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Mediterr. Sea on NOAA

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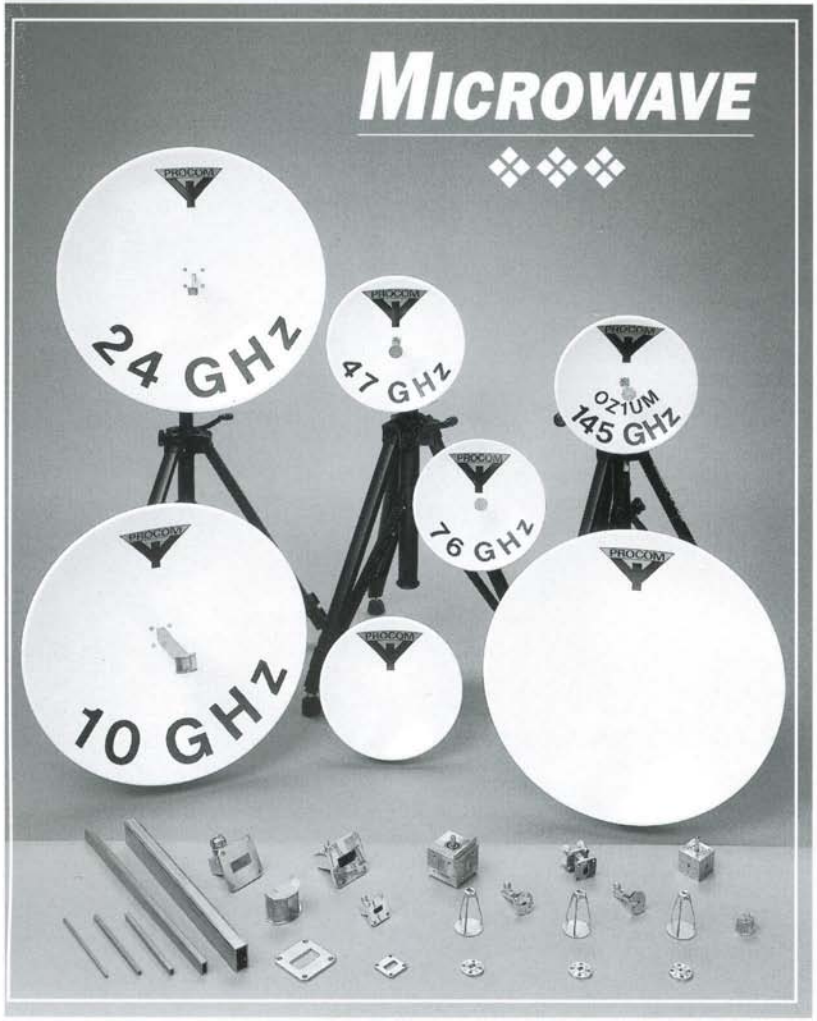

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DUBUS
die zweisprachige Zeitschrift für den Schmalband-DX-Amateur auf UKW von 50MHZ bis 241GHz. Geschrieben von aktiven UKW-Amateuren für aktive UKW-Amateure.

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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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Technical Reports

Editor: Rainer Bertelsmeier, DJ9BV

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

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(Part III)

10. SSB/CW switching RX/TX

A SSB/CW transceiver requires different switching functions. Fortunately both SSB and CW modes of operation require the same functions in the receiver. Of course two different operating modes are required for the transmitter: SSB voice and CW keying.

The RX/TX change-over is controlled by the PTT switch on the microphone in the SSB mode of operation. In the CW mode of operation, most transceiver use an automatic delay circuit to keep the transmitter enabled during CW keying. This delay circuit was perhaps required in old radios using several mechanical relays. In modern transceiver with all electronic switching it makes no sense, since the RX/TX switching can be performed in less than one millisecond.

It therefore makes sense that SSB transmission is enabled by simply pressing the PTT switch while CW transmission is enabled by pressing the CW key so that no special (and useless) controls are required on the front panel of the transceiver. In the CW mode of operation, no delays are required and the receiver is enabled immediately after the CW key is released ("BK" mode of operation). The circuit diagram of the SSB/CW switching RX/TX is shown on Fig. 48. In the described SSB/CW transceiver, most modules are enabled at all times with a continuous +12V supply: VCXO and multipliers, receiving mixer, IF amplifier, demodulator and modulator. When enabling the transmitter either by pressing the PTT or CW keys, the RX LNA is turned off (+12VRX) and the TX PA is turned on (+12VTX and +5VTX or +4VTX). During SSB transmission the RX AF amplifier is turned off (+12VAF), to avoid disturbing the microphone amplifier (+12VSSB). On the other hand, during CW transmission the AF amplifier remains on as well as most receiver stages, so that CW keying can be monitored in the loudspeaker or phones. The +12VCW supply connects the 683Hz signal to the modulator input.

Fig. 48: SSB/CW Switching TX/RX

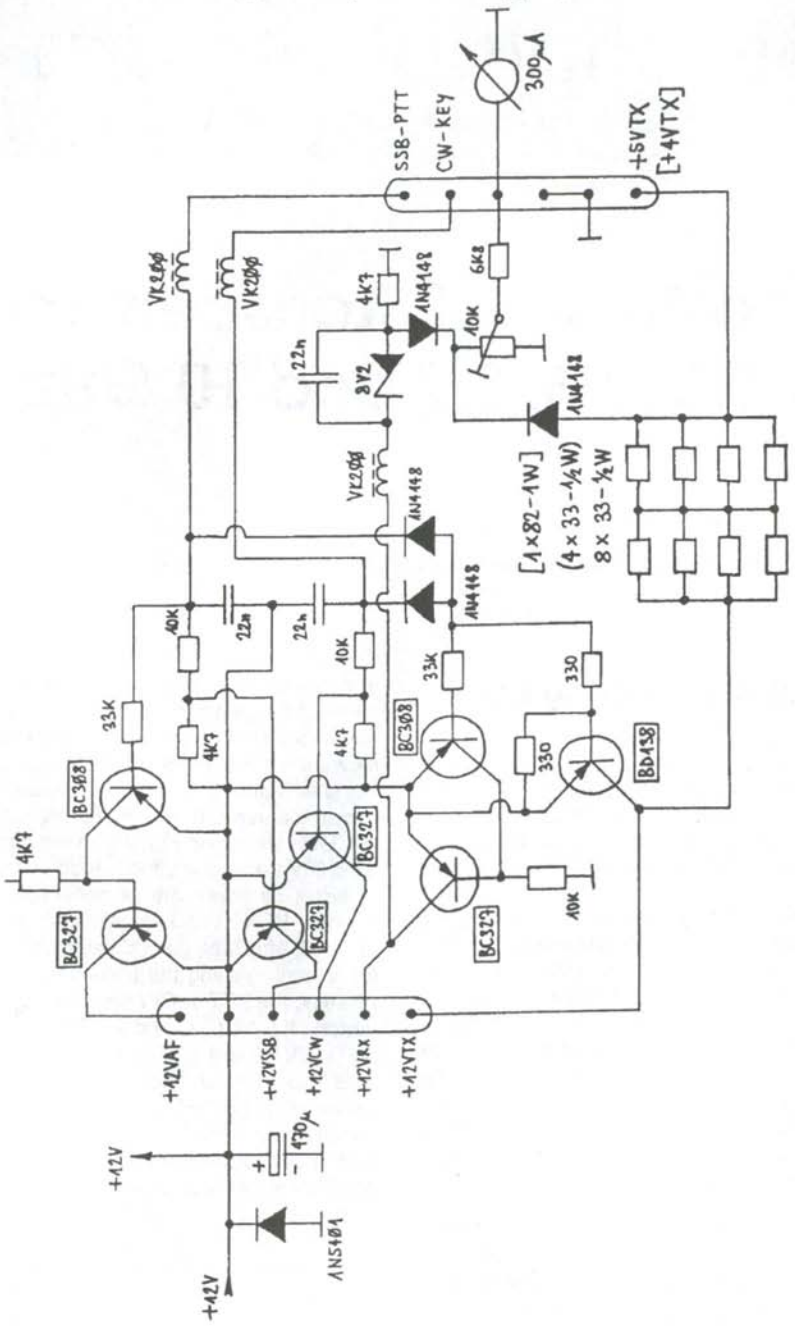
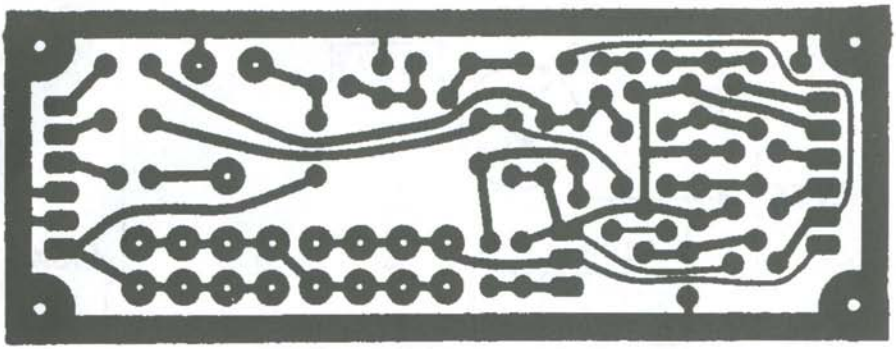


Fig. 49: SSB/CW Switching TX/RX PCB



The supply voltages +12VAF, +12VSSB, +12VCW and +12VRX are switched by BC327 PNP transistors. Due to the higher current drain, the +12VTX supply voltage requires a more powerful PNP transistor BD138. The TX PA receives its supply voltage through a current-limiting resistor from the +12VTX line. Since the latter dissipates a considerable amount of power, it is built from several smaller resistors and located in the switching unit to prevent heating the PA transistor(s).

The value of the current-limiting resistor depends on the version of the transceiver. The 1296MHz PA with a CLY5 requires 8 pieces of 33Ω 1/2W resistors for a total value of 16.5Ω. The 2304MHz PA with a CLY2 requires 4 pieces of 33Ω 1/2W resistors for a total value of 33Ω. Finally, the 5760MHz PA with two ATF35376s requires a single 82Ω 1W resistor.

The switching module also includes the circuits to drive the front-panel meter. The latter is a moving-coil type with a full-scale sensitivity of about 300µA. The meter has two functions. During reception it is used to check the battery voltage. The 8V2 Zener diode extends the full scale of the meter to the interesting range from about 9V to about 15V.

During transmission the meter is used to check the supply voltage of the PA transistor(s). Due to the self-biasing operation, the PA voltage will be only 0.5-1V without modulation and will rise to its full value, limited by the zener diode inside the PA, only when full drive is applied. The operation of the PA and

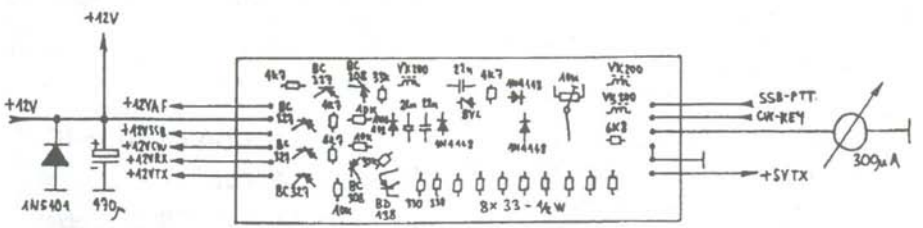
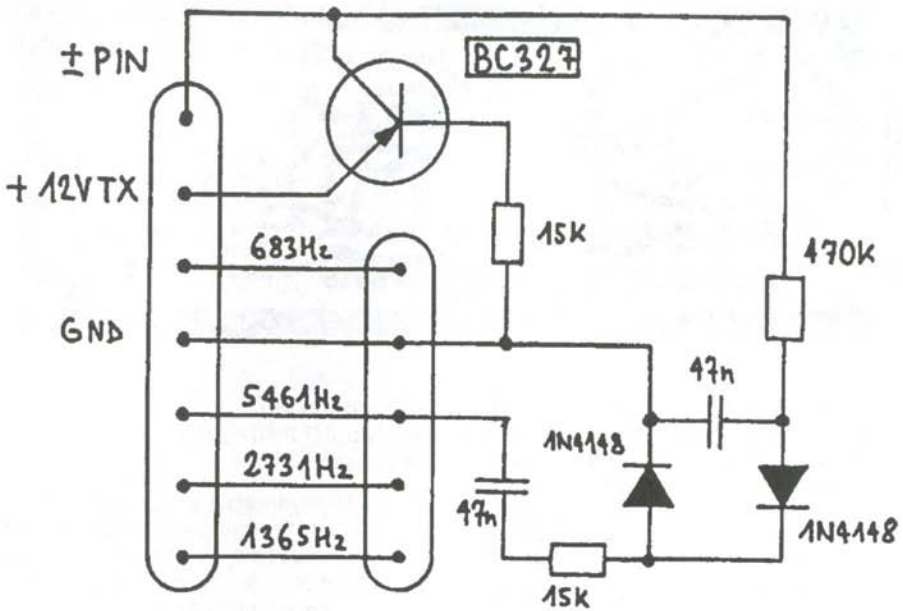


Fig. 50: SSB/CW Switching TX/RX Component Location

Fig. 51: PIN Driver for 5760 MHz



the output RF power level can therefore be simply estimated from the PA voltage.

A S-meter is probably totally useless in small portable transceiver as those described in this article. If desired, the AGC voltage can be amplified and brought to a front-panel meter. However, one should not forget that LED indicators are not visible in full sunshine on a mountain top, so the choice is limited to moving-coil and LCD meters.

Most components of the SSB/CW switching RX/TX are installed on a single-sided FR4 board with the dimensions of 30x80mm as shown on Fig. 49. Their location (1296MHz version) is shown on Fig. 50. Only the reverse-polarity protection diode 1N5401 and the 470µF electrolytic capacitor are installed directly on the 12V supply connector. The 10kΩ trimmer is used to adjust the meter sensitivity.

The 5760MHz version of the SSB/CW transceiver requires an additional PIN diode driver to provide a negative bias to the BAR80 PIN diode during reception. The corresponding circuit diagram is shown on Fig. 51. The negative voltage is obtained from the 5461Hz clock, while the BC327 PNP transistor applies a positive voltage during transmission.

The PIN driver is built on a small FR4 board with the dimensions of 23mmX20mm as shown on Fig. 52. The corresponding component location is shown on Fig. 53. The whole PIN driver module is then installed piggy-back on the demodulator board, using as support the 5-pole connector carrying the clocks to the modulator.

11. Construction of zero-IF SSB transceiver

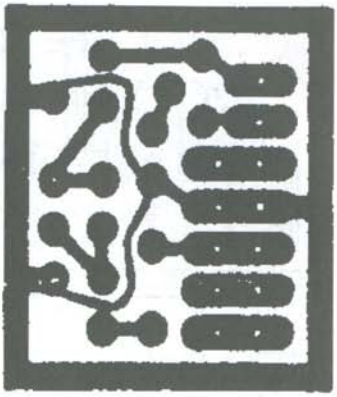
The described zero-IF SSB transceiver are using many SMD parts in the RF section. SMD resistors usually do not cause any problems, since they have low parasitics up to at least 10GHz. On the other hand, there are big

differences among SMD capacitors. For this reason a single value (47pF) was used anywhere. The 47pF capacitors used in the prototypes are NPO type, rather large (size 1206), have a self-resonance around 10GHz and introduce an insertion loss of about 0.5dB at 5.76GHz. Finally, the 4.7µF SMD tantalum capacitors can be replaced by the more popular tantalum "drops".

Quarter-wavelength chokes are used elsewhere in the RF circuits. In the 5760MHz transceiver all quarter-wavelength chokes are made as high-impedance microstrips. On the other hand, to save board space in the 1296MHz and 2304MHz versions, the quarter-wavelength chokes are made as small coils of 0.25mm thick copper-enamelled wire of the correct length, chosen according to the frequency: 12cm for 648MHz, 9cm for 23cm mixers (648/1296MHz), 7cm for 1296MHz and for L3 on Fig. 18, 5.5cm for 13cm mixers (1152/2304MHz) and 4cm for 2304MHz. The wire is tinned for about 5mm on each end and the remaining length is wound on an internal diameter of about 1mm.

The SMD semiconductor packages and pinouts are shown on Fig. 54. Please note that due to lack of space, the SMD semiconductor

Fig. 52: PIN Driver for 5760 MHz PCB



markings are different from their type names. Only the relatively large CLY5 transistor in a SOT-223 package has enough space to carry the full marking "CLY5". The remaining components only carry one-, two- or three-letter marking codes.

All of the microstrip circuits are built on double-sided 0.8mm thick FR4 glassfiber-epoxy laminate. Only the top side is shown in this article, since the bottom side is left unetched

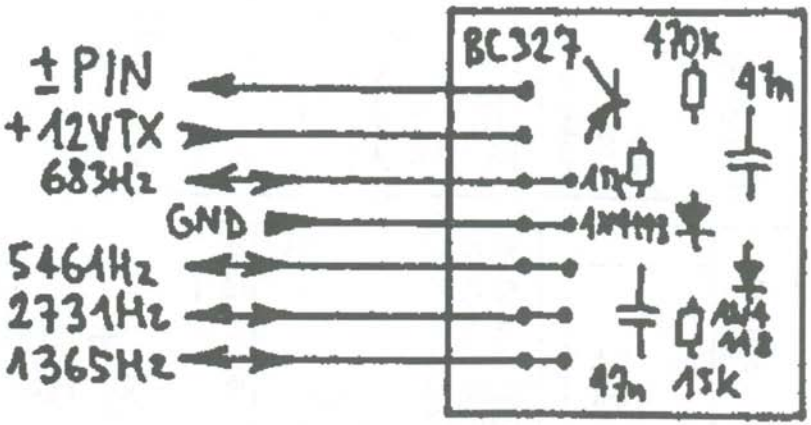
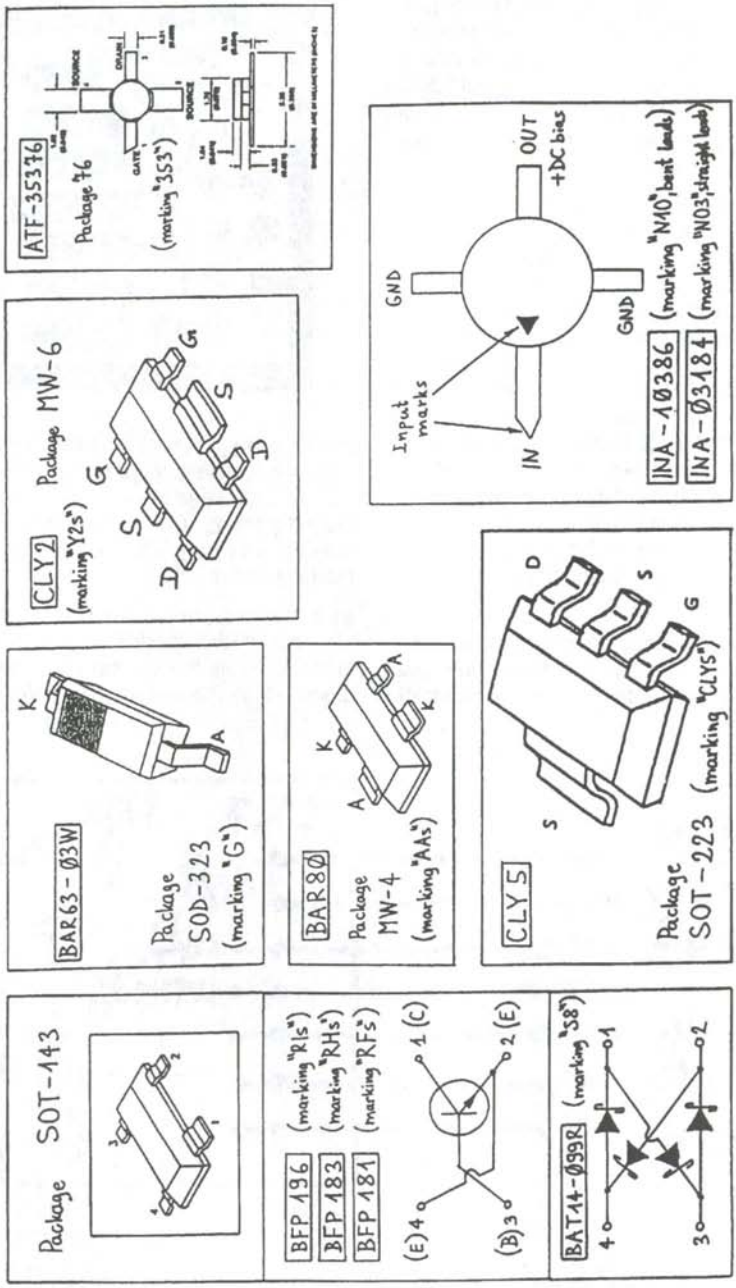


Fig. 53: PIN Driver for 5760 MHz Component Location

Fig. 54: SMD Semiconductor Packages/Pinouts



to act as a groundplane for the microstrips. The copper surface should not be tinned nor silver or gold plated. The copper-foil thickness should be preferably 35µm.

Since the microstrip boards are not designed for plated-through holes, care should be taken to ground all components properly. Microstrip lines are grounded using 0.6mm thick silver plated wire (RG214 central conductors) inserted in 1mm diameter holes at the marked positions and soldered on both sides to the copper foil.

Resistors and semiconductors are grounded through 2mm, 3.2mm and 5mm diameter holes at the marked positions. These holes are first covered on the groundplane side with pieces of thin copper foil (0.1mm). Then the holes are filled with solder and finally the SMD component is soldered in the circuit. Feedtrough capacitors are also installed in 3.2mm diameter holes in the microstrip boards and soldered to the groundplane. Feedthrough capacitors are used for supply voltages and low-frequency signals. Some components like bias resistors, zeners and electrolytic capacitors are installed on the bottom side (as shown on the component-location drawings) and connected to the feedthrough capacitors.

The VCXO/multiplier module and all of the microstrip circuits are installed in shielded enclosures as shown on Fig. 55. Both the frame and the cover are made of 0.4mm thick brass sheet. The printed-circuit board is soldered in the frame at a height of about 10mm from the bottom. Additional feedthrough capacitors are required in the brass walls. RF signal connections are made using thin TEFLON-dielectric coax like RG-188. The coax braid should be well soldered to the brass frame all around the entrance hole. Finally the frame is screwed on the chassis using sheet-metal screws.

The covers are kept in place thanks to the elastic brass sheet, so they need not be soldered. An inspection of the content is therefore possible at any time. The VCXO/multiplier module is built on a single-sided board and therefore requires both a top and a bottom cover. The remaining modules are all built as microstrip circuits, so the microstrip groundplane acts as the bottom cover and only the top cover is required.

The sizes and shapes of the microstrip circuit boards are selected so that no resonances occur up to and including 2880MHz. Microwave absorber foam is therefore only required in the three modules operating at 5760MHz. To avoid disturbing the microstrip circuit, the microwave absorber foam is installed just below the top cover.

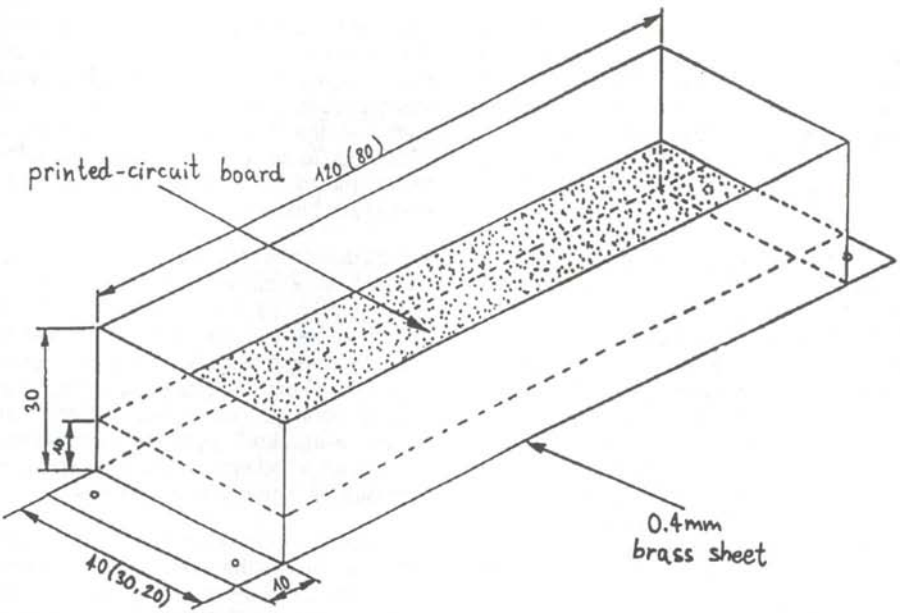
The modules of a zero-IF SSB transceiver are installed in a custom-made enclosure as shown on Fig. 56. The most important component is the chassis. The latter must be made of a single piece of 1mm thick Al sheet to provide a common ground for all modules. If a common ground is not available, the receiver will probably self-oscillate in the from of "ringing" or "whistling" in the loudspeaker, especially at higher volume settings.

The chassis carries both the front and back panels as well as the top and bottom covers. All of the connectors and commands are available on the front panel. The later is screwed to the chassis using the components installed: CW pushbutton, SMA connector, meter and tuning helipot. The top and bottom cover are made of 0.5mm thick Al sheet to save weight and are screwed to the chassis using sheet-metal screws.

The shielded RF modules are installed on the top side of the chassis where a height up to 32mm is allowed. The audio-frequency bare printed-circuit boards are installed on the bottom side of the chassis. The interconnections between both sides of the chassis are made through five large-diameter holes.

The location of the modules of the 1296MHz or 2304MHz transceiver as well as the location of the connectors and commands on the front panel are shown on Fig. 57 for both sides of the chassis. The 5760MHz transceiver has different RF modules, so the corresponding module location is shown on Fig. 58. The location of the connectors and commands is the same for all three transceiver.

Fig. 55: Shielded RF Module Enclosure



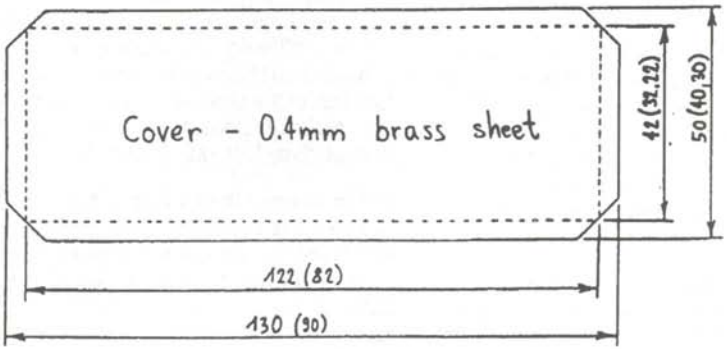


Fig. 56: Zero-IF SSB/CW Transceiver Enclosure

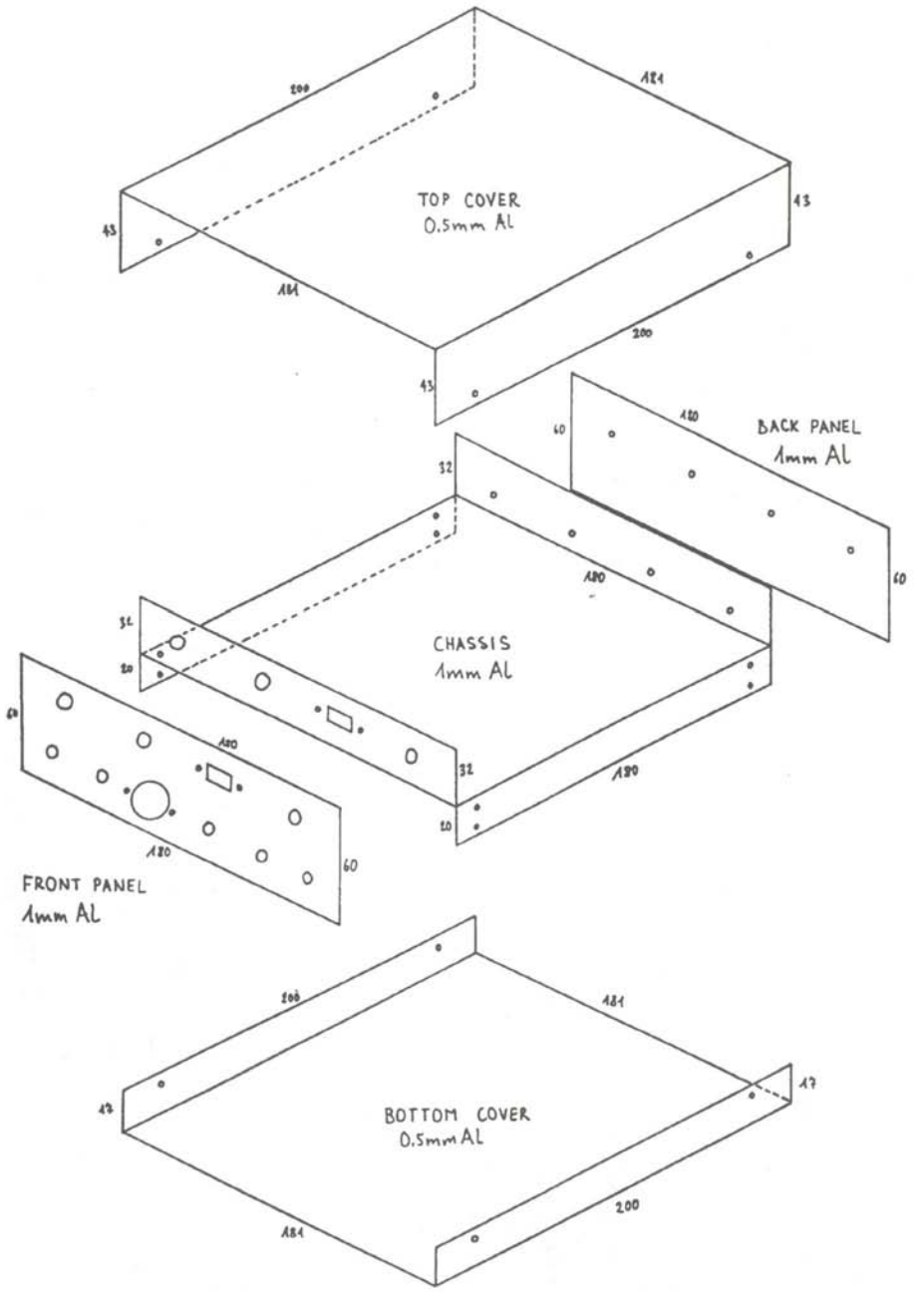


Fig. 57: 1296 SSB/CW Transceiver Module Location

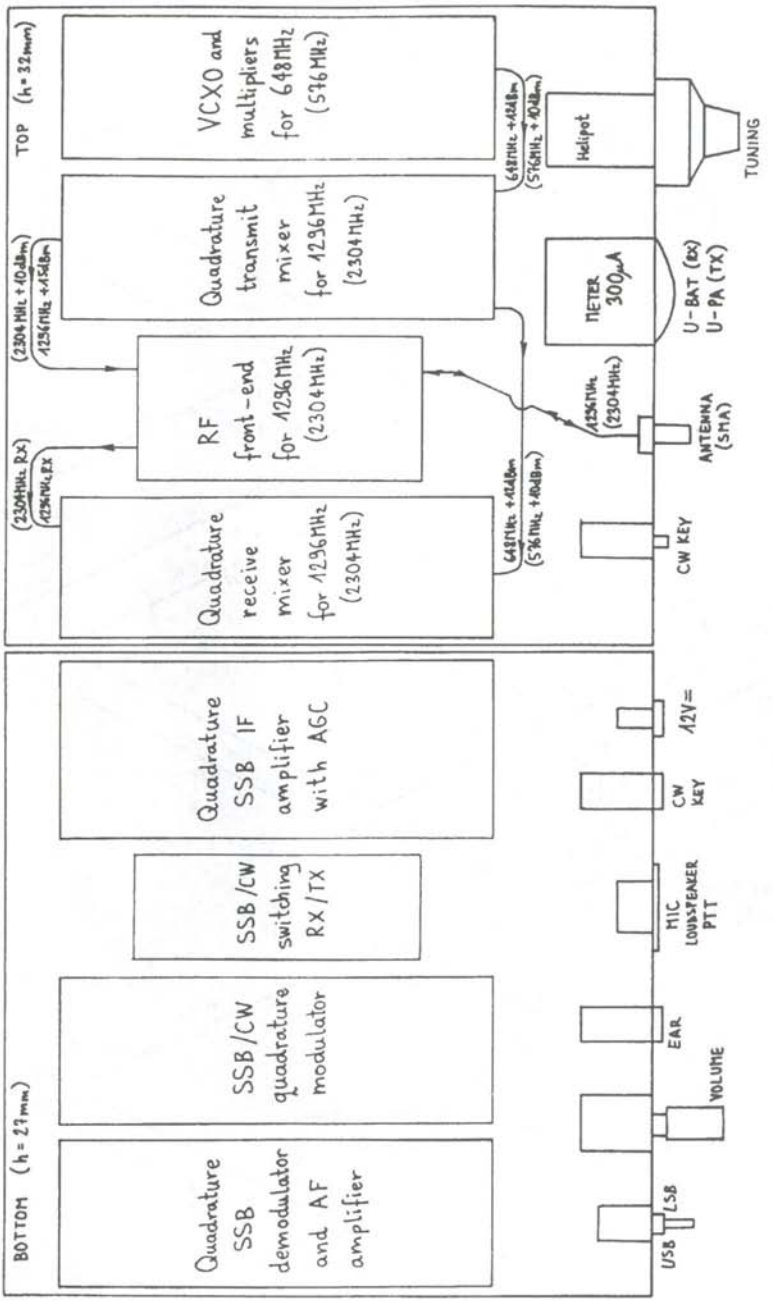
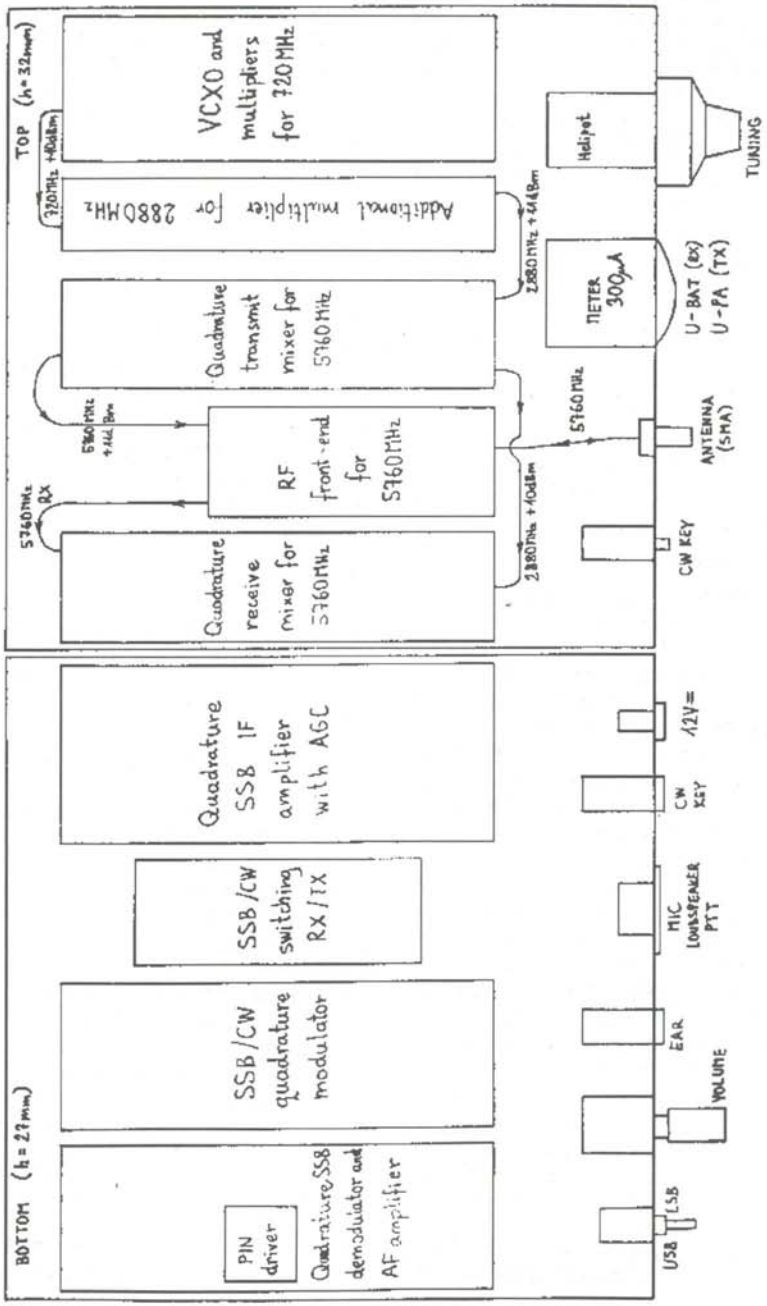


Fig. 58: 5760 SSB/CW Transceiver Module Location



The loudspeaker should not be installed inside the transceiver, since the RF receiving modules are quite sensitive to vibrations. On the other hand, the same loudspeaker may also be used as a dynamic microphone for the transmitter. The circuit is designed so that it allows a simple parallel connection of the loudspeaker output and the microphone input. The PTT and CW keys are simple switches to ground.

12. Checkout of zero-IF SSB transceiver

The described SSB/CW transceiver for 1296MHz, 2304MHz and 5760MHz do not require much tuning. The only module that really requires tuning is the VCXO/multiplier. The latter is simply tuned for the maximum output on the desired frequency. Of course, the desired coverage of the VCXO has to be set with a frequency counter.

After the VCXO/multiplier module is adjusted, the remaining parts of the transceiver require a checkout to locate defective components, soldering errors or insufficient shielding. The receiver should already work and some noise should be heard in the loudspeaker. The noise intensity should drop when the power supply to the LNA is removed. The noise should completely disappear when the receiving mixer module is disconnected from the IF amplifier. A similar noise should be heard if only one (I or Q) IF channel is connected. Next the receiver is connected to an outdoor antenna far away from the receiver and tuned to a weak unmodulated carrier (a beacon transmitter or another VCXO/multiplier module at a distance of a few ten meters). Tuning the receiver around the unmodulated signal one should hear both the desired tone and its much weaker mirror-image tone changing its frequency in the opposite direction. The two trimmers in the IF amplifier should be set so that the mirror tone disappears. The correct function of the USB/LSB switch can also be checked.

Finally, the shielding of the receiver should be checked. A small, handheld antenna (10-15dBi) is connected to the receiver and the main beam of the antenna is directed into the transceiver. If the noise coming from the loudspeaker changes, the shielding of the local oscillator multiplier chain is insufficient. Next a mains-operated fluorescent tube (20W or 40W) is turned on in the same room. A weak mains hum should only be heard when the handheld antenna is pointed towards the tube at 2-3m distance. If a clean hum without noise is heard regardless of the antenna direction, the shielding of the local oscillator multiplier chain is insufficient.

The transmitter should be essentially checked for the output power. The full output power should be achieved with the trimmer in the modulator in a middle position in CW mode. The DC voltage across the PA transistor should rise to the full value allowed by the 5.6V or 4.7V zener diode. The output power should drop by an equal amount if only I or only Q modulation is connected to the transmit mixer.

Finally the SSB modulation has to be checked with another receiver for the same frequency band or best in a contact with another amateur station at a distance of a few km. This is the simplest way to find out the correct sideband, USB or LSB, of the transmitter, since the I and Q channels can be easily interchanged by mistake in the wiring.

The residual carrier level of the transmit mixer should also be checked. Due to the conversion principle this carrier results in a 1365Hz tone in a correctly-tuned SSB receiver. The carrier suppression may range from -35dB in the 1296MHz RTX down to only -20dB in the 5760MHz RTX. A poor carrier suppression may be caused by a too high LO signal level or by a careless installation of the BAT14-099R mixer diodes. Note that the residual carrier can not be monitored on another correctly-tuned zero-IF receiver, since it falls in the AF response hole of the zero-IF receiver.

The current drain of the described transceiver should be as stated in Table 1.

The current drain of the transmitters is inversely proportional to the output power due to the self-biasing of the PA. The minimum

current drain corresponds to SSB modulation peaks or CW transmission.

All figures are given for a typical sample at a supply voltage of 12.6V.

At the end, one should understand that zero-IF transceiver also have some limitations. In particular, the dynamic range of the receiver is limited by the direct AM detection in the receiving mixer. If very strong signals are expected, the LNA gain has to be reduced to avoid the above problem. This is already done in the 1296MHz receiver, since strong radar signals are quite common in the 23cm band. The sensitivity to radar interference of the described zero-IF 1296MHz transceiver was found comparable to the conventional transverter + 2mRTX combination.

On the other hand, the 2304MHz and 5760MHz transceiver have a higher gain LNA. If the dynamic range needs to be improved, the second LNA stage can simply be replaced with a wire bridge in both transceiver. Of course, the internal LNA gain has to be reduced or the LNA has to be completely eliminated if an external LNA is used.

10. Sende-/Empfangsumschaltung

Die Sende/Empfangsumschaltung wird im SSB-Betrieb durch einen PTT-Schalter am Mikrofon bewerkstelligt. Im CW-Betrieb wird die Umschaltung durch die Tastung selbst bewirkt: das bedeutet Voll-BK Betrieb. Das ist wegen der schnellen PIN-Dioden Umschalter möglich. Diese schalten in weniger als 1 ms.

Abb. 48 zeigt die entsprechende Schaltung. Die meisten Module werden die ganze zeit mit 12V versorgt: Es sind der VXCO, die Vervielfacher, die RX-Mischer, ZF-Verstärker, Demodulator und Modulator.

Schaltet man den Sender über die Morsetaste oder den PTT-Schalter ein, wird der LNA für den RX abgeschaltet und die TX-PA wird eingeschaltet. Während des SSB-Betriebs wird der Empfänger-Audioverstärker abgeschaltet, um Einstreuungen auf die Mikrofonvorstufe zu unterbinden. Während CW sind diese Verstärker allerdings eingeschaltet, um einen Mithörton zu generieren.

Die Spannungen +12VAF, +12VSSB, +12VCW und +12VRX werden durch BC327 Transistoren geschaltet. Die +12VTX wird mit einem BD138 geschaltet. Die TX-PA wird über Widerstände, welche den Strom begrenzen, gespeist. Die 1296MHZ PA mit dem CLY5 benutzt 8 Stück 33Ω/0,5W Widerstände. Der Gesamtwiderstand ist dann 16,5Ω. Die 13cm PA mit dem CLY2 braucht 4 Stück 33Ω/0,5W Widerstände mit einem Gesamtwert von 33Ω. Die 5760MHz PA mit 2 ATF35376 braucht einen einzelnen Widerstand von 82Ω/1W.

Das TR-Modul enthält auch die Schaltung zur Ansteuerung des Drehspulinstruments auf der Frontplatte. Dieses kontrolliert während des Empfangs die Batteriespannung und während des Sendebetriebs die Betriebsspannung der PA. Diese ist ohne Modulation ca. 0,5...1V und steigt dann mit Modulation auf den vollen Wert.

Table 1: Power Consumption

Band	RX (mA)	TX (mA)
23	105	650-870
13	175	490-640
6	300	410-440

Table 2: RX/TX-Performance

Band	Range (MHz)	TX-Power (W)	Noise Figure (dB)
23	1296.030 1296.270	0.85 - 1.10	4
13	2304.000- 2304.300	0.45 - 0.55	3
6	5760.000- 5760.400	0.09 - 0.10	3
3	10368.03- 10368.20	0.10 - 0.11	3

Ein S-Meter ist nicht vorgesehen. Allerdings kann man eventuell die AGC-Spannung auf ein Drehspulinstrument auf der Frontplatte legen.

Die gesamte Umschaltung findet auf einer 30x80mm großen Leiterplatte aus FR4 Platz, die man in Abb. 49 sehen kann. Nur die Verpolungsschutz-Diode 1N5401 und der 470µF Elko werden direkt an der 12V Buchse montiert.

Die 6cm Version des Transceivers erfordert einen zusätzlichen PIN-Dioden Treiber, um die BAR-80 während des Empfangs mit einer negativen Spannung zu versorgen. Wie in Abb. 51 ersichtlich, wird diese aus dem 5461Hz Takt gewonnen. Der Treiber wird auf einer kleinen Leiterplatte (Abb. 52) montiert.

11. Konstruktion

In den Schaltungen werden zahlreiche SMD-Bauteile verwendet. Die SMD-Widerstände sind unproblematisch und funktionieren gut bis 10GHz. Bei den SMD-Kondensatoren gibt es große Unterschiede unter den Fabrikaten und Bauformen. Deswegen wird nur ein Typ, nämlich 47pF/1206 benutzt. Dieser hat eine Parallelresonanz bei 10GHz und hat bei 5,76GHz eine Einfügedämpfung von ca. 0,5dB. Die 4,7µF SMD Tantalelkos können auch durch bedrahtete Versionen ersetzt werden.

Als Drosseln werden in allen HF-Schaltungen Viertelwellen-Leitungen benutzt, die auf 5760MHz als Streifenleitungen und auf 1296MHz und 2304MHz als 0,25mm dicker Draht ausgelegt sind. Die korrekte Drahtlänge beträgt 12cm auf 648MHz, 9cm für die 23cm Mischer, 7cm für 23cm HF und für L3 in Abb. 18, 5,5cm für die 13cm Mischer und 4cm für die 13cm Verstärker. Nach Verzinnen der Enden wird der Rest als Spule auf einem 1mm Dorn aufgewickelt.

Die Gehäuseformen und Anschlußschemata für die SMD-Halbleiter werden in Abb. 54 gezeigt. Man beachte, daß der Aufdruck nicht mit der Typenbezeichnung übereinstimmt.

Alle Mikrostreifenleitungen werden auf 0,8mm dickem, doppelseitig kaschiertem FR4 Material mit 35µm dicker Kupferauflage realisiert. Die Oberflächen bleibt roh, d.h. wird nicht verzinnt oder versilbert.

Die HF-Platine sind nicht durchkontaktiert. Deswegen müssen alle Kontaktierungen manuell gefertigt werden. Mikrostreifenleitungen werden mit 0,6mm dickem Silberdraht, die durch 1mm große Löcher gesteckt werden, kontaktiert.

Widerstände und Halbleiter werden mit 2mm, 3,2mm oder 5mm großen Löchern an den angegebenen Positionen kontaktiert. Diese Löcher werden auf der Masseseite mit 0,1mm dicker Cu-Folie abgedeckt. Dann werden die Löcher mit Lötzinn gefüllt und zuletzt das SMD-Bauelement aufgelötet. Durchführungskondensatoren werden durch 3,2mm große Löcher auf den Leiterplatten gesteckt. Die bedrahteten Komponenten werden auf der Masseseite montiert und mit den Durchführungskondensatoren verbunden.

Das VXCO-Modul wird in eine Gehäuse nach Abb. 55 eingebaut. Dieses wird aus 0,4mm dickem Messingblech gefertigt. Der Abstand der Platine beträgt ca. 10mm zum Boden des Gehäuses. HF-Verbindungen werden mit RG-188 PTFE Kabel ausgeführt. Es ist auf saubere Verbindung des Abschirmgeflechtes mit Masse zu achten.

Die Deckel werden durch federnde Laschen festgehalten. Das VXCO-Modul erfordert wegen der einseitigen Leiterplatte auch einen Boden. Die anderen Module sind zweiseitig kaschiert, so daß die Masseseite der Platine als Gehäuseseite genommen werden kann.

Die Größen der Gehäuse sind so ausgelegt, daß es keine Hohlleiter-Resonanzen bis 2880MHz gibt. Daher benötigen nur die 5760MHz Module Absorber im Deckel, um die Hohlleiter-Resonanzen zu dämpfen.

Das Gesamtgehäuse ist ebenfalls selbstgebaut, wie man aus Abb. 56 sehen kann. Das Chassis wird aus 1mm dickem Aluminium gefertigt. Es dient zur mechanischen Befestigung und als gemeinsame Massefläche.

Das Chassis trägt sowohl die Frontplatte und die Rückwand als auch den Boden und den

Deckel. All Buchsen und Schalter sind auf der Frontplatte angeordnet.

Die abgeschirmten HF-Module werden auf dem Chassis montiert. Die zulässige Höhe ist 32mm. Alle NF-Leiterplatten werden unterhalb des Chassis montiert.

In Abb. 57 sieht man die Anordnung der Module für 1296 und 2320MHz. Der 5760MHz Transceiver ist in Abb. 58 beschrieben.

Ein Lautsprecher darf nicht innerhalb des Gehäuses montiert werden, da all Module empfindlich auf Vibrationen reagieren (Mikrofonie!). Das dynamische Mikrofon wird folglich als Lautsprecher mitbenutzt, sofern man keinen Kopfhörer gebraucht.

12. Inbetriebnahme

Die beschriebenen Transceiver haben nur in dem VXCO-Modul und im Demodulator einige Abgleichpunkte. In den HF-Teilen ist der Transceiver abgleichfrei. Das VXCO-Modul wird einfach Stufe für Stufe auf maximale Ausgangsleistung abgestimmt. Der richtige Frequenzbereich wird mit einem Zähler überprüft.

Wenn der VXCO abgeglichen ist, werden die HF-Module auf defekte Bauteile und schlechte Lötungen inspiziert. Der Empfänger sollte schon funktionsfähig sein und Rauschen von sich geben. Unterbricht man die Stromversorgung zum LNA, sollte das Rauschen geringer werden. Unterbricht man die Leitung vom Mischer zum ZF-Verstärker muß das Rauschen komplett verschwinden. Gleiches gilt, wenn man nur den I oder nur den Q-Kanal anschließt. Nun schließt man den Empfänger an eine Antenne an und stimmt ihn auf eine Bake oder einen zweiten VXCO-Modul ab. Stimmt man den Empfänger ab, hört man sowohl das richtige Seitenband als auch in Form eines schwachen Störtons das umgekehrte Seitenband. Beim Durchstimmen verändern beide Töne die Tonhöhe gegenläufig. Man stellt nun die beiden Trimmer im ZF-Modul so ein, daß der Störton verschwindet. Nun kann man auch die Seitenbandumschaltung prüfen.

Nun kann man die Abschirmung testen. Dazu steckt man eine kleine ¼-Antenne auf den RX auf und richtet die Antenne auf den Transceiver. Ändert sich das NF-Rauschen, ist die Abschirmung des VXCO-Moduls nicht in Ordnung. Als nächstes schaltet man eine 220V Leuchtstofflampe mit 20...40W ein und bringt sie in die Nähe. Erst bei einer Entfernung von 2...3m darf ein schwaches Brummen hörbar sein. Wenn man ein klares Brummen unabhängig von der Antennenrichtung hört, strahlt der LO-Modul unzulässig. Bei Direkt-Konversions-Empfängern wirkt sich jede Oszillatoreinstrahlung in unerwünschten Signalen aus.

Nun schaltet man auf Senden und stellt den Trimmer im Modulator in Mittenstellung. In CW-Betrieb muß nun volle Leistung erreicht werden. Das Instrument auf der Frontplatte zeigt dann volle Spannung an. Unterbricht man einen der beiden Kanäle, I oder Q, muß die Leistung um das gleiche Maß sinken.

Dann kann SSB-Betrieb mit einem zweiten Gerät testen. Dadurch kann man auch das richtige Seitenband finden, da eine einfache Vertauschung von I und Q bereits das Seitenband tauscht. Das könnte z.B. Folge eines Verdrahtungsfehlers sein.

Eine gute Trägerunterdrückung des Sendemischers ist wichtig, um den Pilotton von 1365Hz zu unterdrücken. Die Trägerunterdrückung der Sendemischer beträgt auf 23cm ca. 30 dB und auf 5760MHz nur noch 20dB. Falls das nicht erreicht wird, muß man den LO-Pegel oder den Einbau der Mischerdioden BAT-099R überprüfen. Den Pilotton kann man nur mit einem normalen SSB-Empfänger(Filtermethode) abhören, da ein zweiter gleichartiger Transceiver an dieser Stelle ein 'Loch' im Übertragungsband hat.

Die typischen Stromverbräuche kann man aus Tabelle 1 ersehen. Die Frequenzbereiche sind aus Tabelle 2 ersichtlich.

Zum Schluß noch ein Paar Worte zum Einsatzbereich der Transceiver. Man sollte beachten, daß diese relativ einfachen Schaltungen auch ihre Grenzen haben. Z.B. ist der Dynamikbereich durch direkte AM-Demodu-

lation in den Mischern begrenzt. Wenn es sehr starke Signale im Band gibt, muß die Vorverstärkung reduziert werden. Das wurde wegen der starken Radarsignale bereits im 23cm Transceiver berücksichtigt. Test haben ergeben, daß das verhalten gegenüber Radarstörungen durchaus mit der üblichen Kombination Transverter/2m Transceiver vergleichbar ist.

Die Transceiver auf 13 und 6cm haben mehr Vorverstärkung, um die Rauschzahl klein zu halten. Will man externe Vorverstärker einsetzen, überbrückt man einfach eine Stufe im internen LNA.

Part IV, which describes the 10GHz transverter will be published in next issue.

Transverter for 2.3...2,4 GHz

Charles Suckling, G3WDG

1. Description

The G3WDG010 is a single board low power transverter, with an on-board transceiver interface. The unit uses a single mixer for both transmit and receive, with PIN diodes used to route the signals to and from the mixer between receive and transmit. Constructors of production receive-only versions will receive a different kit, with the PIN switches and other components removed. Wire links will replace the PIN diodes. Circuit diagrams and board layout are shown in Figs 1, 2 and 3. Underside wiring is shown in Fig 5.

The mixer is a sub-harmonically pumped design, using a half-frequency local oscillator. For the present, the recommended local oscillator is the G4DDK004, with the output taken from the penultimate stage. The G4DDK001 will not be supplied for use with the transverter as it is becoming obsolescent. If you already have a G4DDK001 it is OK to use it of course. The modifications to the G4DDK004 are shown in Fig. 4. The board

2.3 GHz Transverter

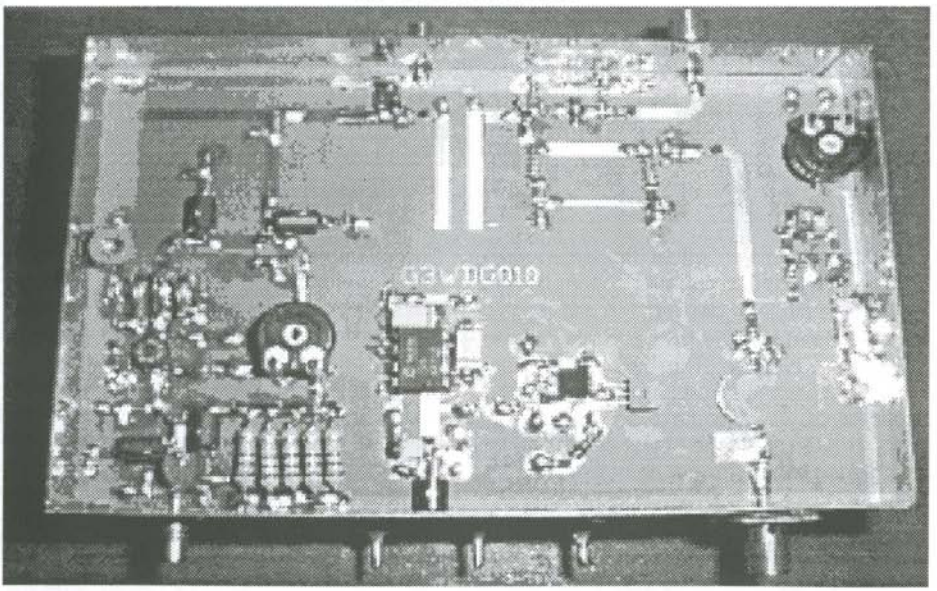
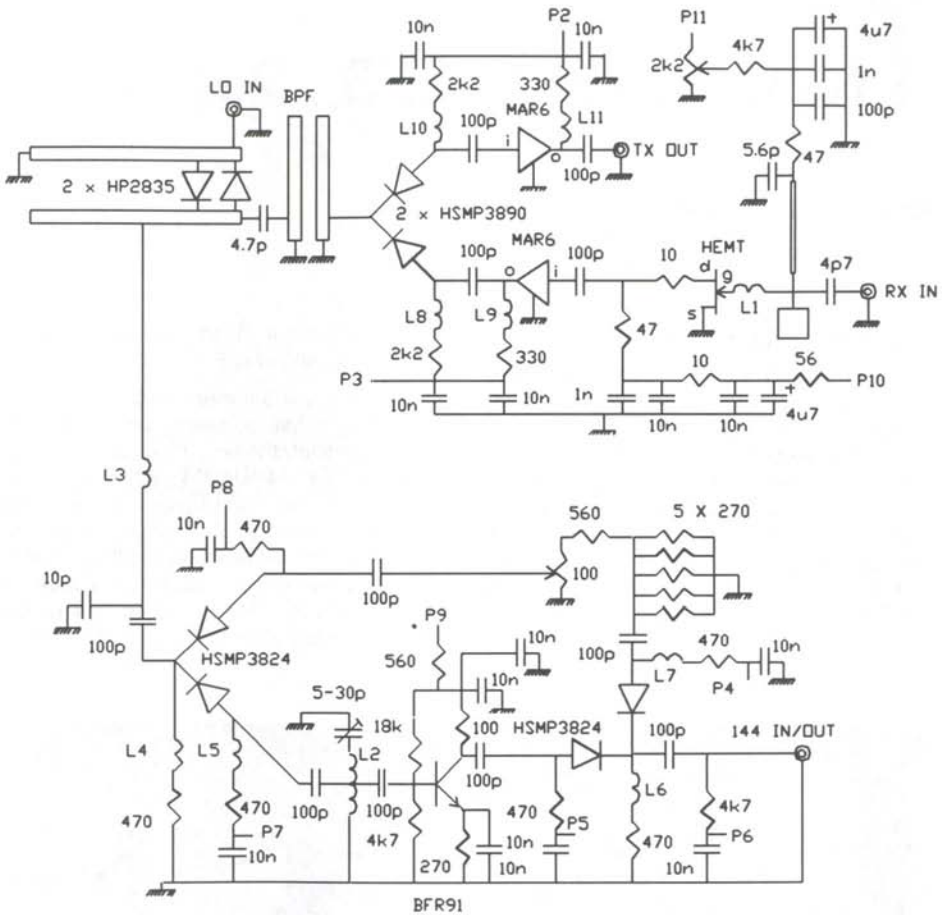


Fig. 1: Circuit Diagram

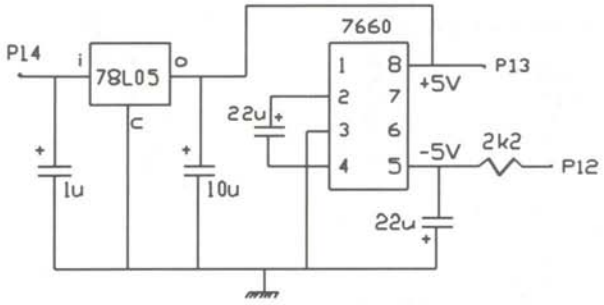


can either be sawn off at the appropriate point, or the output brought to a connector via a thin 50Ω cable. If desired, the cable could be connected directly to the transverter, to save on connectors. The other mod to the oscillator board, is to add a preset pot in the collector DC feed to the (now) final stage, which is used to set the power on receive for best performance (maximum noise).

On my LO, this occurs with about 0.8- 0.9 V on the collector.

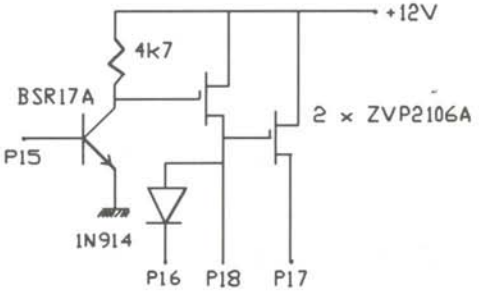
The mixer needs about 1-3mW for best receive operation. On transmit, the pot is bypassed by a diode connected to the +12 on transmit line to allow the board to produce full output (about 20mW). This improves the linearity of the mixer under large signal operation (ie transmit) and thus improves transmit output power considerably. The transmit output is amplified my a MODAMP to approx 1mW under linear conditions. More output can be obtained, but at the expense of linearity!

Fig. 2: DC-Circuitry for Transverter



P13 connects to P10, P12 connects to P11

Regulator / negative voltage generator



P15 connects to P6

TX/RX Control

For IC202:
P16 connects to P7, P9, P3, P14
P17 connects to P4, P8, P2, DDK004
P18 connects to P5

For FT290:
P16 connects to P7, P9, P3, P14
P18 connects to P4, P8, P2, DDK004
swap 1N914 from P18 to P17
P17 connects to P5

For external T/R control:
Use IC202 scheme, connect P15 to +12V
via 4k7 resistor. Ground P15 to TX.

Fig. 3: Transverter Parts Layout

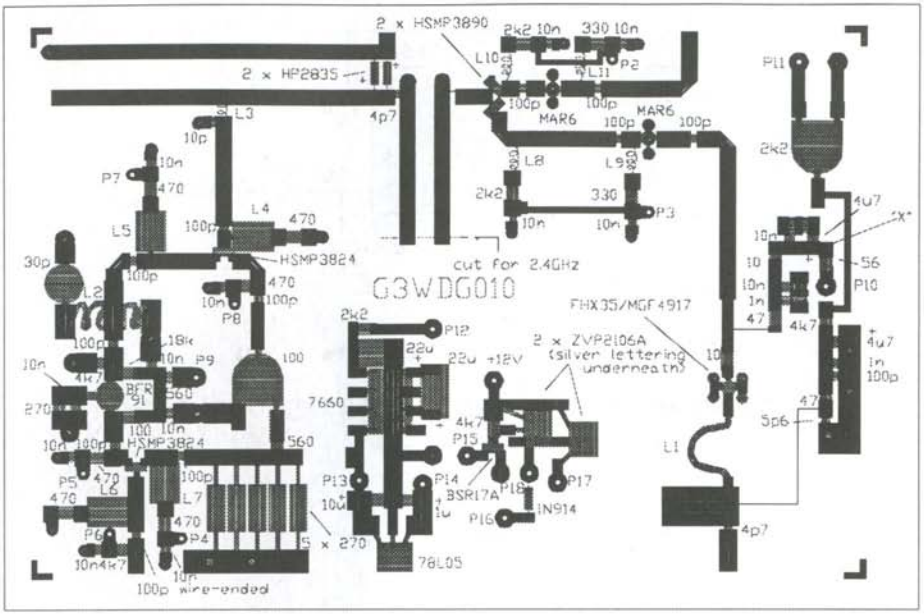


Image rejection is provided by a coupled line filter printed on the board. As supplied, the filter is tuned to 2320MHz. For satellite operation at 2400MHz, the lines have to be cut. Marks are provided on the board to show where the lines have to be cut. Try to do this as accurately as possible with a scalpel blade. If an error is made it is not a problem, as sufficient signal should pass through the filter to allow it to be tuned later by further cutting or by soldering on small pieces of foil to regain lost length. Just aim for maximum receive noise, or max transmit power. If this proves to be a problem, boards could be precut by us, but lets see how we go for now.

The receive preamp uses a HEMT in the first stage feeding a MODAMP to provide a total of about 25dB gain. The HEMT circuit is based on DJ9BV's design, which has perhaps the best performance of any 2.3GHz preamp design around, and is very stable. No sign of any instability has been seen in the prototypes, even with the lid on the box!

The 144 input/output port of the mixer is switched using a PIN diode switch either to a BFR91 tuned IF preamp (same design as used in WDG002), or a transmit attenuator. The output level from the attenuator can be adjusted by a pot, to set the correct output level from the transverter. The RF input port is switched between the output of the IF preamp (on receive) and the attenuator (on transmit). The DC drive to the PIN diode at this point which is biased on receive is fed via a diode.This prevents the PIN from back-biasing itself when the unit is on transmit and losing isolation.

TX/RX switching is accomplished using two P-channel MOSFETs to supply the PIN diode RF switches and the various active devices. On transmit the RF preamp stages are disabled, to prevent the possibility of RF feedback causing oscillations around the PA/RF changeover relay loop. The transverter has been tested with a 20W PA and a good antenna changeover relay and no problems were encountered.

The transverter has been designed for use with an IC202, which has a DC voltage on its output on receive which is used to drive the

Fig. 4a: Modification for G4DDK001

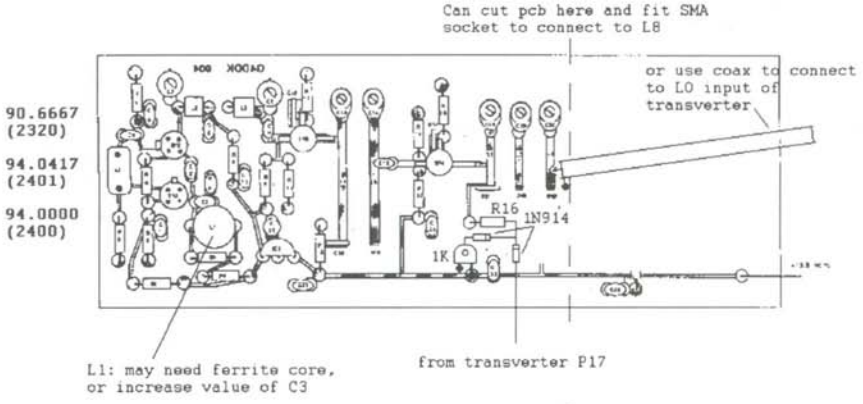


Fig. 4b: Circuit Diagram Modifications for LO

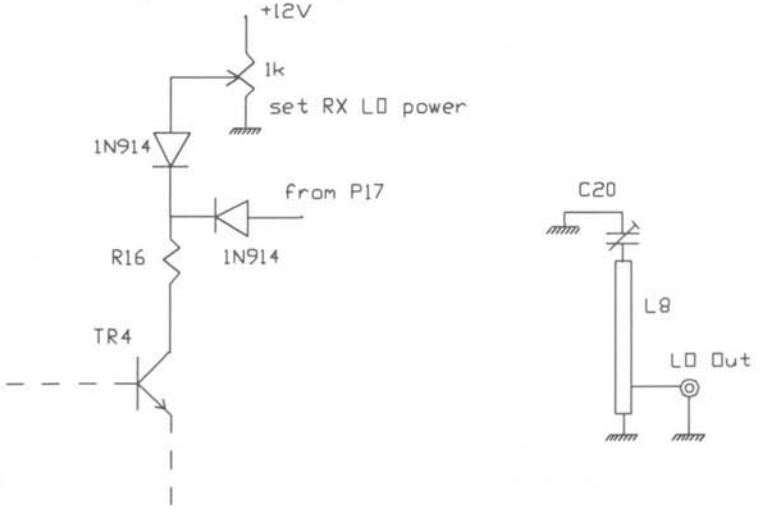
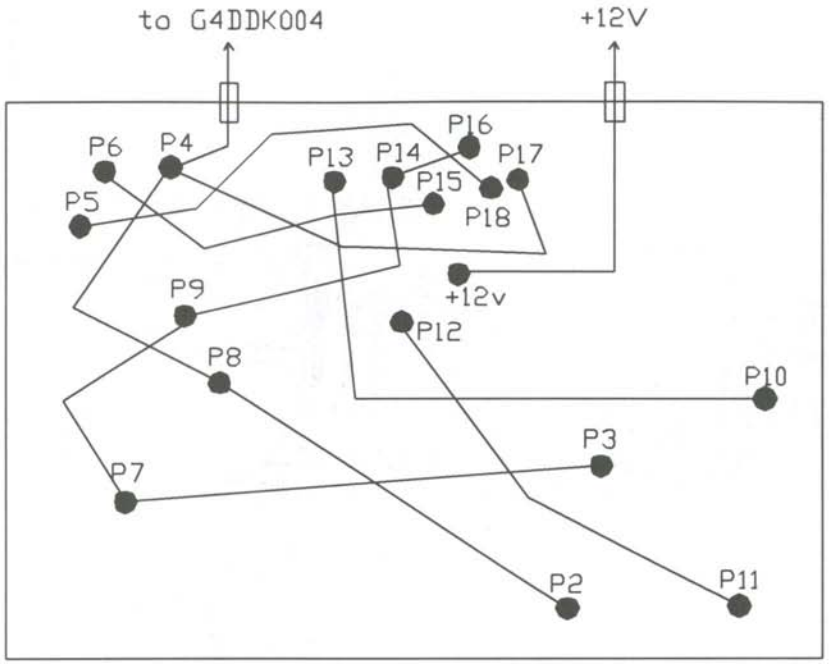


Fig. 5: Underside Wiring IC202 Compatible



switching unit. The switching circuit will also accommodate an FT290 (opposite standard to the IC202), and a ground to transmit mode. If an FT290 is to be used, the transmit and receive busses are swapped at the MOSFETs. Note the diode which feeds one of the PIN diodes separately needs to be swapped also. The ground-to-transmit mode can be arranged by using the original connections to the MOSFETs and taking a 4.7k resistor to 12V from the base of the BSR17A. The base is then grounded to transmit. (The link between the RF input and the base of the BSR17A is removed).

1. Beschreibung

Der Transverter G3WDG010 besteht aus einer Leiterplatte, welche die gesamte Schaltung für den RX und den TX ohne den LO enthält. Für beide Zweige wird ein Mischer benutzt. Der Sende- und der Empfangszug wird durch PIN-Dioden auf der HF- und der ZF-Seite umgeschaltet. Man kann auch den Empfangszug allein aufbauen. Dann entfallen die PIN-Dioden-Umschalter, welche durch Drahtbrücken ersetzt werden. Die Schaltung, und das Layout der Teile ist in den Abb. 1, 2 und 3 zu sehen.

Der Mischer besteht aus einem Harmonischen-Mischer, der mit der halben Frequenz als LO getrieben wird. Zur Zeit empfiehlt sich der Gebrauch des bewährten LO's G4DDK004. Die notwendigen Modifikationen sind in Abb. 4 zu sehen. Die letzte Stufe wird einfach abgesägt und der Ausgang wie in Abb. 4 gestaltet. Eine zweite Modifikation betrifft die Umschaltung der Oszillatorleistung. Diese kann jeweils für Empfang auf ca. 2mW und bei Sendebetrieb auf 20mW eingestellt werden. Der Harmonische Mischer reagiert bezüglich Rauschzahl und Linearität empfindlich auf den Pegel des LO's. Für niedrigste Rauschzahl (Empfang) sind ca. 2mW und für beste Linearität (Sendebetrieb) sind

ca. 20mW optimal. Das Ausgangssignal des Mischers wird bei Senden durch einen MODAMP auf ca. 1mW verstärkt.

Das Spiegelband wird über ein 2-poliges Filter aus Mikrostreifenleitungen ausgesiebt. Es ist auf 2320MHZ abgestimmt. Für Satellitenbetrieb (2400MHz) muß es gekürzt werden. Dafür sind Schneidmarken auf der Leiterplatte angebracht.

Der LNA für Empfang benutzt in der ersten Stufe die bewährte HEMT-Schaltung von DJ9BV (siehe [1]) und in der zweiten Stufe einen MODAMP.

Die Eingangsfrequenz von 144MHz für den Mischer wird durch einen PIN-Dioden -Schalter entweder auf einen Vorverstärker mit dem BFR91 oder auf einen Abschwächer im Sendebetrieb geschaltet. Ein Potentiometer justiert den ZF-Pegel auf 144MHz. Die Gleichspannung für die PIN-Diode wird über eine Seriendiode zugeführt, um eine Beeinflussung über die Sendeleistung auf der ZF zu verhindern.

Die Umschaltung zwischen Senden und Empfang wird durch zwei P-Kanal MOSFET's erreicht. Diese schalten die Gleichspannung für die PIN-Dioden und die aktiven Halbleiter. Beim Senden sind die HF-Stufen im RX abgeschaltet, um einen HF-Durchschlag zu vermeiden.

Der Transverter wurde für den Betrieb an einem IC-202 ausgelegt. Dieser gibt bei Empfang eine positive Gleichspannung auf die Ausgangsbuchse. Man kann auch einen FT-290 einsetzten, der den entgegengesetzten Standard benutzt, wenn man die Leitungen zu den MOSFET's vertauscht. Die Seriendiode für die PIN-Diode muß ebenfalls getauscht werden.

Die Einzelheiten kann man aus Abb. 2 ersehen.

2. Construction

The choice of connectors is left to the constructor. My choice is to use SMAs, but other suitable connectors could be used.

The detailed description of construction will follow in Part II.

2. Konstruktion

Die Konstruktion wird im zweiten Teil beschrieben

3. Tuning and Test

Before attempting to tune up the unit, apply DC power and connect the 144MHz prime mover. Check operation of the TX/RX switching unit, by checking that +12V appears at the appropriate output of the MOSFETs, and that it changes over correctly on transmit. If the 144MHz rig does not have a DC output, the unit must be wired for the "ground-to-transmit" option descibed above. With the 144MHz transceiver on receive, LO power applied, and a dummy load or antenna connected to the RX input, adjust the 30p trimmer for maximum noise, to tune up the IF preamp. (If an antenna or dummy load is not available, connect a long length of cable to the RX input to act as a dummy load). There should be a significant- increase in noise. If not, check again operation of the TX/RX switching MOSFETs. Next, adjust the HEMT gate bias pot (2k2 one) to get about +4 V to ground at the junction of the 56Ω external resistor to the Vd pin (point "X"). This sets the right operating current for the FET.

The noise level should now be quite high. Check that the noise level decreases significantly if a finger is placed on the open ends of the filter (which detunes it very effectively!). Adjust the LO power using the 1K pot on the modified DDK004 for maximum noise. The wiper should be fairly near to the grounded end of the pot.

Next, go to transmit, and monitor the TX output port with a power meter or diode detector. Set the RF level pot (the 100r one) for 1mW output.

If a noise figure meter or weak signal is available, the preamp may be optimised by varying the spacing between L1 and the pcb. Adjustment can be live if an insulated tool such as a cocktail stick is used. In all the prototypes and beta test models, best noise

figure occurred with L1 pushed hard against the board.

Alignment of the transverter is now complete.

3. Inbetriebnahme

Nach Anlegen einer 12V Gleichspannung und eines 144MHz Transceivers wird zuerst die Funktion der Sende-/Empfangsumschaltung überprüft. Dazu mißt man die entsprechenden Spannungen an den MOSFET's.

Nach Anschluß eines 50Ω Abschlusses am Eingang kann man den 30pF-Trimmer in der ZF auf maximales Rauschen im Empfänger abgleichen. Dann stellt man das Bias-Poti P11 für den HEMT so ein, daß sich am Elko 4,7µF, der durch 56Ω mit P10 verbunden ist, eine Spannung von 4V einstellt.

Man muß nun einen deutlichen Rauschpegel feststellen. Nun kann man das 1k-Poti im LO-Modul so einstellen, daß der Rauschpegel maximal wird.

Nach Umschaltung auf Senden stellt man das 100Ω-Poti so ein, daß eine Ausgangsleistung von 1mW erreicht wird.

Falls man ein Rauschzahlmeßgerät zur Verfügung hat, kann man die HEMT-Vorstufe optimieren, indem man den Abstand der Drahtschleife zur Platine variiert. In allen Mustern war das der Fall, wenn die Drahtschleife fast auf der Leiterplatte lag.

4. Debugging

If the transverter does not appear to work, the following steps may be helpful in trying to find the source(s) of the problem.

- If the noise does not peak as the IF amplifier is tuned with the 30pF trimmer, check that the transistor is connected correctly, and check the DC voltages around it. Measuring with respect to ground, the emitter should be near 0.8V, the base at near 1.5V and the collector near 9V. Voltage from base to emitter should be near 0.7V. If these voltages are not obtained, check that the right components have been used.
- Other possible causes might be broken chip capacitors - this can be checked by melting the solder at one end of a capacitor, and with the solder molten, gently push the body of the chip cap to make sure the other end is not broken. Then repeat for the other end.
- If the noise is still absent, check that the PIN diodes type HSMP-3824 are biased correctly. The left hand connections should have about 5-7V to ground with the transverter in receive mode. These voltages should go to zero when the transverter goes to transmit, and then the right hand pins should have the 5-7V present. There should be about 0.7V across a biased diode, measured between the centre pin and the appropriate outer pin.
- If the IF noise is there and the 30pF cap peaks it, but noise does not increase when the LO is connected, either suspect that the LO is off tune or on the wrong frequency. The HSMP-3890 PIN diode bias voltages can also be checked (same method as above, except that the voltage at the diode pins will only be about 0.7V for a biased diode.
- Finally, if there is not much of a drop in noise when a finger is placed on the open ends of the image filter, and the LO is known to be producing power, check that the lower MODAMP has about 3.5V relative to ground on its output pin.

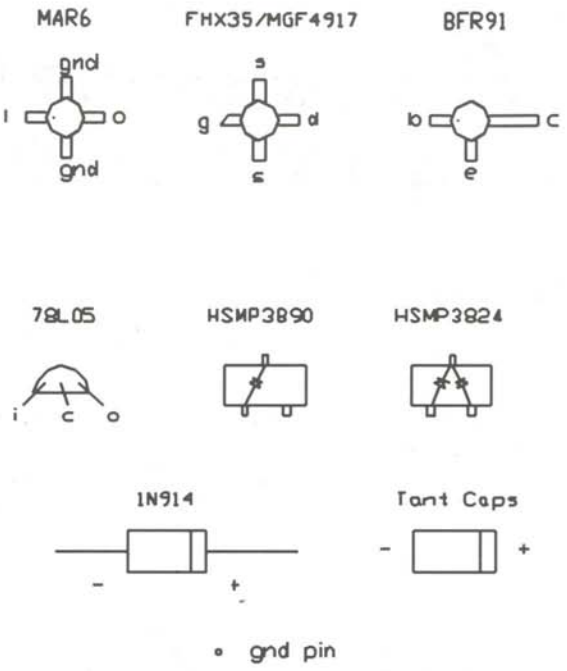
4. Fehlersuche

Falls der Transverter nicht auf Anhieb funktioniert, geht man bei der Fehlersuche in folgender Reihenfolge vor:

- Fall es kein Rauschmaximum beim Duirchstimmen des 30pF Trimmers gibt, prüft man die Gleichspannungen am BFR91. Der Emitter sollte 0,8V, die Basis 1,5V an der Kollektor 9V Spannung gegen Masse haben. Wenn das nicht so ist, müssen alle Bauelemente überprüft werden.

- SMD-Kondensatoren haben eine Tendenz zu brechen. Diese sind mit einer Lupe zu entdecken und zu wechseln.
- Die PIN-Dioden HSMP3824 sind auf korrekte Einstellung zu prüfen. Die linken Verbindungen zeigen eine Spannung von 5...7V, wenn der Transverter in Empfangsstellung ist. Beim Übergang auf Senden, gehen die linken Verbindungen auf Masse und die rechten Enden auf 5...7V. Über der Diode liegen ca. 0,7V.
- Wenn das ZF-Rauschen mit dem 30pF Trimmer auf Maximum zu bringen ist, aber das Rauschen nicht ansteigt, wenn der LO verbunden wird, dann ist entweder der LO ohne Leistung oder auf der falschen Frequenz. Die HSMP-3890 Diode sollte ebenfalls auf eine Flußspannung von ca. 0,7V geprüft werden.
- Wenn das Rauschen nicht abnimmt, wenn man die 'heißen' Enden des Filters berührt und der LO funktioniert , kann der MODAMP defekt sein. Die Spannung vom Ausgang des MODAMP gegen Masse gemessen muß ca. 3,5V betragen.

Fig. 6: Component Footprints



6. Parts/Teile

PCBs and kits containing some of the more difficult to obtain parts can be obtained from:

Microwave Committee Component Service
314A Newton Road
Rushden
Northants NN10 0SY
England
Tel.: +44 1933 411 446

Part II, which describes the details of construction will be published in the next issue 2/1998.

5. References/Literatur

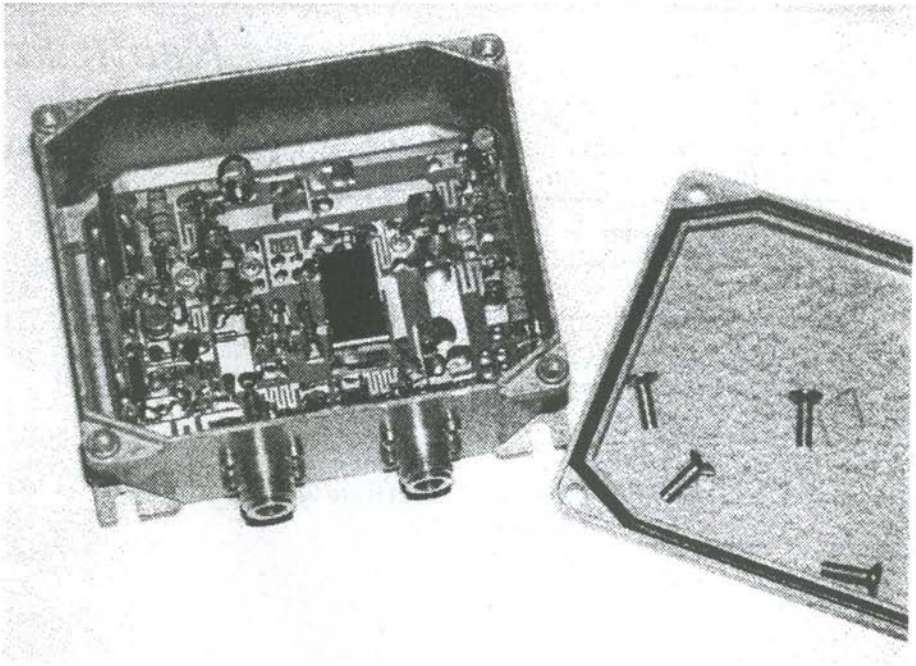
[1] R. Bertelsmeier, DJ9BV, 'PHEMT Preamp for 13 cm', DUBUS TECHNIK IV, pp.198..207

Microwave T/R Switches Using Low-Cost PIN Diodes

G. Sabbadini, I2SG

Kurzbeschreibung: Ausgehend von den elektrischen Eigenschaften von PIN-Dioden wird die Topologie von HF-Schaltern erklärt. Als Anwendung folgt die Schaltung für einen Sende-/Empfangsumschalter für das 23cm Band.

Abstract: The electrical porperties of PIN-Diodes and their application in RF-Switches are



I2SG Pin-Diode Switch for 1.3 GHz

discussed. As an example the circuit of a T/R-Switch for 23cm is detailed.

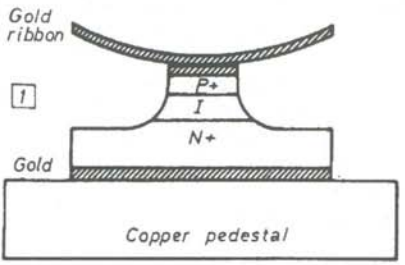
1. Introduction

An alternative and cheaper solution to mechanical T/R switches are the electronic T/R using PIN diodes: these are easily feasible in VHF/UHF and in the lower microwave bands.

The use of PIN diodes is interesting because low-cost diodes - as those manufactured for consumer applications - can be used achieving both a low insertion loss (a fraction of dB) and a power handling capability up to 100 watts or more.

Such switches are, therefore, a valid solution for terrestrial communications, as the small increase of the noise figure doesn't change significantly the overall RX sensitivity, but with defined advantages of an unlimited lifetime and no degradation when operated in extreme environment conditions (i.e. when they're located near the antenna). There are many possible configurations for PIN T/R: this note describes the classical "Single Pole Double Throw", realised with low cost PIN diodes originally designed for UHF TV tuners.

Fig. 1: Structure of a UHF-PIN-Diode



1. Einführung

PIN-Dioden Umschalter sind in der Anwendung als Sende-/Empfangsumschalter eine preiswerte Alternative zu mechanischen Koaxialrelais. Sie lassen sich vorzugsweise im VHF/UHF-Bereich und den unteren Mikrowellenbändern einsetzen.

Hierfür eignen sich preiswerte Dioden, die für Anwendungen in Fernsehtunern entwickelt worden sind. Solche Schalter haben eine Einfügedämpfung von einigen Zehnteln dB und es können damit Leistungen bis zu 100W geschaltet werden.

Für Geräte, die für terrestrische Kommunikation eingesetzt werden, haben diese Schalter sehr große Vorteile. Die etwas größere Einfügedämpfung dieser Schalter gegenüber Koaxialrelais spielt dabei keine Rolle.

Dieser Artikel beschreibt die 'klassische' Konfiguration dieser Schalter, den SPDT-Schalter oder Einfach-Umschalter.

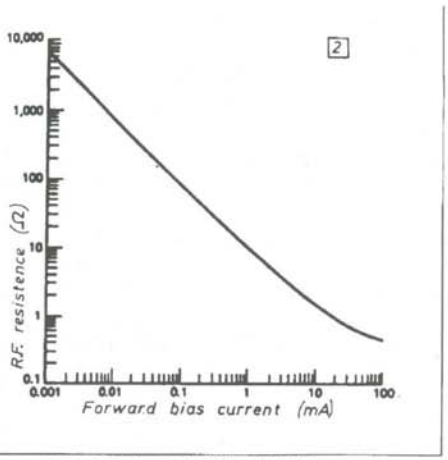


Fig. 2 - Resistenza R.F. di un diodo Pin in funzione della corrente diretta di polarizzazione

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Fig. 2: RF-Resistance of a UHF-PIN-Diode

2. Properties of PIN Diodes

The PIN diodes are so called because the semiconductor material has a "sandwich" structure, with 3 layers and are manufactured using Silicon crystal (Fig. 1) :

- One layer "P" doped at one end
- One " Intrinsic" layer in the middle: therefore a pure non-doped layer characterised by very high resistivity.
- One "N" doped layer at the other end.

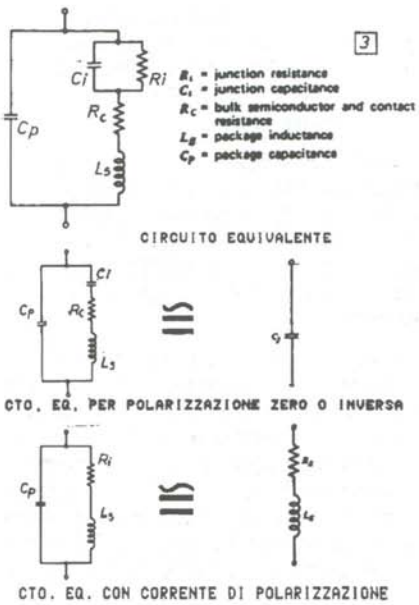
When the diode is forward biased both negative charges (electrons) and positive charges (holes) are injected in the intrinsic layer and these charges recombine very slowly: due to this fact conduction continues also if polarity is reversed for a short time. This means that if the R.F. period is shorter than the relaxation time of the injected charges, the diode lose the rectifying properties and its behaviour is just like a linear resistance.

In Fig. 2 the equivalent series resistance of a typical PIN diode vs. the biasing current is given. The R.F. resistance drops to few ohms with biasing current of few mA. Obviously there is a minimum operating frequency below that the PIN diode behaviour is that of a rectifier: this frequency is inverse function of the carrier "lifetime" in the intrinsic layer: modern PIN diodes have a low minimum operating frequency: they are used also in the "front-end" of top-class HF communications receivers, withstanding large signal levels as switches of preselection filters or electronic attenuators.

The upper frequency limit of a PIN diode is determined by two major parameters:

1. The diode capacitance when the diode is in "open" state (i.e. without the biasing current).
2. The parasitic series inductance when the diode is in "closed" state (i.e. with biasing current).

Fig. 3: Equivalent Circuit of PIN-Diodes



The capacitance is mainly the intrinsic one associated to the PIN junctions, with a minor contribution due to the package of the device. On the other hand, the parasitic inductance is due only to the package itself and to the interconnecting wires (or ribbon) to the semiconductor chip.

Both the capacitance and the parasitic inductance of the PIN diode limit the degree of isolation between RX and TX ports and the SWR achievable when the device is used as R.F. switch. The series resistance and the thermal properties of the package, instead, fix the insertion loss characteristics and the maximum power level that can be handled.

Fig. 3 shows the equivalent circuit of a PIN diode and its approximation for "ON" and

"OFF" states. The series resonance F_c - or cutoff frequency - is the absolute upper limit. It is possible to design T/R switches with good performances up to about 1/3 the cutoff frequency, implementing compensation techniques.

PIN diodes are widely used into professional applications up to, and beyond, 100 GHz and only in low-level applications there is an alternative solution using MESFETS: the main advantage of the latter is the integration in a single monolithic chip including other functions or devices.

Among various PIN diodes easily available on the surplus market, some consumer types are very cheap (a few Pfennig/Unit) and can be used to build solid state T/R up to about 3 GHz. These are BA379 and BA479 or equivalents in other packages for surface mount. The main characteristics of BA379 are:

- Capacitance (at Vd = 0 Volt): Cj = 0.3 pF
- Series resistance (Id = 10 mA): Rs = 3...4 Ohm
- Parasitic inductance: Ls = 2 nH

The upper useful frequency limit of this device is basically limited by the plastic package that clamps the cutoff frequency to 6.5GHz. The same semiconductor chip assembled in a small coaxial package having ten times less the inductance would give a cutoff frequency of 20GHz and therefore would be useful for applications in the 6cm band.

Anther interesting feature of the BA379 is its very low capacitance also at zero volt. This makes the device usable also without reverse bias when in "OFF" state. However the reverse bias of few volts, reduces the parallel conductance to negligible levels, minimising therefore the insertion loss. (See Fig. 4)

Fig. 4: Conductnace and Capacitance

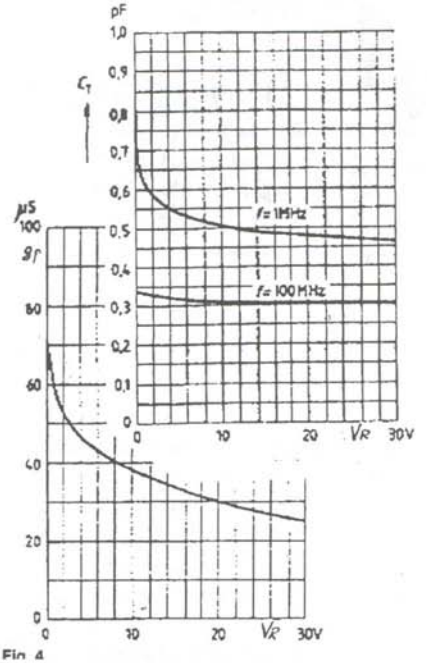


Fig. 4

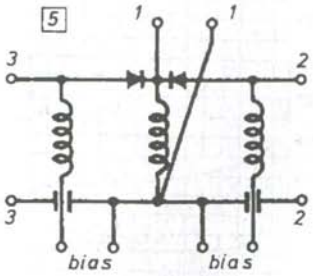
2. Eigenschaften von PIN-Dioden

Der Name von PIN-Dioden kommt von der Dotierungsstrukur im Siliziumkristall (Abb. 1): Abweichend von einer normalen P-N Struktur bei Dioden gibt es:

1. P-Dotierte Schicht (P)
2. Undotierte Schicht (I) mit geringer Leitfähigkeit
3. N-Dotierte Schicht (N)

Wenn die PIN-Diode in Flußrichtung vorgespannt ist, werden Elektronen und 'Löcher' in die I-Schicht injiziert und rekombinieren dort relativ langsam. Wenn die Polarität der externen Spannung wechselt, fließt wegen der gespeicherten Ladungsträger noch für einige Zeit ein Strom. Wird die Diode nun mit einer HF-Wechselspannung beaufschlagt und ist die Rekombinationszeit der Ladungsträger in der I-Schicht länger als die Periode der HF, verliert die PIN-Diode ihre Fähigkeit, mit dem Strom der anliegenden

Fig. 5: SPDT Switch with series diodes



HF-Spannung zu folgen, d.h. die Fähigkeit gleichzurichten. Stattdessen wirkt sie nun wie ein Widerstand.

In Abb. 2 kann man sehen, daß der HF-Widerstand von dem fließenden Gleichstrom abhängt. Er variiert von einigen kΩ bei kleinen Strömen bis zu wenigen Ω bei Strömen von einigen mA. Wegen der endlichen Rekombinationszeit gibt es eine untere Frequenzgrenze für PIN-Dioden. Bei modernen Dioden gibt es Rekombinationszeiten von bis zu 5µs, so daß die untere Frequenzgrenze ohne weiteres 1MHz betragen kann.

Die obere Frequenzgrenze wird von zwei Parametern bestimmt:

1. Im gesperrten Zustand wirkt die Kapazität der Sperrschicht
2. Im Ein-Zustand wirkt die Serieninduktivität der Bonddrähte

Sowohl die Kapazität als auch die Serieninduktivität begrenzen die Größe der Isolation zwischen den Schaltzuständen und das VSWR im Einzustand. Die maximale Leistung wird durch den Wärmewiderstand und den minimalem Ein-Widerstand begrenzt. Abb. 3 zeigt das Ersatzschaltbild einer PIN-Diode. Die Serienresonanzfrequenz f_c ist die absolut obere Betriebsfrequenz. Mit bestimmten Kompensationstechniken kann man Schalter mit einer Betriebsfrequenz von bis zu 1/3 von f_c realisieren.

PIN-Dioden werden bei einer Menge von professionellen Anwendungen für Frequenzen bis 100GHz benutzt. Für Anwendungen mit kleinem Pegel sind auch Schalter mit MESFET's gebräuchlich. Diese haben den Vorteil, daß sie sich einfach in MMIC's integrieren lassen.

PIN-Dioden für Unterhaltungselektronik wie die BA379 oder BA479 sind sehr billig und können bis 3GHz gebraucht werden. Speziell ihre SMD-Versionen sind von großem Nutzten. Sie haben folgende Eigenschaften:

- Kapazität: C_j = 0,3pF
- Serien-Widerstand: R_S = 3...4Ω
- Serieninduktivität: L_S = 2nH

Die Grenzfrequenz f_c beträgt ca. 6,5GHz. In anderen Gehäusen (Koaxial) hat der gleiche Chip Grenzfrequenzen bis 20GHz.

Eine interessante Eigenschaft der BA379 ist die niedrige Kapazität für 0V Vorspannung.

Fig. 6: Series PIN-Diode on Microstrip

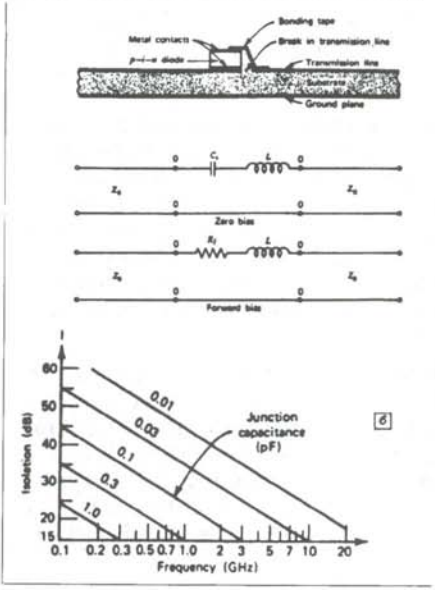


Fig. 6 - Diodo connesso-serie su microstrip ed isolamento in funzione della capacità della giunzione

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Man könnte sie daher auch ohne Sperrspannung betreiben (Abb. 4), obwohl die Impedanz mit einer Sperrspannung noch zunimmt.

3. SPDT-Switch and General Design Guidelines

PIN switches for R.F. applications can be classified into two categories:

1. Broad-band switches
2. Narrow- band switches

The broad- band types have a large frequency coverage but have lower performances vs. those optimised for a narrow frequency range. Therefore category 2. is more adequate to amateur needs.

A simple broadband SPDT T/R is given in Fig. 5:

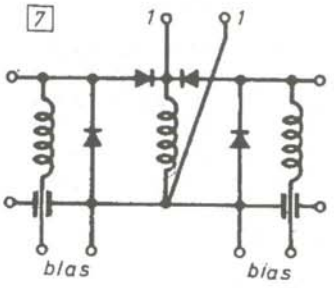
1. The isolation of the open port (cross-talk) is limited by the diode capacitance "Cj". At 1.3 GHz, using the BA 379, we have just 12 dB: too small to avoid the destruction of the RX front-end, even with low power. (see Fig. 6).
2. The diode working in open state (toward the insulated port) requires a reverse biasing voltage - to avoid conduction - and therefore the maximum TX power is limited by the breakdown voltage. (V_{break}= 30V for BA379).

The isolation is improved using a series-parallel connection as shown in Fig. 7, but limitation due to diodes breakdown remain unchanged.

With 'selective' switches the power limitation is avoided: all diodes are forward biased when the antenna is connected to the transmitter output and the "impedance inverters " insulate the RX port. Fig. 8 shows the basic circuit. In this case D1 connect the TX output and D2 shorts to ground the RX input. The impedance inverter is given by the quarter wavelength line, so that the short circuit. at RX port translates as open circuit at the D1 junction.

In RX mode both diodes are open and therefore the antenna is virtually connected only to the receiver port. The useful bandwidth of

Fig. 7: SPDT Switch with series-parallel diodes



such a T/R is limited by the impedance inverter (Ref.), and with a simple one quarter wavelength line is ca. 10...15 percent.

Concerning the undesired effects one notes:

1. On Transmission: (D1,D2 are 'closed').
   - The parasitic inductance of D1 is series connected with the TX output: therefore the P.A. tuning includes this component.
   - The parasitic inductance of D2 translates in a capacitive loading at D1 junction.
2. On Reception: (D1,D2 are 'open')
   - Capacitance of D1 couples a fraction of the input signal to the TX port
   - Capacitance of D2 to ground mismatch the RX port.

To remove the constraints one can utilise compensation techniques as shown for example in Fig. 9:

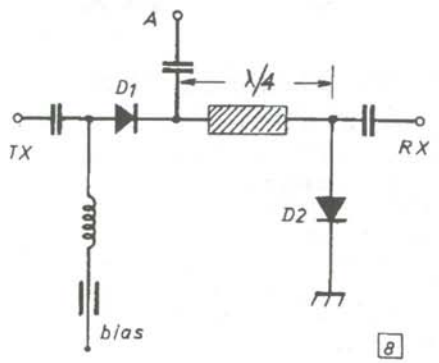
1. D1 capacitance resonates with a parallel inductance when in 'open-state'. In this way the isolation of RX port is increased by one order of magnitude or more. Indeed, more diodes could be connected in parallel, to handle high power without deterioration of RX sensitivity.
2. The length of the line is lower than a quarter wavelength and the characteristic impedance is higher. In this way the RX isolation is unchanged and:

- The capacitive susceptance at the junction is cancelled
- Reflection losses at the RX port are minimised.

Fig. 10 shows the equivalent circuit of a compensated T/R SPDT.

It's worth to note that introducing this kind of compensation the losses measured at the RX port are within 0,1...0,2 dB at 1.3 GHz and less than 0.3...0.4 dB at 2.3 GHz (with D1=D2= BA379). In case of high power, the leakage to the RX is reduced using 2 sections as shown in Fig. 11.

Fig. 8: T/R-Switch with lambda/4 decoupling



Konstruktion von HF-Schaltern

HF-Schalter mit PIN-Dioden können in zwei Gruppen eingeteilt werden:

1. Breitband-Schalter
2. Schmalband-Schalter

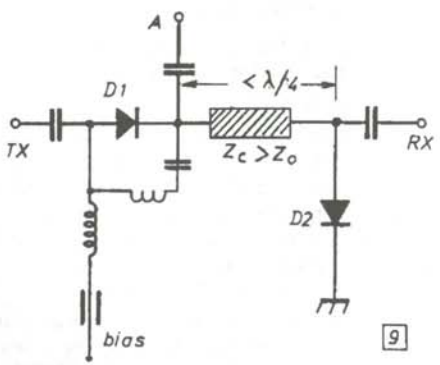
Breitbandschalter haben zwar einen großen Frequenzbereich, weisen aber in der Regel schlechtere Werte für Isolation und Einfügedämpfung als Schmalbandschalter auf.

Ein einfacher Breitband-Umschalter wird in Abb. 5 gezeigt. Er hat folgende Eigenschaften:

1. Die Isolation wird durch die Diodenkapazität C_j auf Werte von ca. 12 dB auf 23cm begrenzt (Abb. 6).
2. Die sperrende Diode erfordert eine Sperrspannung, um Durchsteuerung mit HF-Spannung zu vermeiden. Die maximale Sperrspannung der BA379 ist 30V. Damit ist maximale HF-Leistung vorgegeben.

Wie in Abb. 7 gezeigt kann man die Isolation durch eine Serien-Parallel-Kombination verbessern.

Fig. 9: T/R-Switch with parallel resonance



Konzipiert man Schmalband-Schalter, kann man das RX-Tor durch Viertelwellenleitungen isolieren. In Abb. 8 kann man erkennen, daß der Kurzschluß, der durch die Parallel-Diode am RX-Tor erzeugt wird, mittels der Viertelwellenleitung auf einen Leerlauf am Summentor transformiert wird. Die Seriendiode im TX-Zweig steuert in diesem Fall durch. Im Empfangsfall öffnet die Seriendiode im TX-Zweig und die Paralleldiode im RX-Zweig geht in den Sperrzustand.

Die Bandbreite ist durch die Bandbreite der Viertelwellenleitungen gegeben und beträgt ca. 10...15%.

Betrachtet man die beiden Fälle genauer, so ergibt sich

Stellung TX:
D1 und D2 sind im leitenden Zustand. Die Serieninduktivität von D1 ist in Serie zum Senderausgang und kann weggestimmt werden. Die Serieninduktivität von D2 wird in eine kapazitive Last am Ausgangstor transformiert.

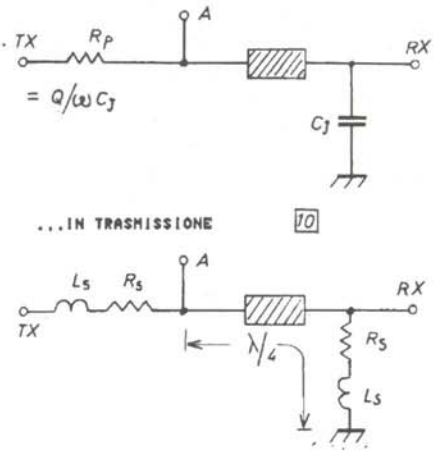
Stellung RX
D1 und D2 sind gesperrt. Die Kapazität von D1 koppelt einen Teil der Antennenspannung an die Sendestufe. Die Kapazität von D2 erzeugt eine Reflexion auf dem Empfängereingang.

Die Schaltung in Abb. 9 vermeidet einige der o.a. Nachteile.

Die Kapazität von D1 ist im Sperrzustand der Diode mit der Parallelinduktivität in Resonanz. Dadurch wird die Isolation des RX-Tores wesentlich verbessert.

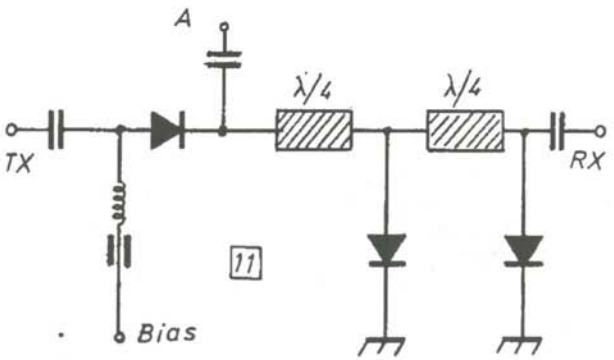
Die Länge der Viertelwellenleitung ist etwas kürzer als $\lambda/4$. Die Impedanz der Leitung ist so hoch wie möglich. Dadurch beliebt die Isolation des RX-Tores unverändert. Die vorher erwähnte Parallelkapazität, die durch Transformation der Induktivität der Diode entsteht, wird kompensiert. Außerdem wird das VSWR am RX-Tor minimiert. In Abb. 10 ist das Ersatzschaltbild des kompensierten Schalters zu sehen. Mit dieser Schaltung kann man eine Einfügedämpfung von weniger als 0,2dB auf 1,3GHz und weniger als 0,4dB auf 2,4GHz erreichen.

Fig. 10: Compensated SPDT Switch



Bei hoher Leistung kann zwei Sektionen wie in Abb. 11 im RX-Zweig benutzen.

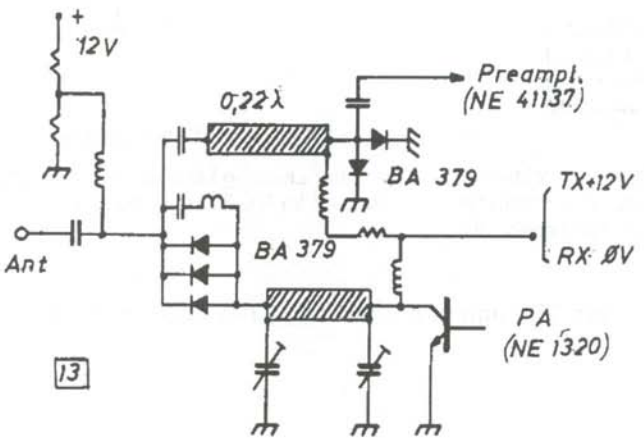
Fig. 11: Improved Isolation by two shint sections



4. Application Examples and Conclusions

The basic concepts given in these brief overview have been applied by the author in different projects, since many years. Fig. 12 shows a 20 Watt booster for 23 cm and the simplified circuit diagram of the antenna T/R switch; this device assembled in a waterproof case for installation near the antenna includes: an antenna preamplifier, 2 stage

Fig. 12: Circuit Diagram of pratical T/R-Switch for 23 cm



PA.., a VOX circuit, a simple preselection filter and it is foreseen for power supply via the interconnecting cable. This project (dated 1985) nowadays could be updated and improved using modern devices, but the basic concepts of solid state PIN switches remain still a viable solution for a reliable operation. Some of these boosters are still alive and operative after 10 years or more of continuous service.

Similar designs have been applied into transverters for the 13 cm band (up to 3 Watts out), still using BA379 diodes. The availability of MESFET's solid state switches, suitable for application up to the "X" band, open interesting possibilities to the experimenter willing to try new ways, challenging for innovative and genuine solutions as many of us are triggered to follow.

4. Anwendungen von PIN-Dioden

Die oben beschrieben Konzepte wurden vom Autor seit vielen Jahren in diversen Anwendungen eingesetzt. Abb. 12 zeigt den T/R-Schalter für einen 20W Leistungsverstärker auf 23cm. Dadurch war es bereits 1985 möglich, eine Transistorendstufe mit integriertem Vorverstärker direkt an der Antenne zu montieren.

Man kann heute natürlich modernere Halbleiter einsetzen. Für 13cm und auch im X-band (10GHz) ergeben sich interessante Möglichkeiten, die teuren und störanfälligen Koaxialrelais zu ersetzen.

5. References/Literatur

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Broadband Directional Coupler from 1 – 6 GHz

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1. Einführung

Die von mir für unterschiedliche Mikrowellenkomponenten, wie z.B. Filter, Richtkoppler,-3dB/90° Hybride sowie Leistungsteiler angewandte Triplatetechnik wurde bereits in dem Artikel "3dB-Hybride in Triplatetechnik für 1,3 GHz und 2,35 GHz" in DUBUS 3/95 ausführlich beschrieben.

In diesem Artikel möchte ich einen in Triplatetechnik entwickelten breitbandigen Richtkoppler von 1...6 GHz mit -20dB Koppeldämpfung und möglichst gutem Richtfaktor vorstellen.

Der Richtkoppler sollte in den Bändern von 23 bis 6 cm einsetzbar sein und möglichst kommerzielle Werte wie z.B. Richtkoppler der Firmen Nada oder Anaren erreichen.

2. Realisierung

Für die Realisierung des Richtkopplers wurde das aluminiumverstärkte Polyguide mit einem Epsilon von 2.32 und einer Substrathöhe von 1,57 mm ausgewählt.

Zwei ¼ lange gekoppelte Leitungen haben eine Bandbreite von einer Oktave.

Um eine größere Bandbreite zu erreichen, müssen also mehrere ¼ lange gekoppelte Leitungsabschnitte zusammengeschaltet werden.

Mit dem Optimierungsprogramm Touchstone (Series IV) der Fa. HP-EEsof wurde ein symmetrischer Richtkoppler mit n=3 gekoppelten ¼ Leitungsabschnitten optimiert.

Die Ergebnisse waren nicht zufriedenstellend, so daß eine weitere ¼ Sektion hinzugefügt wurde.

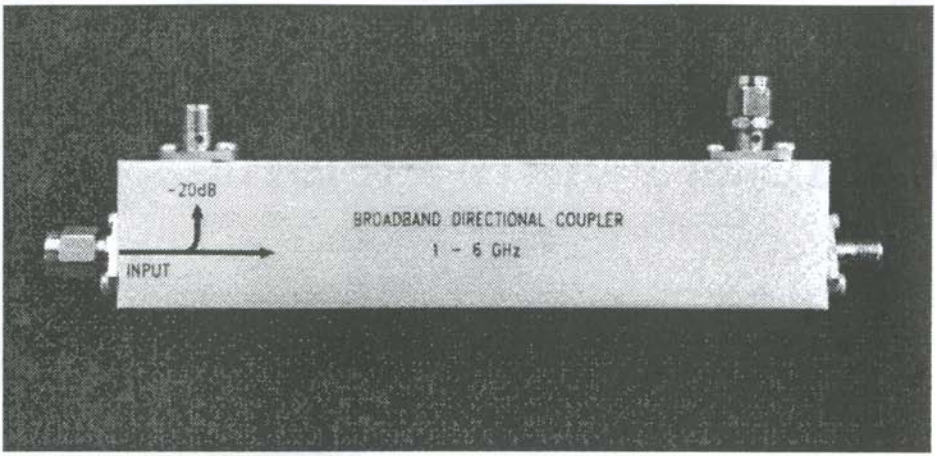
Bei der Optimierung mit n=4 symmetrisch gekoppelten ¼

Fig. 1: Layout of directional coupler

Die Länge für alle ¼ gekoppelten Leitungen beträgt 13,177 mm bei einer Leiterbahnbreite w von 2,519 mm. Die Breite der jeweiligen Koppelspalte beträgt: s1=0,495, s2=1,622, s3=2,673, s4=4,00 mm.

The length for all ¼ coupled lines is 13.177 mm with an width w of 2.519 mm. The width of the corresponding gaps is s1=0.495, s2=1.622, s3=2.673, s4=4.00 mm.

Fig. 2: Prototype



Leitungsabschnitten ist über die Bandbreite von 5 GHz eine saubere Koppeldämpfung von –20dB erreicht worden.

Mit den Simulationswerten für die Länge der ¼ gekoppelten Leitungen sowie der dazugehörigen Leiterbahnbreite wurde ein Layout erstellt und anschließend auf dem Substrat geätzt.

Nach dem Ätzvorgang wurden die beiden Substrathälften mit M2 Senkkopfschrauben verschraubt.

Alle vier 50Ω Stripline Ausgänge des Richtkopplers werden mit speziellen SMA-Striplinesteckern der Fa. Suhner (Typ 23SMA-50-0-166 female) und (Typ 13SMA-50-0-166 male) versehen.

Das isolierte Tor wird mit einem 50Ω SMA Abschlußwiderstand abgeschlossen.

3. Meßergebnisse

Nach dem Aufbau des Richtkopplers wurde mit dem Netzwerkanalysator HP8510C eine Eingangsanpassung von (Reflexion) von -25 dB sowie eine Koppeldämpfung von 20 dB mit einem Fehler von +/- 0,3 dB gemessen.

Die Isolation an dem mit 50 Ohm abgeschlossenen Port beträgt –40 dB, sodaß sich eine Richtschärfe (Directivity) von ca. 20 dB ergibt.

Dem Meßplot (Bild 3) des Netzwerkanalysators können die gemessenen Werte für die Eingangsanpassung, Koppeldämpfung und Isolation entnommen werden.

Somit werden durchaus kommerzielle Werte erreicht und der Richtkoppler kann für Messungen im Frequenzbereich von 1 bis 6 GHz eingesetzt werden.

1. Introduction

The triplate technology used for different microwave components, such as filter, directional coupler, -3dB/90° hybrid as well as power splitter has already been described in detail in DUBUS 3/95.

In this article I would like to present a broadband directional coupler for 1...6 GHz with –20 dB coupling attenuation and good directivity.

The directional coupler should be applicable in the frequency bands from 23 to 6 cm and it should achieve as far as possible a performance comparable to commercial directional couplers from Nada or Anaren.

2. Realisation

For the directional coupler's realisation an aluminium reinforced polyguide with an epsilon of 2.32 and a substrat height of 1.57 mm was selected. Two ¼ coupled lines have a bandwidth of one octave. In order to achieve a broader bandwidth, several ¼ coupled line segments have to be interconnected.

With the help of HP-Eesof's software Touchstone (Series IV) a symmetric directional coupler with n=3 coupled ¼ segments was optimised. The results were not satisfying, therefore a further ¼ section was added.

Optimised with n=4 symmetric coupled ¼ line segments a uniform coupling factor of –20 dB over the 1...6 GHz bandwidth has been achieved.

With the simulation results for the lengths and widths of the ¼ coupled lines a layout has been designed and subsequently etched on the substrate.

After the etching process both substrate halfs were screwed with M2/V2A flush screws.

All four 50Ω stripline outputs of the directional coupler were equipped with special SMA-stripline connectors from Suhner (type 23SMA-50-0-166 female) and (type 13SMA-50-0-166 male). The isolated port has to be terminated with a 50Ω SMA termination.

3. Measuring Results

After assembly of the directional coupler an input match (reflection) of –25 dB and a coupling factor of –20 dB was measured.The instrument used was the HP vector network analyzer HP8510C, which states an accuracy for this measurement of ±0.3dB.

The isolation of the port terminated with 50Ω is –40dB, resulting in a directivity of about 20 dB.

The measured values for input matching, coupling attenuation and isolation can be taken from the network analyzer's plot in

Fig. 3: Measurements

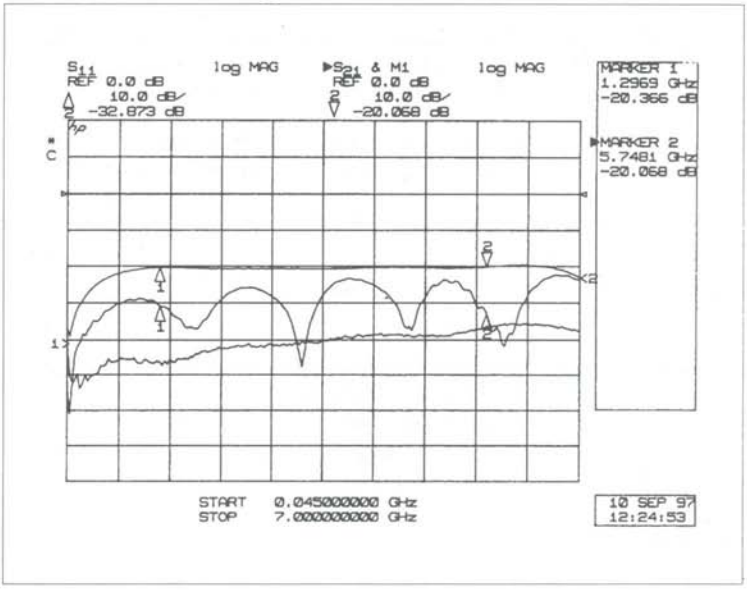


Fig. 3.

Hence a professional performance level is achieved and the directional coupler can be applied for measurements in the frequency range from 1 to 6 GHz.

Literatur/References

[1] Bernard Chareyron, FC1GAS, "Triplate Directional Couplers", DUBUS 2/1990, pp. 31...41

[2] Heinrich Masemann, DB7BP, "3 dB-Hybride in Triplatetechnik für 1,3 GHz und 2,35 GHz", DUBUS 3/1995, pp. 17...23

Oscillator for 2.5GHz

U. Nitschke, DF9LN & U. Kafka, DC8SE

Kurzbeschreibung: Der Oszillator für 2,556GHz ist klein (74x37x30mm), leicht und erzeugt ein spektral sauberes Signal. Er benutzt einen rauscharmen Quarzoszillator auf 106,5MHz und in den Vervielfachern Helixfilter für optimale Nebenwellenfreiheit. Mit einer Ausgangsleistung von > 10mW ist er für 10GHz Transverter oder andere Mikrowellenbaugruppen geeignet.

Abstract: A small (74x37x30mm), lightweight local osillator generates a clean signal on 2556MHz for 10GHz tramsverter systems. It uses a well proven, low noise oscillator on 106.5MHz and bipolar transistors in the multipliers. Low spurious output is achieved by use of pretuned helical filters. Output power is 10mW minimum.

1. Beschreibung

Der Oszillator 2,5GHz nach DF9LN besteht aus einem Quarzoszillator mit Vervielfacherstufen. Auf dem Schaltbild sehen Sie einen Quarzoszillator mit SST310-FET in bewährter Sourcerückkopplung, der je nach Quarz zwischen 98Mhz und 107MHz schwingt. Zur Temperaturkompensation wird für L1 eine hochwertige Spule mit Silberdraht verwendet. Des weiteren erfolgt eine Temperaturkompensation mit den Kondensatoren C3/C4. Hier werden bedrahtete Kondensatoren mit unterschiedlichem TK eingesetzt. Anschließend erfolgt mit T2 eine Verdreifachung auf ca. 320MHz. Diese Frequenz wird mit dem Helixfilter Fi1 ausgesiebt. Daran anschließend erfolgt eine weitere Verdopplung mit T3. Die Frequenz bei ca. 640MHz wird über das Helixfilter Fi2 ausgesiebt. Es erfolgt eine weitere Verdopplung mit T4. Die gewünschte Frequenz bei ca. 1280MHz wird über das Helixfilter Fi3 ausgesiebt. Abermals erfolgt eine weitere Verdopplung mit T5. Die Endfrequenz bei 2556MHz wird über das Helixfilter Fi4 ausgesiebt. Am Ausgang des Filters steht bei optimalem Abgleich der Vervielfacherkette eine Leistung von ca. 10mW zur Verfügung.

2. Konstruktion

Die Orginalleiterkarte von DF9LN wurde überarbeitet. Nunmehr sind bis auf Filter, Quarz und C3/C4 alle Bauelemente in SMD und auf der Unterseite der Leiterkarte untergebracht.

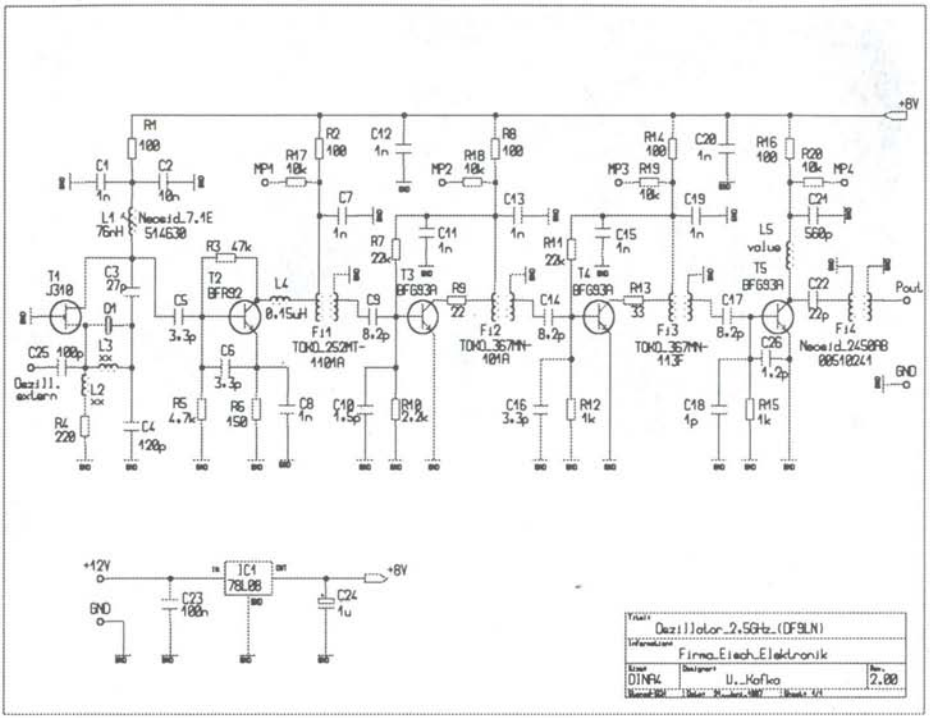
Einbau der SMD-Kondensatoren.

Die Kondensatoren sind anhand des Bestückungsplanes auf der Lötseite der Leiterkarte einzubauen. Bitte halten Sie die angegebenen Plätze für die Kondensatoren ein, da hiervon die Höhe der Ausgangsleistung und die Unterdrückung von Nebenwellen abhängt.

Einbau der SMD-Drosseln.

Der Bausatz enthält nur eine SMD-Drossel. Bitte suchen Sie die entsprechende Stelle auf dem Bestückungsplan heraus. Die im Schaltplan eingezeichneten Drosseln L2 und L3 sind nicht im Bausatz enthalten. Sie sind nur dann notwendig, falls die auf dem Quarz aufgedruckte Frequenz nicht erreicht werden kann. L2 falls Frequenz zu niedrig. L3 falls Frequenz zu hoch.

Fig. 1: Circuit Diagram 2.5GHz Oszillator



Einbau der SMD - Widerstände.

Der Bausatz enthält etliche SMD-Widerstände. Bitte suchen Sie die entsprechenden Stellen auf dem Bestückungsplan heraus und löten Sie die Widerstände vorsichtig ein. Für den Widerstand R4 werden zwei verschiedene Einlötplätze angegeben.

Einbau der SMD-Transistoren.

Alle Transistoren sind SMD-Transistoren. Weiter hinten finden Sie die Anschlußbelegung aller Transistoren. Bitte löten Sie die Transistoren dem Lageplan entsprechend ein. Besonders bei Transistor T5 ist vor dem Festlöten die Lage genau zu prüfen. Der Transistor wird gerade (nicht schief!!) plaziert.

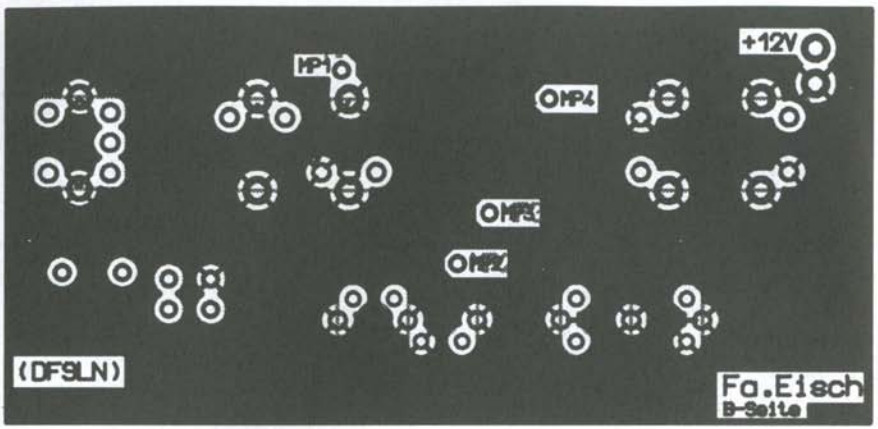
Einbau des Spannungsreglers:

Der Spannungsregler 78L08 ist entsprechend dem Lageplan einzulöten. Auf die Markierung ist zu achten.

Einbau der Leiterkarte

Bitte stecken Sie beide Metallwinkel zusammen und prüfen Sie, ob die Leiterkarte reinpaßt. Eventuell müssen Sie an den Ecken noch etwas feilen. Bitte überlegen Sie sich jetzt auch, wo welche Löcher in die Weißblechwinkel gebohrt werden müssen. Zerlegen Sie jetzt wieder die Teile und bohren Sie bitte die Löcher in die Weißblechwinkel. Jetzt können Sie die Winkel zusammenlöten. Dazu sollte aber die Leiterkarte (als Abstandshalter) im Gehäuse liegen und der obere und der untere Deckel aufgesteckt werden. Beide Gehäusewinkel aus Weißblech nur an den gegenüberliegenden Ecken zusammenlöten. Die Leiterkarte sollte vom unteren Deckel einen Abstand von 11mm haben. Zuerst sollte sie an einigen Stellen am Blechstreifen festgelötet werden. Prüfen Sie genau, ob die Leiterkarte richtig mit den Ge-

Fig. 2: PCB Top



häusewinkeln verbunden ist und ob überall der Abstand von 11mm eingehalten wird. Die Leiterkarte darf nicht unter (mechanischer) Spannung stehen! Sollte das der Fall sein, ist jetzt die letzte Gelegenheit die Lage der Leiterkarte zu korrigieren. Zum Einlöten der Leiterkarte sollten Sie einen Lötkolben von mind. 50W (80 W sind besser) verwenden (z.B. Weller Magnastat mit Spitze "7" oder "8" oder einen geregelten Lötkolben, bei dem Sie die Temperatur einstellen können (ca. 400°C), damit es keine "kalten Lötstellen" gibt.

Durchführungskondensator.

Nach dem Einbau der Leiterkarte sollte der DuKo von außen eingesteckt und verlötet werden. Vor dem Einstecken können Sie auf

fig. 3: PCB Bottom

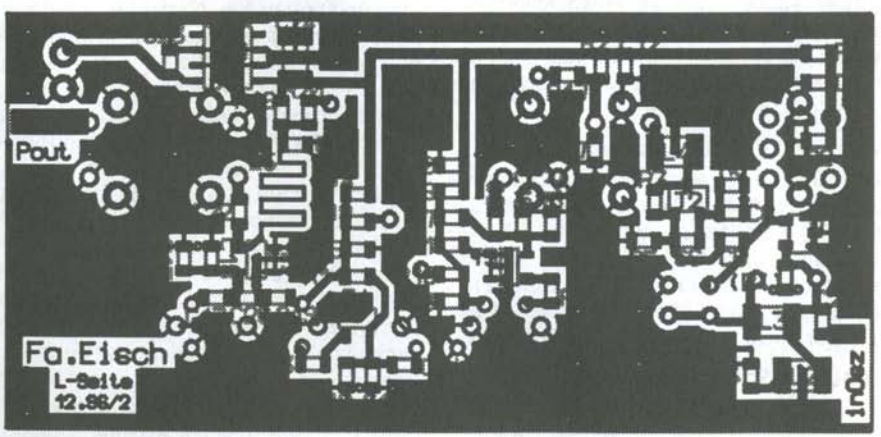
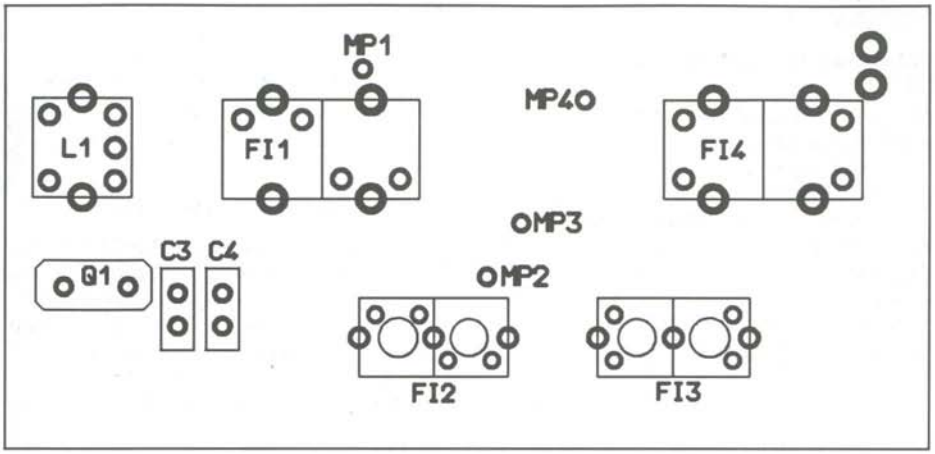


Fig. 4: Parts Layout Top



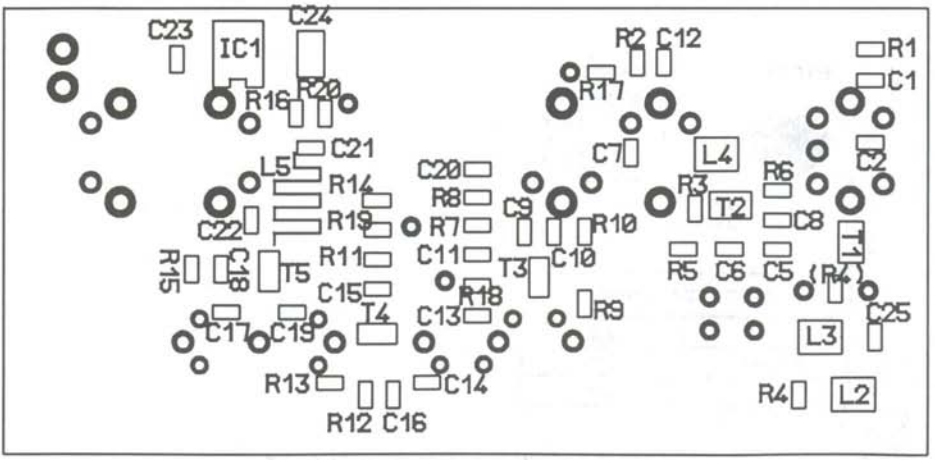
den DuKo als Masseanschluß eine Lötfahne aufschieben und diese mit DuKo und Gehäuse verlöten.

Koaxbuchsen.

Es können zwei Koaxbuchsen eingelötet werden. Im Normalfall werden Sie nur eine Koaxbuchse für den 2,5GHz-Ausgang benötigen. Sollten Ihnen die Frequenzstabilität des verwendeten Quarzes nicht ausreichen, kann über den Eingang "Oszill.extern" z.B. ein OCXO nach DF9LN (siehe [1]) angeschlossen werden. In diesem Fall muß auch eine zweite Koaxbuchse eingebaut werden:

Die Koaxbuchsen können jetzt von außen eingelötet werden. Der Innenleiter der SMA-Koaxbuchse muß auf der Leiterkarte auflie-

fig. 5: Parts Layout Bottom



gen, damit eine möglichst kurze und induktionsarme Verbindung vorhanden ist. Keinesfalls als Verbindung ein Stück Draht verwenden.

Einbau der Kondensatoren C3/C4:

Wie aus der Schaltung ersichtlich wird von den Kondensatoren C3/C4 mit die Resonanzfrequenz des Schwingkreises bestimmt. Deshalb sind zur Temperaturkompensation beide Kondensatoren als normale Keramikkondensatoren ausgeführt. Hier haben Sie die Möglichkeit bedrahtete Kondensatoren mit unterschiedlichem Temperaturkoeffizienten einzulöten. (C3 hat N150/N330, C4 hat NP0).

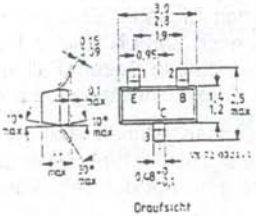
Beschriftung der Filter

Filter	Alte Beschr.	Neue Beschr.
L1	514630	352238
Fi1	252MT-1101A	252HEP-2956A
Fi2	5HW 367MN-101A	5HW 367MN-101A
Fi3	5HW 367MN-113F	5HW 125055F-1305
Fi4	510241	Neosid FN2450

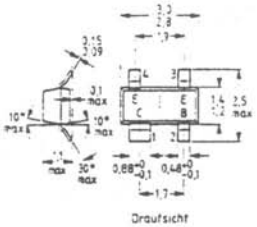
Einbau aller Filter und Spulen.

Diese Filter sind kleine Metallbecher mit vier bis sechs Anschlüssen. Zuerst sollten Sie die Spule L1 einlöten. Sie trägt ein kleines Zettelchen mit der Nummer "352238". Alle anderen Filter sind Helixfilter und an der Seite beschriftet. Bitte vergleichen Sie genau die Beschriftung auf den Filtern mit der unten ange-

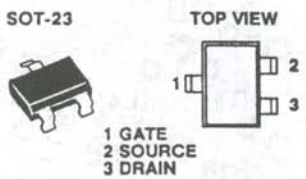
BFR92



BFG93A



SST310



PRODUCT MARKING	
SST308	Z08
SST309	Z09
SST310	Z10

78L08

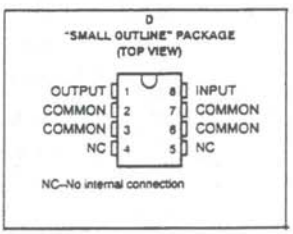


Fig. 6: Footprints of Semiconductors

Table 1: Parts List of 2.5 GHZ Oszillator

Stück/ Count	Art/Sort	Wert/Value	Hersteller/ Manufacturer	Bauform/ Size
1	SMD-R	22 Ω	Sie	0805
1	SMD-R	33 Ω	Sie	0805
5	SMD-R	100 Ω	Sie	0805
1	SMD-R	150 Ω	Sie	0805
1	SMD-R	220 Ω	Sie	0805
2	SMD-R	1k Ω	Sie	0805
1	SMD-R	2.2kΩ	Sie	0805
1	SMD-R	4.7kΩ	Sie	0805
4	SMD-R	10kΩ	Sie	0805
1	SMD-R	22kΩ	Sie	0805
1	SMD-R	47kΩ	Sie	0805
1	SMD-C	1 pF NP0	Sie	0805
1	SMD-C	1.2 pF NP0	Sie	0805
1	SMD-C	1.2 pF NP0	Sie	0805
1	SMD-C	1.5 pF NP0	Sie	0805
3	SMD-C	3.3 pF NP0	Sie	0805
3	SMD-C	8.2 pF NP0	Sie	0805
1	SMD-C	22 pF NP0	Sie	0805
1	SMD-C	100 pF NP0	Sie	0805
1	SMD-C	560 pF NP0	Sie	0805
9	SMD-C	1 nF NP0	Sie	0805
1	SMD-C	10 nF NP0	Sie	0805
1	SMD-C	100 nF NP0	Sie	0805
1	C	27 pF N330	Sie	EGPU
1	C	120 pF NPO	Sie	EGPU
1	C	18 pF N470	Sie	EGPU
1	SMD-Tantal	1 uF/16V	Sie	A
1	Feed-Through	1 nF		
1	SMD-L	150 nH	Sie	SIMID01
1	Coil	76 nH/No. 514630	Neosid	
1	Helix-Filter	2.4 GHz/No. 00510241	Neosid	
1	Helix-Filter	252-MT-1101A	TOKO	
1	Helix-Filter	367 MN-101A	TOKO	
1	Helix-Filter	367 MN-113F	TOKO	
1	SMD-NPN	BFR92A	Sie	SOT-23
1	SMD-FET	SST310	Siliconix	SOT-23
3	SMD-NPN	BFG93	Sie	SOT-23
1	Regulator	78L08	TI	SO8
1	Quarz	106.5MHz, TQ35.07.26	Telequarz	

Table 2: Parts List of 2.5 GHZ Oszillator

Stück/ Count	Art/Sort	Wert/Value	Hersteller/ Manufacturer	Bauform/ Size
1	PCB	RO-4003, LO2.5	Eisch	
1	Coax	SMA		
1	Box	Tinplate 37x74x30mm	Eisch	

gebenen Beschriftung. Teilweise stimmen auch nur einige Ziffern überein (Siehe Kasten auf Seite ??).

Damit wäre der Aufbau des Oszillators abgeschlossen.

3. Abgleich des Oszillators

Prüfung auf Kurzschlüsse.

Vor der ersten Inbetriebnahme sollten Sie prüfen, ob kein Kurzschluß vorhanden ist. Bitte messen Sie mit einem Ohm-Meter zwischen "+13.8V" und "Masse" Der Widerstand sollte 100Ω sein.

Erstes Einschalten.

Jetzt können Sie an den Oszillator zum ersten Mal Betriebsspannung anlegen. Verwenden Sie dazu ein Netzteil mit Strombegrenzung (Strombegrenzung auf 200mA einstellen). Es sollte bei 12,6V ein Strom von 100mA fließen.

Inbetriebnahme:

1. Oszillator/Vervielfacherstufe: Durch Eindrehen des Kernes von L1 fängt der Oszillator an zu schwingen und die Spannung an MP1 ändert ihren Wert auf unter 8V.
2. Fi1 auf Spannungsminimum an MP2 abgleichen.
3. Fi2 auf Spannungsminimum an MP3 abgleichen.
4. Fi3 auf Spannungsminimum an MP4 abgleichen.
5. Fi4 auf maximale HF-Leistung am Ausgang abgleichen. Am Ausgang steht eine Leistung von mindestens 10mW an.
6. Die Frequenz sollte 2556MHz sein. Dazu ist vorsichtig an L1 zu drehen. Sollte die auf dem Quarz aufgedruckte Frequenz durch Drehen an der Spule L1 nicht erreicht werden, sind die im Schaltplan eingezeichneten Drosseln L2 oder L3 einzubauen und der Widerstand R4 zu verlegen. L2 falls Frequenz zu niedrig. L3 falls Frequenz zu hoch. Die Werte für L2 und L3 können zwischen 220 und 470nH betragen. Die Gesamtstromaufnahme liegt beim Mustergerät bei 80mA. Damit ist der Abgleich des Oszillators beendet.

Anschlußbelegung der Halbleiter:

Die Anschlußbelegung einiger Transistoren sind in Abb. 6 zu sehen.

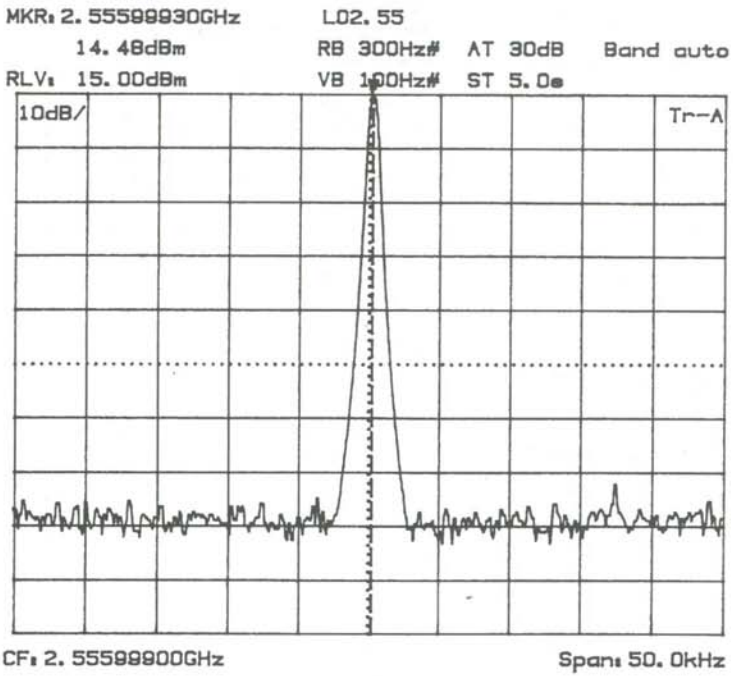
4. Meßwerte

Es werden folgende typische Meßwerte erreicht:

Eingangsfrequenz:	106,500MHz (Bereich: 98..107MHz)
Ausgangsfrequenz:	2556MHz ($fQ \cdot 24$)
Eingangsleistung:	1mW (bei Anst. durch OCXO-DF9LN)
Ausgangsleistung:	10mW
Versorgungsspannung:	9<=12,6<=15V
Stromaufnahme:	ca. 80mA
Nebenwellen (2...3 Ghz):	<-75dB
Nebenwellen (50...2000MHz):	<-50dB
Nebenwellen (3...12GHz):	<-40dB

Ein zufälliges Muster erzeugt eine Leistung von 14,5dBm mit einem sehr sauberen Spektrum (Abb. 7). Die einzigen Nebenwellen im Bereich von 50...2900MHz, welche weniger als -75 dB Abstand zum Hauptträger haben,

Fig. 7: Close-in Output-Spectrum of 2.5GHZ LO



sind eine Spektrallinie bei 532MHz mit -65dB und eine Linie bei 1278 MHz mit -51dB Abstand zum Ausgangssignal (Abb. 8). Im kritischen Bereich von 2,556GHz ± 0,5GHz sind keine Nebenwellen, die größer als -75dB sind, zu beobachten.

Das Breitbandspektrum von 2 bis 12GHz zeigt nur 5 Linien bei 3.843, 5,112, 6.39, 7.668 und 8.946GHz. Diese sind Harmonische von 2.556 bzw. 1.278GHz. Die stärkste liegt bei 6.39GHZ mit 41dB Abstand. Nichtharmonische Nebenwellen sind nicht zu bobachten.

Inzwischen sind mehr als 300 dieser Oszillatoren weltweit gebaut worden.

1. Description

Fig. 1 shows the circuit diagram of the 2.5GHz oscillator, which has been originally developed by DF9LN. A low noise oscillator is compromised by the FET T1, which uses the proven grounded gate colpitts circuit for an overtone crystal on 106.5 MHz. A temperature compensation can be achieved by menas of C3/C4, which provide a negative TC.

T2 triples to 320MHz. The signal is filter by helical filter FI1. T2 doubles and FI2 filters on 640MHz. T4 doubles again and FI3 filters on 1278MHz. T5 doubles again and FI4 filters on 2556MHz.

Careful layout, filtering by helical filters and the appropriate bias for the transistors leads to a clean output of at least 10dBm on 2.5GHz.

2. Construction

The original PCB by DF9LN was reworked by DC8SE. All parts except the filters are SMD type and are mounted to the bottom of the

Fig. 8: Output-Spectrum from 50...2900MHz

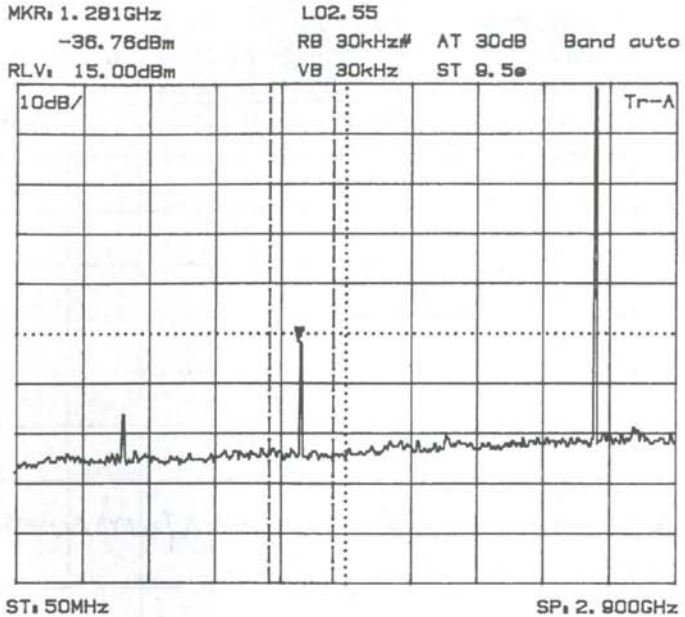
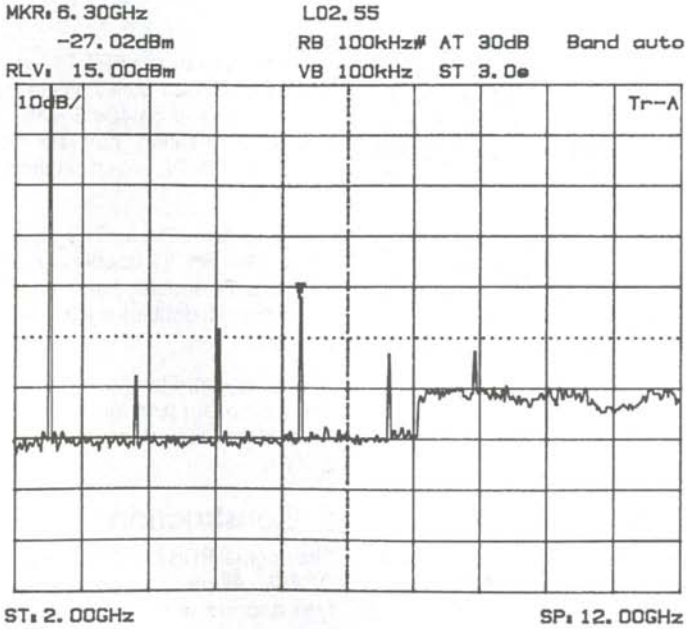


Fig. 9: Output-Spectrum from 2...12GHz



PCB. Refer to Fig. 5 for the components location.

Mounting of SMD Caps

All caps are soldered to the PCB according to Fig. 5. The exact locations have to be maintained for achieving the output power and cleanliness of the spectrum.

Mounting of SMD Chokes

L4 with a value of 150nH is soldered to its pads. L2 and L3 are necessary in case, that the correct frequency of the crystal oscillator cannot be achieved. L2 is used if the frequency is to low, L3 is used if the frequency is to high.

Mounting of SMD Resistors

All resistors are soldered to the correct pads. The location of R4 depends on the existance of L2. Use that pad which establishes the ground connection of the source of T1.

Mounting of SMD Transistors

Solder all transistors. Refer to Fig. 6 for the footprints. Try to align the transistors with the pads.

Mounting of SMD Regulator

Solder the regulator. Take care of the right orientation of PIN 1, which can be seen from Fig. 6.

Mounting of PCB, Connectors and Filters

Put the tinplate nooks together and check whether it fits to the PCB. If not adjust the size of the PCB.

Driil all holes for connectors and feedthrough caps into the tinplate nooks. Solder together with the PCB as a ruler. The adjust the PCB for 11mm clearance from the bottom. Solder the PCB into the sidewalls of the box.

Solder the feedtrough cap.

Solder the SMA-connectors. If you use an external XO, you have to solder two of them.

Solder the caps C3/C4 which control the temperature compensation onto the board.

Now insert all filters and solder them.

Alignment

First check the whole circuit for possible shorts with an Ohmmeter. The resistance indicated when measuring B+ to ground should be around 100Ω.

Apply a voltage of 12.6V from a regulated and short circuit protected power supply. The short current should be adjusted to 150mA max. A current of 100mA for initial operation is reasonable.

The aligment procedure is based on the fact that the correct tuning of the filters leads to an increase of the current in the associated transistor of the next stage. As the helical filters are pretuned and have only a small tuning range this procedure works very nice.

Step-by-Step alignment procedure:

1. The crystal oscillator has to be tuned. By tuning L1 you will eventually initiate the oscillation, which can be observed by a drop of the voltage at MP1.
2. Tune FI1 to minimum voltage at MP2.
3. Tune FI2 to minimum voltage at MP3.
4. Tune FI3 to minimum voltage at MP4.
5. Tune FI4 to maximum output power. This must be at least 10mW.
6. Check the output frequency. It should measure 2556MHz. If this is not the case first try to achieve the correct frequency by turning the core of L1. If this does not succeed additional coils L2 or L3 have to be inserted into the circuit. If frequency is lower insert L2, if it's higher insert L3. L2 and L3 can have a value between 220 and 470nH.

Total current current consumption is about 80mA at 12V. Power output is at least 10mW(10dBm) and can reach up to 14 dBm.

Footprints for the transistors can be seen in Fig. 6.

4. Measurements

The following Table indicates some numerical values.

Fundamental Freq.:	106,500MHz (Bereich: 98..107MHz)
Output Freq.:	2556MHz ($f_Q \cdot 24$)
Input Power:	1mW w/ ext. XO
Output Power:	10mW
Supply Voltage:	9<=12,6<=15V
Supply Current:	ca. 80mA
Spurious Resp. (2...3 Ghz):	<-75dBc
Spurious Resp. (50...2000MHz):	<-50dBc
Spurious Resp. (3...12GHz):	<-40dBc

The measurements in Fig. 7, 8 and 9 indicate a clean spectrum for this LO. The close-in spectrum is very clean without any spurs.

The band from 50MHz to 2.9GHz shows only three spurs:

- the ouput on 2556MHz
- a spurious at 532MHz at -65dBc
- and a spurious at 1278MHz at -51dBc.

The band from 2 to 12 GHz shows only various multiples of 1278 or 2556 MHz.

Up to today more than 300 units have been built in Europe and elsewhere.

Literatur/References

[1] U. Nietschke, DF9LN, "Oven-stabilized XO for VHF", DUBUS 3/1997, pp. 36...40

Teile/Parts

Parts, PCBs and kits are available from:

Annemarie Eisch-Kafka, Abt-Ulrich-Str.16, 89079 Ulm-Gögglingen, Tel.: 07305/23208, FAX: 07305/23306

Printing Bugs

Error in PANFI MK II

Rainer Bertelsmeier, DJ9BV

Description of Problem

Some users of the PANFI complain about wrong indication of Y-factor when the instrument is operated manually in ON or OFF mode. This manual mode is quite useful for moon or sun noise measurements for microwave EME operators.

An investigation of the switching circuit revealed an error in the wiring of SW1C (Figure 1). In fact during ON or OFF modes input CAL2 has been left open and output ENR CAL 1 has been shorted with the reference voltage. The Z-input of the multiplier is open circuit. This leads to an erratic indication of the Y-factor.

The analysis of the problem showed that during the transfer from hand sketches to ORCAD schematics the signals ENR CAL 1 and ENR CAL 2 where exchanged. This resulted in the wrong schematic of Fig. 1.

I have to apologise for this error and for the eventual inconvenience.

Intended Function

Modes AUTO and CAL:

Rotary Switch SW1C routes the Z-input of multiplier/divider IC7 (ENR CAL 2) via the ENR Cal Pot (20k) to U_{OFF} at IC8/Pin 5, which is equivalent to TP6 and signal ENR Cal 1.

Modes ON and OFF:

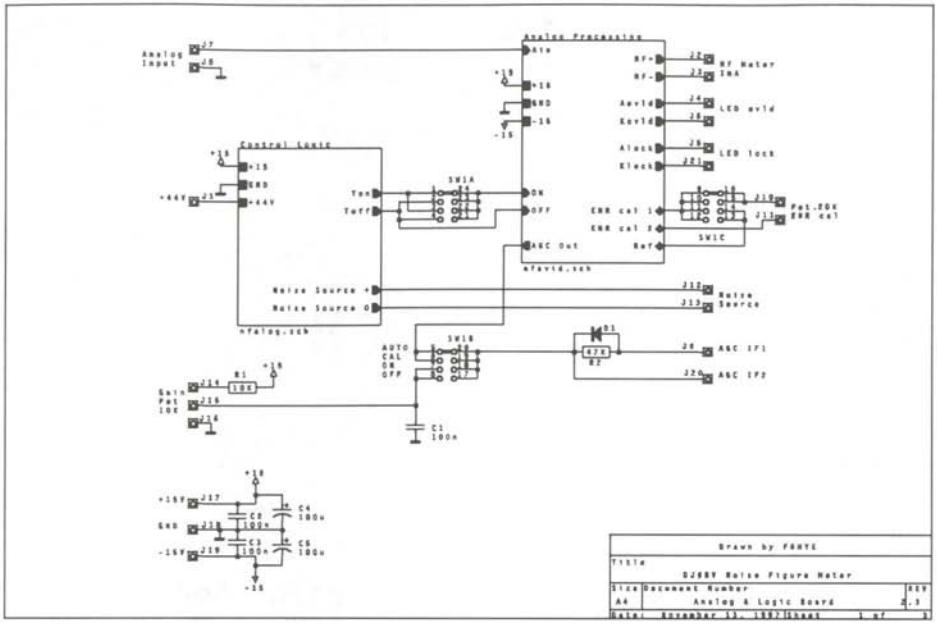
Rotary Switch SW1C routes the Z-input of multiplier/divider IC7 directly to the reference voltage at TP4, to establish a constant voltage at the Z-input.

Circuit Correction

Case 1: External Switch SW1

Wiring should be changed according to Fig. 2. Switch SW1C is connected to ENR CAL 2 via J11. AUTO/CAL positions are routed to J10. The ENR CAL Pot is rewired to J10 and TP6. ON/OFF psoitions are routed to REF/TP4.

Fig. 1: Block Diagram as published



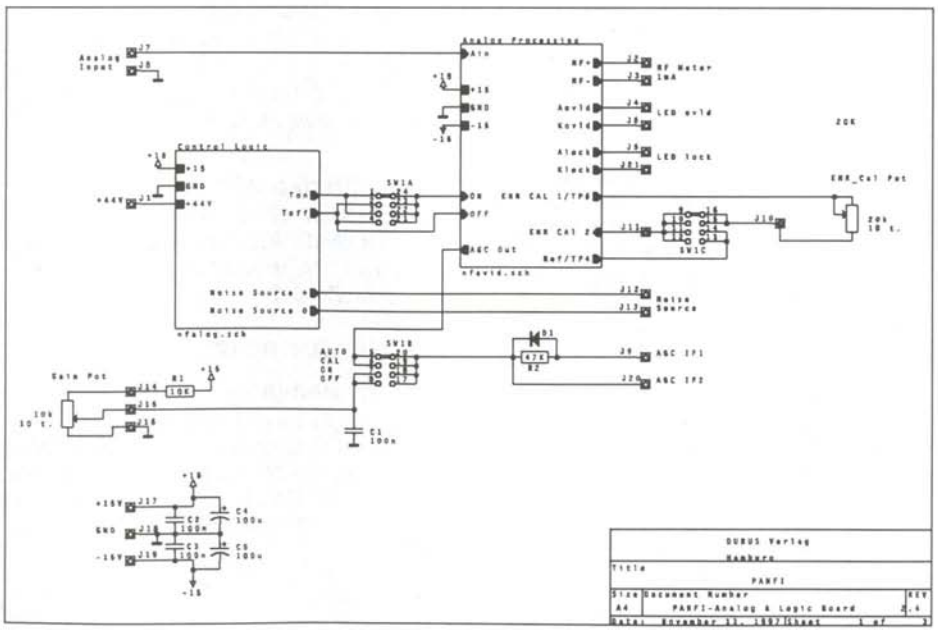
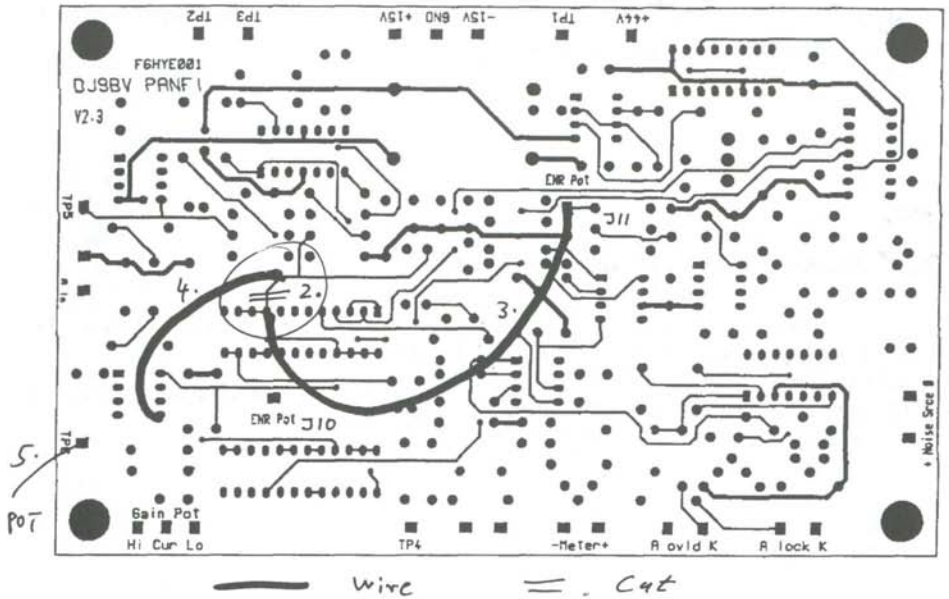


Fig. 2: Block Diagram Corrected

Fig. 3: Analog Processor PCB Top View



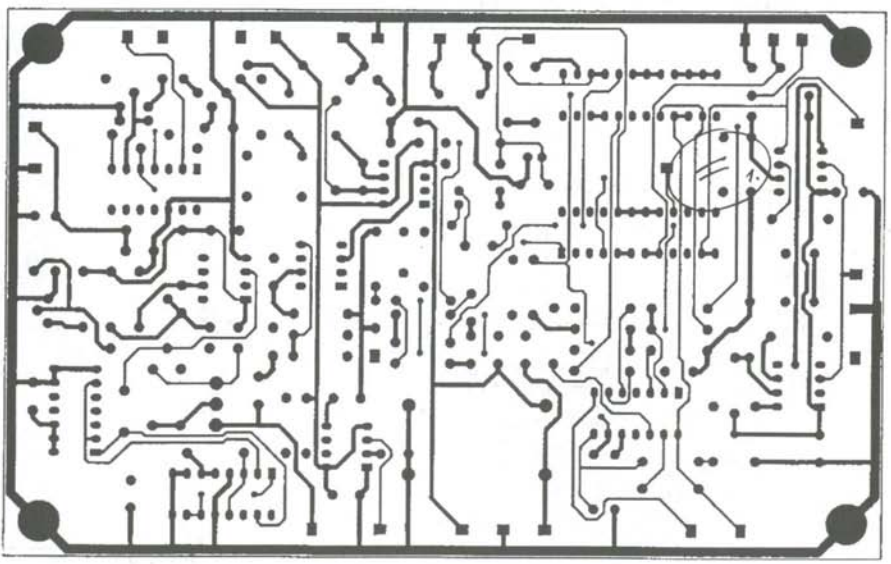


Fig. 4: Analog Processor Bottom View

3. Connect SW1C/9...12 to J11 (Top of PCB)
4. Connect CAL 1 to IC8/Pin 5 (Top of PCB)
5. Connect ENR CAL Pot between J10 and TP6.

References

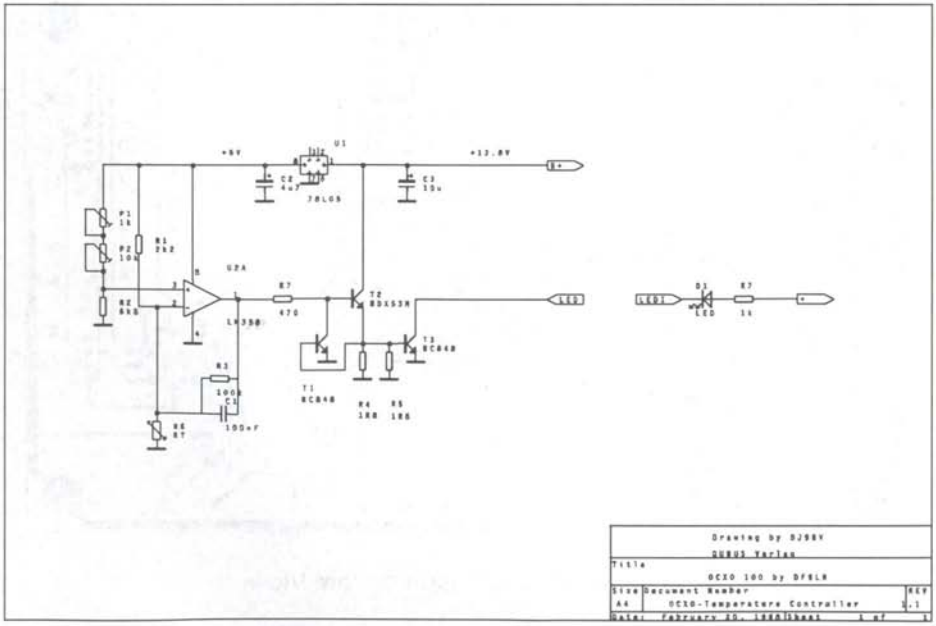
[1] Rainer Bertelsmeier, DJ9BV, "Noise Figure Meter MKII", DUBUS 3/1994, pp. 27...44.

Oxco-Circuit Diagram

In DUBUS 3/1997 on page there is an error in the circuit diagram of the oven controller for the OXCO designed by DF9LN. R7 (Value 470Ω) is missing in the diagram. Additionally there is a label on the output of the LM7805 regulator, which states its output as 9V. The correct value of the label is 5V.

The corrected circuit diagram can be seen below.

Fig. 1: Correction of Circuit Diagram for Oven-Controller



Microwave Europe

Editor: John Sørensen, OZ1IPU

HAPPY NEW YEAR! Dear readers!

Because of time constraints 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, you can still use my Fax also on ++45 98467877 and send is by letter.

1296MHz

DK0DK (op. DG3FK) JO40XL wkd: 4/5.10.97 DJ9TM JN57, PA0JCA JO22, PA3AWJ JO21, PA0EHG JO22, PA0RDY JO22, PA0SQ JO21, OE5MKN JN78, PA3FPS JO22, PA0ASH JO22, PA0FRX JO22, PI4EUR JO21, PA0WWM JO22, PA3ATP JO21, PA6NL JO21, PI4ZLD JO11, PE1PTQ JO11, PE1FZH JO11, OE3XXA JN88, G4DDK JO02, G3XDY JO02, G0KPW JO02, G4ZTR JO01, G6SPS/p JO01, G6HKM JO01, G4KIY IO92, G3OHM/p IO92, G4KGC/p IO92, G4PMS IO91, G8ZQB IO92, G3CKR/p IO93. Rig: TS790, 4x 35elm, 2x2c39. Tks fer info Tom.

F6HTJ/p JN12EK wkd: 27.7.97 F5HRY JN18, F1CYB JN17, F5AQC JN05, F6GCT JN18, 17.8.97 F6BSJ/p JN26, 7.9.97 F1BJD/p IN98, F6APE IN97, F5IWE JN18, F6DKW JN18, 5.10.97 IK1YWB/p JN54. Tks fer info F6HTJ.

I4JED/4 JN54OK wkd: 4/5.10.97 OL7M JO80, DC9NL JO50, OK1KJB JN79, F6BSJ JN26, OE5VRL/5 JN78, 9A5Y JN85, S51ZO JN86, HB9AOF/p JN36, HB9XC/p JN37. Rig: IC1271, MGF1302, TH308, 3m dish. Tks fer info I4JED.

PA0WWM JO22FE wkd: 11.8.97 GM4ODA/p IO89, 12.8.97 SM6EAN JO57, LA9VHA JO28. Tks fer info Wim.

SM7ECM JO65NQ wkd: 20.8.96 PA0JUS JO22, G8AVA JO01, OH2AXH KP20, 5.10.96 DG0KK/mm JO95, 25.10.96 SM3BEI JP81, 14.1.97 G8NEY IO81, 4.6.97 G3XDY JO02, PA3FHY JO22, G4BYV JO02, G6DER IO93, 10.8.97 G4KDH JO01, 19.8.97 LY2FE/a KO05, 16.9.97 OK1VMS JO70, OK1AQT/p JO70, 22.9.97 G8NEY IO81, G3MEH IO91, G8XVJ IO83, 23.9.97 SP2NJI JO92. Tks fer info Anders.

SP6MLK/p JO80JG wkd: 3.5.97 SP3DRT JO91, OK1KIR/p JO60, SP2NJI JO92, SP2DDV JO93, DG0EW/p JO60, OK1KRQ JO60, OK1DSO/p JO70, 7/8.6.97 OK1VMS/p JO70, OK1PSG/p JN69, 5.7.97 OK1KIR/p JO60, SP3DRT JO91, SO3EP JO81, SP3TYI JO80, 21.9.97 DL8OBU JO42, OE3JHC JN78, OE3XXA JN88, DK2GR JN59, DB6NT/A JO50, 22.9.97 JO57, 5.10.97 SP6LB/p JO71. Tks fer info Stan.

2320MHz

F6HTJ/p JN12EK wkd: 5.10.97 F5FEN/p JN24. Rig: 5W, 52elm loop yagi. Tks fer info F6HTJ.

PA0WWM JO22FE wkd: 12.8.97 SM6EAN JO57. Tks fer info Wim.

SM7ECM JO65NQ wkd: 20.8.96 LA6LCA JO59, SM6ESG JO67, DL2NUD JO63, DG0RG JO62, LA2D JO59, OZ2OE JO45, SM6EAN JO57, 17.9.96 OZ2OE JO45, DL2NUD JO63, DG0RG JO62, SM6EAN JO57, 6.10.96 DF0TEC/p JO73, 15.10.96 SM6EAN JO57, DL2NUD JO63, 19.11.96 SM6ESG JO67, SM6EAN JO57, 9.12.96 SM6ESG JO67, 17.12.96 DG0RG JO62, SM6EAN JO57, 21.1.97 OZ2OE JO45, SM6EAN JO57, LA8AV JO59, LA6LCA JO59, 18.2.97 OZ2OE JO45, SM6ESG

JO67, SM6EAN JO57, 18.3.97 SM6ESG JO67, 15.4.97 SM6ESG JO67, SM6EAN JO57, 20.5.97 DL2NUD JO63, 4.6.97 G4BYV JO02, G3LQR JO02, 5.7.97 DF0TEC/p JO73, OZ5BAL/p JO55, 15.7.97 DG0RG JO62, LA8AV JO59, LA6LCA JO59, SM6ESG JO67, 10.8.97 G3LQR JO02, G4KDH JO01, 19.8.97 DJ8ES JO43, LA6LCA JO59, LA8AV JO59, 16.9.97 OZ2OE JO45, SM6ESG JO67, 21.10.97 OZ2OE JO45, 18.11.97 SM6EAN JO57, SM6ESG JO67. Tks fer info Anders.

SP6MLK/p JO80JG wkd: 7.6.97 OK2BFF/p JN89, 5.7.97 OE5VRL/5 JN78, OK1KIR/p JO70, OK1AIY/p JO70, SP3DRT JO91, SO3EP JO81. Tks fer info Stan.

3400MHz

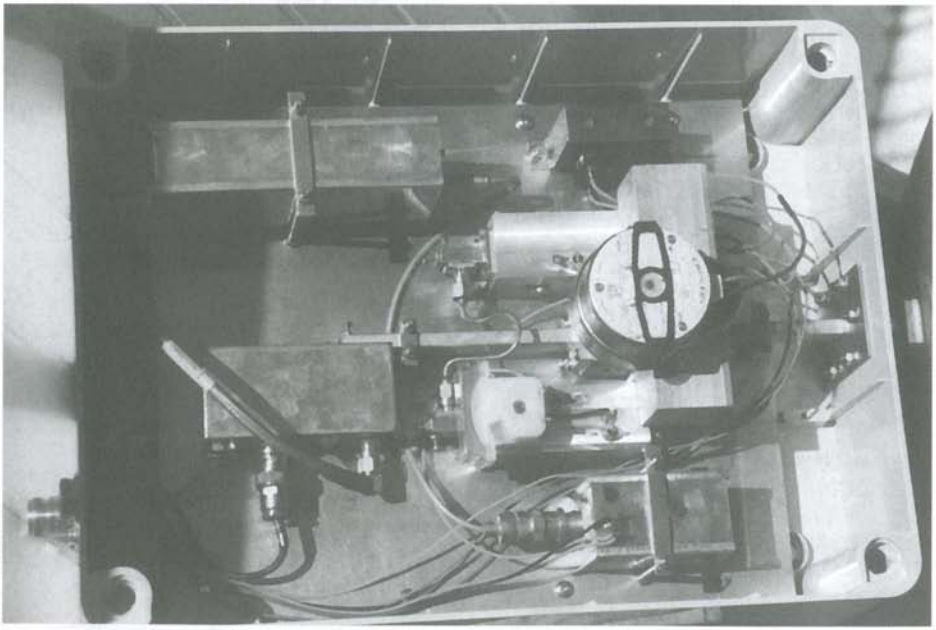
PA0WWM JO22FE wkd: 10.8.97 G4KNZ/p JO02. Tks fer info Wim.

5760MHz

I4JED/4 (op. I4CHY, IW4BJT) JN54OK wkd: 4/5.10.97 OE8MI/8 JN66, S51WI JN75, S51MW JN66, S57UUD JN65, S51JN JN75, S57C JN65. Rig: 1W, 1m dish. Tks fer info I4JED.

PA0WWM JO22FE wkd: 12.8.97 SM6EAN JO57. Tks fer info Wim.

SM7ECM JO65NQ wkd: 20.8.96 LA6LCA JO59, SM6ESG JO67, SM6EAN JO57, OZ1 DOQ JO65, 17.9.96 SM6EAN JO57, 15.10.96 OZ1DOQ JO65, SM6EAN JO57, 19.11.96 SM6ESG JO67, SM6EAN JO57, OZ1DOQ JO65, 17.12.96 SM6EAN JO57, OZ1DOQ JO65, 21.1.97 SM6EAN JO57, SM4DHN/p JP60, 18.2.97 SM6ESG JO67, SM6EAN JO57, 18.3.97 SM6ESG JO67, 15.4.97 SMSEAN JO57, SM6ESG JO67, 4.6.97 G4BYV JO02, G3LQR JO02, 15.7.97 LA8AV JO59, LA6LCA JO59, SM6ESG JO67, 10.8.97 G3LQR JO02, 19.8.97 OZ7IS JO65, OZ2TG JO65, 16.9.97 SM6ESG



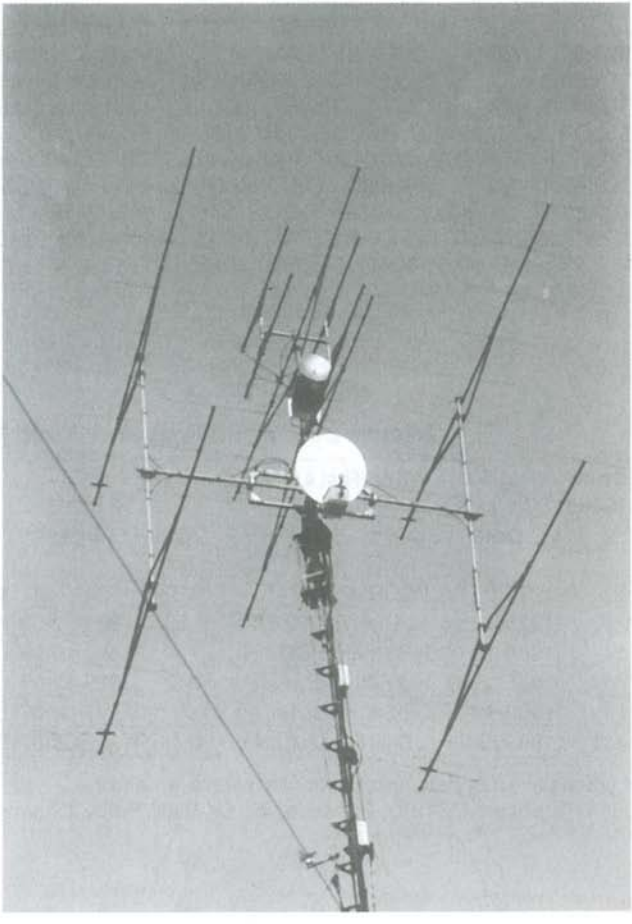
F5HRY 24GHz Transverter

JO67, OZ9ZI JO65, 21.10.97 OZ2TG JO65, SM6EAN JO57, 18.11.97 SM6ESG JO67, OZ2TG JO65, SM6EAN JO57. Tks fer info Anders.

10368MHz

F6DRO JN03SM wkd: 2.5.97 F1EIT/p JN03, 8.6.97 EA6ADW/P JN19, F6CXO JN03, 15.6.97 F1EIT/P JN13, 16.6.97 F2SF JN12, 20.6.97 F6DKW JN18 one way only!, 8.7.97 F6DKW JN18 not complete missing locator, 12.7.97 F6CGB/P JN12, F1GTX/p JN03, 19/07/97 F6CGB/p JN12, F1VBW JN03, 20/07/97 F1EIT/p JN13, F1GTX/p JN03, F6ETU/p JN13, 26.7.97 F5HRY/B JN18 hrd on airplane reflection, 27.7.97 F1EIT/p JN02, F1HDF/p JN18 one way only, F6ETU/p JN13, F2SF/p JN12, F1GTX/p JN03, F6GBQ/p JN14, F6CGB/p JN12, F6CXO JN03, 3.8.97 F1EIT/p JN02, 5.8.97 EA/F5PAU/p IN83, 17.8.97 F6ETU/p JN13, F5CAU/p JN33, F5KTL/p JN04, F5AXP/p JN03, F4ARY/p JN03, 31.8.97 F6ETU/p JN13, F6BVA/p JN24, F5CAU/p JN33 one way only!, F8UM/P JN05, F4ARY/p IN93, 7.9.97 F1ANY/p JN02, F6APE IN97, F1EIT/p JN13, F6ETU JN03, 28.9.97 F1HDF/p JN18 one way only, F6DKW JN18 one way, F5FLN/p JN04, F5FVP/p JN04, F4ARY/p JN04, F1EIT/p JN02, F1VBW JN03, F6ETU/p JN13, F8UM/p JN05, F2SF/p JN12, F6BVA/p JN24, 29.9.97 F6DKW JN18 one way, F5HRY JN18 no rr's, 2.10.97 F6DKW JN18 no rr's, 4.10.97 F5KTL/p JN04, 5.10.97 F6HYE/p JN25, F5CAU/p JN23, 23.10.97 F6DKW JN18 at last complete ODX 581km, 25.10.97 F6BVA/p JN02, 26.10.97 F1EIT/p JN12, F1VBW JN03, F1GTX/p JN03, F6BVA/p JN02, F2SF/p JN12, 5.12.97 F5HRY/p JN18 no rr!, 7.12.97 F6APE IN94 59+++. Rig:4w/1db/60cm (building 5.7 and 24Ghz rigs during winter). Tks fer info Dom.

I4JED/4 JN54OK wkd: 4/5.10.97 OE5VRL/5 JN78, IZ3ALJ/7 JN71, OE8MI/8 JN66. Rig: 30W, 4m dish. Tks fer info I4JED.



F5HRY in JN18

PA0WWM JO22FE wkd: 10.8.97 OZ/DL4IB/p JO56, 12.8.97 SM6EAN JO57, 20.8.97 DC8AG JO31. Tks fer info Wim.

SM7ECM JO65NQ wkd: 20.8.96 SM6ESG JO67, DG0RG JO62, DL2NUD JO63, LA6LCA JO59, SK6YH JO57, LA2D JO59, OZ2OE JO45, SM6EAN JO57, 17.9.96 OZ1DOQ JO65, SK6YH JO57, 15.10.96 OZ1DOQ JO65, SM6EAN JO57, SK6YH JO57, 19.11.96 SM6ESG JO67, OZ2TG JO65, SM6EAN JO57, OZ1DOQ JO65, 17.12.96 OZ2TG JO65, SM6EAN JO57, OZ1DOQ JO65, 21.1.97 OZ2TG JO65, 18.2.97 SM6ESG JO67, SM6EAN JO57, OZ2TG JO65, 18.3.97 SM6ESG JO67, 15.4.97 OZ2TG, JO65, SM6EAN JO57, SM6ESG JO67, 20.5.97 OZ2TG JO65, DL2NUD JO63, 4.6.97 G8APZ JO01, G3LQR JO02, 29.6.97 via RS DJ5BV JO30, PA0EZ JO22, PA0WWM JO22, DJ1KP JO40, DL6NCI/p JO50, 30.6.97 OZ/ON4AOD JO56, OZ/ON4AWV JO56, OZ/ON1BTH JO56, OZ/ON4QQ JO56, 6.7.97 PA6C JO33, 15.7.97 SM7FMX/7 JO65, DG0RG JO62, OZ/SM7FWZ JO57, LA6LCA JO59, SM6ESG JO67, 10.8.97 G3LQR JO02, 19.8.97 OZ2TG JO65, SK6YH JO57, S-K7HR/7 JO77, 16.7.97 OZ2OE JO45, SM6ESG JO67, OZ9ZI JO65, 21.10.97 OZ2TG JO65, OZ2OE JO45, SM6FHZ JO57, SM6EAN JO57, OZ9ZI JO65, 18.11.97 OZ2TG JO65, SM6ESG JO67. Tks fer info Anders.

SP6MLK/p JO80JG wkd: 7/8.6.97 OK1JKT/p JO60, OK1VAM/p JO, OK1MDK/p JN79. Tks fer info Stan.

A new world record direct QSO on 24 Ghz 398Km on SSB. After many attempts and waiting for favorable meteorological conditions the 24GHz SSB world record has been beaten on October 26th 1997 at 5.30GMT by F6BVA/p and F5CAU/p. F5CAU/P at Mont Chiran, 1900 m ASL (43x52.12N 6x19.00E) have a ssb QSO with F6BVA/P 1400 m ASL (42x54.59N 1x33.93E) with a 52 report. They have only 10-40 mW , 75 cm dish. Tks fer info Gil.

Microwave: World Firsts and World Records

Band (GHz)	World First QSO			World Record		
	Date	Calls	QRB (km)	Date	Calls	QRB (km)
10	1946-05-06	W2JRM-W2JN	3.3	199412-30	VK6KZ/p-VK5NY/p	1912
24	1975-10.14	G3BNL/P-G3EEZ/p	150	1993-02-03	HB9MIN/p-DH6FAE/p	396
47	1984-10-03	HB9AMH-HB9MIN	1	1994-10-05	HB9MIN/p-DJ7FJ/p	184
76	198512-30	HB9MIN-HB9AGE	0.5	1995-12-07	HB9MIO/p-DK4GD/p	114
145	1992-12-12	DB6NT/p-DL1JIN/p	1	1997-04-07	DL6NCI/p-DB6NT/p	53
241	199305-23	DB6NT/p-DL1JIN/p	0.1	1995-06-07	DB6NT/p-DF9LN/p	2.1

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

Microwave USA

Editor: Kent Britain, WA5VJB

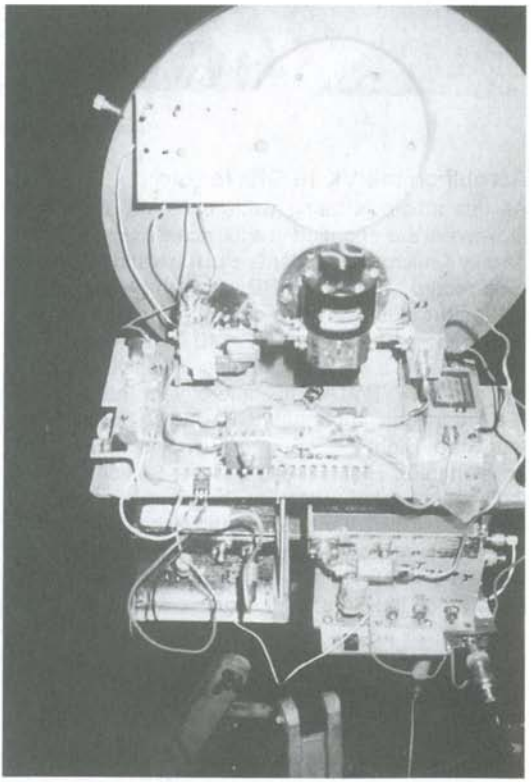
78GHZ QSOs

The long time efforts of AA6IW and W0EOM paid off November 28th with the first US amateur QSO in our 76 GHz band. Good signals were heard each way over the 4.6km path. Equipment problems kept them from extending the US record that day. December 11th was clear, sunny, and 22 C, hardly an ideal day for extending millimeter wave records. Their last QSO was over a 12.7km path with the CW signals about 5 dB out of the noise. More power and antenna upgrades are planned and we expect to the the US 76 GHz record extended again soon. AA6IW used an 18 inch dish with 2 milliwatts from a 2X harmonic multiplier chain locked to a rubidium standard. Receiver was a Harmonic mixer to a 435 MHz all-mode transceiver also locked to a rubidium standard. W0EOM used a 12 inch dish and a 3X DB6NT multiplier with -3 dBm output. Receive was a DB6NT mixer board modified for waveguide L.O. input to an Icom R-7000. US automobile companies are currently planning to market millions of anti-collison Radars for passenger cars. These Radars would share our amateur millimeter assignment. Tons of millimeter equipment certainly excites this author!

For the 3cm EME'ers, NU7Z is now active from the Seattle Washington area with a 4 Meter dish and the loan of a 25 watt TWT from WA5VJB. Rick has 3 initials thus far and says it would be 4 initials if SM4DHN would only tune around a few KHz.

New VK 24 GHz record.

January 10th, VK6BHT worked VK6KZ on 24 GHz SSB at a distance of 143km. Weather conditions over the sea path was 22C with a 98% relative humidity and the time was about an hour after sunset. Signal reports of 3/1 each way on SSB were exchanged along with serial numbers in the Ross Hull Field Day contest. There was severe QSB over the path and the stations maintained a 5 minute cycle.



78GHZ Transverter

AA6IW: 78GHz

Assault on the VK 10 GHz record:

As this article is being written, 16 VK Microwavers are engaged in a full scale assault on all VK microwave records and the world 10 GHz record. Alan, VK3XPD will be traveling to Western Australia with equipment for the 1, 2, 3, 5, and 10 GHz band. On 10 GHz, Alan will be using a 55 watt portable rig using a Hughes 1277 TWTA. This time of year there is a 2 to 3 week propagation DX window along the 'Great Bight' of Southern Australia when an elongated High Pressure Cell sits along the south coast of Australia. The group plans to operate from a variety of portable sites with 3 complete microwave stations on the Southwest tip of Australia and 13 stations 2000 km away along the Southeast coast.

EME News

Editor: Bernd Wilde, DL7APV

Intro: My new FAX Number at work is: ++49-33208 667 - 25. Dates REF/DUBUS contest, 7/8 March & 4/5 April. Registration for Paris counts.

144 MHz

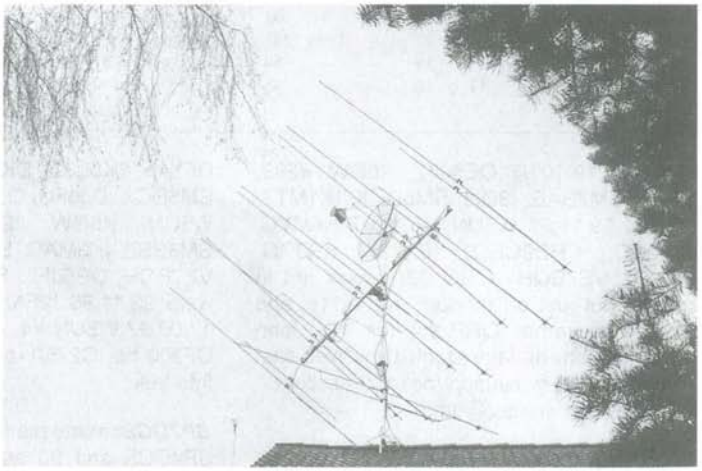
CT1DMK wkd since last report: JA9BOH, DC7UT, W7HAH, K0GU, WA1JXN, W7CS, and during the 1997 contest, all in random: SM5FRH, I5JUX, W5UN, K5GW, SM5FRH, SM5BSZ, EA2LU, EA3ADW, JL1ZCG, SM3AKW, F3VS, SM2CEW, SM7BAE, RU1AA, I3DLI, OE5JFL, I2FAK, F1FLA, SM5DCX, WA6PEV, K7CA, VE3KDH, AA8BC, N6PYI, IK3MAC, HB9CRQ, 9A2AE, IK1MTZ, PA2CHR, SM4IVE, VE7BQH, K6MYC, DL5MAE, EA3DXU. Dec97 and Jan98 wkd: VE3BQN, OZ1HNE, AB3D, F1FLA, K8BHZ, JH5FOQ, S52LM, W5UN, EA3ADW, AA7A. Now the 70cm yagis are no longer inside the 144MHz array, small improvement was noted on 2m, (while the 70cm suffered a lot with the nearby 2m yagis). 144MHz 4x11el WU and 1.2KW(GU74b). Web: http://spmgs1.cfn.ist.utl.pt/~cupido

I2FAK wkd initials '97: EA3AUA, DL1CF, IK2CDI, EA2LY, N7EIJ, F8DO, OH2PO, JH2COZ, N2WK, F6HVK, W0PT, PE1OGF, W0AH, IW4BLG, W6/SM0PYP, JR5JXV, UA3MHJ, RK2FWA, N6PYI, LX1EC/P, S53J, RZ3BA, SM2LKW, K4VJ, VE3FOD, W4QS, YO2IS, W5UWB, N0AKC/9, KD9PW, W7CS, K1CA, KA6NBC, KE7MR, JH0WJF, JR3REX, DL2FDX, KB3PD, KK5IH, W5AL, DF9CY, OK1MAC, W7EME/P, WA1JOF, VE2JWH, WA8CLT, KB8JVH, Z30B, KE7NR, W7EME, K8GP/3, DL7FF, EI3DP, VE3FKX, KE7NS. In Jan 98 DL2IAN, DK4RC and IW5BML for 942 initials. mny tnx fer info Franco

I4XCC wkd 09.02 WA9KRT #165, DL1HYZ #166, 19.10. RU1AA #167, 16.11 W7GJ, K6MYC #168, I4XCC - JN63gv Claudio Maracci Via Guaitino 4 47040 Croce di Montecolombo - Rn RIG 144 MHz: 4X17 el. F9FT - 1Kw. AX-25: I4XCC@IK4VFK-8 e-mail: maracci@iper.net

OK1FM wkd : 970901 DB0HRO, 970901 DB0SAW, 970901/1559 DB0ERF 970901/1601 DB0SON, 970901/1557 DB0MAK, 970831/2013 OK0PKL (Milan)

PE1OGF reports ARRL: had a good first weekend conditions were not that good in the second weekend but eventhough I could work some new initials. 18.10.97 SM5FRH, SM5BSZ, WB5LBT, SM2CEW, W5UN, PA3EPD, AA4FQ #295, K7CA, AF9Y, F3VS,



DL5FN 432 8x23el wu antenna

EME-TOPLIST

144MHz

Call	small SQR	DX CC	US States	WAS	WAC	# initials
I2FAK	448	56	105	50	1993	1988	942
DK3WG	374	54	86	50	1992	1983	642
PA2CHR	254	43	63	48	--	1993	364
F9HS	180	33	49	27	--	1985	247
DJ7OF	150	28	30	22	--	1996	170
UA4NM	114	23	32	21	--	--	0
RA3LE	88	27	26	0	--	--	95
DL5DTA	83	21	24	15	--	--	96
HB9SUL	48	16	19	0	--	--	63
PE1OGF	46	14	16	12	--	--	55
F5HRY	20	0	8	7	--	--	21
W6/SM0PYP	19	10	8	7	--	--	21
HB9DFG	18	11	8	5	--	--	14
DL3YEE	11	6	6	2	--	--	0
SP7DCS	4	3	3	1	--	--	4
9A9B	0	0	18	8	--	--	72

432MHz

DL9KR	363	50	80	50	1987	1978	665
DJ6MB	258	39	59	43	--	1984	309
OK1KIR	229	43	62	43	--	1982	329
DK3WG	228	40	62	40	--	1991	326
G3LTF	206	0	55	47	--	--	327
F1ANH	117	24	30	23	--	--	141
RA3LE	111	26	24	23	--	1984	124
ON4KNG	110	25	34	17	--	1996	129
YO2IS	106	22	33	21	--	--	0
DL3YEE	90	22	32	15	--	--	0
G4ERG	77	21	24	19	--	--	93
OK1CA	71	24	25	22	--	1996	121
EA3ADW	63	18	23	19	--	--	64
PA2CHR	38	14	17	10	--	--	45
HB9SUL	34	12	17	9	--	--	37
OK1DFC	15	15	9	3	--	--	15
UA4NM	12	8	10	4	--	--	0
F5HRY	4	0	14	8	--	--	31
JA9BOH	0	0	45	40	--	--	260
G3SEK	0	0	53	40	--	??	255
GW3XYW	0	0	33	0	--	--	178
G3SEK	0	0	54	42	--	--	275

1296MHz

OK1KIR	112	29	34	24	--	1989	139
G3LTF	108	0	31	20	--	--	134
F1ANH	100	24	30	20	--	1994	128
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	31	13	17	8	--	--	32
F1ANH	16	8	11	5	--	--	17
G3LTF	13	0	12	2	--	--	14
EA3ADW	8	4	8	1	--	--	9
GW3XYW	0	0	13	0	--	--	16

5760MHz

OK1KIR	7	4	6	1	--	--	7

10368MHz

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

DK9ZY, 19.10.97 OE5JFL, K5GW, #299, I2FAK, SM7BAE, I3DLI, SM5DCX, IK1MTZ, F1FLA, 09.11.97 W5UN, 15.11.97 K6MYC, IK3MAC, HB9CRQ, 16.11.97 KB8RQ, EA2LU, VE7BQH QSO 09/11 was not in contest but just on random. rig 4x11el and GS31b so rather QRP..tnx fer info John pe1ogf@iaehv.nl Take a look at my Web-site: http://www.IAEhv.nl/users/pe1ogf/---listkeeper of meteor-scatter@qth.net

SP2JXN (JO94GJ) wkd: ARRL 15/16.11.97 OK1MS, N2WK, DK1KO; DK3WG, K1CA, WB5LBT, IW5AVM, I5JUX, LZ2US, DL7FF, IK1MTZ, EA3ADW, DL9MS, DL1SUN, DF1AN, 7K3LGC, DK9OY, JL1ZCG, W4MW, SM5DCX, DJ6FU, OE5EYM; hrd: SM5FRH, W5UN, K5GW, I2FAK, F3VS, W0HP, SM5BSZ, IK3MAC, EA2LU, KB8RQ, K7CA, VE7BQH, OE5JFL, SM4IVE. Ireks first qso were 23.11.96 I2FAK #1, SM5FRH, F3VS, 17.08.97 W5UN #4. rig 1x17el.M^2, 4CX250, CF300 hb IC275A+af filter MF784B. tnx fer info Irek

SP7DCS: made his first EME qsos 85-86 as SP4DCS and 90 as SP7DCS. He is now removed and continues to be active with a single 10el.H +10el. V 5.25m own design horizon only. In Italian Contest '97 he heard

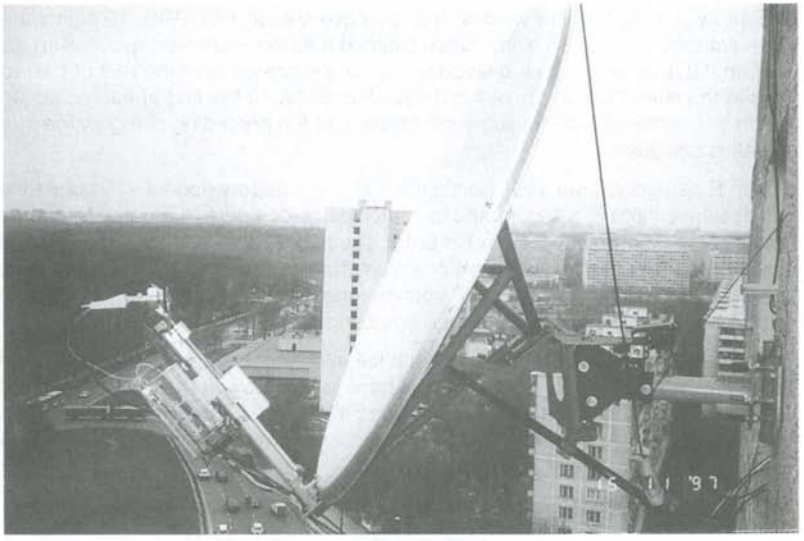
KB8RQ but got only qrz back. More success he had in ARRL '97 part I he worked SM5FRH #, F3VS ', hrd KB8RQ, JL1ZCG, I5JUX. Part II with handy elevation he worked W5UN, K5GW #, hrd K7CA, SM5FRH (Strongest signal), F3VS, IK3MAC, SM4IVE, SM5DCX, SM5BSZ, I2FAK, EA2LU, W7HAH. 'Score 4x3x100 all on random. rig 1x (10H+10V) cross yagi 5.25m, FHX35 preamp, FT736R, MJF DSP, 400w. In '98 he will improve his antenna to 4x 10H+10V and more power. tnx fer info Chriss (email: SP7DCS@POL-BOX.COM)

432 MHz

CT1DMK wrd since last report, most on random: N2IQU, N2IQU(ssb), K1FO, DL9KR, OZ4MM, N2IQU, DL9NDD, OE5JFL, OH2PO, UR5LX, F1ANH, G3SEK, N9AB, EA8FF, K4QI, K2UYH, SM3AKW, I2COR, N4GJV. Less active on 70cm than before because I have to share the dish with other bands. Condx: 5.6m dish and 1.5kW GS35b FHX35(0.35dB). Photos of my 70cm amp at http://spmgs1.cfn.ist.utl.pt/~cupido

G4ERG reports: In June I replaced my old antenna system of 4 x 7.7 lamda 9bv's with with a new polarity rotatable array comprising 16 x 10 el 9bv's... Using open wire line throughout the array with a 4:1 balun at the centre...Results so far are very incouraging, with 28 initials added since the end of June... Fully autotracking with homebrew software and interfaces. he worked since June, K1FO, K4QI, SM2CEW, DL9KR, G3LTF, DK3WG, G3SEK, VE1ALQ #66, CT1DMK #67, OK1KIR, WI7Z #68, DF3RU, W7FN #69, JH4JLV #70, F5FEN, OZ4MM #71, KA0RYT #72, JA5OVU #73, JA2KRW #74, JA0BOH #75, K0RZ, 7M2PDT #76, UT5EC #77, HB9SV, KB3PD #78, OM4KNG, UR5LX, OE5JFL, N2IQU, OH2PO, F1ANH #79, DL9NDD, I2COR, K4QI,RA3LE #80, KD4LT, K2UYH, EA8FF #81, F5AQC #82, DK3BU, JL1ZCG #83, PA3CSG, K5GW, EA3UM, DF3RU, OE5EYM #84, ON5OF, K2OS #85, W7QX #86, N4GJV, WB6IMC #87, SM3AKW, W0KJY #88, W8MQW #89, HA1YA #90, DL4MEA #91, N9AB #92, UA6LGH #93... 73 and see you soon de Peter G4ERG

G3SEK reports: sorry for this late report on the EME contest. I worked 80 x 32, all on 432. This was way above my expectations - mainly



RW3BP 10G 1.65m offset dish

V ITALIAN EME CONTEST

Date and Time: from 00.00z of 12 september 1998 to 24.00z of 13 september 1998

Frequency: 50,144,432,1296,2304,5760,10450 MHz.

Mode: cw,ssb. Only bilateral contact EME. Report: M,O,RST.

Band 144 MHz: Category A) antennas max 20 elements. B) ant.between 21 to 40 el.,or parabole till 7 mt. diameter. C) ant.between 41 to 80 el.,or parabole between 7,01mt. to 10 mt. diameter. D) ant.between 81 to 160 el.,or parabole over 10,01 mt.diam.. E) ant.between 161 el. to 320 elements. F) ant. over 321 elements.

Band 432 MHz: A) antennas max 50 elements. B) ant. between 51 to 100 elements. C) ant. between 101 to 200 el.,or parabole till 4,5 mt.diameter. D) ant. over 201 el.,or parabole over 4,51 mt.diameter.

As for **other frequencies** (50MHz; 1,2GHz; 2,3GHz; 5,7GHz; 10GHz), categories are one each band. To define serials' number of elements: each director and dipole, count 1 element,also the reflector (whether compound with more elements or not) scores 1 elements,(all referred to each single aerial).

EX. 1 antenna with 19 elements more trigonal reflector goes in A category,also with a plant of 4 x 5 elements or 2 by ten elements are A category as well,(referred to 144 and 432 MHz). For the stations that use cross antenna,all elements present on each antenna will be added up. EX: 10 + 10 cross-yagi, count 20 elements; 17 + 13 cross-yagicount 30 elements. OM and SWL can partecipate.

On section SWL also OM are accepted, but just as SWL and they can't execute trasmission EME during the contest.

SCORE: 10 points a bilateral contact 31 points a bilateral contact with Italian stn. 10 points a bilateral contact among Italian stn. SWL station: the listened station can be put in as correspondent twice only. Not are valid cq hrd, only qso are valid SCORE: 10 points a station when listened on qso. 31 points when listened a Italian station on qso. Italian stations (or stranger on Italy), have got their own classification separeted from the rest of the world. Referencies to the classification on 144 and 432 MHz bands: If the first of each category doesn't reach or overtakes with his score the first one of the preceding category,the category itself is declassed.

EX. the first in E category,score 1000 points,the first in F category scores 990 points,then F category is declassed into E category and its partecipants compete in E category too. As well as first in C cat. scores 300 p.ts,first in D cat. scores 290 p.ts, first in E cat. 280 p.ts and first in F cat. scores 310 p.ts, we will have one classification for F category and another for C D E all together. WINNER: Is the one who gets the maximum score in each category. Every single station can partecipate with more than one band.

PRIZES: Only the first in each category gets a prize,all the others get a certificate. Awards are not combinable; who vin more than one will have to choose just the one he wishes to be awarded,as for others categories,the prize will go to the second. For the contest qso among Italian stations are valid. All info, comments, photo,ecc. are welcome,pse declaration on the log.

The end of acceptation logs is **november 1998**. Sending the **logs to**:

I1ANP Mario Alberti, via priv. Maralunga,12, 19126 LA SPEZIA ITALY
Accept also log via **packet or internet**. Before and after the contest data, i send all info on this way.

IV italian EME contest results

Good partecipation, better propagation of the last year,around the perigee is better,good partecipation of Italian stations,with new stations on eme,at this stations a great welcome. I confirm excellent ham spirit of eme group Italian,that to come contest data,arranged all to be possible for to present on the contest,also for short time but are present.Best regards to all see your next year. Was presents; I1ANP, I1PIK, IK1FJI, IK1MTZ, IW1CGB, IZ1AEM, I2COR, I2FAK, I2MBC, I2RV, I2XLF, IK2DDR, IK2EAD, IK2EBP, IW2MNU, I3DLI, IN3TWX, IN3KLQ, IV3CER, IV3GBO, I4XCC, IK4DCX, IW4BLG,I5JUX, I5MPK, I5TDJ, I5WBE, I5YDI/5 ,IW5AVM, IW5CNS, IW5DRA, IK6EIW, IC8FAX,IK8RIH, I0UGB, IK0OZK. Of course ,back of this stations much OM ,that no partecipate with personal call, but to were active on contest on the team.Confirm record of presence of Italian stations,is the better, after start the contest. During the contest arranged record on 144 MHz, first qso of the stations using one antenna only,between W5UN and F/G8MBI,congrats. Come to classify with various categories.

144 MHz

call	n.qso	l.qso	points	ant.declared
Cat. A (antenna maximum 20 elements)				
1) W5UN	16	3	223	1x17 el.
2) YO2IS	4	1	61	2x10 el.
Cat. B (antennas between 21 to 40 elements)				
1. EA3DXU	35	10	560	2x17 el.
2. DK9ZY	24	5	345	4x10 el.
3. F6CRP		2	20	2x17ft,no el.)
Cat. C (antennas between 41 to 80 elements)				
1. SM5DCX	75	17	1107	4x18xxxM2
2. S52LM	34	12	592	4x17M2
3. EA2AGZ	23	5	335	4x17B2
4. JA4BLC	17	6	296	4x17M2
5. JA9BOH	19	5	295	4x13el.
5. 9A9B		19	5	295 4x16el.
7. S53J		16	5	265 4x17M2
8. JH2COZ	18	4	264	4x14el.
9. DL5DTA	15	5	255	4x11BV
10. S51ZO		15	4	234 4x15BV
11. JH5FOQ	11	3	173	4x13el.
12. PE1OGF	7	1	91	4x11ft
13. N8XA		3	--	30 4x17el.
13. N8ZAT		3	--	30 4x17el.
15. K9DTB	2	--	20	4x17el.
16. 7N2TCC	1	--	10	4x17B2
Cat. D (antennas between 81 to 160 elements)				
1. SM5BSZ	85	18	1228	4x14+14 x-yagi.
2. RU1AA	72	13	993	6x16el.
3. DL5MAE	48	10	690	8x17el.
4. 9A2AE		49	8	658 8x24M2
5. DJ7OF		32	9	509 6x17el.
6. 7K3LGC	29	5	395	4x15+15 x-yagi.
7. JL1ZCG	23	3	293	12x13el.

E and D categories are unit for rule.

Cat. F (antennas over 321 elements)

1. SM5FRH	136	29	1969	32x19+10el.H/V

432 MHz

Cat. B (antennas between 51 to 100 elements)

1. DL4KG	6	1	81	4x23el.
2. JA9BOH	8	--	80	8x20el
3. EA3DXU	5	1	71	2x38el.
4. JH4JLV	5	--	50	6x24el.
5. S52CW	4	--	40	8x24el.
6. JH1EFA	1	--	10	4x22el.
6. HB9SUL	1	--	10	4x23el.

Cat. D (antennas over 201 elements,dish over 4,51 mt. diam.)

1. UR5LX	32	1	341	10,7mt. parab.
2. ON4KNG	18	2	222	8x32el.
3. JA5OVU	16	1	181	16x14el.
4. ON5OF	10	1	121	16x20el.
5. CT1DMK	9	1	111	5,6mt. parab.
6. JA4BLC	5	--	50	6mt. parab.
7. HB9SV	2	--	20	8mt. parab.

The B and C categories are unit, on A category not receive any log.

1296 MHz

1. ON5RR	20	--	200	6mt. parab.
2. N6BQ	17	--	170	3,6mt. parab.
3. HB9SV	11	1	131	8mt. parab.
4. JA4BLC	8	1	101	6mt. parab.

Not receive any other logs,for other band and SWL

Italian stations 144 MHz

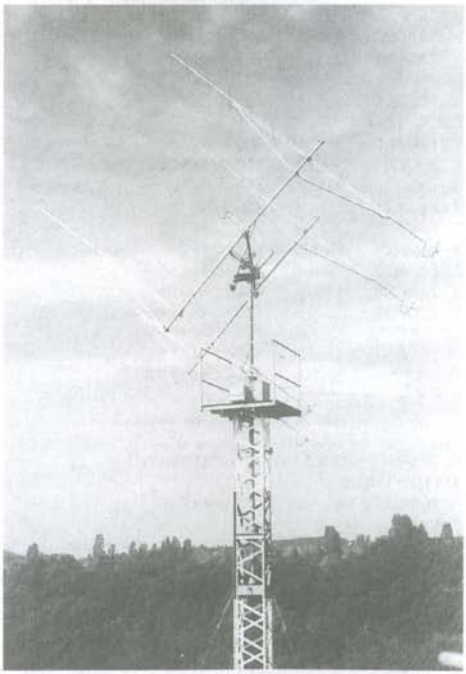
Cat. B

1. IW4BLG	8	1	80	4x 10el.K5gw+
2. I2RV	7	1	70	2x 17B2 cc
3. IW5DRA	2	1	20	2x 11el.F9ft
3. IW2MNU	2		20	(2x 17B2cc
5. I2XLF		1	10	2x 17B2cc
5. IK2EBP		1	10	2x 17B2cc
Cat. C & D				
1. IK1MTZ	68	12	680	4x 17FT
2. IK1FJI	56	10	560	4x 17M2
3. I3DLI	51	11	510	6x LLYhb
4. IK2DDR	41	9	410	4x 18cc mod.
5. I1ANP	35	9	350	4x 16BV
6. IW5AVM	23	6	230	4x 20 Laret
7. IV3GBO	20	7	200	4x
8. IW5CNS	13	4	130	4x 11 el.
9. IZ1AEM	12	6	120	4x 16 el.
10. IW1CGB	12	5	120	4x 17 F9ft
11. I5WBE	11	2	110	4x 17 el.
12. IK0OZK	3	--	30	4x 17 F9ft
Cat. E				
1. I2FAK	90	13	900	16x 18xxxM2
SWL				
1. IK8RIH	3 hrd	--	30	4x 15 WU hb
432 MHz Cat. B				
1. IN3KLQ	4	1	40	4x 21el.
Cat. D				
1. I2COR		13	1	130 10 mt.dish

Many other stations were active but no sended log.

Date for next year contest is: 12 to 13 september 1998, 00.00 to 24.00z. The Italian EME meeting is 16/17 may 1998, to Hotel Joseph,Marina diPietrasanta, from I5JUX Jack. Thanks to all, Mario I1ANP, Italian EME coordinator.

F1ANH 8m dish F/d:0.6 with 13cm feedhorn



9A9AB's 4x16el. 2m antenna

thanks to the good activity. Over the two weekends I added 13 initials: S52CW, SM3BYA, F1ANH, WI7Z, F1CH, W5ZN (state #42), KN6M, JA2TY, JJ1NNJ, KL7HFQ, K7XD (the only sked in the contest), DL4KG and DL4MEA. Great contest! Next year's target has to be 100 QSOs, so I have started serious work on the YL1050 PA. 73 from Ian G3SEK

DL5FN is a new station on 432. Dieter wkd: since october 1997 OH2PO, OE5JFL, K5GW, JA5OVU, N4GJV, OZ4MM, ON4KNG, SM2CEW, DL9NDD, DL9KR. his rig: 8x23el dl6wu, MGF1302+converter + TS870, TX:FT736, GS23B 1KW at feed. Dieter is avaible for skeds via net or fax ++ 49-6145-377925. adr: Dieter Naumann, Schillerstr.30, D-65439 Flörsheim. Mny tnx fer info Dieter.

F5AQC wkd: 18.10.97 N2IQU, K4QI, UR5LX; G4ERG, UA6LGH, OZ4MM, G3SEK, VE6TA, OH2PO, UT5DL, F1ANH, DL9KR, K0RZ, KA0RYT, W7FN, N9AB, WB6IMC, WA7TZY, I5CTE, DK3BU, WA7BBM, K1FO, K2UYH, OE5JFL then lost 220V power. new rig YL1050 pa. tnx fer info

K3HZO reports: I was unable to complete any of the skeds assigned for February. Feedback from several of the sked stations, however, indicated K3HZO was heard without difficulty. Worked K0RZ random. Between now and March, I will be changing the receive side of the system here to include a post amplifier after the pre amp to overcome receive side losses which should help. It will not be difficult, just need to have the wx to cooperate. We did hear W7GBI, DK3WG, DL4KG, G4FUF, G4ERG to varying degrees at sked times, but not sufficiently well enough to work them. Did not copy JJ1NNJ, however, and E-mail from him indicates he copied me. K7XD was not heard, and DL4MEA cancelled the sked. See no problem being QRV with the better receive capability for March. tnx fer info Harry

1296 MHz

CT1DMK wrd since last report, 99% random: F5PAU, LA8LF, S59DCD, F6CGJ, HB9SV, EA3UM, K2DH, OE9ERC, VE1ALQ, OE5JFL, F6KSX, EA6ADW #, W4OP, OK1KIR, K5JL, W2UHI, G3LTF, OE9XXI, F2TU, ZS6AXT #, F5AQC, OH2AXH, GW3XYW, K2UYH, OZ4MM, K4QI, HB9BBD #, OK1DFC, SM4DHN, N6BQ, F5PL, W4RDI, DL0SHF #, 4X6UJ, OE9ERC, W2UHI, LA8LF, DJ9YW, K5JL, W2UHI, K4QI, K4QI(ssb), OK1KIR, S59DCD, KB2AH, VE1ALQ, OZ4MM #, WA8WZG, LA8LF, W2UHI, S59DCD, W2UHI, KB2AH, KB2AH(ssb), K5JL, OE9ERC, W2UHI #, ON5RR. At the ssb contest wkd: OH2AXH(ssb), OZ4MM(ssb), OE9XXI(ssb), K2DH(ssb/cw), K2UYH(ssb/cw), K2UYH(ssb). HB9SV, HB9SV(ssb), W2UHI #, W0KJY. Condx: 5.6m dish and 500W Gi7b FHX14(0.35dB). Photos of my 23cm amp also at http://spmgs1.cfn.ist.utl.pt/~cupido 73 de CT1DMK (Luis Cupido)

F5AQC wkd: 15/16.10.97 (ARRL) VE1ALQ, F5PAU, OE9XXI, EA6ADW, W7GBI, K5JL, F6CGJ, W4OP, G3LTF, F2TU, W4RDI, WA4OFS, LA8LF, EA3UM, NU7Z, K2DH, OE5JFL, OE9ERC, NL7F, W2UHI, OZ4MM, OH2AXH, SM4DHN, HB9SV, DD0SB, PA3CSG, HB9BBD, I6QGA, JL1ZCG, OK1DFC, ON5RR, DC6UW, JH3EAO, JH5LUZ, DD1XF, OK1KIR, JA6CZD, 4X6UJ, S59DCD, ZS6AXT, PA0JCA, GW3XYW, CT1DMK, K4QI, G3LQR, F5PL fer 30x46. new rig TH347 pa and on 2300 TH363+2xTH326 (200w) new. tnx fer info

RW3BP at his 10GHz Dish

OK1DFC wkd: 50 contacts in ARRL 1997 only on 23cm. He has to big qrm on 432. He wkd: 18.10.97 ZS6AXT, G3LTF, EA6ADW, HB9SV, OH2AXH, F6KSX, KB2AH, SM4DHN, S59DCD, F5PAU, K2DH, SM3AKW, F6CGJ, OE9XXI, EA3UM, WB5LUA, W4RDI, K5JL, WD5AGO, W2UHI, W4OP, HB9BBD, JH5LUZ, 15.11. JL1ZCG, OK1KIR, LA8LF, I6QGA, OE5JFL, 4X6UJ, ON5RR, OE9ERC, OZ4MM, DC6UW, PA3CSG, DD1XF, DJ9YW, F5AQC, GW3XYW, 16.11. VE1ALQ, PA0JCA, F5PL, K4QI, K2UYH, G3LQR, N6BQ, CT1DMK, F2TU NU7Z, SM2CEW. rig: TS790E + 2x2C39BA about 170w, 10m dish, 9bv preamp. In the future he plans to be qrv from JO60tp on 1296 with 3.8m dish and TH338.

VK2ALU's portable 10GHz 3.7m dish

Zdenek will attend the conference in Paris. mny tnx fer info Zdenek

10368 MHz

RW3BP reports: that he completed his first EME QSO at 20.09.97 on 10GHz with WB5LUA (M/M) followed by WA7CJO (O/O) #2. 18.10.97 DJ7FJ (O/M) #3 and AA5C (M/M) #4. 19.10.97 WA7CJO (O/O), G3WDG (M/M) #5 and G4KCG (M/M) #6. Station consists of 1.65 m offset dish, wall mounted on the 16th floor of an apartment building - this limits his Az to a window from 207 deg to moonset. Receiver is based on a SAT TV LNB. The 1st stage is a NE32584C with WG input with some correction of the strip line filters. The DRO synchronized by injection of external 10.000000 GHz reference from an LO. The 1st IF is 368.000 MHz. If conditions are good I get 1 dB of Moon noise. The TX is a 30 w TWTA. Separate TX and RX feedhorns are used. The TX feed is optimized for max gain, The RX feed is optimized for best noise temp. They are mechanically switched in position between TX and RX. The switching time is abt 1 sec. The Rx feed move with LNB. TX feed is connected to the TWTA by 0.5 m flexible waveguide, so it can move also. Thanks to Vladimir RA3ACE for great technical assistance, to Charlie G3WDG for first receiving tests in June. 73, Sergei RW3BP (KO85ws).

Last

deadline every first of Nov./Feb./May/August

DUBUS REF contest 432, 2300&up 7/8 March!!! 144&1296 4/5 April!!!!!

Booking for **Paris!!!!**

DUBUS mailbox is closed due to low activity.

73 Bernd DL7APV

OK1DFC 10m dish

Tropo News

Editor: Joachim Kraft, DL8HCZ

2m > 700 km

DD0VF JO61VA wkd >700km: 5.9.97 IK4PLU JN64 778km, 17.9.,05.10.,08.10.97 I4XCC JN63 800km Rig: 100W+HB9CV!

DD0VF JO61VC (2nd QTH) wkd >700km: 18.9.97 I4XCC JN63 810km, G0KPW JO02 875km. 21.9.97 OY9JD IP62 1736km!! 23.9.97 G7RAU IO90 1056km, F1MUG+UGY JO10 784km, G3JHM IO91 1034km, hrd FX2VHF/B JO10 559 801km. 25.9.97 LA0BY/P JO59 1006km, 27.9.97 G0KPW JO02 875km. 7.10.97 SK6NP JO67 758km, SM5BUZ JO78 852km. 4.11.97 OZ9IT JO46 731km, OZ9AEG JO57 735km. Rig: 13el 3.6wl+100W

DD0VF/P JO71AD wkd >700km: 2.11.97 TM6P JN19 792km, F5PLC/P JN27 712km, IK4DCX JN64 800km, F5IQA JN36 764km, G4XBF/P JO00 954km, G4SWX JO02 885km. Rig: 8el 2wl+100W tnx for info Steffen

DG6PY, JO30JF, wkd: 3.2.98 OZ8ZS JO65 695, OZ5W JO55UL 670, OZ7UHF JO65ER 716, OZ7AGJ JO56DF 707, SK7CE JO65OT 754km. Rig: 75w + 4 x 17ele. tnx for info Hans-Peter

DH0GHU JN38VN wkd: 15.11.97 OK2ZZ JN89AO 612km. 16.11.97 OK1KLX JO80BJ 635km, OK1UBA/p JO80DB 638km, OK1FID/p JO80DI 646km. 2.12.97 OZ1LPR/A JO44WX 728km. 6.12.97 T7/IK5AMB JN63GW 635km, hrd DL0UB/B JO62KK 561km good condx but no activity... 7.12.97 G0KPW JO02OD 614km, G4MRS JO02PB 603km, G4PIQ JO01MU 604km. 12.12.97 4U1ITU JN36BF. 21.12.97 OK1UBA/p JO80EF 648km. 26.12.97 mni OK JO70, 80, JN79. 28.12.97 F6FMB JN24EL 523km. 1.1.98 IK4DCX JN64GA 623km, DK1KR JO53HW 630km. 4.1.98 S53VV JN65UM 561km, IW5DAQ/5 JN53SR 610km, I4XCC JN63GV 634km. 8.1.98 DL8UD JO44SK 665km, hrd OZ1SDB/p JO44XX. Poor tropo season in jn38 except some small openings during september/ october... Rig : 150W, 11el. DL6WU tnx for info Ulrich

DL1EJA, JO31DS, wkd >700km: 2.12.97 1828-2009 OZ6ABA JO57DJ, OZ4EDR JO75JF, SK7OL/6 JO66LJ. 7.12.97 1015 GD4IOM IO74QD. 6.1.98 OZ4EDR JO75JF, OZ6ABA JO57DJ. 11.1.98 1536-1927 I4YNO 529/319 JN54OK, IK4DCX 51/51 JN64GA, I4XCC 319/519 JN63GV. 12.1.98 1016 F1ABW 52/58 IN97MQ. Rig: IC720A+LT2S, GU74B (750W), MGF1302 (NF=0,3dB), 24ele M2 (8,0WL). tnx for info Oliver

DL8EBW DL66a/JO31NF, wkd: 5.10.97 hrd: 1113 FX3THF IN88 (803), 1710 DH8BQA/p JO73 (531), **1./2.11.97 wkd /p from JO30GU >700km:** (MMContest): 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 310 QSOs in MMC/81 of them >500k! 18.11.97 ufb condx hrd on 3mtr.: 1951 MDR LIFE/Brocken (D3C2) 91,5MHz, 2004 Radio Brocken (D3D8) 91,0MHz 2015 NDR 2 (D382) 92,1MHz, 2021 MDR S-AN (D4D1) 94,6MHz. tnx for info Guy

F6HTJ, JN12KQ, wkd: 21.6.97 IW8QOT/p JM89CA 1192km, IZ8AZZ/p JM89CH 1172km. 9.8.97 I8TUS IM89AJ 1162km.

F6HTJ/p JN12EK, wkd: 3.8.97 IT9JOF/IH9 JM56XT 1031km. (Rig: 80W, 9 Ele). tnx for info Michel

I4XCC, JN63GV, wkd 1997: 1.2. 1840 LX2DX JN29WO 813km. 11.5. 1144 DL0DAU JO30JF 828. 7.6. 1757 PE1OGF JO21QJ 992. 15.6. 1717-28 DD0VF JO61VA 798, DG1EHB JO61SL 846, DL1HTT JO61FR 871. 20.6. 1720 DL5YET JO41EV 942. 22.6. 1113-46 HA0KLL KN17DX 881, HA0GK KN18AA 867, YO2BBT/P KN05WG 756, YO2II KN06PE 734, 1810 LX1DB JN39CO 797. 26.6. 1625 DG5DWL JO71IC 818. 29.6. 1028 SP6GVU JO81LC 867. 03.7. 1925 SP2SGZ/PJO83VA 1086! 06.7. 0605 DK5DQ/P JO31PG 910, 0932 DL8CMM/P JO52VM 961. 12.7. 1035 SP2FAX JO83VA 1086. 13.7. 0850 PE1OGF JO21QJ 992. 14.7. 1050 DL1KDA JO30FQ 884. 20.7. 1208 DL9AN JO62SN 967. 27.7. 0927 DK3WG JO72GI 952, 1315 PA2CHR JO22XA 1028. 31.7. 1523 DL0BDP JO71ET 891, 1524 DG6INK/P JO71ET 891, 1558 SP9SNK JO90FB 820. 12.8. 1803 YU6A JN91PV 594. 3.9. 1055 DJ3VI JO51BS 894, 1431 DL2VML JO61UL 848. 6.9. 1120-1550 YO3GLJ/P KN16JS 864, SV1WE/8 KM08HQ 890, YU1HFG/6 JN91PV 594. 7.9. 1112 DL0KM JO31BC 935. 18.9. 1409-1523 SP2FAX JO83VA 1086 559!, DL9USM JO72CE 930. 21.9. 1350-1415 DC6AZ JO31NH 919, PA0PVW JO22VA 1034!, 28.9. 1558 DL2HXE JO61BH 825.

I4YNO wkd from Monte Capra, JN54OK: 12.10.97 YU1IO KN041Q (worked from my home QTH in JN54KP 777 Km) 18.10.97 DL1HTT JO61FR 817 Km. LX2DX JN29WO DL9YEY JO41GV 1.11.97 OM7F/p JN98TM 788 Km. OK2KIS/p JN99JQ 819 Km. TM6P JN19PG 807 Km. (it wouldn't be a bad idea to find time for QSLing every now and then...) DF0CI JO51CH 769 Km. DF2ZC JO30MK 730 Km. DL8EBW/p JO30GU 795 Km. DL9YEY JO41GV 853 Km. DL2LSM J061HH 772 Km. PE1OGF JO21QJ 887 Km. DL8CMM/p JO52VM 900 Km. SP9EWU JO90NH 884 Km. HA8MV/p KN06HT 778 Km. HA0MK KN08TA 894 Km. DL0KM JO31BC 833 Km. DL2OM JO30SN 735 Km. PA3BAS JO21OJ 893 Km. Our group is always very interested in long distance tropo sked on 144 and 432 Mhz from our hilltop QTH on Monte Capra. Look for I4JED's callsign on packet radio most weekends (especially on the "Converse"). You can also reach me via my home BBS: I4YNO@I4EUM or via Email: alex.della@iol.it 73 de Alex, I4YNO tnx for info Alex

IK1PAG, JN35, wkd: 4.5.97 DL2GTA JO52 837, 9A1EZA JN86HF 719, 9A5Y JN85OO 760. 14.5.97 IC8FAX JN70CN 739. 18.5.97 9A2KK/P JN85OV 761, HG1DRD JN86KU 750. 25.5.97 IT9IEF JM68SB 924, IT9OPF +AAI + AUP JM67LX 907. 27.5.97 9A1CAL JN86EL 704. 7.6.97 OK2BX/P JN89AO 816, OK1DCF JN80BJ 874, OK1VDJ/P JN79US 808, OK1UOZ JN79US 808. 8.6.97 9A1CMS JN86EL 704, 9A90CBI JN85OO 760. 9.6.97 IT9TVF JM68OD 901, IT9IPO/P JM78SG 1005, IT9DMT 901. 14.6.97 IT9NDW JM68OD 901, IW9CER JM78OF 1000. 22.6.97 HG1Z JN86KU 750. 6.7.97 OL7M JO80FG 884. 14.7.97 I8MPO JN70FP 748. 23.7.97 IT9IEF JM68SB 924. 3.8.97 IW9EKK/9 JM68OA 913, 9A2AE JN86HF 719, 9A4VM JN85FS 702, IT9JOF/IH9 JM56XT 988, 9A3B/P JN83MI 782. 4.8.97 9A2VR/P JN83MI 782. 9.8.97 IW8OOT JM88DR 1010. 10.8.97 IT9SGO JM68GA 886. Rig: 2 x 17 ele + 3CX800. I am looking for Tropo-Skeds with JN08, JN09 and JN84. Phone: ++39 11 4152825 tnx for info Roberto

70cm>500km

DG6GP, JN48MF, wkd >500km: 31.8.97 DG5HQ JO43WP 604km. 10.9.97 G6YAY IO80EL 949km. 17.9.97 G0FIG IO90UU 732km. 21.9.97 F6ETI/p IN87KW 902, F6APE IN97QI 727, F1JGP Jn17CX 502. 4.10.97 G3GHN/P JO00HU 672, G4LIP/P JO01OD 699, F6HPP/P JN19DG 507, G0FIG IO90UU 792. 5.10.97 OZ5BAL/P JO55KR 842, G3CKR/P IO93AD 946, G8OHM/P IO92GB 859, G4YPC/P JO00EW 692. tnx for info

DG7SFL, JN49, wkd >500km: 12.1.97 F6DKW JN18CS 567. 14.1.97 DG3LAV

JO44NM 591. 1./2.3.97 PE0MAR/P JO21BX 513, PI4GN JO33KK 515, PI4KGL JO22GE 504, I4JED/P JN54OK 541. 1.5.97 I4JED/P JN54OK 541, DG3LAV JO44NM 591. 3./4.5.97 PI4GN JO33KK 515, PE0MAR/P JO21BX 513, PI4KGL JO22GE 504, SP6MLK/P JO80JG 504, DG3LAV JO44NM 591, PA3FPS JO22IJ 510, PI4ZLD JO11WM 501, G4LIP/P JO01QD 647. 8.6.97 I4JED/P JN54OK 541. 22.6.97 IW4BET/P JN54OK 541. 5./6.7.97 PE0MAR/P JO21BX 513, PI4GN JO33KK 515, G4LIP/P JO01QD 647, G5LK/P JO01OC 657, I4JED/P JN54OK 541. 17.9.97 G0FIG IO90UU 753. 5./6.10.97 PA6NL JO21BX 513, G4LIP/P JO01QD 647, G3GHN/P JO00HU 690, PI4GN JO33KK 515. 14.10.97 DG3LAV JO44NM 591, PI4KGL JO22GE 504. Rig: TS-850S, Homebrew XVTR, PA 75W, MGF 1302 Preamp DJ9BV, 2x21El. Tonna, 374m asl. tnx for info Michael

F6HTJ/p, JN12EK, wkd: 27.7.97 F5HRY Jn18EQ 695km, F5ZO JN08XL 673km. 3.8.97 F6DBB IN96NS 546, F1CIA JN08BA 645, F1NW/P IN97HV 674, F1BOC IN97DG 626, F6ETZ IN97DF 622, F6DKW JN18CS 704. 5.10.97 OT7D J030AM 941km. Rig: 50W + 21ele. tnx for info Michel

SP6MLK/p, JO80JG, 1150m asl, wkd: 3.5.97 I4JED/4 JN54 771km, DL0UL/P JN48 543, IK4GNG/4 JN64 764, DF4UE JN48 555, DG7SFL JN49 591. 6.6.97 SP2FAX JO83 (new Loc.) 7.6.97 S59DGO JN75 546, I4JED/4 JN54 771. 8.6.97 IV3DVB JN65 588. 6.7.97 S57C JN85 534, I4JED/4 JN54 771, I4LCK/4 JN54 796. 3.8.97 LY2WR KO24 750, DF4UE JN48 555, DL2AM JN57 548. 21.9.97 F1EJK JN37 771, HB9AMH/P JN37 780, OE8TPK JN66 562, PA2CHR JO22 778. DJ9DL JO31 686, DF9QX JO42 604, DL8OBU JO42 527, I4JED/4 JN54 771. 22.9.97 OZ1ANA JO55 720, DK5KK JO63 510, SM6MUY JO67 875, SM7JVQ JO65 636, OZ2OE JO45 779, SM7FMX JO65 643, SM7BOU JO66 715, SM6VQW JO67 807, SK7BT JO65 643, SM7TUG JO65 643, DL8AKI/P, SM7UHF JO65 609, SM6HCO JO67 892, OZ1IEP JO65 674, SM6FHZ JO57 851, LA5KO JO59 1081. 4.10.97 I4LCK/4 JN54 796, DL6AM/P JO42 562, DL4MEA JN58 502, S53DKR JN66 499. 5.10.97 HB9DGX/P JN47 639, DK0BN JN39 641, S50D JN75 503, S75C JN65 568. tnx for info Stán

6m News

Editor: Joachim Kraft, DL8HCZ

I4XCC, JN63GV, wkd 6m 1997: 18.5. LY2BAW KO25KA, LY1DQ KO25RF. 4.6. EW8DD KO42QA, OJ0/DL5IO JP90NH, OH0LIZ KO09KW. 8.6. SM4HEJ JO69OJ. 14.6. SV9/DL8SET KM15VX, 5B4/DF2UU KM64. 30.6. SV8DTL KM39GB. 3.7. LZ3BS KN23DA. 4.7. UR4LL KO70. 6.7. YM7PA KN91QC. 10.7. LA4GHA JP32KT. 13.7. M/PE1PZS/P IN69UW, OJ0/OH1VR, EH4EHI IM68TV. 17.7. LY2BI KO14QN. 19.7. SV8/I4WCK KM08II. 12.8. GM1ZJP/P IO89QC, GM4ODA/P IO89QC. 16.11. SP2MKO JO93CB, SQ2CDC JO94MA, SP2BNJ JO94GJ, SP3EPX JO83ID. tnx for info Claudio

TEP in ITALY: 3C5I February 15th 1998: Good opening to 3C5I (Loc. JJ43JR) starting from 13z. 3C5I make contacts with: I0JX, IK0FTA, IK0BAL, IK0VAQ, IW0BET, I0CEP, IK0SME, IT9RZR, I0AMU and many others. Qsl via Alan Isaachsen, P.O.Box 139082, DALLAS, TEXAS (U.S.A.) Also heard in Italy were TR8CA and the beacon 9G1AA.

The signal of 3C5I recorded by I0JX and the signal of the beacon 9G1AA (by IK0FTA) can be found on the Six Italy Infonews on web page: http://www.geocities.com/SiliconValley/Pines/3217/infonews.htm

1.11.97 TEP from Italy (I0): 14-15z V51VHF, TR8CA, TR8XX, ZS5PJS.

1.11.97 14-15 TEP from 9H5EE: ZS6AXT KG33, 1848 7Q7RM 2025 ZD8VHF

3.11.97 14-16 TEP from Italy: ZS6AXT, ZR6VE, ZS6PJS, ZS6XJ, ZS6WB, ZS6BML, V51KC.

3.11.97 14z TEP from SV5BYR KM46: V51VHF, ZS6XJ, V51KC.

7.11.97 1230-1830z TEP from Italy: ZS6JON, ZS6AWK, ZS2SIX-B, V51VHF

23.11.97 PY5CC GG54 wkd F2: 7S6CCU PL36, Okinawa Isl.

27.11.97 PY5CC wkd TEP: W1, W2, W3...

6m in Ger many

All old 6m special licences are still valid. Other information that there are no more licences since 1.1.98 is WRONG! From May 1st 1998 all licence classes (Class 1 and 2) will have access to the 6m-band in Germany on a non interference basis.

Libya

The UKSMG is planning a 6m-expdetion to the clubstation 5A1A during this summer.

Aurora

Editor: Norbert Göttsche, DL8LAQ

DL6BF (JO32QD) wkd on 144 MHz:

1998-02-17

2336 GM4AFF	IO86ST	56A	57A	350°

1998-02-18

0010 ES2RJ	KO29JM	57A	57A	0°
0016 YL3AG	KO26AW	57A	57A	0°

Hrd: SK4MPI on new QRG 144.412 57A 0°
Hrd: LA5KO JO59, ES1AJ KO29, LA3BO JO59, SM5BSZ. Not many stns qrv... Thanks for info, Heinz.

DL8EBW (JO31NF) wkd on 144 MHz:

1997-08-03

1715 GM4YXI	IO87WI	55A	hrd	355°

1997-10-01

1612 GM0NAI	IO75RU	57A	57A	30°
1613 SM7BOU	JO66	55A	hrd	30°
1616 DL9MS	JO54WC	55A	55A	40°
1618 PA3FJY	JO32	55A	hrd	45°
1620 GM0CLN	IO85	52A	hrd	10°

1997-11-23

0111 GM4AFF	IO76	55A	55A	30°
0114 GM4CXM	IO75	55A	53A	40°
0127 SM5BSZ	JO89	55A	55A	355°
0135 GM4YXI	IO87	58A	56A	20°
0202 OZ6OL	JO65	53A	53A	330°

0050-0215 heard also GI3PDN, SM6TFA and SM4VQP (in SSB)

1332 GM4YXI	IO87	52A	hrd	20°

1997-12-30

1710 SM5BSZ	JO89	55A	hrd	0°

Thanks for your report, Guido.

PA3FJY writes:

After getting in several interesting spots on 50 MHz from USA (ES/TEP) and also several reports abt good HF-condx, now finally we got the aurora... Opening started here already around 16UTC, but I was QRV a bit later. Between 1650 and 1850 (that time SM5BSZ dissappeared into te noise...).

I could work on the 30th of December 1997 following stations:

SM6EQO JO57, LA3BO JO59, DF8LC JO53, LA3PK JO59, SM5EFP JO79, DL9MS JO54, SM7TKR JO77, SM5BSZ JO89 the strongest one (as so often, hihi) with 59+20dB! SM4HFI JP70, LA5PBA JO59, SM0EJY JO89, SK5CG JP80, OZ3GW JO56, SM6OPX JO58RG (he still can't transmit his own locator right, hi) and GM0GMD IO86.

Around 18 UTC I was sure that somebody called me (144.032) but it was just too weak to copy. I heard LA6TFA, LA8AJA and SM6RTM. Nice to hear several new stations from LA and SM. 73, Dick.

SM4SJY (JP70OC) wkd on 144 MHz:

1997-11-22

DL4UU	JO62DP	52A	52A
DJ9YE	JO43SJ	54A	58A
DJ8LU	JO44SJ	53A	55A
PA3CEE	JO33JI	52A	55A

1997-11-23

DJ4TC	JO63PN	52A	54A
RU1AA	KP40XD	55A	55A
SP3SUX	JO72OR	52A	54A

1997-12-30

DL9MS	JO54WC	55A	58A
DL4AO	JO42NX	52A	55A

Equipment: FT726R, 7 el Yagi, preamp BF981, PA 50W (all homemade). Thanks for your report.

Meteor Scatter

Editor: Norbert Göttsche, DL8LAQ

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

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

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

73, Norbert

4U1ITU-MS-REPORT

We arrived Geneve in the afternoon of 11th of December. After we talk with the 4U1ITU-stationmanager OM1AM about a lot of details, I started to set up the antennas in heavy rain. At the same time Wolfgang, DF8AA, set up the station. All antennas above 30 MHz (except the packet antenna) are not in order there, so we put our own antennas.

We have testet all the rig in advance at home, except the HLV600 PA (we got the PA in Basel) - so Murphy was on our side...The PTT-circuit was broken. The PA was not our own, so I didn't try to repair.

The noiselevel was very high especial in east, nortwest and southwest direction, by hundret of computers at the ITU-building, but also by the office-towers near the ITU. A few hours we had less QRM around S1-S2 but allmost S3 and sometimes up to S5-S9.

We never want to win the BCC-Test, so we take skeds also. (If you want to win this test you have to go 1000...1500km away from the main MS-activity only, in a rare square with good take off and no qrm, like RU1A). The take off was very limited, as we knew before, only the 45-deg-direction (along the lake of Geneve) was good.

Well, it seems to be not so a good idea, to be QRV at 4U1ITU in the BCC-test. (Some rare stations are QRV too, a lot stations trying her luck with skeds or hunting for points only - so in June might be the result 200% of our). But in my opinion the Geminids-shower is a nice shower for CW-operation.

Sorry to all stations, wich calling us, but got no complete QSO. On the other hand we called more than 9 hours CQ without any response, so 4U1ITU seems not more so a wanted DXCC?

Allmost we worked the QSO via side- or backscatter, which need of course much better reflections than via (more than) 1000 km forwardscatter. Also the distance was allmost far below 1000km. So we found the maximum on 14.12., between 01 and 08 UTC. (also a sharp maximum on 13.12. 00:45-01:15). At this point thanks to Joop, PA0JMV, who was monitoring our sked frequency and reportet the burst via side or backscatter a long time.

Anyway, it was a pleasure to give more than 50 stations a new DXCC, wich was our first reason to be activ there.

The ODX was EU6MS with 1879 km and we are very happy about this QSO. Just during this time we had less QRM fortunatly and we completed the QSO after half an hour, the close to 3000-lpm-speed of EU6MS sounded very nice.

On 6m we took a handful skeds (all complete of course). In the maximum I was working 2-m-random and DF8AA tried 6m. Six sounded like Es as usual, but nobody was QRV, except the less number of OM, wich we were able to work - so Wolfgang was really disappointet...

QSL: usually to 4U1ITU, but you can send via DF8AA also for sure (only for our activity!). If you want to send direct: DF8AA, Wolfgang Boehmer, Waldstr. 4, D-01796 Pirna.

2-m-random-station: IC275H (100W), 25m Aircom+, 8el on 4m boom (11.5 dBd), preamp by Landwehr, DTR , OH5IY V5.0. The 3CX800 was used with 600W during the maximum.^

2-m-sked-station: IC275H, 3CX800 (600W), 25m Aircom+, 9el F9FT, SP2-preamp, DTR, ETM9c-keyer.
6-m-station: IC706, 32m Aircom+, 4el 2.8m boom (7.2dBd)

All antennas were mounted at 2.5m over the roof, with 15° fixed elevation (not so good for tropo, but for ms good enough). We used short antennas because of the low distances.

I made the 2m 8el and the 6m 4el antenna after calculating with the famouse software "YA" by K6STI. (especially the 8el was calculated with thicker elements, to solve possible ice-problems).

Now the 2m MS-log as follow (I hope without type-error):

Random:

4U1ITU (JN36BF) wkd random on 144 MHz:

1997-12-12								
0040	0100	S54AA	27	26	5	7	3	c sc
0105	0200	DL1EAP	27	26	4	5	3	nc sc*1
0530	0615	SP4MPB	26	27	8	11	2	c
0705	0730	YU7MS	26	27	4	6	2	c
1805	1845	DH0LS	26	26	4	8	2	c
1955	2030	DL1DUR	27	27	4	16	4	c
1997-12-13								
0210	0305	PA3FOC	27	36	5	9	1	c sc
0310	0345	IK3VZO	27	27	4	m	3	c bc
0350	0405	PE1LCH	36	27	3	6	15	c sc
0505	0515	DL5ME	27	26	7	m	7	c
0625	0655	EA3DXU	27		2	3	2	nc bc*2
1997-12-14								
0000	0055	9A4EW	27	27	9	2	5	c
0137	0145	F6DRO	28	27	4		1	c bc
0145	0200	S51AT	28	27	5		2	c s/bc
0200	0213	S57EA	38	27	2		5	c s/bc
0213	0218	EA3DXU	38	27	3		5	c bc
0227	0237	IK0BZY	26	28	3		3	c bc
0240	0320	OE6IWG	26	27	1		2	nc sc *1
0322	0328	DL8CMM	38	26	4		7	c
0330	0349	DL9AN	27	27	2		5	c
0350	0355	PE1OGF	27	27	2		5	c sc
0432	0442	PA3BZL	39	28	4		5	c sc
0446	0450	PA3EFC	28	27	2		1	c sc
0452	0458	DF0WD	38	36	4		7	c sc
0520	0538	DL3YEL	27	27	5	12	2	c sc
0555	0615	ON4AVJ	26	38	4		2	nc sc *3
0632	0703	S53VV	37	27	4		5	c sc/bc
0705	0725	PE1LWT	26	37	2		2	nc sc *1
0740	0748	LA2AB	39	27	3		7	c sc
0800	0833	PA2TAB	26	28	6		2	c sc
0835	0900	SM0KAK/0	26	37	2		1	nc

Skeds:

4U1ITU (JN36BF) wkd on 144 Mhz:

1997-11-12								
2100	2155	DL8LAQ						nil *4
2155	2305	DL3YEL	27	26	7	5	1	nc *5
2310	0000	DJ9YE	27	26	7	9	2	nc *6
1997-12-12								
0000	0112	SP9LCV	37	26	3	3	7	nc *7
0115	0150	SP9MRT,SP9TCE,SP9EWO - they want to cancel their skeds						
0150	0230	SP4MPB						nil
0300	0327	HA7UL	26	27	3	2	2	c
0330	0452	HA5CRX	26	27	3	5	0.2	nc
0455	0500	HA7PL	sri,time not enough					
0457	0523	DK5KK	28	26	10	7	1	c
0542	0555	DL9MS	28	26	7	5	1	c *8
0652	0710	DL1UU	27	27	12		1	c
0715	0755	IC8FAX	37	27	7	2	12	c
0800	0900	DH0LS	26		1	4	0.2	nc sc*9
1800	1835	DK9OY	27	26	17	8	1	c
1845	1908	DL4DTU	26	38	3	1	2	c
1915	1955	DL3DTS	26		1	1	0.5	nc
2000	2040	I8TWK	28	26	4	4	2	c *10
2100	2147	9A4FW	26	26	8	5	3	c *11
2150	2200	9A4EW	sri time not enough					
2200	2218	EA2LU	27	27	4	2	3	c qrm
2218	2242	EA2AGZ	27	27	10	4	2	c qrm
2245	2255	EA3DXU						nil
2255	2240	PA0JMV	26	27	2		5	c s/bc*12
1997-12-13								
0000	0055	OE6IWG	26	-	1		0,2	nc qrm
0055	0147	DL8EBW	27	26	11	5	2	c sc45'
0150	0158	DH3YAK	27	27	5		5	c "
0215	0317	DK5DQ	38	27	7	13	5	c "
0322	0340	DL1EAP	27	37	16	1	2	c "
0345	0420	DL1KDA	27	27	9	14	3	c "
0600	0607	DL5DTA	38	26	3	1	5	c ufb
0700	0750	DL2ARD	38	59	!8	3	9	c
0755	0815	DL2DXA	27	37	4	14	2	c
0815	0915	DL3DTS	27	26	4	8	0.5	c
1700	1745	9A1CCY	27	27	11	5	2	c qrm
1745	1800	YU7ON						nil
1800	1900	PA2CHR	26	26	4	8	0.5	c sc35'
1900	1940	YU7EW	28	27	11	9	5	c qrm
1940	1955	9A3PA			5		10	*13
2000	2100	IK0BZY	27	27	7	3	0.5	nc *14
2100	2153	LA0BY	26	26	9	3	1	c *15
2200	2217	LA2AB						nil

2300	2333	EU6MS		27	27	3	2	1c	*16
1997-12-14									
0000	0030	UT8AL						nil	*17
0100	0125	YO3JW						nil	
0400	0410	G4YTL		38	27	5		5c	

Remarks: *1 No final RRR heard; *2 (5 periods nil); *3 He txd 4UNITU; *4 He cfmd not his sked (Sri, I have to check daily the BBS, not weekly :-(.ed); *5 Uli got not our RRR; *6 We txd RRR 40 min, but his RX failed; *7 He got not our RRR; *8 1.2 khz to low; *9 QRM S5 (sidescatter, 35 offset); *10 1kHz to low and qrm; *11 Vy slow speed (appr. 700 lpm); *12 50 deg. offset; *13 We rcvd tuning-sigs only; *14 Sidescatter, 40 offset, QRM S3-9; *15 Other qso on same qrg YO? *16 1879km! We are vy happy; *17 2100 km, very sorry, Alex.

See you in Quadrantids (and from another rare area 1998 again, hi). Steffen, DD0VF - Wolfgang, DF8AA. Many thanks for your report, Steffen.

DL4MEA writes: Hello all, this is my MS report for the Quadrantides 1998. I did some skeds and hoped for some success. Over all, here is the list:

DL4MEA (JN58JD) wkd on 144 MHz:

1998-01-03									
0900	0930	SM3MXR	JP80GR	27	27	21	18	5c	
1000	1045	SM2EKM	KP05	27	26	4		1c	*1
1300	1340	OH8HDL	KP34WJ	27	27	13	4	1c	
1600	1630	OH8MFH	KP34UG					nil s	*3
1800	1900	SK6HD	JO68SD	26	27	10	7	1c	
2100	2200	Z32UC	KN11CR	26	26			1c?	

DL4MEA (JN58JD) wkd on 432 MHz:

1998-01-03									
1100	1230	LY2WR	KO24OQ	26	27	3	4	3c	*2
1400	1600	OH5IY	KP30HV					nil	

Remarks: *1 I had 2 burts of EKM during the first period. Then until min=35 nothing, then I started to seek for him on other QRG and found him 1kHz higher; *2 The longest burst contained "27R27R27DL4MEALY2WRR27R". It was loud and very clear. There are very less bursts on 144MHz that are comparable. Its my 3rd completed MS-QSO on 70cm up to now (others are SM3AKW and IK0BZY); *3 OH8MFH reported that he received some fine bursts from me, but i didn't for 30min, so I stopped.

Equipment: Uher tape modfied speed 16:1, AF upconverter MC1496, OH5IY keyer. 144MHz: IC251, TX MRF141G+GS35b, RX MGF1302, ANT 2*15ele BV-OPT 4WL. 432MHz: IC475, TX 2*4CX250, RX MGF1302+MAR-6, ANT 6*33ele BV-OPT70.

I am very satisified, since I found the maximum within one of my 70cm skeds. Any other skeds, especially for 432MHz, are welcome. AX.25 : dl4mea@db0zka.#bay.deu.eu - eMail: dl4mea@amsat.org - Homepage: www.scn.de/~koellner. 73, Guenter, DL4MEA. Thanks for your report, Guenter.

DL8EBW (JO31NF) wkd on 144 MHz:

1997-10-02									
0400	0500	OH5LZY	KP41KL	26	27	4	5	0.5nc	
1997-10-09									
0100	0155	F/DJ3MY/p	IN95		27	26	7	12	0.5c
1997-10-18									
2237	2301	ES2RJ	KO29		27	27	6	7	0.5c
2300	2400	OH4EA	KP32MG	27	2	6	2	1nc	
1997-10-19									
0000	0101	YU7ON	KN04AX	26	26	7	17	2.5c	
1997-10-20									
2300	2330	OH4EA	KP32MG	26	27	4	6	1.5c	
1997-10-21									
0000	0100	OH5LZY	KP41KL	26		2	9	0.5nc	
1997-10-15									
2300	2400	OH0JFB	JP90XI	27		18	32	3nc	*2
1997-10-16									
0400	0500	OH5LZY	KP41KL	26		2	3	1.5nc	
0500	0532	YU1S	JN94US	27	26	7	12	1c	
1997-11-17									
0000	0040	EI2CA/p	IO61CW	26	26	3	3	25c	*4
0300	0400	OH8MSM	KP44FC	26		3	6	1nc	*7
0500	0600	TA1ZK/2	KN40PT	26		3	2	40nc	*9
1997-11-18									
0400	0436	LY2SA/P	KO14LL	48	37	9	22	22c	
1997-12-12									
2340	2350	RU1A	KO48VR	28	27	9	m	3c	*3
1997-12-13									
0007	0026	9A5Y	JN85OO	27	26	9	m	3c	*3
0055	0146	4U1ITU	JN36BF	26	27	m	m	4c	*6
0155	0221	DL9MS	JO54WC	26	27	8	5	2c	*6
0250	0345	LY3GM	KO14LL	28		m	m	3nc	*3
1997-12-14									
0042	0055	RW2F	KO04FT	28	37	10	m	5c	*3
0200	0237	YZ7MON	JN95XA	26	26	9	3	2c	*4/5
0300	0330	TA1ZK/2	KN40PT	26		1	1	0.5nc	
0350	0410	I6BQI	JN72	28	38	m	m	10c	*3
0420	0435	HB9FAP	JN47GJ	27	27	5	5	3c	*3/6
0443	0456	9A1CAL	JN86EL	37	27	8	m	12c	*3/4
1997-12-15									
0200	0300	RK1B	KO69AK	26		4	6	0.8nc	
1997-12-22									
0330	0430	YO3JW	KN34CK	27	26	7	10	2nc	
0500	0540	OH5LZY	KP41KL	26		1	3	0.5nc	
1998-01-03									
1200	1225	RU1AS	KO49VV	26	26	7	4	21nc	
1300	1400	OH8MSM	KP44FC	26		3	7	1nc	*7
1600	1700	UA3MHJ/3	KO87OT				3	nc	*8
1998-01-06									
2045	2136	GW0KZG/mm	IN42		26	26	8	14	1.5c

Remarks: *1 Regular sked to Geir (1320 km), to test MS-condx (stopped right now, because of equipment problems at Geir); *2 There was some AURORA Backscatter Condx in the North at the time - this could be the problem at the OH0 side; *3 Random during BCC-Contest; *4 SSB Contact; *5 Ilja worked with 25 Watts into 2 x 11el; *6 QSO made via Side- or Backscatter; *7 1500lpm; *8 2053km.

Comments:

BCC-Contest

Again a very fine activity around the BCC-Contest. Thanks for The Bavarian-Contest-Club which invite year per year many people to join this MS-party. I did copy with bursts longer than 5 sec. in the time from 12.12. 22UT to 15.12. 02UT: 4U1ITU (Rndm-Stn), RW2F, UT8AL, EU6MS, RU1A, LY3GM, LY2FE, OF8UV, SP2OFW, YU7MS, EA3DXU, EA2LU, EA2LY and several others... vy nice also the backscatter from DJ5BV and DL1EJA on the 14.th around 02-05UT in the maximum! NIL-Skedresult: 20.10. YU7KB, 21.10. Z32UC, 18.11. OH5LZY 18.11./14.12./04.01. UT2HN (1993km), 18.11. UR5LX (2002km), 03.01. UA3PTW (2099km), RA3QTT (2301km), TA/HB9STY/0 (2000km).

Orionids '97

Did not meet any special big reflection from this shower during 3 days of operation (often checked 49,75Mc)

Leonids '97

It was not the predicted storm 98-pre-storm and also what I have caught it was not as good as last year! The maximum seemed to be around 6-10UT at 17.11. but this can be a fault due to that the Radiant gone thereafter down the horizont! From 16.11. In the morning there were some spectacul{r bursts on 49,75Mc (up to 5min!) but did not meet them on 144MHz (longest was 40-50sec.). In the night of the 18.11. there were still some big reflections (LY2SAp 22sec) but I believe most people was too tired. Saw again one Bolide (17.11. around 330UT) coming through the clouds. Lets hope for the big spectacle in next and overnext year!

Geminids '97

As written some lines before it was a great show over this geminids periode again. I believe this was happend because 2 facts came together - an rich maximum (which I have seen 14.12. 02-04UT) and the fact that most people could sleep next day because of the weekend periode. Again Geminids was was good for medium distances and of course for side- and backscatter tests (I believe inbetween mostly everybody recognized that our BCC participation in 94/95 have given a good sign in the right direction!). For long distances it was again disapointing me - In fact UT8AL or other cracks was not hrd as gd as last years - on the other hand I saw that IC8FAX and OF8UV hrd each other (over 2700km - must be possible double-hopp condition) So see you again in jannuary in the great quadrantids and ... dont miss that maximum, hi!

Quadrantids '98

Heard Random 5sec: OH5LK, OH1TX, SM4VQP, I1DMP, GW0KZG/MM. As predicted, the Shower was peaking in the early evening hours around 17-19UT. Did copy some good refelctions from far away (hrd first time UT2HN but not in my sked, hi !) Also some very good condx on 144,200MHz in SSB all over this time up to early morning of the 04.01. Around 01UT the Signals getting weaker and Bursts getting rare! Anyway a bad start into new season for me (0 QSOs!) but had some fine impression about a shower which was rich on Burst for low distance and also for doing Sidescatter (hrd DH3YAK with several big Bursts as he was beaming east - QRB only 60km and tropo signal was 519 - Burst up to 4 sec S5-7!) Lets have a break now and wait for the comming events!

Every sked for MS, also with stations worked before is very (!) welcome! Thanks for your report, Guido.

EA3TI (JN11DO) wkd on 144 MHz in SSB:

1997-01-03					
1000	1010	DK8ZJ	JO30IX	37	27 c s
1112		DK9OY	JO53CK	38	38 c s r
1116		ON1LGS		39	39 c s r
1117		PA3FJY		37	37 c s r
1142		DJ9YE	JO44HV	37	37 c s r
1210		DJ5RE	JN59WI	38	38 c s r
1218		DL8VJ		39	39 c s r
1232		G8XVJ	IO83RJ	39	39 c s r
1241		G6YIN	IO93FU	39	39 c s r
1310	1314	EB4FQP	IM68TV	37	37 c s r
1437		YU1VG	JN94US	37	27 c s r
1647		DL6EAT	JO43WN	39	39 c s r
1997-05-19					
1000	1100	DL8BDU	JO43AA	27	nc s
1997-06-18					
0400	0420	DL1KDA	JO30FQ	37	27 c s
1997-06-22					
0800	0830	DL7USD/p	JO72HN	27	nc s
0930	1020	DL4ABJ	JO42XP	27	27 nc s
1997-06-29					
1046		DL3IAE	JN49DE	59	59 c s r .300
1997-06-30					
0400	0439	PA3AKP	JO21EX	37	27 c s
0500	0530	HB9BQU	JN37UD		nil
1997-07-06					
0400	0445	DL9MS	JO54WE		nil
0500	0530	DL4ABJ	JO42XP	37	27 c s
1997-07-13					
0932		DL9AN		59	59 c s r .300
1997-07-20					
0658	0718	M/PA3FJY/p	IN79JX	27	27 c s
1997-07-26					
0600	0616	G4RKV	JO01OI	27	27 c s
0730	0816	M/PA3FJY/p	IO70ID	37	47 c s
1997-07-27					
0500	0546	G4AEP	IO91NJ	26	27 c s
0600	0630	DL8CMM	JO52WO	27	27 c s
1997-08-10					
0535		DL9YY		37	37 c s r
0606		F5TQF		59	59 c s r
0610		DL9YEY		37	27 nc s r
0630		DL9YEY		39	39 c s r
1021		S50C		39	59 c s r .300
1997-08-11					
1156		DL5YET		37	37 c s r
1156		DC9YC		37	37 c s r
1997-08-12					
0536		G8JUR		39	28 c s r
0612		GW8JLY		39	39 c s r
0613		G8XVJ		39	39+ c s r
0701		SP2OFW	JO93AC	39	27 c s r
0728		G4AEP	IO91NJ	39	37 c s r
0728		G7RAU		39	39 c s r
0737		GW4WPR		39	39 c s r
0852		9A2TU		39	39 c s r
1016		DG9NCX		39	39 c s r
2219		DL4ABJ		39	39 c s r
1997-08-13					
0408		SP2FAX		39	39 c s r
0732		SP2FAX		39	39 c s r
0742		9A2CAL		39	27 c s r
0749		DL1EAP		39	37 c s r
0749		DG5OAA		39	39 c s r
1997-11-16					
0834		YU1VG		39	39 c s r .300
0834		YU7EW		59	59 c s r .300
0834		HA8CE		59	59 c s r .300
1997-11-17					
0600	0640	SP4MPB	KO03GS	27	nc s
0753		G4HGI		39	49 nc s r
0753		G8XVJ		59	49 c s r
0800	0818	DH0GHU	JN38VN	39	37 c s
0841		G7RAU		39	39 c s r
0841		GM4CXM		37	37 c s r
0903		G4HGI		39	39 c s r
0904		PA0ZM		37	37 c s r
0904		PA0PVW		39	37 c s r

0923		GM2GMD		39	39	c	s	r
0924		G4ASR		39	38	c	s	r
0957		G8XVJ		39	39	c	s	r
0959		GW6VZW		37	57	nc	s	r
0959		G1HWY		39	39	c	s	r
1000	1030	DL2IAN				nil		
1102		PE1OO		39	37	c	s	r
1102		PA3BIY		39	39	c	s	r
1102		PE1OGF		39+	59	c	s	r
1102		PA2CER		39	39	c	s	r
1140		DD0VF		39	39	c	s	r
1215		G0KS		39	39	c	s	r
1215		G3IMV		39	39	c	s	r
1216		OZ6OL		37	37	c	s	r
1309		GW6VZW		39	39	c	s	r

1997-12-13

2000	2056	DL4MEA	JN58JD	29	27	c	s	

Equipment: TR751E, MGF1302, 3CX800A7, 2x17 ele EA3ADW. Skeds are welcome from stations with EME power and QRPP power. Address: EA3TI, Ramon, POBox 298, 08400 Granollers, Spain. Thanks for your report, Ramon.

I4YNO (JN54KP) wkd on 144 MHz:

1997-06-04

0400	0445	OJ0/DL3YEL	JP90	27	26	6	7	c	*1

1997-06-22

0520	0552	DJ3HW	JO42	26	27	mni		c	r
0700	0725	PA3FJY	JO32	27	49	mni		c	r
0725	0737	DL4ABJ	JO42	27	27	mni		c	r
0740	0800	DL1SUZ	JO53	26	-	3	5	nc	r

1997-07-01

0300	0323	EU6MS	KO45	27	38	5	14	c	

1997-07-17

0300	0337	LY2WR/p	KO35	26	38	mni		c	

1997-07-20

2200	2310	DJ1SHF	JO73	26	26	4	6	nc	

1997-07-23

0400	0515	DJ1SHF	JO73	26	26	3	6	c	

1997-07-25

0400	0430	ES2RJ/8	KO18					nil	
0530	0547	LA/DL2ARD	JO49	26	27	mni		c	

1997-07-29

0520	0550	LA/DL2ARD	JO39	27	29	mni		c	

1997-07-30

2242	2257	YL/DJ1OJ	KO27	3838		mni		c	
2347	0002	LA/DL2ARD	JO29	2627		mni		nc	

1997-08-01

0433	0447	LA/DL2ARD	JO29	27	28	mi		c	
2200	2223	SP4MPB	KO03	26	26	mni		c	

1997-11-16

2300	0000	IK7UXY	JN90	26	3	6		nc	

1997-11-17

0600	0645	EA7GTF	IM87	26		7	13	nc	

1997-12-13

0500	0542	IK7UXY	JN90	26	37	8	mni	c	
0600	0612	SP2OFW	JO82	27	27	mni		c?	r
0624	0642	DL8CMM	JO52	26	27	mni		c	r
1935	1950	OH0JFB	JP90	27	27	3	mni	nc	r

1997-12-14

0312	0330	PA3BIY	JO22	28	29	3	mni	nc	sc

QSY for businees to DL. From the QTH of DL5MAE I worked the following stations in BCC Contest:

1997-12-14

1924	1939	RW2F	KO04	27	27	mni		c	r
2000	2020	RU1A	KO48	27	27	mni	and loud	c	r
2040	2045	IC8FAX	JN70	27	27	mni		c	sc
2118	2125	SM3MXR	JP80	38	37	mni		c	r

At this point I had to QRT, because the three bottles of Grnbacher Weizen beer (produced by DL1MAJ) that the housowner offered me started to have questionable effects on my operating capabilities and I was laughing all the time.

When DL5MAE realized that he decided to drive me back to my hotel, anyway absolutely no hangover the following morning (congrats to DL1MAJ). Next year I promise I won't touch beer before and during the BCC contest" :-)

1998-01-03

0800	0900	EA7GTF	IM87	26	27	6	4	c	
1200	1230	OH3AWW	KP21					nil	
1330	1402	DL8UD	JO44	26	27	4	5	c	
1443	1456	RK2FWA	KO04	26	26			c	r *2
1900	1925	SP2FAX	JO83		-	6		nc	s

Heard on random: LY2SA and OH0JFB (very loud). Remarks: *1 DXCC #64! *2 DXCC #65 and square #375. These were the poorest Qadrantids to date, but happy to work a new one, RK2FWA. I'm interested to try MS on 70 cm during major showers, so let me have your proposals if you want to try, we have EME capability on this band. Thanks for your report, Alex.

I4XCC (JN63GV) wkd on 144 MHz:

1997-01-03

0947		ON1AEN	37	37	*
0950		G8XVJ	39	39	*
1008		DL9YEY	39	39	*
1010		LA2PHA	39	37	*
1015		F6CBH	39	39	*
1035		DG6JR/P	37	38	*
1041		DJ2QV	37	37	*
1055		DL9MS	39	39	*
1056		DJ9YE	39	37	*
1107		DL5YET	28	28	*
1112		OZ2ELA	38	37	*
1120		G4SWH	39	39	*
1125		GM4CXM	27	27	*
1206		ON7UC	28	28	*
1250	1310	SM3MXR	28	37	
1350	1415	SM1BSA	27	27	

1997-06-04

0300		OJ0/DL3YEL	JP90NH	27	27

1997-07-04

0500		DH8BQA	JO73CF	27	27

1997-07-08

0400		RW1AW	KP50EB	27	27	2161km

1997-07-16

1250		PA3BIY	JO22EB	27	26

1997-07-27

1251		SM7LCV		57	57

1997-07-28

0400		LA/DL2ARD	JO39XR	27	27
0500		DJ1SHF	JO73AM	27	26

1997-07-30

2100		LY2MW	KO24PQ	27	27

1997-07-31

0400		LA/DL2ARD	JO29OG	27	27
0430		ES2RJ/8	KO28KL	27	26
0500		DG1DCN	JO41BD	27	27

1997-08-04

0100		LA/DL2ARD	JP22NE	26	26

1997-08-07

1900		EW5M	KO22CA	27	26	10min
1997-08-08						
1020	1045	DL8BDU	JO43AA	27	26	
1643		PE1OGF	JO21QJ	27	27	*
1997-08-09						
2200		DF8IK	JO30JT	27	27	9
1997-08-10						
2340	0010	PA0RDY	JO22KJ	28	27	
1997-08-11						
2200	2215	EU1AA	KO33SJ	27	37	
1997-08-12						
0200		RW1AW/P	KP60BF	26	26	2241km!
1300		DC3QB	JO41	27	27	150W,6el
1415	1432	DL4ABJ	JO42	26	27	
2300		LZ1KWT	KN21JX	27	27	
1997-08-13						
0008	0012	GM4DHF/P	IO89QC	39	37	
0100	0115	YL/DJ5CL	KO36RI	29	28	
0308		G6YIN	IO93ET	39	39	*
1015	1045	SM/DL2ARD	JO58PI	27	29	
1300	1310	LZ2KRU	KN33FL	27	27	
2200	2218	DD3DX	JO31OK	27	37	
1997-08-21						
2200		DJ3HW	JO42LH	27	27	
1997-08-27						
0630	0715	IS0/IK1LGV	JM48HX	27	27	
1997-08-17						
0400	0420	SP4MPB	KO03GS	27	27	
0500	0520	PA2DWH		39	27	
0620	0650	UT8AL	KO61	49	48	
0656		LA0BY/P	JO59IX	48	49	*
0704		G8XVJ	IO83RJ	49	49	*
0745		PA0JMV	JO21PL	58	58	*
0751		G4HGI		49	49	*
0756		G4ASR	IO81MX	39	39	*
0806		SM4VQP		39	39	*
0818		LY2FE		39	39	*
0828		DL9MS		39	37	*
0830		DJ9YE		49	37	*
0830		OZ6ABA	JO57	59	59	*
0954		OZ6OL		59	37	*
1013		DF0WD	JO42FD	59	59	*
1030		PE1PJG	JO33NA	27	27	*
1145		G3IMV		39	39	*

Remarks: * Single burst or very short QSO.

Comment: I'm really glad for RW1AW/P QSO...sigs were ufb and burst not too short. Perseids conditions was normal and we must wait 12/08 to have good chances to complete QSOs.

I used 9A4GL v 0.34 program and a Creative SB (vibra 16) to slow down the speed on CW-MS and it worked very very well (many thanks Tihomir)! This program work like DTR, is very practical, and decode signals with (relatively) short S/N ratio. When a burst is stored, it's possible to decode it very quickly because 8 markers (buffers) are avaiable. Further, you can decode a burst and continue to monitor BF fm receiver and, of course, save bursts in normal WAV format (if somebody want hrd burst from RW1AW I can send it via e-mail). I tested the program with a SB clone card but, even the BLASTER enviroment variable was setted at standard values (I/O 220h, IRQ 5, DMA low 1, DMA high 5), the play function was ok but the record function seems to be unavaiable (anyway it's possible that with other clone audio card it work ok). I tested also last version of program 0.41 with HSCW transmission avaiable with 2 different PC:

1) Pentium 100 MHz 16 Mb RAM, Win 95 (1st version, no OEM) and original SB 16bit. The 0.41 work fine without any problem.

2) Pentium 75 MHz 16 Mb RAM, DOS 6.22 and original SB Vibra 16 bit.

The 0.41 crash with message "EMM386 don't have DMA mangement".

I tested it with and without NOEMS option in EMM386 line of CONFIG.SYS but a crash was always happened.

You can download the program in BBS with names MSDSP034.ZIP, MSDSP041.ZIP.

Equipment: 4x17 el. F9FT - 1 kW

AX.25 I4XCC@IK4VFK-8 - eMail: maracci@iper.net.

Thanks for your report, Claudio.

I8TWK (JN70GR) during the Leonids:

1997-10-17								
0400	0440	DF8IK	JO31JT	27	27	13	4	1.5c
1997-11-17								
0747		DF0WD		28	28	1		10csr
0838		DH8NAA	JN49	39	39	1		40csr
0854		PE1OGF	JO21	59	59	1		30csr
0938		PA3BIY	JO21	39	39	1		60csr
0938		PA2CHR	JO32	28	28	1		60csr
0938		PA3FJY	JO32	37	37	1		60csr
1000	1100	LA0BY/p	JO59ix	37	37	2		30nc *
1129		G3IMV	IO91	39	39	1		120csr
1129		G4DHF	IO92	39	39	1		120csr
1130		G4ASR	IO81	38	38	1		120csr
1130		G4CLA		38	38	1		120csr
1130		G0SNS		27		1		120nc

NIL: Sri for all, next year I'll take only SSB skeds, as reflections were rather rare but deep and strong, vy good for true DX. Remarks: * Strong QRM (S9+20) on 144.155 from DK3BU in QSO CW with YU stn., on SAME QRG of Stefan. Strange he wasn't informed of busy frequency. In lack of this, QSO should be completed easily at 1004, 30 sec. burst; second burst at 1012, 5", same QRM. I copied well his call but wasn't sure of reports 37. Equipment: IC271 + Front end MuTek + 4CX250R (400W) + 4218 CC + DTR DK7KF + OH5IY rev.4.3 + PC.

Maximum between 1000 and 1100, rather unpredictable with 6 hours lag rule starting with last year peak... 73' Carlo, I8TWK. Thanks for your report, Carlo.

IW1AZJ (JN35UB) wkd on 144 MHz:

1997-03-08									
0400	0455	HA7UL	JN97KK	26	26	12	8	3c	
2300	0000	HG7B/P	JN97KK	26	26	15	9	2c	
0040	0135	HA7KPL/p	JN97KK	27	26	11	9	2c	
0145	0235	HA7KSV/p	JN97KK	27	26	13	3	3c	
1997-03-28									
0300	0400	OZ/DL2ARD	JO47	27	26	23	12	2nc	
1997-04-19									
2000	2100	IW/DG0CAL	JM87AX	26		6	3	1nc	*1
1997-03-29									
2300	0000	OZ/DL2ARD	JO47	26	26	9	4	3c	
1997-05-03									
0700	0755	F5HRY/p	IN78VI	27	37	21	13	8c	
1997-05-05									
0300	0330	LY2WR/P	KO16CB	26	27	7	7	5c	
1997-05-18									
0500	0545	SM2MXR	JP80GR	27	26	3	5	2nc	

1997-05-29									
0400	0450	DL8UD	JO44UH	36	37	17	10	2	c
1997-06-01									
0500	0527	DL1DUR	JO70KV	27	27	20	10	4	c
1997-06-04									
0500	0600	OJ0/DL3YEL	JP90NH	26	27	9	3	4	nc
1997-06-07									
0400	0500	4N5AX	KN05PC	26	26	13	3	3	c
1997-06-11									
0500	0530	DH0LS	JO61II	37	27	5	7	6	c
1997-05-13									
0500	0552	PA3EFC	JO22HA	27	26	22	7	3	c
1997-06-28									
0230	0330	YU7KB	JN94XX	27		19	6	1	nc *2
0500	0530	SM3/DL1UU	JP61OC	26	26	5	5	4	c
1997-07-04									
0330	0430	YU7KB	JN94XX	26		11	3	1	nc
1400	1435	SP9PZU/8	KN19EU	26	26	13	7	2	c
1997-07-20									
1157	1217	M/PA3FJY	IN79JX	27	27	12	12	9	c r
1997-07-24									
0500	0555	OM9AAW	JN98EP	27	27	9	5	2	c
2237	2252	M/PA3FJY	IO70ID	27	27	12	9	5	c r
2300	2335	LY2MW	KO24PQ	26	26	9	6	6	c *2
1997-07-25									
0100	0150	LA/DL2ARD	JO49ML	27	26	24	13	6	c
1997-07-28									
0225	0240	LA/DL2ARD	JO39XR	26	27	9	4	4	c r
1997-07-30									
0300	0320	LA/DL2ARD	JO29PG	37	27	15	10	6	c
1997-08-01									
0400	0445	YL/DJ1OJ	KO27EO	26	26	11	4	2	c
2220	2240	HA7UL/M	KN07OX	37	26	24	12	5	c
1997-08-05									
2000	2050	EW5M	KO22CE	26	26	10	5	3	c
1997-08-06									
0300	0400	LA/DL2ARD	JP32NR	26		6	1	1	nc *1
1997-08-07									
2200	2302	DL8YET	JO31	26	26	20	11	3	c
1997-08-08									
2000	2050	HA5CRX	JN97NN	26	26	11	10	3	c
2100	2130	YU7KB	KN94XX	26		5	1	2	nc
1997-08-13									
0300	0340	LA0BY/P	JP41UA	28	27	m	11	5	c
1997-08-26									
0300	0400	IS0/IK1LGV	JM48HX	26	26	m	9	1	c *3
1997-11-17									
0500	0550	TA1ZK/2	KN40PT	26	26	10	3	70	c *4
0600	0645	G3KWY	IO92IS	27	26	5	3	40	c *5
0732		G8XVJ	IO83RJ	39	39				c r s
0732		G4AEP	IO91NJ	39	39				c r s
0751		SM4VQP	JO78OX	39	39				c r s
0755		DF0WD	JO42GD	39	37				c r s
0848		LA0BY/P	JO59IX	39	39				c r s
0901		DL9MS	JO54WC	38	37				c r s
0905		DL3AMA	JO51JI	37	39				c r s
0929		PA3BIY	JO22EB	38	38				c r s
0933		PA3FJY	JO32EH	39	39				c r s
1004		ES2RJ	KO29JM	38	38				c r s
1041		LZ1KWT	KN32SK	39	39				c r s

Remarks: *1 too weak; *2 25W; *3 200 squares in MS! *4 DXCC #60; *5 qrm first half hour. NIL: SP8RHP, ES2RJ/8, DG9BEM and EI2CA.

Nice Leonids: Two new squares, one new country, new odx 1971 km with ES2. Best signals came from stations farest than 1700 km (LA, SM); For next Leonids: OH, LA, RW, UT please beam to Italy! Heard random 144.200: G4ASR, DJ9BV, LY2FE, DF1AN, TA1ZK (!) and many more. Thanks for your report, Silvio.

IW5AVM (JN52NS) wkd on 144 MHz:

Listed only complete QSOs

1997-05-05							
0900	0940	LY2WR/P	KO16CB	26	26		c
1997-05-06							
2200	2220	PE1OGF	JO21QJ	26	26		c
1997-05-08							
0800	0830	LA0BY/P	JO59IX	26	26		c
1997-05-14							
2240	2300	PE1LCH	JO23WF	26	26		c
1997-05-15							
2200	2220	G4RKV	JO01OI	26	27		c
1997-05-21							
2200	2300	DH2OAA	JO42TU	26	27		c
1997-05-24							
0500	0540	DF1SO	JN48PO	26	27		c
1997-06-06							
0457	0555	OJ0/DL3YEL	JP90NH	26	36		c r *1
2200	2215	DJ1SHF/P	JO73CF	27	27		c
1997-06-14							
0600	0635	OE6IWG	JN77PK	27	27		c
1997-06-27							
1100	1155	DJ5RE	JN59WK	26	27		c
1997-07-04							
0600	0645	SP4MPB	KO03GS	37	37		c
1997-07-05							
0700	0725	SP9PZU/8	KN19EU	26	26		c
1997-07-07							
1130	1200	TA1ZK/0	KM39AT	26	26		c
1997-07-08							
0600	0645	LY2SA	KO14LL	26	27		c
1997-07-15							
0001	0050	LY2WR/P	KO35DS	26	26		c
1997-07-19							
2200	2220	LZ2HV	KN23TB	26	26		c
1997-07-20							
0600	0620	EB4GIA	IN80CG	27	26		c
0700	0720	DL3IAE	JN49DE	26	26		c
1997-07-25							
0600	0615	LA/DL2ARD	JO49ML	26	29		c
1997-07-29							
0430	0455	LA/DL2ARD	JO39XR	26	27		c r
1997-08-01							
0100	0125	LA/DL2ARD	JO29OG	26	26		c
1997-08-05							
2212	2225	DJ3HW	JO42LH	26	26		c
1997-08-06							
2200	2250	DL2IAN	JN49BC	26	26		c
2300	2320	LY2MW	KO24PQ	26	26		c
1997-08-07							
0025	0035	EW5M	KO22CA	27	26		c r
2230	2255	DL8UD	JO44UH	36	37		c
1997-08-08							
1300	1340	DK8EL	JO31JO	26	27		c
2300	2330	DF8IK	JO30JT	26	27		c
1997-08-10							
0600	0612	LZ1KWT	KN21JX	26	37		c
0800	0822	LZ2FO	KN13KX	26	26		c
0825	0835	LZ1UK	KN13KX	26	26		c
2000	2055	EA4EHI	IM68TV	26	26		c *2
1997-08-11							
1800	1835	YO5KAI/P	KN26GR	26	26		c

2110		SP2OFW	JO93AC	37	37					c s r	
1997-08-12											
0124		PA3DYS	JO21	39	39					c s r	
0124		PE1OGF	JO21QJ	39	39					c s r	
0124		GM4AFF	IO87VA	39	39					c s r	
0125		GI0KOW	IO64	39	39					c s r	
0125		ON4KHG	JO10WK	39	39					c s r	
0415	0430	SM6/DL2ARD	JO58PI	26	36					c	
2300	2400	YL/DJ1OJ	KO36RI	26	26					c	
1997-09-18											
2100	2120	DD3DX	JO31OK	26	26					c	
1997-11-17											
0924		G8XVJ	IO83RJ	59	49					c s r	
0924		GM4CXM	IO75TW	39	39					c s r	
0924		G4HGI	IO83PC	39	39					c s r	
0929		ON1IM	JO11	27	27					c s r	
0933		PA3FJY	JO32EH	39	39					c s r	
1997-12-12											
0700	0730	TA1ZK/2	KN40PT	26	37					c *4	
1997-12-14											
0040	0055	ON1AFN	JO20SW	26	37					c	
0230	0250	DK5DQ	JO31PH	27	26					c	

IW5AVM (JN52NS) wkd on 50 MHz:

19970807											
1116	1125	PA2VST	JO22IM	26	36					c s	

IW5AVM (JN52NS) wkd on 432 MHz:

1997-08-12											
0800	1010	LY2WR	KO24PQ	26	26					c *3	

Remarks: *1 New dxcc #63, tks Uli for nice rdm QSO; *2 He sent me the final RRR but the qso was NC... ; *3 New dxcc #20. First MS-QSO on 432 MHz I-LY, many thanks Rytis. Had also sked with PA3DZL and DK3WG, both NC! *4) Thanks for square #423, Andy. Thanks for your report, Marco.

LY2SA (KO14LL) wkd on 144 MHz:

1998-01-03											
1000	1020	HB9QQ	JN47	27	27	10	12	1	c		
1100	1120	LZ1ZX	KN32	26	39	m	m	2	c		
1120	1140	LZ1KWT	KN22	26	39	m	m	2	c r		
1200	1245	OK1FM	JN69	27	27	6	5	0.5	c		
1300	1340	LX2DX	JN29	26	26	5	8	1	c *1		
1400	1430	LZ1KDP	KN12						nil		
1430	1500	S53VV	JN65	27	27	12	10	2	c r		
1500	1530	DH0GHU	JN38	26		3	5	0.5	nc s		
1530	1545	F6BSJ	JN26	27	27	10	m	3	c r		
1600	1635	DD9SQ	JN59	26	38	m	m	5	c		
1635	1700	9H1PA	JM75						nil		
1700	1740	DG9GCD	JN38	26	26	8	10	2	c		
1915	1950	HB9DBM	JN47	27	28	m	m	10	c r		
2000	2020	G4ZHI	IO91	27	27	6	10	1	c		
2020	2100	DL1SUZ	JO53	27	27	4	5	1	nc		
2100	2145	DG3GSR	JN47	27	27	m	m	5	c r		
2200	2210	UA4AQL	LO20	37	27	6	6	30	lc *2		
2210	2255	DL6YCY	JO41	27	27	m	m	3	c r		
2300	2320	PA2DWH	JO22	37	38	m	m	10	c		
2330	0005	DL5GAC	JN47	26	28	8	14	2	c r		
1998-01-04											
0000	0100	9A4NF	JN73	26					nc *3		
0200	0300	S57EA	JN76						nil		
0300	0325	UA3PTW	KO93	26	26	10	10	3	c r		
0600	0635	DL5NEN	JN59	26	26	4	5	O.5	c		

Remarks: *1 New DXCC. Thanks, Jean; *2 S9, vy nice signals, Aleksandr; *3 Sri, Damir, UUU... Heard: RW3PF, Z32UC, UR5LX, SM3AKW, LA1K, YU1BT, IT9VDQ, OH6KTL and DK2AM. Equipment: IC-821H, 300W, 16el. KLM long yagi, 200m asl. Software: OH5IY + audio interface, 9A4GL v0.34. Thank you for the report.

OE3JPC (JN88EB) wkd on 144 MHz:

144MHz:											
1997-07-30											
2137	2152	YL/DL1OJ	KO27EO	27	37	5	3	2	c r		
1997-08-06											
2110	2122	ES/DJ5CL	KO39	27	37	4		20	c r		
1997-08-11											
2020	2105	RW1AW/A	KP60BF	37	27	5	4	5	c r		
2155	2212	LY2MW	KO24	27	27	3	6	2	c		
2222	2250	LY2BIL	KO24PQ	27	27				c		
1997-12-12											
2320	2332	RU1A	KO48VR	38	37	m	m	10	c r		
2350	2400	UT8AL	KO61WP	39	49	m	m	6	c r		
1997-12-13											
0000	0020	LZ2HV	KN23TB	37	27	5	2	5	c r sc		
1997-12-14											
0000	0032	RA3QTT	LO01GQ	27	38	6	1	7	c		
0050	0115	I6BQI	JN62AL	37	38	6		6	c r sc		

OE3JPC (JN88EB) wkd on 432 MHz:

1997-08-11											
0800	1000	LY2WR	KO24PQ	26	27	3	3	10	c *		
1100	1305	SM3BEI	JP81NG	28	27	3	2	10	c		

Remarks: * 1st 70cm MS in OE (Conratulations and many thanks for your report, Johannes - ed.) 73, Johannes.

OE6IWG (JN77PK / HH47j) wkd on 144 MHz:

1997-08-30											
0700	0740	IS0/IK1LGV	JM48HX	27		26	8	14	2 c		
1997-09-01											
0500	0600	I/DK5DQ	JN43BV	26		9	3	0.5	nc		
1997-09-07											
0000	0041	EA6IB	JM09SB	27	26	5	7	1	c		
1997-11-17											
0000	0100	TA1ZK/2	KN40PT	27	27	7	3	1	c		
1997-12-12											
2300	2325	IK0BZY	JN61GW	27	27	12	6	2	c		
1997-12-13											
0000	0100	4U1ITU	JN36BF	26		2	2	2	nc		
0100	0200	I8MPO	JN70FP	26		2	3	1	nc		
0600	0635	DF8IK	JO30JT	27	26	9	10	5	c		
0750	0800	RU1A	KO48VR	27	27	3	14	3	c r		
2000	2055	OZ5AGJ	JO56DF	27	27	6	3	4	c s		
2300	2313	I8MPO	JN70FP	27	27	7	3	3	c s		
1997-12-14											
0000	0030	DH0GHU	JN38VN	26		9	7	3	nc		
1947	2302	RW2F	KO04FT	27	26	6	8	1	c r		

NIL: DB3VE and ON7UC (both QRL), OH4EA, IK0OKY. Equipment: 400W, 16ele F9FT, cf300, dtr and oh5iy soft with audiokeying. Sri, most time I had skeds during the Geminids, not much random-work. Thanks to all stations for skeds and qso's! 73, Walter. AX25: OE6IWG @ OE3XBS.AUT.EU - email: waltstone @ computerhaus.at. Thanks for your report, Walter.

OH0JFB (JP90XI) wkd on 144 MHz:

1997-12-13											
1700	1720	DC7OH		26	28	4	m	2	c		
1737	1757	YU7MS		27	28	6	m	5	c		
1800	1825	IV3HWT		26	26	6	m	5	c		
1834	1855	DL1UU		28	38	7	m	10	c		
1900	1925	OE3MWS		27	27	3	m	5	c s *		
2000	2015	DL5ME		27	37	11	m	10	c		

2100	2130	I8TWK					nil
2200	2230	IW1AZJ					nil
2230	2240	RU1A	38	27	5	10	10c
2300	2330	ON7UC					nil
2334	2345	PA3FJY	38	37	10	1	5c
1997-12-14							
0000	0010	PE1BVM	28	28	5	5	5c s
0100	0130	IK1PAG					nil
0200	0230	IK0BZY					nil
0300	0325	YU7EW	28	27	4	5	3c
0400	0410	DH9NBB	28	28	2	m	5c
0410	0420	DH5NBE	38	28	4	m	10c
0430	0440	DL5MAE	38	38	3	2	30c
0500	0520	PA3EFC	27	38	4	m	5c
0520	0535	PA3FOC	37	37	5	m	15c
0600	0610	PE1LWT	28	37	3	4	2c
0620	0630	PA2DWH	29	39	13	m	2c S9+
0635	0650	PE1OGF	29	39	10	m	3c S9+
0655	0700	DK5DQ	29	39	10	m	2c
0700	0710	DF0WD	38	38	15	m	2c
0710	0720	ON4KHG	39	39	5	m	15c
0720	0730	OK1FM	39	28	3	m	3c
0730	0735	DJ5RE	29	28	10	m	5c
0730	0740	DK8ZJ	28	28	10	m	40c S9!
0800	0900	I1ANP	29	27	2	8	5c
0900	0950	F5HRY	27	27	4	4	2c
1000	1100	YU7ON	26	26	2	4	3c

Remarks: * 1st SSB! Heard: 9A4FW, DK1KO, DL8CMM, S53VV, RW2F, SP2OFW, S57TW, S51AT, DL5MA(?), LX2DX, DJ9YE, PA3BZL, DL5MEL (sri, had sked at 0800!).

Quadrantids report...

Again I was QRV for some MS here on the islands and I must say that i get more and more excited each time! This time I had no skeds, only random on 144.124 CW was worked. I started my operation at abt 1100 UTC. Before I had my equipment set up I listened on 144.100 and there were MNI strong bursts all the time... *hurry up !* HI! A had planned to work packet radio on 70cm at the same time I was working QRO on 2m but those plans went to h-ll as I had severe problems with one computer. There were lots of stns calling me and I had some trouble picking one call from the piles. I had great pileup 'til about 1500z when I decided to take a short dinner break. But when I returned the reflections seemed to be worse all the time. At abt 19.30 I got bored and longed home. The reflections were very weak and NIL for long periods so I decided to quit.
Here's the result:

OH0JFB (JP90XI) wkd on 144 MHz:

1998-01-03					
1120	1130	PA0JMV	27	37	c
1130	1150	DH0LS	38	28	c
1155	1205	PA3BIY	37	27	c
1210	1215	ON4AMX	28	37	c ?? *
1225	1230	ON4FI	28	37	c
1245	1255	PA0PVW	37	37	c
1305	1315	PA3BZL	26	27	c
1350	1405	ON4AVJ	27	38	c
1410	1420	DL6YCY	39	37	c
1425	1440	DK8LV	26	27	c
1530	1535	PA3FJY	38	27	c
1550	1600	G4AEP	38	27	c
1650	1700	DL5BBW	27	27	c
1700	1715	DL3YEL	28	38	c

Remark: * ON4AMX: This was QSL on my side. I RXed RRR from you and you confused me alot later on when you called again. 73, Peter (OH0JFB @ OH0RBA.FIN.EU). Thanks for your report, Peter.

RK1B BCC result from KO69AK

Hello MS folks,

during BCC contest we was in KO69AK, and a little story what really happened in our "pedition".

At first a little of our history. I (oh5lzy) had before contest 13 completed MS qsos via skeds, Alex RU1AS was never worked MS before. Other members of our team RX1CM and UA1CFM was local ham.

11h Dec we came to city Kirisi and put station up on the 9 floor house. (12el DL6WU + 20m aircom). QRM level was 0 even we was in the middle of the city and there was also cable TV in the house.

But local idea for "contest?" was very damp... Nearly every ham operator from city Kirisi visit in contest place with one bottle and toast for us...

Totally we worked 18 hours during BCC (counted from OH5IY MS_LOG) and we made 9 completed qsos: 9A4EW, 9A5Y, DG5MAA, DJ7OF, DK9OY, DL1EAP, DL5MAE, DL8CMM, DL9MS and SP2OFW.

On Sunday evening was our only tecnical problem. When outside was -25c rotator drop speed and antenna was not in same direction like control unit. Two hours we were calling CQ and beaming NE and nobody didn't answer... But then to the roof and armstrong it worked wery well.

On monday afternoon when I drove back to St. Petersburg with Alex, we decided that next shower during Quadrantids when we are in KO49, we will only work MS.

I was very big mouth with info in our expedition. I thing that there were many stations who looked for new sqr (KO69 was white sqr in DL8EBW database). So sorry for small activity.

On monday evening before driving back to home I had also possibility to meet with Alex, RW1AW. He is still in the hospital after dropping from a tower. After seven cirurgial operations he is nowin well condition. In January two more operations will follow. Alex send via me 73 to all MS friends.

73, Janne Harakka - OH5LZY (ax.25: @OH5RCB.FIN.EU - eMail: oh5lzy@mail.wwnet.fi)

RU1AS (KO49) Quadrantids report

During the Quadrantids I was together with Alex, RU1AS, in KO49SW city Lomonosov. Before we looked from big map and guessed that the locator is KO49VV, but now checked with GPS.

We arrived that qth early in the evening of Jan, 2nd and put a 13 el F9FT yagi 8 m up. There was good a takeoff 360 degree and qrm level 0. First time we tested random 1720-1745 and second 1845-1906 but not any pings. Then we went qrt for a few hour before skeds.

1998-01-03
Complete QSOs: 0800-0850 DL5ME, 1100-1135 DH7FB, 1300-1350 DL5DTA, 1400-1450 HA5CRX, 1600-1630 DH3YAK, 1700-1740 DK5DQ, 1800-1833 PA3BZL, 2000-2028 DL9AN, 2100-2120 DL5NEN,

2332-2350 DL8LC and 2337-0010 SM6KJX.
Not complete QSOs with DF6NA, DF8IK, DH8NAA, DL1EAP, DL2ARD, DL7FF, DL8EBW, G4AEP, HA8CE, I4XCC, OE6IWG, OK1FM, PA3EFC, S54AA, S57EA and YU7ON.

Sri, Guido (DL8EBW), other station came to the sked freq with big signal.

Setup was IC-706 (mni tnx for Orvo OH5NE who lend that radio. My own ic was blowed up) and GI7B in PA and 13 el F9FT.

From 0015 to 0115 I tried to work random and also 05-06 UTC I was on the air, but not even any pings. Maybe the reason was that in the night it start snowing very wet snow and SWR was more than enought... So totally 12 qsos, a few bottle of beer and one bottle vine. MS is little pooring without vodka :-)

Ten times in sked nothing heard during first 20 min, and end of the time was too short for completed random, we recognized S54AA and DL1EAP many time in random, but big sri that we didn't oompleted. When we drived back to St. Petersburg, we decided, that next time we work only random. (if we go some place in next coming showers). It is too sad to stop nice going random qso and qsy for sked and listening empty band 20 min.

QSL via buro or direct to RU1AS: Russia, 198332 St Petersburg, Pr Zaharova 22 1 61, Alexander Panfilov.

I'm still interest for CW MS skeds from my home QTH KP41KL, every skeds are welcome. 73, Janne - OH5LZY.

PA2TAB (JO32GF) wkd during the BCC MS contest:

1997-12-11					
2155	2210	9A5Y	JN85	27 26	1 c r
2220	2235	IC8FAX	JN70	28 27	2 c r
2315	2330	I1JTQ	JN35	27 27	1.5c r
1997-12-12					
0135	0215	9A4FW	JN95	37 27	4 c r
0255	0320	S51AT	JN75	27 27	2 c r
0445	0505	LA0BY	JO59	27 27	3 c r
0510	0530	RU1A	KO49	27 27	2 c r
2215	2235	YU7MS	KN05	28 29	2 c r
2320	2335	IZ1BPN	JN35	39 27	4 c r
1997-12-13					
0100	0120	DL9MS	JO54	27 27	1.5c r *1
0215	0230	DL1MAJ	JN68	27 29	2 c r *2
0230	0245	DL5MAE	JN58	29 29	1 c r *2
0300	0350	9A4EW	JN95	27 27	5 c r
0355	0415	LZ2HV	KN23	28 28	1.5c r
0440	0455	F6DRO	JN03	28 27	1 c r
0455	0510	F6CRP	IN96	28 27	1 c r
0515	0530	EA3DXU	JN11	28 27	3 c r
0535	0555	I8TWK	JN70	28 37	7 c r
0605	0625	S53VV	JN65	29 27	2 c r
0650	0705	RW2F	KO04	38 29	4 c r *3
2215	2230	I6BQI	JN72	37 37	4 c r
2300	2310	IK1MTZ	JN35	38 37	4 c r
2325	2340	LY2FE	KO05	38 27	5 c r
1997-12-14					
0030	0050	UT8AL	KO61	38 37	6 c r
0115	0145	F5HRY	JN18	37 28	3 c r *4
0240	0305	LZ2FO	KN13	28 27	3 c r
0315	0325	F6CRP	IN96	29 27	1.5c r
0435	0445	LA2AB	JO59	39 27	5 c r
0445	0455	S54AA	JN76	39 29	7 c r
0540	0555	LY3GM	KO24	28 29	1 c r
0600	0630	YU1VG	JN94	47 37	1 c r
0700	0720	I5YDI/5	JN54	27 27	1 c r
0750	0840	4U1ITU	JN36	28 26	1 c r *5

Remarks: *1 Side scatter, QTF 90 deg; *2 Side scatter, QTF 100 deg.; *3 DXCC #50 and grid #264; *4 Side scatter, QTF 110 deg.; *5 Side scatter, QTF 160 deg, DXCC #51 and grid #265. Equipment: R2CW, preamp MGF1302, PA 400 Watt, 14 el hm DJ9BV no elevation, 16 el F9FT with fixed 15° elevation, DTR (DF7KF) and OH5IY software. MS-skeds are very welcome. AX.25: PA2TAB@PI8DAZ.#TWE.NL.EU or eMail baltea@ci-int.nl. 73, Arie. Thanks for your report, Arie.

PA3FJY (JO32eh) wkd on 144 MHz:

1997-08-02					
2050	2110	IC8CQF	JN70	27 26 12 8	6 c r
1997-08-03					
0530	0553	HA5OV/m	KN17	27 37 9 24	c r
997-08-09					
0615	0625	S51AT	JN75	27 27 6 17	c r
1400	1500	IK3VZO	JN55	27 26 21 37	1.5c
2000	2018	LA0BY/p	JP41	27 27 12 40	10c
2200	2220	9A4WY	JN75	27 26 5 27	1 c
1997-08-10					
0600	0615	IC8CQF	JN70	47 CQ 20	4225nc r
0620	0647	IC8CQF	JN70	36 26 16 34	8 c r
0700	0750	SM3UZS	JP92	27 26 21 89	1.5c
0920	0957	SM3MXR	JP80	27 37 40 150	5c r
1000	1015	LA8KV	JP52	27 27 8 20	2 c
1140	1240	RW1AW/p	KP60	46 2 5	50nc
1655	1752	LY2MW	KO24	27 37 19 47	4 c r
1800	1900	ES2RJ/8	KO28	27 27 6 26	4 nc
2100	2200	EA4EHI	IM68	26 26 11 16	10nc
2200	2230	YU7ON	KN04		nil
1997-08-11					
0540	0556	9A90CBD	JN85	37 37 12 26	28c r
061310		SM4VQP	JO79	27 27 1	15c r s
1000	1020	EW5M	KO22	27 49 8 27	4 c
1120	1140	EU1AA	KO33	39 37 15 22	6 c r
1700	1740	LZ2KRU	KN33	27 26 13 15	1 c
1900	2000	YU6A	JN91	27 27 19 35	1 c
2000	2100	YZ7MON	JN93	26 26 4 3	5c s
2100	2142	F1NSR	JN33	28 26 11 9	2 c s
1997-08-12					
0714		LA8KV	JP52	37 37 1	20c r s
0739		F/G8MBI	JN04	38 37 1	20c r s
0751		LA7DFA	JP33	39 39 1	30c r s
0926		I8TWK	JN70	27 27 1	15c r s
1050	1130	SM3PXO	JP73	47 26 21 58	27c r
1135	1152	RU1AA		38 27 28 51	8 c r
1255	1308	RW1AW/p	KP60	28 38 8 18	4 c r
1330	1400	ES2RJ/8	KO28	27 37 5 18	2 c r
1900	2000	UA3MHJ	KO87		nil
2000	2021	YL/DJ5CL	KO36	37 38 6 5	8 c r
2021	2052	LZ1KG	KN31	27 26 5 5	3 c
2105	2118	EU6MS	KO45	39 28 13 29	8 c r
2125	2138	UT8AL	KO61	38 28 10 6	7 c r
1997-08-17					
0650	0710	S57EA	JN76	29 15 25	3 nc r
1997-11-17					
0654		YU7ON	KN04	39 39 1	120c r s
0654		IV3HWT	JN65	39 39 1	120c r s
0704		HB9FAP	JN47	37 38 1	20c r s
0706		9A1CAL	JN86	39 37 1	30c r s

0711		LA0BY/p	JO59	39	49	1	60c r s
0924		EA2LU	IN92	39	39	1	90c r s
0932		IW5AVM	JN52	39	39	1	45c r s
0937		IK3VZO	JN55	37	37	1	60c r s
0938		I8TWK	JN70	37	37	1	60c r s
0949		EB4GIA	IN80	37	37	1	30c r s
0953		SP4MPB	KO03	39	27	1	90c r s
0957		F6DRO	JN03	49	49	1	180c r s
0958		EA3BTZ	JN01	39	39	1	180c r s
1997-11-17							
0958		EA7GTF	IM87	39	39	1	180c r s
1003		I8MPO	JN70	39	39	1	60c r s
1012		9A1CCY	JN85	27	27	1	30c r s
1015		I8MPO	JN70	59	59	1	20c r s
1102		EA3TI	JN11	37	39	1	120c r s
1997-12-11							
2150	2200	IC8FAX	JN70	27	27	6	23 1.5c r
2215	2227	I6BQI	JN72	27	27	9	31 5c r
2310	232	2LY3GM	KO14	27	26	7	33 4c r
2345	2357	RW2F	KO04	47	49	10	45 35c r
1997-12-12							
0008	0027	9A5Y	JN85	28	27	18	60 10c r
0030	0052	9A4FW	JN95	27	27	21	67 3c r
0100	0117	RU1A	KO48	28	27	15	69 3c r
0210	0220	YU7MS	KN05	27	37	11	18 3c r
0220	0230	S54AA	JN76	27	28	9	15 1c r
0240	0300	9A4EW	JN95	27	27	13	34 2c r
0325	034	5S51AT	JN75	27	27	13	28 1c r
1935	1945	EA2LU	IN92	27	27	16	18 2c r
1945	2002	EA3DXU	JN11	29	27	14	23 4c r
2053	2103	I1JTQ	JN35	27	27	11	33 2c r
2125	2137	EA3BTZ	JN01	27	27	16	30 1c r
2248	2301	OH6MAZ	KP22	27	26	14	29 2c r
2303	2311	OF8UV	KP34	27	27	9	5 2c r
2333	2356	IK1MTZ	JN35	27	38	12	33 1c r
1997-12-13							
0150	0205	DH0LS	JO61	27	28	6	8 4c r bs
0215	0301	LZ1KWT	KN22?	27	27	15	33 2c r
0305	0328	SP2OFW	JO93	27	27	8	9 2c r
0328	0350	LZ2HV	KN23?	37	38	5	5 6c r
0435	0446	LA2AB	JO59	37	29	16	40 6c r
0450	0520	4U1ITU	JN36	27	qrz	15	31 1nc r
0538	0548	F6CRP	IN96	27	27	14	23 2c r
0625	0636	I8TWK	JN70	27	37	13	12 10c r
0640	0656	IZ1BPN	JN35	28	38	8	43 2c r
0735	0746	EA2LY	IN93	28	28	27	32 2c r
0800	0822	EA7GTF	IM87	28	37	10	13 4nc r
0823	0846	IK7UXY	JN90	27	27	22	32 6c r
1910	1930	LZ1AG	KN22	37	27	2	8 6c r
1940	2010	LZ2FO	KN13	37	27	7	7 7c r
2025	2040	S53VV	JN65	27	27	11	20 2c r
2150	2205	9A4NF	JN73?	37	27	11	9 1c r
2210	2220	S57EA	JN76	27	27	11	10 1c r
2315	2326	SM2CEW	KP15	38	38	15	40 6c r
2335	2345	OH0JFB	JP90	37	38	15	17 15c r
2350	0002	OH4EA	KP32	37	37	7	10 5c r
1997-12-14							
0005	0026	SM3MXR	JP80	38	37	15	9 25c r
0140	0200	UR5BAE	KN29	37	27	15	22 7c r
0308	0321	DL5MAE	JN58	28	28	16	8 2c r bs
0330	0347	DL1MAJ	JN68	28	28	8	11 2c r bs
0400	0427	S51MQ	JN75	28	38	13	36 6nc r
0555	0611	HA3UU	JN96	29	39	9	16 1c r
0750	0800	I5YDI/5	JN54	29	27	9	4 3c r
2058	2121	EU6MS	KO45	37	28	24	42 25c r
2145	2203	LY2FE	KO05	28	38	2	4 2nc r
2230	2247	SP4MPB	KO03	27	27	12	30 1c r
2305	2317	OH2BNH	KP20	27	27	13	15 3c r

Equipment: 400 W, 4x17 ele. mod. CueDee with elevation, FT225RD using audiofilter (DSP59+) and DTR (DF7KF), OH5IY v4.3 + DTR (audio-keying) now. Works very good! Maximum speed up to 5000 lpm (rx+tx).Skeds up to 1500 km are no problem, especially in CW. Normal sked frequency 144.141 MHz. Longer distances between QTF 0 and 140 degrees difficult because of local "mountain" (75 meters high). Therefore I was during a part of the Perseids and during the Geminids QRV from the top of the mountain with 9 element yagi, but with free take-off in all directions and almost no QRM.

Look for me on RANDOM .100 during the weekends between 04 and 07 UTC. You can call me upto 2000lpm (DTR) higher speed may give problems at weaker signals. So, wishing good luck in MS! 73 de DICK, PA3FJY. Address: D.G.A. van der Knaap, PA3FJY, Raalterweg 33, 7451 KZ Holten, Netherlands. Telephone: 0548 36 37 42 (17-21 UTC). AX.25: PA3FJY@PI8DAZ.#TWE.NLD.EU. thanks for your report, Dick.

TA1ZK 1997

Eventually I have some time to write a little report of my past activity from Turkey.

First of all, I have been working on the field for about 235 days (in HB9, I, DL, ON, F and TA), so I had very little time left for myself and for my hobbies.

My trips to TA where basically for business, so the HAM side came after any other schedule with my company which sent me there. But over those trip I was able to get in touch with several sympathetic and very helpful OM and also be able to buy and leave in TA some equipment for further activities (the excess luggage on the airplanes is VERY expensive, hi)

So, with the help of TA2FE, TA1E and TA2DS I was able to get the TA1ZK callsign. We also ask for a special and temporary 6m licence, but in the 1, 2, 3 area is strictly forbidden because of the army... will see later...

Over my summer acitvity,I managed to work some stations from KM39AT (TA1ZK/0):
4 Complete MS qso despite the several tries and the fairly low MS condx.
3 Complete Es qso with OZ9AEG (2253km), OZ6ABA (2259km) and SP4MPB (1606km).
Several Tropo qso with LZ, SV0, 1, 7, 8, Z3.

I must add that unfortunately, at that time my rig was not the best for MS as I tought to be qrv on 6m and 2m ES (so no preamp and IC706 which is quite deaf on RX) and 13el Yagi.

The acitvity from KN40PT has been little more sactisfactory:

TA1ZK/2 (KN40PT) wkd on 144 MHz:

1997-11-16								
IK1PAG	JN35UB	26	26					nc
IW1AZJ	JN35UB							nc
DL1EAP	JO31IK							nc 2089km
IW2BNA	JN45ON	26	26					c
S53VV	JN65UM	37	37					nc r
DL2IAN	JN49BC	26						nc *1
S53VV		37	26					c
1997-11-17								
OE6IWG	JN77PK	27	27					c
LY2WR	KO24OQ	26	26					c
IK1PAG	JN35UB	37	26					c *2 odx
IW1AZJ	JN35UB	26	26					c *3
DL8EBW	JO31							nil
S57TW	JN75EX	27	26					c r
DF7KF	JO30GU	37	26	7	5	10	nc *4	
DL9MS	JO54							*5
S57TW		37	28					c *6
DD0VF	JO61VB	27						nc *7
PA3BIY	JO22EB							nil 2264km
I1ANP	JN44VC							*8
I5WBE	JN53	Sorry, still no 220V!						

Remarks: *1 1890km, bad readablility; *2 67s burst! ODX 1813km; *3 qrm S54AA ODX; *4 2120km, 10sec burst with S2, qrm S51AT, DL5MAE; *5 qrt after 15 min because of a very strong qrn (320 deg); *6 He called me agn, so I made the qso agn! *7 copied vy well; *8 Lack of 220V after abt 30 min and then I made QRT.

I also worked IK6IHM on SBB random and heard IW5AVM, but no qso.

I also replied to DJ3MY the 16th of Novmeber around 0800 and I must apologize for not answering to S54AA the 17th of November at 2210 but I had trouble with my DTR. When I realised that he was calling me, he disappeared.

OBSERVATIONS:Over the night the network shut down 5 times because of a thunderstorm and high winds.

BCC geminids contest worked on random:

S54AA		27	26	c
DL5MAE	JN58VF	27	27	c *
SP4MPB	KO03GS	27	27	c
IW5AVM	JN52NS	37	26	c sked
DL1MAJ	JN58VF	27	28	c
DH0LS	JO61	27	27	c
I1JTQJN35UB		26	26	c
DF5BN		26	27	c
I4XCC	JN63	27	27	c sked

Remark: * Booming signal.

I've heard the following stations without succeding in working them: LY3GM, SP2OFW (vy loud!), S57TW, HA7UL, IK7UXY (also on tropo but I was a little pistol...), I8TWK, DL1DXA; DL1UU, DL5ME, DK5KK and DL7AKA. Back-/sidescatter: YU7MS, YT4D, YU7EW, 9A5Y, LZ1KWT, LZ1ZP and LZ2HV. And some incomplete calls: ?3WG, S51?, DL3IA?, IK3VZO?

Comments:

I was calling CQY and I didn't know to be on RW2F and I8TWK frequency. When I realised that, I moved to CQK.

Well, as you can see, I've heard more than what I could work. My equipment was: TR751, 100W, preamp SP2, 17B2 @ 6m agl. Good take off. This proves, and according to my experience, 100W are mostly not enough to work MS from such a far qth, ESPECIALLY on random.

I must tell that several stations which knew that I was on, called me, I copied them, but I never complete a QSO. After few periods they were QSY! THIS IS VERY FRUSTRATING, especially if you don't sleep for 3 nigths in order to achieve something, you do your best but in the end the results are just satisfactory. That's also the fun.

By the way, in the end I was "dead" and I slept 12hrs non-stop between sunday and monday, the day I left to come back home.

For info, I bought this 17B2 which is still in TA ready for any further activity, the 100W brick PA is also still there. Furthermore, it will be very interesting to get a compact 400-600W PA to use next time, but unfortunately I don't have any (a part from the 8877, hi). Would you like to get rid of an old and cheap PA ? Please let me know since I'm very interested. A compact 2500-3000V power supply is also very interesting.

Eventually, I must thank the hospitality of TA1E, which support has been basic. Without his help I could not have done anything. All the HAM which visited me and helped me with informations, advices and burocratics matters: TA2FE, TA2DS and TA1D.

I received today the qsl, so reply via bureau or home address.

I look forward to hearing from anybody for the hardware as above and for skeds over the Quadrantids from my home QTH: TS711, 17 el F9FT, 8877 and preamp SP2. See you next time from TA1ZK/? 73, Andrea, JN46LA. AX.25: HB9SUL@HB9OK - eMail: hb9sul@compuserve.com.

UT8AL (KO61WF) wkd on 144 MHz during the 8th BCC MS Contest:

1997-12-11				
2212	2230	LZ1KWT	27 27	c
2312	2322	YU7MS	28 28	c
2337	2347	DL5MAE	29 27	c
1997-12-12				
0200	0235	SP2OFW	26 27	c
2202	2212	S57TW	39 28	c
2252	2302	9A4EW	27 27	c
2322	2342	LZ2HV	37 28	c
2350	0002	OE3JPC	49 39	c
1997-12-13				
0050	0110	DJ1SHF	26 27	c
2207	2215	DK0OG	38 28	c
2217	2230	DH9NBB	28 28	c
2230	2240	YU7BCL	37 27	c

2252	2310	OE6IWG	39 37	c
2342	2355	DL4MEA	38 37	c
1997-12-14				
0005	0020	DL9AN	49 38	c
0030	0045	PA2TAB	39 38	c
0232	0247	LY3GM	27 27	c
0257	0310	RU1A	28 28	c
0345	0352	UA9FAD	38 38	c
0417	0432	HA5CW	27 27	c
2157	2205	YT4D	28 26	c
2247	2310	9A5Y	28 27	c
1997-12-15				
0007	0027	DH0LS	27 28	c
0027	0045	9A4FW	27 27	c
0102	0115	DK8ZJ	28 27	c
0115	0150	DL1MAJ	27 27	c

UT8AL (KO61WF) wkd on 144 MHz:

1998-01-04				
0202	0240	PA3BZL	27 27	c
0310	0325	DK1CO	38 28	c
0330	0350	PA2DWH	37 37	c

Equipment: 700W, 20 ele KLM. 73, Alex. Thanks for your report, Alex.

YO5KAI (KN16TS) wkd on 144 MHz:

1997-08-09				
2300	2400	DK2PH	26 27	c
1997-08-10				
0100	0200	DK1KO	37 27	c
0200	0300	DL9MS	37 26	c

Equipment: SSB, 1KW, 4 x 10 el DJ9BV, QRV CW 3000 lpm tx/rx.

YO5KAI/P (KN26GR) wkd on 144 MHz:

1997-08-11				
1800	1830	IW5AVM	26 26	c
1830	1900	I4XCC	26 26	c
1997-08-12				
0100	0200	DL8EAP	26 27	c
1997-08-13				
0000	0100	DK2PH	37 26	c
0300	0400	DJ7OF	37 27	c

During short DX-spedition in KN26 the weather was very bad, raining all the time resulting in very big problems with the tent...moving into the car.
The team will be back in KN26 with a better equiped station. This time we used 150W, MGF1302, 10 ele DJ9BV, DTR (tnx DL8EBW, fantastic machine!) and OH5IY software. QSL-address: YO5TE, FOLEA ION, P.O.Box 168, Postal office 1, RO-3400, Cluj, Romania.

YO5TE (KN16TS) wkd on 144 MHz:

1997-12-12				
2020	2100	EU6MS	37 28	c r
1997-12-13				
1915	1945	RA3LBK	38 38	c r
2225	2245	RW2F	38 38	
2315	2335	UA3PTW	38 38	c r
1997-12-14				
0310	0335	LY3GM	38 27	c r
0355	0415	RU1A	39 39	c r

Equipment: 4x10 ele DJ9BV, POWER 300W (some problems at anodic transformer at 1KW PA), MGF 1302, DTR. Thanks for your reports, Nelu.

YU7EW (KN05HP) wkd on 144 MHz:

1997-12-13				
1900	1942	4U1ITU	JN36BF	27 28 28 82 5c
2042	2050	RW2F	KO04FT	27 27 11 19 3c *1
1997-12-14				
0300	0310	OH0JFB	JP90XI	27 28 10 26 10c
1857	1905	RU1A	KO48VR	29 27 13 18 7 c # 431
1937	2000	LY3GM	KO14LL	27 29 21 47 5c *2

Remarks: *1 Using my 2x8 ele Hy-Gain vertical polarized! *2 Strong QRM. Equipment: FT-225RD with "Mutek" modif. BF988, GI-7B abt 350W out, 10 ele DJ9BV and 2x8elm Hy-Gain 208, tape recorder modif. Grundig TK-845, Memokey 2x1kb (max. 1000 lpm).
Comment: I have experimented with horizontal and vertical polarisation. I received many stations with vertical polarisation at the same time with stronger and longer bursts. Is the optimal antenna for MS a circular polarized antenna?
Any sked is welcome during the Quadrantids with max. 1000 lpm. 73, Pista. Thanks for your report, Pista.

"ARIETIDS" METEOR SCATTER CONTEST JUNE '98

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 became the second annual MS contest in European land, after the BCC Geminids Contest held by German amateur of Bavarian Contest Club. We mean to explore better, by enhancing MS random activity, the period of June showers, in which daily are possible easy contacts 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 tecniques in daily confortable time togheter experienced ones, or to call all VHF enthusiasts, that are in a marginal position to work easily via Tropo stations from central Europe (with most regard to the South of Italy), and work them in this propagation mode. Experimentally we stated a separate SSB category, as many skilled operator are not enough "CW good takers" or don't own a DTR or similar decoding device but could enjoy themselves in frequents long bursts of this shower.

Contest period: An entire week, from June 08th 0000 UTC to June 14th 2359 UTC.

Mode: CW or SSB, in separate sub-bands as IARU Reg.I bandplan.

Participation: Category I Single op. CW, Category II Multi operator CW, Category III, Single/Multi operator SSB. One station can partecipate to both CW and SSB categories, but scores will be separately computed on CW and SSB QSO. In this case any QSO can be repeated in each mode. Competing stations can stay on fix or portable site, but they can operate validly during the contest period exclusively from the same QRA Locator. Portable station will be identified by P letter after suffix (Es: I1JTQP means I1JTQ portable) or with their call area number; stations operating in

foreign territories should add 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. It is allowed CW number abbreviation transmitting the letters "A", "N" and "T" instead of, respectly, "1", "9" and "0" numbers.

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, are allowed 15" breaks.

Frequencies: Two meters band. We recommend using the IARU Reg. I procedure reccomandation for the frequency plan. To reduce QRM it is not allowed held QSO on calling frequency; to assure this will be appointed some control stations 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 enough clear between 144.100 to 144.126 one may use extended letter system with two letter, where AA --+26 KHz, BB --+27 KHz and so on. Only one TX signal is allowed at any time. In SSB class the calling is allowed at 144.400 +/- 20 KHz. We exclude expressly 144.200 calling frequency to reduce QRM with CW sub-band and 144.300 Tropo DX calling frequency.

Reports: Full callsigns, reports and final rogers.

Scoring: A complete QSO signs 1 point. QSO's with I8 zone counts two points. QSO with following stations by Pompei ARI Radio Club: IK8UHC (club chairman), I8TWK, IK8YOQ, IZ8AZB, IW8BOW counts three points. A Special Call IR8POM from our Radio Club (call to be confirmed, under government permission) will be active saltuarily in the period, and counts five points. To enhance portable activity any QSO held with a portable station counts doubly (Es:if PA0JMV works LA0BY/P his score is two pts.; if he works IK8TOY/P score is four pts., finally if works I8TWK/P score is six pts.). It is not allowed dupe any QSO also in different locations, except in both mode SSB+CW if one wants to join both separate class. Portable station totalize as fixed station their final score, but the final scoring will be multiplied by a factor 1.5, to take advance of operating efforts from a different location.

(Es: 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 56x28 = 1568. DL5MAE/p is portable so his final score is 1568 x 1.5 = 2352.)

Multipliers: Sum of any different prefix worked will be the multiplier.

Final score - Total Points times multiplier.

Log - Following data will be included: Operator's name, category, callsign, address and QTH locator.

Multi-op stations will add list of all operators. For each QSO: date, time in UTC, worked station call, reports sent and received, and possibly antenna QTF for side-scatter evaluation. Complete technical data of equipment and antenna used in the competition. Portable station will give proof of the operation with a photo; in proof lacking they will be trated as fixed, and will not achieve 1.5 enhancement. Together the logs, photo of contesting stations are welcome.

PAY ATTENTION! QSO details will be crossed log by log. Writing errors on call and/or received reports cause QSO abolition and 5% scoring penalty. Only three errors are allowed, contesters over three error will be disqualified. Any dupe QSO will be abolited without penalties.

Deadline will be 30th June, 1998 (Postmark).

Send the logs to: MS Contest, Sezione ARI Pompei, Casella Postale 14, 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 should be two stations with equal score, the winner will be the station with bettĕr 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 contesters will be sent printed results and a nice view of our city. A nice QSL card to all contesters that worked our Special Call Station.

73, Carlo Spano - I8TWK

Letters to the editor*

Det, DK9OY, writes:

Dear Norbert,

when reading DUBUS-MS-Report in issue 4/97, I was really surprised about PA3BIYs contribution to this column. We all know that he was the key to GW0KZG/mm but he did not mention a single MS-QSO he had with Andy! I don't know why he acts this way, but sure I know that this proceeding is no good sport anymore.

Please cancel my Top List entry: I don't compete with people making secrets out of their activity while nevertheless claiming the results for the Top List. Det, DK9OY

* *Letters are statements of the writer and do not necessarily reflect the opinion of the editor or DUBUS*

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	ON4PS	JO20	564	124	752	1740	1902	6520	16358
9	G6HKM	JO01	552	0	347	1883	780	5674	16112
10	GW4LXO	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	464	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	SP6GZZ	JO81	407	0	515	0	1826	8103	0
18	OK1DDO	JO60	394	88	620	1423	1340	6100	13300
19	SP4MPB	KO03	391	0	520	1836	1507	8290	0
20	OK1IBL	JO60	377	77	530	1320	1717	6941	11816
21	PA3FYM	JO22	375	0	1238	2019	0	****	16373
22	G8VR	JO01	365	0	760	2154	1290	8470	16416
23	DL3AMA	JO51	348	70	501	1431	1600	7172	0
24	OK1MAC	JN79	336	0	0	0	0	0	0
25	PE1OGF	JO21	332	76	0	0	0	0	0
26	DL9GU	JN49	327	0	721	450	0	8500	15625
27	YO2IS	KN05	325	0	270	1155	1404	6942	14292
28	OK1FAV	JO60	325	74	0	579	1093	6250	10366
29	DL7ARM	JO62	315	0	909	1189	1245	8324	15817
30	F8CS	JN27	311	68	336	0	0	7454	9753
31	DL4ALI	JO50	303	62	464	0	1042	3996	0
32	SM7JUQ	JO65	292	0	372	1349	1062	3900	14070
33	OK1FFD	JO60	291	74	580	1231	0	6250	13300
34	SP6GWB/P	JO80	288	0	696	629	1880	7540	0
35	OZ7IS	JO65	287	0	410	1294	850	3100	0
36	OK2ZW	JN89	286	0	0	0	0	0	15580
37	HB9STY	JN36	280	65	367	0	1431	4448	7810
38	IW5AVM	JN52	275	55	768	0	1712	3056	7839
39	ES1CW	KO29	275	63	421	1850	1669	5251	0
40	F1FIH	JN23	273	98	796	0	1637	2492	15613
41	HB9AOF	JN36	272	72	500	0	0	5400	10663
42	OK1VBN	JN78	263	59	455	0	0	5793	0
43	IK5OIY	JN52	262	0	332	0	1444	2826	8305
44	DL3YEE	JO42	261	0	540	1056	1300	2700	13053
45	ON5SE	JN29	257	78	0	0	0	0	0
46	F5DE	JN05	237	64	860	0	0	2304	0
47	I3ZVN	JN55	237	62	532	0	0	5742	8422
48	DL5BBL	JO42	237	0	414	1008	0	3975	5863
49	YL3AG	KO26	233	49	397	1817	0	6420	0
50	DL7YS	JO62	230	0	342	461	1086	3547	8767
51	DL8LAQ	JO43	228	0	0	0	0	0	0
52	CT1BGE	IM58	215	0	0	0	0	0	0
53	G6LEU	IO70	214	0	700	750	0	0	0
54	OK1VQ	JO60	212	44	245	539	0	2002	2755
55	DL6BF	JO32	207	71	574	1108	0	3058	8011
56	SP5HEJ	KO02	206	0	568	0	1838	4699	0
57	YU1VG	JN94	201	50	1766	0	1450	3666	1650
58	SP2JXN	JO94	198	0	0	0	0	0	0
59	PA2CHR	JO22	187	72	1334	909	0	5215	13966
60	DL8EBW	JO31	186	50	247	1050	1150	5800	13300
61	9A2EY	JN85	182	0	438	0	0	0	0
62	CT1DIN	IN60	174	37	1581	0	0	3169	0
63	OE3OKS	JN87	172	45	467	0	0	3519	0
64	OK2PPP	JN99	170	0	0	0	0	3200	0
65	SP6AZT	JO81	169	0	612	0	1168	4327	0
66	HB9RUZ	JN47	168	54	406	0	960	3585	0
67	DJ2XS	JO53	164	0	440	419	0	4155	0
68	DL2DR	JO31	160	15	0	0	0	3982	0
69	OH2BNH	KP20	147	37	391	948	0	3246	0
70	DL5GAC	JN47	147	0	129	690	0	5100	11900
71	SP5EFO	KO02	147	0	0	0	0	0	0
72	OK2XTE	JN79	138	42	162	0	0	2419	0
73	DL5IO	JN49	134	0	113	340	900	3100	12995
74	DL5UH	JN48	129	35	103	0	0	5943	0
75	DJ6XV	JO31	128	0	401	0	1130	3232	0
76	DF1EQ	JO31	108	0	0	0	0	2769	0
77	I2FUM/2	JN45	107	0	137	0	0	2023	0
78	DK2BJ	JO30	105	0	275	0	0	1782	0
79	IN3TWX	JN56	95	0	396	0	0	1890	8100
80	OK1UDX	JN79	90	0	333	1054	0	1978	0
81	IW2DVK	JN45	88	29	411	0	1022	2944	0
82	PA0JUS	JO22	87	0	325	1706	0	9650	0
83	F1JKY	JN25	85	24	0	0	0	1584	0
84	SM0FZH	JO99	66	0	502	1016	0	1984	0
85	DJ6MB	JO30	64	0	0	661	0	5968	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	DL8HCZ	JO53	559	0	1615	1976	2096	3527
5	PA0RDY	JO22	551	0	1582	1979	2272	2819
6	DF8LC	JO53	544	0	2105	2045	2226	3291
7	SM6CMU	JO57	534	0	1760	1928	2280	2540
8	SM6AFH	JO66	531	0	1730	1554	2010	2330
9	DL8EBW	JO31	524	61	1454	1918	2030	2214

10	OH5LK	KP30	517	0	1962	2041	2235	2891
11	DK6AS	JO52	516	0	1460	1885	2510	2260
12	SP6GZZ	JO81	512	0	1670	1794	2017	2717
13	HA1YA	JN87	509	71	1548	1876	2183	2885
14	OE3JPC	JN88	504	0	1584	1821	2128	2769
15	SP9EWU	JO90	498	0	1710	1927	2154	2531
16	I2FAK	JN45	493	0	1797	1508	2405	2995
17	OZ1DOQ	JO65	467	58	1885	1940	1981	2888
18	I4XCC	JN63	461	0	1177	1803	2275	3257
19	DL8LAQ	JO43	460	0	1376	1806	1934	3302
20	ON4GG	JO20	459	0	1420	1965	2150	2124
21	PA2CHR	JO22	453	0	1432	1683	2240	3201
22	PA3FOC	JO21	446	0	1373	2010	2209	2326
23	OK2ZW	JN89	445	0	1417	1775	2113	2471
24	DL2NWK	JO63	441	0	1819	1956	1991	2251
25	DJ7OF	JO51	436	63	1512	1518	1970	2156
26	DL5DTA	JO61	436	56	1344	1578	1907	2057
27	DL7FF	JO62	430	0	1516	1379	2057	2312
28	RX1AS	KN59	427	0	1709	1905	2271	2547
29	OK2VMD	JN89	425	0	1662	1765	2031	3605
30	YU7EW	KN05	425	0	1404	1755	2179	2430
31	IW5AVM	JN52	423	63	1590	0	2040	2893
32	DL5BCU	JO43	421	0	1479	1928	2010	2538
33	RA3YCR	KO73	420	0	1835	1964	2255	2429
34	ES2WX	KO29	410	0	1370	1950	2270	2071
35	F8OP	JN26	408	0	1228	1196	2028	2720
36	YO2IS	KN05	407	0	1360	1916	2130	2556
37	OK1FM	JN69	402	55	1843	1438	2200	2150
38	OM3AU	KN08	401	0	2128	1756	2065	2513
39	DL3AMA	JO51	401	54	1785	1803	1925	2075
40	ON4ANT	JO20	399	0	1420	1965	2124	2725
41	DL7AKA	JO62	396	0	1747	1916	2065	3620
42	SP4MPB	KO03	393	0	1886	1764	2038	2697
43	SP5EFO	KO02	392	0	1702	1982	2010	2626
44	OK1MAC	JN79	392	0	1536	1681	2005	2511
45	DK0OG	JN68	391	0	1708	1722	2172	3320
46	DD0VF	JO61	385	57	1736	1275	1955	2328
47	OK1JKT/P	JO60	385	51	1701	1764	2121	2269
48	I3LGP	JN65	380	0	1335	1387	2020	3174
49	F8CS	JN27	378	54	1161	1468	2124	3231
50	UA3MBJ	KO88	374	0	1560	2006	2573	2392
51	HB9CRQ	JN47	369	0	1404	1288	2060	2959
52	IW1AZJ	JN35	369	60	1115	1188	1971	2780
53	DL1SUN	JO53	367	0	1824	1724	1845	2333
54	PA3FJY	JO32	366	0	1536	1337	2085	2086
55	I4YNO	JN54	366	63	1374	1374	2122	2276
56	SM7JUQ	JO65	357	41	1902	1646	1921	2332
57	OE3OKS	JN87	356	59	1441	1273	1867	2788
58	F5FHI	IN97	355	0	1739	2051	2183	2735
59	DL1KDA	JO30	354	54	1388	1924	2101	2276
60	YL3AG	KO26	353	33	1552	1912	0	2448
61	S50C	JN76	350	61	1463	1530	2233	3356
62	PA2DWH	JO22	345	59	1230	1950	2150	2250
63	DL6BF	JO32	344	50	1542	1932	1814	2332
64	OH2BNH	KP20	344	37	1334	1787	2003	2003
65	DL7YS	JO62	343	0	1512	1528	1826	2136
66	UT1PA	KO21	340	0	1901	1934	1806	2425
67	YU1WP	JN94	340	50	1422	1850	2236	2825
68	SP6AZT	JO81	335	0	2080	1463	1710	2566
69	G3LQR	JO02	333	0	1776	2031	0	2406
70	OK1DKS	JO70	333	56	1230	1308	0	3530
71	DJ1LP	JO64	331	46	1347	1071	2058	2301
72	DL5GAC	JN47	330	0	1264	1876	2135	3079
73	F6DKW	JN18	327	51	1519	1602	2051	2755
74	EA1DVY	IN81	323	0	1946	0	0	2064
75	DH3YAK	JO31	320	55	1424	1162	1860	2650
76	OK1MG	JO70	319	49	1526	1590	0	2632
77	DK1KR	JO53	316	0	1481	2103	0	2026
78	PA0RLS	JO22	311	0	1350	1890	1890	2832
79	SP3MFI	JO91	307	0	1697	1632	1802	2617
80	ES2RJ	KO29	307	0	1190	1866	1850	1953
81	UA3TCF	LO26	306	0	1131	1996	2498	2332
82	SP9HWY	JO90	303	0	1698	1928	0	2532
83	G4YTL	IO91	303	0	1450	1774	2143	2172
84	DB6BX	JO32	302	52	1534	1541	1921	2115
85	I1JTQ	JN35	301	0	1106	1269	1825	2742
86	OK1AXH	JO70	300	0	2142	1486	1366	1768
87	F1FIH	JN23	298	51	1305	999	1757	2934
88	DL8OBU	JO42	297	0	1483	1866	1733	2159
89	RW3RW	LO02	297	0	1298	2098	1740	2834
90	SP6GWB/P	JO80	296	0	1780	1581	1875	2437
91	SM5BSZ	JO89	293	0	1764	1824	1938	0
92	OK1DFC/P	JO60	291	51	1775	2099	2024	2016
93	PE1OGF	JO21	291	52	1391	1139	1959	2260
94	UA3DHC	KO96	289	0	1766	1891	2180	2429
95	IK1PAG	JN35	289	0	1186	0	1910	2725
96	SP2JXN	JO94	286	0	1650	1690	0	2634
97	F5HRY	JN18	285	50	1276	1695	2038	2758
98	OK1FFD	JO60	283	47	1388	1720	1937	2154
99	IN3TWX	JN56	283	0	1100	0	1609	1750
100	F1EAN	JN06	282	0	1650	1420	0	2479
101	ES3GZ	KO28	281	32	1495	1828	2134	2101
102	PA0WWM	JO22	281	49	1303	1839	1997	2212
103	LA8AK	JO38	280	0	1496	1804	1804	2413
104	ON4KST	JO20	277	50	1435	1612	863	2383
105	G4IGO	IO80	274	0	2761	1917	1903	2833
106	DL1BKK	JO43	273	0	1513	928	0	2712
107	DK2BJ	JO30	272	0	1476	1924	0	2205
108	RZ6BU	KN84	272	0	1172	960	2017	2953
109	UA4API	LO20	271	0	1127	1820	0	0
110	UA4NM	LO48	270	0	1215	1850	2510	2290
111	G6HKM	JO01	269	0	1304	1555	1660	2269
112	OK1IBL	JO60	266	50	1438	1462	2003	3398
113	PA2TAB	JO32	265	51	1302	1094	1949	2183
114	IK5OIY	JN52	265	0	1048	0	2095	2253
115	OE6IWG	JN77	263	51	1221	1110	2220	2126
116	OZ1IPU	JO57	262	40	1387	1187	1566	2452
117	GW4LXO	IO81	261	0	2750	1550	2000	2200
118	RK2FWA	KO04	261	0	912	1759	2125	2010
119	OK1HAG	JN79	260	0	1441	1749	1909	3463

120	F6CKZ	JN09	258	0	1552	1330	1721	3408
121	DD0BI	JO33	257	0	1565	1018	1102	2450
122	DK8EL	JO31	256	0	1199	1051	1870	1996
123	DJ6LV	JO31	250	0	1268	1880	1822	3130
124	ES1RF	KO29	249	30	1184	1820	1978	2084
125	DG1BA	JO43	245	0	1674	1280	1588	2239
126	ON4PS	JO20	243	43	1449	1435	1393	1964
127	LZ1ZX	KN32	243	0	1162	0	1945	2729
128	PE1KHP	JO22	241	0	1685	1214	1321	2010
129	F5JRX	JN25	237	0	1598	1187	1616	2301
130	OK2QI	JO80	237	0	1475	1686	1380	2050
131	OM7AQ	JN98	236	49	1484	1294	1793	2483
132	OK1KEI	JO70	235	0	1861	1259	983	2067
133	UT7GA	KN66	234	0	1877	1446	2131	2617
134	OK2PNN	JN89	234	0	149	1216	0	3771
135	HB9DFG	JN37	232	49	1367	1299	1784	2302
136	OK1PG	JO70	229	0	1773	0	0	3488
137	DK1VI	JN49	227	0	1148	1107	1604	3131
138	F1GTU	JN05	225	0	1650	967	1934	2400
139	DG1VL	JO61	224	43	1343	1223	1800	2325
140	RA6HHT	LN05	224	0	1255	1827	1827	2782
141	YU1VG	JN94	224	39	1022	826	1727	2294
142	OK1VBN	JN78	223	45	1578	1682	1915	2209
143	F5DE	JN05	222	38	1891	1671	1892	2399
144	9A4EW	JN95	216	0	1075	0	1956	2293
145	DL5BBL	JO42	215	0	1416	1290	0	2028
146	UA4UK	LO14	215	0	0	0	0	0
147	DC6DY	JO31	212	0	1416	1045	1914	2292
148	F5PAU	IN88	209	0	1630	0	0	2425
149	UR7GN	KN66	208	0	1830	0	2010	1940
150	G3XDY	JO02	208	38	1355	2049	0	2124
151	DH9NBB	JN49	207	47	1363	1228	1725	2039
152	ES0NW	KO19	207	30	1060	1720	1797	1965
153	IK1LGV	JN44	204	0	1466	0	1613	1890
154	SP5HEJ	KO02	201	0	1830	1705	1312	2313
155	UY5HF	KN66	201	0	1750	0	1820	2032
156	OK1VMS	JO70	201	0	1692	1232	0	2225
157	DF1IAZ	JN49	201	48	1038	789	1978	1873
158	DL8AAV	JO52	198	44	1236	1127	0	2144
159	DL9BDM	JO33	197	0	1538	1248	1659	2321
160	G6RAF	IO92	197	0	1507	1722	2078	2400
161	DF9QX	JO42	197	0	1446	1070	1455	3320
162	OK1DDO	JO60	196	46	1329	1500	1720	2418
163	OK1SC	JO70	195	0	1490	1673	0	1729
164	DK2DB	JN48	195	0	1239	1136	0	3106
165	IT9VDQ	JM68	192	41	1625	0	1950	2491
166	PA0JUS	JO22	192	38	1409	1050	0	2167
167	OE5VRL/5	JN78	190	0	1665	1573	1990	2157
168	DL2DR	JO31	190	39	1158	980	0	2057
169	UA3MHJ	KO87	186	0	1227	1943	2405	1948
170	HB9MIO/P	JN37	185	0	1316	975	0	2183
171	S59AM	JN65	184	0	1377	0	1945	1788
172	UA3T	LO16	183	0	1163	1941	2145	0
173	HB9RUZ	JN47	183	48	1060	1050	0	3014
174	DL3YEE	JO42	178	0	1574	1450	1480	2106
175	DK9RL	JN69	177	0	1311	1513	1286	3316
176	RA3TES	LO15	177	0	1074	1935	2144	2247
177	DG3XA	JO43	176	35	1371	1061	1839	2183
178	DG3HS	JO53	174	0	1152	1091	0	2306
179	G6LEU	IO70	173	0	2620	750	0	2403
180	HB9AOF	JN36	172	44	1201	670	1675	2166
181	OK1IAS	JO60	171	0	1195	1444	0	2138
182	HA1SO	JN87	170	0	1787	1797	0	2143
183	OK1VEI	JO70	170	0	1677	1197	1398	0
184	UA6LGH	KN97	169	0	1918	758	1918	2167
185	DG0CR/P	JO50	169	0	1279	1530	0	2010
186	UA3RBO	LO03	169	0	952	1909	2137	2378
187	UA3MAS	KO97	167	0	1667	1752	1884	1996
188	ES5RY	KO38	167	30	1198	1695	2002	1409
189	OK1KRY	JN69	166	40	1437	977	0	1830
190	ON4ZN	JO21	163	32	1390	980	0	2149
191	ES1JL	KO29	163	25	1379	1596	0	0
192	DG0CAL	JO52	161	0	1160	0	1543	2105
193	UA4AQL	LO20	161	0	1124	1841	2158	2195
194	DK5WO	JO30	159	0	1474	1219	0	1993
195	SP9FG	JN99	158	29	1647	1283	0	1698
196	SM0FZH	JO99	158	0	1226	1442	1200	2377
197	DL0UL/P	JN48	157	0	1026	0	0	2019
198	OK1CA	JO70	156	0	1540	1065	950	2096
199	RW3PF	KO93	153	0	1015	1840	0	2162
200	OZ7IS	JO65	151	0	1128	1294	1901	1845
201	ES6PZ	KO38	151	20	1100	0	0	2532
202	UT5JCW	KN64	150	0	0	0	0	0
203	DJ6XV	JO31	148	0	1337	961	0	2007
204	DK0PX	JN48	147	0	966	0	1815	1649
205	PA3FXW	JO22	144	0	1267	1247	1436	1965
206	OK2PMN	JN88	141	0	871	1547	887	2101
207	RW4AK	LO20	136	0	1126	1480	2158	2301
208	OK2UFB	JN99	135	27	1526	0	0	1983
209	LY2SA	KO14	135	31	1008	1118	1676	2088
210	OK2KDS	JN99	134	0	1568	0	0	1983
211	DG5NEX	JN49	133	0	1234	0	1333	1941
212	DL3IAS	JN49	130	36	988	1123	1830	1866
213	RU3ZD	KO81	126	0	1713	2126	1755	2363
214	DL5IO	JN49	126	0	1073	925	1450	1899
215	LA7DFA	JP33	125	0	630	1816	1803	0
216	RV3ZR	KO80	124	0	1045	1956	1785	2077
217	DH0GHU	JN38	123	29	1170	0	1013	1937
218	DL3NAW	JN59	120	0	1019	0	1961	1237
219	F6FGO	JN25	118	31	1390	0	0	2218
220	UA4CFV	LO32	118	0	1311	1824	0	2415
221	ES1CW	KO29	112	16	1192	1570	0	0
222	OK2XTE	JN79	111	33	1362	0	0	2267
223	DL0SP/P	JO62	111	0	1315	785	0	1608
224	UA9XQ	LP63	107	0	626	1832	2018	1656
225	ON7WR	JO20	106	24	0	0	0	1834
226	UA3TIE	LO16	104	0	1161	1766	1808	1929
227	HA1DAB	JN87	103	0	820	1130	0	2143
228	DJ8ES	JO43	102	19	1306	0	0	1856
229	I3ZVN	JN55	96	31	1212	0	0	2237

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	169	32	1550	662	0	0
15	PE0AGO	JO32	163	0	1702	0	0	0
16	HA1YA	JN87	163	40	1438	1221	0	0
17	G3XDY	JO02	163	27	1350	1619	0	0
18	DK6AS	JO52	161	0	1569	775	0	0
19	F6DKW	JN18	161	23	1519	0	0	0
20	SP6MLK/P	JO80	160	30	1780	0	0	0
21	DK1KO	JO53	160	0	1643	694	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	DK1KR	JO53	152	0	1400	1827	0	0
26	SP6GWB/P	JO80	151	0	1780	759	0	0
27	PA3DIJ	JO33	150	0	2116	1010	0	0
28	OZ2OE	JO45	149	0	2216	1020	0	0
29	DF8LC	JO53	149	0	1615	1361	0	0
30	YL3AG	KO26	148	19	1571	1041	0	0
31	SM6ESG	JO67	148	26	1436	712	0	0
32	RA3YCR	KO73	147	0	1671	1788	0	0
33	OK1CA	JO70	146	0	1670	0	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	PA2CHR	JO22	122	31	1357	323	0	0
52	OE5VRL/5	JN78	121	0	1524	1031	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	PE1OGF	JO21	112	18	1288	0	0	0
58	DL0UL/P	JN48	112	0	1238	0	0	0
59	DL6BCT	JO43	112	0	1152	0	0	0
60	DJ6XV	JO31	112	0	1128	976	0	0
61	F5PAU	IN88	111	0	1630	0	0	0
62	SP6GZZ	JO81	110	0	1549	870	0	0
63	UA3MBJ	KO88	110	0	1306	1541	0	0
64	ON7WR	JO20	110	23	1163	0	0	0
65	GW4LXO	IO81	109	0	1550	0	0	0
66	DL7FF	JO62	109	0	1507	772	0	0
67	DK0OG	JN68	109	0	1459	745	0	0
68	HB9MIN/P	JN37	109	0	1300	0	0	0
69	ON4ZN	JO21	109	21	1132	0	0	0
70	SM6CMU	JO57	108	0	1641	670	0	0
71	SM6AFH	JO66	108	0	1315	1200	0	0
72	DH9NBB	JN49	107	24	1363	0	0	0
73	DL3AMA	JO51	107	21	1015	1219	0	0
74	UT1PA	KO21	105	0	1238	1761	0	0
75	DF9QX	JO42	105	0	1136	721	0	0
76	DC4XH	JO43	104	20	1133	808	0	0
77	OK1DKS/P	JO60	102	23	1118	0	0	0
78	UT7GA	KN66	101	0	1877	0	0	0
79	UA3DHC	KO96	101	0	1596	1009	0	0
80	ON4PS	JO20	101	18	1335	0	0	0
81	HB9CRQ	JN47	101	0	1010	0	0	0
82	DL4KG	JO31	100	19	1273	0	0	0
83	ON4GG	JO20	98	0	1407	0	0	0
84	SP9HWY	JO90	98	0	1398	1306	0	0
85	DK5WO	JO30	98	0	1150	0	0	0
86	ON4ANT	JO20	96	0	1406	0	0	0
87	DL1KDA	JO30	95	15	1286	999	0	0
88	F5HRY	JN18	94	18	1222	583	0	0
89	OK1KRY	JN69	93	23	1350	0	0	0
90	RX1AS	KN59	93	0	0	0	0	0
91	DL2NWK	JO63	92	0	1636	590	0	0
92	DD0BI	JO33	92	0	1259	0	0	0
93	DL2DR	JO31	92	21	1158	0	0	0
94	DJ1LP	JO64	91	9	1414	0	0	0
95	DK2DB	JN48	91	0	1331	0	0	0
96	DG5NEX	JN49	91	0	1187	0	0	0
97	G4LRT	IO92	90	0	1394	410	0	0
98	OK1VMS	JO70	89	0	1315	0	0	0
99	OK1KPA	JN79	89	0	1176	0	0	0
100	DK0PX	JN48	89	0	1168	0	0	0
101	OK1OKL	JO60	88	0	1199	0	0	0
102	DK9RL	JN69	87	0	1185	0	0	0
103	SP5EFO	KO02	87	0	1120	1705	0	0
104	DJ8ES	JO43	87	12	1087	0	0	0
105	IW5AVM	JN52	86	20	1458	0	1670	0
106	DG0CAL	JO52	86	0	1160	0	0	0
107	UY5HF	KN66	84	0	1670	0	0	0

108	OE3JPC	JN88	84	0	1132	1450	1469	0
109	DK1VI	JN49	84	0	1125	870	0	0
110	HB9MIO/P	JN37	84	0	1096	0	0	0
111	DC6DY	JO31	83	0	1190	0	0	0
112	DL5BCU	JO43	83	0	1188	766	0	0
113	DG1VL	JO61	83	14	1125	0	0	0
114	HB9AOF	JN36	83	15	926	0	0	0
115	DG3XA	JO43	83	13	905	0	0	0
116	OH2BNH	KP20	82	12	1235	1046	0	0
117	DG0CR/P	JO50	82	0	1048	759	0	0
118	F6CKZ	JN09	80	0	1302	0	0	0
119	DF1EQ	JO31	80	0	1249	0	0	0
120	DK0FLT	JN49	80	17	1103	0	0	0
121	OK2KDS	JN99	79	0	1212	0	0	0
122	S50C	JN76	79	18	977	0	0	0
123	I4YNO/4	JN54	77	15	886	0	0	0
124	ES2RJ	KO29	76	17	1261	1123	0	0
125	DH3YAK	JO31	75	13	1165	0	0	0
126	F1GTU	JN05	75	0	1114	0	0	0
127	OK1FFD	JO60	74	23	1339	0	0	0
128	DL7YS	JO62	74	0	1100	0	0	0
129	OK1MG	JO70	74	18	1045	0	0	0
130	DG6GP	JN48	74	13	1024	0	0	0
131	RW3RW	LO02	73	0	1275	1284	0	0
132	UR7GN	KN66	70	0	1790	0	0	0
133	OK2PWY	JN89	69	0	1135	0	0	0
134	OK2PNN	JN89	69	0	918	0	0	0
135	DL0SP/P	JO62	67	0	1018	0	0	0
136	DL6BF	JO32	64	15	869	882	0	0
137	G6LEU	IO70	63	0	1400	0	0	0
138	OK1SC	JO70	63	0	1310	758	0	0
139	OK1DFC/P	JO60	63	17	1032	0	0	0
140	F5JRX	JN25	62	0	1070	0	0	0
141	DL8AAV	JO52	62	15	914	0	0	0
142	DG7SFL	JN49	61	10	947	0	0	0
143	DL3IAS	JN49	61	12	886	0	0	0
144	F6FGO	JN25	60	11	1016	0	0	0
145	ES0NW	KO29	59	17	1213	675	0	0
146	UA4NM	LO48	58	0	1230	1310	0	0
147	UA3MAS	KO97	57	0	1254	1251	0	0
148	OK2UFB	JN99	56	0	1232	0	0	0
149	LA/DB1DI/P	JO37	55	0	1013	0	0	0
150	DB8NU	JN49	55	0	691	0	0	0
151	OK1PG	JO70	54	0	1773	0	0	0
152	YO2IS	KN05	54	0	1020	1741	0	0
153	DH0GHU	JN38	53	11	852	0	0	0
154	OK1VBN	JN78	53	10	723	753	0	0
155	ES3GZ	KO28	52	7	1036	0	0	0
156	UA4UK	LO14	51	0	1433	1296	0	0
157	UA3TCF	LO26	51	0	1131	1542	0	0
158	DL5BBL	JO42	51	0	841	722	0	0
159	OL5Z	JN89	51	12	716	0	0	0
160	DL9BDM	JO33	50	0	1278	0	0	0
161	SP2JXN	JO94	49	0	1149	0	0	0
162	I2FUM/2	JN44	47	0	875	0	0	0
163	F5OIH/P	JN08	46	5	651	0	0	0
164	ES1JL	KO29	45	7	1324	0	0	0
165	F5DE	JN05	45	6	740	0	0	0
166	I3ZVN	JN55	41	12	1197	0	0	0
167	SM7JUQ	JO65	41	11	1048	0	0	0
168	9A2EY	JN75	41	0	588	0	0	0
169	OK1HRR	JO70	40	13	754	0	0	0
170	ES1RF	KO29	40	10	728	0	0	0
171	HA1SO	JN87	39	0	552	0	0	0
172	SM4SJY	JP70	36	6	691	554	0	0
173	HA1DAB	JN87	35	0	955	0	0	0
174	OK2PHM	JN89	35	9	746	0	0	0
175	DF0RU	JO62	35	0	682	0	0	0
176	RA6HHT	LN05	33	0	1030	0	0	0
177	UA4API	LO20	32	0	1127	0	0	0
178	OM7AQ	JN98	32	12	803	0	0	0
179	OK2XTE	JN79	32	11	658	0	0	0
180	SP5HEJ	KO02	31	0	1347	850	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 sein). Gültig sind alle Felder weltweit. Nur terrestrische 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 terrestric 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 relais 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.

DUBUS 1296 MHz Top List

NR	CALL	WW	WKD	CODX
1	PA0EZ	JO22	130	231302
2	PA0WWM	JO22	122	231298
3	PA0RDY	JO22	121	01286
4	DL4VCG	JN39	119	01335
5	F6DKW	JN18	119	211273
6	OK1AXH	JO70	118	01444
7	G3XDY	JO02	117	221341
8	HB9AMH/P	JN37	114	01351
9	G3LQR	JO02	111	01274
10	DB6NT/A	JO50	107	01243
11	DB6BX	JO32	97	241120
12	SM6ESG	JO67	96	191440
13	SM7ECM	JO65	96	171326
14	SP6GWB/P	JO80	95	01580
15	DL6NAQ/P	JO40	92	401253
16	OK1KIR/P	JO60	92	221208
17	SP6MLK/P	JO80	91	231580
18	OE5VRL/5	JN78	91	181524
19	G6DER	IO93	86	01306
20	DL7QY	JN59	86	01261
21	F5PAU	IN88	85	01630
22	DK1KR	JO53	85	01097
23	PA0BAT	JO31	85	181014
24	OZ2OE	JO45	84	01425
25	DK0OG	JN68	82	01160
26	DL3YEE	JO42	82	01136
27	OK1KEI	JO70	81	01316
28	OZ1IPU	JO57	81	161096
29	OK1VEI	JO70	80	01313
30	PA3DIJ	JO33	79	0 939
31	OZ7IS	JO65	77	01205
32	DL1BKK	JO43	77	0 995
33	HB9AOF	JN36	77	15 975
34	DL0UL/P	JN48	74	0 962
35	OK1DFC/P	JO60	73	161176
36	OZ1DOQ	JO65	71	171322
37	F5HRY	JN18	71	91064
38	OK1AIY/P	JO70	70	01490
39	OK1CA	JO70	70	01421
40	PA0JUS	JO22	70	01265
41	DH3NAN	JO50	69	01437
42	G6HKM	JO01	69	01193
43	DH9NBB	JN49	69	131016
44	HB9MIO/P	JN37	69	01000
45	ON7YK	JO20	68	01079
46	DC4XH	JO43	67	141090
47	HB9RG	JN47	67	0 920
48	DF1EQ	JO31	67	0 908
49	G4PMK	IO93	66	01302
50	DL2DR	JO31	65	131158
51	DK5WO	JO30	64	01137
52	OK1OKL	JO60	63	01177
53	OK1DKS/P	JO60	62	131207
54	G4LRT	IO92	62	01152
55	DG5NEX	JN49	61	01060
56	ON7WR	JO20	60	141046
57	ON4GG	JO20	60	0 982
58	SP9FG	JN99	58	151492
59	OK1FFD	JO60	58	141058
60	DF9QX	JO42	57	01066
61	ON4ANT	JO20	57	0 914
62	DJ6XV	JO31	56	0 946
63	DC8UG	JO30	56	10 900
64	DC0DA	JO31	55	01034
65	DJ8ES	JO43	55	101025
66	DL1SUN	JO53	54	01162
67	ON4PS	JO20	54	131052
68	DL3NQ	JN49	51	0 920
69	DB1BX	JO32	51	12 905
70	LA8AK	JO38	49	01373
71	PA2CHR	JO22	49	15 828
72	GW4LXO	IO81	48	0 990
73	DL1KDA	JO30	48	11 940
74	DL3IAS	JN49	48	9 769
75	DK0PX	JN48	47	0 942
76	DK0FLT	JN49	46	10 900
77	F6CGB	JN18	45	0 700
78	DG0CAL	JO52	44	01160
79	HB9BBD	JN47	43	111015
80	DJ1KP	JO40	43	0 698
81	IW5AVM	JN52	42	101036
82	SP9EWU	JO90	42	0 946
83	DJ6MB	JO30	42	0 876
84	OE3JPC	JN88	42	0 702
85	HA1YA	JN87	40	13 862
86	DC6DY	JO31	39	0 865
87	LA/DB1DI/P	JO37	38	01013
88	DK2DB	JN48	37	0 873
89	F1GTU	JN05	36	0 896
90	I0LVA	JN62	35	01152
91	YL3AG	KO26	35	9 800
92	DK2BJ	JO30	34	0 885
93	ES2RJ	KO29	34	8 765
94	S50C	JN76	34	9 626
95	DG6GP	JN48	33	7 732
96	DG1VL	JO61	33	6 723
97	DH3YAK	JO31	33	5 715
98	DJ1LP	JO64	30	0 922
99	UR7GN	KN66	30	0 820
100	I2FUM/2	JN44	30	0 779
101	ES2WX	KO29	30	9 692
102	UT7GA	KN66	28	0 680
103	I3ZVN	JN55	27	91197
104	DK9RL	JN69	27	0 891
105	I4YNO/4	JN54	27	8 769
106	F6FGO	JN25	26	4 839
107	DK1VI	JN49	26	0 710
108	HB9RUZ/P	JN47	25	9 640
109	OZ8VO	JO56	24	0 951
110	OK2QI	JO80	23	01275
111	OK1VBN	JN78	22	9 950
112	F1FIH	JN23	22	6 605
113	OK1PG	JO70	21	0 985
114	PE1OGF	JO21	21	6 588
115	OH5LK	KP30	20	01349
116	UA3MBJ	KO88	20	0 301
117	OK1KRY	JN69	19	7 865
118	OK1KPA	JN79	19	0 783
119	F5OIH/P	JN08	17	5 517
120	SP6AZT	JO81	16	0 820
121	ES1RF	KO29	15	6 364
122	DG7SFL	JN49	15	3 358
123	SM4SJY	JP70	14	3 628
124	DF0RU	JO62	14	0 373
125	RX1AS	KN59	13	0 0
126	DL7YS	JO62	12	0 410
127	DL5UH	JN48	10	4 671
128	OK1SC	JO70	10	0 440
129	OK2BBF/P	JN89	10	6 427
130	OK2PHM	JN89	10	0 341
131	IT9VDQ	JN68	9	1 899
132	DL0SP/P	JO62	9	0 347
133	YO2IS	KN05	8	0 472
134	OK1HRR	JO70	8	2 292
135	UY5HF	KN66	6	0 520
136	GU6WDK/P	IN89	6	0 348
137	OM7AQ	JN98	6	4 327
138	OK2XTE	JN89	6	2 206
139	SP5HEJ	KO02	5	0 433
140	GJ6WDK/P	IN89	5	0 282
141	F8UM	JN15	5	0 220
142	DL3AMA	JO51	5	2 162
143	SM7JUQ	JO65	4	2 502
144	OK2PMN	JN88	1	0 74
145	OH2BNH	KP20	1	1 23

DUBUS 2320 MHz Top List

NR	CALL	WW	WKD	CODX
1	PA0EZ	JO22	79	15 973
2	PA0RDY	JO22	64	01000
3	DB6NT/A	JO50	60	0 1119
4	PA0WWM	JO22	60	151022
5	G3LQR	JO02	55	01006
6	DL6NAQ/P	JO40	53	11 932
7	OK1KIR/P	JO60	51	10 1115
8	DL7QY	JN59	47	01018
9	DL1BKK	JO43	45	0 760
10	G6DER	IO93	44	01265
11	SM6ESG	JO67	44	71054
12	OE5VRL/5	JN78	43	111291
13	PA0BAT	JO31	43	12 923
14	PA3DIJ	JO33	43	0 727
15	OK1AIY/P	JO70	42	01296
16	OZ1IPU	JO57	38	71028
17	SM7ECM	JO65	36	9 880
18	DC8UG	JO30	35	8 900
19	OK1OKL	JO60	34	0 830
20	DF1EQ	JO31	34	0 678
21	DL0UL/P	JN48	32	0 960
22	ON7WR	JO20	32	8 756
23	OZ2OE	JO45	31	0 876
24	DC0DA	JO31	31	0 775
25	DJ1KP	JO40	30	0 454
26	DL3NQ	JN49	29	0 890

27	OZ7IS	JO65	29	0	860
28	ON7YK	JO20	29	0	733
29	HB9MIO/P	JN37	29	0	694
30	DL3YEE	JO42	28	0	912
31	F5HRY	JN18	28	6	785
32	G4LRT	IO92	27	0	1022
33	G3XDY	JO02	27	8	947
34	DH9NBB	JN49	27	7	654
35	DL4VCG	JN39	27	0	553
36	DF9QX	JO42	26	0	915
37	DK0PX	JN48	26	0	853
38	OZ1DOQ	JO65	25	7	830
39	I0LVA	JN62	25	0	612
40	DK0FLT	JN49	24	7	646
41	DK0OG	JN68	23	0	675
42	G4PMK	IO93	22	0	1249
43	DK2DB	JN48	22	0	873
44	OK1DKS/P	JO60	22	4	602
45	DB1BX	JO32	22	7	525
46	DL3IAS	JN49	21	6	604
47	I3ZVN	JN55	19	7	603
48	DJ8ES	JO43	18	7	1025
49	HB9AMH/P	JN37	18	0	933
50	G4DDK	JO02	17	0	969
51	LA/DB1DI/P	JO37	17	0	825
52	DG5NEX	JN49	16	0	465
53	S51WI	JN75	16	4	463
54	DK1KR	JO53	13	0	792
55	DJ6XV	JO31	12	0	396
56	PA0JUS	JO22	10	5	705
57	IW5AVM	JN52	10	3	552
58	I2FUM/2	JN44	10	0	354
59	OK1KEI	JO70	9	0	786
60	DL1SUN	JO53	9	0	349
61	OK1DFC/P	JO60	9	3	320
62	SP9FG	JN99	8	4	717
63	LA8AK	JO38	8	0	677
64	OK2BFF	JN89	8	0	308
65	OK1CA	JO70	8	0	291
66	OK1PG	JO70	8	0	0
67	F6CGB	JN18	7	0	407
68	DG6GP	JN48	7	2	388
69	DH3NAN	JO50	7	0	331
70	F1GTU	JN05	7	0	313
71	SP6GWB/P	JO80	7	0	274
72	SP6MLK/P	JO80	6	3	272
73	F1FIH	JN23	6	1	181
74	ON4PS	JO20	5	0	574
75	S50C	JN76	5	2	346
76	OK1KRY	JN69	5	3	189
77	OK2QI	JO80	4	0	201
78	DF2CA/P	JN57	3	0	206
79	GW4LXO	IO81	3	0	200
80	OK1VBN	JN78	3	2	158
81	DL1KDA	JO30	3	2	98
82	F5PAU	IN88	2	0	120
83	SP9EWU	JO90	1	0	134

DUBUS 3400 MHz Top List

NR	CALL	WW	WKD	COD	X
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	G6DER	IO93	15	0	859
10	DL1BKK	JO43	15	0	703
11	DL3NQ	JN49	15	0	637
12	DL7QY	JN59	15	0	565
13	DC8UG	JO30	13	6	724
14	DF1EQ	JO31	13	0	532
15	DB1BX	JO32	12	4	425
16	DK2DB	JN48	11	0	331
17	G4PMK	IO93	10	0	845
18	DK0PX	JN48	9	0	632
19	G4LRT	IO92	9	0	509
20	DL0UL/P	JN48	9	0	239
21	DL4VCG	JN39	6	0	339
22	OZ2OE	JO45	5	0	772
23	DJ8ES	JO43	5	3	578
24	DJ6XV	JO31	5	0	396
25	GW4LXO	IO81	3	0	117
26	DK0OG	JN68	3	0	78
27	DF9QX	JO42	2	0	143
28	DF2CA/P	JN57	2	0	24
29	OZ1IPU	JO57	1	1	209
30	GU6WDK/P	IN89	1		06

DUBUS 5760 MHz Top List

NR	CALL	WW	WKD	COD	X
1	HB9AMH/P	JN37	36	0	929
2	SM7ECM	JO65	34	6	960
3	PA0EZ	JO22	33	8	1017
4	DB6NT/A	JO50	32	0	1000
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	6	573
12	OK1KIR/P	JO60	17	3	393
13	OK1UWA/P	JO70	16	0	998
14	OE5VRL/5	JN78	15	6	901
15	PA0WWM	JO22	14	6	863
16	DL0UL/P	JN48	14	0	660
17	S51WI	JN75	14	3	586
18	I0LVA	JN62	14	0	557
19	G6DER	IO93	13	0	947
20	F1GHB/P	IN88	12	0	435
21	DL3NQ	JN49	12	0	318
22	DC8UG	JO30	11	5	724
23	OZ7IS	JO65	11	0	593
24	DC0DA	JO31	11	0	451
25	OK1AIY/P	JO70	10	0	693
26	DL7QY	JN59	10	0	565
27	OK1OKL	JO60	9	0	611
28	DL6NAQ/P	JO40	9	2	452
29	OZ1DOQ	JO65	9	4	442
30	DB1BX	JO32	9	4	425
31	DK0PX	JN48	9	0	409
32	DK2DB	JN48	9	0	315
33	HB9MIN/P	JN37	8	0	286
34	LA/DB1DI/P	JO37	7	0	746
35	G4PMK	IO93	6	0	958
36	F5HRY	JN18	6	3	442
37	DC8EC/A	JN57	6	0	278
38	I2FUM/2	JN44	6	0	201
39	OZ2OE	JO45	5	0	679
40	DJ8ES	JO43	5	5	578
41	DF1EQ	JO31	5	0	461
42	F6CGB	JN18	5	0	407
43	DL4VCG	JN39	4	0	339
44	DJ6XV	JO31	4	0	176
45	F8UM/P	JN05	4	0	162
46	DK0OG	JN68	4	0	78
47	DG1VL	JO61	3	2	191
48	OK1KRY	JN69	3	2	175
49	F6CGB/P	JN24	2	0	375
50	OK1DKS/P	JO60	2	1	318
51	ES2WX	KO29	2	2	89
52	GJ6WDK/P	IN89	1	0	136
53	OK2QI	JO80	1	0	108
54	SP6MLK/6	JO70	1	1	1
55	SP6MLK/P	JO80	1	1	1
56	SP6GWB/P	JO80	1	0	1

DUBUS 10 GHz Top List

NR	CALL	WW	WKD	COD	X
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	HB9AMH/P	JN37	51	0	939
6	SM7ECM	JO65	48	7	1110
7	G3LQR	JO02	46	0	1006
8	HB9MIN/P	JN37	45	0	939
9	OE5VRL/5	JN78	42	10	1136
10	DB6NT/A	JO50	40	0	1000
11	DK1KR	JO53	40	0	868
12	DL3YEE	JO42	40	0	700
13	G4BRK	IO91	39	0	1115
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	G3GNR	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	DK0PX	JN48	25	0	567
37	OK1KIR/P	JO60	25	5	553
38	DK0FLT	JN49	24	7	646
39	DH9NBB	JN49	24	7	646
40	DK4GD/P	JN48	24	0	566
41	ON7WR	JO20	23	9	756
42	OZ2OE	JO45	22	0	789
43	EA6ADW/P	JM19	21	4	850
44	OK1AIY/P	JO70	21	0	736
45	S51WI	JN75	21	5	586
46	DC8UG	JO30	20	6	753
47	DB1BX	JO32	20	7	705
48	DL4VCG	JN39	20	0	533
49	I3ZVN	JN55	19	7	573
50	DF9QX	JO42	19	0	504
51	F1GHB/P	IN88	19	0	456
52	G4LDR	IO91	18	0	1118
53	LA/DB1DI/P	JO37	18	0	825
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	HB9AMH	JN37	15	0	567
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	I4XCC	JN63	13	0	496
66	OZ1DOQ	JO65	13	5	472
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	DC8EC/A	JN57	9	0	297
72	G4LRT	IO92	8	0	824
73	F5HRY/P	JN08	8	2	491
74	DL1KDA	JO30	8	4	477
75	DJ6XV	JO31	8	0	195
76	F6CGB/P	JN12	7	0	823
77	SP6GWB/P	JO80	7	0	374
78	DF1EQ/P	JO31	7	0	283
79	SP6MLK/P	JO80	6	4	355
80	PA3DIJ	JO33	6	0	344
81	OK1DKS/P	JO60	5	2	616
82	DG0CAL	JO52	5	0	255
83	LA8AK	JO38	5	0	212
84	S50C	JN76	4	4	176
85	F5OIH/P	JN08	4	1	149
86	OK1DFC/P	JO60	3	2	185
87	DH3NAN	JO50	3	0	134
88	PA0JUS	JO22	2	2	245
89	DG5NEX	JN49	1	0	173
90	OK1KRY	JN69	1	1	78
91	SM4SJY	JP70	1	1	0

DUBUS 24 GHz Top List

NR	CALL	WW	WK	DC	ODX
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	DK0PX	JN48	4	0	168
22	OK1DFC/P	JO60	4	2	160
23	G3GNR	IP70	4	0	154
24	DL3YEE/P	JO42	4	0	151
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	I3ZVN	JN55	3	1	102
31	DG1VL	JO61	3	1	50
32	DF1EQ	JO31	2	0	133
33	DB1BX	JO32	2	1	90
34	DK2DB	JN48	2	0	48
35	ON7YK	JO20	2	0	34
36	SM6ESG	JO67	2	1	20
37	G4KGC	IO92	1	0	392
38	DC0DA/P	JO32	1	0	104
39	F5OIH/P	JN08	1	1	90
40	CT1DMK	IN50	1	0	82
41	DJ6XV	JO31	1	0	76
42	F6CGB/P	JN37	1	0	74
43	OK1OGS/P	JN69	1	0	60
44	GW4LXO	IO81	1	0	58
45	OZ1IPU	JO57	1	1	55
46	DL4VCG	JN39	1	0	9
47	SP6MLK/6	JO70	1	1	1
48	SP6MLK/P	JO80	1	1	1
49	SP6GWB/P	JO80	1	0	1

DUBUS 47 GHz Top List

NR	CALL	WW	WK	DC	ODX
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	DL2DR	JO31	3	1	71
7	OK1OKL	JO60	2	0	96
8	OK1UWA/P	JO70	2	0	96
9	OK1AIY-P	JO60	2	0	96
10	DB6NT/A	JO50	2	0	95
11	DC0DA/P	JO31	2	0	69
12	DK0PX	JN48	2	0	62
13	DF2CA/P	JO60	2	0	59
14	DL3YEE/P	JO42	2	0	45
15	DL/HB9AMH/P	JN48	1	0	184
16	DC8EC/A	JN57	1	0	14
17	OK1AIY/P	JO70	1	0	12
18	OK1KIR/P	JO60	1	1	5
19	SP6MLK/6	JO70	1	1	1
20	CT1DMK	IN50	1	0	1

DUBUS 76 GHz Top List

NR	CALL	WW	WK	DC	ODX
1	DK4GD/P	JN47	4	0	114
2	DF2CA/P	JO50	4	0	4
3	HB9MIO/P	JN37	2	0	114
4	DB6NT/A	JO50	2	0	77
5	DC0DA/P	JO50	2	0	48
6	OE9FKI	JN47	1	0	2
7	HB9AMH/P	JN37	1	0	1
8	HB9MIN/P	JN37	1	0	1

DUBUS 145 GHz Top List

NR	CALL	WW	WK	DC	ODX
1	DB6NT/OZ	JO57	1	0	3
2	DB6NT/A	JO50	1	0	2

DUBUS 241 GHz Top List

NR	CALL	WW	WK	DC	ODX
1	DB6NT/A	JO50	1	0	2
2	DB6NT/OZ	JO57	1	0	0

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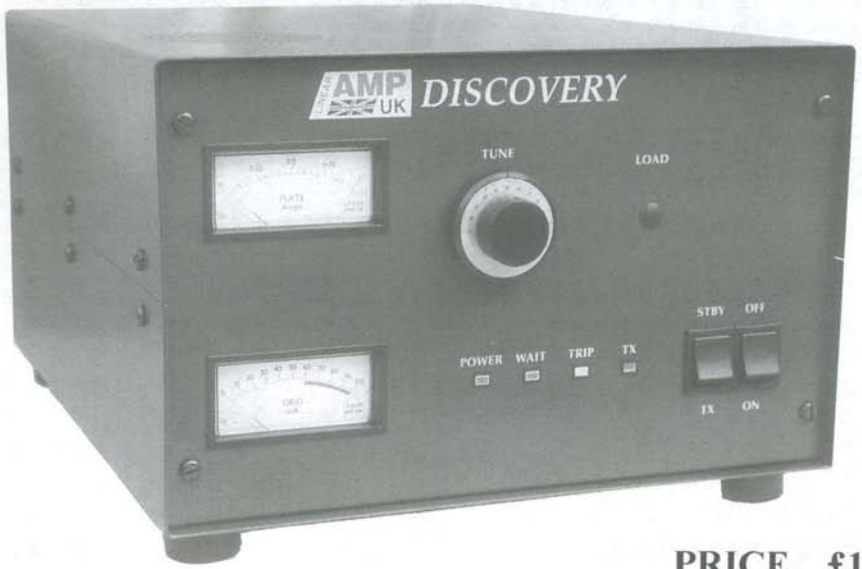

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Ausgang zur Versorgung von Endstufen. TX Gain einstellbar

Transverter für 3400 MHz	Typ: MKU 34 G,	für 5760 MHz Typ: MKU 57 G	a. 685.- DM
Oszillator LO für 3256 MHz	Typ: MKU 33 LO,	für 5616 MHz Typ: MKU 56 LO	a. 360.- DM
Power Amplifier für 3400 MHz - typ.: 5 Watt 12 dB Gain		Typ: MKU 341 A	475.- DM
Power Amplifier für 5760 MHz - typ.: 5 Watt 2 stufig		Typ: MKU 602	725.- DM

3 cm Transverter Modul 144 / 10368 MHz

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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

1,4 cm Transverter Modul 144 / 24192 MHz

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

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

Transverter	Typ: MKU 24 G	253.- DM
Oszillatorbaugruppe 12024 MHz	Typ: MKU 12 LO	483.- DM
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Output Power typ. 0,2 mW HF
Rauschzahl < 8 dB NF

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

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