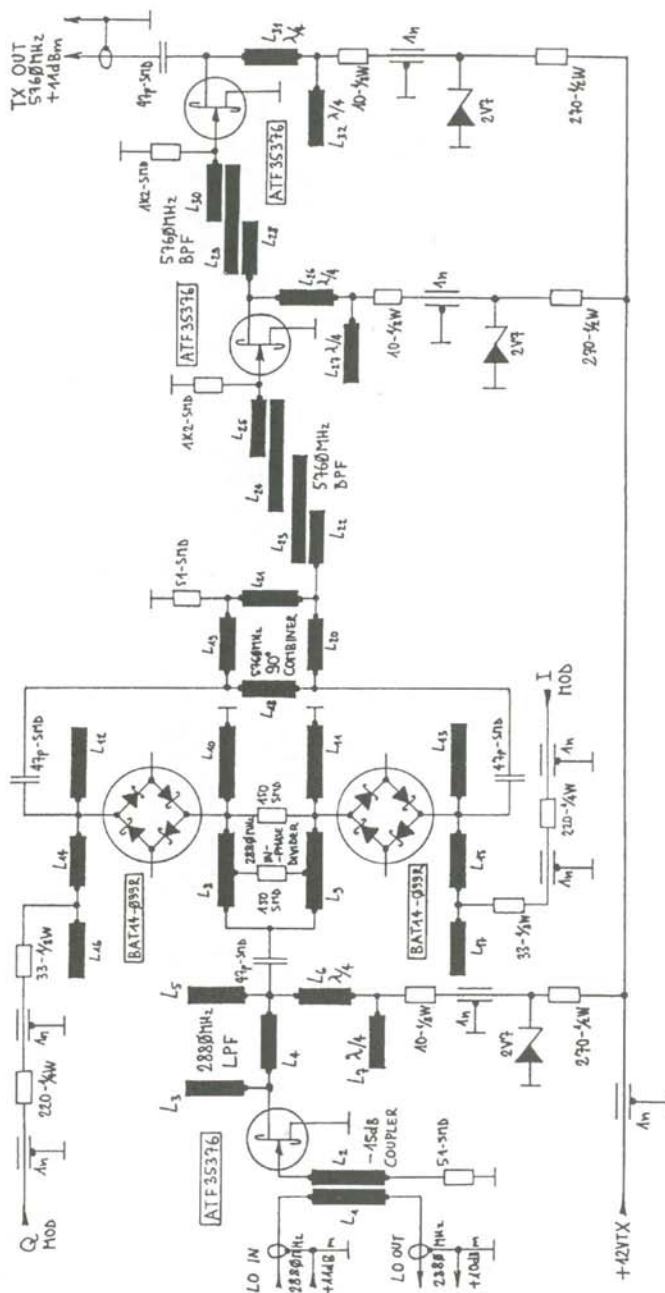
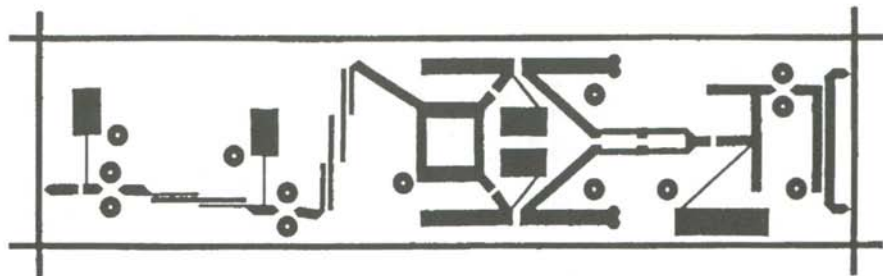


Fig. 22: 5760 MHz TX Mixer PCB



filtering the 5760MHz SSB signal level is rather low (around -14dBm), so two amplifier stages with ATF35376 HEMTs are used to boost the output signal level to about +11dBm.

The quadrature transmit mixer for 5760MHz is built on a double-sided microstrip FR4 board with the dimensions of 30mmX120mm as shown on Fig. 22. The corresponding component location is shown on Fig. 23. The circuit does not require any tuning for operation at 5760MHz.

The quadrature transmit mixers do not supply any output signal when the modulation input is absent. For transmitter testing purposes it is possible to

obtain an output signal by feeding a DC current of 2-10mA into one or both mixers.

## 6. RF front-ends

### Common Features

The RF front-ends include the transmitter power amplifiers, the receiver low-noise amplifiers and the antenna switching circuits. Of course there are major differences among different power amplifier designs, depending not just on the frequency, but also on the technology used and the output power desired. On the other hand, it no longer makes sense to use expensive coaxial relays, since PIN diodes can provide the same insertion loss and

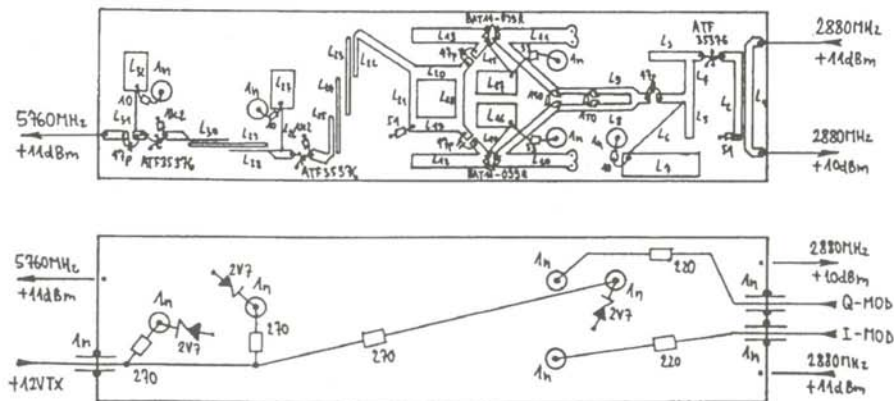


Fig. 23: 5760 MHz TX Mixer Component Location

Fig. 24: RF Front End for 1296 MHz

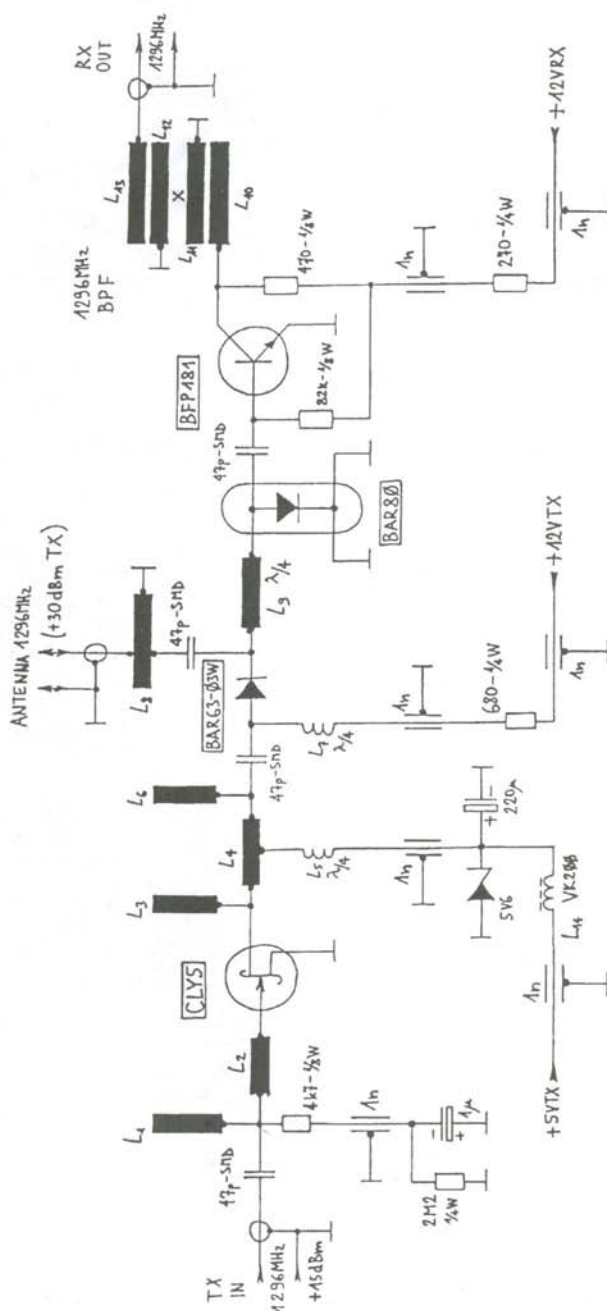
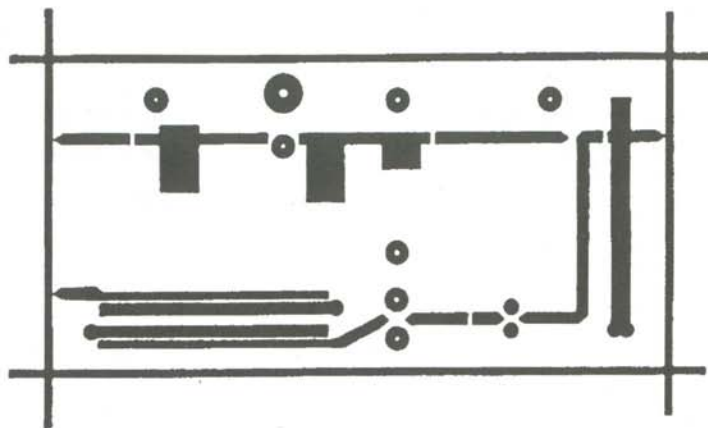


Fig. 25: 1296 MHz RF Front End PCB



isolation at lower cost with better reliability and much shorter switching times.

#### RF front-end for 23cm

The circuit diagram of the RF front-end for 1296MHz is shown on Fig. 24. The transmitter

power amplifier includes a single stage with a CLY5 power GaAsFET, providing a gain of 15dB and an output power of about 1W (+30dBm). The CLY5 is a low-voltage transistor operating at about 5V.

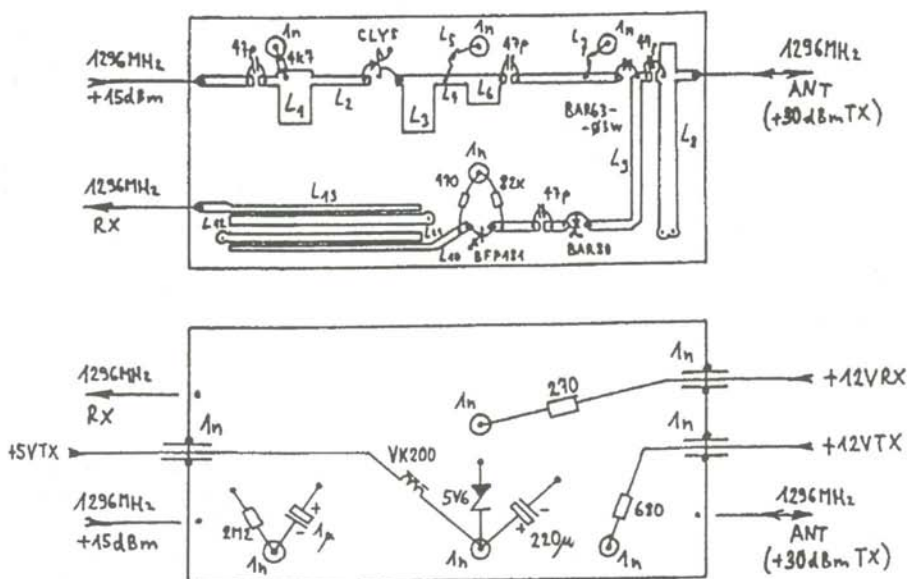


Fig. 26: 1296 MHz RF Front End Component Location

The negative gate bias is generated by rectification of the driving RF signal in the GS junction inside the CLY5 during modulation peaks. The gate is then held negative for a few seconds thanks to the 1uF storage capacitor. To prevent overheating and destruction of the CLY5, the +5VTX voltage is obtained through a current-limiting resistor. This arrangement may look strange, but it is very simple, requires no adjustments, allows a reasonably linear operation and most important of all, it proved very reliable in PSK packet-radio transceivers operating 24 hours per day in our packet-radio network.

The antenna switch includes a series diode BAR63-03W and a shunt diode BAR80. Both diodes are turned on while transmitting. L9 is a quarter-wavelength line that transforms the BAR80 short circuit into an open for the transmitter. The receiving preamplifier includes a single BFP181 transistor (15dB gain) followed by a 1296MHz bandpass filter (-3dB loss). In the 1296MHz RF front-end, the LNA gain should be limited to avoid interference from powerful non-amateur users of this band (radars and other radio navigation aids).

The RF front-end for 1296MHz is built on a double-sided microstrip FR4 board with the dimensions of 40 mmx80 mm as shown on Fig. 25. The corresponding component location is shown on Fig. 26. The RF front end for 1296MHz requires no tuning. However, since the output impedance of the INA-10386 inside the transmit mixer is not exactly 50ohms, the cable length between the transmit mixer and the RF front-end is critical. Therefore L1 may need adjustments if the teflon-dielectric cable length is different from 12.5cm.

### RF front-end for 13cm

The circuit diagram of the RF front-end for 2304MHz is shown on Fig. 27. The transmitter power amplifier includes two stages: a BFP183 driver and a CLY2 final amplifier. The additional BFP183 driver is required since the gain and output power of the INA-10386 inside the transmit mixer are smaller at 2304MHz than at 1296MHz. Further the additional bandpass filter at the input of the power amplifier adds some insertion loss.

The BFP183 operates as a class-A amplifier while the CLY2 is used in a similar self-biasing arrangement like the CLY5 in the 1296MHz front-end. Of

course the drain current of the CLY2 is smaller, the +5VTX current-limiting resistor must be higher and the RF output power on the antenna connector amounts to about 0.5W (+27dBm). The PIN-diode antenna switch is identical to that used in the 1296MHz RF front-end with a series diode BAR63-03W and a shunt diode BAR80.

Since there are no powerful users of the 2.3GHz band, the RF front-end for 2304MHz includes a two-stage LNA: a HEMT ATF35376 in the first stage and a BFP181 in the second stage. The overall gain of the LNA is around 23dB. Since the Idss of the ATF35376 is usually around 30mA, no negative voltage needs to be applied to the gate.

The RF front-end for 2304MHz is built on a double-sided microstrip FR4 board with the dimensions of 40mmX80mm as shown on Fig. 28. The corresponding component location is shown on Fig. 29. The RF front-end for 2304MHz should require no tuning, since both the transmit and the receive chains have a few dB of gain margin. However, in order to squeeze the last milliwatt out of the CLY2 (is it really necessary?), some tuning may be attempted on the output.

### RF front-end for 6cm

The circuit diagram of the RF front-end for 5760MHz is shown on Fig. 30. The transmit power amplifier uses two HEMTs ATF35376 in parallel to obtain about 100mW (+20dBm) on the antenna connector. The gain of the HEMTs is around 13dB, however circuit losses both in the input matching network and in the antenna switch on the output amount to about 3dB, so that about +10dBm of drive power is required.

The two PA HEMTs receive a positive bias on the gates both while transmitting and while receiving. In transmission the PA HEMTs generate a self bias just like the CLY5 and CLY2 power GaAsFETs. Of course the +4VTX supply line requires a current-limiting resistor.

The antenna switch includes a single shunt diode BAR80 to protect the receiver input during transmission. During reception, the two PA HEMTs act as short circuits thanks to the positive gate bias. The short circuit is transformed through package parasitics, L5, L6 and interconnecting lines (total electrical length 3/4 lambda) into an open circuit at the summing node.

Since the shunt diode BAR80 was not designed for operation above 3GHz, its capacitance introduces additional insertion loss in the receiving path at 5.76GHz. This additional loss can be substantially reduced if a reverse bias is applied to the BAR80 diode. Therefore a negative bias voltage is applied to the BAR80 during reception and a positive current is applied during transmission through the command line +PIN.

Since there are no strong signals expected in the 5.7GHz band, the LNA for 5760MHz includes two stages with ATF35376 HEMTs. The total insertion gain including the losses in the antenna switching network and the two 5760MHz bandpass filters amounts to about 23dB.

The RF front-end for 5760MHz is built on a double-sided microstrip FR4 board with the dimensions of 30mmX80mm as shown on Fig. 31. The corresponding component location is shown on Fig. 32. The RF front-end for 5760MHz requires no tuning. It is however recommended to select the ATF35376 HEMTs according to the Idss. The highest Idss devices should be used in the transmitter PA while the lowest Idss devices should be used in the receiver LNA.

## 7. Quadrature receive mixers

### Common Features

All three receiving mixer modules for 1296MHz, 2304MHz and 5760MHz include similar stages: an additional RF signal amplifier, a quadrature-hybrid divider, two subharmonic mixers, an in-phase LO divider and two IF preamplifiers. The mixers, in-phase and quadrature dividers and RF bandpass filters are very similar to those used in the transmitting mixer modules.

### RX Mixer for 23cm

The circuit diagram of the quadrature receiving mixer for 1296MHz is shown on Fig. 33. The incoming RF signal is first fed through a microstrip bandpass filter, then amplified with an INA-03184 MMIC and further filtered by another, identical microstrip bandpass. The total gain of the chain of the two filters and the MMIC is about 20dB.

A high gain in the RF section is required to cover the relatively high noise figure of the two subharmonic mixers and the additional losses in the

quadrature hybrid. The two receiving subharmonic mixers are also using BAT14-099R schottky quads. The mixer outputs are fed through lowpass filters to the IF preamplifiers.

The IF preamplifiers are using HF transistors BF199. These were found to perform better than their BC... counterparts in spite of the very low frequencies involved (less than 1200Hz). HF transistors have a smaller current gain, their input impedance is therefore smaller and better matches the output impedance of the mixers. Both IF preamplifiers receive their supply voltages from the IF amplifier module.

The quadrature receiving mixer for 1296MHz is built on a double-sided microstrip FR4 board with the dimensions of 40mmX120mm as shown on Fig. 34. The corresponding component location as shown on Fig. 35. The receiving mixer for 1296MHz requires no tuning.

### RX Mixer for 13cm

The circuit diagram of the quadrature receiving mixer for 2340MHz is shown on Fig. 36. Since the same components, INA-03184 MMIC and BAT14-099R schottky quads, have similar performances in the 1296MHz and 2304MHz frequency bands, the circuit diagram of the 2304MHz mixer is almost identical to the 1296MHz mixer.

The only difference is the additional frequency doubler to 1152MHz with the transistor BFP196. The multiplier includes a lowpass on the input and a bandpass filter on the output. The input lowpass filter should prevent unwanted interactions with other circuits operating with the same 576MHz LO signal. The 1uH choke should have a ferrite core for the same reason.

The quadrature receiving mixer for 2304MHz is built on a double-sided microstrip FR4 board with the dimensions of 40mmX120mm as shown on Fig. 37. The corresponding component location is shown on Fig. 38. The receiving mixer does not require any tuning for operation on 2304MHz or 2320MHz. For operation in the satellite band above 2400MHz, the LO bandpass should be re-adjusted to 1200MHz by shortening L26 and L27 at their hot ends.

### RX Mixer for 6cm

The circuit diagram of the quadrature receiving mixer for 5760MHz is shown on Fig. 39. Since a

Fig. 27: RF Front End for 2304 MHz

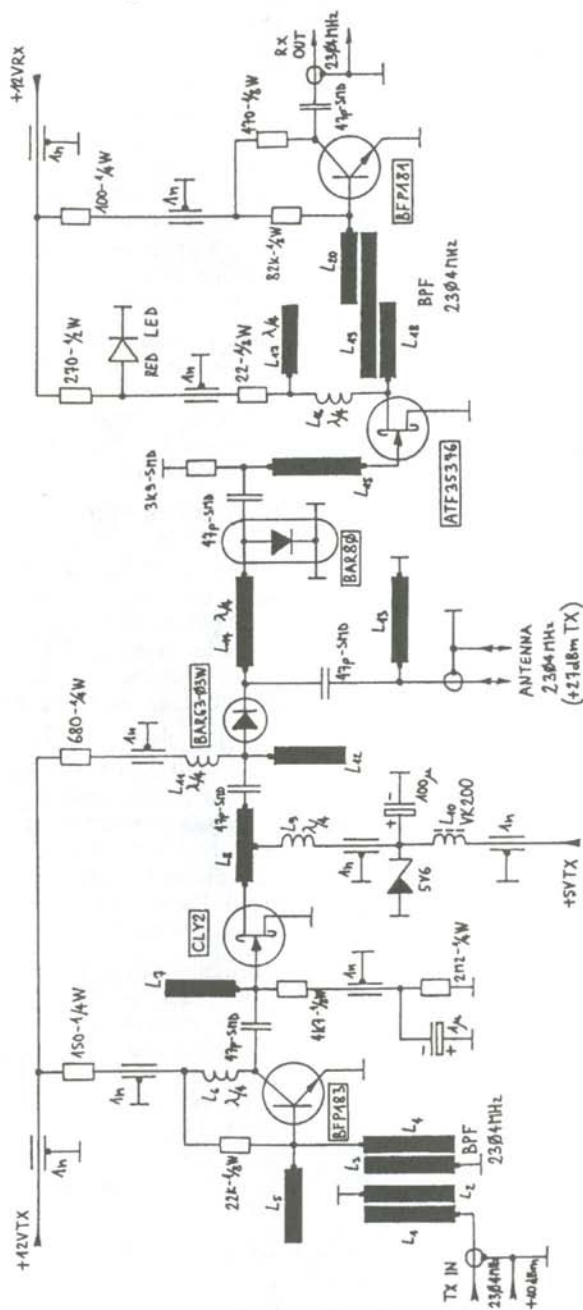
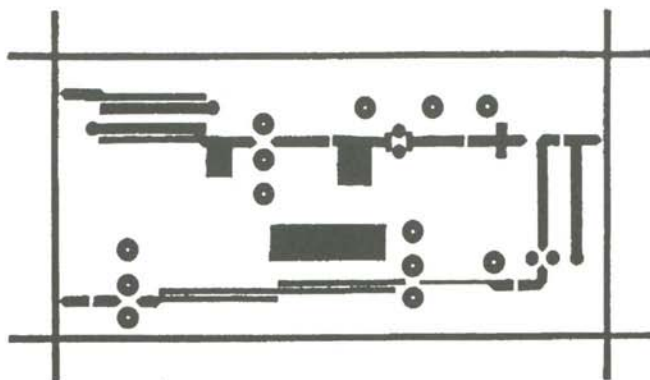


Fig. 28: 2304 MHz RF Front End PCB



component with the gain comparable to the INA-03184 is not available for 5.7GHz, two RF amplifier stages are required to obtain about 20dB of gain. ATF35376 HEMTs are used in both RF amplifier stages. Otherwise the circuit is almost identical

to the quadrature receiving mixer for 1296MHz.

The quadrature receiving mixer for 5760MHz is built on a double-sided microstrip FR4 board with the dimensions of 30mmX120mm as shown on

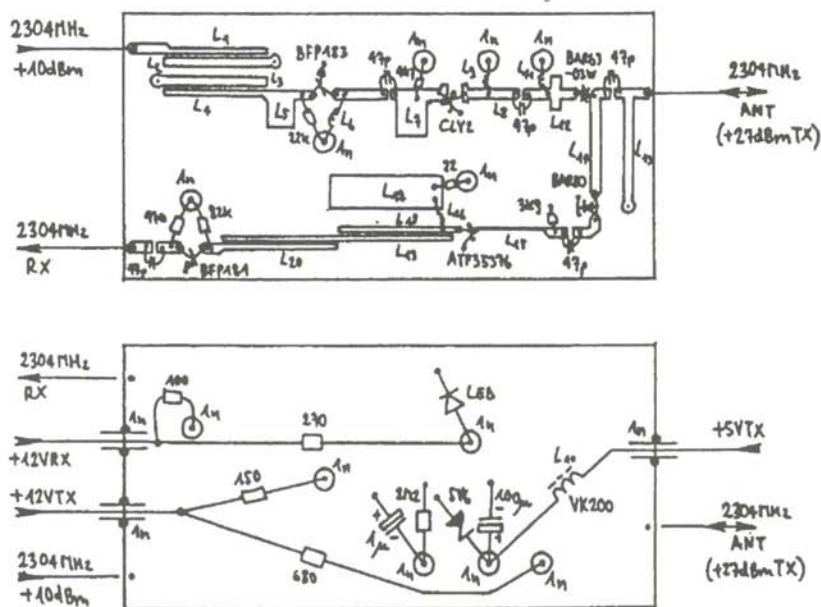
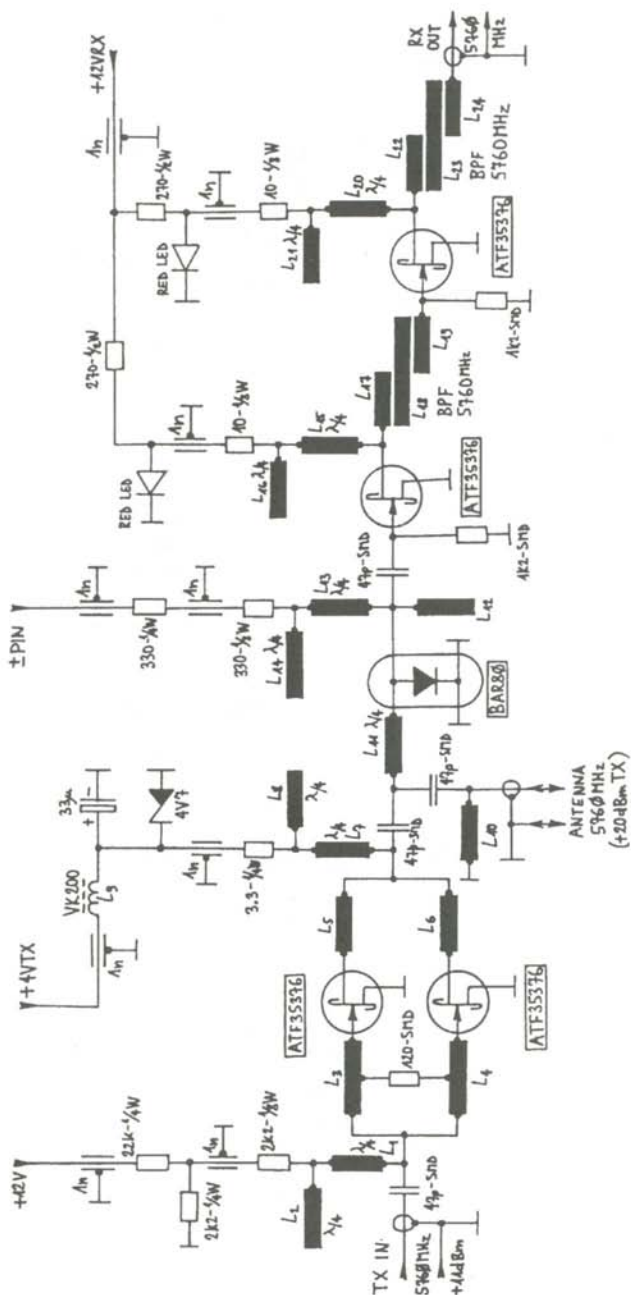


Fig. 29: 2304 MHz RF Front End Component Location

Fig. 30: RF Front End for 5760 MHz





both channels should have a common AGC so that the amplitude ratio remains unchanged.

The circuit diagram of the quadrature SSB IF amplifier with AGC is shown on Fig. 42. The IF amplifier module includes two identical lowpass filters on the input, followed by a dual-amplifier stage with a common AGC. An amplitude/phase correction is performed after the first amplifier stage, followed by another pair of lowpass filters and another dual-amplifier stage with a common AGC.

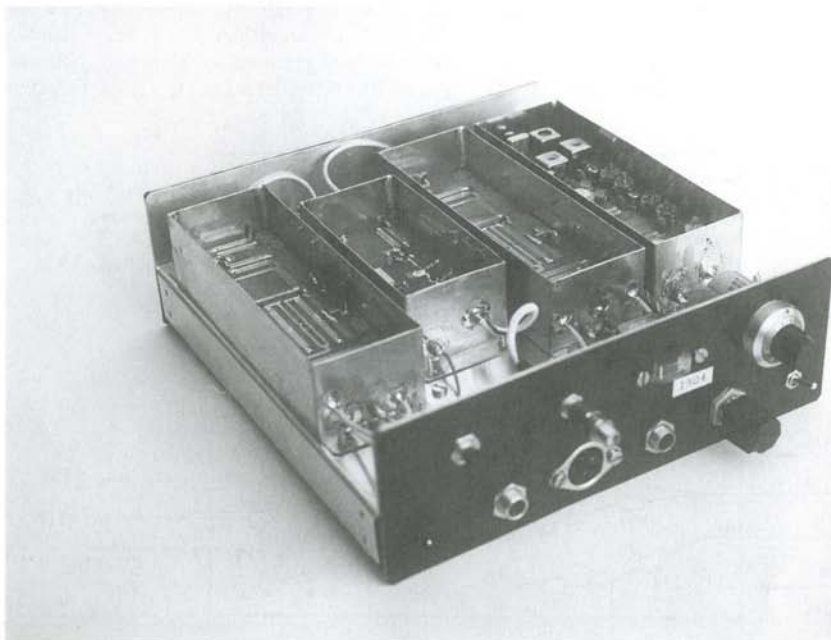
The two input lowpass filters are active RC filters using BC238 emitter followers. Discrete bipolar transistors are used because much less noisy than operational amplifiers. The input circuit also provides the supply voltage to the IF preamplifiers inside the receiving mixer module through the 1.5kohm resistors.

The dual-amplifier stages are also built with discrete BC238 bipolar transistors. Each amplifier stage includes a voltage amplifier (first BC238) followed by an emitter-follower (second BC238)

essentially to avoid mutual interactions when the amplifiers are chained with other circuits in the IF strip.

The AGC is using MOS transistors as variable resistors on the inputs of the dual-amplifier stages. To keep the gain of both I and Q channels identical, both MOS transistors are part of a single integrated circuit 4049UB. The digital CMOS integrated circuit 4049UB is being used in a rather uncommon way, however the remaining components inside the 4049UB act just as diodes and do not disturb the operation of the AGC.

The IF amplifier module includes two trimmers for small corrections of the amplitude balance (10kohm) and phase offset (250kohm) between the two channels. The correction stage is followed by two active RC lowpass filters using operational amplifiers (MC3403), since the signals are already large enough and the operational-amplifier noise is no longer a problem. Finally there is another, identical dual-amplifier stage with its own AGC.



13 cm Transceiver

The quadrature SSB IF amplifier is built on a single-sided FR4 board with the dimensions of 50mmX120mm as shown on Fig. 43. The corresponding component location is shown on Fig. 44. In order to keep the differences between the I and Q channels small, good quality components should be used in the IF amplifier. Using 5% resistors, 10% foil-type capacitors and conventional BC238B transistors should keep the differences between the two channels small enough for normal operation. Most components are installed vertically to save board space.

The amplitude balance (10k $\Omega$ ) and phase offset (250k $\Omega$ ) trimmers are initially set to their neutral (central) position. These trimmers are only used while testing the complete receiver to obtain the minimum distortion of the reproduced audio signal.

## 9. Quadrature SSB demodulator and AF amplifier

The main function of the quadrature SSB demodulator is the conversion of both I and Q IF signals (frequency range 0 to 1200Hz) back to the original audio frequency range from 200Hz to 2600Hz. The same module includes a power AF amplifier and a clock generator for both the phasor rotation in the transmitter and the phasor counterrotation in the receiver. The circuit diagram of the module is shown on Fig. 45.

The quadrature SSB demodulator includes four operational amplifiers (MC3403) to produce an 8-phase system from the I and Q signals, using a resistor network similar to that used in the modulator. The signal demodulation or phasor counterrotation is performed by the CMOS analog switch 4051, rotating with a frequency of 1365Hz. The I and Q signals are alternatively fed to the output or in other words the circuit performs exactly the opposite operation of the modulator.

Unwanted mixing products of the phasor counterrotation are removed by an active RC lowpass (BC238). The demodulated audio signal is fed to the 100k $\Omega$  volume control. A LM386 is used as the audio power amplifier due to its low current drain and small external component count.

The three clocks required to rotate both 4051 switches in the modulator and in the demodulator

are supplied by a binary counter 4029. The 4029 includes an up/down input that allows the generation/demodulation of USB or LSB in this application. The up/down input has a 100k $\Omega$  pullup resistor for USB operation. LSB is obtained when the up/down input is grounded through a front-panel switch.

USB/LSB switching is usually not required for terrestrial microwave work. USB/LSB switching is only required when operating through satellites or terrestrial linear transponders or when using inverting converters or transverters for other frequency bands. Finally, USB/LSB switching may be useful to attenuate interferences during CW reception. An alternative way of USB/LSB switching is interchanging the I and Q channels. When assembling together the modules of the described transceivers one should therefore check the wiring so that the transmitter and the receiver operate on the same sideband at the same time.

The 4029 counter requires an input clock around 11kHz. This clock does not need to be particularly stable and a RC oscillator could be sufficient. In the described transceivers a crystal source was preferred to avoid any tuning. In addition, if all transceivers use the same rotation or counterrotation frequency, the mutual interferences are reduced.

The crystal oscillator is using a clock crystal operating on a relatively low frequency of 32768Hz. The dual D-flip-flop 4013 divides this frequency by 3 to obtain a 10923Hz clock for the 4029 binary counter. The resulting rotation frequency for the 4051 switches is 1365Hz. The latter figure almost perfectly matches the hole in the frequency spectrum of human voice. The same 4029 counter also supplies the CW tone 683Hz to reduce the unwanted mixing products in the transmitter.

The quadrature SSB demodulator and AF amplifier are built on a single-sided FR4 board with the dimensions of 40mmX120mm as shown on Fig. 46. The corresponding component location is shown on Fig. 47. Most of the components are installed vertically to save board space.

The 32768Hz crystal oscillator will only operate reliably with a 4011UB (or 4001UB) integrated circuit. The commonly available "B" series CMOS integrated circuits (4011B in this case) have a too-high gain for this application. In the latter case

Fig. 33: Quadrature RX Mixer for 1296 MHz

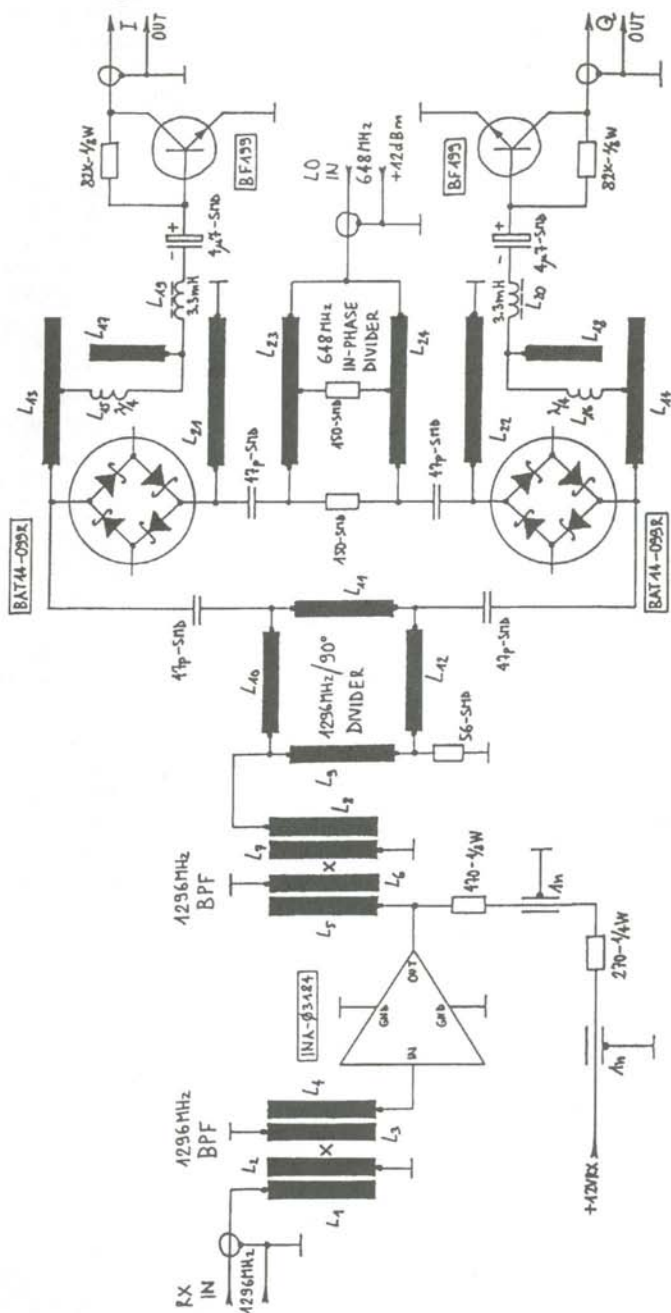
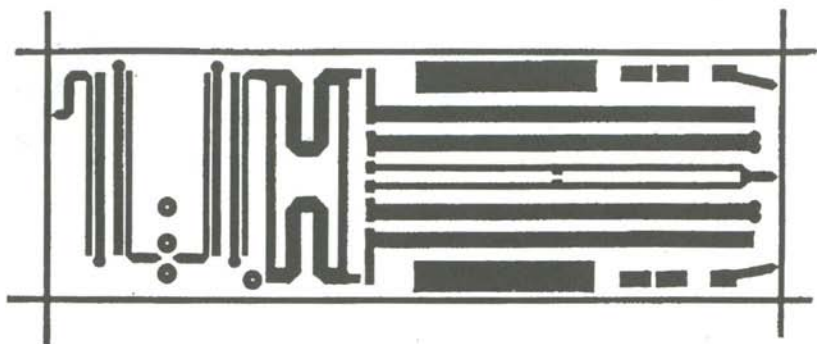


Fig. 34: 1296 MHz RX Mixer PCB



a 560pF capacitor may help to stabilize the oscillator. On the other hand, the oscillator circuit usually works reliably with old 4011 or 4001 circuits with an "A" suffix or no suffix letter at all.

### Deutsche Fassung

## 5. Quadratur Sendemischer

### Gemeinsame Eigenschaften

Alle drei Sendemischer für 23, 13 und 6 cm haben eine ähnliche Struktur: das schaltbare LO-Signal,

ein Null-Grad Leistungsteiler, zwei symmetrische Subharmonischen Mischer, ein 90° Hybrid und ein selektiver HF-Verstärker.

Ein Koppler koppelt etwas von dem LO-Signal, das an den Empfangsmischer geht, aus und wird in einer separaten Zwischenstufe verstärkt. Während Empfang wird einfach die Versorgung dieser Stufe wegeschaltet.

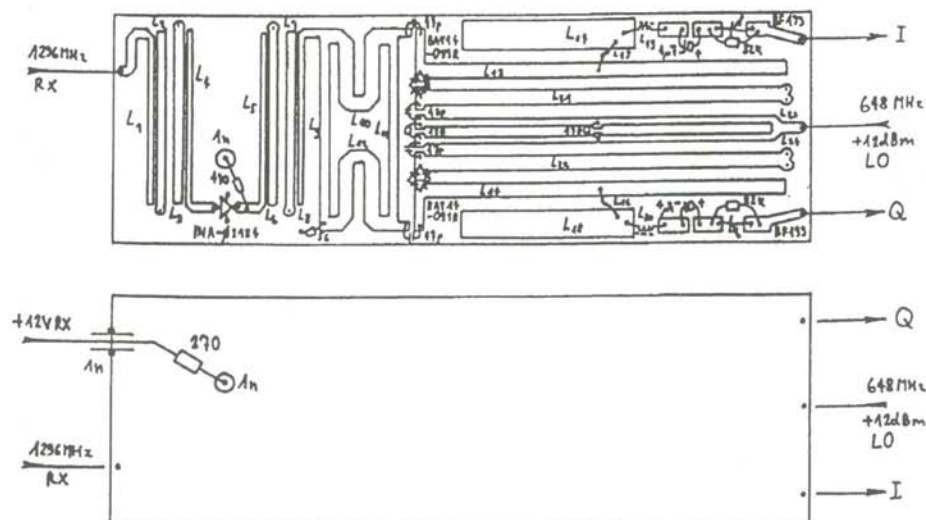


Fig. 35: 1296 MHz RX Mixer Component Location

### Sendemischer für 23cm

Der 23 cm Mischer, der mit einem LO-Signal auf 684MHz betrieben wird, ist in Abb. 15 zu sehen. Das LO-Signal wird von einem -20dB Koppler ausgekoppelt und mit einem BFP183 verstärkt. Über einen Tiefpaß gelangt das Signal an die beiden Subharmonischen Mischer mit der BAT14-099R.

Die zwei 23cm Signale werden in einem 90° Hybrid zusammengeführt. Dann folgt ein 1296MHz Bandfilter, welches unerwünschte Mischprodukte und den 684MHz LO ausfiltert. Ein INA-10386 MMIC hebt den Pegel von -10dBm auf +15dBm an.

Der Sendemischer für 1296MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 120x40mm aufgebaut (Abb. 16). Abb. 17 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich.

### Sendemischer für 13cm

Der Sendemischer für 2304MHz ist in Abb. 18 zu sehen. Das 576MHz LO-Signal wird über einen

20dB Richtkoppler entnommen, von einem BFP183 verstärkt und dann in einem BFP196 auf 1152MHz verdoppelt. Nach Filterung durch ein Bandfilter werden die zwei Sendemischer mit den BAT14-099R Dioden versorgt. Die zwei Ausgangssignale auf 2304MHz werden in einem 90° Hybrid zusammengeführt und von einem Bandfilter von störenden Mischprodukten befreit. Ein INA-10386 MMIC verstärkt das SSB-Signal auf eine Leistung von +10dBm.

Der Sendemischer für 2304MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 120x40mm aufgebaut (Abb. 19). Abb. 20 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich für Ausgangsfrequenzen von 2304 und 2320MHz. Will man auf 2400MHz arbeiten, muß man das LO-Bandfilter (L7, L8) auf 1152MHz am heißen Ende etwas verkürzen.

### Sendemischer für 6cm

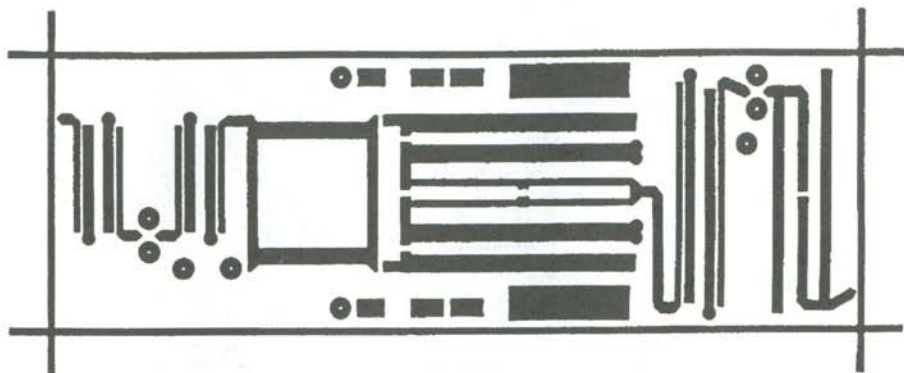
Der Sendemischer für 5760MHz ist in Abb. 21 zu sehen. Das 2880MHz LO-Signal wird über einen 15dB Richtkoppler entnommen und von einem



The Author during his lecture in Weinheim



Fig. 37: 2304 MHz RX Mixer PCB



ATF35376 verstärkt. Nach Filterung durch einen Tiefpaß auf 2880MHz werden die zwei Sendemischer mit den BAT14-099R Dioden versorgt. Die zwei Ausgangssignale auf 5760MHz werden in einem 90° Hybrid zusammengeführt und von einem Bandfilter von störenden Mischprodukten, hauptsächlich dem LO-Signal, befreit. Nach dem Bandfilter steht ein Pegel von ca. -14dBm an. Dieser wird von zwei Verstärkerstufen mit

ATF35376 HEMT's auf einen Pegel von +11dBm verstärkt.

Der Sendemischer für 5760MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 120x30mm aufgebaut (Abb. 22). Abb. 23 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich.

Wenn keine Modulation anliegt, liefern die Sendemischer kein Ausgangssignal. Für Testzwecke

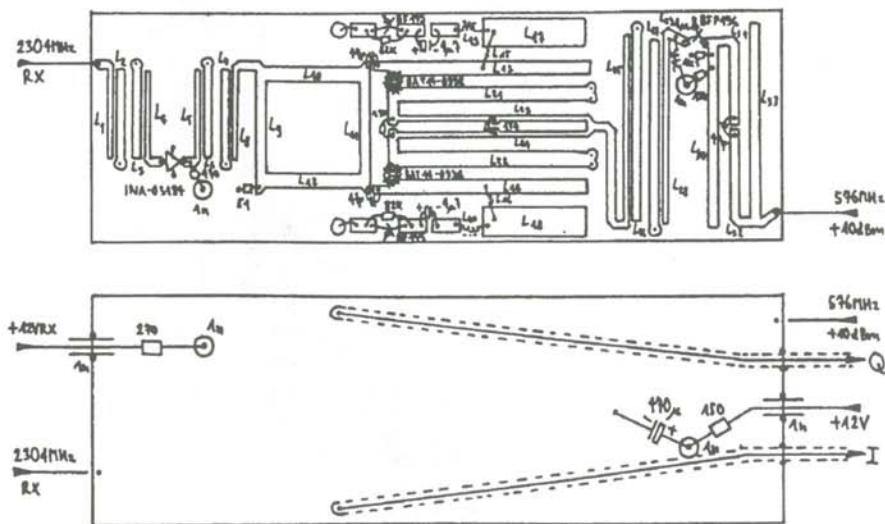


Fig. 38: 2304 MHz RX Mixer Component Location

kann man einen Mischer durch Einspeisung einer Gleichspannung desymmetrieren.

## 6. HF-Teile

### Gemeinsame Eigenschaften

Die HF-Teile für alle Transceiver beinhalten den Leistungsverstärker für den Sender, die rauscharmen Vorverstärker für den Empfänger und die Sende-/Empfangsumschaltung. Unterschiede in den Schaltungen sind durch die eingesetzten Halbleiter (Bipolar/FET) bedingt. Die Sende-/Empfangsumschaltung wird nicht durch teure Koaxialrelais sondern durch preiswerte, kleine und zuverlässige PIN-Dioden-Schalter bewerkstelligt. Diese erreichen gute Werte für Einfügedämpfung und Isolation.

### HF-Teil für 23cm

Die Schaltung des HF-Teils für 1296MHz ist in Abb. 24 zu sehen. Der Sendeverstärker ist mit einem CLY5 Leistungs-GaAs-FET von Siemens ausgerüstet. Die Verstärkung dieser Stufe beträgt 15 dB bei einer Ausgangsleistung von 1W.

Die nötige negative Gatevorspannung wird durch Gleichrichtung der HF an der Gatediode des Transistors erreicht. Wegen des 1µF Speicherkondensators hält die Spannung für einige Sekunden nach einer Modulationsspitze. Um den Kurzschlußstrom während der Modulationspausen zu begrenzen dient der Widerstand in +5VTX Leitung. Diese Methode der Vorspannungserzeugung ist sehr einfach und zuverlässig. Sie wurde ausgiebig im 24 Stunden Betrieb bei ähnlich aufgebauten Packet Radio Transceivern getestet.

Der Sende-/Empfangsumschalter besteht aus einer Seriendiode BAR63-03W und einer Paralleldiode BAR80. Beide Dioden werden während des Sendens durchgeschaltet. L9 ist eine Viertelwellenleitung, die den Kurzschluß der BAR80 in einen Leerlauf für den Sender transformiert. Der Empfangsvorverstärker benutzt einen BFP181 mit ca. 15dB Verstärkung. Diesem folgt ein Bandfilter mit ca. 3dB Verlust. Die Nettoverstärkung von 12dB wurde bewußt niedrig gewählt, damit es keine Störungen durch andere Benutzer (RADAR und Navigationsdienste) des 23cm Bandes gibt.

Das HF-Teil für 1296MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 80x40mm aufgebaut (Abb. 25). Abb. 26

zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich. Da jedoch die Ausgangsimpedanz des INA-101386 nicht 50Ω beträgt, kann es auf dem Kabel zwischen dem HF-Teil und dem Sendemischer zu Reflexionen kommen. Man sollte die Kabellänge mit 125mm wählen (Teflonkabel). Andernfalls könnte ein Nachgleich von L1 notwendig sein.

### HF-Teil für 13cm

Die Schaltung des HF-Teils für 2304MHz ist in Abb. 27 zu sehen. Der Sendeverstärker ist mit einem BPP183 als erste Stufe und einem CLY2 als zweite Stufe bestückt. Der BFP183 ist notwendig, um den kleineren Ausgangspegel des INA-10386 MMIC und die höheren Filterverluste auf 2304MHz auszugleichen. Der BFP183 arbeitet im A-Betrieb, während der CLY2 im gleichen Betrieb wie der CLY5 auf 23cm arbeitet. Da der CLY2 weniger Leistung (ca. 0,5W Ausgangsleistung) liefert, muß der Strombegrenzungswiderstand in der +5VTX-Leitung größer sein. Der PIN-Dioden-Schalter ist genauso wie auf 1296MHz aufgebaut.

Der Empfängereingang besteht aus zwei Vorstufen mit einem ATF35376 HEMT in der ersten und einem BFP181 in der zweiten Stufe. Die Gesamtverstärkung beträgt 23dB. Der ATF wird im 'Zero-Bias' Betrieb genutzt, da sein  $I_{DSS}$  nur ca. 30mA beträgt.

Das HF-Teil für 5760MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 80x40mm aufgebaut (Abb. 28). Abb. 29 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich, da einige dB Reserve in der Verstärkung sowohl für den Sende- als auch für den Empfangszweig vorhanden sind.

### HF-Teil für 6cm

Die Schaltung des HF-Teils für 2304MHz ist in Abb. 30 zu sehen. Der Sendeverstärker ist mit zwei HEMT's ATF35376 im Parallelbetrieb bestückt. Damit kann bei ca. 13dB Verstärkung eine Leistung von 100mW(+20dBm) erreicht werden. Während Empfang werden die HEMT's durch eine positive Spannung durchgeschaltet. Beim Senden laufen sie im Selbstvorspannungsbetrieb ähnlich wie die CLY5 und CLY2.

Der T/R-Schalter benutzt eine einzelne BAR80. Während des Sendens wirkt sie als Kurzschluß. Während des Empfang wirken die beiden

Fig. 39: Quadrature RX Mixer for 5760 MHz

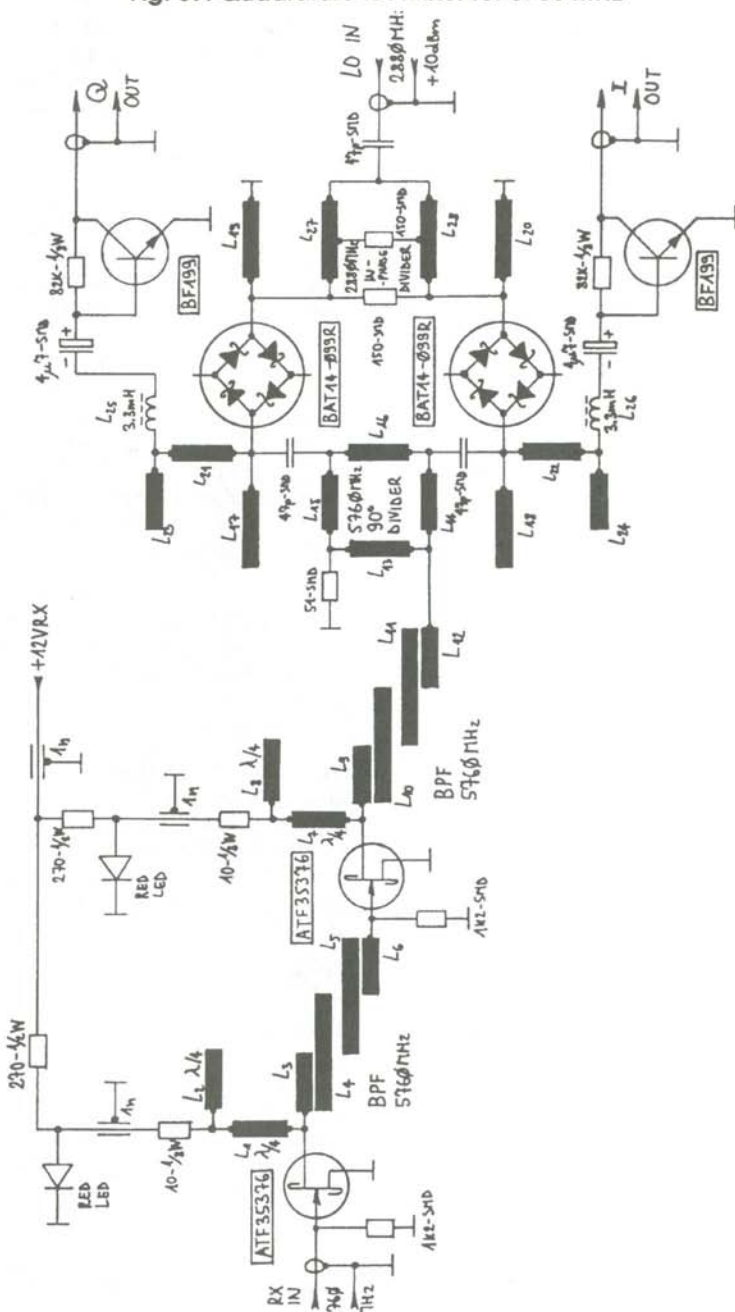
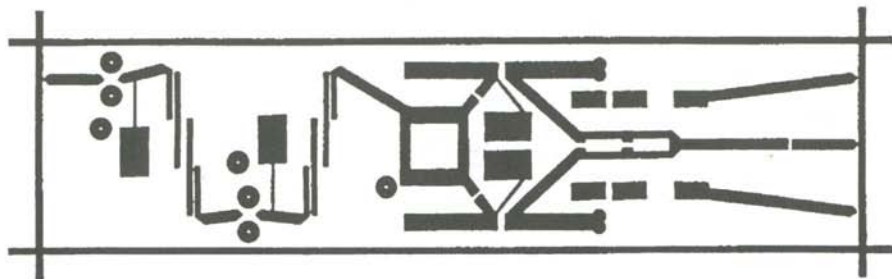


Fig. 40: 5760 MHz RX Mixer PCB



ATF35376 im Sender dank ihrer positiven Gatevorspannung wie Kurzschlüsse. Dieser wird durch L5 und L6 sowie durch die Verbindungsleitung mit ca.  $\frac{3}{4}\lambda$  elektrischer Länge in einen Leerlauf am gemeinsamen Anschluß transformiert.

Da die BAR80 nicht für einen Betrieb oberhalb von 3GHz spezifiziert ist, bewirkt ihre Eigenkapazität Verluste auf 5760MHz. Diese wird durch eine negative Sperrspannung während des Empfangs erniedrigt.

Der Empfängereingang benutzt zwei ATF35376. Die Gesamtverstärkung beträgt ca. 23dB. Dieser Wert schließt bereits die Verluste für die beiden Bandfilter und den PIN-Dioden-Umschalter ein.

Das HF-Teil für 5760MHz ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den

Maßen 80x30mm aufgebaut (Abb. 31). Abb. 32 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich, da einige dB Reserve in der Verstärkung sowohl für den Sende- als auch für den Empfangszweig vorhanden sind. Man kann allerdings die ATF-HEMT's nach dem  $I_{DSS}$  selektieren. Die mit dem höchsten gehen in den Sender, die anderen in den Empfänger.

## 7. Quadratur Empfangsmischer

### Gemeinsame Eigenschaften

Alle drei Module für den Empfangsmischer sind ähnlich: Sie enthalten einen Vorverstärker, einen 90° Hybrid, zwei Mischer, einen Leistungsteiler für den LO und zwei ZF-Vorverstärker. Die HF-

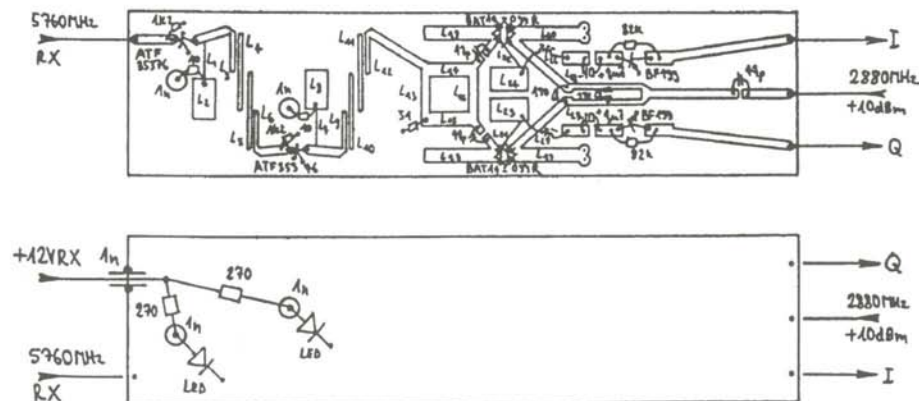


Fig. 41: 5760 MHz RX Mixer Component Location

Fig. 42: Quadrature SSB IF Amplifier

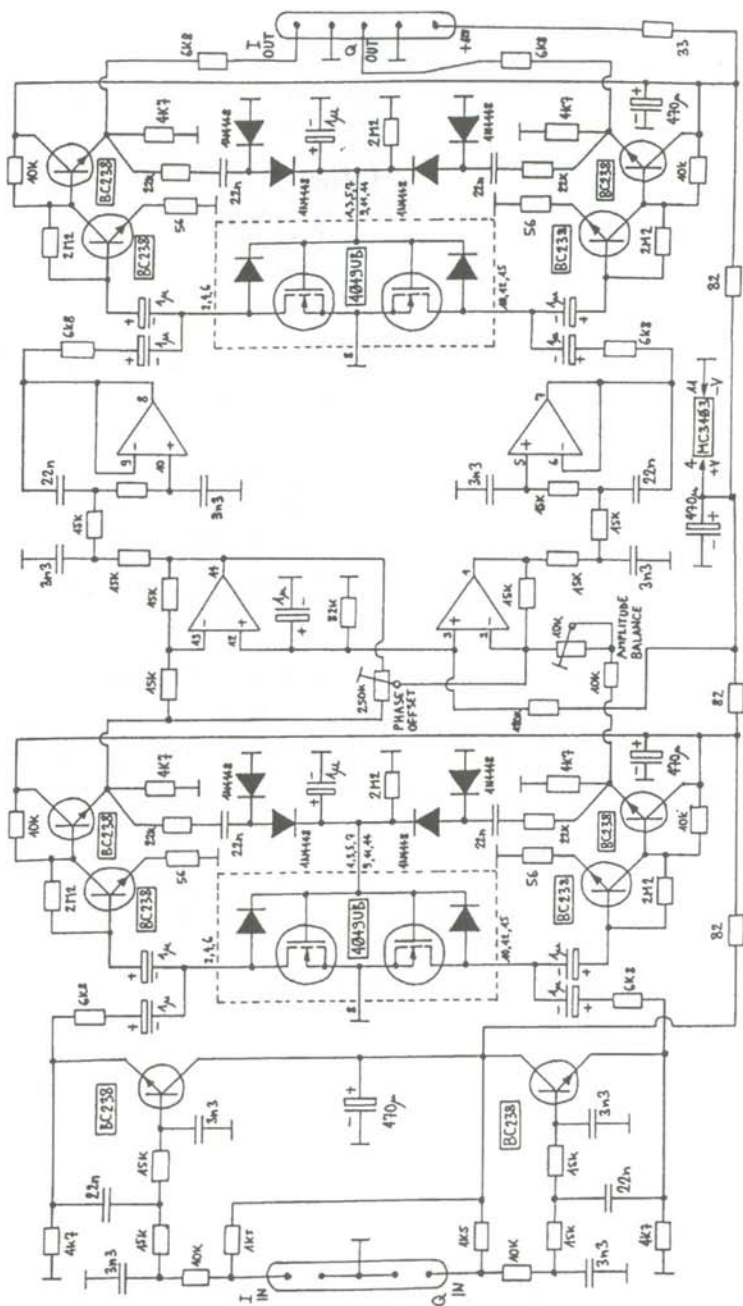




Fig. 45: Quadrature SSB Demodulator and AF Amplifier

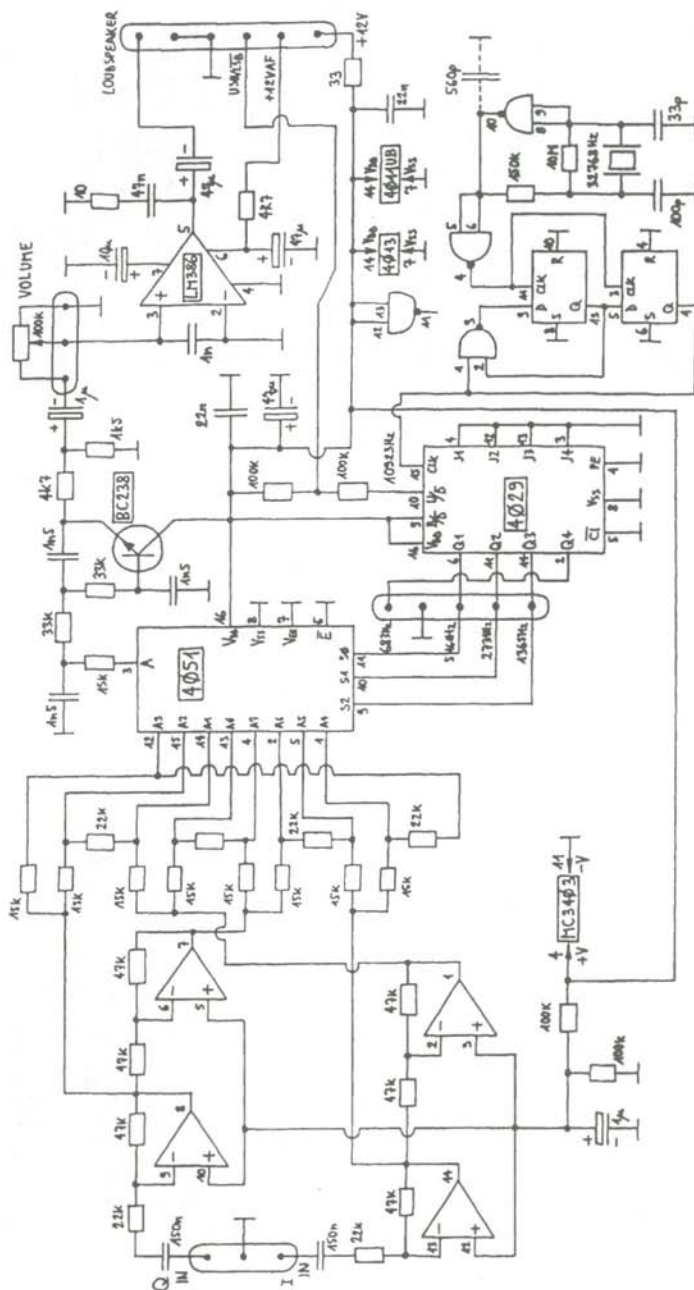
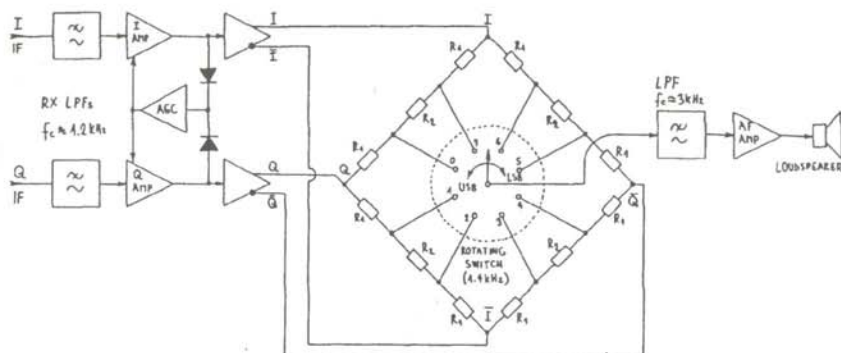


Fig. 45a: RX Demodulator Block Diagram



2320MHz arbeitet. Für 2400MHz ist das LO-Bandfilter mit L26 und L27 entsprechend zu kürzen.

### Empfangsmischer für 6cm

Die Schaltung des Empfangsmischers für 5760MHz ist in Abb. 39 zu sehen. Das HF-Signal wird einem ATF35376 HEMT verstärkt, durchläuft ein Bandfilter, wird einem zweiten ATF35376 HEMT verstärkt und durchläuft ein zweites Bandfilter. Die Gesamtverstärkung ist ca. 20dB.

Der einzige Unterschied ist die Verdopplerstufe mit dem BFP196, die ein 1152MHz Signal erzeugt. Am Eingang ist ein Tiefpaß und am Ausgang ist ein Bandfilter angeordnet.

Der Empfangsmischer ist auf einer doppelt-kaschierten Leiterplatte aus FR-4 Material mit den Maßen 120x40mm aufgebaut (Abb. 40). Abb. 41 zeigt die Anordnung der Bauteile. Die Schaltung benötigt keinen Abgleich.

## 8. SSB 'Zero-IF' ZF-Verstärker

### Gemeinsame Eigenschaften

Die Grundidee des 'Zero-IF' Prinzips ist es, die notwendige Verstärkung vom HF-Teil auf die NF-Stufen zu verlagern. Selektivität wird mit einfachen RC-Filtern erzielt. Daher unterscheidet sich der 'ZF'-Verstärker erheblich von konventionellen ZF-Teilen von Superhet-Schaltungen.

Der 'Zero-IF' Empfänger benötigt zwei identische ZF-Verstärker für den I- und den Q-Kanal. Die

Amplituden- und Phasenverhältnisse müssen möglichst gleich sein. Daher haben beide Kanäle eine gemeinsame AGC-Schaltung.

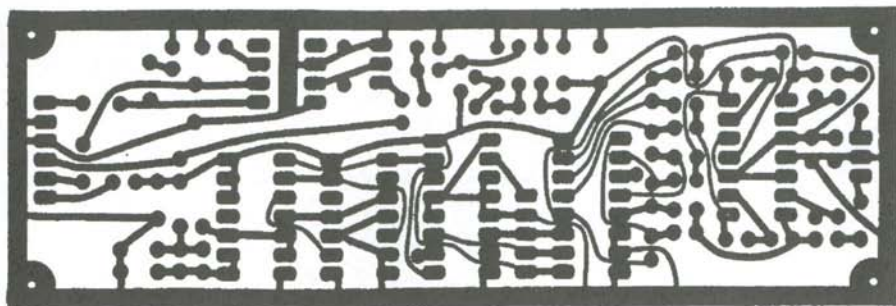
Die Schaltung des ZF-Verstärkers ist in Abb. 42 zu sehen. Nach einem Tiefpaß im Eingang folgt ein geregelter Verstärker. Dann findet ein trimmbarer Ausgleich von Amplitude und Phase statt, gefolgt von einem weiteren Tiefpaß und einem weiteren geregelten Verstärker.

Die Eingangsfilter benutzen bipolare Transistoren BC238 als aktive Elemente an Stelle von Operationsverstärkern, weil Transistoren rauschärmer sind. Die zwei Verstärker benutzen ebenfalls BC238 Transistoren. Die AGC-Schaltung besteht aus MOS-Transistoren, die in einem CMOS-Gatter 4049B angeordnet sind. Dadurch sind beide Kanäle völlig gleichartig. Die MOS-Transistoren werden als variable Widerstände genutzt.

Mit zwei Trimmern kann man die Amplitudenbalance (10kΩ) und die Phasenbalance (250kΩ) einstellen. Das nachfolgende Tiefpaßfilter ist nun mit einem OP-Amp bestückt, da an dieser Stelle das Rauschen keine Rolle mehr spielt.

Der doppelte 'Zero-IF' ZF-Verstärker ist auf einer einseitigen FR4-Platine mit den Abmessungen 120x50mm realisiert (Abb. 43). Der Bestückungsplan ist in Abb. 44 zu sehen. Um den Gleichlauf der beiden Kanäle zu erhalten sollten nur gute Teile mit 5% Toleranz für die Widerstände und 10% Toleranz für die Kondensatoren eingesetzt wer-

Fig. 46: Demodulator PCB



den. Für normale Anwendungen ist dann der Gleichlauf gut genug. Die Trimmer werden auf Mitte gestellt. Sie werden erst beim Endabgleich fein eingestellt.

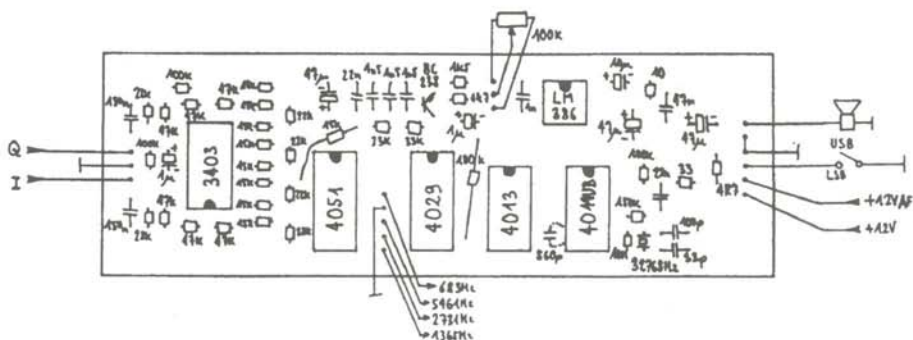
## 9. Quadratur SSB-Demodulator

Der Demodulator konvertiert die beiden I- und Q-Kanäle, die Signale mit Frequenzen von 0...1200Hz enthalten, zurück in den NF-Bereich von 0...2600Hz. Außerdem sind hier der NF-Leistungsverstärker und der Takt-Generator für den Demodulator und den Modulator im Sender angeordnet.

Der Demodulator benutzt ein Widerstandsnetzwerk, das von den I- und Q-Signalen gespeist und mit einem Abtastsignal, das über 8 Zustände läuft

- das entspricht  $45^\circ$  -, abgetastet wird (Abb. 45a). Die Abtastung bewirkt ein Umschalten der CMOS-Schalter zyklisch im oder gegen den Uhrzeigersinn. Vier Operationsverstärker sorgen für gegenphasige Signale und die Auskopplung aus dem Widerstandsnetzwerk. Durch die Widerstandsverhältnisse von  $\sqrt{2}:1$  werden exakt die Sinus oder Cosinus Funktion in  $45^\circ$ -Schritten abgebildet. Mittels der Drehrichtung kann einfach zwischen Phasenvoreilung ( $+90^\circ$ ) oder Phasennacheilung ( $-90^\circ$ ) wählen und damit das Seitenband umschalten.

Der Modulator für den TX und der Demodulator für den RX sind exakt reziprok. Die Abtastung wird auf einer Frequenz von 1365Hz durchgeführt. Das ist die Weaver-Pilotfrequenz. Der Ausgang wird durch einen Tiefpaß von unerwünschten



**Fig. 47: Demodulator Component Location**

Mischprodukten befreit und dann mit einem LM386 Verstärkt.

Für eine 8-fache Abstastung sind drei Takt-Signale erforderlich. Sie werden von einem 4029 Up/Down-Zähler generiert. Der Up/Down-Eingang dient als Seitenband-Umschalter.

Seitenbandumschaltung ist zwar normalerweise auf Mikrowellenbändern nicht erforderlich, kann aber bei Verkehr über Satelliten oder bei Interferenzproblemen nützlich sein. Da eine Seitenbandumschaltung auch bei Vertauschung des I- und Q-Kanals entsteht, sollte man die Verdrahtung sorgfältig prüfen, damit bei Empfang und Senden die gleichen Seitenbänder benutzt werden.

Der 4049 Zähler braucht einen Eingangstakt von ca. 11kHz. Dieser wird von einem 32768Hz Uhrenquarzoszillator mittels Teilung durch 3 erzeugt. dafür dient ein Zweifach D-Flip-Flop 4013. Die exakte Frequenz ist 10922,667Hz. Der 4029 er-

zeugt daraus 1365Hz und 638Hz für den CW-Generator.

Der Quadratur SSB-Demodulator ist auf einer einseitigen FR4-Platine mit den Abmessungen 120x40mm realisiert (Abb. 46). Der Bestückungsplan ist in Abb. 47 zu sehen. Die Komponenten sind vertikal bestückt, um Platz zu sparen.

Der 32768Hz Oszillator funktioniert nur vernünftig mit einem 4011UB Gatter. Die normale 4011B Version hat zuviel Verstärkung für diese Anwendung und führt zu Instabilitäten. Alte Muster 4011 oder 4011A funktionieren auch gut.

## References

[1] Rainer Bertelsmeier, DJ9BV, "Weaver Method of SSB-Generation", DUBUS 3/1997, pp. 27-35

Part III will be published in next issue.

# Set of hard to find microwave semiconductors for the "Zero-If Transceiver" by Matjaz Vidmar

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# 90W Transistor-PA für 1,3GHz

(A 90W Transistor PA for 1.3GHz)

Dieter Briggmann, DC6GC

**Kurzbeschreibung:** Ein Linearverstärker mit dem ERICSSON PTB-20174 Gegentakt-Transistor liefert auf 1,3GHz einen Ausgangsleistung von 90W bei einer Steuerleistung von 13W und einem Wirkungsgrad von 57%.

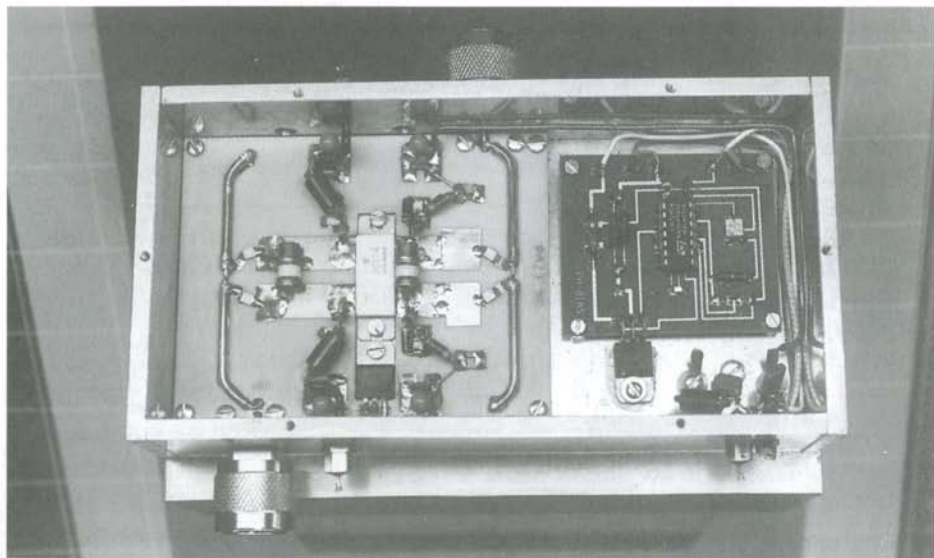
**Abstract:** A linear power amplifier with the ERICSSON PTB-20174 Push-Pull transistor delivers about 90W output with 13W drive power and about 57% efficiency on 1.3GHz.

## 1. Einführung

In der DUBUS 4/96 stellte Konrad Hupfer, DJ1EE eine Transistor-PA für 23cm mit Transistoren von

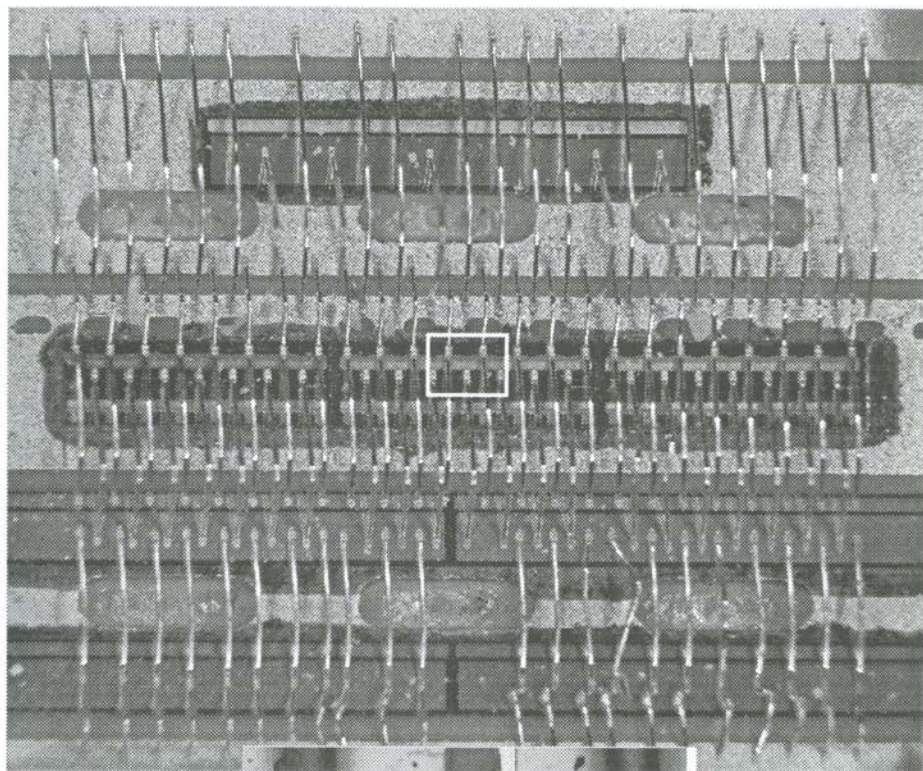
Motorola und MA/COM vor und beschrieb die Wirkungsweise der Gegentaktschaltung. Mittlerweile sind ähnliche Transistoren von Ericsson auf dem Markt, die gegenüber den genannten den Vorteil haben, daß sie „billiger“ sind und einen besseren Wirkungsgrad zulassen. Billig ist vielleicht etwas zuviel gesagt, denn billig sind die Transistoren nicht:

Ein Exemplar PTB 20174 kostet ca. 530 DM und es tut weh, wenn sich ein Transistor unter den Händen des bastelnden OM verabschiedet.



90 W PA for 23 cm

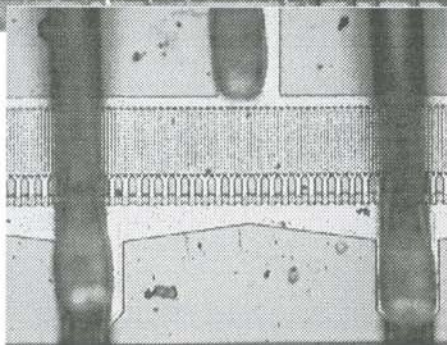
Fig. 1: Inside the PTB 20174



Man bekommt allerdings auch viel(e) Halbleiter für sein Geld, wie die Aufnahme des Innenlebens des Ericsson-Transistors in Bild 1 zeigt.

Die Endstufe wurde auf einem Platinenmaterial mit  $\epsilon_r=3,38$  und  $h=0,81\text{mm}$  realisiert.

Wie der Tabelle 1 zu entnehmen ist, konnte eine Ausgangsleistung von ca. 90W mit einem Wirkungsgrad von  $\eta=57\%$  bei einer Steuerleistung von 13,8W erreicht werden. Diese Steuerleistung lieferte ein Yaesu FT-736R.

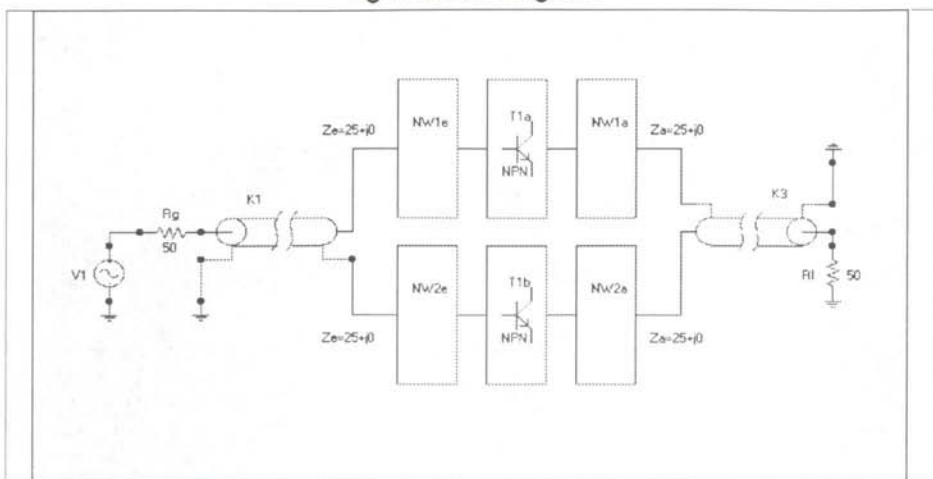


## 1. Introduction

In DUBUS 4/96 (/1/) Konrad Hupfer, DJ1EE, introduced a PA for 1.3GHz based on Push-Pull transistors from MA/COM and MOTOROLA. These transistors are either very expensive or not available. In the meantime a similar transistor from

ERICSSON, the PTB-20174 is available and moderate in pricing. Moderate in this case means that the transistors costs about DM 530,- (US\$ 300.00). This price, which may be not ham-like may give some headache, if this transistor is killed during operation or initial tuning.

Fig. 2: Block Diagram



But as shown in Fig. 1, you will get a lot of transistors for the money.

Table 1 shows, that the manufactureres data on 1490MHz can be verified on 1270MHz too. Output power is in excess of 90W with quite good linearity and an excellent efficiency of 57% when driven with a drive power of about 14W. This value is considerable better than with those obsolete modules (<30%) and even better than what can be achieved with those obsolete tubes like the 2C39.

## 2. Schaltung

Die Schaltung der Gegentakt-Endstufe basiert auf der bereits erwähnten PA von DJ1EE /1/.

Die Transformationsnetzwerke (NW1e, NW2e und NW1a, NW2a) sind für den Transistor PTB20174 und das Substrat (Rogers 4003,  $\epsilon_r = 3,38$ ) neu berechnet worden und passen die Ein-

und Ausgangsimpedanzen ZIN bzw. ZOUT der beiden Transistoren an einen Quell- bzw. Lastwiderstand von jeweils 25  $\Omega$  an.

Bild 2 zeigt das Prinzip der Endstufe. Ein kurzes ( $< 1/4 \lambda$ ) Stück Koaxleitung K1 dient der Symmetrierung und der Erzeugung der gegenphasigen Schwingungen (s. Bild 3), mit denen die beiden Transistoren T1a und T1b angesteuert werden. Bild 3 zeigt die Symmetrierschaltung mit kurzer Koaxleitung. Die Spannung am Eingang der Leitung K1 (3. Zeile von oben) erscheint gegenphasig und jeweils mit halber Amplitude an den Widerständen RL1 (1. Zeile von oben) und RL2 (zweite Zeile von oben). Analog werden die Ausgangsschwingungen nach Durchlaufen der Anpaßnetzwerke über ein kurzes Stück Koaxleitung mit  $Z_0=50\Omega$  zusammengefaßt. Die Funktionsweise

Table 1: Features of PTB-20174

| Data                    | Power Gain (dB) | Output Power (W) | Efficiency (%) | Bias Current (mA) |
|-------------------------|-----------------|------------------|----------------|-------------------|
| Manufacturer @ 1490 MHz | 8.3(typ.)       | > 90             | 56             | 250               |
| Measurements @ 1270 MHz | 8.1             | > 90             | 57             | 300               |

Fig. 3: Balun Circuit with short coaxial line

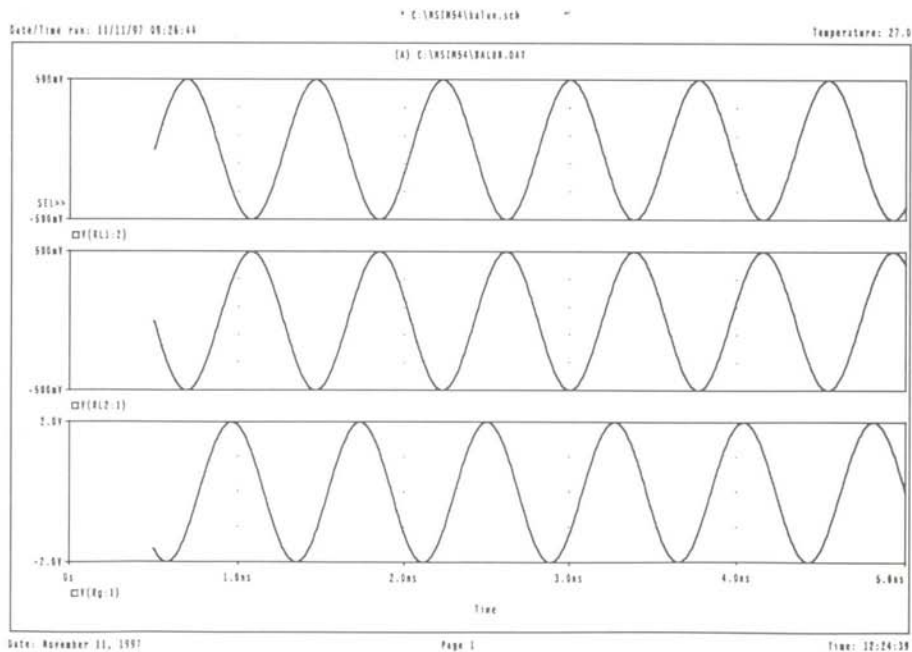
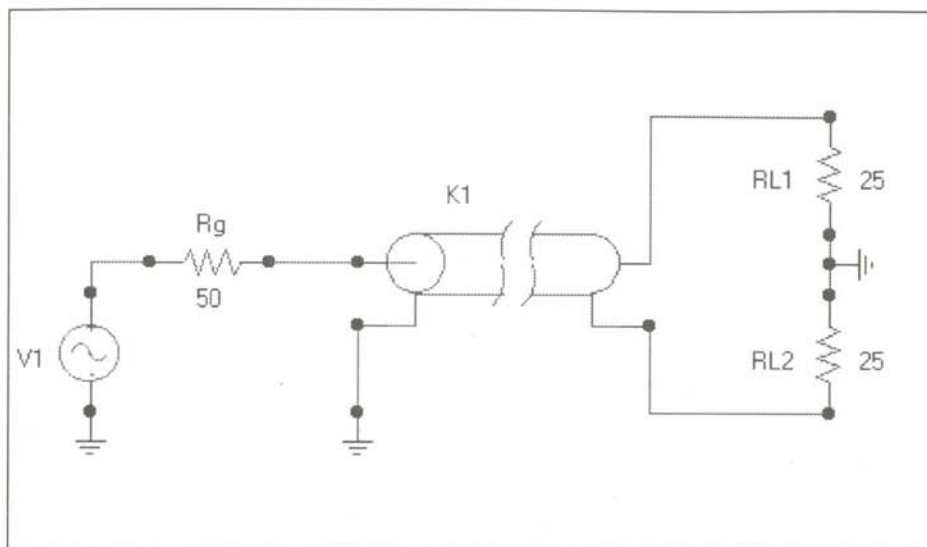
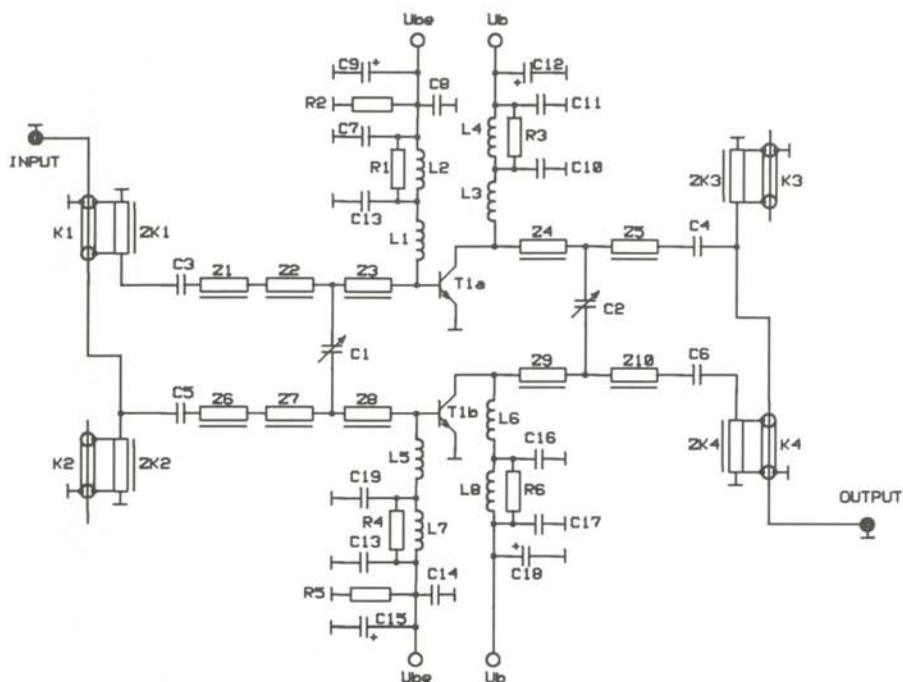


Fig. (3a): Balun Function

Fig. 4: Circuit Diagram

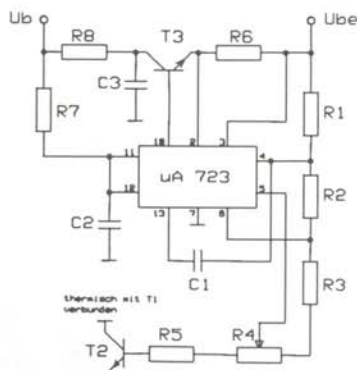


dieser Symmetrierschaltung kann in 3/ nachgelesen werden.

Die detaillierte Schaltung der PA ist in Bild 4 wiedergegeben. Gegenüber dem Prinzip des Bildes 2 fällt auf, daß zur Symmetrierung zwei Coax-

leitungen eingesetzt werden. Der Grund hierfür ist, daß der am Eingang mit Masse verbundene Außenleiter der Symmetrierleitung K1 zur mechanischen Fixierung auf einen Streifenleiter ZK1 aufgelötet wird. Dieser Streifenleiter mit aufgelö-

Fig. 5: Bias Circuit



Parts for Bias-Board

| Des.     | Part                 |
|----------|----------------------|
| T2, 3    | Transistor BD243     |
| R1, 4, 7 | Resistor, 1k         |
| R2       | Resistor, 18k        |
| R3       | Resistor, 8k2        |
| R5       | Resistor, 150Ω       |
| R6       | Resistor, 2Ω/0.5W    |
| R8       | Resistor, 47Ω/5W     |
| C1       | Capacitor, 1nF/100V  |
| C2, 3    | Capacitor, 100nF/50V |

tetem Koaxleiter würde nur einen Eingang des Verstärkers, nämlich T1a belasten. Zur Wiederherstellung der Symmetrie wird an den zweiten Eingang, der mit dem Innenleiter von K1 verbunden ist, zusätzlich der Außenleiter einer zweiten Koaxleitung K2 angeschlossen. Damit die vier Koaxleitungen K1- K4 die Anpaßschaltungen NW1, NW2 nicht verstimmen, werden sie auf am Ende kurzgeschlossene Streifenleitungen ZK1 - ZK4 der Länge  $l/4\lambda$  ( $l=23$  cm) aufgelötet. Diese Leitungen haben die Eigenschaft, einen Kurzschluß am Ende in einen Leerlauf an den Anfang (sehr große Eingangsimpedanz) zu transformieren.

Wählt man für die Streifenleitungen einen Wellenwiderstand von  $Z_0 = 38\Omega$ , so ergibt sich für das verwendete Platinenmaterial mit  $\epsilon_r^{eff}(Z_0) = 2,8$  eine Länge von  $l = 35,3$  mm. Damit ist auch die Länge  $l = 35,3$  mm für die  $50\Omega$ -Koax-Symmetrierleitungen festgelegt.

Fig. 6: PCBs for PA and Bias Circuit

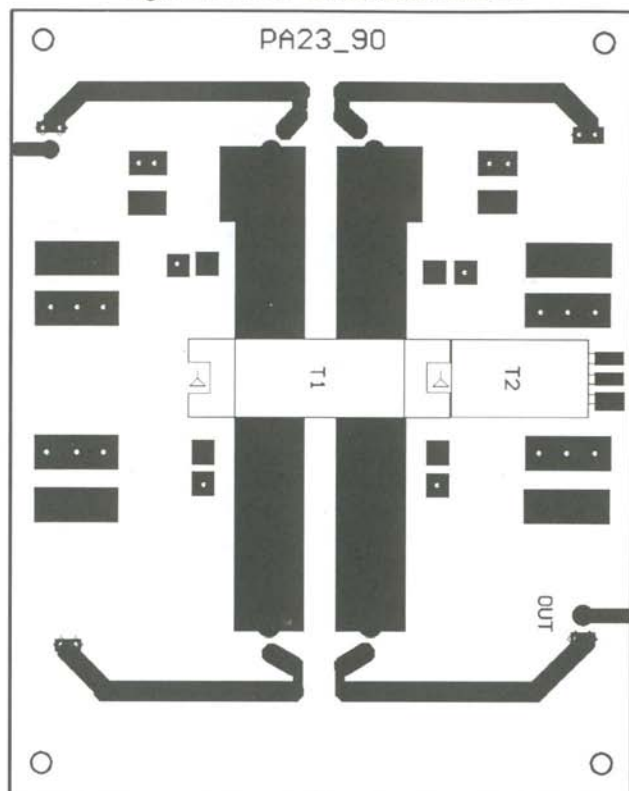


Bild 6 zeigt die Platine für die Endstufe und die Platine für die Vorstromerzeugung (bias). Der Temperaturfühler ( Transistor T2 ) liegt mit seinem Kollektor thermisch und elektrisch direkt auf "Masse", daher wird hier der PN-Übergang Kollektor-Basis genutzt. Der Transistor BD 243 muß isoliert auf dem Gehäuseboden ( Glimmerscheibe ) montiert werden. Die Vorspannungsschaltung wird mit einer Spannung von 12...14V betrieben und erlaubt darüber auch die Umschaltung zwischen Senden und Empfang.

## 2. Circuit Description

Basically the circuit of this PA stems from Konrad Hupfer, DJ1EE. The transformation networks (NW1e, NW2e and NW1a, NW2a) have been recalculated to accommodate the transistor PTB 20174 and the substrate Rogers 4003 with an

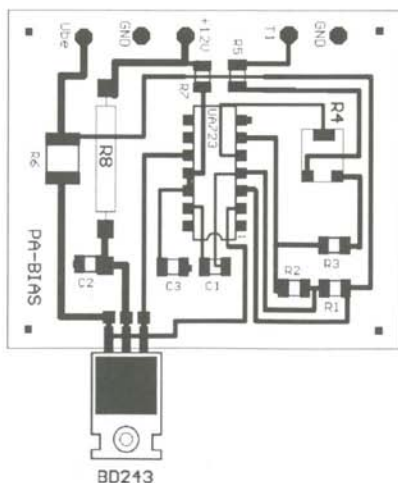


Fig. 7: Output Power  $P_o$  and Current  $I_c$  vs. Drive Power

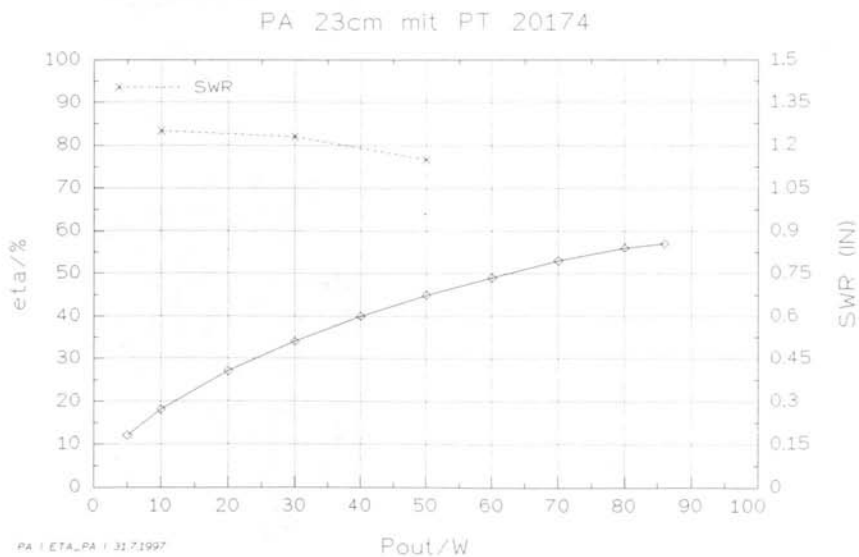
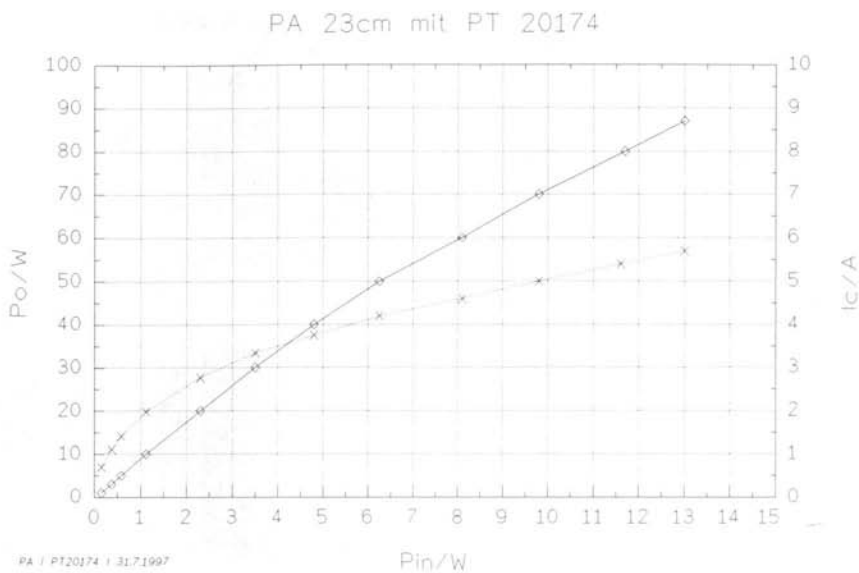


Fig. 8: Efficiency and Input-VSWR vs. Output Power

$\epsilon_r=3.38$ . The block diagram can be seen from Fig. 2. Short pieces of semirigid function as baluns to drive the transistor in push-pull and combine the output. Fig. 3 and 3a show the function of these baluns. Voltage V1 is divided by half and fed in antiphase to RL1 and RL2.

The circuit diagram of the PA is shown in Fig. 4. The baluns are soldered to quarterwave microstriplines ZK1 and ZK2. To preserve symmetry additional lines ZK2 and ZK3 together with additional coaxial lines K2 and K3 have to be introduced. This scheme provides a fully balanced configuration which works even if the load impedances of the transistor are not the same. The quarterwave microstriplines have a length of 35.3 mm and hence the coaxial lines.

The bias circuit is shown in Fig. 6. A temperature sensor with T2 senses the temperature of the PTB-20174 and serves as a reference voltage for the bias regulator with the 723. This circuit provides a temperature compensated and low impedance source for the base current. You should operate the bias circuit with 12..14V. The voltage can be used as a T/R-switching.

### 3. Konstruktion

Dimensionierung und Abmessung der Bauelemente sind aus Bild 6 und Tabelle 2 ersichtlich. Die Endstufe wird mit einer Betriebsspannung von  $U_b = 26$  V betrieben, mit dem Potentiometer R4 ein Kollektorruehstrom von ca. 300 mA (ohne Steuerleistung) eingestellt. Der Trimmkondensator C1 wird direkt neben das Gehäuse des Transistors T1 auf die beiden Streifenleiter gelötet. Die Schraube ist ca. 1 mm hineinzudrehen. Trimmkondensator C2 hat einen Abstand von 18 mm von der Kollektorseite, die Schraube schließt mit dem Körper ab (kleine Kapazität).

Die Symmetrierleitungen sind aus Semirigid-Koaxleitung mit Teflon-Dielektrikum und  $d = 2,2$  mm gefertigt. Vorsicht beim Knicken.

Der Eingangstrimmer wird auf minimale Reflexion und der Ausgangstrimmer auf optimalen Wirkungsgrad abgestimmt. Abgleich und Inbetriebnahme der PA sind ausführlich in Heft 4/96 beschrieben.

Verwenden Sie nur Netzteile mit Strombegrenzung, geben Sie niemals ohne Betriebsspannungen HF-Steuerleistung auf die Endstufe, prüfen Sie mit einem Oszilloskop (an den Kollektoren des Transistors T1), ob die Endstufe im Kurzwellen-

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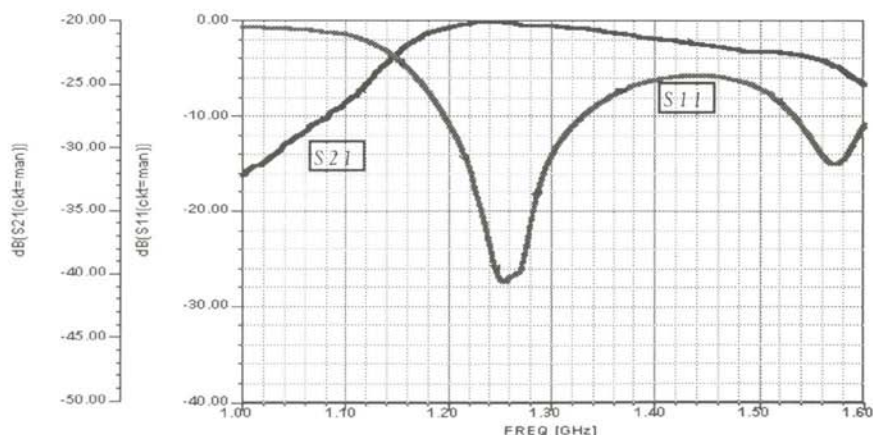


Fig. 9: Measurement of S21 and S11 for small power (<1mW)

Table 2: Parts List for PA (Fig. 4)

| Bez./Des.          | Art/Sort       | Wert/Value                                    | Hersteller<br>/ Manuf. | Bauform<br>/ Size |
|--------------------|----------------|-----------------------------------------------|------------------------|-------------------|
| R1, 4              | Resistor       | 10 $\Omega$ / 0.25W                           |                        |                   |
| R2, 5              | Resistor       | 18 $\Omega$ /0.25W                            |                        |                   |
| R3, 6              | Resistor       | 12 $\Omega$                                   |                        |                   |
| C1, 2              | Cap            | 11pF/60-0715-10011                            | Tronser/Jo<br>hanson   |                   |
| C3, 5              | Cap            | 18 pF                                         | ATC                    | 100B              |
| C4, 6              | Cap            | 22 pF                                         | ATC                    | 100B              |
| C7, 13             | Cap            | 1.5nF                                         | Ker                    |                   |
| C8, 14, 11,<br>17  | Cap            | 0.1 $\mu$ F, MKL                              |                        |                   |
| C10, 16,<br>13, 19 | Cap            | 33 pF                                         | ATC                    | 100B              |
| C9, 12, 15,<br>18  | Cap            | 10 $\mu$ F/35V Elco                           |                        |                   |
| L1, 5              | Inductor       | 3 t., 0.6mm CuEI, D=4 mm                      | HB                     |                   |
| L2, 7              | Inductor       | 12 t., 0.6mm CuEI on R1,4                     | HB                     |                   |
| L3, 6              | Inductor       | 2 t., 0.6mm CuEI, D=4 mm                      | HB                     |                   |
| L4, 8              | Choke          | VK200                                         | VALVO                  |                   |
| K1, 2, 3, 4        | Semirigid      | UT086 (D=2.2 mm), Z=50 $\Omega$ ,<br>L=35.3mm |                        |                   |
| Z1, 6              | Microstripline | Z=13 $\Omega$ , L=9.6 mm                      | PCB                    |                   |
| Z2, 7              | Microstripline | Z=15 $\Omega$ , L=13.4 mm                     | PCB                    |                   |
| Z3, 8              | Microstripline | Z=15 $\Omega$ , L=4 mm                        | PCB                    |                   |
| Z4, 9              | Microstripline | Z=15 $\Omega$ , L=18 mm                       | PCB                    |                   |
| Z5, 10             | Microstripline | Z=15 $\Omega$ , L=8.2 mm                      | PCB                    |                   |
| T1                 | RF-Transistor  | PTB20174                                      | ERICSSON               |                   |
| T2, 3              | Transistor     | BD243 or BD201                                |                        | TO-202            |
| PA90               | PCB            | Rogers 4003, 0.81mm,<br>0,035mm Cu            | DC3XY                  |                   |

bereich "wild " schwingt. Die Endstufe darf bei Steuerleistungen von 0...15W keinerlei Schwingneigung zeigen.

Der Transistor T1 braucht einen "großen" Kühlkörper mit einem Wärmewiderstand von höchstens 0,5°K/W und muß mit diesem unter Vermeidung von Wärmewiderständen verbunden werden. Der Transistor selbst hat einen Wärmewiderstand von 0,6°K/W. Beim Muster liegt ein plan geschlif-

fener Kupferblock von 6mm Höhe zwischen Transistor und Aluminium-Kühlkörper (Abb. 10). Dieser Kupferblock dient zum Verteilen der Wärme, die relativ konzentriert auftritt und ist 'lebenswichtig' für den Transistor. Rechnet man für die Montage 0,1°K/W ergibt sich eine gesamt Wärmewiderstand von 1,2°K/W. Bei 90 W Ausgangsleistung und 50% Wirkungsgrad bedeutet das eine Temperaturerhöhung des Transistorkristalls von

$90 \cdot 1,2 = 108^\circ\text{C}$  gegenüber der Umgebung. Der Kühlkörper hätte dann bei  $T_U = 25^\circ\text{C}$  eine Temperatur von  $79^\circ\text{C}$  und der Transistorkristall von  $133^\circ\text{C}$ . Ein Lüfter für Dauerbetrieb ist in jedem Fall empfehlenswert. Empfehlenswert ist der SK418 Kühlkörper von Fischer mit einer Länge von 200mm. Er hat einen Wärmewiderstand von  $0,3^\circ\text{K/W}$ .

Für T1 und T2 ist ein geeigneter Ausschnitt in die Platine zu sägen. Die geöffneten Augen werden mit Nieten zur Masse-Ebene durchkontaktiert, wie auch PIN 7 des uA 723.

### 3. Construction

The photograph, Fig. 6 and table 2 show the components layout. Variable trimmer C1 is soldered directly to the bases. C2 has a distance of about 18 mm to the collector. C1 is tuned to 1mm inside, C2 is on minimum.

Be careful with the semirigid lines. For initial operation connect a **current-limited** power supply with an output voltage of 26V. Adjust for a bias current of 300mA. Adjust C1 for maximum return loss and C2 for maximum output with moderate drive power of about 5W. Check with an oscillo-

scope (at the collector circuit), that there is no oscillation on HF (3...50MHz).

A well designed heat sink has to be used for this PA. With full output a thermal power of about 80W has to be sinked. The heat sink should have a thermal resistance of less than  $0,5^\circ\text{K/W}$ . For example a Fischer type SK418 with a length of 200mm provides a thermal resistance of  $0,3^\circ\text{K/W}$ . For effective heat distribution a heat spreader made from 6mm thick piece of copper is flanged to the transistor.

A blower may be worthwhile. The temperature of the heatsink can reach a temperature of nearly  $80^\circ\text{C}$  with full output and 100% duty cycle.

### 4. Meßergebnisse

Alle Meßergebnisse sind für eine Frequenz von  $f = 1270\text{ MHz}$  (uplink AMSAT Phase III) gültig. Soll die Endstufe bei 1300 MHz betrieben werden, ist ein geringes Nachstimmen mit C1 notwendig.

Bild 7 gibt Auskunft über die Ausgangsleistung  $P_o$  in Abhängigkeit von der Steuerleistung  $P_{in}$  und den zugehörigen Kollektorstrom  $I_C$ . Bei einer Eingangsleistung von 13W steht eine Ausgangsleistung von 90W bei einem Kollektorstrom von ca. 6A zur Verfügung.

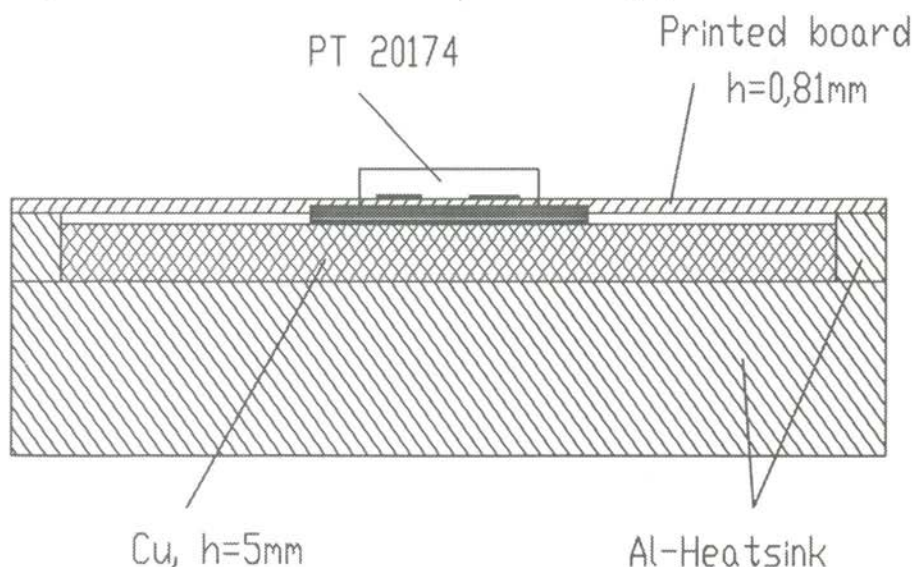


Fig. 10: Mounting Details of Heatspreader

Nach Bild 8 ergibt sich hieraus ein Wirkungsgrad von 57%, das entspricht einem Kollektorwirkungsgrad von etwa 49%. Das Eingangs-SWR konnte im Leistungsbereich von 10W bis 50W ermittelt werden, bei 50W Ausgangsleistung gilt  $VSWR = 1,15$ , das entspricht einem Reflexionsfaktor von -23dB und ist in guter Übereinstimmung mit dem Reflexionsfaktor, der bei Kleinsignalaussteuerung zu  $S_{11} = -26dB$  bestimmt wurde (Bild 9). Für den Kleinsignalverstärkungsfaktor ist ein Wert von 9,5dB ablesbar, der gemäß Bild 7 auch für Ausgangsleistungen bis ca. 2W stimmt.

Bild 9 zeigt den Übertragungsfaktor  $S_{21}$  und Eingangsreflexionsfaktor  $S_{11}$  der PA bei Kleinsignalbetrieb (1mW).

Für die Übertragungsmessung wurde ein 30dB - Dämpfungsglied an den Ausgang geschaltet. Den Absolutwert  $S_{21}$  erhält man durch Addition von 30dB zum Betrag der Y-Achse dB(  $S_{21}$  ).

## 4. Measurement Results

The PA has been measured at 1270MHz (Phase III uplink frequency on 23cm). Operation on 1300MHz requires only minor retuning of C1.

Fig. 7 shows the dependency of output power  $P_o$  and collector current  $I_C$  and drive power  $P_{in}$ . At a drive level of 13.8W an output power of 90W at a collector current of 6A can be achieved.

Fig. 8 shows an efficiency of 57% at this power level.

The input VSWR is less than 1.15. Fig. 9 shows the return loss and gain at small power.

## 5. Danksagung/Acknowledgements

Ich bedanke mich bei Herrn Friedrich von der Firma Richardson Electronics GmbH, Puchheim, für die freundliche Unterstützung bezüglich der aktiven Hardwarekomponenten.

I have to thank Mr. Friedrich from the German branch of Richardson Electronics, who did kindly help with the delivery of the ERICSSON components.

## 6. Teile/Parts

Die Leiterplatten sind bei Rainer Jäger, DC3XY, Breslauer Str. 4, D-25479 Ellerau, Tel.: 04106-73430, Fax.: 04106-761288 zu beziehen.

PCB's you can get from DC3XY, address as above.

## 7. Literatur/References

/1/ Konrad Hupfer, DJ1EE, "100W Transistor Linear on 1.3GHz", DUBUS 4/96, pp. 5...12

/2/ ERICSSON, "Datasheet PTB-20174", DUBUS 1/97, pp. 40...42

/3/ Zinke, Brunswig, "Lehrbuch der Hochfrequenztechnik", Springer Verlag 1986, 3. Auflage, Band I, S. 177ff

# Feeding a 12 inch SHF Dish on 10 GHz

Zack Lau, W1VT

## Description

For a 0.6 f/D dish, a popular choice is the W2IMU feed. It offers good illumination efficiency, low sidelobes, and a relatively small blockage. My design uses is made out of 3/4 and 1 1/2 inch water pipe joined by a conical adapter bent out of a piece of 50 mil copper sheet (bending this was a challenge). After bending, the adapter was filed and sanded to mate with the tubing sections. The 0.911 inch length of 3/4 inch tubing (0.808 ideal) has a 265 mil probe (50 mil diameter, long center conductor of SMA connector) 398 mils from the back wall. Interestingly enough, cutting a circle in half generates the required 30 degree taper for the conical section. The length of the 1.48 inch ID section is 1.548 inches. I measured a return loss of 21 dB.

Source of the 12 inch 0.6 f/D dishes:  
<http://www.shfmicro.com/> SHF Microwave Parts Company Alan, WA9GKA prutz@shfmicro.com  
7102 W. 500 S. La Porte, IN 46530

## Beschreibung

Um einen Parabolspiegel mit einem F/D von 0,6 auszuleuchten, eignet sich das W2IMU Horn sehr gut. Es hat einen guten Wirkungsgrad, niedrige Nebenzipfel und eine kleine Fläche.

Mein Design besteht aus zwei Kupferrohren mit 0,75" und 1,5" mm Durchmesser, die durch einen konischen Adapter, der aus 1 mm dickem Kupferblech gebogen wird, verbunden ist. Das 0,75" Rohr (20,4 mm Innendurchmesser) ist 23,1 mm lang. Die Viertelwellen-Sonde besteht aus dem 1,27mm dickem Innenleiter einer SMA-Buchse und ist 6,75 mm lang. Der Kurzschluß auf der Rückseite befindet sich 10,1 mm dahinter.

Für den konischen Teil aus Blech braucht man nur einen Halbkreis ausschneiden, wie es in Abb. 1 gezeigt wird. Das 1,5" Rohr (37,6mm Innendurchmesser) hat eine Länge von 39,3 mm.

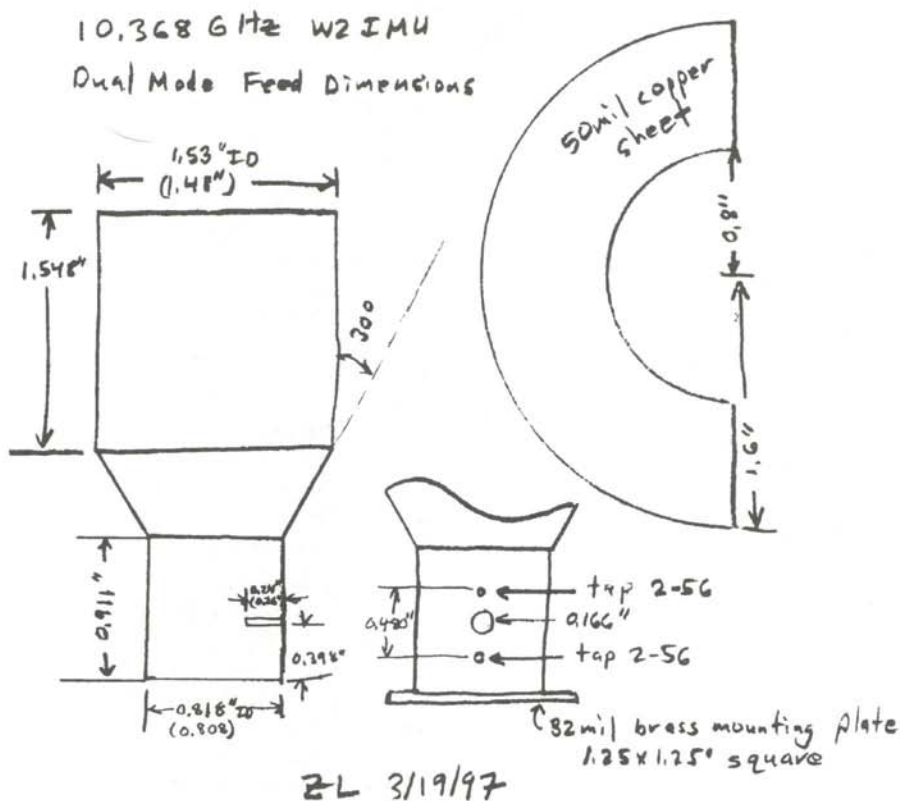
Die Rückflußdämpfung des Horns wurde mit 21 dB gemessen.

## References

- [1] Dick Turrin, W2IMU, "Parabolic Reflector Antennas and Feeds," The ARRL UHF/Microwave Experimenter's Manual, ARRL, 1990. Page 9-31 has the dimensions I used.
- [2] Dick Turrin, W2IMU, "A Simple Dual-Mode (IMU) Feed Antenna for 10368 MHz,"
- [3] Proceedings of Microwave Update '91, ARRL, 1991, p. 309. Also included in the Proceeding VII International EME Conference Washington DC August 15, 16, 17, 18, 1996. Get them from Willie Mank 7620 Bensville Rd., Waldorf, MD 20603. \$US 12.00 +shipping (\$3.00 in the US)

Dick's design using standard pipe fittings that I couldn't find at the local hardware stores.

Fig. 1: Mechanical Data



# Microwave Europe

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Dear readers: because of timepress it will be a big help for me, if you have possibility to send your big reports on a disk in ASCII (dos) tekst or send it on E-mail to [dmteknik@post4.tele.dk](mailto:dmteknik@post4.tele.dk), you can still use my Fax also on ++45 98467877 and send is by letter.

## 1296 MHz

**DL0UL/p JN48UO** wkd: 07./08.06.97 PA6V/P JO23 584km, IK4DCX JN64 554km, F6KBF/P JN18 531km, HA5SHF/P JN97 703km, G3XDY JO02 715km, 04./05.10.97 G4LIP/P JO01 660km, OL7Q/P JN99 627km, 9A5Y JN8500 658km, G6SPS/P JO01 733km, G4DSF/P JO01 703km, G3XDY JO02 715km, G0KPW JO02 720km, 9A2SB JN95 751km, G4DDK JO02 708km, G4ZTR JO01 729km, G3LQR JO02 714km, G8VOI/P IO90 809km, G3OHM/P IO92 880km, G3CKR/P IO93 960km, G4KIY IO92 821km, G8NWM IO92 849km, G6DER IO93 954km. Rig: 2m Dish, 120W. Tks fer info Ingo. **F5HRY JN18EQ** wkd: 4.10.97 OK1KRQ/p JN69, DL6NAQ/p JO40, DK2XZF/p JO40, DL0GTH JO50, OK1OKL JO60, OK2KKW JO60, 5.10.97 OE5VLR/5 JN78, DL8DBN/p JO41, HB9AHD JN47, OK1KYY JN69. Rig: 150W, 4x23 elem. F9FT. Tks fer info Herve.

**PA0BAT JO31FX** wkd: 5.8.97 GM4ODA/p IO89. Tks fer info Gerard.

**PA0WWM JO22FE** wkd: 5.7.97 G0API IO80, DL0GTH JO50, LA/DB1DI/p JO38, 5.8.97 GM4ODA/p, 11.8.97 GM4ODA/p IO89, 12.8.97 SM6EAN JO57, LA9VHA JO28. Tks fer info Wim.

**PA0JUS JO2200** wkd: 22.10.96 F6ETZ IN97, 3.6.97 SM6EAN JO57, OY9JD IP62, 7.6.97 DB1DI JO41, ON4PS/p JO20, DK0MU JO31, DL2DR JO31, 9.7.97 G8GXP IO93, 11.7.97 G4CCH IO93, 12.7.97 G7UWA/p JO02. Tks fer info.

2320 MHz **DL0UL/p JN48UO** wkd: 04./05.10.97 DB1BX JO32 500km, PA6NL JO21 546km, PA3DIJ JO33 560km, PI4GN JO33KK 573km, OM1GX/PJN88 554km, OM3LQ/PJN88 554km, PA6C JO33 546km, G4LIP/P JO01 660km, G4DDK JO02 708km, G4ZTR JO01 729km, G3LQR JO02 714km, G3OHM/P IO92 880km, G3CKR/P IO93 960km, G6DER IO93 954km. Rig: 1.8m Dish, 30W. Tks fer info Ingo.

**F5HRY JN18EQ** wkd: 4.10.97 F5FEN/p JN24, DL6NAQ/p JO40, OK1OKL JO60, 5.10.97 DK1VC JO31, DL0SE/p JO31, DK0PX JN48. Rig: 30W, 25 elem. F9FT. Tks fer info Herve.

**PA0WWM JO22FE** wkd: 20.7.97 LA/DB1DI/p JO38, 12.8.97 SM6EAN JO57. Tks fer info Wim.

**PA0JUS JO2200** wkd: 23.10.96 F6CBH JN19, 3.6.97 G6SPS/p JO01, SM6EAN JO57, 7.6.97 DB1DI/p JO41, DK0MU JO31. Rig: 80 elem. Flexa, 1W, RX MGF1302. Tks fer info.

## 3400MHz

**PA0WWM JO22FE** wkd: 20.7.97 LA/DB1DI/p JO38, 10.8.97 G4KNZ/p JO02. Tks fer info Wim.

## 5760 MHz

**DL0UL/p JN48UO** wkd: 04./05.10.97 OK1OKL JO60 308km, OE5VRL/5 JN78 338km, G4BRK/P JO01 660Km. Rig: 60cm Dish, 10W. Tks fer info Ingo.

**F6DWG/p JN19AJ** wkd: 22.10.97 OE5VRL/5 JN78 902km first F/OE. Rig: 5W, 70cm dish. Tks fer info Marc.

**PA0BAT JO31FX** wkd: 3.5.97 G4BRK/p JO01. Tks fer info Gerard.

**PA0WWM JO22FE** wkd: 11.6.97 HB9AMH/p JN37, 20.7.97 LA/DB1DI/p JO38, 12.8.97 SM6EAN JO57. Tks fer info Wim.

## 10368MHz

**DG1VL JO61WC wkd:** 12.5.97 DG0VE JO71, 16.5.97 OK1JKT/p JO60, 26.5.97 DB6NT JO50, DL6NCI JO50, DG8EB JO60, 12.6.97 DJ1KP JO44, 13.6.97 DH9NBB JN49, DG5NEX JN49, DB8NU JN49, DK0FLT JN49, 6.6.97 OE5VRL/5 JN78, 05.7.97 OK1KIR/p JO60, 15.7.97 DL4EAU/p JO51, DK2AN/p JO51, DL4OAN/p JO51, 26.8.97 DL2ABO/p JO51, DK2AN/p JO51, 26.8.97 DL3YEE JO42, DJ5BV JO30. Tks fer info Henry.

**EA6ADW/p JM19NW wkd:** 6.8.97 EA6SA/MM JM18BW #4.th MM-QSO (backup-STN EA6ADW, 50mW,13dBd), 15.8.97 F6BVA JN33AD, 31.8.97 F5CAU/P JN33HR, F6BVA/P JN24VC, F5CAU/P JN33HR, 14.9.97 EA5JF/P IM98XR, 28.9.97 F6BVA/P JN24VC, F6ETU/P JN13GK, #Blockade by 2000mASL, 5.10.97 F6BVA/P JN23WE, F5CAU/P JN23WE. RIG:87cm,1Watt,1dB. Tks fer info Peter.

**F6DWG/p JN19AJ wkd:** 22.10.97 OE5VRL/5 JN78 902km. Rig: 7W, 48cm dish, NF. 0.9dB. Tks fer info Marc.

**F5HRY JN18EQ wkd:** 4.10.97 F6HYE/p JN25, OK1UWA/p JO60, 5.10.97 DK1VC JO31, OE5VRL/5 JN78 ODX 877km, DL1GLH/p JN48. Rig: 2W, 60cm dish. Tks fer info Herve.

**G0JDL wkd:** 14.1.97 PA0EZ JO22, 10.7.97 PA0JUS JO22, PA0WWM JO22, 13.7.97 PA0BAT JO31, PE1JBK JO22, DJ5BV JO30. Rig: 1W, 60cm dish. Tks fer info John.

**OK1JKT/p JO60OK wkd:** 6.6.97 OK1VAM/p JO60, 7.6.97 OK1AIY/p JO70, OK1UFL/p JO70, OK1VAM/p JO60, 7/8.6.97 DJ5BV JO30, DJ1KP JO40, DL6NCI JO50, DL3ALI/p JO50, OK1VAM/p JO60, DL1WA/p JO60, DF0MTL JO60, DG0JJ/p JO60, DG0MG/p DL3JAN JO60, DG0AU JO60, DL4DTU/p JO60, DG2DWL/p JO60, DG8EB JO60, OK1AIY/p JO70, OK1UFL/p JO70, OK1KIR/p JO70, SP6GWB/p JO80, SP6MLK/p JO80, OK2QI/p JO80, DF0CI JO51, DL1VAA JO61, DL4WO JO61, DH5NBE/p JN49, OK1MDK/p JN79, OL7Q/p JN99, OE5VLR/5 JN78, DF6TK/p JN47, OE2JG/2 JN67, DJ7GK/p JN69, DH9NBB JN49, 11.6.97 DJ9DW JO40, DL6NCI JO50, DL2ABO/p JO51, DL1VAA JO61, DK9MN JN58, DG5NEX JN49, 13.6.97 DD7MH JN68,

DG8EB JO60, DB6NT JO50, DG1VL JO61, DG0VE JO71, DL2ABO/p JO51, DL9LW JO52, 14.6.97 DL1VAA JO61, DH9NBB JN49, DK2AN JO51, 15.6.97 DL1VAA JO61, DL4WO JO61, 21.6.97 DL6NCI JO50, DL1VAA JO61, DJ9DW JO40, 26.6.97 DL9LW JO52, DL1VAA JO61, OE5VRL/5 JN78, DC8EC JN57, 27.6.97 DL1VAA JO61, DG1VL/p JO71, 28.6.97 OE5VRL/5 JN78, 1.7.97 OE5VRL/5 JN78, DL1VAA JO61, DL1VAA JO61, DG8EB JO60, 2.7.97 OK1UVY JO60, 3.7.97 OE5VRL/5 JN78, DB4CE JN57, OE5VRL/5 JN78, 4.7.97 OK1UVY JN69, DL6NCR JO50, DL1VAA JO61, 5.7.97 DL3ALI/p JO50, DJ5BV JO30, 5/6.7.97 DJ5BV JO30, DJ1KP JO40, DL0GTH JO50, DL6NCI JO50, OK1KIR/p JO60, OK1KKD/p JO60, DG2DWL/p JO60, DL4DTU/p JO60, OK1UFL/p JO70, OK1AIY/p JO70, SP6GWB/p JO80, DL3YEE JO42, DL1VAA JO61, DG1VL JO61, DL4WO JO61, DD7MH JN68, OK1KRQ/p JN69, OE5VRL/5 JN78, OK1MDK/p JN79, OK1VAM JN79, DL0NN JN57, 18.7.97 DL1VAA JO61, DG1VL JO61, DL6NCI JO51, 19.7.97 DL1VAA JO61, DK2AN/p JO51, DD7MH JN68, 25.7.97 DG0VE JO71, DG1VL JO61, 1.8.97 DL1VAA JO61, DG8EB JO60, 2.8.97 DL0RCW JO60, OK1VTF JN78, 14.8.97 DF9QX JO42, DL1VAA JO61, DK1KR JO53, DJ1KP JO40, DB4CE JN57, 16.8.97 DL1VAA JO61, 17.8.97 DJ1KP JO40, 22.8.97 DK2GR JN59, OE5VRL/5 JN78, DG1VL JO61, DL1VAA JO61, 23.8.97 DL1VAA JO61, 24.8.97 DL1VAA JO61, DC9YC JO31, DF7JS JO31, DC8EC JN57, PA0WWM JO22, PE1JBK JO22, PA0EZ JO22, hrd LX1DU JN29, DG1KJG JO30, DL1KDA JO30, DJ5BV JO30, DK5KB JO30, DL2ALI/p JO50, DL4ALI/p JO50, DK1KR JO53, DH9NBB JN49, 27.8.97 DL6NCI JO50, DL1VAA JO61, 2.9.97 DF1OI JO42, 4.9.97 OE5VRL/5 JN78, DL6NCI JO50, DG1VL JO61, 5.9.97 DD7MH JN68. Rig: 1,2m dish, 1,3W NF. 2dB. Tks fer info Kaul.

**PA0BAT JO31FX wkd:** 3.5.97 G0EMG/p JO02, 4.5.97 DL3NQ JN49, 15.5.97 DL3IAS JN49, DJ1KP JO40, 25.5.97 G4DDK JO02, 1.9.97 DF6NA JN49, DK9MN JN58, DL3NQ JN49. Tks fer info Gerard.

**PA0WWM JO22FE wkd:** 11.6.97 DH9NBB JN49, F5HRY JN18, HB9AMH/p JN37, ON6UG JO11, F6DKW JN18, PA3DIJ JO33, 13.6.97 DL4EAU/p JO51, DG1KJG JO30, DL2ABO JO51, 19.6.97

ON7WR JO20, 22.6.97 G8APZ JO01, G4BRK IO91, 28.6.97 DL3EAG JO31, 29.6.97 DL6NCI/p DL4IB/p JO54, DL1VAA JO61, DG0RG JO62, DL2NUD JO63, SM7ECM JO65, 4.7.97 DL1KDA JO30, 5.7.97 DL3YEE JO42, DG1KJG JO30, DL0GTH JO50, DJ5BV JO30, DL3EAG JO31, DC8UG JO30, DB1DI/p JO31, DC9KK JO30, DL0LN/p JO31, 6.7.97 DL4FBN JO30, 10.7.97 G0JDL JO02, 13.7.97 DF5DP JO31, DL3EAG JO31, DG1KJG JO30, DC9KK JO30, DL4FBN JO30 JO30, DL3NQ JN49, DK3FF JO30, 20.7.97 LA/DB1DI/p JO38, 22.7.97 DK1KR JO53, 27.7.97 G4ZXO/p IO91, 10.8.97 OZ/DL4IB/p JO56, 12.8.97 SM6EAN JO57, DC8AG JO31. Tks fer info Wim.

**PA0JUS JO2200 wkd:** 21.6.97 PA/ON7YK/p JO22, PA/ON1BPS/p JO22, PA0PLY JO22, PA0HRK/p JO22, 10.7.97 G0JDL JO02. Rig: 48cm dish, 15m Aircom Plus, 20mW, DB6NT transverter. Tks fer info.

## 24192MHz

**DG1VL/p JO61XE wkd:** 04.5.97 DG2DWL/p JO60, DL4DTU/p JO60. Tks fer info Henry.

**PA0BAT JO31FX wkd:** 28.4.97 DK2MN JO32, 3.5.97 DL3YBY JO32, 4.5.97 DF7JS/p JO31, 6.6.97 PI4AJS JO21, PB0AOL JO21, 8.6.97 DL4BBU/p JO31, 5.7.97 PA0EZ JO22, 6.7.97 DK2PH/p JO42, DK3RV/p JO42, 20.7.97 DJ6JJ

JO31, 18.8.97 PA3AWJ JO21 ODX 131km, only 10mW, 6.9.97 PA3BRC JO32. Tks fer info Gerard.

## Report of first 24GHz IJsselmeer contest

### Introduction

Within the Dutch SHF community various members were promoting the use of the 24GHz band. Hans, PA0EHG was one of the first PA stations, who activated this band with good success. Based on this experience, two years ago a 25GHz activity group was formed, which now counts 25 members. Within this group a 24GHz Newsletter is circulated, publishing everything of interest for the 24GHz operator. During the yearly VHF/UHF conference, the major complaint of the members was, that it was difficult to check the equipment since most of the stations believe their station is working OK, but lack of partners or beacons delayed confirmation. Distances between various locations seemed to be too far for this band yet. Based on these comments, the idea was launched to organize a 24GHz contest with the main goal to provide workable distances for everyone, even "barefoot" stations. The idea was there and promotion started, since our inner lake, called IJsselmeer showed many beautiful locations with wonderful take-offs all along the lake. An organisation time was formed in order to divide all the jobs to be done. Finding locations, camping-sites, promotions and a tentative programme were the first activities to start with. The final dates 21/22th of June, were chosen, not to conflict with other activities around in Europe.

The amount of stations ready to run such a contest were much more than expected and participation of neighbour hams from Germany and Belgium could be logged. A total of 16 different stations pre-registered for the contest on Saturday, while a total of 25 people would like to join the 24GHz conference including the Barbeque on the Sunday. Since the organisation searched for the

### The Contest

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PA0PLY

various locations everyone was informed on the details of their positions and the positions of the other stations, QRA locator and callsigns were exchanged mainly using E-mail communication in advance of the contest. The contest rules were set up to primarily promote full band contests on 24GHz, although split band Qso's were honoured as well. Depending on the talkback frequency a multiplier has to be used for final points. Although the contest ran on the first summerday, the weather was very disappointing and several stations went Qrt much earlier than expected. Due to continuously rainclouds, the 10GHz talkback frequency was crowded with rainscatter signals all over, making it very difficult to find proper direction for 24GHz. DF1EQ was quite unlucky due to this weather conditions. His location could only be reached by feet and he was not prepared to cover this problem. That is also why his signal on 10GHz was not stable, since the dish was under his arm rather than on a mast! DC0DA and DF6VB did find their location little better, but were removed by local police since they stayed on a memorial point. Fortunately this removal happened late in the contest, so they were able to make some Qso's. Thy outmon 47GHz resulted in nil contacts majorly due to the bad weather conditions. ON1BPS and ON7YK were comfortable located in a nice campercar with antenna mast. Their location was on one of the "dyks" between the western and eastern costern of the lake. Quite near to them PE1JBK was located, while on the "Afsluitdijk" in the northern part of the lake, PA0JGF and PA0HRK were located 7km apart from each other, PA0EHG was located on the west coast as well as PA0PLY. PE1BTB was located off the lake on the top roof of a high building about 66km from the farrest station. Due to the ongoing rains and heavy winds it was very difficult to maintain Qrv for the entire contest. Myself, PA0PLY was located just behind the dyk to ensure, not to stay in full winds all the time. Unfortunately the rainprotection shield proved to be worthless and after the first rains all equipment became soaked,

## PA0HRK



and the tripod with 10 & 24GHz was blown to ground. Besides this, the phenomenon was that once the weather was good on one side of the lake, the other side suffered with the bad weather and went Qrt and vice versa. Although the weather participated for 99% as the problem source, all the stations were able to have their first QSO's on 24GHz. After 17.00 hrs Loc, it was possible to re-work the stations and gain another couple of contest points. At about 19.00 hrs almost everyone was Qrt and preparing for the conference the next day.

## Contest results

| Call sign | Qra    | Qsos | DX | TX power |
|-----------|--------|------|----|----------|
| ON1BPS    | JO22RM | 11   | 58 | 200mW    |
| PA0EHG    | JO22PR | 11   | 53 | 100mW    |
| PA0JGF    | JO23OA | 7    | 58 | 100mW    |
| PA0HRK    | JO22NX | 7    | 56 | 50mW     |
| PE1BTB    | JO22HL | 4    | 66 | 80mW     |
| PA0PLY    | JO22MM | 7    | 57 | 10mW     |
| PE1JBK    | JO22QP | 8    | 54 | 60mW     |
| DC0DA     | JO22QU | 6    | 66 | 200mW    |
| ON7YK     | JO22RM | 6    | 38 | 30mW     |

## Conference &amp; Barbeque.

The Sunday was programmed for the conference and the barbeque. Several stations which did not participate in the contest on Saturday showed up during the conference bringing their measuring equipment such as noise-gain analyser, spectrum analyser and power meter. During the eyeball qso's excellent food prepared by PA#AKP was available, as well as lots of drinks served. The barbeque

## During BBQ



was located inside the building so no problems on the weather conditions although it remain the same as the day before. Noise measurements were performed by PA3BPC and showed good results of some stations.

| Call   | Device    | NF dB | Gain dB |
|--------|-----------|-------|---------|
| DF6VB  | CFY-65-12 | 4,6   | 30      |
| DC0DA  | NE324     | 3,3   | 28      |
| PA0PLY | ??        | 10,9  | 2,5*    |
| ON1BPS | S8905     | 1,7   | 33      |
| PA0HRK | NE325     | 5,4   | 32      |

\*Loaner station of PA0JFG, seemed to be defective.

On the final end Remco PA3FYM, the new manager of the Veron VHF Commission Launched his speech and prices for the winners of the contest as well as for the best rig. The happening closed at 17.00 hrs local and reviewing the weekend, it was very fruitful for most of the participants. Therefore we thank all of them withstanding the weather and participating.

Surely the organisation learned a lot of this first experiment and will adapt several suggestions to change the contest rules and make it even more attractive for a larger of people next time. Make sure your rig is up and working for next summer and join the 2nd IJsselmeer 24GHz contest. Finally I would like to thank all members of the organisation for their excellent support: PA0JCA, PA3AGS, PA3AKP, PA3BPC, PA3FYM and PE0PJV. Best 73's de Jan, PA0PLY E-mail PA0PLY@comtestnl.com

Reports can be send to me on FAX ++45-98467877 or E-mail dmteknik@post4.tele.dk

Vy 73 John OZ1IPU

## Microwave: World Firsts and World Records

| Band (GHz) | World First QSO |                  |          | World Record |                   |          |
|------------|-----------------|------------------|----------|--------------|-------------------|----------|
|            | Date            | Calls            | QRB (km) | Date         | Calls             | QRB (km) |
| 10         | 6.V.1946        | W2JRM-W2JN       | 3.3      | 30.12.1994   | VK6KZ/p-VK5NY/p   | 1912     |
| 24         | 14.IX.1975      | G3BNL/P-G3EEZ/p  | 150      | 3.II.1993    | HB9MIN/p-DH6FAE/p | 396      |
| 47         | 3.X.1984        | HB9AMH-HB9MIN    | 1        | 5.X.1994     | HB9MIN/p-DJ7FJ/p  | 184      |
| 76         | 30.12.1985      | HB9MIN-HB9AGE    | 0.5      | 7.VII.1995   | HB9MIO/p-DK4GD/p  | 114      |
| 145        | 12.VII.1992     | DB6NT/p-DL1JIN/p | 1        | 7.IV.1997    | DL6NCI/p-DB6NT/p  | 53       |
| 241        | 23.V.1993       | DB6NT/p-DL1JIN/p | 0.1      | 26.VI.1995   | DB6NT/p-DF9LN/p   | 2.1      |

If you have an update or a correction, please write to:  
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# Contents/Inhalt 97

## Technical Reports

|                                                                  |                                             |        |
|------------------------------------------------------------------|---------------------------------------------|--------|
| 90W Transistor-PA für 1,3GHz .....                               | Dieter Briggmann, DC6GC.....                | IV/36  |
| A 23cm Diagonal Waveguide Feed .....                             | Russ Miller, N7ART.....                     | II/5   |
| An Affordable RF Change-Over Switch For 10 GHz .....             | W.R. Cox, VK2ZAC.....                       | I/26   |
| Cavity Design Tips.....                                          | Russ Miller, N7ART.....                     | I/5    |
| Cavity Preamp for 1.3 GHz .....                                  | P. Cervený, DF5JJ & F. Schreyer, DD1XF..... | I/16   |
| Cometary Origin of Sporadic-E.....                               | G. Neil Spokes, Ph.D.....                   | III/43 |
| Feeding the 12 inch SHF Dish on 10 GHz.....                      | Zack Lau, W1VT.....                         | IV/47  |
| SSS23: Preamplifier on 1.3 GHz .....                             | Gianfranco Sabbadini, I2SG.....             | II/15  |
| No-Tune SSB Transceivers for 1.3, 2.3, 5.7 and 10 GHz (Part I) . | Matjaz Vidmar, S53MV.....                   | III/5  |
| No-Tune SSB Transceivers for 1.3, 2.3, 5.7 and 10 GHz (PartII) . | Matjaz Vidmar, S53MV.....                   | IV/5   |
| Oven-stabilized XO for VHF.....                                  | Uwe Nitschke, DF9LN.....                    | III/36 |
| Weaver Method of SSB-Generation.....                             | Rainer Bertelsmeier, DJ9BV.....             | III/27 |

## Parts & Product Reviews

|                             |                                  |             |
|-----------------------------|----------------------------------|-------------|
| Parts .....                 | Rainer Bertelsmeier, DJ9BV ..... | I/33; II/31 |
| 160W Linear for 23 cm ..... | Philipp Prinz, DL2AM.....        | I/23        |
| 40W Linear for 23 cm .....  | Philipp Prinz, DL2AM.....        | II/28       |

## News

|                         |                                   |                            |
|-------------------------|-----------------------------------|----------------------------|
| 6m News .....           | Joachim Kraft, DL8HCZ.....        | II/76; IV/70               |
| Aurora News .....       | Norbert Götsche, DL8LAQ.....      | IV/72                      |
| EME News.....           | Bernd Wilde, DL7APV.....          | I/48; II/55; III/59; IV/56 |
| ES News.....            | Ilan Schnell, DL5BCU.....         | III/66; IV/65              |
| FAI News.....           | Georges Violet, F8OP.....         | IV/71                      |
| Microwave Europe.....   | John Sørensen, OZ1IPU.....        | I/43; II/39; III/50; IV/49 |
| Microwave Japan .....   | Toshihiko Takamizawa, JE1AAH..... | I/46; II/52                |
| Microwave USA .....     | Kent Britain, WA5VJB.....         | III/54; IV/55              |
| Meteor Scatter .....    | Norbert Götsche, DL8LAQ.....      | I/69; II/70; III/77; IV/73 |
| News & Comments .....   | Klaus Tiedemann, DL4EBY.....      | I/79; II/77; IV/83         |
| Tropo News .....        | Joachim Kraft, DL8HCZ.....        | I/66; II/68; III/71; IV/66 |
| DUBUS Toplist .....     | Norbert Götsche, DL8LAQ.....      | I/90; III/90; IV/87        |
| DUBUS Beacon List ..... | Norbert Götsche, DL8LAQ.....      | II/78                      |

# Microwave USA

Editor: Kent Britain, WA5VJB

## Microwave Update 1997

Microwave Update 1997 went well this year with 120 Microwave enthusiast from a dozen countries attending. We would like to thank Tom Whitted for a fine job and excellent technical program. Proceedings of the conference are available through the ARRL Order Number 6389

Next year the North Texas Microwave Society will again sponsor Microwave Update, this time in Longmont, Colorado. Longmont is 20 minutes North of the Denver International Airport and along the edge of a majestic mountain range. The conference will be held the last weekend in September. Hosting the conference this year will be Bill McCaa, K0RZ and John Anderson, WD4MUO/0.

As plans are made I will pass the details along to DUBUS. 1999 will find Microwave Update in the Virginia area hosted by N4MW and W4TJ. The year 2000 will find Microwave Update either back in the Dallas, Texas area again hosted by WB5LUA and WA5VJB or in Pennsylvania hosted by the 'Pack Rats'.

## 10 GHz EME

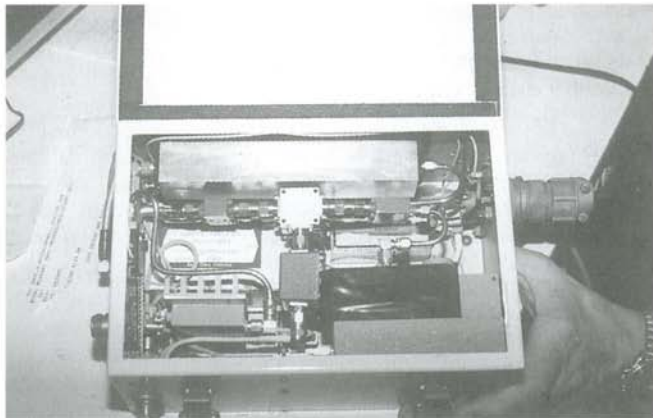
10 GHz EME QSO's hardly make news these days, but WB5LUA reports working JA7BMB on 5.77 GHz. JA7BMB was using a 10 Meter dish, 10 watts, and Circular Polarization while WB5LUA used a 5 Meter dish, 28 watts, and Linear Polarization.

## 474 THz

Even higher in frequency is a new US 474 THz record. September 21st N7VUB and KC7AED worked

WB7VVD and KC7PCV over a 192km path, extending the old 92 km record. Equipment used were 5 mW HeNe (Red) Lasers with 16 inch Fresnel lenses focusing on to photomultiplier tubes for receive. CW tone was accomplished by modulating the beam passing it through the blades of a muffin fan. Keying was by optically interrupting the beam. This is a new record for HeNe Lasers, but it is still 100 km short of WA7CJO & KY7B's record with HeCd (Blue) Lasers. As a side note to history, all this technology has yet to equal the 1898 US Army Signal Corp feat of sending telegrams over a 340km path with helostats. (Mirrors reflecting the sun)

There are some proposals for changing the EME contest to encourage more microwave EME contacts. The contest would be changed to one weekend for operation up to 23 cm, with 13cm and up activity only on the second weekend. I am interested in hearing your comments. KBRI-TAIN@JOHNSTONTECH.COM



WA7CJO Image Reject Transverter for 10 GHz

# EME News

Editor: Bernd Wilde, DL7APV

## 144 MHz

**intro** : the most reports arriving via internet. The activity on the DUBUS mail box dropped to nearly zero, so we closed it.

**AF9Y reports** : 1st EME Night Results. He had Nice weather conditions locally - no wind and clear for visual moon tracking. Good EME conditions. Worked all but 4 hours and had the following 52 QSOs: S52LM, DL5MAE, AA8BC, OE5EYM, W0PT, I2FAK, SM0FFS, I3DLI, RU1AA, OH2BC, OH3AWW, OZ1HNE, DL3JWD, DL1HYZ, DK3WG, PA2CHR, PA3EPD, SM3PWM, IK1FJI, IW1CGB F1CML, PE1OGF, IK2DDR, W7HAH, F3VS, KE3AX, VE3BQN, SM2CEW, VE3KDH, WP4G I5WBE, IW5CNS, 9A2AE, I5JUX, VE7BQH, K5GW, K0GU, J1ZQG, KN6M, W0RWH JH2COZ, WA2GSX, WB5LBT, N2WK, W0AH, K6MYC, W7CS, N6PYI, AA4FQ, K7CA, WA6PEV, JA9BOH tnx fer info Mike, AF9Y <http://www.webcom.com/af9y>  
Work: [mwcook@itt.com](mailto:mwcook@itt.com)  
Home: [mwcook@cris.com](mailto:mwcook@cris.com) [af9y@iquest.net](mailto:af9y@iquest.net)

**DL2IAN wkd** : 19.10.97 W5UN o/o random, F3VS o/o random, SM5FRH o/o random. RIG: 100 W, 4x9 element F9FT, Preamp. tnx fer info Tom

**HB9QQ** : reports good conditions, he wkd 1997-08-21 0723 VE7BQH 429 429 2044 RU1AA O O 2115 I3DLI O O 1997-08-22, 0720 EA3DXU cwnr strong sigs, no reply! 0747 K6MYC, 0828 WA6PEV O O 1997-08-23 0810 W5UN 439 429 0834 VE7BQH 429 419 0903 PA2CHR O O 0924 W7HAH O O 0936 SM2CKR O O 1997-08-24 0942 LX1EC/P O O 1009 KB8RQ 429 429 1027 W7HAH O O 1035 F3VS 429 429. The 4 home-made 16-eement antennas (DJ9BV) doing a good job, he can copy the echoes away tnx fer info

**W6/SM0PYP** reports : he was QRV during both parts of the ARRL EME Contest. It was difficult to run between 10 GHz station below the dish in the backyard and 144 MHz station upstairs. He made 10 stations W5UN, K5GW, K7CA, KB8RQ, VE7BQH, F3VS, SM5FRH, SM2CEW, I2FAK, J1ZCG. LocDM12ju, he is QRV from San Diego, CA, from AUG 3, 96. rig : single 20 EL 4.2 WL YAGI tnx fer info Paul

**VE3KDH** reports from ARRL I : Conditions seemed pretty good here. Asian Window is just too noisy with the sun up! VE3KDH 144 EME Results for the weekend are as follows: First Pass - F3VS, I2FAK, SM5FRH, RU1AA, SM5BSZ, LA9NEA, I3DLI, KB8RQ, EA3ADW, K2GAL, K5GW, W5UN, AA4FQ, W4MW, I5JUX, EA3DXU, W7GJ, W9HLY, DK9ZY, W7HAH, AF9Y, 9A2AE #, IK1FJI #, W0AH, AA8BC, K7CA, KN6M, SM5DCX, VE7BQH, VE3BQN #, AA7A, K6MYC, WA6PEV, J1ZCG, VE3AX, WA2GSX second Pass - OE5JFL, VE1ZJ #, OH7PI, WB5LBT, IK2DDR, DL5MAE, W0HP, EA6VQ #, PA2CHR N2WK #, VE6TA, SM2CEW, DL9YEY #, EA5GIY #, K0GU, JH5FOQ 52 stations, 25 mults, 8 new initials, 2 new countries. Many missed he hope to catch you during the 2nd weekend. Hi All; If you were one of my first 21 contacts, please email me with the time of our QSO, I lost part of my log in a computer crash (no callsigns luckily due to paper backup). tnx fer info Kevin Kevin D. Hobbs P.Eng. VE3KDH in FN03cl, VHF+ / EME "<http://www.cimtek.on.ca/homepages/ve3kdh>"

**Z30B** : VE7BQH reports Denny, Z31RQ is the prime EME Operator at Z30B The station is equipped as follows: 4 X YO0BJ slot antennas 900 watts elevation. Denny has accepted the offer to make scedules to the time frames he provides me on a monthly basis. He has already given me blocks of time for Europe and North America on Dec 12 and 13. I have started to fill in schedules

## EME-TOPLIST

Call small SQR DX US WAS WAC #  
CC States

JA9BOH 0 0 45 40 -- -- 260  
G3SEK 0 0 53 40 -- ?? 255  
GW3XYW 0 0 33 0 -- -- 178

## 144MHz

I2FAK 430 56 102 50 1993 1988 884  
DK3WG 374 54 86 50 1992 1983 642  
F9HS 180 33 49 27 -- 1985 247  
UA4NM 114 23 32 21 -- -- 0  
DJ7OF 104 26 29 19 -- 1996 134  
RA3LE 88 27 26 0 -- -- 95  
DL3DTA 83 21 24 15 -- -- 96  
HB9SUL 48 16 19 0 -- -- 63  
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

## 432MHz

DL9KR 363 50 80 50 1987 1978 665  
DJ6MB 258 39 59 43 -- 1984 309  
DK3WG 228 40 62 40 -- 1991 326  
OK1KIR 226 42 61 43 -- 1982 0  
G3LTF 204 0 56 47 -- -- 312  
RA3LE 111 26 24 23 -- 1984 124  
ON4KNG 110 25 34 17 -- 1996 129  
YO2IS 106 22 33 21 -- -- 0  
FIANH 103 23 29 22 -- -- 126  
DL3YEE 90 22 32 15 -- -- 0  
OK1CA 71 24 25 22 -- 1996 121  
EA3ADW 63 18 23 19 -- -- 64  
HB9SUL 34 12 17 9 -- -- 37  
OK1DFC 15 15 9 3 -- -- 15  
UA4NM 12 8 10 4 -- -- 0  
F5HRY 4 0 14 8 -- -- 31

## 1296MHz

OK1KIR 107 27 31 21 -- 1989 0  
G3LTF 101 0 28 19 -- -- 122  
FIANH 94 23 28 17 -- 1994 118  
EA3ADW 90 22 26 23 -- -- 112  
HB9BBD 80 21 29 12 -- 1994 0  
F5PAU 74 24 24 15 -- -- 47  
OK1CA 34 16 18 7 -- -- 31  
DL3YEE 12 6 9 1 -- -- 0  
GW3XYW 0 0 27 0 -- -- 114

## 2300MHz

OK1KIR 30 12 16 8 -- -- 0  
FIANH 12 5 8 4 -- -- 13  
G3LTF 10 0 8 2 -- -- 10  
EA3ADW 8 4 8 1 -- -- 9  
GW3XYW 0 0 13 0 -- -- 16

## 5760MHz

OK1KIR 7 4 6 1 -- -- 0

## 10368MHz

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

for the stations he has heard. Please send me (VE7BQH!) an E Mail if you are interested in a sched. Just be aware 4 X YU0B J slots are NOT a large antenna. Do not be concerned if you do not make the list this month, Z30B is a permanent station. Denny could not imagine what interest would excite my 2m. EME activity. He works from the Z37CEF club station, mainly on perigee weekends. They share the same shack for the HF and VHF operation. Since EME work needs quiet working atmosphere (surrounding), no other HF activity is possible during the EME experiments. Besides this, the VHF power amplifier shares the same power supply that the HF amplifier does. And the most limiting factor - the shack is pretty small and he has to replace the shortwave equipment with the VHF rigs every time when he is

working EME. This is not so difficult for him, but it can be difficult for the other club fellows (HF operators). He will try to organize better the club's work in the near future and he hopes Z30B will be QRV for everyday EME activity. Unfortunately, the QTH of his own (Z31RQ) is in the center of the town and no EME activity is possible from there. He appreciate very much the sched-manager's help you offered to me. In the 1997 ARRL EME contest he worked (all random) the following stations: SM5FRH, F3VS, SM5BSZ, SM2CEW, K5GW, W5UN, KB8RQ, EA2LU, VE7BQH, OE5JFL, I5JUX and I2FAK. He also heard WB5LBT, RU1AA, SM4IVE, OESEYM, I3DLI, JA2JRI, EA3ADW, K2GAL. He was calling WB5LBT, SM4IVE and EA3ADW but they could not copy him. WB5LBT was near to success, when

## \*\*\* LUNAR WEEKEND CALENDAR FOR 1998 \*\*\* by G3SEK

| At 2400 Sat/<br>0000 Sun | Declination<br>(deg) | Signals<br>(dB) | Sun offset<br>(deg) | Sky temp (K)<br>432MHz 144MHz |      | Comments          |
|--------------------------|----------------------|-----------------|---------------------|-------------------------------|------|-------------------|
| Jan-03/04                | -3.8                 | 1.0             | +69                 | 24                            | 275  | Moon in south.    |
| Jan-10/11                | 18.6                 | 0.1             | +158                | 44                            | 575  | Night.            |
| Jan-17/18                | 2.5                  | -0.9            | -121                | 20                            | 264  | Night. Apogee.    |
| Jan-24/25                | -18.2                | -0.1            | -42                 | 132                           | 2320 | Moon in south.    |
| Feb-00/01                | -0.7                 | 1.0             | +51                 | 24                            | 305  | Moon in south.    |
| Feb-07/08                | 18.5                 | 0.0             | +140                | 36                            | 467  | Night.            |
| Feb-14/15                | 0.0                  | -0.9            | -141                | 24                            | 320  | Moon in south.    |
| Feb-21/22                | -18.5                | 0.0             | -62                 | 175                           | 3390 | Moon in south.    |
| Mar-00/01                | 2.2                  | 1.0             | +32                 | 25                            | 310  | Day(PM).          |
| Mar-07/08                | 18.0                 | -0.1            | +122                | 29                            | 400  | Night.            |
| Mar-14/15                | -2.8                 | -0.9            | -160                | 27                            | 360  | Moon in south.    |
| Mar-21/22                | -18.5                | 0.1             | -82                 | 140                           | 2030 | Moon in south.    |
| Mar-28/29                | 4.9                  | 1.0             | +13                 | ++++                          | ++++ | Sun noise.        |
| Apr-04/05                | 17.1                 | -0.2            | +104                | 19                            | 260  | Day(PM).          |
| Apr-11/12                | -5.5                 | -0.9            | -176                | 26                            | 360  | Moon in south.    |
| Apr-18/19                | -18.2                | 0.1             | -100                | 67                            | 835  | Moon in south.    |
| Apr-25/26                | 7.4                  | 0.9             | -8                  | ++++                          | ++++ | Sun noise.        |
| May-02/03                | 15.9                 | -0.3            | +85                 | 17                            | 226  | Day(PM).          |
| May-09/10                | -8.1                 | -0.9            | +162                | 27                            | 376  | Moon in south.    |
| May-16/17                | -17.4                | 0.2             | -117                | 60                            | 419  | Moon in south.    |
| May-23/24                | 9.9                  | 0.9             | -26                 | 28                            | 400  | Sun noise.        |
| May-30/31                | 14.5                 | -0.4            | +67                 | 15                            | 200  | Day(PM).          |
| Jun-06/07                | -10.5                | -0.9            | +144                | 30                            | 420  | Moon in south.    |
| Jun-13/14                | -16.0                | 0.3             | -134                | 28                            | 375  | Moon in south.    |
| Jun-20/21                | 12.3                 | 0.9             | -43                 | 29                            | 420  | Day(AM).          |
| Jun-27/28                | 12.8                 | -0.5            | +48                 | 15                            | 210  | Day(PM).          |
| Jul-04/05                | -12.4                | -0.8            | +125                | 32                            | 453  | Moon in south.    |
| Jul-11/12                | -14.1                | 0.4             | -151                | 27                            | 375  | Moon in south.    |
| Jul-18/19                | 14.5                 | 0.8             | -59                 | 29                            | 405  | Day(AM).          |
| Jul-25/26                | 10.8                 | -0.5            | +29                 | 17                            | 225  | Sun noise.        |
| Aug-01/02                | -14.2                | -0.8            | +106                | 25                            | 490  | Moon in south.    |
| Aug-08/09                | -11.9                | 0.5             | -168                | 24                            | 360  | Moon in south.    |
| Aug-15/16                | 16.5                 | 0.8             | -75                 | 32                            | 442  | Day(AM).          |
| Aug-22/23                | 8.5                  | -0.6            | +11                 | ++++                          | ++++ | Sun noise.        |
| Aug-29/30                | -15.8                | -0.7            | +88                 | 39                            | 600  | Moon in south.    |
| Sep-05/06                | -9.5                 | 0.6             | +173                | 22                            | 280  | Moon in south.    |
| Sep-12/13                | 18.0                 | 0.7             | -91                 | 34                            | 517  | Day(AM).          |
| Sep-19/20                | 5.8                  | -0.7            | -8                  | ++++                          | ++++ | Sun noise.        |
| Sep-26/27                | -17.2                | -0.7            | +69                 | 50                            | 1900 | Moon in south.    |
| Oct-03/04                | -7.1                 | 0.7             | +154                | 22                            | 279  | Moon in south.    |
| Oct-10/11                | 18.9                 | 0.6             | -109                | 44                            | 525  | Day(AM).          |
| Oct-17/18                | 3.0                  | -0.7            | -27                 | 20                            | 275  | Sun noise.        |
| Oct-24/25                | -18.5                | -0.6            | +50                 | 100                           | 1500 | Moon in south.    |
| Nov-00/01                | -4.7                 | 0.8             | +135                | 23                            | 275  | Moon in south.    |
| Nov-07/08                | 19.4                 | 0.5             | -128                | 37                            | 472  | Night.            |
| Nov-14/15                | 0.2                  | -0.8            | -46                 | 27                            | 360  | Day(AM). Apo-gee. |
| Nov-21/22                | -19.3                | -0.5            | +31                 | 150                           | 2800 | Moon in south.    |
| Nov-28/29                | -1.9                 | 0.8             | +116                | 24                            | 280  | Moon in south.    |
| Dec-05/06                | 19.3                 | 0.4             | -148                | 31                            | 415  | Night.            |
| Dec-12/13                | -2.4                 | -0.8            | -65                 | 27                            | 360  | Moon in south.    |
| Dec-19/20                | -19.6                | -0.5            | +13                 | ++++                          | ++++ | Moon in south.    |
| Dec-26/27                | 1.2                  | 0.9             | +97                 | 25                            | 306  | Day(PM).          |

All data are at Saturday midnight wherever possible.

Sky temperatures behind the moon are estimated using VK3UM's program.

"++++" means that the sun is within a typical antenna beamwidth, at some time during the weekend.

he asked QRZ? DK0Z? but some stronger station called him and my attempt was over. tnx fer info Lionel, VE7BQH ve7bqh@wimsey.com

## 432 MHz

**F5PAU wkd:** ARRL EME CONTEST 18/19-10-1997 EA6ADX 549/559, SM4DHN 569/559, F6KSX 559/559, OH2AXH 569/569, SM3AKW 559/559, EA3UM 559/559, KB2AH 559/559, OK1DFC O/O #82, WD5AGO 559/449, K2DH 559/559, K5JL 559/569, HB9SV 569/569, ZS6AXT 549/559, WBSLUA 559/559, W2UHI 559/569, W4RDI 549/559, W4OP 559/559 #83, F6CGJ 569/449, W3XS 449/549 #84, OE9XXI 579/569, G3LTF 549/569, HB9BBD 549/559, F2TU 549/559, OE5JFL 569/569, JH5LUZ 559/559, DD1XF 549/559, FIANH 559/559, DD0SB 449/559 #85, S59DCD 559/559, I6QGA 449/559 #86, DJ9YW 559/559, ON5RR 449/549, OZ4MM 569/569, DC6UW 559/549 #87, K2UYH 559/559, VE1ALQ 559/559, N6BQ 559/549. QSO 37 MULTI 25. Little problem with my high voltage power supply during the contest. My tone cw was very bad HI... I will change my filter capacitor for second party. tnx fer info F5PAU Francis.

**HB9SUL (JN46al) wkd ARRL Part I:** 18.10.97 OZ4MM 549/529, K1FO 559/549, N21QU 559/449, DL9NDD 449/449, I2COR 549/559, OH2PO 559/549, OE5JFL 559/549, UR5LX O/O, G3SEK 439/449, K7FF O/O, FIANH 549/539, DL9KR 559/559, DK3BU O/O, DK3WG 349/429, ON4KNG 439/449, J1IZCG 449/419, HB9SV 559/549, PA3CSG 449/449, ON5OF 449/O, N21QU 559/549, K4QI 449/439, K5GW 559/O, K0RZ 549/549 for 23x18. Andrea missed G4FUF cwnr., JA2KRW, EA4LY?, and suppose G4RGK answered at his cq but couldn't work. rig TS950SDX, LT70S, h.b. K2riw@700w at feed point, 4x13l, h.b. LNA1302. tnx fer info Andrea

**OH2PO reports:** he ended up with 147 QSOs and 43 mults on 432 MHz. Conditions were good and Faraday rotation was small on both contest weekends. Found out after 1st leg that one of the dipoles in our dual dipole feed was ripped off during the storm. The feed was repaired for this weekend but degraded our 1st leg score (118 x 40). Mults worked: A2, CT, DK, EA, EA8, F, G, GD, GM, HA, HB9, HP, I, JA, K1/2/3/4/5/6/7/8/9/0, KL7,

LU, OE, OH, OM, ON, OZ, PA, UA, UR, SM, S5, VE1/6/9, YL, YO, ZS, 9M2 15.6m hb dish w/ dual dipole feed DJ9BV preamps 2x3CX800A7 PA VK3UM automatic tracking SW. Ops. OH2JTE, OH2PO, OH6DD 73, Jukka, OH6DD

**ON4KNG wkd:** This is my sort report of the first part of the ARRL EME contest. Result is 45 x 24 mult. Initials are: OE5EYM (559/449), S51ZO (O/O), KL7HFQ (O/O, dxcc 33), J1INN (O/O and # 124). Heard: W8MQW, W0KJY, DK3BU. Thanks for all stations contacted and hope to meet others in the next week-end contest. 73's de Peter, ON4KNG. My final score is 59x26, not exactly what I expected to do, conditions were better in october. Meanwhile I was very happy with the following initials: OE5EYM - DL3EAG - S51ZO - KL7HFQ - J1INN - F1CH - OE3JPC - DL5FN - DL4XX - YL3AG (# 129 and dxcc 34). The multipliers are: DL-OE-N2-OH-K1-OZ-G-K4-F-K5-UT-VE6-W7-JL-I-EA3-ON-S51-SM-YO-HB9-K0-KL7-EA8-UA6 and YL (# 129 and dxcc 34) tnx fer info Peter, ON4KNG EME home pages: <http://www.club.innet.be/~year1039>

**VE6TA** 1st weekend results I spent the first weekend operating 432 the first moon pass and 144 the second. Found very good condx on 432 and average lockout condx on 144. Oct 18 432 Worked the following: N21QU, OH2PO, OE5JFL, UR5LX, I2COR#, K4QI, K1FO, DL9KR, OZ4MM, FIANH#, F5AQC#, K0RZ, ON4KNG, DK3BU#, K2UYH, N9AB#, W7FN, VE1ALQ, JA5OVU, and J1IZCG. For a total of 20 x 16 on 432. Oct 19 144 Worked the following: W5UN, F3VS, VE1ZJ, WOHP, KB8RQ, SM5FRH, AF9Y, WOA, SM2CEW, N2WK#, VE3AX, VE3KDH, I5JUX, AA4FQ, K5GW, AA8BC, W4MW#, SM5BSZ, K7CA, WA6PEV, PA3EPD, W9HLY#, 7K3LGC#, and W7GJ. For a total of 24 x 15 on 144. You will note my lack of European QSO's as it seemed as if most had gone to bed by the time I got moon HI. Most likely just the usual lockout though. My own echoes were none-existent most of the night as well. Hope to be QRV most of next weekend on 1296 if Murphy allows! 73's Grant VE6TA DO31ah 432- 5 meter dish K2RIW Pol. Rot. 144- 4 x 17 M2 8877.

**YO2IS reports:** Hello! thanks to all who did respond to my tiny E.M.E. sigs in the contest. Have fixed the faulty TX connector on 432 ( any idea about connecting better the H100 cable "tiny

shield" to N connectors ? ) and so was able to get more QSO's : JA5OVU, DF3RU, HA1YA with a very QRO signal, 7M2PDT, G3SEK ( tks Ian, it was like I predicted, hi!), I2COR after several QRZ's, UT5EC #137, K5GW #138 and new state !, VE1ALQ very strong, N4GJV just before the end of my EME window when the Moon goes behind the nearby apartment house ! (40 degrees elev.) Got several CWNr: F1CH, EA3DXU hrd twice answerig with my call, EA8FF got a couple of QRZ's, WD5AGO always solid signal, DL4KG 449 !, KA0RYT, N9AB... Heard also: KN6M, JA9BOH with big pile up !, JL1ZCG, I5CTE, F5FEN very loud answering some CQ's...and a couple of times my own echoes up to 3 dB !, hi. On 144 things went better this time, despite my marginal system got 11 QSO's. Last night wk'd: I3DLI #15 who did replay to my first call ! and EA2LU #16 both easy to copy here. Wasted a lot of time calling IK1MTZ. Heard VE3KDH for two periods in our sked. Quite variable conditions. Certainly had a lot of fun making the contest. Score : 35 QSO's ( 11/24 ) and 25 Multip ( 7/18 ). Not bad for my downtown location with a very restricted Moon window, only elevations 40 degrees !. Was happy that my HB gear did perform in good shape. More work has to be done to improve my ERP's and to get better accuracy in pointing the antennas. Always glad to swap QSL's with the new initials. 73 and DX, Szigy... P.S. No activity from here for the next pass. Have already dismatled my EME rig "configurations" which does include 23 different boxes and gears !, tnx fer info Szigy

### (Inter) netnews

**BY1QH** : QRV ill have to move (will move as little as possible). Our horizon is not totally clear until 1900 UTC. We would very much appreciate if some of you could help us evaluate the influence of some obstacles, and possible "roof gain"

(30m long flat about 10 m away) blocks one or both of the lower antennas in QTF about 60-90 degees up to 2-3 degrees. On top of the building is a 4 el yagi for 14 MHz. ROOF GAIN? The antennas are on one end of a long roof. The direction of the roof is ap ham radio in China). These transmitters transmit practically constantly, but fortunately rarely 17-21UTC (01-05 local time). MORE QRM There are also computer carriers on approximately every 2 kHz. FIRST ATTEMPT : We started to call CQ on schedule at moonrise. We heard absolutely nothing during the first 4 hours. We made many quick QSY to look for the big guns, but heard NIL! At this point we made a break to do some checks on our ant etc. No problems were found. During the night our local QRM got better. Among other things the paging transmitters on 144.000 Mhz transmitted very rarely. These transmitters are 59+++ at BY1QH. (We might later ask for your support to put some pressure on the local authorities to move these transmitters). At about 18 UTC we heard the first signal off the moon: Results JL1ZCG HRD & CALLED, SM5FRH WKD VERY strong!, SM5DCX HRD & CALLED, SM2CKR HRD & CALLED, I3DLI HRD, SM0FFS HRD, SM7BAE HRD & CALLED, 9A2AE HRD & CALLED, SM5BSZ WKD, HB9CRQ HRD (not 100% sure abt call), DL5MAE HRD SM2CEW WKD, PA2CHR SKED NIL HRD BZ1BM might also operate



**DJ9YW**

## **EUROPEAN EME CONTEST 1998**

### **Sponsored by REF and DUBUS**

This contest is intended to encourage worldwide activity on moonbounce. Multipliers are DXCC countries plus \*\*\* ALL W/VK/VE STATES \*\*\* This gives equal chances for stations from North America, Europe and Oceania. The rules reward random QSOs, but do not penalize skeds on 2.3GHz or above. Note that 144/1296MHz is on the APRIL weekend (for lower sky noise on 144MHz, and to reduce QRM from the tropo contest in March). 432MHz and microwaves is in MARCH.

#### **1. Contest Dates & Periods**

The contest happens during two full weekends: 144 and 1296MHz on the APRIL weekend, and 432MHz and all other bands on the MARCH weekend. Each weekend of the contest begins at 00:00 UTC on Saturday and ends at 24:00 UTC on Sunday.

#### **2. Bands and dates**

First weekend: 432MHz, 2300MHz and above 7/8 March 1998 Second weekend: 144MHz and 1296MHz 4/5 April 1998

#### **3. Categories**

QRP 144MHz <100kW EIRP 432MHz <400kW EIRP 1296MHz <600kW ERP = 2300MHz no separate QRP/QRO categories

QRO EIRP equal to or greater than stated above.

PRO Non-amateur equipment or antenna. PRO stations will not be ranked.

#### **4. Exchange**

Callsigns + TMO/RST + R.

#### **5. Scoring**

100 points for each random QSO completed. 10 (ten) points for each sked QSO completed on bands below 2.3GHz. 100 points for each sked QSO completed on 2.3GHz or higher bands. 6. Multipliers

Each DXCC country (except W/VE/VK), or EACH INDIVIDUAL STATE worked in W/VE/VK.

Multipliers count only if worked by RANDOM (except on 2.3GHz or above).

States and provinces can be determined after the contest using address lists in recent Newsletters or in DUBUS.

#### **7. Total per band**

Sum of points multiplied by sum of multipliers.

#### **8. Final score for multiband entries**

(Total sum of points on all bands) \* (total sum of multipliers on all bands)

#### **9. Classifying**

Top scores define one winner per band and one multiband winner. Multiband stations will also be classified on each separate band worked.

There are no separate multi-operator classes. Multi-operator and QRO stations will be highlighted in the general classifications.

#### **10. Reporting**

Copy of the log for each band with details of points, multipliers and total points.

The following information MUST also be included:

1. Output power, transmit cable loss, antenna type and gain.
2. Working category: QRO/QRP mono/multi operator
3. Name(s) and signature(s) of all operators
4. Locator/State.

Other information is welcome: Comments, conditions, grid locator, station details, photographs, etc...

#### 11. Awards

A certificate will be sent to each entry. All band winners and the multiband winner will receive a trophy.

In each section, the highest-scoring station in the southern hemisphere will receive a special certificate <NEW!

#### 12. Logs

Log entries MUST be postmarked no later than 30 days after the end of the second weekend (i.e. in the mail by 6 May 1998), to the following address:

DUBUS Verlag EME Contest P.O. Box 500368 D-22703 Hamburg Germany

Fax: (++49)40-8508972

You can also e-mail your log directly to: dubus01@ibm.net

#### 13. Referee

Responsible for rules and general questions is:

Ian White, G3SEK 52 Abingdon Rd. Drayton, Abingdon, Oxon OX14 4HP England

Tel.: (++44)1235-531559 E-Mail: g3sek@ifwtech.demon.co.uk

BY1QH a FEW hours in our second moon window (QRV from perhaps 15 UTC, Oct 19). We plan to be active also in the next leg of the contest, possibly with about 0.7 dB higher ERP. 73 de ops BZ1BM David, Frank, SM0KAK Lasse, PA3BZO Piet, PA3DSS Theo, BA1HAM Chen, BA1DU Alan. Added note: On the 19th BY1QH was on and was worked by KB8RQ at 1344.

## 1296 MHz

**DJ9YW**: wkd March to Nov. 97 with his new 4.5m dish : 08.03.97 DD1XF, 09.03. F6CGJ &ssb, 15.03. OZ4MM, DF9QX, EA3UM, JA4BLC, JH5LUZ, ZS6AXT, F6CGJ, OE9XXI, SM3AKW, I2COR, K5JL, DJ7FJ, EA6ADW, KB2AH, OH2AXH, FIANH, GW3XYW, CT1DMK, K2UYH, N6BQ, 16.03. F6KXS, K2DH, K4QI, IK6EIW, F5PL, G3LTF, 12.04. OE9XXI, DD1XF, W2UHI, F5PL, HB9BBD, 13.04. EA6ADW, JA6CZD, SM5DGX, K2DH, W4OP, 19.04. FIANH, 20.04. HB9BBD, 10.05. W2UHI, K2DH, 11.05. ZS6AXT, I5MPK, G3LQR, HB9SV, 08.06. JA4BLC, ZS6AXT, DD1XF, W2UHI, KB2AH, VE4MA, 28.06. KB2AH &ssb, N6BQ, K2UYH ssb, 29.06. W2UHI, ZS6AXT, WB5LUA, DC6UW ssb, OE9ERC ssb, K2DH, N6BQ, W4OP, 26.07. DD1XF, W2UHI, W4OP, 27.07. OK1KIR, ON5RR, W2UHI, OH2AXH, PA3CSG, VE3BQN, KB2AH, 22.08. S59DCD, 23.08. DC6UW ssb, 24.08. K5JL, W2UHI, G3LTF, SM2CEW, ON5RR, 30.08. KB2AH, W2UHI, 31.08. KB2AH, W2UHI, K2DH,

FIANH, WA8WZG, K5JL, 20.09. IK6EIW, S59DCD, HB9SV, JA4BLC, SM3AKW, 21.09. W2UHI, K5JL, ZS6AXT, W4OP, ON5RR, KB2AH, N6BQ, EA6ADW, VE1ALQ, G3LTF, DF3RU, DL0SHF, OE9XXI, F6CGJ, 27.09. DD1XF, FIANH, 28.09. ZS6AXT, DD1XF, KB2AH, W2UHI, 18.10. ZS6AXT, HB9BBD, K6KSX, F5PAU, DD1XF, EA6ADW, SM4DHN, OH2AXH, OE9XXI, 19.10. W2UHI, K2UYH, F6CGJ, WD5AGO, N6BQ, ON5RR, K2DH, OE5JFL, JA4BLC, F2TU, OE9ERC, JH5LUZ, SM3AKW, 15.11. S59DCD, OH2AXH, JL1ZCG, OK1DFC, 16.11. 4X6UJ (first DL-4X !!!) K2UYH, G3LTF, W4OP, NU7Z #77, OZ4MM, LA8LF, HB9SV, FIANH, SM4DHN, JH5LUZ, SM2CEW, OE9ERC. 150 random, only 4 sked. rig 4.5m dish f/D 0.47, W2IMU Horn circ., erp 438KW, NF 0.48dB. NEW FAX for skeds ++ 49-5155-983256. tnx fer info Heinrich

**EA6ADW** (JM19LU) wkd: 24.8.97 G3LTF 549 559, K5JL 559 559, K2UYH 54 55, F5PL 559 559, 20.9.97 SM3AKW 449 449, W4OP 449 559, K2UYH 44 55, F6CGJ 569 579, 21.9.97 G3LTF 449 559, DK7LJ 44 55 #, K5JL 569 569, W2UHI 559 559 ZS6AXT 449 569, OH2AXH 559 559, KB2AH 579 559, DJ9YW 549 559, N6BQ 449 449, VE1ALQ 559 559. tnx fer info Peter

**4X6UJ** reports : 2'nd night the weather here was awful and some water entered the azimuth potentiometer so i had to track the moon by hearing and sometimes via the camera when it managed to shine through the clouds. It was the only time i was happy that my dish is so small and not so directive.

**8th 432 MHz AND ABOVE EME CONFERENCE****PARIS 1998****Web page :** <http://ham.ireste.fr/eme98>

HURRY UP, we are going to close these pre-registrations in December, and open phase 2 which is registration from January to March 98 (with your 30% deposit payment). REMEMBER THAT SPACE IS LIMITED and the priority will be given to pre-registered people.

**Pre-registration list (27 Nov. 97):**

The count is now 80 EME'rs, 35 YIs and 10 children.

9U5DX (F5FHI op), CT1DMK, CT1FWC, DD1XF, DF6NA, DF9CY, DJ6MB, DK3FB, DL3EAG, DL6WU, DJ9BV, EA3DXU, F1EHN, F1IKA, F5FLN, F5HRY, F5IVP, F5PAU, F6DLA, F6HYA, F6HYE, F6CGJ, G3LQR, G3LTF, G3SEK, G3WDG, G4ALH, G4CCH, G4ERG, G4RGK, HB9AGE, HB9SUL, HB9JAW, HB9JBL, I5TDJ, I5CTE, JA4BLC, JH3EAO, K1IM, K1RQG, K2RIW, K2UYH, KD4LT, N6BQ (ex AA6WI), N8XA, NA4N, NC1I, OE5JFL, OE9ERC, OE9PMJ (OE9XXI), OK1CA, OK1DFC, ON5OF, ON5RR, ON6JY, OZ1HNE, OZ1IPU, OZ4MM, PY5ZBU, RW3BP, S50X, S54X, S56UUU, SM2CEW, SM2BYA, SM3AKW, SM4IVE, SM6CKU, UR5LX, VE1ALQ, VE4MA, VE6JW, W6/SM0PYP, W7GBI, WA7CJO, W8MQW, W8TN, ZS6AXT

**PROGRAM**

(see also the Sept. NL 25#11, Nov. NL 25#13 and DUBUS 3/97 for details and prices):

When : Aug. 7 (arrival) / 8 / 9, 1998

Where: Paris City (14th arrondissement).

The Conference itself will be held in a nice and calm conference center. We will be booking in two different hotels (also in 14th arrondissement).

**FRIDAY :**

For those arriving on Friday, we will be possible to check in from 1400 to dinner time. We will have dinner together. Friday evening will welcome second-hand equipment sales and exchange between amateurs, conference hall, video and slide projection and ladies program.

**SATURDAY :**

Welcome to the new arrivals. Saturday is dedicated to the conferences, full time, except for a few coffee breaks, and a quick lunch. Parallel ladies program with tours in Paris and Shopping. Special dinner and evening together.

**SUNDAY :**

Nancay radio-telescope visit, lunch in the Nancay area. A short meeting will be held in Nancay (debriefing, open forum ...). We will then be back to Paris at 1900 or 2000. Parallel ladies program with the Versailles castle visit, lunch and probably a river boat tour on the Seine (Paris).

**IMPORTANT:**

We would appreciate your comments on this timing.

Hotel bookings: we book Friday Night and Saturday night, and you book other nights if any, with the same hotel if you want, at conference price (quite lower than normal). In response to a few inquiries: Children will get a reduced rate ticket. We will confirm all the price in the next information (and also in our web page)

## CONFERENCE, TECHNICAL MATTERS:

You are not so many to have proposed a conference talk. Any ideas, any volunteers? Please send your papers as soon as possible. DON'T FORGET also to send photos of your installations and your articles.

Every registered ham is invited to send some information on his station and two or more photos, with the operator and the aeriels. This is all to be published in the proceedings. Send electronic files by Email at :

jjm\_flehn@msn.com / floppy disk (3.5") or photos to : Jean-Jacques MAINTOUX, 30 rue de Villacoublay, F78140 VELIZY, FRANCE.

### 73 from the EME PARIS 1998 crew.

The power output(at feed) is 150W. Rx- PHEMT 23K Sometimes i guess my echoes at noise level. Have heard a lot of calls. Worked: OH2AXH, WB5LUA, OE9XXI, KB2AH, OE5JFL, F6CGJ, SM4DHN, DD1XF, F1ANH, OZ4MM, K5JL, Have called K2UYH for 30min. but it seems he had strong qrm. HE is glad to be back with a new bigger dish. Working condx are: 5.1m solid commercial dish F/D 0.36 VE4MA feed , LNA 0.3db nf. 175W. Anyone collecting pictures of dishes can get mine sending an e-mail. These are the worked stations so far: First pass: K2DH, K5JL, HB9SV, VE1ALQ, LA8LF, W2UHI, OE9ERC, F6CGJ, Second pass: OK1KIR, OK1DFC, I6QGA, OZ4MM, OE9XXI, F5PAU, S59DCD, JH5LUZ, OH2AHX, SM4DHN, EA3UM, G3LTF, F5AQC, EA6ADW, ZS6AXT, DD1XF, OE5JFL, ON4RR, CT1DMK, HB9BBD, WB5LUA, K4QI, F5PL, K2UYH, W4OP, N6BQ, DJ9YW, F2TU, DL0SHF (SSB). Total: 37 QSO's tnx fer info Howie 4X6UJ (KM72MT)

**ON5RR** reports : he worked the following initials on 23 cm : 21 Sept : W4OP, DK7LJ, DL0SHF, 18 Oct: DD1XF, JH5LUZ, HB9BBD, F2TU, S59DCD, DC6UW, WD5AGO All these brings us to 51 initials in exactly 1 year EME . We stopped the ARRL contest with a score of 42 x 24 Worked initials : OK1DFC, I6QGA, F5AQC, 4X6UJ tnx fer info Marc

## 10368 MHz

**W6/SM0PYP** reports: he was QRV during both parts of the ARRL EME Contest. It was difficult to run between 10 GHz station below the dish in the backyard and 144 MHz station upstairs. on 10

GHz: QSO'd 5 stations G3WDG G4KGC AA5C WB5LUA WA7CJO. After the contest I QSO'd SM4DHN. During the sked with VE7CLD I could not find Gunter due to the frequency calibration problems. Later I heard him M-copy during QSO with WA7CJO. I heard on SSB G3WDG, WA7CJO and WB5LUA. My station consist of 3 m dish f/D=0.29, Caparall feed linear horizontal polarization, 20 W at the feed and I receive 2.4-2.6 dB Moon noise. I am using one IC202 for TX and second for RX. Dish is manually aimed using Moon noise. 10 GHz 10ft dish f/D=0.29 NF=1.7 dB Pout = 20 W QRV from Sept 28, 1997. tnx fer info Paul

## Dates European EME Contest

**G3SEK** states the final dates for the European EME contest, sponsored by REF and DUBUS:

1. Leg: 432MHz/≥2300MHz: 7/8th of March, 1998
2. Leg: 144/1296MHz: 4/5th of April, 1998

The move of 144MHz to the second weekend is due to the lower sky-temperature in April.

## Last

- Don't forget the deadline every first of Nov./Feb./May/August!!.
- Please add my new adress to your data base !!!!!
- My QRL is moving in dec, my new FAX No. follows

73 Bernd DL7APV

# ES News

Editor: Ilan Schnell, DL5BCU

Thank you for your reports.

## 1997-05-23

DC3QB (JO41IV) wkd: 15:30 LZ1KDP KN12, 15:36 LZ1QI KN12, 15:39 LZ3UF KN12.

DG6GP (JN48MF) wkd: 15:17 LZ2CC KN23, 15:26 YO7VS KN14, 15:34 LZ2HV KN23, 15:44 YO3DMU KN34, 15:48 YO3APJ KN34.

DL8EBW (JO31NF) wkd: 15:48 LZ2CC KN23.

## 1997-06-05

PA3BIY (JO22EB) wkd: 06:30 EU1AA KO33, 06:52 EU1AA KO33, 07:18 SP4SKA KO14, 07:29 RA3LBK KO65, 07:43 SP4MPB KO03, 07:56 LY2WR KO24, 08:04 LY2MW KO24.

## 1997-06-18

G0FIG (IO90UU) wkd: 10:39 IW7CLK JN81, 10:52 IW7DEC JN81, 10:54 I4YNO JN54, 10:57 I4MES JN54, 10:58 IK0FEC JN63, 11:00 IK6ZGF JN72, 11:01 I2PY JN55, 11:03 I7HCB JN71, 11:04 IW6AFT, 11:06 I4RHP JN54, 11:08 I4CIL JN64, 11:11 IK6WDY JN72, 11:12 IK6MLI JN62, 11:14 IW6NIW JN72, 11:15 I4ASV JN54, 11:19 I4PVP JN54.

## 1997-07-10

DH0GHU (JN38VN) wkd: 10:05 SM4VQP JO79.

G0FIG (IO90UU) wkd: 10:02 LY2MW KO24, 10:21 SP4MPB KO03, 12:21 SM5NVF JO89, 12:34 SM4VQP JO70, 12:38 SM4HFI JP70.

PA3BIY (JO22EB) wkd: 12:21 SM3JLA JP93, 12:23 SM3RLJ JP93.

## 1997-07-13

IW9CER (JM78QF) wkd: 14:28 EA3BTZ JN01, 14:30 EA1BFZ JN81, 14:30 EA3CSV JN01, 15:05 EA3CQQ JN11, 15:07 EA3DXU JN11, 15:09 EA3TI JN11, 15:11 EA2LU JN92, 15:17 EB3EDT JN01, 16:21 G4JZF IO82.

## 1997-08-14

DL8EBW (JO31NF) wkd: 16:53 I7CSB JN71, 16:58 9A4EW JN95.

G0FIG (IO90UU) wkd: 16:30 YU1IO KN04, 16:31 YU7ON KN04, 16:32 YZ7MON KN04, 16:33 YU7KB JN94, 16:34 YZ1KU KN04, 16:49 YU1EV KN04, 16:50 YU7DP KN05, 16:53 YU1LA KN04, 16:57 YU7KU KN05, 16:58 9A4EW JN95, 18:01 IT9TMN JM77.

It looks like 1997 was again a bad year for ES. Let's hope for a better season in 1998!

Thanks to a suggestion from Ian, G1SMD, I am now also using the International Standard ISO 8601 for the date format.

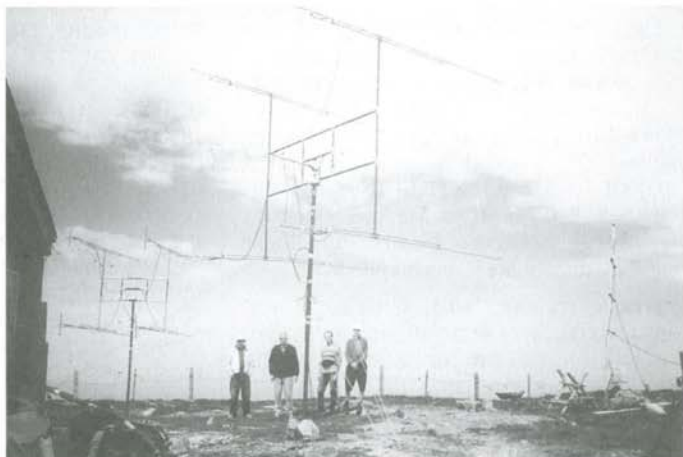
If possible, please submit your ES reports in machine readable form (ASCII). You may do so using 3 1/2 inch MS-DOS magnetic media.

Time, Call, [Locator] for each QSO are needed.

e-mail: ilan@informatik.uni-bremen.de

Packet-Radio: dl5bcu@db0cl

Merry Xmas and HNY. 73's and good DX in 1998. Ilan



YO5KAV/p in KN16JS during July Contest

# Tropo News

Editor: Joachim Kraft, DL8HCZ

## 2m > 700 km

**DD0VF, JO61VA, wkd:** 21.9.97 OY9JD 1736km.

**DF0MTL, JO61JF wkd >700km:** 1./2.3.97 9A5Y JN8500 705km, OZ6ABA JO57dj 704km, OZ2N JO57cl 714km, TM2DX JN09tt 804km, F5FNY JN36bp 704km. 3./4.5.97 OZ6ABA JO57dj 704km, 9A5Y JN8500 705km, TM2DX JN09tt 804km, 9A1CHI JN85tm 727km. 5./6.7.97 TM2DX JN09tt 804km, OZ5GX/P JO57fj 702km, 9A7S JN85ee 722km, F5FNY/P JN36bp 704km, M0BAA/P JO02tg 776km, G1WPF/P JO01kj 827km, LA0BY/P JO59ix 981km. 6./7.9.97 F1RAD/P JN25vv 784km, F6HYE/P JN36bp 704km, F6KCP/P JN18nu 738km, TM2DX JN09tt 804km, OZ6ABA JO57dj 704km, HB9S/P JN36do 700km, G4LIP/P JO01qd 795km, G4PIQ JO01mu 814km, I4XCC JN63gv 815km.

**DG1DCN, JO41BD, 480m asl, wkd >500km:** 8.9.97 2200 F6CGJ IN78rk 956km. 21.9.97 1953 GW4FRX IO82mr 779km, 1956 GI6ATZ IO74aj 1012km. 23.9.97 0914 GM4JJJ IO86gb 938, 1119 G4CYA/M IO93fi 702, 1518 GD4XTT IO74tf 908. 29.9.97 1934 F5MSC IN99ep 710, 2015 F6GBZ JN09ej 594, 2121 FB1AYS JN09mg 545, 2134 F1BBK JN08pp 563, 2245 GU6EFB IN89rk 780. hrd: OY (due QRL no time fr pile-up hi), GB3NGI IO65 559, FX3THF IN88 599 Rig: 100w, 9ele. Every sked (also MS) is very welcome via dg1dcndb0bid.#hes.deu.eu or E-Mail "marc.noekert-online.de" tnx fr info Mark

**DG1DCN, JO50AN, wkd >600km:** 28.09.97 0455-0843 OK2VYG/P JN99JQ 648km SP9EWU JO90NH 643, G0KPW JO02OD 637, HA3UU JN96JO 778, S53VV JN65UM 623, HA8CE KN06EN 879, HG1DLZ JN87HF 607, OK2XUM JN99FO 609, HG8UG JN97SA 798. Rig: 100w, 2 x 9ele. tnx fr info Michael

**DG7EAI/A, JO31NH, wkd:** 21.9.97 OY9JD. 28.9.97 0943-1647 G8GXP IO93FQ 642km,

SM7FMX JO65KN 606, GM4OGI IO85DX 880, GM8LFB IO88JH 1019, G4XNL JO00DS 620, GI6ATZ IO74AJ 941, G8GXP IO93FQ 642, G4CUI IO93FI 630, G4KUX IO94BP 706

**DH0GHU, JN38VN, wkd:** 19.7.97 G4SIV/p JO03CE 739km. 3.8.97 9A2AE JN86HF 713km. 5.8.97 OZ5W/p JO64GX 785km, DJ1SHF/p JO73AJ 693km. 24.8.97 IA5/IK1VCI JN52ER 679km. 06.09.97 EA3TI/p JN12IK 787km. 7.9.97 EA2LU/p IN93IA 935km. 8.9.97 F6CGJ IN78RK 908km, F6FAI IN88DK 846km. 22.10.97 GW8OQV IO81QR 821km, G7RAU IO90IR 697km. Rig: 20 or 100W, 11 ele DL6WU, 12m agl. tnx fr info Ulrich

**DH0LS, JO61II wkd:** 1./2.11.97 in MMC: 9A5Y JN8500 720km, 9A3PA JN85el 706, G4XBF/P JO00ew 860, G4SWX JO02pb 789, G4PIQ JO01mu 806. tnx fr info Jens

**DJ1SHF, JO73AM, wkd:** 22.9.97 GW4ZQV IO81LQ, G0KPW JO03OD, G4OGG IO92RC, EI2FIB IO63RK 1374km at 2138 ut, GM4YXI IO87WP, GW4FRX IO82MR.

**DL1EJA, JO31DS, wkd:** 18.9.97 GU3EJL 1810 IN89VR. 21.9. 1456-1843 GD4XTT IO74TF, MD1BYG IO74RD, GD3TNS/P IO74SE, GI6ATZ IO74AJ, OY9JD IP62OA, GI1XLK IO74AQ, GI4GVS IO744CR, OK2ZZ/P JN89AO. 22.9. 1512 GM4CXM IO75TW, 2035 9A2AE JN86HF 27.9. 1032-1521 GI6ATZ IO74AJ, GD4XTT IO74TF, LA2PHA JO38IB. 29.09. 1812-2017 F5MSC IN99EP, F6IIZ IN78RI, F1CKO JN06FS, F9OE/P IN78QF, F5SSX IN78VI. 30.10.97 LA0BY/P 2029 JO59IX 953km. 1.11.97 1132-2328 OK1AMI/P JN79US 698km, OM3KEE JN88UU 872, OE5X JN78DJ 683, OE3XKW JN77XX 810, I2FAK JN45OB 776, OL2R JN89AO 727, OE5D JN68PC 645, F6ETI/P IN87KW 789, OL7M JO80FG 730. 2.11.97 OK1FUM/P JO80BJ 703, 9A1EZA

JN86HF 972. Rig: 750w, 24 ele. tnx for info Oliver

**DL2IAN, JN49, wkd:** 7.9.97 0938 EA2LU/p IN931A 991km. 9.9.97 1810 F6FAI IN88DK 869km. 2.11.97 0704-1017 9A1EZA JN86HF 711, OK2KFM JN99FN 749, OM3W JN99BB 727, HA2KSD JN87VE 747, HG7P JN97KW 801. Rig: 100w, 4 x 9 ele. tnx for info Tom

**DL8EBW JO3INF wkd:** 19.7.97 2002 GM4ZAP/p IO85 775km. 21.9.97 hrd: 1640 GB3NGI IO65 (983), 1648 GD4XTT IO74 (841), 1847 OK2ZZ JN89 (675), wkd: 1656 GW3ZTH/p IO81 (740), 1809 GI6ATZ IO74 (944). 22.9.97 hrd: 0450 GB3NGI IO65 (983), 9A2AE JN86 (890), wkd: 1833 SP1EOI JO73 (566). 23.9.97 hrd: 0500 GB3NGI IO65 (983), 0525 EI2FIB IO63 (800km) from my car with L5/8, 1610 GB3NGI IO65 (983), 1617 GD4XTT IO74 (841), 1830 EI3GE IO63 (920), 1835 G3GNR IO70 (787). EI7FJ/p IO62 (946), wkd: 1555 SQ1DNM JO73 (566), 1848 F6CGJ IN78 (890). 25.9.97 wkd: 1728 OE2JG/2 JN67 (575). 27.9.97 hrd: 1551 G8GXP IO93 (647), wkd (mit 20Watt!): 1440 HB9FAP/p JN46 (486), 1510 LA2PHA JO38 (760). 28.9.97 hrd: 1835 SP1EOI JO73 (566). 29.09.97 hrd: 1905 FX3THF IN88 (803), 2009 F9OE/p IN78 (906), wkd: 1908 F1CNB JN09 (520), 1924 F5MSC IN99 (643), 1948 F6GBZ JN09 (531), 2029 F1CJP JN08 (515). 30.9.97 hrd: 0510 FX3THF IN88 (803), 5.10.97 hrd: 1113 FX3THF IN88 (803), 1710 DH8BQA/p JO73 (531).

**DL8EBW wkd from JO30gu > 700km (MMContest):** 1./2.11.97 9A5Y JN85 (981), F5RBT/p JN05 (778), F6DBB IN96 (707), G0TUX IO92 (757), G3YIY IO70 (796), GW3ZTH/p IO81 (707), HA2KSD JN87 (915), HG1W/p JN87 (832), HG7P JN97 (948), I4YNO/4 JN54 (794), I5YDI/5 JN54 (797), IK4DCX JN64 (883), IK5VLO/5 JN54 (811), OE3XKW JN77 (752), OK1FFG/p JN89 (727), OK2KFM JN99 (859), OK2KJU/p JN89 (800), OK2KMT JN88 (824), OK2KYC/p JN99 (860), OK2OAS JN89 (706), OK2PHM/p JO80 (725), OL7M JO80 (703), OM3F JN88 (820), OM3KEE JN88 (830), S53VV JN65 (796), S57C JN65 (808), SM7WT JO65 (703), SP2FAX JO83 (807), es SP6ASD JO81 (729) - at all 310QSOs in MMC / 81 of them >500km! Rig: 400w 11 ele. tnx for info Guy

**G0FIG, IO90UU, wkd >600km:** 7.9.97 EA2LU/P IN931A 875km, HB9S/P JN36DO 675, EA3TI/P JN12IK 968, DK0FLT JN49WS 731. 9.9.97 DF1CF JN57FP 857, HB9QQ JN47KJ 769, HB9STY JN36IP 694, HB9DFG JN37SM 679, HB9SLO JN36LT 679. 10.9.97 DF1CF JN57FP 857, HB9AOF JN36AD 701, DG4GAN JN48NC 745, F5QA JN36BG 694, HB9FAP/P JN46EW 768, HB9BQU JN37WB 730, OE9NHI JN47UL 818, F1OWN JN25IT 671, F6KEX JN25PO 715, F5TV JN15RQ 638. 17.9.97 OE2JG/2 JN67NT 1028, DL4RAT JN57UV 928, DH0GHU JN38VN 634, DJ2KUA JN49FD 653, DK0OG JN68GI 965, OE3LFA JN88CH 1220, DL5NEB JN59KV 798, DL4NAZ JN58JR 829. 22.9.97 OZ5AGJ JO56DF 919. Rig: 400w, 2x9 ele, 50m asl. Tnx for info Alec

**G1ZCW, JO03AG, wkd:** 22.9.97 SP1EOI JO73GN 959Km, DK5KK JO63EX 815, DL3KVR JO64AC 793, DG0RG JO62JV 850, DG0KT JO64AD 794, OZ1IEP JO65ER 839, DL4NVC JO73CK 938, SP4MPB KO03GS 1351, OZ1BNN JO55PM 768, SP2IQW JO94GM 1215, OZ7M JO55EJ 708, SP2SGZ JO82UU J178, SM7HWD JO65OT 892, SP4CHY KO03SS 1416, SQ3VAA JO72OW 1010, SP3SFN JO82TM 1179, SH7ABV JO65RL 900, DB7LN JO44VL 651, DK1CB JO53CL 673, DF4LY JO44SL 635.

**GM4CXM, IO75TW, wkd:** 21.9.97 DF6YH JO41KW 975km, PA3GMD JO21RN 810, DJ6JJ JO31LG 911, DF8IK JO30JT 935, PE1AGJ JO20XX 879, DF1CF JN57FP 1373. 22.9.97 F1CYB JN17XT 1069, DL7AKA JO62QO 1121, SK7VC JO65OR 1099, DL1EJA JO31DS 840, SH7ABV JO65RL 1119, DG2BC/P JO43C 868, DG0RG JO62JV 1161, PA3FJY JO32EH 809, OZ2N JO57CW 913, DL1UU JO62SP 1219, DL4AO JO42NX 933, PE1LAU JO33MD 935, OZ5AGJ JO56DF 911, PE1RKQ JO33NE 803, DK9OY JO52CK 1026, DL4ABJ JO42XP 1000, SP2FAX JO83VA 1466, SM7FMX JO65KN 1081, SP2OFW JO93AC 1478, OZ1ELF JO45TL 880, SP3SFN JO82TM 1477, SP1EOI JO73GN 1242, DK5KK JO63EX 1092. 23.9.97 DL7UK JO41SX 1012, DL8YET/P JO32TC 893, ON4PS/P JO20KQ 848, DB8KJ JO30CM 927, DF7KF JO30GU 919, PA3GKY JO30AU 893, DL2KBX JO30EM

936, DL8YET JO31NF 923, ON5VU JO30AP 909, ON4KRI JO20VQ 893. Rig: 400w, 2 x 16 ele.

**ISWBE, JN53, wkd: 6./7.9.97 EA5FKX/p** in IM98 1115km.

**LA0BY/p, JO59IX wkd >700 km:** 6.5.97 DH8BQA/p JO73CF, OH0AB JP90XI. 3.6.97 DL5ME JO52SD, PA3CEE JO33JI, PE1LCH JO23WF, PA3HBH JO33HF, OH0LIZ KO09KW, OJ0/DL3YEL JP90NH, OH2AAQ KO29FX. 6.7.97 SP1EOI JO73GN, DL3SWS/p JO53WH, DL5SWB/p JO63AR, DF1HC/p JO53WH, DF0YY JO62GD, DL5UH/p JO74AA, DL0OU/p JO43WJ, DL8CMM/p JO52VM, DF0TEC/p JO73CF, SP1FPG JO73GN, DK5DQ/p JO31AG, DK0HF JO42IC, PI4GN JO33KK, DG6QF/p JO61NB, DJ6OL/A JO52EQ, DL1SUZ JO53UN, DF0MTL JO61JF. 5.8.97 DK3WG JO72GI, DL7AKA JO62QO, DL8CMM JO52WO, SH1AAJ/1 JO96BW. 2.9.97 DL1SUN JO53PN, SH1AAJ/1 JO96BW.

**LA0BY/p, JP41UA wkd: 9.8.97 OZ6ABA JO57DJ, OZ5AGJ JO56DF, DG6LS JO54AL, SK6HD JO68SD, OZ5KM JO45VX, OZ1FDJ JO65FR, DL9MS JO54WC, OZ1IEP JO65ER. 10.8.97 OZ3GW JO56DR, DL9MS JO54WC, OZ1IUP JO57GH, OZ9AEG JO57FJ. 11.8.97 PA3FBN JO33JI, OZ9IT JO46HW. 12.8.97 PE1LCH JO23MF, DL3LBK JO54AH, DL8UD JO44, OZ1CTZ JO46AL, DK2AM JO43AM, SM0KAK/0 JO99BM. Tnx for info Stefan**

**PA3BIY JO22EB wkd: 3.6.97 OY9JD IP62OA, 970603 LA2PHA JO38ID, LA1E JO38DO, GM0HTT IO89JC. 4.6.97 GM4CAQ IP90. 2.7.97 GW0KZG/MM IO96XB. 20.7.97 GM8LFB IO88JH, GW0KZG/MM JP23ET 1306km. 21.7.97 GW0KZG/MM JP12AW 1216km (59!), GW0KZG/MM JP02QO, GW0KZG/MM IP91XX. 5.8.97 GM4DHF/p IO89QC. 12.8.97 SM6/DL2ARD JO58PI. 23.9.97 SP4MPB KO03GS. 27.9. OK2BLE JN99FN. 29.9.97 F9OE/p IN78QF, F6IIZ IN78RI. tnx for info Peter**

**SM6USS, JO67AT, wkd: 22.9.97 OK1VMS MIREK JO70GU 791km, G0AFH JO01EI 1039, GU3EJL IN89VR 1296, PE1PZS JO21DV 824, OK2UCM JN99FN 1010, F6CGJ LOUIS IN78RK 1516, G0MJW IO91JO 1095, G8FMC IO91P 1054, G0KPW JO02OD 936, G0AFH JO01EI 1039, G3YVR IO91WD 1080.**

**SP4MPB, KO03, wkd: 22.9.97 GW + G 1600km.**

**SV1WE (Op SV1BTR), KM08, wkd: 6./7.9.97** VHF Region 1 contest: 200 QSOs, aver. 600km!, 45 QSOs 1000km mostly to northern Italy. QDX: 5A1A and 5A28 in Tripoli/Libya, 1300km.

**S75C, JN75, wkd: 6./7.9.97 LZ1KWT KN12**

**YO5KAV/p, KN16JS, (Op YO5TE) 1836m asl wkd: 5.7.97 DF0BV JN58VF 841km. 6.7.97 SP2FAX JO83VA 781km. 6.9.97 DK0OG JN68GI 788km. 7.9.97 OE2CAL JN67NT 738, SV4BGY/P KM19HS 780, OK1HRR JN79FV 707, OK1OTS/P JO70LJ 703, DL2RL JN58PE 878, DL1MGZ/P JN57QW 869, OK1KKD/P JO60NF 809, OK1DTG/P JO60NF, IV3HWT JN65ST 718, OK1OPT JN69OL 772. Rig: 200w, 4 x 10 ele. tnx for info Nelu**

**70cm > 500 km**

**DB3VE/P, JN39PN, wkd: 1./2.10.97 F6GPT/P IN94SW 778km, F8XT/P JN05AI 718, F6KPL IN99IO 619, F5FEN/PJN24BW 567, OK1KNG/P JN69VN 469, DK6HA/P JO53IO 508, OE5D JN68PC 468, G4LIP/P JO01QD 455, G3GHN/P JO00HU 496, G4DEZ JO01IN 515, G1WPF/P JO01KJ 498, OK2PWY/P JN89NX 708, OK2TT/P JO80IB 678, OK1KPA JN79US 606, OK1KLL/P JN79IW 535, OK1AIY/P JO70SQ 601, OK1SC JO70OB 571, OK2ZZ/P JN89AO 631, OL7M JO80FG 661, S53J JN75EV 668, F1BJD/P IN98WE 564, G3JHM IO91LC 616, OE3XKW JN77XX 659, IW1QBJ/I JN44GK 578, G8OHM/P IO92GB 674, G3CKR/P IO93AD 755, IW1BCW JN45IA 516, G3GNR JN70WT 824, G4YTL IO92MB 643, G6SPS/P JO01IT 527, G4PBP IO82WO 739, G3SDC/P IO92JL 677, OE2CAL JN67NT 470, G4DDK JO02PA 503, G7VHW IO92JL 677, G8JVM IO82SP 762. Rig: 90w, 2 x 28ele. tnx for info Ernie**

**DG1DCN, JO50AN, 815m üNN, wkd >500km:** 28.9.97 0503-0757 SP9EWU JO90NH 643, HA8VF JN96UW 814, HG1DLZ JN87HF 607, 9A2SB JN95GM 843. Rig: 80w, 23ele. tnx for info Michael

**DG7EAI/A, JO31NH, wkd 70cm: 28.9.97 1410-1814 G8GXP IO93FQ 642, G6CYA JO01OT 412, G7TYV JO02OB 416, G4DEZ JO01IN**

445, G4TVR IO93CJ 647, G4KUX IO94BP 706, DG1VL JO61WC 470.

**DG3FK/PJO40XL wkd:** 4/5.10.97 OK2PWW/P JN89NX 513, OZ6HY JO45WA 505, S50C JN76JG 588, OE3XXA JN88CH 512, S59ACM JN66WA 574, OZ5BAL/PJO55KR 587, OZ1SDB JO44XX 500, OE3JPC JN88EB 537, FIJGN JN19GV 532, F5HRY JN18EQ 582, F6HMQ JN18DP 589, F6HYE/P JN25VV 596, OE3XKW JN77XX 517, OE3W JN88BA 524, G1WPF JO01KJ 644, G4LIP/P JO01QD 607, HG1W JN87GF 602, S54M JN86CL 640, G3GHN/P JO00HU 659, TM5AVO JN09TD 616, G0FUV JO00CX 688, G6HKM JO01FT 679, G6TTL JO01NI 626, G6CYA JO01OT 628, G8APZ JO01DO 687, G1SDO JO01OT 628, G4YPC/P JO00EW 676, G7HCO JO01GN 669, S51ZO JN86DR 625, G3XDY JO02OB 633, G3FIJ JO01KV 652, G7TYV JO02OB 633, G0FIG IO90UU 723, G4ITE/P IO90MX 770, IK4GNG/P JN64GA 744, G4KGC IO92RG 755, G3AVO IO92UF 737, G8NWM IO92TT 758, G8FBH IO92LL 793, G4PMK IO91IP 796, G3WDG IO92RG 755, G1RDX IO91OO 761, G3JHM IO91LC 776, G8FBG IO91SG 736, F6KPL IN99IO 809, G3CKR/P IO92AD 848, G6DER IO93GN 852, G8GXP IO93FQ 862, G4MJS/P IO92JL 804, G3TPH/P IO92JL 804, G8ZQB IO92JN 806, G4PBP IO82WO 867, G8JVM IO82SP 890, G3LTF IO91GG 805, G7VHW/P IO92JL 804, F8XT/P JN05AI 932, GD4GNH IO74QD 1069km! RIG: TS850 + Transv; 4 \* 17 ele + 2 \* 34 ele 9bv 5/6.7.97 OZ6HY JO45WA 505, F5LJA JO10IA 518, OZ5BAL/P JO55KR 587, OE3JPC JN88EB 537, S50C JN76JG 588, G5LKP/P JO01OC 619, G4LIP/P JO01QD 607, S57C JN65XM 626, S52EZ JN86DT 618, G7OSV/P JO01KJ 644, I4JED/4 JN54OK 678, IK4DCX JN64GA 744, IK4GNG/4 JN64GA 744, I4LCK/4 JN54PD 711, I0WBX/P JN62OW 874. RIG: TS850 + Transv; 2 \* 34 ele (9 lambda DJ9BV) cuagn on 144/432/1296? tnx for info Tom

**DH0GHU, JN38VN, wkd:** 6.7.97 G3SDC/p JO02TG 601km, I4JED/4 JN54OK 528km. 2.8.97 OK1AGE/p JO70GU 548km. 10.9.97 F6APE IN97QI 640km. 17.9.97 G0FIG IO90UU 634km. 18.9.97 DG1VL JO61WC 520km. 21.9.97 F6APE IN97QI 640km. 4.10.97 G4LIP/p JO01QD 542km, DL0OU/p JO43WJ 557km, G3GHN/p JO00HU 575km, I4JED/4 JN54OK 528km,

OK1VMS JO70GU 548km. 5.10.97 OE3XKW JN77XX 608km, G0FIG IO90UU 634km, DJ9KH/p JO42OX 501km, G3CKR/p IO93AD 852km, G1WPF/p JO01KJ 586km, G8OHM/p IO92GB 763km, PI4GN JO33KK 546km, PA6C JO33FB 509km, OE1EMS/3 JN77XX 608km. 22.10.97 OE3LFA JN88CH 621km. RIG: 75W oder 20W, 18 ele, 13m agl. tnx for info Ulrich

**DL2IAN, JN49, wkd:** 5.10.97 0614 OE3XKW JN77XX 589km. RIG: 10w, 2x19 ele. tnx for info Tom

**G0FIG, IO90UU, wkd >500km 70cm:** 9.9.97 F6BSJ JN26HP 590km, F5JNX JN37QT 650. 10.9.97 HB9RDE JN37LI 655, F5FEN JN25JC 743. 17.9.97 DK1FG JN59OP 828, DG7SFL JN49XF 753, DF9PX JN49OL 693, DH0GHU JN38VN 634, DL6WU JN49HT 643, DG6GP JN48MF 733. 4.10.97 over 700km: 1413-1954 F6HYE/P JN25VV 711km, DG3FK/P JO40XL 723, HB9DXG/P JN47RH 811, DK0ES/PJN48TN 757, DK0PX JN48JC 724, DL0FM JN57GN 867, HB9WNL/P JN47RH 811, DL0UL/P JN48UO 761, DG6GP JN48MF 733, DL4MEA JN58JD 854. 5.10.97 0608-1310 OE5NEL/2 JN67RS 1053km, OE5D JN68PC 1027, OE2CAL JN67NT 1028, DF4UE JN48RR 738, DF3SMA/P JN49RB 725, DG7NBE/P JO40XI 725, DL0GTH JO50JP 780. RIG: 75w, 2x19 ele, 50m asl. Tnx for info alec

**I4JED/4, JN54OK, wkd 70:** 4/5.10.97 FIUIM JN28GJ 675 Km, OK2TT/p JO80IB 751, SP9EWO/9 JN99LP 825, OK2KDJ/p JN99BM 771, HG7P JN97KW 707, OK2KJU/p JN89SJ 732, F6HPP/p JN18PG 807Km (why don't you answer to QSL requests from time = to time?) OM3KHE/p JN99JC 776Km, DK0WAL JO61OA 748, F6KBF/p JN18GP 788, DF0CI JO51CH 769, OK2WDC JN89PO 737, OL7Q JN99CL 772, OK2BFM JN89OI 712, OK2KIS JN99JQ 819, OK2KHF/p JN99HO 804, OL7M JO80FG 760, OK2KFM JN99FN 792, SO9DL JN99LN 818, OK2TF/p JN89PV 761. RIG: 8877, 4x23 ele. We are QRV for tropo tests on 144, 432 and 1296 MHz most weekends. Contact= t us via PR or email: Alex, I4YNO@I4EUM email: alex.della@iol.it Alberto, I4JED@I4EUM Tnx for info Alex.

**YO5TE, KN16JS, 1836m asl wkd:** 5.7.97 9A7A JN86BE 514km, 9A2HW/P JN75XV 533, S57M JN76OM 579, S51S JN76QK 568. RIG: 25w, 4 x 27 ele. tnx for info Nelu.

# 6m News

Editor: Joachim Kraft, DL8HCZ

## TEP from ITALY (by IK0FTA):

13.10. 97 A22BW hrd in JN61 (41) wkd in JN33 (IK1EGC) 15.10. TR8CA wkd in JN61 (55) (IK0FTA) 19.10. V51KC wkd (5/9) (all Italy), TR8CA wkd (all Italy), TR8XX wkd (all Italy) 7Z500 wkd S-Italy 20.10. TR8CA hrd in JN61 (51) 22.10. V51KC hrd in JN61 (41), V51VHF hrd in JN61 (529) 24.10. V51VHF hrd in JN61 (539), 9G1BJ wkd in JN61 (59) (IK0FTA) 27.10. V51VHF hrd in JN61 (559) 01.11. V51VHF hrd in JN61 (539), TR8CA wkd in JN61 (41) (IK0FTA, 10JX), TR8XX hrd in JN61, ZS6PJS wkd in JN61 (51) (IK0VAQ) 03.11. ZS6AXT, ZR6VE, ZS6XJ, ZS6PJS, ZS6WB, ZS6BML, V51KC wkd ITALY.

## TEP from Malta / 9H5EE in JM75 reports:

15.10. 1726z 7Q7RM Ron in CW, then SSB, 55(9) both ways. 1810-1822z heard F1BBK and G3FPQ in SpE (in QSO with 9H1AW). 16.10. 2100z ZD8VHF beacon heard peaking to around 539. 18.10. 1735z heard 2 or 3 SP stations in brief SpE or MS. 20.10. late morning and very early afternoon SpE covering many EU areas. 1756-1801z F1MXE SpE at 59, reports TR8CA and V51. 22.10. 1720-1739z V51KC Jack in JG88la (in Okahandia) for the first time with me since 19. March 95. Using his Icom IC-706 he peaks up to 59. 1806-1815z V51KC reappears, now peaking to just 53 up to 1840z. 25.10. 1517z IK0VAQ in brief SpE or MS. 27.10. 1600z V51KC readable with difficulty just above an S3 noise floor. 1608z A22BW also bordering around 50.110 with V51KC but QSYs a little up when I told him. Also just readable above my S3 noise. 01.11. 1448z ZS6AXT, Ivo in KG33, was first in CW at 559 both ways. Then, 1500z ZS6AXT was 55 in SSB, peaking to 59 at one time before he started a QSO with IK0FTA and fading out with me around 1505z. 1848z 7Q7RM in CW and SSB peaking to S3 up to around 1900z 2025z ZD8VHF beacon was just readable in an S6 noise floor. 08.11. at 1242z wkd 9G1BJ, John in IJ99se. He QSYs to 50.120. Ear-

lier, at around 1200z we had ZS6WB Hal and ZS6PJS Paul peaking to 59 in QSB. Paul was still there at 1230z. 73 John, 9H5EE @ 9H1MRL.SLM.MLT.EU

**31.10.97** F2: PY5CC GG54 wkd NH6YK BL11 Hawaii! hrd KH6HI/B 50.065

**29.10.97** TEP: 2246 EA7KW hrd ZD8VHF 539

**23.10.97** PP1CZ hrd 22z: EH8BPX, D44BC, CT3FT

**22.10.97** PP1CZ wkd 22z: D44BC

**19.10.97** 14-18 TEP: V51KC JG88, TR8CA, TR8XX wkd ON, PA, DL, I PY5CC 2143 hrd CS1ACP 579, wkd EH7CD, CT4QP, EH7KW. 2312 wkd KP4EIT, WP4O 2344 wkd 8P9HA on 6 and 2m!!!

**18.10.97** PY5CC wkd CT1AL, EH1YV, CT1HB, hrd CS1ACP beacon.

**16.10.97** TEP: TR8CA, 7Q7RM + A22BW wkd central EU.

**14.10.97** PY5CC 01z wkd JR6HI

**8.10.97** ET3SID, KJ99, wkd: 9H1JN, IW8EQS, 9H1AW. 18z I5MXX JN53 wkd K3RRE, hrd K1DT.

# FAI News

Editor: Georges Vialet, F8OP, "Le Cottage" F-71290 Cuisery

I have received only a very few reports. This is a pity, because lots of FAI-QSOs are taking place and the DUBUS readers want to read about this interesting mode.

Please don't forget to send your FAI logs.

**F6HTJ (JN12KQ)** wkd: 16.05.97 21.55 YU1IO  
KN04 29.05.97 21.43 9A2AE JN86 Mci Michel

**F1SNR (JN33JK)** wkd: 29.05.1997 21.52 9A2AE  
JN86 Mci Yannick

**F6GOE/P (JN15EQ)** wkd: 01.08.1997 23.53  
9A3RU JN85LI 23.59 YU1EV KN04CN Mci Jan

**FISAG (JN26XU)** wkd: 01.08.1997 19.20  
9A3RU JN85LI 19.25 YU1EV KN04CN  
02.08.1997 00.35 S54AA JN76KA Mci Gard

**F8DO (JN26FI)** wkd: 14.08.1997 16.41 9A3RU  
JN85LI 16.45 LZ1KWT KN21JX 16.54 YU1EW  
KN04 16.57 HA3UU JN96JO 17.30 9A4FW  
JN95 Mci Marius

**HA3UU (JN96JO)** wkd: 14.08.1997 16.31  
F6CKZ JN08LH 16.44 F1FIH JN23GS 16.46  
FINPX JN19CN 16.47 F1EYX IN96 16.48  
F1EKO ? ? 16.50 G6YIY IO83EL (1) 16.51  
G1KTW?? 16.54 F1BYA?? 16.57 F8DO JN26IF  
17.16 F/G8MBI ? ? 17.21 G8UY ? ? 17.55  
EA3DXU JN11CX 17.58 EA3ADW JN11CQ  
18.01 EA3DJL JN11CX 18.03 EA3TI JN11DO  
18.17 EA5YB/P JN01XG 18.25 F6FLV JN18 (1)  
After 23 years of VHF activity, it is the first FAI  
QSO's with G. QTF : 250/260 I heard many G  
during this FAI opening, but they were working ES  
with LZ,YO,YU. TKS for infos Janus.



YO5KAV/p in KN16JS during October

# Aurora News

Editor: Norbert Göffsche, DL8LAQ

## DL8EBW (JO31NF) wkcd on 144 MHz:

03.08.97

1715GM4YXI IO87WI 55A hrd 355

01.10.97

1612GM0NAI IO75RU 57A 57A 30

1613SM7BOU JO66 55A hrd 30

1616DL9MS JO54WC 55A 55A 40

1618PA3FJY JO32 55A hrd 5

1620GM0CLN IO85 52A hrd 10

Equipment: FT726R mod. CF300, 11 ele DL6WU, MGF1302, 400W. Thanks for your report, Guido.

## PA3BIY (JO22EB) wkcd on 144 MHz:

1997-04-21

1758 GM4ILS IO87 52A 55A

1997-10-10

2321 SMSBSZ 57A 57A

That was it! I hope next time the same time period will be more productive! 73, Peter. Thanks for report, Peter.

## LA0BY in JO59FW wkcd on 144 MHz:

1997-05-15

1515DK1QH JO42HA 59A 55A 20

1520SP3SUX JO72OR 55A 59A 20

1524DL9MS JO54WC 59A 59A 20

1526DJ0VZ JO30GL 51A 55A 20

1527DL1IU JO62SP 55A 55A 20

1529DL9YFY JO41GV 52A 57A 20

1538SM3AKW JP92AO 52A 56A 0

1548PA0ZM JO32GK 53A 53A 20

1550PA3CEE JO33JI 59A 59A 20

1553LY2BIL KO24PQ 59A 57A 20

1557DG3BEW JO43RJ 57A 57A 20

1559PA3BCP JO32HT 52A 55A 20

1601LY3ED KO14UX 52A 55A 20

1609DK5DQ JO31PH 52A 52A 20

1609OZ7AX/A JO55JI 57A 59A 20

1617DL6BF JO32QI 53A 55A 20

1618DJ3HW JO42LH 52A 55A 20

1621DK9OY JO52CK 59A 59A 20

1623DJ9YE JO43HV 59A 59A 20

1625PA3GTC JO32LR 55A 59A 20

1627SM5EFP JO79WJ 52A 54A 20

1633DL8BDU JO43AA 55A 59A 20

1635DL6CY JO41CU 52A 52A 20

1639OH2BNH KP20LG 57A 59A 10

1643SP2FAX JO83VA 53A 57A 20

1649DL4ABJ JO42BP 51A 59A 20

1655PE1LCH JO23WF 57A 59A 20

1659GM4ILS IO87IP 55A 59A 20

1713DL1SUN JO53PN 59A 59A 20

1997-07-15

1532SM4HFI JP70TO 57A 54A 0

1554LA4XGA JP33VC 52A 55A 30

1601SM1HOW JO97GL 53A 57A 30

1615SM6EQO JO57XP 53A 55A 20

1641PA3BGM JO33CE 53A 55A 20

1645DL8UD JO44UH 57A 57A 20

1704OZ3GW JO56BR 55A 57A 20

1708PA0RDY JO22KJ 55A 55A 20

1756DK1CO JO63SX 57A 59A 20

1800SM5MIX JO78JG 59A 57A 20

1807OK1VMS JO70GU 52A 55A 20

1997-08-03

1615DL1SUN JO53PN 55A 55A 40

1649LY3ED KO14UX 53A 55A 45

1658SM6MNH JO68RD 59A 59A 40

1700PA3CEE JO33JI 57A 55A 30

1701DL8ATV JO52NU 59A 59A 30

1716YL2AJ KO16OX 53A 57A 30

1719LY2BHP/KO05NW57A 59A 30

1721YL3AG KO26AW55A 57A 30

1725LA/DL2ARD JP22NE 55A 55A 20

1742ES5PC KO38IK 52A 55A 10

1749DG7EAI JO31PH 55A 55A 10 SSB

1755DL1KDA JO30FQ 55A 55A 10

1809DG9BEM JO43CA 55A 55A 10 SSB

1831RK2FWA KO04FT 59A 59A 10

## LA0BY/p in JO59IX wkcd on 144 MHz:

1997-09-27

1649ES2RJ KO29JM 59A 59A 30

1652OH2KKP KP20MH 59A 59A 30

1700OH3BYZ KP21TA 53A 59A 30

1706RX1AS KO59FX 51A 57A 30

1715YL2AJ KO16OX 55A 57A 30

1722LY2FE KO05OQ 51A 55A 30

1733OZ1FDJ JO65FR 55A 53A 30

1746OH6JKY KP02QL 52A 53A 30

1752OH3HTZ KP11TM 53A 55A 30

1997-10-07

1700OH6OR KP22BN 53A 55A 30

1704SM4HFI JP70TO 55A 55A 30

1704OH2AAQ KO29FX 52A 55A 30

1708OH2KW KP20IJ 53A 53A 30

1710ES2RJ KO29JM 53A 55A 30

1713OH2BNH KP20LG 55A 56A 30

Continuation on Page 96

Keep the Aurora Reports Coming

# Meteor Scatter

Editor: Norbert Götsche, DL8LAQ

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

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, m = many, nc = not complete, nil = not in log (no reflections!), r = random, s = sss, 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

## DL2IAN (JN49BC) wkd on 144 MHz (complete qsos):

1997-06-06  
04200445 OJ/DL3YEL JP90NH 27 26 25 m 5 c  
1997-07-05  
02150227 SP9PZU/8 KN19 26 26 4 4 1 c  
1997-07-07  
04000450 SM7SJR JO87EB 26 26 10 16 2 c  
1997-07-25  
22002237 LA/DL2ARD JO49 26 26 18 17 3 c  
1997-07-27  
06500710 M/PA3FJY IO70ID 27 27 15 17 4 c  
22002225 SP4MPB KO03GS 28 26 6 10 4 c  
23002310 LA/DL2ARD JO39XR 26 27 11 13 2 c  
1997-08-02  
11001141 15WBE JN53JR 26 26 19 11 6 c  
1997-08-04  
03000322 LA/DL2ARD JP22NR 26 27 10 11 2 c  
1997-08-06  
18001822 EW5M KO22DF 26 26 8 8 2 c  
22002257 IW5AVM JN52NS 26 26 22 34 2 c  
1997-08-09  
06000645 ES2RJ/8 KO28TC 26 27 11 11 5 c  
1997-08-10  
06000640 LA0BY/p JP41UA 27 27 41 m 5 c  
1997-08-11  
19302007 SM/DL2ARD JO58 26 27 9 m 40 c  
1997-08-12  
02550310 YL/DJ1OJ KO36 27 27 7 3 60 c  
04000432 YU7KB JN94XX 26 26 8 8 2 c  
17001752 OH0JFB JP90XI 26 26 24 12 40 c  
18001830 LZ1KWT KN21JX 27 27 6 10 2 c  
19051937 SM3MXR JP80GR 27 26 12 10 2 c  
1997-08-17  
01000111 YU6A JN91PV 26 27 7 8 4 c

Thanks for your report, Tom

## DL3IAE (JN49DE) wkd on 144 MHz:

1997-11-17  
0729 G4ASR 38 38 1 csr  
0806 ES2RJ 39 39 1 csr  
0810 LA0BY/p 39 49 1 csr

|      |            |         |          |
|------|------------|---------|----------|
| 0823 | IK1LGV     | 39 39 1 | csr*1    |
|      | EA7GTF     | 37 37 1 | csr*1    |
|      | F6DRO      | 39 49 1 | 90 csr*1 |
| 0851 | SM4VQP     | 39 27 1 | csr      |
| 0858 | OH6KSR     | 37 27 1 | csr      |
| 0901 | LY2FE      | 39 39 1 | csr      |
| 0905 | SM2GCR     | 39 39 1 | csr      |
| 0923 | EI2CA      | 39 26 1 | csr      |
| 0931 | GM4CXM     | 39 39 1 | csr      |
| 1032 | S57TW      | 39 39 1 | csr*2    |
| 1100 | 1150 OF8UV | 26 26   | 15 c*3   |

Remarks: \*1 Backscatter, QTF 30 deg.; \*2 330 deg.; \*3 2050km. Equipment: 600W output, MGF1302 and 2x10el 9BV yagis.

I think the shower was about the same as last year, but the activity was much higher. Last year people worked SSB MS on 144300, because there was only little activity on 200! About the chaos on 144.2: Of course you have to spread out a little bit. I found activity +/- 7 or 8 kHz. During big bursts I was calling "QSY 5 down" because nobody seems to use the letter system in SSB anyhow. But I made several QSOs after QSY. To me SSB random is big big fun, if the reflections reach a certain lengths. It took me about 5 years to understand how one can be successful in this mode, but now I have the necessary routine and I can "hear or feel" when the burst comes up. I used to be annoyed about the QRO gang and blamed their success on rude behavior. There really is no need for a big station to work SSB MS (although it helps), as profed by many people. Look at LA0BYs results, he was running only 180 Wtts out and made a lot of contacts. What counts is experience and patience and of course the knowledge of the MS procedures! Hope to hear YOU during the next showers, geminids usually is high speed cw shower but Quadrantids can be nice for SSB! 73, Daniel.

## DL8EBW (JO31NF / DL66a) wkd on 144 MHz:

1997-06-01  
05150526 OJ/DL3YEL JP90NH 27 28 10 m 2 cr  
1997-06-02  
04000411 OH0LIZ KO09KW27 26 9 5 2 c  
1997-06-07  
03000400 YZ7MON JN93RV 26 3 5 1 nc s  
05000521 RW1AW KP50EB 26 27 8 13 1.5 c  
1997-06-09  
04000500 SP8RHP KO10EF nil  
1997-07-04  
03150340 GW0KZG/mm JP00 26 27 13 27 1 c  
1997-07-05  
03500445 SP9PZU/8 KN19 27 3 m 0.3 nc\*2  
04550542 GW0KZG/mm JP02 27 27 12 15 3 c  
1997-07-06  
04000441 EA4EOZ IM79WS 26 26 16 18 1 c  
1997-07-07  
03020325 GW0KZG/mm JP24 26 26 10 18 1.5 c  
21452156 LA/DL1UU JP55UB 27 27 10 m 3 cr

# Meteor Scatter

1997-07-10  
0400 0500 TA1ZK/0 KM39AT 3 nc \*4  
1997-07-13  
0457 0542 GW0KZG/mm JP36 26 26 10 14 2 c  
1997-07-14  
0330 0442 GW0KZG/mm JP37 26 26 13 23 3 c  
1997-07-16  
2257 2317 LY2WR/P KO35 27 27 m m 2 c r  
1997-07-19  
0400 0500 LA/DL1UJ JP78TE 26 3 5 0.5 nc \*5  
1997-07-20  
0342 0406 GW0KZG/mm JP45 37 26 15 m 5 c  
1997-07-21  
0407 0426 GW0KZG/mm JP12 28 27 9 m 2 c  
1997-07-25  
0355 0411 SM6CMU/3 JP74 27 27 7 6 45 c  
1997-07-28  
2212 2236 OH/DL1UJ KP24CL 27 27 7 7 1.5 c r  
2332 2356 LA/SM6CMU JP57 27 27 5 3 2 c r  
1997-07-31  
0400 0438 OZ/DL5ME JO45GC 26 3 3 0.5 nc \*8  
1997-08-01  
0100 0200 LA/SM6CMU JP79 26 2 2 0.5 nc \*6  
1997-08-02  
2300 2400 LA/SM6CMU JP88 26 3 1 0.5 nc \*7  
1997-08-05  
0400 0422 SM6CMU/2 JP95 26 38 3 4 27 c  
1997-08-06  
2357 0017 ES/DJ1OJ KO39WI 27 37 12 m 1 c  
1997-08-07  
0100 0110 EW5M KO22CE 27 26 11 m 11 c \*3  
1997-08-09  
0400 0500 OH9NYW KP25GR nil  
0500 0615 CQ1MS IM59 26 26 5 6 3 c  
1997-08-11  
0000 0100 EW6DX KO45JL 26 2 4 0.5 nc  
2352 OK2ZZ JN89 37 59 1 20 c r  
1997-08-12  
0000 0100 YO5KAI/P KN26GR 28 27 5 9 4 nc  
0100 0200 OH8UV/P KP44FJ 26 2 2 0.5 nc  
0400 0500 RW1AW/P KP60BF 37 27 8 14 12 nc  
2200 2300 UR5LX KO70WK26 2 1 0.5 nc  
2310 2330 YO5KAI/P KN26GR 27 m m 15 nc r  
1997-08-13  
0000 0100 OH8UV/P KP44FJ 26 2 4 1.5 nc  
0200 0300 RW1AW/P KP60BF 36 10 m 8 nc  
1997-08-14  
0200 0221 RW1AW/P KP60BF 27 27 6 8 2 c  
0246 0321 LZ2FO KN13? 38 27 m m 10 c r  
1997-08-21  
0332 0416 GW0KZG/mm IO46 27 26 12 m 2 c  
1997-08-23  
0332 0406 GW0KZG/mm IO27 26 26 10 7 1.5 c  
1997-08-26  
0317 0421 GW0KZG/mm IO13 26 26 9 10 5 c  
1997-08-27  
0337 0411 GW0KZG/mm IO12 26 26 12 21 1 c  
1997-08-28  
0400 0500 IS0/IK1LGV JM48HX 26 1 3 0.3 nc  
1997-08-29  
0300 0345 IS0/IK1LGV JM48HX 26 36 8 16 7 c  
0400 0500 OH5LZY KP41KL 26 27 4 7 0.5 nc  
1997-10-02  
0400 0500 OH5LZY KP41KL 26 27 4 5 0.5 nc  
Remarks: \*1 Regular sked to Geir (1320 km), to test MS-Condx (stopped right now, because of equipment prob. at

Geir); \*2 Test with CW-HSCW in 1min sequenz - sri had much qrm and copied nearly nothing - so had QRT at 0445 for next sked! lets discuss the 1 min sequenz for showers! \*3 Test with CW-HSCW in 1min sequenz - this time fine! \*4 1934km \*5 1940km \*6 2075km \*7 2000km. \*8 Completed on tropo.

Equipment: FT726R modified (CF300), 4CX250R abt 400Wts, 11 ele Flexa, MGF1302, DTR (made by DF7KF), ETM9C, RX/TX max 3500lpm, OH5IY Compact-MS-Soft Version 4.2f. Every sked for MS, also with stn wkd before is very (!) welcome. Thanks for report, Guido.

## DL8UD (JO44UH) wkd on 144 MHz:

1997-11-15  
2300 0000 I1DMP JN35SB 16 8 5 nc \*1  
1997-11-16  
0400 0500 IK1PAG JN35SB nil  
0500 0600 YU7KB JN94XX nil  
2200 2300 EI4DQ IO51WU nil  
2300 0000 OH4EA KP32MG 18 15 5 c  
0000 0100 YU1S JN94US 8 5 5 c \*2  
1997-11-17  
0100 0200 LZ1ZX KN32IO nil  
0200 0300 IK4DCX JN64GA 18 29 20 c  
0300 0400 UT8AL KO61WP nil  
0400 0500 IK7UXY JN90DC nil  
2200 2300 I1DMP JN35UB 16 14 5 nc \*3

Remarks: \*1 I have sent from period 4 R27, but i think that was a one way QSO, every period both call's and 27 27 :- (next time Paul. \*2 QSL-Manager for this Clubcall is YU1HQR \*3 Same think as sked one: Nice reflections and from period three I send R27 again. One way QSO good bursts with both call es rpt 27. See you Paul in the next big shower. Equipment: FT-736R, preamp SP2, 200W, DTR, ETM9C, 17 ele F9FT with elevation.

That was a hard night and at 0700 UTC to work, but that's life. Two new squares es one new DXCC, more than nothing. I don't no why so many sked's will miss or they are not QRV? We hope the best for the next year in this shower.

That was my little report from the Leonids 1997. I Hope to hear many station as possible in BCC Contest in December from UA2 in the Geminids. 73 and all time good reflections. Uwe, DL8UD.

## EW5M activity from KO22

Here is short story and results of EW5M activity which took place between 4 and 12 of August 1997.

As you know we are small group of friends with common hobby: HAM RADIO. In the past most of us were QRV only on HF BANDS doing contests, DX-es and normal HF activity. But some years ago we met Michal SP9LCV who was mostly interested in VHF operation, and he convinced us that VHF means not only FM (telephone) operation it but is also very exciting with a lot of possibilities. From this time one of our preferred activities is VHF field operation in contest or via METEOR SCATTER.

3.6 lambda D.19BV 7.5m long yagl

## EW5M camp during sunshine

14 MHz inverted Vee

### EW5M

Two years ago we decided to activate one of Polish squares which was rather rare for many Europeans. We were QRV as SP9ZDN/7 from small city Pinczow in KO00GM square. Most of our activity was via MS and we made finally 77 complete MS QSO's with many EU stations. Of course we were QRV also via TROPO. For some of us it was first MS operation and we were very surprised that it is possible to do QSO on 144 MHz when distance is over 1000 (and more) km. Next year we went to little village Neple which lies near Byelorussia border. As SP9PZU/8 we made 75 complete MS QSO's from KO12SC.

When we returned from KO12 we started to think where should we go for 1997 PERSEIDS. We heard

that KO22 is one of most wanted squares in Europe but KO22 square start 15 km of Polish border and lies in Byelorussia. It means that expedition to KO22 is more difficult and complicated. We start to prepare this expedition in late Autumn of 1996. It was really a lot of paperwork and equipment preparation. Finally we tested equipment in July IARU contest and before contest we made several MS QSO's as SP9PZU/8. We were QRV from KN19EU. There were not a lot of informations before expeditions because we were not sure that everything will go OK. Tadek DL2SDQ got his entry visa in last moment a week before

planned start of expedition. Anyway, on 3rd of August in the morning DL2SDQ, SP9LCV and SP9TCE started on a journey in 2 cars full of equipment to Byelorussia border. In the evening we reached SP8NCJ QTH near Biala Podlaska. Next day in the morning, accompanied by SP8RSE we went to border crossing in Terespol.

I can write a lot, to describe all problems on the border but finally we reached EA3AI QTH in Pieski near Kobrin in the evening 4th of August. After first welcome with local HAM's we set up antennas, transceivers and operating tent. And then we called first CQ on 144.300 MHz. First station in the log was OK2BLE from Lysa Hora 1324 asl and good distance 497 km was achieved. It got dark ...

so we haven't time to set up sleeping tents ... first night we slept on the ground in operating tent. Next day we were forced to set down our 7.5m long yagi ... and during this we had small accident. Major antenna element was broken ... but after repairing we set up our 11m mast again, built HF antenna for VHF NET operation and finished building of our camp. In the early evening we were ready to Meteor Scatter and hard work could start.

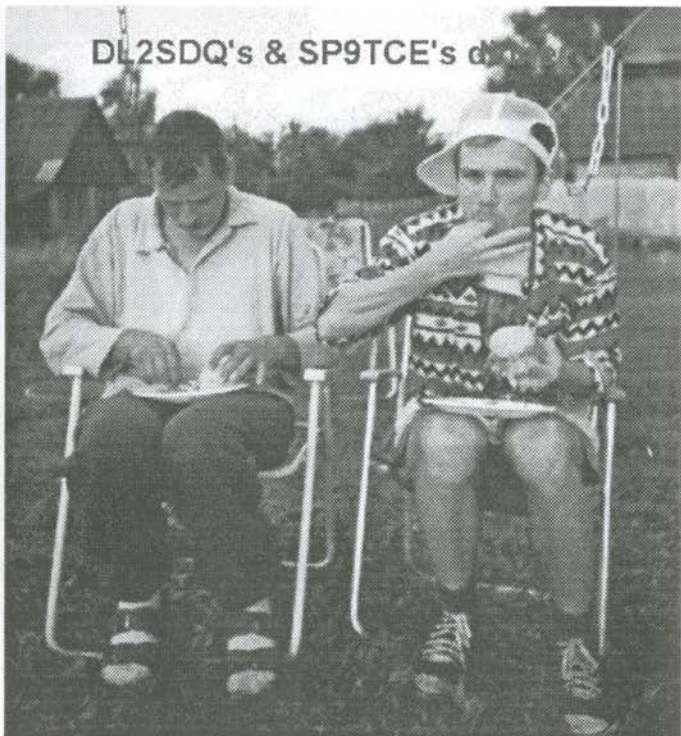
First complete MS QSO we made with G3IMV on 5 Aug 1500-1530 UTC. After 2 day's next operator SP9WZF came by train. He was missed in Brest but Alek EU3AB find him quickly and bring him to us. During next days we were QRV almost 24 hour for a day on 144 MHz TROPO and MS and also on 3.5, 7 and 14 MHz. Our most important goal was to do chance of QSO with KO22 for as many stations as possible ... so HF operation was rather occasional (besides of VHF NET operation - we were QRV everyday).

If you ask ... why we haven't 6m or 70cm with us ... it is also reason, we were concentrated in 90% on 2m band. First night of meteor scatter operation we had strong storm and rain so we were forced to turn off equipment. We could start SKED with IW1AZJ just on 20:35 UTC ... when SKED time was 20:00 UTC. But it doesn't matter ... we finished SKED with Silvio in 20 minutes. Also some TROPO skeds were lost this night ... but it is also no problem, as I can see ... every station who had TROPO SKED with us in the night of 5 Aug made QSO with us later.

We were very surprised of very good activity and reflections first days. Since 9 Aug morning we had 88 complete MS QSO's and only 7 SKED's failed. Unfortunately next days were worse... For several days

we had storm and rain in late evening everyday, but we were still QRV. Second problem was eating. We didn't take our cookmaster girls with us ... so we were forced to eat man-cooked food everyday ... hi! We have job for a cook during next expeditions ... hi! The biggest problem occurred 11 Aug in the evening. During SKED with YU7MS we noticed that our Power Amplifier is out of order ... and nothing is transmitting to antenna. After 3.5 hour of battle with our PA we were able to transmit again but only with 40 watts (first we had 200 watts). During this break, SKED's of: YU7MS, YU7KB, F5JNX and DJ3VI were lost. We are very sorry for this.

Anyway we decided to don't arrange more SKED's ... try to finish already arranged SKED's and went back home. We made 7 complete MS QSO's and one TROPO SKED with this QRP. These stations can say "we had a lot of luck". Everybody can draw



EW5M



### EW5M

a lesson of this accident: "don't wait for maximum and last moment ... it is possible that you will work nobody". We had promised spare PA from one german station ... but finally it was the only equipment that we have not another one (you know Murphy laws ?). When last arranged SKED (with G0CUZ) was successfully finished we start to prepare to come back to Poland. In the evening of 12 August with help of SP8RSE we crossed border and full of impressions reached our last accommodation - SP8NCJ QTH. Next day in the morning we were on the way to SP9 district.

Now we are back home. Here is a summary of our activity. Finally we have some observations and suggestions about Meteor Scatter QSO protocol ... we will try to discuss them in future. There are a lot of things which can be improved, I think.

Equipment: IC-730, Transverter, PA DAIWA 200 W, DJ9BV - 3.6 lambda antenna, DTR, 386SX33 with OH5IY Software (speed up to 4000 LPM is possible)

Operator: Tadek - DL2SDQ, Michal - SP9LCV, Jurek - SP9TCE and Janusz - SP9WZF.

Here are results of our expedition:

135 complete 144 MHz MS QSO's with 71 different squares (46 random QSO's)

104 complete 144 MHz TROPO QSO's with 31 different squares

215 complete HF QSO's (on 3.5, 7, 14 MHz band)

Total: 454 QSO's, 239 QSO's on 2m, 102 squares worked on 2m

Longest MS distance: F6CRP IN96KE 1945 km

Longest Tropo distance: 9A2AE JN86HF 860 km

We didn't drink so much beer like during our last expeditions because some problems with beer providing occurred ... but there was no problem with "high voltage" supply at all ... hi!

QSL info for EW5M operation is the same as for our other expeditions (SP9ZDN/7, SP9PZU/8) via SP9TCE. Direct address: SP9TCE, BOX 246, 44-122 Gliwice 22, Poland. QSL's via buro are also OK. Please remember! I am beer stickers collector ... so any beer stickers or any other beer accessories are very welcome.

Great thanks go to: Kostia - EU3AI (our cordial host), Olek - EU3AB, Andrzej - SP8NCJ (they made a BIG help to get all needed papers) Janusz - SP8RSE (he "smuggled" us safely through the border), Dithmar - DF7KF (he lent us backup DTR), Janusz - SP9EWO (he prepared TRCV for us and helped with tropo activity in south-west direction). Our families (they allow us ... to do "so stupid things" like go to KO22 and do amateur radio ... hi!)

We enjoyed this trip very much. I believe that some stations are satisfied of our work. I think you will hear us via MS in future. Where we will go? Who knows?

73, Jurek - SP9TCE & the crew: Tadek - DL2SDQ, Michal - SP9LCV, Janusz - SP9WZF

(The Tropo-Listing you will find in the Tropo-part)

# **EW5M (KO22CE) wkd on 144 MHz:**

1997-08-05

|                   |        |    |    |    |    |       |
|-------------------|--------|----|----|----|----|-------|
| 1400 1500 F6CRP   | IN96KE | 26 | 7  | 2  | 2  | nc    |
| 1500 1530 G3IMV   | IO91OX | 26 | 26 | 2  | 27 | 1 c   |
| 1600 1700 OH9NYW  | KP25GR | 26 | 27 | 8  |    | nc    |
| 1700 1735 S53VV   | JN65UH | 26 | 26 | 3  | 10 | 2 c   |
| 1800 1850 DL5ME   | JO52SD | 26 | 26 | 4  | 12 | 2 c   |
| 2035 2055 IW1AZJ  | JN35UB | 26 | 26 | 18 |    | c     |
| 2100 2115 IW2BNA  | JN45OB | 26 | 26 | 17 |    | c     |
| 2115 2135 IK1PAG  | JN35SB | 26 | 27 | 5  | 23 | 3 c   |
| 2150 2215 IIANP   | JN44VC | 26 | 27 | 5  | 10 | 4 cr  |
| 2220 2235 DL5MAE  | JN58VF | 26 | 26 | 3  | 17 | 3 cr  |
| 2240 2300 IIKTC   | JN45HK | 26 | 27 | 4  | 14 | 3 cr  |
| 2300 2315 DL1MAJ  | JN58VF | 26 | 27 | 5  | 18 | 5 cr  |
| 2340 2400 I2FAK   | JN45OB | 26 | 27 | 16 | 28 | 5 cr  |
| 1997-08-06        |        |    |    |    |    |       |
| 0300 0400 DL4MEA  | JN58JD | 26 | 27 | 5  | 28 | 2 c   |
| 0400 0425 LA0BY   | JO59FW | 26 | 27 | 4  | 18 | 3 c   |
| 0500 0525 DH2OAA  | JO42TU | 26 | 27 | 1  | 8  | 8 c   |
| 0600 0635 F/G8MBI | JN04FT | 26 | 26 | 5  | 6  | 10 c  |
| 0800 0845 S57TW   | JN75EX | 26 | 36 | 3  | 50 | 2 c   |
| 0900 0930 DK5DQ   | JO31PH | 26 | 27 | 2  | 20 | 1 c   |
| 0930 0950 DL6GYC  | JO41CU | 26 | 26 | 1  | 9  | 2 cr  |
| 1030 1040 DJ5RE   | JN59WI | 26 | 27 | 1  | 7  | 1 c*1 |
| 1100 1200 DF1IAZ  | JN49LD |    |    |    | 19 | nc    |
| 1400 1500 UA4API  | LO20QC | 26 |    | 1  | 2  | 2 nc  |
| 1500 1550 G3KWY   | IO92IS | 26 | 26 | 2  | 4  | 10 c  |

|                   |        |    |    |    |    |        |
|-------------------|--------|----|----|----|----|--------|
| 1600 1700 OH9NYW  | KP25GR | 26 | 27 | 2  | 9  | 3 c    |
| 1700 1720 DK2PH   | JO41GU | 26 | 27 | 2  | 14 | 5 c    |
| 1720 1750 DK90Y   | JO52CK | 26 | 27 | 2  | 17 | 1 cr   |
| 1800 1825 DL2IAN  | JN49BC | 26 | 26 | 1  | 11 | 15 c   |
| 1835 1850 DF5BN   | JN49GV | 26 | 27 | 4  | 7  | 4 cr   |
| 1900 1910 OH5IY   | KP30HN | 26 | 38 | 5  | 10 | 6 c    |
| 1910 2030 OH7PI   | KP32XG | 26 | 38 | 1  | 28 | 1 c    |
| 2100 2145 GM4YXI  | IO97AI | 26 | 26 | 7  | 18 | 10 c   |
| 2145 2200 DJ7OF   | JO51HQ | 26 | 27 | 2  | 8  | 3 cr   |
| 2200 2210 PE1LCH  | JO23WF | 26 | 27 | 1  | 15 | 5 c    |
| 2225 2245 PA3BIY  | JO22EB | 26 | 27 | 2  | 10 | 5 cr   |
| 2300 2310 PA3BZO  | JO21RS | 26 | 27 | 6  | 3  | 10 c   |
| 2320 2340 DL1EAP  | JO31HK | 26 | 26 | 3  | 15 | 5 cr   |
| 2340 2350 G4RKY   | JO01OI | 26 | 27 | 1  | 5  | 8 cr   |
| 1997-08-07        |        |    |    |    |    |        |
| 0000 0020 I5WBE   | JN53JR | 26 | 37 | 1  | 19 | 2 c    |
| 0020 0035 IW1AVM  | JN52NS | 26 | 27 | 7  | 22 | 10 cr  |
| 0040 0100 DJ3MY   | JN58QD | 26 | 28 | 5  | 24 | 3 cr   |
| 0100 0114 DL8EBW  | JO31NE | 26 | 27 | 3  | 8  | 4 c*1  |
| 0128 0138 DL1EAP  | JO31HK | 26 | 38 | 3  | 13 | 3 cr*1 |
| 0200 0220 F6CRP   | IN96KE | 26 | 27 | 5  | 15 | 4 c*6  |
| 0225 0300 DL4ABJ  | JO42XP | 26 | 27 | 5  | 21 | 5 cr   |
| 0655 0705 S54AA   | JN67KA | 26 | 27 | 2  | 6  | 2 cr   |
| 1125 1155 DL8GP   | JN39LH | 26 | 27 | 2  | 12 | 3 cr   |
| 1215 1240 PA3EFC  | JO22HA | 26 | 27 | 1  | 4  | 3 cr   |
| 1900 1910 I4XCC   | JN63GV | 26 | 27 | 3  | 12 | 8 c    |
| 2000 2028 DL1EEX  | JO31MA | 26 | 37 | 2  | 15 | 2 c*2  |
| 2045 2100 DL8UD   | JO44UH | 26 | 27 | 4  | 12 | 2 cr   |
| 2100 2115 DK0OG   | JN48GI | 26 | 27 | 8  | 25 | 6 c    |
| 2125 2135 IV3HWT  | JN65ST | 26 | 26 | 5  | 10 | 8 cr   |
| 2200 2215 DL3YEL  | JO41EV | 26 | 27 | 2  | 15 | 2 c    |
| 2230 2240 DL8CMM  | JO52WO | 26 | 27 | 1  | 6  | 2 cr   |
| 2300 2345 SK6HD   | JO68SD | 26 | 27 |    | 23 | c      |
| 2345 2400 SM6KJX  | JO67CK | 26 | 27 | 1  | 28 | 2 cr   |
| 1997-08-08        |        |    |    |    |    |        |
| 0000 0020 DF8IK   | JO30JI | 26 | 27 |    | 26 | c      |
| 0400 0500 HA5CRX  | JN97UO | 26 | 27 | 2  | 18 | 2 c    |
| 0500 0520 G4YTL   | IO92HD | 26 | 26 | 1  | 30 | 2 c    |
| 0530 0600 DL9MS   | JO52NS | 26 | 26 | 1  | 20 | 5 cr   |
| 0600 0620 IK5JWQ  | JN52NS | 26 | 36 | 5  | 33 | 10 c   |
| 0620 0635 IK5OIY  | JN52NT | 26 | 26 | 2  | 18 | 3 cr   |
| 0645 0700 DK8ZJ   | JO30IX | 26 | 27 | 1  | 16 | 5 cr   |
| 0700 0710 PE1OGF  | JO21QJ | 26 | 36 | 3  | 15 | 1 c    |
| 0800 0815 UA3PTW  | KO93BS | 26 | 27 |    | 12 | c      |
| 0900 0930 OE6IWG  | JN77PK | 26 | 27 | 1  | 8  | 2 c    |
| 1000 1100 9A4EW   | JN59JG |    |    |    | 5  | nc     |
| 1100 1125 F8CS    | JN27UR | 26 | 26 | 1  | 16 | 5 c    |
| 1200 1220 IC8FAX  | JN70CN | 39 | 27 | 3  | 3  | 20 c   |
| 1300 1350 Y07VS   | KN14VH |    |    |    |    | nil    |
| 1350 1440 DK8EL   | JO31LJ | 26 | 26 |    | 10 | c      |
| 1440 1500 DL1KDA  | JO30FQ | 26 | 27 | 6  | 25 | 10 cr  |
| 1500 1600 DJ9MG   | JO52TC |    |    |    |    | nil    |
| 1600 1625 ON4AVJ  | JO11UB | 26 | 27 | 2  | 24 | 4 c    |
| 1700 1730 LA8KV   | JP52QQ | 26 | 27 | 11 | 36 | 4 c    |
| 1800 1835 DG1DCN  | JO41BD | 26 | 27 | 2  | 7  | 3 c    |
| 1900 1935 OH8UV   | KP34VJ | 26 | 47 | 1  | 14 | 3 c    |
| 2000 2020 PA0RDY  | JO22KJ | 26 | 27 | 3  | 33 | 10 c   |
| 2035 2055 PA3BZL  | JO22SB | 26 | 27 | 1  | 10 | 10 cr  |
| 2100 2200 G0KAS   | IO91UI | 26 | 27 | 1  | 33 | 1 c    |
| 2200 2245 IW1ICGB | JN35VG | 26 | 27 | 1  | 29 | 2 c    |
| 2300 2315 PA2TAB  | JO32GF | 26 | 38 | 1  | 8  | 4 c    |
| 2315 2325 G4JRE   | JO01PU | 26 | 38 | 3  | 13 | 2 cr   |
| 2325 2335 DJ5RE/P | JN59   | 26 | 36 | 2  | 11 | 2 cr   |
| 2335 2345 PA3FOC  | JO21FW | 26 | 27 | 7  | 10 | 4 cr   |
| 2345 2355 DL0AO   | JN59WI | 26 | 27 | 3  | 15 | 4 cr   |
| 1997-08-09        |        |    |    |    |    |        |

|                |        |        |    |    |     |    |      |    |
|----------------|--------|--------|----|----|-----|----|------|----|
| 00000010DF9KX  | JO30FQ | 26     | 27 | m  | m   | 15 | c    | r  |
| 00100020DL1KDA | JO30FQ | 26     | 37 | m  | m   | 10 | c    | r  |
| 00200040DK4TG  | JO31FF | 26     | 26 | 5  | 20  | 3  | c    | r  |
| 00400100G0FIG  | IO90UJ | 26     | 26 | 2  | 4   | 3  | c    | r  |
| 03000315IK2DDR | JN55GN | 26     | 27 | 1  | 35  | 2  | c    |    |
| 03200350F6DRO  | JN03SM | 26     | 27 | 2  | 10  | 50 | c    | r  |
| 04000450IK0BZY | JM49   | 26     | 27 | 2  | 9   | 5  | c    |    |
| 045505159A1CCY | JN85OO | 26     | 37 | 2  | 4   | 15 | c    |    |
| 05200540S51AT  | JN75GA | 26     | 27 | 1  | 5   | 3  | c    | r  |
| 06000620DL5DTA | JO61SD | 26     | 38 | 2  | 5   | 3  | c    |    |
| 06450700IW1BCV | JN44FS | 26     | 27 | 1  | 17  | 5  | c    | r  |
| 08000900DG0TU  | JO61TU |        |    |    |     |    | nil  | sc |
| 09000920PA0JMV | JO21PH | 26     | 28 | 3  | 23  | 3  | c    |    |
| 10001030ON4FI  | JO20IV | 26     | 26 | 2  | 18  | 2  | c    |    |
| 10301100F6BSJ  | JN26SP | 26     | 27 | 1  | 19  | 1  | c    | r  |
| 11001110DF1IAZ | JN49LD | 26     | 27 | 1  | 2   | 3  | c    |    |
| 12001300YT4D   | JN49BR | 26     |    |    | 16  |    | nc   |    |
| 13001400RW3TU  | LO25TU | 26     |    |    | 7   |    | nc   |    |
| 14251500IK1EGC | JN35US | 26     | 27 | 2  | 5   | 2  | nc   |    |
| 16001700DF6VW  | JO42KH |        |    |    |     |    | nil  |    |
| 17001730DJ3HW  | JO42LH | 26     | 37 | 1  | 9   | 5  | c    |    |
| 19001930PA3BIY | JO22EB | 26     | 47 | 3  | 9   | 4  | c    | *1 |
| 19301952PA2CHR | JO22XA | 26     | 27 | 4  | 16  | 3  | c    | *1 |
| 20002025IK3VZO | JN55XA | 26     | 27 | 3  | 18  | 5  | c    |    |
| 21002120IW1CHX | JN35VI | 26     | 26 | 2  | 2   | 2  | c    |    |
| 22002240DL1SDN | JN48PP | 26     | 27 | 1  | 3   | 30 | c    |    |
| 22402250DF1SO  | JN48PO | 26     | 28 | 3  | 8   | 8  | c    |    |
| 23002308GIHWW  | IO90UV | 26     | 28 | 5  | 3   | 15 | c    | *2 |
| 1997-08-10     |        |        |    |    |     |    |      |    |
| 00000100G0GMS  | IO91UB |        |    |    |     |    | nil  |    |
| 01000120DL5GAC | JN47SS | 26     | 26 | 4  | 11  | 3  | c    |    |
| 03000320ON4AMX | JO20KU | 26     | 37 | 7  | 28  | 4  | c    |    |
| 03200400DL3LKB | JO54AH | 26     | 26 | 3  | 30  | 1  | c    | r  |
| 04000440DJ5SQ  | JN37UW | 26     | 27 |    | 22  |    | c    |    |
| 04400500DL8GAM | JN37UW | 26     | 27 | 1  | 14  | 1  | c    |    |
| 05000530F8OP   | JN26MM | 26     | 27 | 2  | 2   | 5  | c    |    |
| 06000700PA3DZL | JO22   | 26     | 26 | 4  | 16  | 3  | nc   |    |
| 07000750F6HVK  | JN27QT | 26     | 26 | 3  | 40  | 5  | c    |    |
| 08000900F5JNX  | JN37QT | 26     | 26 | 1  | 14  | 15 | nc   | s  |
| 10001100CQ1MS  | IM59   |        |    |    | nil | *5 | 2800 |    |
| 11001200EA3KU  | JN00JV |        |    |    | nil | *4 | 2170 |    |
| 12001240S57EA  | JN76HE | 26     | 27 | 2  | 3   | 10 | c    |    |
| 13001350S50C   | JN76JG | 26     | 26 | 1  | 18  | 1  | c    |    |
| 14001425SM2KCR | KP03CT | 26     | 37 | 2  | 11  | 2  | c    |    |
| 15001600LZ1KWT | KN21JX | 26     | 37 | 2  | 19  | 5  | c    |    |
| 16001630UA4API | LO20QC | 26     | 27 | 3  | 7   | 5  | c    |    |
| 17001730H1JTG  | JN35UB | 26     | 27 | 1  | 18  | 5  | c    |    |
| 18001850OH9NDD | KP26UM | 26     | 26 | 1  | 11  | 20 | c    |    |
| 19001940G44EP  | IO91NJ | 26     | 26 | 1  | 9   | 5  | c    |    |
| 20002010OH7MA  | KP52BN | 26     | 27 | 1  | 3   | 20 | c    |    |
| 21002200LZ2FO  | KN13KX | 26     | 26 | 1  | 12  | 2  | nc   |    |
| 220022259A1CCB | JN75JO | 26     | 26 | 2  | 5   | 3  | c    |    |
| 22302300YU1EV  | KN04CN | 26     | 26 | 2  | 13  | 3  | c    | r  |
| 23002325F8DO   | JN26IF | 26     | 26 | 3  | 6   | 5  | c    |    |
| 23302355HB9DBM | JN47CD | 26     | 37 | 7  | 10  | 10 | c    | r  |
| 1997-08-11     |        |        |    |    |     |    |      |    |
| 00000100G0CUZ  | IO82WM | 26     | 26 | 2  | 19  | 3  | nc   |    |
| 01000200F5HRY  | JN18EQ |        |    |    |     |    | nil  |    |
| 02000240LA7DEA | JP33VC | 26     | 27 | 5  | m   | 20 | c    |    |
| 03000320DL3IAE | JN49DE | 26     | 27 | 3  | 13  | 10 | c    |    |
| 03200335HB9FAP | JN47GJ | 26     | 26 | 3  | 9   | 5  | c    | r  |
| 04000425PA2DWH | JO22GD | 26     | 27 | 5  | 4   | 4  | c    |    |
| 05000600YU7ON  | KN04AX |        |    |    |     |    | nil  |    |
| 06000630YT4D   | JN94BR | 26     | 26 | 4  | 10  | 10 | c    |    |
| 07000800I81WK  | JN70GR |        |    |    |     |    | nil  |    |
| 0808           | DJ9YIE | JO43MV | 26 | 27 | 1   | 20 | c    | *3 |

|                |        |    |    |   |    |     |     |    |
|----------------|--------|----|----|---|----|-----|-----|----|
| 09001000Y07VS  | KN14VH | 26 |    |   | 2  |     | nc  |    |
| 10001020PA3FJY | JO32EH | 49 | 27 | 1 | 40 | 120 | c   |    |
| 10201100I81WK  | JN70GR | 26 | 37 | 2 | 23 | 10  | c   |    |
| 11001200EA3KU  | JN00JV |    |    |   |    |     | nil | *4 |
| 12001300RM3T   | LO16XG | 26 | 26 | 2 | 9  | 1   | c   |    |
| 150015259A2TE  | JN85JO | 26 | 26 | 2 | 8  | 20  | c   |    |
| 16001700DK0UB  | JO31PK | 26 | 26 | 2 | 9  | 60  | nc  |    |
| 17001800YU7MS  | KN05FJ | 26 |    |   | 4  |     | nc  |    |

At 17.15 UTC our POWER AMPLIFIER crashed. We were not able to work.

18001900YU7KB JN94XX We were  
19002000F5JNX JN37QT not QRV  
20002100DJ3VI JO51BS Very sorry!

After 3.5 hour of battle with our PA we were QRV again but power was only about 40 watts.

21002150UA3TCF LO26IU 26 26 4 12 7 c  
22002215DF7KF JO30GU 26 27 1 18 4 c  
23002325DJ5MS JN68NS 26 27 4 15 10 c

1997-08-12  
00000020G0JUR IO92WT 26 26 2 25 10 c  
01000200UA3MHJ KO87OD 26 26 13 25 4 c

02000215ON4KHG JO10WK 26 26 13 25 4 c  
03000400EA3KU JN00JV 26 26 1 9 2 nc

04000500I5YDI JN54BB 26 27 1 9 2 nc  
06000700ON4P5 JO20KQ 26 27 2 12 2 c

06000650DD0VF JO61VB 26 27 2 10 2 c  
09001000G0CUZ IO82WM 26 26 6 32 120 c

Remarks: \*1 One min. period; \*2 Two min. period; \*3 It is our the only MS SSB QSO! My congrats to DJ9YE; \*4 We tried three times with EA3KU, but haven't enough luck, sorry Fernando; \*5 We were tailender of DL1EAP, we heard reflections of DL1EAP but nothing came from CQ1MS, maybe some days we will break 2800 km, hi! \*6 MS odx 1945 km.

Thanks for your report, Jurek.

#### GM4CXM (IO75TW) wkcd on 144 MHz: 1997-11-17

|      |        |    |    |
|------|--------|----|----|
| 0842 | EA3TI  | 37 | 37 |
| 0848 | S51AT  | 39 | 39 |
| 0848 | DJ9KV  | 39 | 39 |
| 0924 | HB9FAP | 39 | 39 |
| 0925 | IW5AVM | 39 | 39 |
| 0929 | IW1BCV | 39 | 39 |
| 0932 | DL3IAE | 39 | 39 |
| 0933 | DF1IAZ | 37 | 37 |
| 0933 | DL9YIE | 39 | 39 |
| 0933 | DG7RZ  | 39 | 39 |
| 0934 | DL1UL  | 37 | 37 |
| 0940 | F6DRO  | 39 | 39 |
| 1055 | HB9DFG | 27 | 27 |
| 1055 | DF1CF  | 37 | 37 |
| 1056 | IDMP   | 39 | 39 |
| 1102 | EB4GVA | 37 | 37 |
| 1114 | EA2LU  | 38 | 27 |

Equipment: 400W and 2 times 16 ele at 20m.

I was QRV during the Leonids on random SSB only. Not too much time to be QRV so was only active for 2.5 hours. Reflections however were the best I have heard in a long time. Activity on 144.200 was very high (as noted already by Chris HB9DFG). It would certainly help if stations did spread themselves out a lot more but this has always been a problem on SSB Random. There is nothing worse than hearing a raging pile-up and you move to a nice clear frequency and call many times without reply, even with the burst still going strong....it needs a lot of patience and fingers crossed HI. With regard to Chris commending my activity off 144.200, this is not always

the case however, and is dependant on local activity heard from here in Scotland or across in England. GM0BQM (IO85), GM0GMD (IO86) and G8XVJ (IO83) were all audible here so we all take turns to call CQ and try not to QRM each other when a burst occurs, so spread out! 73, Ray GM4CXM@GB7SAN.

# HA5CRX (JN97NM) wkd on 144 MHz:

1997-11-16  
0900 0940 DG9BEM JO43CD 27 27 c s  
1997-11-17  
0600 0640 DH0GHU JN38VN 37 27 c s  
0800 0820 DG5HV JO43XQ 38 38 c s  
0830 G4ASR IO81MX 38 38 c s r  
0900 0940 OZ5AGJ JO56DF 27 27 c s  
1210 1252 PA3BIY JO22EB 26 26 c \*1  
2100 2145 PA2DWH JO22GD 27 26 c  
NC:IK7UXY, NIL: OH5LZY, G4ASR, IW1BCV, EI2CA, UR5LX. Heard on SSB random: DL1EAP, G8XVJ, GM4CXM, HB9DFG, IW0AYZ, ON1ANE, PE1OGF, PA3BIY. Remarks: \*1 One minute periods.  
Equipment: FDK Multi 2700, Cuscraft 13B2, 250W with G17B, preamp CF300, TX OH5IY-MS-Soft, RX DTR by DF7KE.

I am looking for MS-partners during the next shower of Geminids. I prefer CW mode, but SSB is also OK. AX.25: HA5CRX @ HA5OB.HUN.EU - eMail: ha5crx @ ha5kfu.sch.bme.hu - Phone: 00-36-20-284-053 GSM. 73, Jani.

# I4XCC (JN63GV) wkd on 144 MHz:

1997-11-17  
0400 0420 SP4MPB KO03GS 27 27 c  
0500 0520 PA2DWH 39 27 c  
0620 0650 UT8AL KO61 49 48 c  
0656 LA0BY/P JO59IX 48 49 1 c s r  
0704 G8XVJ IO83RJ 49 49 1 c s r  
0745 PA0JMV JO21PL 58 58 1 c s r  
0751 G4HGI 49 49 1 c s r  
0756 G4ASR IO81MX 39 39 1 c s r  
0806 SM4VQP 39 39 1 c s r  
0818 LY2FE 39 39 1 c s r  
0828 DL9MS 39 37 1 c s r  
0830 DJ9YE 49 37 1 c s r  
0830 OZ6ABA JO57 59 59 1 c s r  
0954 OZ6OL 59 37 1 c s r  
1013 DF0WD JO42FD 59 59 1 c s r  
1030 1055 PE1PJG JO33NA 27 27 c s  
1145 G3IMV 39 39 1 c s r  
73, Claudio.

# LA0BY (JO59FW) wkd via MS on 144 MHz:

1997-11-21  
0500 0540 OF8HDL KP34VJ 26 27 7 17 3 c  
Thanks for report, Stefan.

## MS-Expedition to KP44 by DH3YAK, OH8HDL and OH8UV

# OH8UV (KP44FJ) wkd on 144 MHz

1997-08-10  
2000 2100 DF8AA 26 26 7 2 1 c  
2100 2147 LA0BY/P 26 27 m m 10 c  
2200 2218 SM6KJX 37 27 m m 3 c  
2220 2240 DL9MS 27 39 8 5 7 c r  
2240 2300 SP4MPB 27 27 21 3 14 c r  
2300 0000 DJ3HW nil

1997-08-11  
0000 0100 DL8GAM 2 2 1 nc  
0100 0200 DJ5SQ nil  
0200 0300 PA3EFC 26 46 1 1 20 nc  
0300 0336 SM7SJR 27 27 10 1 3 c  
0400 0448 LY2WR 27 27 11 1 2 c  
0500 0514 DF8LC 26 27 15 2 30 c  
0520 0600 SP2OFW - 26 2 1 nc  
0600 0700 G0FIG nil  
0700 0800 G3IMV nil  
0800 0900 DL5DTA 26 26 4 1 2 nc  
2300 0000 HB9FAP 2 nc  
1997-08-12  
0000 0028 DL8LAQ 26 26 14 3 3 c  
0100 0130 DL8EBW nil  
0200 0239 DF7KF 26 26 7 2 6 c  
0300 0332 DL5ME 26 26 11 m 8 c  
0335 0400 DL1IU 27 27 5 2 3 cr  
0400 0443 DD0VF 27 26 7 1 2 c  
0500 0539 PA0RDY 26 27 8 4 23 c  
0600 0700 G4RKY nil  
0700 0800 PA2DWH/PA0JMV tail end nil  
0800 0833 DL1EAP 27 26 4 3 8 c  
0900 0925 DL3LBK 37 38 3 10 cr  
DL9AN 27 28 5 2 3 nc  
1100 1150 DH2OAA 27 27 6 4 3 c  
1555 1609 DJ7OF 28 27 4 3 6 cr  
1800 1850 DL9AN 28 27 6 3 4 c  
1900 1930 DL9YEE 26 27 12 3 6 c  
1940 2000 DL9YCY 26 27 3 nc  
2000 2050 HA5CRX 1? nc  
2050 2200 CQ random! nil  
1997-08-13  
0000 0100 DL8EBW 26 26 3 1 1 nc  
0100 0156 DK5DQ 27 26 6 4 3 c  
0200 0300 DL1KDA 27 8 1 4 nc  
0300 0400 DL3IAE nil  
0400 0500 DL8EBW 26 4 5 1 nc  
0420 0429 DL7AKA 27 27 6 m 15 c  
0500 0600 DL5MAE 26 3 1 1 nc  
0600 0700 OE6IWG nil  
0700 0800 DL4MEA nil

Equipment: FT225RD (MuTek), Beko 300W MosFet-PA, MGF1302 preamp, OH5IY 4.3 Software, Notebook 486SX and DTR+, 15le CueDee on 10 m Alu-Tower.

Thanks for the qso's. We had a lot of fun to work you even if persids where not as good as expected from our qth. Take a look at our webpage for pictures and background infos: <http://www.paltamo.fi/~oh8uv/kp44res.htm>. 73 de Tanja, Markku and Winfried. Thanks for your report, Winfried.

# OZ5AGJ (JO56DF) wkd on 144 MHz:

1997-11-16  
0800 0900 IK7UXY JN90DC 27 2 7 nc  
0900 1000 OE6IWG JN77PK nc  
1997-11-17  
0500 0600 IW1CHX JN35V1 1 c  
0600 0700 S57MSU JN76EF 1 c  
0700 0800 F5HRY JN18EQ 1 c  
0800 0900 YU7KB JN94XX 1 c  
0831 9A1CAL JN86 37 37 cr  
0900 1000 HA5CRX JN97NM 1 c  
0954 S57TW JN75 37 59! cr  
1000 1100 YU7ON KN04AX 27 37 6 3 c  
1100 1200 YZ7MON JN95XA nil  
1130 IK1LGV JN44 27 37 cr

1200 1300IK00KY JN61 nil  
 1900 2000 LZ1KWT KN32IO nil  
 For me it was a good shower with 5 new SQR's and i will be  
 QRV again in the Geminids shower to hear some new call's.  
 73, Benny.

**PA3BIY (JO22EB) wkd on 144 MHz:**

1996-09-14  
 0200 0300 SV/TW1AZJ KM09AJ26 27 9 18 9 c  
 1996-11-17  
 0334 0357 EU6MS KO45IN 27 38 m m 60 cr  
 0840 14DHP 59 59 180 nc sr  
 0929 14YNO 59 59 cr sr  
 0942 1K7UXY 59 59 cr sr  
 1000 EA3DXU 39 37 cr sr  
 1044 EA3TI 59 59 cr sr  
 1996-12-11  
 2017 2037 S51AT 28 28 2 cr  
 1996-12-12  
 0012 0047 LY2BIL KO24 28 27 1 cr  
 1910 1955 S53VV 27 27 nc sr  
 2022 2030 9A5Y 28 28 2 cr  
 2035 2100 S57EA 28 27 3 cr  
 1996-12-13  
 0000 0017 SP2OFW JN93AC 27 27 m m 6 cr  
 0045 0102 YU7MS 27 37 4 cr  
 0130 0150 F6CRP 27 27 nc sr  
 0150 0200 LZ2FO 37 27 m m 5 cr  
 0200 0215 LZ1UK 37 27 m m 5 cr  
 0220 0230 HA1BC JN87 28 27 m m cr  
 0230 0250 YU1BT 27 28 m m 8 cr  
 0255 0310 HB9FAP 29 27 nc sr \*1  
 0315 0330 S53VV 28 27 m m 3 cr  
 0330 0347 S54AA 27 27 5 cr  
 2017 2045 EA/DL3MGL 27 37 4 cr  
 2110 2120 EA3BTZ 27 27 7 cr  
 1996-12-14  
 0125 0140 9A4FW 27 27 m m 5 cr  
 1997-01-03  
 1117 1127 SM3MXR 39 38 20 cr  
 1140 1150 I8TWK JN70 37 27 m m 15 cr  
 1152 1205 DL5MAE JN58 27 27 m m 10 cr  
 1207 1220 F8DO 28 38 10 cr  
 1230 1240 IC8FAX JN70 47 36 20 cr  
 1250 1300 TK5JJ JN42 39 28 10 cr S9  
 1335 1415 EU6MS KO45 27 28 10 cr S9 \*2  
 1355 1415 SM3UZS 39 38 10 cr  
 1500 1515 SP4MPB 37 27 m m 10 cr  
 1800 1900 RZ1AWR KO59 26 2 4 nc  
 2150 2220 RU1AA 27 27 cr  
 0000 0030 Z32UC nil  
 1997-04-25  
 0100 0132 LDK5KK JN51 26 26 6 9 1 c \*3  
 1997-05-17  
 0500 0600 YU7ON 26 3 4 nc  
 1997-05-19  
 0400 0455 HA5CRX 26 26 14 24 3 cr  
 0920 0930 LY2WR KO24 27 27 c \*4  
 1997-06-01  
 0752 0815 OJ0/DL3YEL 27 27 13 21 2 cr \*5  
 1997-06-06  
 2000 2105 HA5CRX 26 26 12 12 1 c  
 1997-06-07  
 0800 0900 OH5AG KP31 26 26 2 9 nc  
 1250 1307 TK5JJ JN42 27 28 10 cufb  
 2325 0007 EU6MS KO45IN 26 27 12 15 1 c  
 1997-06-08

0400 0440 RW1AW KP50EB 27 27 11 12 3 c  
 1997-06-10  
 1225 1247 ISWBE JN53 28 27 m m c  
 1997-06-15  
 0500 0527 HA5CRX 27 26 12 33 1.5 c  
 1997-06-16  
 1020 1047 IK5EHR JN53 26 26 10 27 c  
 0400 0430 SP8RHP nil  
 1997-07-01  
 0300 0323 IK1PAG JN35 27 26 m m 2 c  
 0400 0432 LY2SA KO14 28 27 m m 2 c  
 1997-07-05  
 1440 1500 LA/DL1UJJP54 28 29 m m 1.5 cr  
 1997-07-06  
 0100 0132 EA4EOZ IM79 27 27 26 77 2 c ufb  
 0815 0915 IK1LGV 27 37 c  
 1997-07-08  
 0500 0600 RA3LBK KO65 26 1 2 nc  
 1997-07-11  
 0400 0445 LY2MW KO24 26 26 10 23 2 c  
 2025 2035 LA/DL1UJJP55 26 28 10 10 4 cr  
 1997-07-15  
 0400 0500 LY2WR/P KO35 27 26 8 11 3 c \*6  
 1000 1013 LY2WR/P KO35 28 27 now qro! cr  
 1997-07-16  
 1250 1320 I4XCC 29 27 18 23 2 c  
 1997-07-22  
 0400 0430 S57EA 26 38 2 c  
 1997-07-25  
 2300 2400 OH/DL1UJ KP37 27 1 3 1 nc \*7  
 1997-07-28  
 2307 2332 LA/SM6CMU JP57 27 27 16 23 1 cr  
 1997-08-05  
 2000 2037 IV3VZO JN55XA 27 26 15 23 1 c  
 1997-08-06  
 2225 2245 EW5M KO22CA 27 26 17 22 6 cr  
 1997-08-07  
 2100 2135 9A4WY JN75BC 26 26 7 18 4 c  
 1997-08-09  
 1900 1935 EW5M KO22CA 47 26 11 15 20 c  
 1997-08-10  
 2243 2310 EU6MS KO45 27 28 m m 30 cr  
 1997-08-11  
 2102 2115 RU1AA 38 38 15 cr  
 2115 2152 RW1AW KP60BF 27 28 13 7 8 cr  
 2300 2320 LZ1KWT KN21 27 26 10 8 9 c  
 1997-08-12  
 0130 0203 ES5PC 27 26 11 15 1 cr  
 0706 SM3BEI 37 37 1 20 cr sr  
 0722 LA0BY/P 37 38 1 40 cr sr \*8  
 0948 SM3UZS 37 37 1 10 cr sr  
 0900 0930 LA5TFA KP09JQ nc  
 1400 1500 RA3LBK KO65QA 27 27 7 8 41 c \*9  
 1997-08-13  
 1045 1105 SP4MPB KO03 38 27 12 c  
 1997-08-29  
 0453 0610 IK1LGV JM48HX 27 26 \*10  
 Remarks: \*1 NIL after 1 period; \*2 Ended with a slow speed  
 burst with "TNX PETER". UFB refl, as usual! \*3 Pse TX  
 full callsigns next time when transmitting R report. Only the  
 suffixes nearly ruined the QSO. Fortunately I only missed a  
 part of the suffix when I got the R report; \*4 Experiment with  
 1 minute period; \*5 UFB operation, TNX Ulli! Finally a good  
 2 meter MS operation from OJ0 (at least from the last 15  
 years!!); \*6 QRP test with 5W on both sides. Next will be 1W!  
 \*7 QRB is 2091km. Only got 1 good burst. Tnx for try Wolf!

## Meteor Scatter

\*8 FB reflections! Lots of 30" + bursts from you, Stephan; \*9 Back on MS after 12 years QRT on this mode. Victor produced good CW but he drifts 3kHz in 30 minutes. Beware! \*10 This was not a standard QSO!! PA2TAB could not be QRV because off local QRM, so I called (I had a sked after TAB). Unfortunately things got mixed up and I did not get all complete till the last period. Gabriel got my final rogers, but heard a different report...

SP4MPB is the first station that I have worked on all terrestrial modes: Tropo, Aurora, MS and Es (this year). Iono and TEP excluded, hi!

Gd dx and hope to catch you on MS, Peter. Email:

hoefslot@fcl.tno.nl - PR:

PA3BIY@P18HGL.#ZHI.NL.EU

### PE1LAU (JO33MD) wkd on 144 MHz:

1997-11-17

|      |             |    |    |   |
|------|-------------|----|----|---|
| 0513 | IW1CHX      | 39 | 37 | c |
| 0656 | IV3HWT      | 39 | 39 | c |
| 0706 | 9A3EW JN95  | 39 | 39 | c |
| 0754 | EB4EQZ      | 27 | 27 | c |
| 0806 | EA3BTZ JN01 | 27 | 27 | c |
| 0901 | ES2RJ KO29  | 37 | 37 | c |
| 0901 | 9A1CAL      | 39 | 39 | c |
| 0939 | ES2RJ KO29  | 27 | 27 | c |
| 1104 | EA3BTZ JN01 | 37 | 37 | c |
| 1215 | EA7GTF IM87 | 27 | 27 | c |

73, John.

### YU7EW (KN05HP) wkd on 144 MHz:

1997-11-17

|      |         |        |    |    |   |        |
|------|---------|--------|----|----|---|--------|
| 0704 | G4ASR   | IO81MX | 37 | 37 | 1 | c s r  |
| 0744 | G8XVJ   | IO83RJ | 59 | 59 | 1 | c s r  |
| 0753 | G4AEP   | IO91NJ | 39 | 39 | 1 | c s r  |
| 0805 | SM4VQP  | JO78OX | 59 | 59 | 1 | c s r  |
| 0813 | DJ9YE   | JO43HV | 27 | 39 | 1 | c s r  |
| 0817 | ON4AMX  | JO20KV | 39 | 39 | 1 | c s r  |
| 0818 | DK8EL   | JO31JO | 29 | 39 | 1 | c s r  |
| 0819 | DG6JF/p | JO33QN | 39 | 39 | 1 | c s r  |
| 0830 | OZ6ABA  | JO57DJ | 59 | 59 | 1 | c s r  |
| 0905 | G4HGI   | IO83PL | 38 | 38 | 1 | c s r  |
| 0911 | DJ5BV   | JO30KI | 59 | 37 | 1 | c s r  |
| 0912 | G4CLA   | IO92LJ | 38 | 38 | 1 | c s r  |
| 1027 | SM5GHD  | IO88AN | 39 | 39 | 1 | c s r  |
| 1040 | DH8NAA  | JN49NX | 39 | 39 | 1 | c s r  |
| 1041 | PA2CHR  | JO22XA | 29 | 29 | 1 | c s r  |
| 1044 | LY2SA/p | KO14LL | 39 | 39 | 1 | c? s r |
| 1055 | DL1EAP  | JO31IK | 59 | 39 | 1 | c s r  |
| 1056 | PA3DOL  | JO22MT | 39 | 39 | 1 | c s    |

73, Pista. Thanks for report, Pista.

### Comments

#### F8OP writes:

Since 1997-08-13, F8OP (JN26MM) and F8DO (JN26FI), we have every day a sked with HA3UU (JN96JO). We made more than 80 complete QSOs. The dates: QRG 144.124 MHz, mostly at 0730 UTC, from time to time at 1600 UTC. It is very interesting to see how the conditions are changing day after day, with maximum of MS reflexions during the showers peak (Draconids, Lyrids, Orionids, Taurids,...). The distance between us is more than 1000 km.

HA3UU's statistics:

Perseids 1997: 97 QSO's, 3 NC

Perseids 1996: 116 QSO's

Perseids 1995: 109 QSO's

Perseids 1994: 117 QSO's

Perseids 1993: 118 QSO's

Janus is using 1.5 kW with two antennas: A 9 ele DL6WU for

short distances (DL, PA, ON) and a 15 ele long yagi for long distances.

Interesting: During the Perseids '97 Janus heard OY9JD in SSB (18 sec. S9 burst)! Thanks for comment, Georges.

### IW1AZJ writes:

Nice Leonids, as predicted. We don't meet any storm due radiant below horizon during the maximum, anyway, like past year we note interesting contribute of meteors of high mass (population index 96= 1.8). It will be interesting to know what happened in the other hemisphere. You can find reports on IMO site, next weeks. Between 0600 to 1100 UTC I had 17 qso's in ssb random ... All the friends were qrv ... (few om's at work hi hi) ... best qso's were TA1ZK/2 (sked) at 0500 with one burst of 70 sec. (!) and ES2RJ (odx 1971 km), the new squares #368 and #369. The strongest stations were LA0BY/P and SM4VQP (S9) in accordance with fast shower (71 km/sec). We will meet again next year. 73, Silvio - eMail: srua@mail.tlc.enel.it.

### From the internet: Introducing MS Euro Live!

Hello friends of the hot rocks,

Many of you may have already come across a service called "MS Rocks Live !" by Bob Colyard. This is a webservice that allows near-real-time exchange of messages, very convenient for exchanging last minute news on meteor events or to set up last minute skeds. "MS Rocks Live !" has found wide acceptance by US VHF hamradio operators. Speedwise it's somewhere in the middle between webchat and email.

Following a proposal of Ilkka, OH5IY, I've sent a mail to Bob Colyard, webmaster of the "MS Rocks Live !", asking him if he would set up a service similar to "MS Rocks Live !" and make it a page especially for European users. Well, Bob has been so friendly to dedicate some of his webspace to us "European Rockers". The new service is online since yesterday, Nov 17th, called "MS Euro Live !", to be found under

<http://www.cybercomm.net/cgi-bin/cgiwrap/slapshot/mseuro.sh>

Check it out and give it a try. For those of you with VHF homepages, please set a link to it and help fill Bob's new service with life!

73, Bernie DK3XT/AB7IY eMail [gap@ilk.de](mailto:gap@ilk.de) or [dk3xt@qsl.net](mailto:dk3xt@qsl.net). Homepage:

<http://www.ilk.de/sites/gap/>

"Make More Miles On VHF" or <http://www.qsl.net/dk3xt/>

# News & Comments

Editor: Klaus Tiedemann, DL4EBY

## LY Activity Contest (LYAC)

### Open Class Rules (started from May 1997)

**Participants:** All amateurs outside LY are invited to participate.

**Dates:**

144 MHz, 1st Tuesday, every month  
432 MHz, 2nd Tuesday, every month  
1296 MHz & up, 3rd Tuesday, every month  
50 MHz, 4th Tuesday, every month.

**Time:**

18:00 - 21:59 UTC October-March,  
17:00 - 20:59 UTC April-September.

**Contacts:** All operation in accordance with IARU region 1 bandplans. Any station may be worked, but to classify, QSOs with at least 2 different Locators in LY are necessary (KO14,15 etc...). Contacts via active repeaters and EME are not allowed.

**Modes:** CW, SSB, FM

**Exchange:**

RS(T) and Locator, i.e. 599 KO15NV.

**Points:**

50 MHz and 144 MHz: 1 km = 1 point + 500 bonus points for each new WW Locator (KO14, KO25, JO94, JP70 .....)

432 MHz: 1 km = 1 point + 300 bonus points for each new WW Locator.

1296 MHz and up: 1 km = 1 point \* band multiplier + 300 bonus points for each new WW Locator.

QSO with own WW LOC counts 1 point.

**Band multipliers:**

1,3 GHz \* 1  
5,7 GHz \* 3  
10 GHz \* 4  
24 GHz \* 5

**Logs:** Log must contain: date, time UTC, call, sent RS(T), received RS(T) and Loc, points, bonus points, totals for the page.

Summary sheet must contain: call, name, address (or PR BBS, or e-mail), points claimed, ODX, declaration.

Standard EDI, TACLog formats are welcome. Electronic logs must be in ASCII format.

Logs must arrive at Contest Committee not later than 20 days after the Contest. You may use one of the following addresses:

LY2BIL: P.O.Box 927, 2050 Vilnius, Lithuania  
Packet Radio LY2BIL@LY1BZB.LTU.EU  
e-mail ly2bil@ly1xx.ampr.org

**Results:** Monthly results will be announced in LY PR net and may be sent to participant by PR or e-mail by request. Yearly result will be calculated from only 9 best monthly results (best 6 in 1997).

Awards will be issued to 3 top scorers on every band and 1 top scorer in every DXCC country.

**Notes:** LYAC Contest is parallel to Nordic Activity Contest with exactly the same calculation of points. 5.7, 10, 24 GHz bands are not yet activated in LY. 50 MHz licensing is in process.

This Contest is organized by LY2BIL and LRMD VHF-Committee c/o LY2IC.

73! See you on VHF/UHF/SHF, LY2IC, LY2BIL

I8TWK's Radio Club offers the following new Meteor Scatter contest:

# "ARIETIDS" METEOR SCATTER CONTEST JUNE '98

by POMPEII ARI RADIO CLUB

Our Radio Club ARI of Pompei invites all active meteor scatter stations to join the MS contest that will be held in next Arietids/Z-Perseids showers in 1998. We think that this enterprise, that we intend experimental for this year, on successful results could become the second annual MS contest in European land, after the BCC Geminids Contest held by German amateurs of Bavarian Contest Club.

We mean to better explore, by enhancing MS random activity, the period of June showers, in which easy contacts are possible daily also for portable stations and contributing to stimulate activity from less active European squares and/or lands.

Moreover we intend to give to novices a good chance to learn MS operating techniques in daily comfortable time together with experienced ones, or to call all VHF enthusiasts, that are in a marginal position to work stations from central Europe (with most regard to the South of Italy) via Tropo easily, and work them in this propagation mode.

Experimentally we stated a separate SSB category, as many skilled operators are not enough "CW good takers" or don't own a DTR or similar decoding device but could enjoy themselves in the frequent long bursts of this shower.

## Contest period:

An entire week, from June 08th 0000z to June 14th 2359z.

## Mode:

CW or SSB, in separate sub-bands according to IARU Region I bandplan.

## Participation:

Category I Single operator CW,  
Category II Multi operator CW,  
Category III Single/Multi operator SSB.

One station can participate to both CW and SSB categories, but scores will be separately computed on CW and SSB QSOs. In this case any QSO can be repeated in each mode.

Competing stations can stay on fix or portable site, but they may operate validly during the contest period only from the same QRA Locator.

Portable station will be identified by P letter after their suffix (eg. I1JTQP means I1JTQ portable) or with their call area number; stations operating in foreign territories should add the prefix to their respective call; in contest score will be valid anyway the call prefix owned, not the prefix of the land where is operating the station.

In CW, the numbers "0", "1" and "9" may be abbreviated using the letters "T", "A" and "N", respectively.

Scope of this contest is to enhance random activity, so only random QSOs count for the contest score.

CW timing period will be 2.5 minutes.

SSB period will usually be 1 minute, 15 seconds breaks are allowed.

## Frequencies:

Two meters band. We recommend using the IARU Region I procedure recommendation for the frequency plan. To reduce QRM, QSOs on the calling frequency are not allowed.

To assure this, control stations will be appointed in each country.

Calls will be carried between 144.095 and 144.105, using letter system for the RX frequency

offset (CQA= RX shift +1 KHz, CQB= +2KHz and so on).

If the frequency is not clear enough between 144.100 to 144.126 one may use the extended letter system with two letters, where AA stands for a shift of +26 kHz, BB for +27 kHz and so on.

Only one TX signal is allowed at any time.

In SSB class calling is allowed at 144.400 +/- 20 kHz. We explicitly exclude 144.200 as a calling frequency to reduce QRM with CW sub-band and the 144.300 Tropo DX calling frequency.

## **Reports:**

Full callsigns, reports and final rogers.

## **Scoring:**

A complete QSO counts 1 point. QSO's with I8 zone counts two points. QSOs with following stations by Pompei ARI Radio Club: IK8UHC (club chairman), I8TWK, IK8YOO, IZ8AZB, IW8BOW counts three points. A Special Call IR8POM from our Radio Club (call to be confirmed, under government permission) will be active saltuarly in the period, and counts five points.

To enhance portable activity, any QSO held with a portable station counts double (eg.: if PA0JMV works LA0BY/P his score is two pts.; if he works IK8TOY/P score is four pts., finally if he works I8TWK/P score is six pts.). Dupe QSOs are not allowed, not even in different locations, except if one wants to participate in both the CW and SSB class, where both modes with the same station counts.

Portable station totalize their score like a fixed station, but the final scoring will be multiplied by a factor of 1.5, to take advance of operating efforts from a different location.

(eg.: DL5MAE/P totalizes 35 QSO with fixed station, 2 QSO with portable, 2 with I8 zone fix, 1 with Pompei ARI r.c. fix, 1 with i8 zone portable, 1 with Pompei ARI r.c. portable. Total score:  $35 + 4 + 4 + 3 + 4 + 6 =$  pts 56. Prefix worked 28. Partial score is  $56 \times 28 = 1568$ . DL5MAE/p is portable so his final score is  $1568 \times 1.5 = 2352$ .)

## **Multipliers:**

The sum of any different prefix worked will be the multiplier.

## **Final score:**

Total Points times multiplier.

## **Log:**

Following data must be included: Operator's name, category, callsign, address and QTH locator. Multi-op stations shall add a list of all operators. For each QSO: date, time in UTC, worked station's call, reports sent and received, and possibly antenna QTF for sidescatter evaluation. Complete technical data of equipment and antenna used in the competition. Portable station have to proof of the operation with a photo; in lacking the proof they will be treated as fixed, and will not achieve 1.5 enhancement.

Togheter with the logs, photos of contesting stations are welcome. PAY ATTENTION! QSO details will be cross checked log by log. Writing errors on call and/or received reports cause QSO abolition and 5% scoring penalty. Only three errors are allowed, testers with more than three errors will be disqualified.

Any dupe QSO will be abolited without penalties. Deadline will be 30th June, 1998 (Postmark). Logs must be sent to:

MS Contest, Sezione ARI Pompei,  
Casella Postale 14, I-80045 POMPEI (ITALY)

## **Awards:**

Contest winner will be the station totalizing the highest score. Members of ARI Radio Club of Pompei will be outside from prize assignment. If there should be two stations with equal score, the winner will be the station with the higher multiplier.

The winner will receive a nice price from Pompeian artwork, all country winners will be prized with a nice photo-book of famous ancient Pompei ruins.

All testers will be sent printed results and a nice wiew of our city. A nice QSL card goes to all testers that worked our Special Call station.

## MWS/DXCC '98

Hallo liebe UKW-Freunde, in den letzten Jahren wurde von der VHF-DX-Gruppe DL-West in Zusammenarbeit mit dem *Funktelegramm* (by DL8HCZ) die M(ost) W(anted) S(quare) Liste für den UKW-Bereich ausgearbeitet. Auch 1997 fand diese Liste wieder viel positiven Anklang bei DX-Expeditionären und wurde gerne zur Planung heran gezogen. (Erinnern wir uns gerne an OJ0 und C3 als gesuchte WAEs/DXCCs bzw. an Felder wie JM48,79,88 JN51, IM59,79 JO29,39 JP57,67,74 KO22, 39, KP24, 37, 60 usw. um nur einige Beispiele aus der guten 1997er Aktivität hervorzuheben). Auch dieses Jahr haben wir uns entschlossen, diese Liste wieder aufleben zu lassen. Hier die Spielregeln für die 1998er Liste:

Die Erhebung findet Dezember bis Mitte Februar statt. Einsendeschluß ist dann 98-02-1998!! Somit wird die MWS98 schon im März veröffentlicht werden können und jeder kann sich ein Bild bis zur Sommeraktivität machen, was besonders aktivierungswert ist! Einzusenden sind die jeweiligen meist gesuchtesten Großfelder und DXCC-Länder, ohne jegliche Anzahl-Begrenzung, über deren Aktivierung man sich besonders freuen würde. Jede Station darf nur einmal einreichen! Die eingeschickten Großfelder / DXCCs sollten natürlich im Rahmen der Erreichbarkeit des jeweiligen Absenders liegen (Tropostn. max 1000km, MS max. 2200km)

Hier ein Beispiel zur Einsendung: DL8EBW sucht DXCC: HV, SV/A, T7, TA, ZA, 1A0, 4U1ITU... DL8EBW sucht SQRs: IM57, 67; IO44, 69, 79; IP 04, 13...

Infos bitte an : VHF-DX-Gruppe DL-West c/o DL8EBW G. Jünkersfeld,

Post : Gustav-Freytag-Str.1, D-42327 Wuppertal  
per AX25 BBS: DK0MWX.#NRW.DEU.EU

per AX25 Cluster: DB0AMU-9 oder DF7KF-5  
per E-Mail : dl8ebw@qsl.net oder dl8ebw@rtl.de

Die Auswertung wird via Funktelegramm, CQ-DL, PR und Internet im März 1998 verbreitet! Besten Dank an alle für die Mitarbeit die ausschliesslich einer Aktivitätssteigerung des 144MHz Bereiches dienen soll!!!

### English:

Hello dear VHF friends, in the last years the VHF-DX-Gruppe DL-West, together with the german magazine *Funktelegramm* (by DL8HCZ) have created the M(ost) W(anted) S(quare) list for the 144MHz band. Last year it was quite nice to see that a lot of dx expeditioners have checked this list, before they startet their expeditions and did go to quite rare locators, then (remember the great activity in 1997 from eg. JM48, 79, 88, JN51, IM59, 79, JO29, 39, JP57, 67, 74, KO22, 39, KP24, 37, 60...). Also this year we decided to run this collection of most wanted squares and WAEs/DXCCs again!

Please check the following rules and send your infos as soon as possible. The data will be collected from December to mid February. For address see german text.

Deadline is 1998-02-10!! End of March 1998, we will be able to spread the results on Funktelegramm, PR and Internet so that everybody have a good chance to find a recommended square to activate in summertime. Everybody may send in any number of squares and DXCCs, once, provided, the wanted squares / countries are in a reachable area from the QTH of the sender (Tropo max. 1000km, MS 2200km...).

Here an example for the input file: DL8EBW search DXCC: HV, SV/A, T7, TA, ZA, 1A0, 4U1ITU... DL8EBW search SQRs: IM57,67; IO44,69,79; IP04,13...

The results will be published in Funktelegramm, PR and Internet end of march 1998. Thanks very much to all for the input, because it will cause again a piece of activity for the 144MHz band!

You are invited to send in your reports and articles via EMail / disk, or upload to the DUBUS BBS.

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

Thanks, Klaus.

# DUBUS Toplist

Editor: Norbert Goettsche, DL8LAQ

## DUBUS 50 MHz Top List

| NR | CALL     | WW   | WK  | DC  | TR   | AU   | MS   | ES   | F2    |
|----|----------|------|-----|-----|------|------|------|------|-------|
| 1  | ON4KST   | JO20 | 664 | 143 | 757  | 1415 | 1509 | 7920 | 16498 |
| 2  | PA0RDY   | JO22 | 651 | 0   | 725  | 1617 | 1597 | **** | 16320 |
| 3  | G4IGO    | IO80 | 627 | 0   | 578  | 1308 | 2528 | 7301 | 16188 |
| 4  | DL7QY    | JN59 | 603 | 0   | 741  | 1665 | 2186 | 6900 | 16353 |
| 5  | G4UPS    | IO80 | 603 | 0   | 0    | 0    | 0    | 0    | 0     |
| 6  | ON4GG    | JO20 | 595 | 0   | 741  | 1757 | 1695 | 7243 | 16547 |
| 7  | ON4ANT   | JO20 | 576 | 0   | 710  | 1757 | 1695 | 7243 | 16547 |
| 8  | G6HKM    | JO01 | 552 | 0   | 347  | 1883 | 780  | 5674 | 16112 |
| 9  | ON4PS    | JO20 | 544 | 0   | 751  | 1740 | 1449 | 6520 | 16358 |
| 10 | W4LXO    | IO81 | 500 | 0   | 300  | 650  | 1200 | 7500 | 10000 |
| 11 | DL8HCZ   | JO53 | 479 | 0   | 365  | 1250 | 1356 | 3350 | 0     |
| 12 | PA2TAB   | JO32 | 466 | 128 | 762  | 1370 | 1809 | 5797 | 15339 |
| 13 | I4XCC    | JN63 | 453 | 0   | 707  | 0    | 1427 | 3349 | 18627 |
| 14 | SM6CMU   | JO57 | 424 | 0   | 762  | 1452 | 1642 | 5922 | 0     |
| 15 | F8OP     | JN26 | 419 | 0   | 631  | 1023 | 1369 | 5508 | 13547 |
| 16 | F1GTU    | JN05 | 418 | 0   | 699  | 815  | 1421 | 3268 | 16400 |
| 17 | OK1DDO   | JO60 | 394 | 88  | 620  | 1423 | 1340 | 6100 | 13300 |
| 18 | OK1IBL   | JO60 | 377 | 77  | 530  | 1320 | 1717 | 6941 | 11816 |
| 19 | PA3FYM   | JO22 | 375 | 0   | 1238 | 2019 | 0    | **** | 16373 |
| 20 | SP6GZZ   | JO81 | 375 | 0   | 515  | 0    | 1826 | 8103 | 0     |
| 21 | G8VR     | JO01 | 365 | 0   | 760  | 2154 | 1290 | 8470 | 16416 |
| 22 | DL3AMA   | JO51 | 348 | 70  | 501  | 1431 | 1600 | 7172 | 0     |
| 23 | OK1MAC   | JN79 | 336 | 0   | 0    | 0    | 0    | 0    | 0     |
| 24 | SP4MPB   | KO03 | 333 | 0   | 510  | 908  | 0    | 4700 | 0     |
| 25 | DL9GU    | JN49 | 327 | 0   | 721  | 450  | 0    | 8500 | 15625 |
| 26 | YO2IS    | KN05 | 325 | 0   | 270  | 1155 | 1404 | 6942 | 14292 |
| 27 | OK1FAV   | JO60 | 325 | 74  | 0    | 579  | 1093 | 6250 | 10366 |
| 28 | DL7ARM   | JO62 | 315 | 0   | 909  | 1189 | 1245 | 8324 | 15817 |
| 29 | F8CS     | JN27 | 311 | 68  | 336  | 0    | 0    | 7454 | 9753  |
| 30 | DL4ALI   | JO50 | 303 | 62  | 464  | 0    | 1042 | 3996 | 0     |
| 31 | SM7JUQ   | JO65 | 292 | 0   | 372  | 1349 | 1062 | 3900 | 14070 |
| 32 | OK1FFD   | JO60 | 291 | 74  | 580  | 1231 | 0    | 6250 | 13300 |
| 33 | OZ7IS    | JO65 | 287 | 0   | 410  | 1294 | 850  | 3100 | 0     |
| 34 | OK2ZW    | JN89 | 286 | 0   | 0    | 0    | 0    | 0    | 15580 |
| 35 | ES1CW    | KO29 | 275 | 63  | 421  | 1850 | 1669 | 5251 | 0     |
| 36 | F1FIH    | JN23 | 273 | 98  | 796  | 0    | 1637 | 2492 | 15613 |
| 37 | OK1VBN   | JN78 | 263 | 59  | 455  | 0    | 0    | 5793 | 0     |
| 38 | IK5OYI   | ES26 | 262 | 0   | 332  | 0    | 1444 | 2826 | 8305  |
| 39 | SP6GWB/P | JO80 | 261 | 0   | 696  | 629  | 1880 | 6384 | 0     |
| 40 | DL3YEE   | JO42 | 261 | 0   | 540  | 1056 | 1300 | 2700 | 13053 |
| 41 | HB9STY   | JO36 | 260 | 0   | 367  | 0    | 1431 | 4448 | 7810  |
| 42 | ON5SE    | JN29 | 257 | 78  | 0    | 0    | 0    | 0    | 0     |
| 43 | HB9AOF   | JN36 | 250 | 68  | 500  | 0    | 0    | 5400 | 10663 |
| 44 | DL5BBL   | JO42 | 237 | 0   | 414  | 1008 | 0    | 3975 | 5863  |
| 45 | I3ZVN    | JN55 | 230 | 61  | 532  | 0    | 0    | 5742 | 8422  |
| 46 | DL7YS    | JO62 | 230 | 0   | 342  | 461  | 1086 | 3547 | 8767  |
| 47 | DL8LAQ   | JO43 | 228 | 0   | 0    | 0    | 0    | 0    | 0     |
| 48 | F5DE     | JN05 | 219 | 0   | 860  | 0    | 0    | 2304 | 0     |

|    |          |      |     |    |      |      |      |      |       |
|----|----------|------|-----|----|------|------|------|------|-------|
| 49 | CT1BGE   | IM58 | 215 | 0  | 0    | 0    | 0    | 0    | 0     |
| 50 | G6LEU    | IO70 | 214 | 0  | 700  | 750  | 0    | 0    | 0     |
| 51 | OK1VQ    | JO60 | 212 | 44 | 245  | 539  | 0    | 2002 | 2755  |
| 52 | YL3AG    | KO26 | 208 | 47 | 397  | 894  | 0    | 6420 | 0     |
| 53 | SP5HEJ   | KO02 | 206 | 0  | 568  | 0    | 1838 | 4699 | 0     |
| 54 | YU1VG    | JN94 | 201 | 50 | 1766 | 0    | 1450 | 3666 | 1650  |
| 55 | DL8EBW   | JO31 | 186 | 50 | 247  | 1050 | 1150 | 5800 | 13300 |
| 56 | 9A2EY    | JN85 | 182 | 0  | 438  | 0    | 0    | 0    | 0     |
| 57 | OE3OKS   | JN87 | 172 | 45 | 467  | 0    | 0    | 3519 | 0     |
| 58 | OK2PPP   | JN99 | 170 | 0  | 0    | 0    | 0    | 3200 | 0     |
| 59 | SP6AZT   | JO81 | 169 | 0  | 612  | 0    | 1168 | 4327 | 0     |
| 60 | HB9RUZ   | JN47 | 168 | 54 | 406  | 0    | 960  | 3585 | 0     |
| 61 | PA2CHR   | JO22 | 165 | 0  | 398  | 909  | 0    | 5215 | 13966 |
| 62 | DJ2XS    | JO53 | 164 | 0  | 440  | 419  | 0    | 4155 | 0     |
| 63 | DL2DR    | JO31 | 160 | 15 | 0    | 0    | 0    | 3982 | 0     |
| 64 | OH2BNH   | KP20 | 147 | 37 | 391  | 948  | 0    | 3246 | 0     |
| 65 | DL5GAC   | JN47 | 147 | 0  | 129  | 690  | 0    | 5100 | 11900 |
| 66 | SP5EFO   | KO02 | 147 | 0  | 0    | 0    | 0    | 0    | 0     |
| 67 | OK2XTE   | JN79 | 138 | 42 | 162  | 0    | 0    | 2419 | 0     |
| 68 | DL5IO -  | JN49 | 134 | 0  | 113  | 340  | 900  | 3100 | 12995 |
| 69 | DL5UH    | JN48 | 129 | 35 | 103  | 0    | 0    | 5943 | 0     |
| 70 | DJ6XV    | JO31 | 128 | 0  | 401  | 0    | 1130 | 3232 | 0     |
| 71 | DF1EQ    | JO31 | 108 | 0  | 0    | 0    | 0    | 2769 | 0     |
| 72 | I2FUM/2  | JN45 | 107 | 0  | 137  | 0    | 0    | 2023 | 0     |
| 73 | DK2BJ    | JO30 | 105 | 0  | 275  | 0    | 0    | 1782 | 0     |
| 74 | IN3TWX   | JN56 | 95  | 0  | 396  | 0    | 0    | 1890 | 8100  |
| 75 | DL6BF    | JO32 | 94  | 0  | 0    | 0    | 0    | 0    | 0     |
| 76 | OK1UDX   | JN79 | 90  | 0  | 333  | 1054 | 0    | 1978 | 0     |
| 77 | PA0JUS   | JO22 | 87  | 0  | 325  | 1706 | 0    | 9650 | 0     |
| 78 | SP2JXN   | JO94 | 70  | 0  | 0    | 0    | 0    | 0    | 0     |
| 79 | SM0FZH   | JO99 | 66  | 0  | 502  | 1016 | 0    | 1984 | 0     |
| 80 | DJ6MB    | JO30 | 64  | 0  | 0    | 661  | 0    | 5968 | 0     |
| 81 | OK1DKS   | JO70 | 62  | 34 | 934  | 0    | 0    | 1973 | 8514  |
| 82 | DJ8ES    | JO43 | 57  | 19 | 1306 | 0    | 0    | 2100 | 0     |
| 83 | OK2QI    | JO80 | 51  | 0  | 0    | 0    | 0    | 2149 | 0     |
| 84 | EH1DVY/P | IN82 | 49  | 0  | 467  | 0    | 0    | 2409 | 0     |
| 85 | IW5AVM   | JN54 | 44  | 0  | 371  | 0    | 1712 | 1942 | 0     |
| 86 | PA0RLS   | JO22 | 44  | 0  | 80   | 0    | 0    | 1500 | 0     |
| 87 | LA8AK    | JO28 | 37  | 0  | 250  | 607  | 1145 | 1189 | 0     |

## DUBUS 144 MHz Top List

| NR | CALL   | WW   | WK  | DC  | TR   | AU   | MS   | ES   |
|----|--------|------|-----|-----|------|------|------|------|
| 1  | DK3WG  | JO72 | 639 | 104 | 2243 | 2034 | 2295 | 2782 |
| 2  | DK1KO  | JO53 | 638 | 0   | 2124 | 2057 | 2210 | 3285 |
| 3  | PA3BIY | JO22 | 588 | 63  | 1550 | 2026 | 2205 | 3143 |
| 4  | DK9OY  | JO52 | 573 | 57  | 1651 | 1947 | 2208 | 2434 |
| 5  | DL8HCZ | JO53 | 559 | 0   | 1615 | 1976 | 2096 | 3527 |
| 6  | PA0RDY | JO22 | 551 | 0   | 1582 | 1979 | 2272 | 2819 |
| 7  | DF8LC  | JO53 | 544 | 0   | 2105 | 2045 | 2226 | 3291 |

|    |          |      |     |    |      |      |      |      |     |          |      |     |    |      |      |      |      |
|----|----------|------|-----|----|------|------|------|------|-----|----------|------|-----|----|------|------|------|------|
| 8  | SM6CMU   | JO57 | 534 | 0  | 1760 | 1928 | 2280 | 2540 | 63  | DL7YS    | JO62 | 343 | 0  | 1512 | 1528 | 1826 | 2136 |
| 9  | SM6AFH   | JO66 | 531 | 0  | 1730 | 1554 | 2010 | 2330 | 64  | UT1PA    | KO21 | 340 | 0  | 1901 | 1934 | 1806 | 2425 |
| 10 | DL8EBW   | JO31 | 523 | 60 | 1454 | 1918 | 2030 | 2214 | 65  | SP4MPB   | KO03 | 340 | 0  | 1886 | 1764 | 0    | 2697 |
| 11 | OH5LK    | KP30 | 517 | 0  | 1962 | 2041 | 2235 | 2891 | 66  | YU1WP    | JN94 | 340 | 50 | 1422 | 1850 | 2236 | 2825 |
| 12 | DK6AS    | JO52 | 516 | 0  | 1460 | 1885 | 2510 | 2260 | 67  | SP6AZT   | JO81 | 335 | 0  | 2080 | 1463 | 1710 | 2566 |
| 13 | SP6GZZ   | JO81 | 510 | 0  | 1670 | 1794 | 2017 | 2717 | 68  | G3LQR    | JO02 | 333 | 0  | 1776 | 2031 | 0    | 2406 |
| 14 | HA1YA    | JN87 | 509 | 71 | 1548 | 1876 | 2183 | 2885 | 69  | OK1DKS   | JO70 | 333 | 56 | 1230 | 1308 | 0    | 3530 |
| 15 | OE3JPC   | JN88 | 504 | 0  | 1584 | 1821 | 2128 | 2769 | 70  | DJ1LP    | JO64 | 331 | 46 | 1347 | 1071 | 2058 | 2301 |
| 16 | SP9EWU   | JO90 | 498 | 0  | 1710 | 1927 | 2154 | 2531 | 71  | DL5GAC   | JN47 | 330 | 0  | 1264 | 1876 | 2135 | 3079 |
| 17 | I2FAK    | JN45 | 493 | 0  | 1797 | 1508 | 2405 | 2995 | 72  | F6DKW    | JN18 | 327 | 51 | 1519 | 1602 | 2051 | 2755 |
| 18 | OZ1DOQ   | JO65 | 467 | 58 | 1885 | 1940 | 1981 | 2888 | 73  | EA1DVY   | IN81 | 323 | 0  | 1946 | 0    | 0    | 2064 |
| 19 | DL8LAQ   | JO43 | 460 | 0  | 1376 | 1806 | 1934 | 3302 | 74  | OK1MG    | JO70 | 319 | 49 | 1526 | 1590 | 0    | 2632 |
| 20 | ON4GG    | JO20 | 459 | 0  | 1420 | 1965 | 2150 | 2124 | 75  | DK1KR    | JO53 | 315 | 0  | 1481 | 2103 | 0    | 2026 |
| 21 | I4XCC    | JN63 | 453 | 0  | 1177 | 1803 | 2275 | 3257 | 76  | DH3YAK   | JO31 | 314 | 54 | 1424 | 1162 | 1860 | 2650 |
| 22 | PA3FOC   | JO21 | 446 | 0  | 1373 | 2010 | 2209 | 2326 | 77  | PA0RLS   | JO22 | 311 | 0  | 1350 | 1890 | 1890 | 2832 |
| 23 | OK2ZW    | JN89 | 445 | 0  | 1417 | 1775 | 2113 | 2471 | 78  | SP3MFI   | JO91 | 307 | 0  | 1697 | 1632 | 1802 | 2617 |
| 24 | DL2NWK   | JO63 | 441 | 0  | 1819 | 1956 | 1991 | 2251 | 79  | ES2RJ    | KO29 | 307 | 0  | 1190 | 1866 | 1850 | 1953 |
| 25 | DL5DTA   | JO61 | 436 | 56 | 1344 | 1578 | 1907 | 2057 | 80  | UA3TCF   | LO26 | 306 | 0  | 1131 | 1996 | 2498 | 2332 |
| 26 | PA2CHR   | JO21 | 432 | 0  | 1432 | 1683 | 2240 | 3201 | 81  | SP9HWY   | JO90 | 303 | 0  | 1698 | 1928 | 0    | 2532 |
| 27 | DL7FF    | JO62 | 430 | 0  | 1516 | 1379 | 2057 | 2312 | 82  | DL6BF    | JO32 | 303 | 0  | 1542 | 1932 | 1452 | 2332 |
| 28 | RX1AS    | KN59 | 427 | 0  | 1709 | 1905 | 2271 | 2547 | 83  | G4YTL    | IO91 | 303 | 0  | 1450 | 1774 | 2143 | 2172 |
| 29 | OK2VMD   | JN89 | 425 | 0  | 1662 | 1765 | 2031 | 3605 | 84  | I1J7J    | JN35 | 301 | 0  | 1106 | 1269 | 1825 | 2742 |
| 30 | YU7EW    | KN05 | 425 | 0  | 1404 | 1755 | 2179 | 2430 | 85  | OK1AXH   | JO70 | 300 | 0  | 2142 | 1486 | 1366 | 1768 |
| 31 | DL5BCU   | JO43 | 421 | 0  | 1479 | 1928 | 2010 | 2538 | 86  | DB6BX    | JO32 | 297 | 0  | 1534 | 1541 | 1921 | 2115 |
| 32 | RA3YCR   | KO73 | 420 | 0  | 1835 | 1964 | 2255 | 2429 | 87  | DL80BU   | JO42 | 297 | 0  | 1483 | 1866 | 1733 | 2159 |
| 33 | IWSAVM   | JN52 | 414 | 0  | 1590 | 0    | 2040 | 2893 | 88  | F1FIH    | JN23 | 297 | 51 | 1305 | 999  | 1757 | 2934 |
| 34 | ES2WX    | KO29 | 410 | 0  | 1370 | 1950 | 2270 | 2071 | 89  | RW3RW    | LO02 | 297 | 0  | 1298 | 2098 | 1740 | 2834 |
| 35 | FR0P     | JN26 | 408 | 0  | 1228 | 1196 | 2028 | 2720 | 90  | SP6GWB/P | JO80 | 294 | 0  | 1780 | 1581 | 1875 | 2437 |
| 36 | YO2IS    | KN05 | 407 | 0  | 1360 | 1916 | 2130 | 2556 | 91  | SM5BSZ   | JO89 | 293 | 0  | 1764 | 1824 | 1938 | 0    |
| 37 | OK1FM    | JN69 | 402 | 55 | 1843 | 1438 | 2200 | 2150 | 92  | OK1DFC/P | KO60 | 291 | 51 | 1775 | 2099 | 2024 | 2016 |
| 38 | OM3AU    | KN08 | 401 | 0  | 2128 | 1756 | 2065 | 2513 | 93  | UA3DHC   | KO96 | 289 | 0  | 1766 | 1891 | 2180 | 2429 |
| 39 | DL3AMA   | JO51 | 401 | 54 | 1785 | 1803 | 1925 | 2075 | 94  | F5HRY    | JN18 | 285 | 50 | 1276 | 1695 | 2038 | 2758 |
| 40 | ON4ANT   | JO20 | 399 | 0  | 1420 | 1965 | 2124 | 2725 | 95  | SP2JXN   | JO94 | 284 | 0  | 1650 | 1690 | 0    | 2634 |
| 41 | DL7AKA   | JO62 | 396 | 0  | 1747 | 1916 | 2065 | 3620 | 96  | OK1FFD   | JO60 | 283 | 47 | 1388 | 1720 | 1937 | 2154 |
| 42 | DJ7OF    | JO51 | 395 | 63 | 1512 | 1394 | 1970 | 2156 | 97  | IN3TWX   | JN56 | 283 | 0  | 1100 | 0    | 1609 | 1750 |
| 43 | SP5EFO   | KO02 | 392 | 0  | 1702 | 1982 | 2010 | 2626 | 98  | F1EAN    | JN06 | 282 | 0  | 1650 | 1420 | 0    | 2479 |
| 44 | OK1MAC   | JN79 | 392 | 0  | 1536 | 1681 | 2005 | 2511 | 99  | ES3GZ    | KO28 | 281 | 32 | 1495 | 1828 | 2134 | 2101 |
| 45 | DK0OG    | JN68 | 391 | 0  | 1708 | 1722 | 2172 | 3320 | 100 | PA0WWM   | JO22 | 281 | 49 | 1303 | 1839 | 1997 | 2212 |
| 46 | OK1JKT/P | JO60 | 385 | 51 | 1701 | 1764 | 2121 | 2269 | 101 | LA8AK    | JO38 | 280 | 0  | 1496 | 1804 | 1804 | 2413 |
| 47 | DD0VF    | JO61 | 383 | 57 | 1736 | 1275 | 1955 | 2328 | 102 | ON4KST   | JO20 | 277 | 50 | 1435 | 1612 | 863  | 2383 |
| 48 | I3LGP    | JN65 | 380 | 0  | 1335 | 1387 | 2020 | 3174 | 103 | G4IGO    | IO80 | 274 | 0  | 2761 | 1917 | 1903 | 2833 |
| 49 | F8CS     | JN27 | 378 | 54 | 1161 | 1468 | 2124 | 3231 | 104 | DL1BKK   | JO43 | 273 | 0  | 1513 | 928  | 0    | 2712 |
| 50 | UA3MBJ   | KO88 | 374 | 0  | 1560 | 2006 | 2573 | 2392 | 105 | DK2BJ    | JO30 | 272 | 0  | 1476 | 1924 | 0    | 2205 |
| 51 | HB9CRQ   | JN47 | 369 | 0  | 1404 | 1288 | 2060 | 2959 | 106 | RZ6BU    | KN84 | 272 | 0  | 1172 | 960  | 2017 | 2953 |
| 52 | DL1SUN   | JO53 | 367 | 0  | 1824 | 1724 | 1845 | 2333 | 107 | UA4API   | LO20 | 271 | 0  | 1127 | 1820 | 0    | 0    |
| 53 | PA3FJY   | JO32 | 366 | 0  | 1536 | 1337 | 2085 | 2086 | 108 | UA4NM    | LO48 | 270 | 0  | 1215 | 1850 | 2510 | 2290 |
| 54 | I4YNO    | JN54 | 366 | 63 | 1374 | 1374 | 2122 | 2276 | 109 | G6HKM    | JO01 | 269 | 0  | 1304 | 1555 | 1660 | 2269 |
| 55 | SM7JUQ   | JO65 | 357 | 41 | 1902 | 1646 | 1921 | 2332 | 110 | OK1IBL   | JO60 | 266 | 50 | 1438 | 1462 | 2003 | 3398 |
| 56 | OE3OKS   | JN87 | 356 | 59 | 1441 | 1273 | 1867 | 2788 | 111 | IK5OIY   | JN52 | 265 | 0  | 1048 | 0    | 2095 | 2253 |
| 57 | FSFHI    | IN97 | 355 | 0  | 1739 | 2051 | 2183 | 2735 | 112 | OZ1HPU   | JO57 | 262 | 40 | 1387 | 1187 | 1566 | 2452 |
| 58 | DL1KDA   | JO30 | 354 | 54 | 1388 | 1924 | 2101 | 2276 | 113 | IK1PAG   | JN35 | 262 | 0  | 1186 | 0    | 1910 | 2725 |
| 59 | YL3AG    | KO26 | 352 | 33 | 1552 | 1912 | 0    | 2448 | 114 | GW4LXO   | IO81 | 261 | 0  | 2750 | 1550 | 2000 | 2200 |
| 60 | S50C     | JN76 | 350 | 61 | 1463 | 1530 | 2233 | 3356 | 115 | RK2FWA   | KO04 | 261 | 0  | 912  | 1759 | 2125 | 2010 |
| 61 | IW1AZJ   | JN35 | 350 | 0  | 1115 | 1188 | 1904 | 2780 | 116 | OK1HAG   | JN79 | 260 | 0  | 1441 | 1749 | 1909 | 3463 |
| 62 | OH2BNH   | KP20 | 344 | 37 | 1334 | 1787 | 2003 | 2003 | 117 | PA2TAB   | JO32 | 259 | 49 | 1302 | 1094 | 1949 | 2183 |

|              |      |     |    |      |      |      |      |             |      |     |    |      |      |      |      |
|--------------|------|-----|----|------|------|------|------|-------------|------|-----|----|------|------|------|------|
| 118 F6CKZ    | JN09 | 258 | 0  | 1552 | 1330 | 1721 | 3408 | 173 DL3YEE  | JO42 | 178 | 0  | 1574 | 1450 | 1480 | 2106 |
| 119 DD0BI    | JO33 | 257 | 0  | 1565 | 1018 | 1102 | 2450 | 174 DK9RL   | JN69 | 177 | 0  | 1311 | 1513 | 1286 | 3316 |
| 120 DK8EL    | JO31 | 256 | 0  | 1199 | 1051 | 1870 | 1996 | 175 RA3TES  | LO15 | 177 | 0  | 1074 | 1935 | 2144 | 2247 |
| 121 OE6IWG   | JN77 | 255 | 50 | 1221 | 1110 | 2220 | 2126 | 176 DG3XA   | JO43 | 176 | 35 | 1371 | 1061 | 1839 | 2183 |
| 122 DJ6LV    | JO31 | 250 | 0  | 1268 | 1880 | 1822 | 3130 | 177 DG3HS   | JO53 | 174 | 0  | 1152 | 1091 | 0    | 2306 |
| 123 ES1RF    | KO29 | 249 | 30 | 1184 | 1820 | 1978 | 2084 | 178 G6LEU   | JO70 | 173 | 0  | 2620 | 750  | 0    | 2403 |
| 124 DG1BA    | JO43 | 245 | 0  | 1674 | 1280 | 1588 | 2239 | 179 HB9AOF  | JN36 | 172 | 44 | 1201 | 670  | 1675 | 2166 |
| 125 LZ1ZX    | KN32 | 243 | 0  | 1162 | 0    | 1945 | 2729 | 180 OK1IAS  | JO60 | 171 | 0  | 1195 | 1444 | 0    | 2138 |
| 126 PE1KHP   | JO22 | 241 | 0  | 1685 | 1214 | 1321 | 2010 | 181 HA1SO   | JN87 | 170 | 0  | 1787 | 1797 | 0    | 2143 |
| 127 F5JRX    | JN25 | 237 | 0  | 1598 | 1187 | 1616 | 2301 | 182 OK1VEI  | JO70 | 170 | 0  | 1677 | 1197 | 1398 | 0    |
| 128 OK2QI    | JO80 | 237 | 0  | 1475 | 1686 | 1380 | 2050 | 183 UA6LGH  | KN97 | 169 | 0  | 1918 | 758  | 1918 | 2167 |
| 129 OK1KEI   | JO70 | 235 | 0  | 1861 | 1259 | 983  | 2067 | 184 DG0CR/P | JO50 | 169 | 0  | 1279 | 1530 | 0    | 2010 |
| 130 UT7GA    | KN66 | 234 | 0  | 1877 | 1446 | 2131 | 2617 | 185 UA3RBO  | LO03 | 169 | 0  | 952  | 1909 | 2137 | 2378 |
| 131 OM7AQ    | JN98 | 234 | 49 | 1484 | 1294 | 1411 | 2483 | 186 UA3MAS  | KO97 | 167 | 0  | 1667 | 1752 | 1884 | 1996 |
| 132 ON4PS    | JO20 | 234 | 0  | 1449 | 1435 | 1100 | 1803 | 187 ESSRY   | KO38 | 167 | 30 | 1198 | 1695 | 2002 | 1409 |
| 133 OK2PNN   | JN89 | 234 | 0  | 149  | 1216 | 0    | 3771 | 188 OK1KRY  | JN69 | 166 | 40 | 1437 | 977  | 0    | 1830 |
| 134 HB9DFG   | JN37 | 232 | 49 | 1367 | 1299 | 1784 | 2302 | 189 ON4ZN   | JO21 | 163 | 32 | 1390 | 980  | 0    | 2149 |
| 135 OK1PG    | JO70 | 229 | 0  | 1773 | 0    | 0    | 3488 | 190 ES1JL   | KO29 | 163 | 25 | 1379 | 1596 | 0    | 0    |
| 136 DK1VI    | JN49 | 227 | 0  | 1148 | 1107 | 1604 | 3131 | 191 DG0CAL  | JO52 | 161 | 0  | 1160 | 0    | 1543 | 2105 |
| 137 F1GTU    | JN05 | 225 | 0  | 1650 | 967  | 1934 | 2400 | 192 DK5WO   | JO30 | 159 | 0  | 1474 | 1219 | 0    | 1993 |
| 138 RA6HHIT  | LN05 | 224 | 0  | 1255 | 1827 | 1827 | 2782 | 193 SP9FG   | JN99 | 158 | 29 | 1647 | 1283 | 0    | 1698 |
| 139 YU1VG    | JN94 | 224 | 39 | 1022 | 826  | 1727 | 2294 | 194 SM0FZH  | JO99 | 158 | 0  | 1226 | 1442 | 1200 | 2377 |
| 140 OK1VBN   | JN78 | 223 | 45 | 1578 | 1682 | 1915 | 2209 | 195 DL0ULP  | JN48 | 157 | 0  | 1026 | 0    | 0    | 2019 |
| 141 F5DE     | JN05 | 220 | 0  | 1891 | 1671 | 1892 | 2399 | 196 OK1CA   | JO70 | 156 | 0  | 1540 | 1065 | 950  | 2096 |
| 142 DG1VL    | JO61 | 219 | 42 | 1343 | 1223 | 1800 | 2325 | 197 RW3PF   | KO93 | 153 | 0  | 1015 | 1840 | 0    | 2162 |
| 143 9A4EW    | JN95 | 216 | 0  | 1075 | 0    | 1956 | 2293 | 198 OZ7IS   | JO65 | 151 | 0  | 1128 | 1294 | 1901 | 1845 |
| 144 DL5BBL   | JO42 | 215 | 0  | 1416 | 1290 | 0    | 2028 | 199 ES6PZ   | KO38 | 151 | 20 | 1100 | 0    | 0    | 2532 |
| 145 UA4UK    | LO14 | 215 | 0  | 0    | 0    | 0    | 0    | 200 UT5JCW  | KN64 | 150 | 0  | 0    | 0    | 0    | 0    |
| 146 DC6DY    | JO31 | 212 | 0  | 1416 | 1045 | 1914 | 2292 | 201 DJ6XV   | JO31 | 148 | 0  | 1337 | 961  | 0    | 2007 |
| 147 F5PAU    | IN88 | 209 | 0  | 1630 | 0    | 0    | 2425 | 202 PA3FXW  | JO22 | 144 | 0  | 1267 | 1247 | 1436 | 1965 |
| 148 UR7GN    | KN66 | 208 | 0  | 1830 | 0    | 2010 | 1940 | 203 OK2PMN  | JN88 | 141 | 0  | 871  | 1547 | 887  | 2101 |
| 149 DH9NBB   | JN49 | 207 | 47 | 1363 | 1228 | 1725 | 2039 | 204 OK2UFB  | JN99 | 135 | 27 | 1526 | 0    | 0    | 1983 |
| 150 ESONW    | KO19 | 207 | 30 | 1060 | 1720 | 1797 | 1965 | 205 OK2KDS  | JN99 | 134 | 0  | 1568 | 0    | 0    | 1983 |
| 151 IK1LGV   | JN44 | 204 | 0  | 1466 | 0    | 1613 | 1890 | 206 DG5NEX  | JN49 | 133 | 0  | 1234 | 0    | 1333 | 1941 |
| 152 G3XDY    | JO02 | 203 | 38 | 1355 | 2049 | 0    | 2124 | 207 DL3IAS  | JN49 | 130 | 36 | 988  | 1123 | 1830 | 1866 |
| 153 SP5HEJ   | KO02 | 201 | 0  | 1830 | 1705 | 1312 | 2313 | 208 RU3ZD   | KO81 | 126 | 0  | 1713 | 2126 | 1755 | 2363 |
| 154 UY5HF    | KN66 | 201 | 0  | 1750 | 0    | 1820 | 2032 | 209 DL5IO   | JN49 | 126 | 0  | 1073 | 925  | 1450 | 1899 |
| 155 OK1VMS   | JO70 | 201 | 0  | 1692 | 1232 | 0    | 2225 | 210 LA7DFA  | JP33 | 125 | 0  | 630  | 1816 | 1803 | 0    |
| 156 DF1IAZ   | JN49 | 201 | 48 | 1038 | 789  | 1978 | 1873 | 211 RV3ZR   | KO80 | 124 | 0  | 1045 | 1956 | 1785 | 2077 |
| 157 DL8AAV   | JO52 | 198 | 44 | 1236 | 1127 | 0    | 2144 | 212 DL3NAW  | JN59 | 120 | 0  | 1019 | 0    | 1961 | 1237 |
| 158 DL9BDM   | JO33 | 197 | 0  | 1538 | 1248 | 1659 | 2321 | 213 F6FGO   | JN25 | 118 | 30 | 1390 | 0    | 0    | 2218 |
| 159 G6RAF    | IO92 | 197 | 0  | 1507 | 1722 | 2078 | 2400 | 214 UA4CFV  | LO32 | 118 | 0  | 1311 | 1824 | 0    | 2415 |
| 160 DF9QX    | JO42 | 197 | 0  | 1446 | 1070 | 1455 | 3320 | 215 UA4AQL  | LO20 | 116 | 0  | 1123 | 2055 | 2158 | 1962 |
| 161 OK1DDO   | JO60 | 196 | 46 | 1329 | 1500 | 1720 | 2418 | 216 DK0PX   | JN48 | 113 | 0  | 847  | 0    | 1815 | 1649 |
| 162 OK1SC    | JO70 | 195 | 0  | 1490 | 1673 | 0    | 1729 | 217 ES1CW   | KO29 | 112 | 16 | 1192 | 1570 | 0    | 0    |
| 163 DK2DB    | JN48 | 195 | 0  | 1239 | 1136 | 0    | 3106 | 218 DH0GHU  | JN38 | 112 | 26 | 1170 | 0    | 878  | 1937 |
| 164 IT9VDQ   | JM68 | 192 | 41 | 1625 | 0    | 1950 | 2491 | 219 OK2XTE  | JN79 | 111 | 33 | 1362 | 0    | 0    | 2267 |
| 165 PA0JUS   | JO22 | 192 | 38 | 1409 | 1050 | 0    | 2167 | 220 DL0SP/P | JO62 | 111 | 0  | 1315 | 785  | 0    | 1608 |
| 166 OE5VRL/5 | JN78 | 190 | 0  | 1665 | 1573 | 1990 | 2157 | 221 UA9XQ   | LP63 | 107 | 0  | 626  | 1832 | 2018 | 1656 |
| 167 DL2DR    | JO31 | 190 | 39 | 1158 | 980  | 0    | 2057 | 222 RW4AK   | LO20 | 106 | 0  | 1125 | 1481 | 2028 | 2283 |
| 168 UA3MHJ   | KO87 | 186 | 0  | 1227 | 1943 | 2405 | 1948 | 223 ON7WR   | JO20 | 106 | 24 | 0    | 0    | 0    | 1834 |
| 169 HB9MIO/P | JN37 | 185 | 0  | 1316 | 975  | 0    | 2183 | 224 UA3TIE  | LO16 | 104 | 0  | 1161 | 1766 | 1808 | 1929 |
| 170 S59AM    | JN65 | 184 | 0  | 1377 | 0    | 1945 | 1788 | 225 HA1DAB  | JN87 | 103 | 0  | 820  | 1130 | 0    | 2143 |
| 171 UA3T     | LO16 | 183 | 0  | 1163 | 1941 | 2145 | 0    | 226 DJ8ES   | JO43 | 102 | 19 | 1306 | 0    | 0    | 1856 |
| 172 HB9RUZ   | JN47 | 183 | 48 | 1060 | 1050 | 0    | 3014 | 227 I3ZVN   | JN55 | 96  | 31 | 1212 | 0    | 0    | 2237 |

|                |         |    |      |      |       |      |
|----------------|---------|----|------|------|-------|------|
| 228 ES1II      | KO29 95 | 13 | 979  | 1570 | 0     | 0    |
| 229 OK2PHM     | JN89 94 | 20 | 829  | 1265 | 0     | 2262 |
| 230 LA/DL7YS/P | JO37 93 | 0  | 1207 | 0    | 16730 |      |
| 231 AM1DVY/P   | IN82 92 | 0  | 612  | 0    | 0     | 1954 |
| 232 DK0FLT     | JN49 90 | 23 | 1363 | 0    | 0     | 1656 |
| 233 UA9XEA     | LP63 89 | 0  | 776  | 1636 | 2034  | 1646 |
| 234 ES2QH      | KO29 86 | 15 | 1072 | 1108 | 1517  | 0    |
| 235 ES1DF      | KO29 77 | 0  | 961  | 1080 | 0     | 0    |
| 236 DL3AZI     | JO51 76 | 0  | 969  | 0    | 1543  | 0    |
| 237 SM4SJV     | JP70 73 | 11 | 1262 | 870  | 0     | 1160 |
| 238 F6OBT/P    | JN19 73 | 11 | 0    | 0    | 0     | 0    |
| 239 DB8NU      | JN49 71 | 0  | 867  | 0    | 0     | 0    |
| 240 CT1BGE     | IM58 65 | 0  | 0    | 0    | 0     | 0    |
| 241 UW9AH      | LO93 64 | 0  | 1310 | 1746 | 1989  | 1385 |
| 242 9A2EY      | JN75 64 | 0  | 707  | 0    | 0     | 0    |
| 243 OK1UDX     | JN79 63 | 19 | 537  | 0    | 0     | 0    |
| 244 OK1HRR     | JO70 55 | 14 | 733  | 0    | 0     | 1890 |
| 245 ES3BM      | KO29 54 | 11 | 1128 | 0    | 0     | 0    |
| 246 DG7SFL     | JN49 52 | 10 | 625  | 0    | 0     | 1750 |
| 247 ON4LCV     | JN29 50 | 10 | 857  | 0    | 0     | 0    |
| 248 F5OIH/P    | JN08 46 | 8  | 666  | 0    | 0     | 0    |
| 249 JX7DFA     | IQ50 45 | 0  | 1    | 1120 | 2211  | 0    |
| 250 IW1QD      | JN44 37 | 10 | 1000 | 0    | 0     | 1358 |

## DUBUS 432 MHz Top List

| NR | CALL     | WW   | WK  | DC | TR   | AU   | MS   | ES |
|----|----------|------|-----|----|------|------|------|----|
| 1  | DJ9BV    | JO43 | 219 | 0  | 2154 | 1863 | 1440 | 0  |
| 2  | DK3WG    | JO72 | 203 | 74 | 1547 | 1494 | 0    | 0  |
| 3  | PA0RDY   | JO22 | 202 | 0  | 1979 | 1807 | 1376 | 0  |
| 4  | G3LQR    | JO02 | 200 | 0  | 2031 | 1613 | 0    | 0  |
| 5  | PA0EZ    | JO22 | 193 | 35 | 1787 | 1445 | 0    | 0  |
| 6  | PA0WWM   | JO22 | 188 | 36 | 1547 | 1836 | 0    | 0  |
| 7  | OZ7IS    | JO65 | 186 | 0  | 1499 | 1048 | 1294 | 0  |
| 8  | F5FHI    | IN97 | 184 | 0  | 1892 | 1280 | 1530 | 0  |
| 9  | UA6LGH   | KN97 | 182 | 0  | 2216 | 0    | 0    | 0  |
| 10 | DL8QS    | JO43 | 182 | 33 | 1513 | 1513 | 0    | 0  |
| 11 | OK1AXH   | JO70 | 181 | 0  | 1861 | 1239 | 0    | 0  |
| 12 | DL7QY    | JN59 | 173 | 0  | 1640 | 1848 | 1292 | 0  |
| 13 | DJ6MB    | JO30 | 171 | 0  | 1278 | 1733 | 0    | 0  |
| 14 | DB6BX    | JO32 | 166 | 0  | 1550 | 662  | 0    | 0  |
| 15 | PE0AGO   | JO32 | 163 | 0  | 1702 | 0    | 0    | 0  |
| 16 | HAIYA    | JN87 | 163 | 40 | 1438 | 1221 | 0    | 0  |
| 17 | DK6AS    | JO52 | 161 | 0  | 1569 | 775  | 0    | 0  |
| 18 | F6DKW    | JN18 | 161 | 23 | 1519 | 0    | 0    | 0  |
| 19 | SP6MLK/P | JO80 | 160 | 30 | 1780 | 0    | 0    | 0  |
| 20 | DK1KO    | JO53 | 160 | 0  | 1643 | 694  | 0    | 0  |
| 21 | G3XDY    | JO02 | 157 | 27 | 1350 | 1619 | 0    | 0  |
| 22 | DB6NT/A  | JO50 | 154 | 0  | 1823 | 0    | 0    | 0  |
| 23 | SP6AZT   | JO81 | 154 | 0  | 1538 | 1087 | 0    | 0  |
| 24 | F1EAN    | JN06 | 154 | 0  | 1493 | 0    | 0    | 0  |
| 25 | SP6GWB/P | JO80 | 151 | 0  | 1780 | 759  | 0    | 0  |
| 26 | PA3DIJ   | JO33 | 150 | 0  | 2116 | 1010 | 0    | 0  |
| 27 | DK1KR    | JO53 | 150 | 0  | 1400 | 1827 | 0    | 0  |
| 28 | OZ2OE    | JO45 | 149 | 0  | 2216 | 1020 | 0    | 0  |

|    |          |      |     |    |      |      |      |   |
|----|----------|------|-----|----|------|------|------|---|
| 29 | DF8LC    | JO53 | 149 | 0  | 1615 | 1361 | 0    | 0 |
| 30 | SM6ESG   | JO67 | 148 | 26 | 1436 | 712  | 0    | 0 |
| 31 | RA3YCR   | KO73 | 147 | 0  | 1671 | 1788 | 0    | 0 |
| 32 | OK1CA    | JO70 | 146 | 0  | 1670 | 0    | 0    | 0 |
| 33 | YL3AG    | KO26 | 146 | 19 | 1571 | 1041 | 0    | 0 |
| 34 | DH3NAN   | JO50 | 145 | 0  | 1437 | 1008 | 0    | 0 |
| 35 | SM0FZH   | JO99 | 143 | 0  | 1900 | 1218 | 0    | 0 |
| 36 | SM7ECM   | JO65 | 141 | 22 | 1389 | 1073 | 0    | 0 |
| 37 | DL3YEE   | JO42 | 140 | 0  | 1574 | 1728 | 0    | 0 |
| 38 | ES2WX    | KO29 | 140 | 0  | 1232 | 1415 | 0    | 0 |
| 39 | OK1KEI   | JO70 | 138 | 0  | 1682 | 1185 | 0    | 0 |
| 40 | OK1VEI   | JO70 | 136 | 0  | 1532 | 811  | 0    | 0 |
| 41 | DL1SUN   | JO53 | 136 | 0  | 1157 | 1071 | 0    | 0 |
| 42 | SP9FG    | JN99 | 134 | 25 | 1660 | 0    | 0    | 0 |
| 43 | OK1KIR/P | JO60 | 133 | 28 | 1773 | 0    | 0    | 0 |
| 44 | PA0JUS   | JO22 | 130 | 26 | 1340 | 0    | 0    | 0 |
| 45 | SP9EWU   | JO90 | 129 | 0  | 1544 | 1558 | 1664 | 0 |
| 46 | OH5LK    | KP30 | 129 | 0  | 1386 | 1196 | 0    | 0 |
| 47 | DL1BKK   | JO43 | 128 | 0  | 1513 | 565  | 0    | 0 |
| 48 | LA8AK    | JO38 | 124 | 0  | 1373 | 981  | 0    | 0 |
| 49 | G6HKM    | JO01 | 124 | 0  | 1289 | 281  | 0    | 0 |
| 50 | G6RAF    | IO92 | 122 | 0  | 1730 | 0    | 0    | 0 |
| 51 | OE5VRL/S | JN78 | 121 | 0  | 1524 | 1031 | 0    | 0 |
| 52 | PA2CHR   | JO22 | 121 | 0  | 1357 | 323  | 0    | 0 |
| 53 | DL4VCG   | JN39 | 119 | 0  | 1335 | 0    | 0    | 0 |
| 54 | OZ1IPU   | JO57 | 118 | 18 | 1387 | 0    | 0    | 0 |
| 55 | OK2QI    | JO80 | 114 | 0  | 1410 | 0    | 0    | 0 |
| 56 | PA0BAT   | JO31 | 112 | 20 | 1301 | 0    | 0    | 0 |
| 57 | DL0UL/P  | JN48 | 112 | 0  | 1238 | 0    | 0    | 0 |
| 58 | DL6BCT   | JO43 | 112 | 0  | 1152 | 0    | 0    | 0 |
| 59 | DJ6XV    | JO31 | 112 | 0  | 1128 | 976  | 0    | 0 |
| 60 | F5PAU    | IN88 | 111 | 0  | 1630 | 0    | 0    | 0 |
| 61 | SP6GZZ   | JO81 | 110 | 0  | 1549 | 870  | 0    | 0 |
| 62 | UA3MBJ   | KO88 | 110 | 0  | 1306 | 1541 | 0    | 0 |
| 63 | ON7WR    | JO20 | 110 | 23 | 1163 | 0    | 0    | 0 |
| 64 | GW4LXO   | IO81 | 109 | 0  | 1550 | 0    | 0    | 0 |
| 65 | DL7FF    | JO62 | 109 | 0  | 1507 | 772  | 0    | 0 |
| 66 | DK0OG    | JN68 | 109 | 0  | 1459 | 745  | 0    | 0 |
| 67 | HB9MIN/P | JN37 | 109 | 0  | 1300 | 0    | 0    | 0 |
| 68 | ON4ZN    | JO21 | 109 | 21 | 1132 | 0    | 0    | 0 |
| 69 | SM6CMU   | JO57 | 108 | 0  | 1641 | 670  | 0    | 0 |
| 70 | SM6AFH   | JO66 | 108 | 0  | 1315 | 1200 | 0    | 0 |
| 71 | DH9NBB   | JN49 | 107 | 24 | 1363 | 0    | 0    | 0 |
| 72 | DL3AMA   | JO51 | 107 | 21 | 1015 | 1219 | 0    | 0 |
| 73 | UT1PA    | KO21 | 105 | 0  | 1238 | 1761 | 0    | 0 |
| 74 | DF9QX    | JO42 | 105 | 0  | 1136 | 721  | 0    | 0 |
| 75 | DC4XH    | JO43 | 104 | 0  | 1133 | 808  | 0    | 0 |
| 76 | OK1DKS/P | JO60 | 102 | 23 | 1118 | 0    | 0    | 0 |
| 77 | UT7PA    | KN66 | 101 | 0  | 1877 | 0    | 0    | 0 |
| 78 | UA3DHC   | KO96 | 101 | 0  | 1596 | 1009 | 0    | 0 |
| 79 | HB9CRQ   | JN47 | 101 | 0  | 1010 | 0    | 0    | 0 |
| 80 | DL4KG    | JO31 | 100 | 19 | 1273 | 0    | 0    | 0 |
| 81 | ON4GG    | JO20 | 98  | 0  | 1407 | 0    | 0    | 0 |
| 82 | SP9HWY   | JO90 | 98  | 0  | 1398 | 1306 | 0    | 0 |
| 83 | ON4PS    | JO20 | 98  | 0  | 1335 | 0    | 0    | 0 |

|     |          |      |    |    |      |      |      |   |     |                |      |    |      |      |      |   |   |
|-----|----------|------|----|----|------|------|------|---|-----|----------------|------|----|------|------|------|---|---|
| 84  | DK5WO    | JO30 | 98 | 0  | 1150 | 0    | 0    | 0 | 139 | DL8AAV         | JO52 | 62 | 15   | 914  | 0    | 0 | 0 |
| 85  | ON4ANT   | JO20 | 96 | 0  | 1406 | 0    | 0    | 0 | 140 | DL3IAS         | JN49 | 61 | 12   | 886  | 0    | 0 | 0 |
| 86  | DL1KDA   | JO30 | 95 | 15 | 1286 | 999  | 0    | 0 | 141 | ES0NW          | KO29 | 59 | 17   | 1213 | 675  | 0 | 0 |
| 87  | F5HRY    | JN18 | 94 | 18 | 1222 | 583  | 0    | 0 | 142 | UA4NM          | LO48 | 58 | 0    | 1230 | 1310 | 0 | 0 |
| 88  | OK1KRY   | JN69 | 93 | 23 | 1350 | 0    | 0    | 0 | 143 | F6FGO          | JN25 | 58 | 11   | 1016 | 0    | 0 | 0 |
| 89  | RX1AS    | KN59 | 93 | 0  | 0    | 0    | 0    | 0 | 144 | UA3MAS         | KO97 | 57 | 0    | 1254 | 1251 | 0 | 0 |
| 90  | DL2NWK   | JO63 | 92 | 0  | 1636 | 590  | 0    | 0 | 145 | OK2UFB         | JN99 | 56 | 0    | 1232 | 0    | 0 | 0 |
| 91  | DD0BI    | JO33 | 92 | 0  | 1259 | 0    | 0    | 0 | 146 | LA/DB1DL/PJO37 | 55   | 0  | 1013 | 0    | 0    | 0 |   |
| 92  | DL2DR    | JO31 | 92 | 21 | 1158 | 0    | 0    | 0 | 147 | DB8NU          | JN49 | 55 | 0    | 691  | 0    | 0 | 0 |
| 93  | DJ1LP    | JO64 | 91 | 9  | 1414 | 0    | 0    | 0 | 148 | OK1PG          | JO70 | 54 | 0    | 1773 | 0    | 0 | 0 |
| 94  | DK2DB    | JN48 | 91 | 0  | 1331 | 0    | 0    | 0 | 149 | YO2IS          | KN05 | 54 | 0    | 1020 | 1741 | 0 | 0 |
| 95  | DG5NEX   | JN49 | 91 | 0  | 1187 | 0    | 0    | 0 | 150 | DG7SFL         | JN49 | 53 | 10   | 947  | 0    | 0 | 0 |
| 96  | G4LRT    | IO92 | 90 | 0  | 1394 | 410  | 0    | 0 | 151 | OK1VBN         | JN78 | 53 | 10   | 723  | 753  | 0 | 0 |
| 97  | OK1VMS   | JO70 | 89 | 0  | 1315 | 0    | 0    | 0 | 152 | ES3GZ          | KO28 | 52 | 7    | 1036 | 0    | 0 | 0 |
| 98  | OK1KPA   | JN79 | 89 | 0  | 1176 | 0    | 0    | 0 | 153 | UA4UK          | LO14 | 51 | 0    | 1433 | 1296 | 0 | 0 |
| 99  | OK1OKL   | JO60 | 88 | 0  | 1199 | 0    | 0    | 0 | 154 | UA3TCF         | LO26 | 51 | 0    | 1131 | 1542 | 0 | 0 |
| 100 | DK9RL    | JN69 | 87 | 0  | 1185 | 0    | 0    | 0 | 155 | DH0GHU         | JN38 | 51 | 10   | 852  | 0    | 0 | 0 |
| 101 | SP5EFO   | KO02 | 87 | 0  | 1120 | 1705 | 0    | 0 | 156 | DL5BBL         | JO42 | 51 | 0    | 841  | 722  | 0 | 0 |
| 102 | DG0CAL   | JO52 | 86 | 0  | 1160 | 0    | 0    | 0 | 157 | OL5Z           | JN89 | 51 | 12   | 716  | 0    | 0 | 0 |
| 103 | DJ8ES    | JO43 | 86 | 12 | 1087 | 0    | 0    | 0 | 158 | DL9BDM         | JO33 | 50 | 0    | 1278 | 0    | 0 | 0 |
| 104 | IW5AVM   | JN52 | 85 | 0  | 1458 | 0    | 0    | 0 | 159 | SP2JXN         | JO94 | 49 | 0    | 1149 | 0    | 0 | 0 |
| 105 | UY5HF    | KN66 | 84 | 0  | 1670 | 0    | 0    | 0 | 160 | I2FUM/2        | JN44 | 47 | 0    | 875  | 0    | 0 | 0 |
| 106 | OE3JPC   | JN88 | 84 | 0  | 1132 | 1450 | 1469 | 0 | 161 | ES1JL          | KO29 | 45 | 7    | 1324 | 0    | 0 | 0 |
| 107 | DK1VI    | JN49 | 84 | 0  | 1125 | 870  | 0    | 0 | 162 | F5DE           | JN05 | 45 | 0    | 740  | 0    | 0 | 0 |
| 108 | HB9MIO/P | JN37 | 84 | 0  | 1096 | 0    | 0    | 0 | 163 | F5OIH/P        | JN08 | 44 | 5    | 651  | 0    | 0 | 0 |
| 109 | DC6DY    | JO31 | 83 | 0  | 1190 | 0    | 0    | 0 | 164 | I3ZVN          | JN55 | 41 | 12   | 1197 | 0    | 0 | 0 |
| 110 | DL5BCU   | JO43 | 83 | 0  | 1188 | 766  | 0    | 0 | 165 | SM7JUQ         | JO65 | 41 | 11   | 1048 | 0    | 0 | 0 |
| 111 | DG1VL    | JO61 | 83 | 14 | 1125 | 0    | 0    | 0 | 166 | 9A2EY*         | JN75 | 41 | 0    | 588  | 0    | 0 | 0 |
| 112 | HB9AOF   | JN36 | 83 | 15 | 926  | 0    | 0    | 0 | 167 | DL6BF          | JO32 | 40 | 0    | 895  | 667  | 0 | 0 |
| 113 | DG3XA    | JO43 | 83 | 13 | 905  | 0    | 0    | 0 | 168 | OK1HRR         | JO70 | 40 | 13   | 754  | 0    | 0 | 0 |
| 114 | OH2BNH   | KP20 | 82 | 12 | 1235 | 1046 | 0    | 0 | 169 | ES1RF          | KO29 | 40 | 10   | 728  | 0    | 0 | 0 |
| 115 | DG0CR/P  | JO50 | 82 | 0  | 1048 | 759  | 0    | 0 | 170 | HA1SO          | JN87 | 39 | 0    | 552  | 0    | 0 | 0 |
| 116 | F6CKZ    | JN09 | 80 | 0  | 1302 | 0    | 0    | 0 | 171 | SM4SJY         | JP70 | 36 | 6    | 691  | 554  | 0 | 0 |
| 117 | DF1EQ    | JO31 | 80 | 0  | 1249 | 0    | 0    | 0 | 172 | HA1DAB         | JN87 | 35 | 0    | 955  | 0    | 0 | 0 |
| 118 | DK0FLT   | JN49 | 80 | 17 | 1103 | 0    | 0    | 0 | 173 | OK2PHM         | JN89 | 35 | 9    | 746  | 0    | 0 | 0 |
| 119 | OK2KDS   | JN99 | 79 | 0  | 1212 | 0    | 0    | 0 | 174 | DF0RU          | JO62 | 35 | 0    | 682  | 0    | 0 | 0 |
| 120 | S50C     | JN76 | 79 | 18 | 977  | 0    | 0    | 0 | 175 | RA6HHT         | LN05 | 33 | 0    | 1030 | 0    | 0 | 0 |
| 121 | I4YNO/4  | JN54 | 77 | 15 | 886  | 0    | 0    | 0 | 176 | UA4API         | LO20 | 32 | 0    | 1127 | 0    | 0 | 0 |
| 122 | ES2RJ    | KO29 | 76 | 17 | 1261 | 1123 | 0    | 0 | 177 | OK2XTE         | JN79 | 32 | 11   | 658  | 0    | 0 | 0 |
| 123 | DH3YAK   | JO31 | 75 | 13 | 1165 | 0    | 0    | 0 | 178 | SP5HEJ         | KO02 | 31 | 0    | 1347 | 850  | 0 | 0 |
| 124 | FI7GTU   | JN05 | 75 | 0  | 1114 | 0    | 0    | 0 | 179 | F1FIH          | JN23 | 30 | 7    | 796  | 0    | 0 | 0 |
| 125 | OK1FFD   | JO60 | 74 | 23 | 1339 | 0    | 0    | 0 | 180 | PA3FXW         | JO22 | 26 | 0    | 844  | 0    | 0 | 0 |
| 126 | DL7YS    | JO62 | 74 | 0  | 1100 | 0    | 0    | 0 | 181 | UA3TIE         | LO16 | 25 | 0    | 1161 | 1082 | 0 | 0 |
| 127 | OK1MG    | JO70 | 74 | 18 | 1045 | 0    | 0    | 0 | 182 | RA3TES         | LO15 | 21 | 0    | 1074 | 0    | 0 | 0 |
| 128 | RW3RW    | LO02 | 73 | 0  | 1275 | 1284 | 0    | 0 | 183 | OK1HAG         | JN79 | 20 | 0    | 650  | 753  | 0 | 0 |
| 129 | UR7GN    | KN66 | 70 | 0  | 1790 | 0    | 0    | 0 | 184 | OM7AQ          | JN98 | 20 | 10   | 589  | 0    | 0 | 0 |
| 130 | OK2PWY   | JN89 | 69 | 0  | 1135 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 131 | DG6GP    | JN48 | 69 | 0  | 1024 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 132 | OK2PNN   | JN89 | 69 | 0  | 918  | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 133 | DL0SP/P  | JO62 | 67 | 0  | 1018 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 134 | G6LEU    | IO70 | 63 | 0  | 1400 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 135 | OK1SC    | JO70 | 63 | 0  | 1310 | 758  | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 136 | DK0PX    | JN48 | 63 | 0  | 1168 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 137 | OK1DFC/P | JO60 | 63 | 17 | 1032 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |
| 138 | F5JRX    | JN25 | 62 | 0  | 1070 | 0    | 0    | 0 |     |                |      |    |      |      |      |   |   |

### Regeln/Rules

Die DUBUS TOP-List veröffentlicht regelmäßig Eigenangaben von UKW-Amateuren über die Zahl der von Ihnen gearbeiteten Felder auf den UKW-Bändern. Für die Topliste zählt nur ein QTH und ein Rufzeichen (Kann ein Portabel Standort

## Regeln/Rules

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restrische Verbindungen zählen. EME-Verbindungen werden in einer eigenen TOP-Liste erfasst, die der Redakteur für die EME-News verwaltet. Verbindungen über Satelliten und Relais zählen nicht. Die Liste wird in regelmäßigen Abständen veröffentlicht. Verwenden Sie den Vordruck und berichten Sie Ihren Felder-Stand entweder an DL8LAQ oder für Nur-EME an DL7APV. Um die Zahl der Einträge immer aktuell zu halten, wird jeder Eintrag pro Band nur dann weiter veröffentlicht, wenn er mindestens einmal pro Jahr von dem Rufzeichen-Inhaber durch Einsenden des untenstehenden Formblatts auf den neuesten Stand gebracht wurde. Nach Ablauf der Frist wird jeder Eintrag automatisch gelöscht.

**DUBUS TOP-List** publishes unconfirmed claims of squares worked by VHF/UHF-operators. Only one call sign or one QTH (may be portable) can be used for these claims. Only QSO's via terrestrial propagation are valid for this TOP-List. EME-Standings (EME-QSO's only) should be reported to the EME-News editor. QSO's via satellites and relays are not valid. The TOP-List will be published regularly. Please report your standings to

DL8LAQ or for EME-ONLY to DL7APV. To have a clear picture of competition and activity each claim one each single band has to be updated at least once a year. Otherwise this entry will be deleted automatically.

### Nomenclature of Toplist

|              |                                        |
|--------------|----------------------------------------|
| <b>NR:</b>   | <b>Position in Toplist</b>             |
| <b>CALL:</b> | <b>Call of Station</b>                 |
| <b>WW:</b>   | <b>Locator</b>                         |
| <b>WK:</b>   | <b>Number of Grid Squares Worked</b>   |
| <b>DC:</b>   | <b>Number of DXCC Countries Worked</b> |
| <b>TR:</b>   | <b>ODX on Tropo in km</b>              |
| <b>AU:</b>   | <b>ODX on Aurora in km</b>             |
| <b>MS:</b>   | <b>ODX on Meteor Scatter in km</b>     |
| <b>ES:</b>   | <b>ODX on Sporadic E in km</b>         |
| <b>F2:</b>   | <b>ODX on F2 in km</b>                 |
| <b>DX:</b>   | <b>ODX on Tropo in km</b>              |

### Application Form for DUBUS Toplist

|       |         |      |           |        |       |    |    |
|-------|---------|------|-----------|--------|-------|----|----|
| Call: |         |      | LOC:      |        | Date: |    |    |
| Info  |         |      | ODX in km |        |       |    |    |
| Band  | Squares | DXCC | Tropo     | Aurora | MS    | ES | F2 |
| 50    |         |      |           |        |       |    |    |
| 144   |         |      |           |        |       |    |    |
| 432   |         |      |           |        |       |    |    |
| 1.3   |         |      |           |        |       |    |    |
| 2.3   |         |      |           |        |       |    |    |
| 3.4   |         |      |           |        |       |    |    |
| 5.7   |         |      |           |        |       |    |    |
| 10    |         |      |           |        |       |    |    |
| 24    |         |      |           |        |       |    |    |
| 47    |         |      |           |        |       |    |    |
| 76    |         |      |           |        |       |    |    |
| 145   |         |      |           |        |       |    |    |
| 241   |         |      |           |        |       |    |    |

### DUBUS 1296 MHz Top List

| NR | CALL     | WW   | WKDCODX     |
|----|----------|------|-------------|
| 1  | PA0EZ    | JO22 | 130 23 1302 |
| 2  | PA0WWM   | JO22 | 122 23 1298 |
| 3  | PA0RDY   | JO22 | 121 0 1286  |
| 4  | DL4VCG   | JN39 | 119 0 1335  |
| 5  | F6DKW    | JN18 | 119 21 1273 |
| 6  | OK1AXH   | JO70 | 118 0 1444  |
| 7  | F5FHI    | IN97 | 115 0 1538  |
| 8  | G3XDY    | JO02 | 114 22 1341 |
| 9  | HB9AMH/P | JN37 | 111 0 1351  |
| 10 | G3LQR    | JO02 | 111 0 1274  |
| 11 | DB6NT/A  | JO50 | 107 0 1243  |
| 12 | PE0AGO   | JO32 | 102 0 1200  |
| 13 | SM6ESG   | JO67 | 96 19 1440  |
| 14 | SM7ECM   | JO65 | 96 17 1326  |
| 15 | SP6GWB/P | JO80 | 95 0 1580   |
| 16 | DB6BX    | JO32 | 95 24 1120  |
| 17 | DL6NAQ/P | JO40 | 92 40 1253  |
| 18 | OK1KIR/P | JO60 | 92 22 1208  |
| 19 | SP6MLK/P | JO80 | 91 23 1580  |
| 20 | OE5VRL/5 | JN78 | 91 18 1524  |
| 21 | F1EAN    | JO06 | 90 0 1321   |
| 22 | G6DER    | IO93 | 86 0 1306   |
| 23 | DL7QY    | JN59 | 86 0 1261   |
| 24 | F5PAU    | IN88 | 85 0 1630   |
| 25 | PA0BAT   | JO31 | 85 18 1014  |
| 26 | OZ2OE    | JO45 | 84 0 1425   |
| 27 | DK1KR    | JO53 | 84 0 1097   |
| 28 | DK0OG    | JN68 | 82 0 1160   |
| 29 | DL3YEE   | JO42 | 82 0 1136   |
| 30 | OK1KEI   | JO70 | 81 0 1316   |
| 31 | OZ1IPU   | JO57 | 81 16 1096  |
| 32 | OK1VEI   | JO70 | 80 0 1313   |
| 33 | PA3DIJ   | JO33 | 79 0 939    |
| 34 | DK6AS    | JO52 | 78 0 1421   |
| 35 | OZ7IS    | JO65 | 77 0 1205   |
| 36 | DL1BKK   | JO43 | 77 0 995    |
| 37 | G6LEU    | IO70 | 74 0 2620   |
| 38 | DL0UL/P  | JN48 | 74 0 962    |
| 39 | OK1DFC/P | JO60 | 73 16 1176  |
| 40 | OZ1DOQ   | JO65 | 71 17 1322  |
| 41 | F5HRY    | JN18 | 71 9 1064   |
| 42 | OK1AIY/P | JO70 | 70 0 1490   |
| 43 | OK1CA    | JO70 | 70 0 1421   |
| 44 | PA0JUS   | JO22 | 70 0 1265   |
| 45 | DH3NAN   | JO50 | 69 0 1437   |
| 46 | G6HKM    | JO01 | 69 0 1193   |
| 47 | DH9NBB   | JN49 | 69 13 1016  |
| 48 | HB9MIO/P | JN37 | 69 0 1000   |
| 49 | ON7YK    | JO20 | 68 0 1079   |
| 50 | DC4XH    | JO43 | 67 0 1090   |
| 51 | HB9RG    | JN47 | 67 0 920    |
| 52 | HB9AOF   | JN36 | 67 14 920   |
| 53 | F6IEQ    | JO31 | 67 0 908    |
| 54 | G4PMK    | IO93 | 66 0 1302   |
| 55 | DL2DR    | JO31 | 65 13 1158  |
| 56 | DK5WO    | JO30 | 64 0 1137   |

|     |               |      |            |
|-----|---------------|------|------------|
| 57  | OK1OKL        | JO60 | 63 0 1177  |
| 58  | OK1DKS/P      | JO60 | 62 13 1207 |
| 59  | G4LRT         | IO92 | 62 0 1152  |
| 60  | DG5NEX        | JN49 | 61 0 1060  |
| 61  | ON7WR         | JO20 | 60 14 1046 |
| 62  | ON4GG         | JO20 | 60 0 982   |
| 63  | SP9FG         | JN99 | 58 15 1492 |
| 64  | OK1FFD        | JO60 | 58 14 1058 |
| 65  | DF9QX         | JO42 | 57 0 1066  |
| 66  | ON4ANT        | JO20 | 57 0 914   |
| 67  | SM0FZH        | JO99 | 56 0 1252  |
| 68  | DJ6XV         | JO31 | 56 0 946   |
| 69  | DC8UG         | JO30 | 56 0 900   |
| 70  | DG0CR/P       | JO50 | 55 0 1048  |
| 71  | DC0DA         | JO31 | 55 0 1034  |
| 72  | DL1SUN        | JO53 | 54 0 1162  |
| 73  | DL9GU         | JN49 | 54 0 900   |
| 74  | DJ8ES         | JO43 | 53 10 1025 |
| 75  | RA3LE         | KO64 | 52 0 1428  |
| 76  | DL3NQ         | JN49 | 51 0 920   |
| 77  | DL1BX         | JO32 | 51 12 905  |
| 78  | LAKAK         | JO38 | 49 0 1373  |
| 79  | DB8NU         | JN49 | 49 0 1016  |
| 80  | GW4LXO        | IO81 | 48 0 990   |
| 81  | DL1KDA        | JO30 | 48 11 940  |
| 82  | DL3IAS        | JN49 | 48 9 769   |
| 83  | DK0FLT        | JN49 | 46 10 900  |
| 84  | F6CGB         | JN18 | 45 0 700   |
| 85  | DG0CAL        | JO52 | 44 0 1160  |
| 86  | HB9BBD        | JN47 | 43 11 1015 |
| 87  | DJ1KP         | JO40 | 43 0 698   |
| 88  | IWSAVM        | JN52 | 42 0 1036  |
| 89  | SP9EWU        | JO90 | 42 0 946   |
| 90  | DJ6MB         | JO30 | 42 0 876   |
| 91  | OE3JPC        | JN88 | 42 0 702   |
| 92  | HA1YA         | JN87 | 40 13 862  |
| 93  | DC6DY         | JO31 | 39 0 865   |
| 94  | LA/DB1D/PJO37 | 38   | 0 1013     |
| 95  | PA2CHR        | JO21 | 38 0 783   |
| 96  | DK2DB         | JN48 | 37 0 873   |
| 97  | F1GTU         | JN05 | 36 0 896   |
| 98  | RA3YCR        | KO73 | 36 0 657   |
| 99  | IO1VA         | JN62 | 35 0 1152  |
| 100 | ON4PS         | JO20 | 35 0 1014  |
| 101 | DK2BJ         | JO30 | 34 0 885   |
| 102 | ES2RJ         | KO29 | 34 8 765   |
| 103 | S50C          | JN76 | 34 9 626   |
| 104 | DG1VL         | JO61 | 33 6 723   |
| 105 | DH3YAK        | JO31 | 33 5 715   |
| 106 | YL3AG         | KO26 | 32 8 800   |
| 107 | DG6GP         | JN48 | 32 0 670   |
| 108 | DF6VB         | JO31 | 31 0 722   |
| 109 | DJ1LP         | JO64 | 30 0 922   |
| 110 | UR7GN         | KN66 | 30 0 820   |
| 111 | I2FUM/2       | JN44 | 30 0 779   |
| 112 | ES2WX         | KO29 | 30 9 692   |
| 113 | DK0PX         | JN48 | 28 0 725   |
| 114 | UT7GA         | KN66 | 28 0 680   |
| 115 | I3ZVN         | JN55 | 27 8 1197  |
| 116 | DK9RL         | JN69 | 27 0 891   |

|     |          |      |           |
|-----|----------|------|-----------|
| 117 | I4YNO/4  | JN54 | 27 8 769  |
| 118 | DK1VI    | JN49 | 26 0 710  |
| 119 | HB9RUZ/P | JN47 | 25 9 640  |
| 120 | OZ8VO    | JO56 | 24 0 951  |
| 121 | OK2QI    | JO80 | 23 0 1275 |
| 122 | OK1VBN   | JN78 | 22 9 950  |
| 123 | F6FGO    | JN25 | 22 4 805  |
| 124 | F1FHI    | JN23 | 22 6 605  |
| 125 | OK1PG    | JO70 | 21 0 985  |
| 126 | OH5LK    | KP30 | 20 0 1349 |
| 127 | UA3MBJ   | KO88 | 20 0 301  |
| 128 | OK1KRY   | JN69 | 19 7 865  |
| 129 | OK1KPA   | JN79 | 19 0 783  |
| 130 | SP6AZT   | JO81 | 16 0 820  |
| 131 | F5OIH/P  | JN08 | 15 5 517  |
| 132 | ES1RF    | KO29 | 15 6 364  |
| 133 | SM4SJV   | JP70 | 14 3 628  |
| 134 | 9A2EY    | JN75 | 14 0 395  |
| 135 | DF0RU    | JO62 | 14 0 373  |
| 136 | HA1SO    | JN87 | 14 0 348  |
| 137 | HA1DAB   | JN87 | 13 0 292  |
| 138 | RX1AS    | KN59 | 13 0 0    |
| 139 | DL7YS    | JO62 | 12 0 410  |
| 140 | DG7SFL   | JN49 | 12 2 358  |
| 141 | UA3MAS   | KO97 | 11 0 265  |
| 142 | DL5UH    | JN48 | 10 4 671  |
| 143 | OK1SC    | JO70 | 10 0 440  |
| 144 | OK2BBF/P | JN89 | 10 6 427  |
| 145 | OK2PHM   | JN89 | 10 0 341  |
| 146 | IT9VDQ   | JN68 | 9 1 899   |
| 147 | UA6LGH   | KN97 | 9 0 464   |
| 148 | DL0SP/P  | JO62 | 9 0 347   |
| 149 | YO2IS    | KN05 | 8 0 472   |
| 150 | RW3RW    | LO02 | 8 0 400   |
| 151 | OK1HRR   | JO70 | 8 2 292   |
| 152 | UY5HF    | KN66 | 6 0 520   |
| 153 | GU6WDK/P | IN89 | 6 0 348   |
| 154 | OK2XTE   | JN89 | 6 2 206   |
| 155 | UA3TCF   | LO26 | 5 0 455   |
| 156 | SP5HEJ   | KO02 | 5 0 433   |
| 157 | GJ6WDK/P | IN89 | 5 0 282   |
| 158 | F8UM     | JN15 | 5 0 220   |
| 159 | DL3AMA   | JO51 | 5 2 162   |
| 160 | SM7JUQ   | JO65 | 4 2 502   |
| 161 | OM7AQ    | JN98 | 4 3 314   |
| 162 | UA3TIE   | LO16 | 2 0 403   |
| 163 | OK2PMN   | JN88 | 1 0 74    |
| 164 | OH2BNH   | KP20 | 1 1 23    |

### DUBUS 2320 MHz Top List

| NR | CALL     | WW   | WKDCODX    |
|----|----------|------|------------|
| 1  | PA0EZ    | JO22 | 79 15 973  |
| 2  | PA0RDY   | JO22 | 64 0 1000  |
| 3  | DB6NT/A  | JO50 | 60 0 1119  |
| 4  | PA0WWM   | JO22 | 60 15 1022 |
| 5  | G3LQR    | JO02 | 55 0 1006  |
| 6  | DL6NAQ/P | JO40 | 53 11 932  |
| 7  | OK1KIR/P | JO60 | 51 10 1115 |

|    |                |      |    |     |      |
|----|----------------|------|----|-----|------|
| 8  | PE0AGO         | JO32 | 49 | 0   | 800  |
| 9  | DL7QY          | JN59 | 47 | 0   | 1018 |
| 10 | DL1BKK         | JO43 | 45 | 0   | 760  |
| 11 | G6DER          | IO93 | 44 | 0   | 1265 |
| 12 | SM6ESG         | JO67 | 44 | 7   | 1054 |
| 13 | OESVRL/5       | JN78 | 43 | 11  | 1291 |
| 14 | PA0BAT         | JO31 | 43 | 12  | 923  |
| 15 | PA3DIJ         | JO33 | 43 | 0   | 727  |
| 16 | OK1AIY/P       | JO70 | 42 | 0   | 1296 |
| 17 | OZ1IPU         | JO57 | 38 | 7   | 1028 |
| 18 | F5FHI          | IN97 | 37 | 0   | 1017 |
| 19 | SM7ECM         | JO65 | 36 | 9   | 880  |
| 20 | DC8UG          | JO30 | 35 | 0   | 900  |
| 21 | OK1OKL         | JO60 | 34 | 0   | 830  |
| 22 | DF1EQ          | JO31 | 34 | 0   | 678  |
| 23 | DL0UL/P        | JN48 | 32 | 0   | 960  |
| 24 | ON7WR          | JO20 | 32 | 8   | 756  |
| 25 | OZ2OE          | JO45 | 31 | 0   | 876  |
| 26 | DC0DA          | JO31 | 31 | 0   | 775  |
| 27 | DJ1KP          | JO40 | 30 | 0   | 454  |
| 28 | DL3NQ          | JN49 | 29 | 0   | 890  |
| 29 | DL9GU          | JN49 | 29 | 0   | 877  |
| 30 | OZ7IS          | JO65 | 29 | 0   | 860  |
| 31 | ON7YK          | JO20 | 29 | 0   | 733  |
| 32 | HB9MIO/P       | JN37 | 29 | 0   | 694  |
| 33 | DL3YEE         | JO42 | 28 | 0   | 912  |
| 34 | F5HRY          | JN18 | 28 | 6   | 785  |
| 35 | G4LRT          | IO92 | 27 | 0   | 1022 |
| 36 | G3XDY          | JO02 | 27 | 8   | 947  |
| 37 | DH9NBB         | JN49 | 27 | 7   | 654  |
| 38 | DL4VCG         | JN39 | 27 | 0   | 553  |
| 39 | DG0CR/P        | JO50 | 26 | 0   | 962  |
| 40 | DF9QX          | JO42 | 26 | 0   | 915  |
| 41 | OZ1DOQ         | JO65 | 25 | 7   | 830  |
| 42 | I0LVA          | JN62 | 25 | 0   | 612  |
| 43 | DK0FLT         | JN49 | 24 | 7   | 646  |
| 44 | DK0OG          | JN68 | 23 | 0   | 675  |
| 45 | G4PMK          | IO93 | 22 | 0   | 1249 |
| 46 | DK2DB          | JN48 | 22 | 0   | 873  |
| 47 | OK1DKS/P       | JO60 | 22 | 4   | 602  |
| 48 | DB1BX          | JO32 | 22 | 7   | 525  |
| 49 | DL3IAS         | JN49 | 21 | 6   | 604  |
| 50 | F1EAN          | JN06 | 19 | 0   | 940  |
| 51 | I3ZVN          | JN55 | 19 | 6   | 603  |
| 52 | HB9AMH/P       | JN37 | 18 | 0   | 933  |
| 53 | DK0PX          | JN48 | 18 | 0   | 566  |
| 54 | G4DDK          | JO02 | 17 | 0   | 969  |
| 55 | LA/DB1DI/PJO37 | 17   | 0  | 825 |      |
| 56 | DB8NU          | JN49 | 17 | 0   | 428  |
| 57 | DJ8ES          | JO43 | 16 | 7   | 1025 |
| 58 | DG5NEX         | JN49 | 16 | 0   | 465  |
| 59 | DF6VB          | JO31 | 15 | 0   | 414  |
| 60 | DK1KR          | JO53 | 13 | 0   | 792  |
| 61 | DJ6XV          | JO31 | 12 | 0   | 396  |
| 62 | DK6AS          | JO52 | 11 | 0   | 620  |
| 63 | PA0JUS         | JO22 | 10 | 5   | 705  |
| 64 | IW5AVM         | JN52 | 10 | 0   | 552  |
| 65 | I2FUM/2        | JN44 | 10 | 0   | 354  |
| 66 | OK1KEI         | JO70 | 9  | 0   | 786  |
| 67 | DL1SUN         | JO53 | 9  | 0   | 349  |

|    |          |      |   |   |     |
|----|----------|------|---|---|-----|
| 68 | OK1DFC/P | JO60 | 9 | 3 | 320 |
| 69 | SP9FG    | JN99 | 8 | 4 | 717 |
| 70 | LA8AK    | JO38 | 8 | 0 | 677 |
| 71 | OK2BFF   | JN89 | 8 | 0 | 308 |
| 72 | OK1CA    | JO70 | 8 | 0 | 291 |
| 73 | OK1PG    | JO70 | 8 | 0 | 0   |
| 74 | F6CGB    | JN18 | 7 | 0 | 407 |
| 75 | DH3NAN   | JO50 | 7 | 0 | 331 |
| 76 | F1GTU    | JN05 | 7 | 0 | 313 |
| 77 | ON4PS    | JO20 | 5 | 0 | 574 |
| 78 | S50C     | JN76 | 5 | 2 | 346 |
| 79 | DG6GP    | JN48 | 5 | 0 | 245 |
| 80 | OK1KRY   | JN69 | 5 | 3 | 189 |
| 81 | OK2QI    | JO80 | 4 | 0 | 201 |
| 82 | F1FHI    | JN23 | 4 | 1 | 181 |
| 83 | DF2CA/P  | JN57 | 3 | 0 | 206 |
| 84 | GW4LXO   | IO81 | 3 | 0 | 200 |
| 85 | OK1VBN   | JN78 | 3 | 2 | 158 |
| 86 | DL1KDA   | JO30 | 3 | 2 | 98  |
| 87 | F5PAU    | IN88 | 2 | 0 | 120 |
| 88 | 9A2EY    | JN75 | 2 | 0 | 96  |
| 89 | SP9EWU   | JO90 | 1 | 0 | 134 |
| 90 | SP6MLK/P | JO80 | 1 | 1 | 37  |
| 91 | SP6GWB/P | JO80 | 1 | 0 | 24  |

## DUBUS 3400 MHz Top List

| NR | CALL     | WW   | WKDCODX  |
|----|----------|------|----------|
| 1  | PA0EZ    | JO22 | 27 5 835 |
| 2  | DB6NT/A  | JO50 | 27 0 741 |
| 3  | DL6NAQ/P | JO40 | 25 4 860 |
| 4  | PA0WWM   | JO22 | 21 5 850 |
| 5  | G3LQR    | JO02 | 19 0 924 |
| 6  | PA0BAT   | JO31 | 18 3 568 |
| 7  | PA0RDY   | JO22 | 18 0 520 |
| 8  | DC0DA    | JO31 | 17 0 660 |
| 9  | PE0AGO   | JO32 | 17 0 457 |
| 10 | G6DER    | IO93 | 15 0 859 |
| 11 | DL1BKK   | JO43 | 15 0 703 |
| 12 | DL3NQ    | JN49 | 15 0 637 |
| 13 | DL7QY    | JN59 | 15 0 565 |
| 14 | DC8UG    | JO30 | 13 0 724 |
| 15 | DF1EQ    | JO31 | 13 0 532 |
| 16 | DB1BX    | JO32 | 12 4 425 |
| 17 | DK2DB    | JN48 | 11 0 331 |
| 18 | G4PMK    | IO93 | 10 0 845 |
| 19 | G4LRT    | IO92 | 9 0 509  |
| 20 | DL0UL/P  | JN48 | 9 0 239  |
| 21 | DK0PX    | JN48 | 6 0 528  |
| 22 | DL4VCG   | JN39 | 6 0 339  |
| 23 | OZ2OE    | JO45 | 5 0 772  |
| 24 | DJ8ES    | JO43 | 5 3 578  |
| 25 | DJ6XV    | JO31 | 5 0 396  |
| 26 | GW4LXO   | IO81 | 3 0 117  |
| 27 | DK0OG    | JN68 | 3 0 78   |
| 28 | DF9QX    | JO42 | 2 0 143  |
| 29 | DF2CA/P  | JN57 | 2 0 24   |
| 30 | OZ1IPU   | JO57 | 1 1 209  |
| 31 | GU6WDK/P | IN89 | 1 0 6    |

## DUBUS 5760 MHz Top List

| NR | CALL           | WW      | WKDCODX   |
|----|----------------|---------|-----------|
| 1  | SM7ECM         | JO65    | 34 6 960  |
| 2  | PA0EZ          | JO22    | 33 8 1017 |
| 3  | DB6NT/A        | JO50    | 32 0 1000 |
| 4  | HB9AMH/P       | JN37    | 29 0 700  |
| 5  | HB9MIO/P       | JN37    | 26 0 694  |
| 6  | SM6ESG         | JO67    | 25 6 951  |
| 7  | G3LQR          | JO02    | 21 0 949  |
| 8  | PA0BAT         | JO31    | 20 7 723  |
| 9  | DL1BKK         | JO43    | 19 0 689  |
| 10 | OZ1IPU         | JO57    | 18 6 807  |
| 11 | I3ZVN          | JN55    | 17 5 560  |
| 12 | OK1KIR/P       | JO60    | 17 3 393  |
| 13 | OK1UWA/P       | JO70    | 16 0 998  |
| 14 | OE5VRL/5       | JN78    | 15 6 901  |
| 15 | PE0AGO         | JO32    | 15 0 800  |
| 16 | PA0WWM         | JO22    | 14 6 863  |
| 17 | DL0UL/P        | JN48    | 14 0 660  |
| 18 | I0LVA          | JN62    | 14 0 557  |
| 19 | G6DER          | IO93    | 13 0 947  |
| 20 | DL3NQ          | JN49    | 12 0 318  |
| 21 | DC8UG          | JO30    | 11 0 724  |
| 22 | OZ7IS          | JO65    | 11 0 593  |
| 23 | DC0DA          | JO31    | 11 0 451  |
| 24 | OK1AIY/P       | JO70    | 10 0 693  |
| 25 | DL7QY          | JN59    | 10 0 565  |
| 26 | OK1OKL         | JO60    | 9 0 611   |
| 27 | DL6NAQ/P       | JO40    | 9 2 452   |
| 28 | OZ1DOQ         | JO65    | 9 4 442   |
| 29 | DB1BX          | JO32    | 9 4 425   |
| 30 | DK2DB          | JN48    | 9 0 315   |
| 31 | HB9MIN/P       | JN37    | 8 0 286   |
| 32 | LA/DB1DI/PJO37 | 7 0 746 |           |
| 33 | S51WI          | JN75    | 7 0 532   |
| 34 | G4PMK          | IO93    | 6 0 958   |
| 35 | F5HRY          | JN18    | 6 3 442   |
| 36 | FLGHB/P        | IN88    | 6 0 412   |
| 37 | DK0PX          | JN48    | 6 0 343   |
| 38 | DC8EC/A        | JN57    | 6 0 278   |
| 39 | I2FUM/2        | JN44    | 6 0 201   |
| 40 | OZ2OE          | JO45    | 5 0 679   |
| 41 | DJ8ES          | JO43    | 5 5 578   |
| 42 | DF1EQ          | JO31    | 5 0 461   |
| 43 | F6CGB          | JN18    | 5 0 407   |
| 44 | DL4VCG         | JN39    | 4 0 339   |
| 45 | DL1JIN/P       | JO60    | 4 0 321   |
| 46 | DG0CR/P        | JO50    | 4 0 304   |
| 47 | DJ6XV          | JO31    | 4 0 176   |
| 48 | F8UM/P         | JN05    | 4 0 162   |
| 49 | DK0OG          | JN68    | 4 0 78    |
| 50 | OK1KRY         | JN69    | 3 2 175   |
| 51 | F6CGB/P        | JN24    | 2 0 375   |
| 52 | OK1DKS/P       | JO60    | 2 1 318   |
| 53 | DG1VL          | JO61    | 2 2 191   |
| 54 | ES2WX          | KO29    | 2 2 89    |

|    |          |      |   |   |     |
|----|----------|------|---|---|-----|
| 55 | GJ6WDP/P | IN89 | 1 | 0 | 136 |
| 56 | OK2QI    | JO80 | 1 | 0 | 108 |
| 57 | SP6MLK/6 | JO70 | 1 | 1 | 1   |
| 58 | SP6MLK/P | JO80 | 1 | 1 | 1   |
| 59 | SP6GWB/P | JO80 | 1 | 0 | 1   |

## DUBUS 10 GHz Top List

| NR | CALL       | WW   | WKDCODX    |
|----|------------|------|------------|
| 1  | PA0EZ      | JO22 | 66 13 1017 |
| 2  | G3WDG      | IO92 | 55 0 1135  |
| 3  | G4KGC      | IO92 | 53 0 1135  |
| 4  | F6DKW      | JN18 | 51 8 1215  |
| 5  | SM7ECM     | JO65 | 48 7 1110  |
| 6  | G3LQR      | JO02 | 46 0 1006  |
| 7  | HB9MIN/P   | JN37 | 45 0 939   |
| 8  | HB9AMH/P   | JN37 | 43 0 939   |
| 9  | OE5VRL/5   | JN78 | 42 10 1136 |
| 10 | DB6NT/A    | JO50 | 40 0 1000  |
| 11 | DL3YEE     | JO42 | 40 0 700   |
| 12 | G4BRK      | IO91 | 39 0 1115  |
| 13 | DK1KR      | JO53 | 39 0 868   |
| 14 | I6XCK/6    | JN63 | 39 0 702   |
| 15 | F5HRY      | JN18 | 38 8 877   |
| 16 | PA0BAT     | JO31 | 38 10 785  |
| 17 | SM6ESG     | JO67 | 37 6 1275  |
| 18 | PA0WWM     | JO22 | 37 12 850  |
| 19 | LX1DU      | JN29 | 37 0 700   |
| 20 | I6CXB/6    | JN63 | 35 0 751   |
| 21 | HB9RG      | JN47 | 34 0 761   |
| 22 | DJ1KP      | JO40 | 34 0 554   |
| 23 | DK0OG      | JN68 | 33 0 524   |
| 24 | I0LVA      | JN62 | 32 0 850   |
| 25 | DL6NAQ/P   | JO40 | 32 8 656   |
| 26 | G4DDK      | JO02 | 31 0 901   |
| 27 | DL4EAU/P   | JO51 | 31 0 826   |
| 28 | DL3NQ      | JN49 | 31 0 712   |
| 29 | DL1BKK     | JO43 | 30 0 842   |
| 30 | G3GNNR     | IO70 | 29 0 1275  |
| 31 | OK1JKT/P   | JO60 | 29 5 638   |
| 32 | OZ1IPU     | JO57 | 28 7 941   |
| 33 | HB9MIO/P   | JN37 | 28 0 694   |
| 34 | DL3IAS     | JN49 | 28 9 584   |
| 35 | OK1OKL     | JO60 | 27 0 795   |
| 36 | OK1KIR/P   | JO60 | 25 5 553   |
| 37 | DK0FLT     | JN49 | 24 7 646   |
| 38 | DH9NBB     | JN49 | 24 7 646   |
| 39 | DK4GD/P    | JN48 | 24 0 566   |
| 40 | ON7WR      | JO20 | 23 9 756   |
| 41 | OZ2OE      | JO45 | 22 0 789   |
| 42 | EA6ADW/P   | JM19 | 21 4 850   |
| 43 | OK1AIY/P   | JO70 | 21 0 736   |
| 44 | DB1BX      | JO32 | 20 7 705   |
| 45 | DL4VCG     | JN39 | 20 0 533   |
| 46 | DC8UG      | JO30 | 19 0 753   |
| 47 | DF9QX      | JO42 | 19 0 504   |
| 48 | G4LDR      | IO91 | 18 0 1118  |
| 49 | LA/DB1DI/P | JO37 | 18 0 825   |
| 50 | PE0AGO     | JO32 | 18 0 800   |
| 51 | F1GHB/P    | IN88 | 18 0 431   |

|    |          |      |           |
|----|----------|------|-----------|
| 52 | DK0PX    | JN48 | 18 0 419  |
| 53 | I3ZVN    | JN55 | 17 7 571  |
| 54 | DL0UL/P  | JN57 | 17 0 363  |
| 55 | DL2DR    | JO31 | 16 4 603  |
| 56 | ON7YK    | JO20 | 16 0 494  |
| 57 | DK2DB    | JN48 | 16 0 432  |
| 58 | S51WI    | JN75 | 15 0 532  |
| 59 | DL7QY    | JN59 | 15 0 492  |
| 60 | OK1UWA/P | JO70 | 15 0 434  |
| 61 | IW5ADB   | JN53 | 14 0 1053 |
| 62 | G4PMK    | IO93 | 14 0 958  |
| 63 | DC0DA    | JO31 | 14 0 639  |
| 64 | DG1VL    | JO61 | 14 2 391  |
| 65 | OZ1DOQ   | JO65 | 13 5 472  |
| 66 | IA4CC    | JN63 | 12 0 496  |
| 67 | GW4LXO   | IO81 | 12 0 309  |
| 68 | G4KNZ    | IO91 | 12 0 247  |
| 69 | F6CGB    | JN18 | 9 0 677   |
| 70 | DJ8ES    | JO43 | 9 4 593   |
| 71 | HB9AMH   | JN37 | 9 0 567   |
| 72 | DC8EC/A  | JN57 | 9 0 297   |
| 73 | SM0FZH   | JO99 | 9 0 242   |
| 74 | G4LRT    | IO92 | 8 0 824   |
| 75 | F5HRY/P  | JN08 | 8 2 491   |
| 76 | DL1KDA   | JO30 | 8 4 477   |
| 77 | DJ6XV    | JO31 | 8 0 195   |
| 78 | F6CGB/P  | JN12 | 7 0 823   |
| 79 | DL1JIN/P | JO60 | 7 0 345   |
| 80 | DF1EQ/P  | JO31 | 7 0 283   |
| 81 | SP6GWB/P | JO80 | 6 0 -374  |
| 82 | SP6MLK/P | JO80 | 6 4 355   |
| 83 | PA3DIJ   | JO33 | 6 0 344   |
| 84 | OK1DKS/P | JO60 | 5 2 616   |
| 85 | DG0CAL   | JO52 | 5 0 255   |
| 86 | LA8AK    | JO38 | 5 0 212   |
| 87 | DF6VB    | JO31 | 5 0 162   |
| 88 | 9A2EY    | JN75 | 4 0 374   |
| 89 | DG0CR/P  | JO50 | 4 0 283   |
| 90 | S50C     | JN76 | 4 4 176   |
| 91 | F5OIH/P  | JN08 | 4 1 149   |
| 92 | OK1DFC/P | JO60 | 3 2 185   |
| 93 | DH3NAN   | JO50 | 3 0 134   |
| 94 | PA0JUS   | JO22 | 2 2 245   |
| 95 | DG5NEX   | JN49 | 1 0 173   |
| 96 | SM48JY   | JP70 | 1 1 0     |

## DUBUS 24 GHz Top List

| NR | CALL     | WW   | WKDCODX  |
|----|----------|------|----------|
| 1  | HB9MIN/P | JN37 | 12 0 396 |
| 2  | DC8EC/P  | JN57 | 10 0 301 |
| 3  | HB9AMH/P | JN37 | 10 0 286 |
| 4  | HB9MIO/P | JN37 | 10 0 172 |
| 5  | DJ1KP    | JO40 | 8 0 273  |
| 6  | OE5VRL/5 | JN78 | 7 3 273  |
| 7  | DB6NT/A  | JO50 | 6 0 301  |
| 8  | G4DDK    | JO02 | 6 0 268  |
| 9  | DK4GD/P  | JN48 | 6 0 184  |
| 10 | G3WDG    | IO92 | 5 0 392  |
| 11 | DL3NQ    | JN49 | 5 0 287  |

|    |          |      |         |
|----|----------|------|---------|
| 12 | G3LQR    | JO02 | 5 0 261 |
| 13 | EA6ADW/P | JM19 | 5 2 204 |
| 14 | DK0OG    | JN68 | 5 0 193 |
| 15 | OK1OKL   | JO60 | 5 0 185 |
| 16 | DF2CA/P  | JN58 | 5 0 142 |
| 17 | PA0BAT   | JO31 | 5 2 126 |
| 18 | PA0EZ    | JO22 | 4 3 391 |
| 19 | OK1UWA/P | JO70 | 4 0 188 |
| 20 | OK1KIR/P | JO60 | 4 2 185 |
| 21 | OK1DFC/P | JO60 | 4 2 160 |
| 22 | G3GNNR   | IP70 | 4 0 154 |
| 23 | DL3YEE/P | JO42 | 4 0 151 |
| 24 | DF6VB/P  | JO31 | 4 0 104 |
| 25 | DL2DR    | JO31 | 4 1 98  |
| 26 | OK1AIY/P | JO70 | 3 0 266 |
| 27 | OK1AIY-P | JO60 | 3 0 227 |
| 28 | F1GHB/P  | IN88 | 3 0 158 |
| 29 | G4KNZ/P  | IO83 | 3 0 120 |
| 30 | DK0PX    | JN48 | 3 0 99  |
| 31 | DG1VL    | JO61 | 3 1 50  |
| 32 | DF1EQ    | JO31 | 2 0 133 |
| 33 | DB1BX    | JO32 | 2 1 90  |
| 34 | DL1JIN/P | JO60 | 2 0 58  |
| 35 | DG0CR/P  | JO50 | 2 0 52  |
| 36 | DK2DB    | JN48 | 2 0 48  |
| 37 | ON7YK    | JO20 | 2 0 34  |
| 38 | SM6ESG   | JO67 | 2 1 20  |
| 39 | G4KGC    | IO92 | 1 0 392 |
| 40 | DC0DA/P  | JO32 | 1 0 104 |
| 41 | F5OIH/P  | JN08 | 1 1 90  |
| 42 | CT1DMK   | IN50 | 1 0 82  |
| 43 | DJ6XV    | JO31 | 1 0 76  |
| 44 | F6CGB/P  | JN37 | 1 0 74  |
| 45 | OK1OGS/P | JN69 | 1 0 60  |
| 46 | GW4LXO   | IO81 | 1 0 58  |
| 47 | OZ1IPU   | JO57 | 1 1 55  |
| 48 | DL4VCG   | JN39 | 1 0 9   |
| 49 | SP6MLK/6 | JO70 | 1 1 1   |
| 50 | SP6MLK/P | JO80 | 1 1 1   |
| 51 | SP6GWB/P | JO80 | 1 0 1   |

## DUBUS 47 GHz Top List

| NR | CALL     | WW   | WKDCODX |
|----|----------|------|---------|
| 1  | HB9MIN/P | JN37 | 8 0 182 |
| 2  | HB9MIO/P | JN37 | 8 0 166 |
| 3  | HB9AMH/P | JN37 | 5 0 166 |
| 4  | DK4GD/P  | JN47 | 5 0 123 |
| 5  | DF2CA/P  | JN58 | 4 0 15  |
| 6  | OE9PMJ/9 | JN47 | 4 0 12  |
| 7  | OE9YTV/9 | JN47 | 4 0 11  |
| 8  | DL2DR    | JO31 | 3 1 71  |
| 9  | OK1OKL   | JO60 | 2 0 96  |
| 10 | OK1UWA/P | JO70 | 2 0 96  |
| 11 | OK1AIY-P | JO60 | 2 0 96  |
| 12 | DB6NT/A  | JO50 | 2 0 95  |
| 13 | DF6VB/P  | JO31 | 2 0 69  |
| 14 | DC0DA/P  | JO31 | 2 0 69  |
| 15 | DF2CA/P  | JO60 | 2 0 59  |
| 16 | DL3YEE/P | JO42 | 2 0 45  |

|    |             |      |   |   |     |
|----|-------------|------|---|---|-----|
| 17 | DL/HB9AMH/P | JN48 | 1 | 0 | 184 |
| 18 | DL1JIN/P    | JO60 | 1 | 0 | 58  |
| 19 | DK0PX       | JN48 | 1 | 0 | 33  |
| 20 | DC8EC/A     | JN57 | 1 | 0 | 14  |
| 21 | OK1AIY/P    | JO70 | 1 | 0 | 12  |
| 22 | OK1KIR/P    | JO60 | 1 | 1 | 5   |
| 23 | SP6MLK/6    | JO70 | 1 | 1 | 1   |

## DUBUS 76 GHz Top List

| NR | CALL     | WW   | WKDCODX |
|----|----------|------|---------|
| 1  | DK4GD/P  | JN47 | 4 0 114 |
| 2  | DG2MF/P  | JO58 | 4 0 4   |
| 3  | DF2CA/P  | JO50 | 4 0 4   |
| 4  | OE9YTV/9 | JN57 | 3 0 1   |
| 5  | OE9PMJ/9 | JN57 | 3 0 1   |
| 6  | HB9MIO/P | JN37 | 2 0 114 |
| 7  | DB6NT/A  | JO50 | 2 0 77  |
| 8  | DC0DA/P  | JO50 | 2 0 48  |
| 9  | DF6VB/P  | JO50 | 1 0 18  |
| 10 | DL1JIN/P | JO60 | 1 0 11  |
| 11 | OE9FKI   | JN47 | 1 0 2   |
| 12 | HB9AMH/P | JN37 | 1 0 1   |
| 13 | HB9MIN/P | JN37 | 1 0 1   |

## DUBUS 145 GHz Top List

| NR | CALL     | WW   | WKDCODX |
|----|----------|------|---------|
| 1  | DB6NT/OZ | JO57 | 1 0 3   |
| 2  | DB6NT/A  | JO50 | 1 0 2   |
| 3  | DL1JIN/P | JO60 | 1 0 1   |

## DUBUS 241 GHz Top List

| NR | CALL     | WW   | WKDCODX |
|----|----------|------|---------|
| 1  | DB6NT/A  | JO50 | 1 0 2   |
| 2  | DB6NT/OZ | JO57 | 1 0 0   |

# Aurora News

Editor: Norbert Götsche, DL8LAQ

Continuation from Page 72

## LA0BY in JO59FW wkcd on 144 MHz:

## 1997-10-01

|               |        |     |     |     |
|---------------|--------|-----|-----|-----|
| 1405 SP4MPB   | KO03GS | 57A | 57A | 50  |
| 1407 DL9MS    | JO54WC | 59A | 59A | 50  |
| 1413 DL/UT8AL | JO43HV | 59A | 59A | 50  |
| 1427 LY3ED    | KO14UX | 56A | 57A | 60  |
| 1432 DL8UD    | JO44UH | 57A | 59A | 60  |
| 1439 SP2JXN   | JO94GJ | 53A | 55A | 60  |
| 1442 DL4IB    | JO64CC | 54A | 59A | 60  |
| 1527 PA3HDD   | JO22FE | 55A | 55A | 20  |
| 1532 G3PJW    | IO83PM | 54A | 55A | 320 |
| 1541 GM4CXM   | IO75TW | 53A | 55A | 330 |
| 1545 PE1PZS   | JO21DV | 55A | 59A | 315 |
| 1554 DL1UU    | JO62SP | 59A | 59A | 40  |
| 1556 DL6AI    | JO43CC | 55A | 55A | 0   |
| 1558 DL6AM    | JO42QH | 59A | 59A | 20  |
| 1601 PA3GGD   | JO33FD | 56A | 55A | 0   |
| 1604 LA2PHA   | JO38IB | 59A | 59A | 20  |
| 1605 DL7FF    | JO62TJ | 59A | 59A | 40  |
| 1607 PA3CEE   | JO33JI | 59A | 59A | 20  |
| 1617 PA3FJY   | JO32EH | 59A | 59A | 50  |
| 1617 DL1CC    | JO72HB | 57A | 57A | 50  |

|             |        |     |     |    |
|-------------|--------|-----|-----|----|
| 1639 DK3WG  | JO72GI | 59A | 59A | 40 |
| 1641 SP2FAX | JO83VA | 55A | 57A | 40 |
| 1642 DJ1SHF | JO73AM | 53A | 59A | 40 |
| 1652 DD0BI  | JO33RL | 55A | 59A | 30 |

## 1997-10-10

|             |        |     |     |    |
|-------------|--------|-----|-----|----|
| 2152 OZ8ZS  | JO55RT | 59A | 59A | 30 |
| 2157 SK5CG  | JP80UE | 52A | 57A | 30 |
| 2159 YL3AG  | KO26AW | 59A | 59A | 40 |
| 2210 SP4MPB | KO03GS | 57A | 57A | 20 |
| 2214 GM4ILS | IO87IP | 55A | 55A | 10 |
| 2221 GM4OGI | IO86DX | 59A | 57A | 10 |
| 2229 SP2IQF | JO94PF | 59A | 59A | 20 |
| 2243 LY2MW  | KO24WZ | 52A | 57A | 30 |
| 2245 SM3KJO | JP92DX | 53A | 57A | 20 |
| 2248 YL2KA  | KO26AX | 53A | 55A | 40 |
| 2252 SM5CKG | JO78KN | 53A | 57A | 40 |
| 2255 DK8LV  | JO44SJ | 59A | 58A | 40 |
| 2303 DL8CMM | JO52WO | 53A | 55A | 40 |

Thanks for your report, Stefan.

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Rauschzahl < 2 dB NF

Eingebaute Umschaltung für ZF/IF  
Ausgang zur Versorgung von Endstufen. TX Gain einstellbar

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Power Amplifier für 5760 MHz - typ.: 5 Watt 2 stufig Typ: MKU 602 725.- DM

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Veröffentlichung in DUBUS  
Heft 1/1991 Buch III

Output Power typ. 10 mW HF  
Rauschzahl < 3 dB NF

Eingebaute Umschaltung für ZF/IF  
Ausgang zur Steuerung von Endstufen. TX Gain einstellbar

Transverter Typ: MKU 10 G 588.- DM  
Oszillatorbaugruppe Typ: MKU 25 LO 340.- DM  
Power Amplifier 200 mW Typ: MKU 102 AL 275.- DM

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Output Power typ. 0,2 mW HF  
Rauschzahl < 8 dB NF

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Ausgang zur Steuerung von Verstärkerstufen. TX Gain einstellbar

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Rauschzahl < 8 dB NF

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Ausgang zur Steuerung von Verstärkerstufen. TX Gain einstellbar

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