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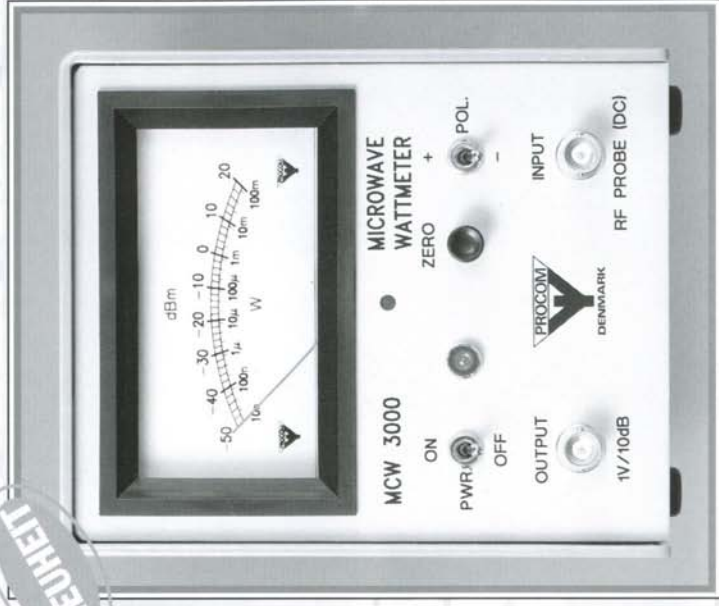
European EME Contest



Entirely Devoted to VHF/UHF and Microwaves

NEUHEIT

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PRO-18G WIRD
MITGELIEFERT.**



EISCH-ELECTRONIC

Annenmarie Eisch-Kafka

Abt.-Ulrich-Str.16, D-89079 ULM, Tel: (+49) 07305 23208, Fax: (+49) 07305 23306

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Redaktion/Editorial Staff

Technical Reports, Microwave Parts:	Rainer Bertelsmeier, DJ9BV, Glücksburger Str. 20, D-22769 Hamburg, email: dj9bv@t-online.de
Microwave News:	Simon Lewis, GM4PLM, 181 Kent Drive, Helensburgh, Strathclyde, G84 9RX, SCOTLAND, UK, email: gm4plm@emn.org.uk
Microwave USA:	Kent Britain, WA5VJB, 1626 Vineyard Rd., Grand Prairie, TX 75052, USA, email: wa5vjb@flash.net
Microwave JAPAN:	T. Takamizawa, JE1AAH, 3-28-6 Takaishi, Asao-ku, Kawasaki 215, Japan, email: toshi@kw.netlaputa.ne.jp
EME-News:	Bernd Wilde, DL7APV, Nordhoferstr. 8, D-16833 Nordhof, email: dl7apv@t-online.de
Tropo News, 6 m News, Beacon List:	Joachim Kraft, DL8HCZ, Grützmühlenweg 23, D-22339 Hamburg, email: funk-telegramm@t-online.de
Meteor Scatter News, Aurora News, Top List, ES News:	Norbert Götsche, DL8LAQ, Tulpenweg 3, D-24568 Kaltenkirchen, email: dl8laq@gmx.de
FAI News:	Georges Vialet, F8OP, Le Cottage, Rte de Tournus, F-71290 Cuisery, France, email: f8op@wanadoo.fr
News & Comments:	Klaus Tiedemann, DL4EBY, Halskestr. 35, D-12167 Berlin, email: tklaus@snaflu.de

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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Chefredakteur/Editor-in-Chief:

Rainer Bertelsmeier, DJ9BV, Glücksbürger Str. 20, D-22769 Hamburg, e-mail: dubus@t-online.de

Geschäftsführer/Manager:

Joachim Kraft, DL8HCZ, Grützmühlenweg 23, D-22339 Hamburg, FRG, email: 0405383186@t-online.de; Fax: (+49)40-71097158

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International Representatives

- Austria:** Reinilde Riml, OE9YTV, Marktstr. 35, A-6971 Hard
- Australia:** Doug McArthur, VK3UM, Tikaluna, 26 Old Murrindindi Rd., Glenburn, Victoria 3717, email: tikaluna@yccs.com.au
- Belgium:** InfoRad c/o Jan Galicia ON6JG, Oude Gendarmeriestratt 62, B-2220 Heist-op-den-Berg, email: inforad@pandora.be
- Bulgaria:** C. Mintchev, LZ1DP, UI Boruigrad 8 AP 10, 6004 Stara Zagora
- Czech Republic:** GES Electronics, OK1FM, Sady S. Kvetna, 30112 Plzen, Tel: 019-7373111, email: zuskova@ges.cz
- Denmark:** Gert Rahbek-Udengaard, OZ1FKZ, Risvangen 2, DK-8362 Hörning, Tel: 086922760, email: GertRahbek@hotmail.com
- Eire:** A.E. Latham, EI6AS, 226 Belgard Heights, Dublin 4
- France:** Patrick Magnin, F6HYE, Marcorens, F-74140 Ballaison, Tel: 0450941914, email: Jukka Saario, OH1FF, Insinrinkatu 48 A 28, SF-33720 Tampere, Fax: 0424 9999 234, email: Jukka.Saario@elektrobit.fi
- Finland:** Tony Fumagalli, I2FUM, Via Masia 34, I-22100 Como, Tel: 031571537, email: elcosrl@tin.it
- Italy:** Toshihiko Takamizawa, JE1AAH, 3-28-6 Takaishi, Asao-ku, Kawasaki 215, Tel: 0449322688, email: toshi@kw.netlaputa.ne.jp
- Japan:** Carlo Diedert, LX1CD, 15 Op der Hobuch, L-5832 Fentange
- Luxemburg:** Veron Verkoop Bureau, P.O. Box 1166, NL-6801 BD Arnhem, email: veroncb@worldonline.nl
- Netherlands:** Anders Thorrud, LA8LF, Jerpeveien 20, N-3030 Drammen, email: milcom@c2i.net
- Norway:** Antonio Filipe S. Ferreira, CT1DDW, Pousada do Forno, 1 E.F., Pascoal, 3510 ABRABEZES, email: filipeferreira@net.sapo.pt
- Portugal:** Andrez Wlodarczyk, SP1JX, P.O. Box 67, 76-270 Ustka
- Poland:** Folea Ion, YO5TE, P.O.Box 168, RO-3400, Cluj 1, email: yo5te@yo5kai.codec.ro
- Romania:** Sergej Joutiaev, RW3BP, P.O. Box 462, 111555 Moscow, email: rw3bp@co.ru
- Russia:** John Sygo, ZS6JON, P.O. Box 66, 1752 Paardekral, tel: 0119540437, email: johnsygo@pop.fast.co.za
- R.S.A.:** J.R. Daglio Accunzi, EA2LU, Manual Irribarren 2-5 D, E-31006 Pamplona, email: ea2lu@retemail.es
- Spain:** Nemethy Istvan, YU7EW, Branka Radicevica 63, YU-23217 Aleksandrovo, email: yu7ew@yo2kjo.ampr.org
- Serbia:** Miha Habic, S51FB, Vodnikova 8, SI-1000 Lubljana, email: Miha.Habic@pub.mo-rs.si
- Slovenia:** Anders Pettersson, SM7ECM, Hökvägen 111, S-24562 Hjärrup, email: Anders.Pettersson@ecs.ericsson.se
- Sweden:** Ferdinand Stämpfli, HB9MIO, Bachtelen 3, CH-3308 Grafenried
- Switzerland:** Sergej Lysenko, UR5LX, Zolochov Reg., Iwaschki, Kharkov Obl, Ukr. 312211, email: ur5lx@ur5lx.kharkov.com
- Ukraine:** Roger Blackwell, G4PMK, 5 Tollgate Road, Culham, Nr. Abingdon, Oxon OX14 4NL, email: dubus@marsport.demon.co.uk
- United Kingdom:** Kyle Britain, KB5UBE, 1626 Vineyard Road, Grand Prairie, TX 75052, email: keb3985@omega.uta.edu
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Editorial

Liebe Leser!

Neuer Redakteur für Microwave News:

Simon Lewis, GM4PLM, ist der neue Redakteur für die Sparte "Microwave News".

Er ist ein aktiver Mikrowellenamateur. Aber lesen Sie selbst in seiner Kolumne über seine Ideen. Wir wünschen Simon alles Gute, viel Erfolg und vor allen Dingen Spaß an seiner Tätigkeit.

Ich danke John Sørensen, OZ1IPU, für seine langjährige Tätigkeit als Redakteur.

73

Rainer, DJ9BV

Dear Reader!

New Editor for Microwave News:

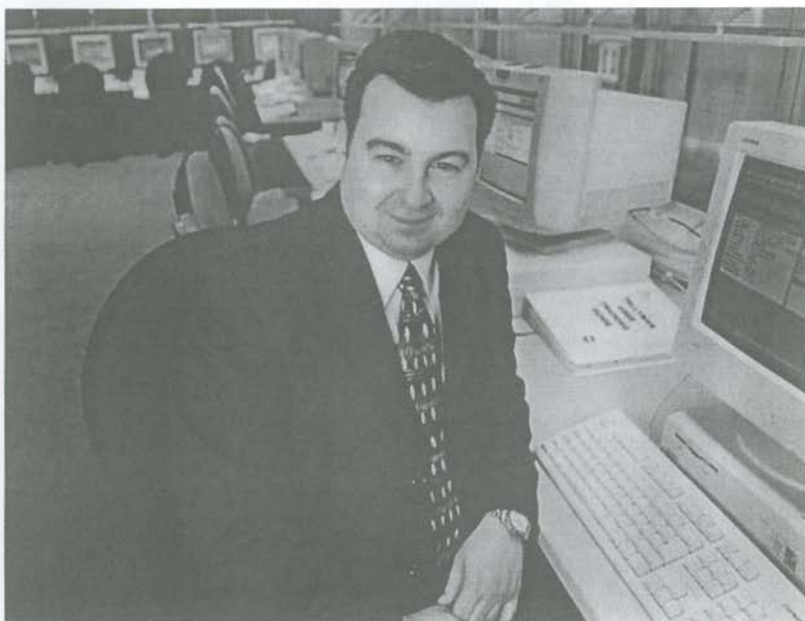
Simon Lewis, GM4PLM is new editor for Microwave News.

He is an active microwave amateur. But inform yourself about his ideas by reading his column. We wish him all the best and a lot of fun in the DUBUS team and his editorial job.

We all thank John Sørensen, OZ1IPU for his work he has done for this column.

73

Rainer, DJ9BV



Simon Lewis, GM4PLM, the new editor for Microwave News

Technical Reports

Editor: Rainer Bertelsmeier, DJ9BV

1.3 GHz Transverter MKII

Michael Kuhne, DB6NT

Birkenweg 15, D-95119 Naila, Germany

1. Einführung

Der hier beschriebene Transverter ist eine Weiterentwicklung der 1991 veröffentlichten Schaltung. Die Baugruppe konnte durch die Verwendung moderner Halbleiterbauteile in ihren technischen Daten weiter verbessert werden. Durch Überarbeiten des Leiterplattendesigns hinsichtlich Kühlung der Leistungsbauteile und einfacher Nachbaubarkeit konnte eine weitere Optimierung des Transvertes erfolgen.

Die Schaltung ist auf keramikgefülltem Epoxydsubstrat aufgebaut. Das Empfangsteil erreicht eine Rauschzahl von typisch 0,6 dB NF, bei mehr als 20 dB Verstärkung. Somit ist auch ein externer Empfangsvorverstärker nicht mehr erforderlich.

Das Sendeteil erzeugt eine Ausgangsleistung von 1,5W, bei typisch -60 dB Neben- und -40 dB Oberwellen Unterdrückung. Der Transverter ist für die lineare Umsetzung des 2 Meter- Bandes in das 23 cm Amateurband (Schmalbandbereich 1296...1298 Mhz) konstruiert. Der 2 Meter Steuerleistungsbereich ist von 0,5...3 Watt einstellbar, durch Änderung eines Widerstandes sind auch 10 mW ausreichend. Die Steuerleistung sollte nicht zu groß gewählt werden, um eine unnötige

Erwärmung der Baugruppe durch die ZF-Verlustleistung zu vermeiden.

Der gesamte Transverter mit ZF- Umschaltung, Steuerausgang für Koaxrelais oder PA's, Quarzoszillator, LO- Aufbereitung ist in einem Weißblechgehäuse mit den Abmessungen 55x74x30mm untergebracht. Ein Abgleich durch aufwendige HF-Messtechnik entfällt, es ist lediglich ein Spannungsmesser erforderlich.

1. Introduction

The new version of the 23cm transverter is an improved circuit of the transverter described in 1991 [8]. By use of modern semiconductors and refinement concerning cooling and the easy replication of the circuit a further optimisation of the transverter had been possible.

The current transverter is a singleboard construction on RO4003 substrate. The receiver has a noise figure of typical 0.6dB at more than 20dB gain.

The transmitter achieves an output power of more than 1.5W in a frequency band of 1296...1298MHz at an IF of 144MHz. The spurious rejection is better than 60dB. Harmonic rejection is better than 40dB.

Everything -TX, RX, LO, IF-Switch and T/R-control is on a single board housed in a 55x74x30mm large box from tin-plate.

For tuning only a simple detector is necessary. All filters are helical filters with restricted tuning range. The restricted tuning range of the helical filters doesn't allow tuning on 'false' resonances.

2. Schaltungsbeschreibung

LO

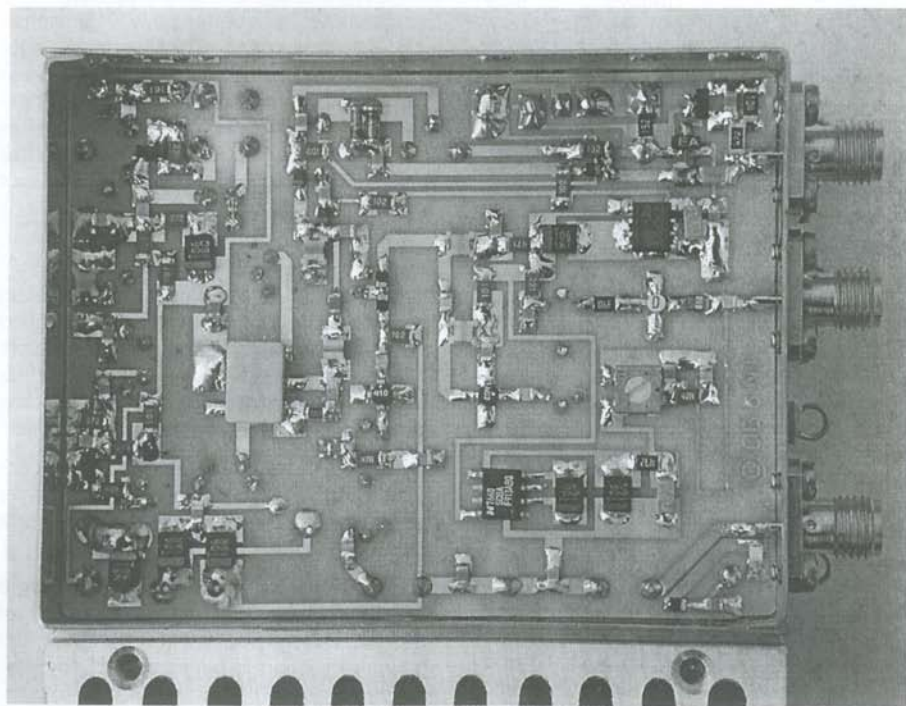
Der bewährte "Simple Quarzoszillator" mit dem FET SST310 schwingt auf 96 MHz. Die Frequenzeinstellung erfolgt durch den Ferritkern in der Oszillatorschleife. Ein auf das 40 °C Thermostatenquarz aufgesteckter PTC-Heizer stabilisiert die Quarztemperatur und somit die Frequenzdrift in gewissen Grenzen. Weiterhin wird durch Einbau entsprechender Kondensatoren (TK. Im Schaltplan mit * gekennzeichnet) im Oszillator eine weitere Tempe-

ratur-Kompensation erreicht. Die Stabilität reicht für normale Verhältnisse aus. Sollte eine sehr genaue und hochstabile Frequenz benötigt werden, ist an der im Schaltplan eingezeichneten Stelle ein externer "Oft-stabilisierter" Oszillator "OCXO" mit ca. 1 mW (DF9LN) einzukoppeln. Dazu wird der Quarz mit Heizer entfernt.

Nach dem Oszillator folgt eine Vervierfacherstufe mit dem BFR92P. Über ein Helixfilter wird die Frequenz 384 MHz selektiert und auf den Verdreifacher mit BFG 93A gekoppelt. Nach einem weiteren Helixfilter, das auf 1152 MHz abgestimmt wird, gelangt das Signal auf den Ringmischer. Die erzeugte LO-Leistung beträgt ca. 5 mW.

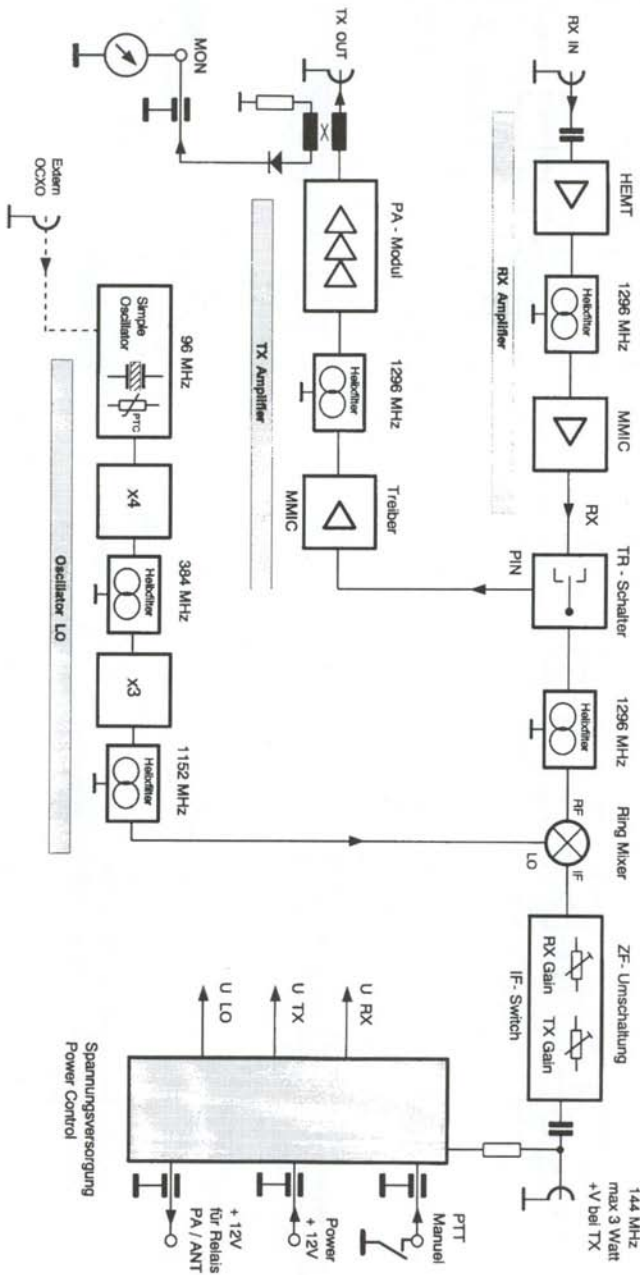
T/R-Umschaltung

Das ZF-Signal wird über getrennt einstellbare Dämpfungsglieder für Sender und Empfänger geführt, die durch PIN-Dioden umgeschaltet werden. Die Sende-Empfangs-Um-

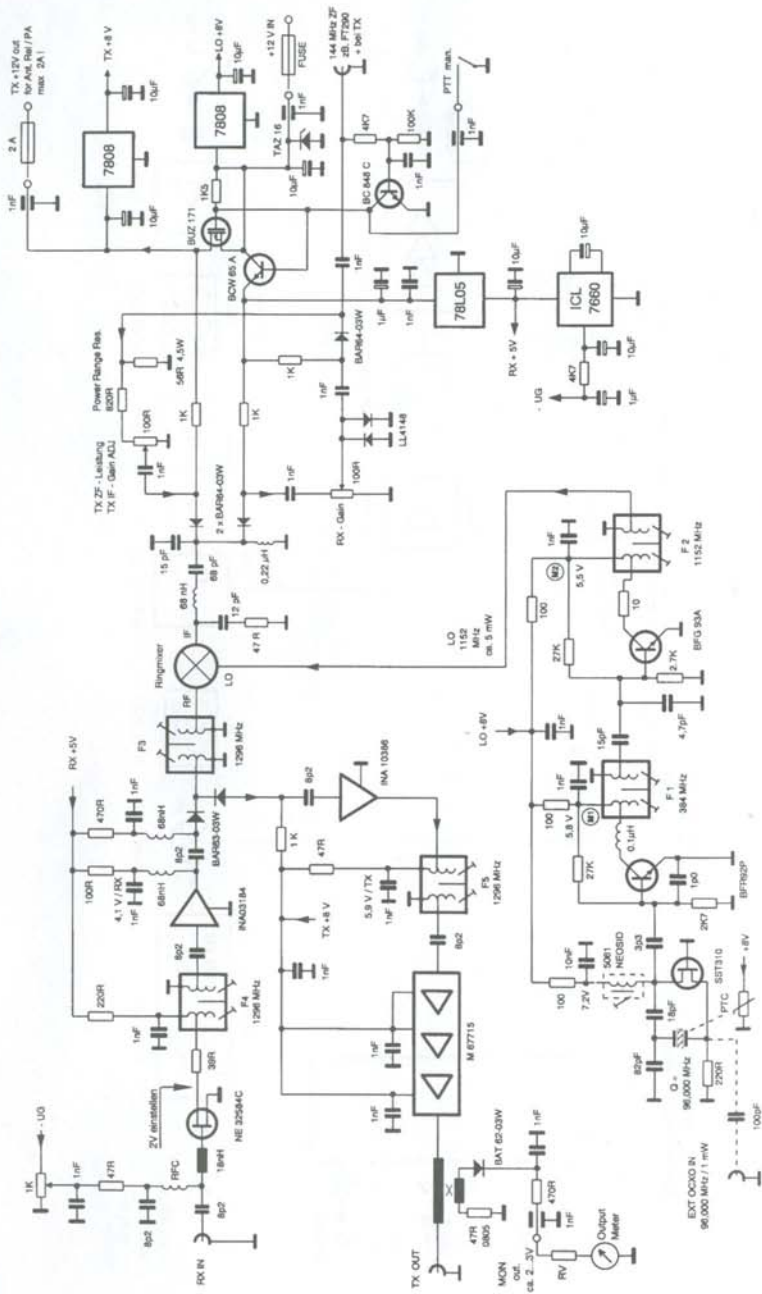


1.3GHz Transverter Top View

Bild/Figure 1: Block Diagram

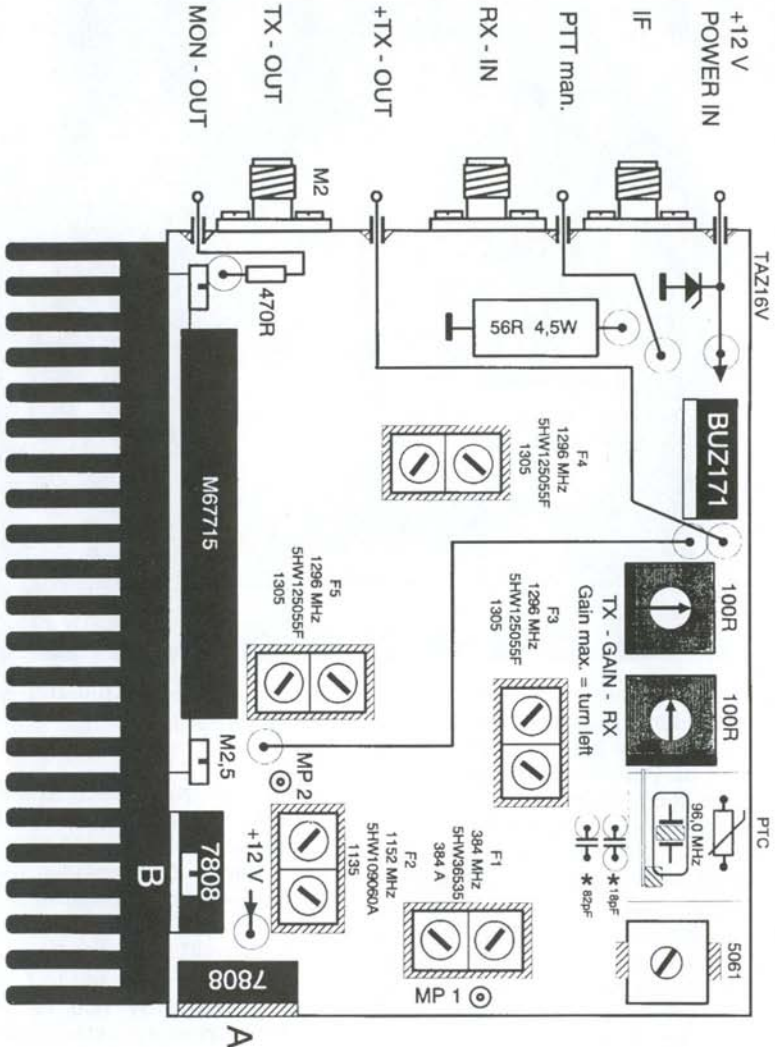


Bild/Figure 2: Circuit Diagram



Die Spannungs- und Leistungsangaben sind Messwerte der Prototypen. Die Angaben können durch Bauteiltoleranzen stark abweichen!

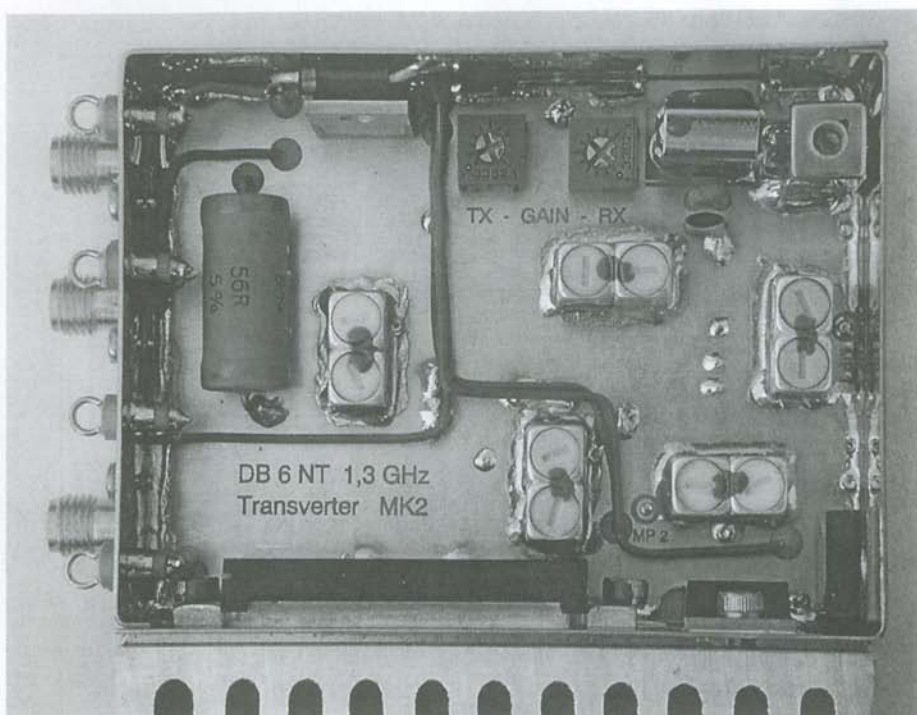
Bild/Figure 3: Parts Layout



 verlöten
to solder

Leiterplatte sowie Festspannungsregler "A" mit Gehäuse verlöten
PCB and voltage regulators 7808 to solder with box

1.3GHz Transverter Bottom View



schaltung des gesamten Transverters erfolgt über eine Plusspannung bei TX auf dem ZF-Steuerkabel, wie es bei dem FT290R bereits eingebaut ist. Bei anderen Transceivern ist ein kleiner Umbau erforderlich (Eine bei Senden verwendete +Spannung im 2m Transceiver, über einen 2K2 Widerstand auf die Ausgangsbuchse legen, fertig!). Diese Steuerung benötigt keine weiteren Steuerkabel und hat sich seit Jahren bestens bewährt. Des weiteren ist aber auch die klassische Umschaltung mit PTT- Kontakt nach Masse möglich. Die Betriebsspannungsumschaltung im Transverter erfolgt durch Transistoren. Die Schaltspannung des Senders ist herausgeführt und kann zur Steuerung von Koaxrelais sowie PA- Verstärkern verwendet werden (max. 2A belastbar). Dieser Ausgang sollte unbedingt mit einer Feinsicherung geschützt werden.

Zur Spiegelfrequenz-Selektion werden Helixfilter verwendet.

RX

Das Empfangsteil besitzt eine HEMT- FET Vorstufe und einen weiteren MMIC mit einer Gesamtverstärkung von 30 dB. Dadurch wird kein weiterer ZF- Verstärker benötigt. Das über einen 8,2pF Kondensator gekoppelte Eingangssignal wird dem rauschangepassten NE32584C zugeführt. Danach folgt über ein Helixfilter F4 die zweite Stufe mit dem MMIC - INA 03184. Über die RX-TX PIN-Diodenumschaltung und ein weiteres Helixfilter F3 folgt der Ringmischer.

TX

Über das auch für den Sendezweig benutzte Helixfilter F3 hinter dem Mischer, gelangt im Sendefall das TX- Signal auf eine MMIC Verstärkerstufe. Über ein weiteres Helixfilter F5 zur Nebenwellenunterdrückung wird das

Endstufenmodul angesteuert. Am Senderausgang ist ein Richtkoppler mit Schottkydiode BAT62-03W eingebaut. Er ermöglicht die Kontrolle der Ausgangsleistung (Monitoring MON.) und erleichtert den Abgleich der Schaltung.

2. Description

LO

The proven 'simple' XO uses the FET SST310 in a grounded gate circuit. The crystal frequency for a 144MHz IF is 96MHz. The coil is tuned by the usual ferrite tuning screw. An extra 40°C PTC-heater improves the drift characteristic of the XO. Extra pads are provided for fitting additional capacitors which can be selected for temperature compensation. For normal use in a restricted temperature change environment the stability is sufficient. But for more serious work a special outboard solution like the OCXO from DF9LN is required. This can be fed in at the source of the SST310, as indicated in the circuit diagram. The crystal and the heater have to be removed in this case.

The XO is followed by a quadrupler to 384MHz which utilises a BFR92P transistor. The fourth harmonic is filtered by a helix bandfilter and drives the tripler with the BFG93A. The output filter selects the harmonic at 1152MHz. The power at this point is around 5mW (7dBm).

T/R-Switch

The IF-port of the mixer is terminated by selectable attenuators for transmit and receive. These are switched by PIN-Diodes BAR64-03W to a common IF-connector. A voltage of at least +9V, which can be supplied by a FT-290 for example, activates the T/R-switching. Other brands of 2m transceivers have to be modified accordingly.

Whilst this method of T/R-switching via the IF coaxial cable is quite elegant, also a separate method via the PTT-MAN input can be accomplished.

An extra output is fitted for TX+, which can be used for external coaxial relays or PAs. This

output must be guarded by a 0.63A fuse. It is not safe in case of short circuit!

RX

The RX-chain uses a HEMT-Amplifiers (NE32584C) and a second stage with a INA03184 MMIC from HP. The gain of >30dB makes an extra IF-amplifier obsolete. The stages are coupled with a helical filter F4. The second stage is coupled to the mixer via then PIN-Switch and a second helical Filter F3.

TX

After the PIN-Switch and the helical Filter F3, which is used both for receive and transmit, a INA10386 MMIC from HP follows and drives via a second helical filter F5 the Mitsubishi hybrid M67715.

The Mitsubishi hybrid can deliver around 1.5W output. A directional coupler with a BAT15-03W Schottky diode allows for a monitor voltage of the RF output power.

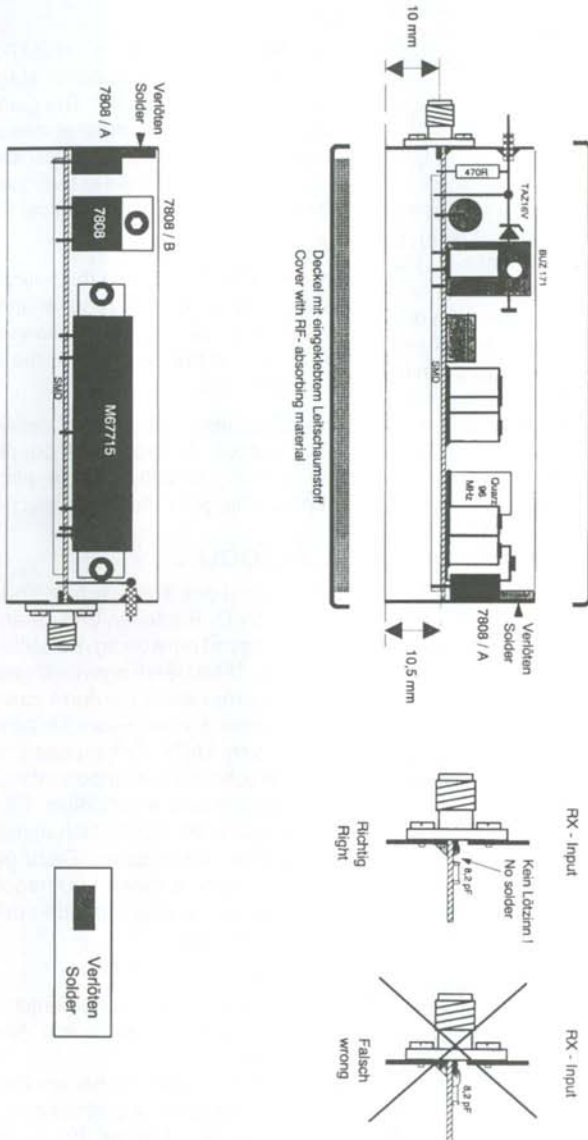
3. Aufbau

Zum Aufbau des Transverters sind Erfahrungen mit SMD- Bauteilen und deren Verarbeitung zwingend notwendig. Es sollte in keinem Fall das "SMD-Erstlingswerk" werden, da Bauteile sehr kleiner Bauform zu verarbeiten sind. Ferner sollten Grundkenntnisse beim Aufbau von UKW Schaltungen vorhanden sein. Verschiedene Komponenten wie FET's sind statisch sehr empfindlich. Es wird dringend empfohlen "ESD" Schutzmaßnahmen beim Aufbau einzuhalten. Dazu gehört eine geerdete und temperaturgeregelte SMD-Lötstation sowie eine leitende und geerdete Arbeitsunterlage.

Aufbauaufolge:

1. Anpassen der Leiterplatten an das Weißblechgehäuse durch Anfeilen der Ecken.
2. Anzeichnen der Löcher am Blechgehäuse für die SMA- Koaxbuchsen
3. Bohren der Löcher für Buchsen und Durchführungskondensatoren. M2 Gewinde für SMA- Buchsen
4. Montage der SMA- Buchsen
5. Einlöten der Leiterplatte in das Gehäuse (siehe Zeichnung). Rundherum verlöten!

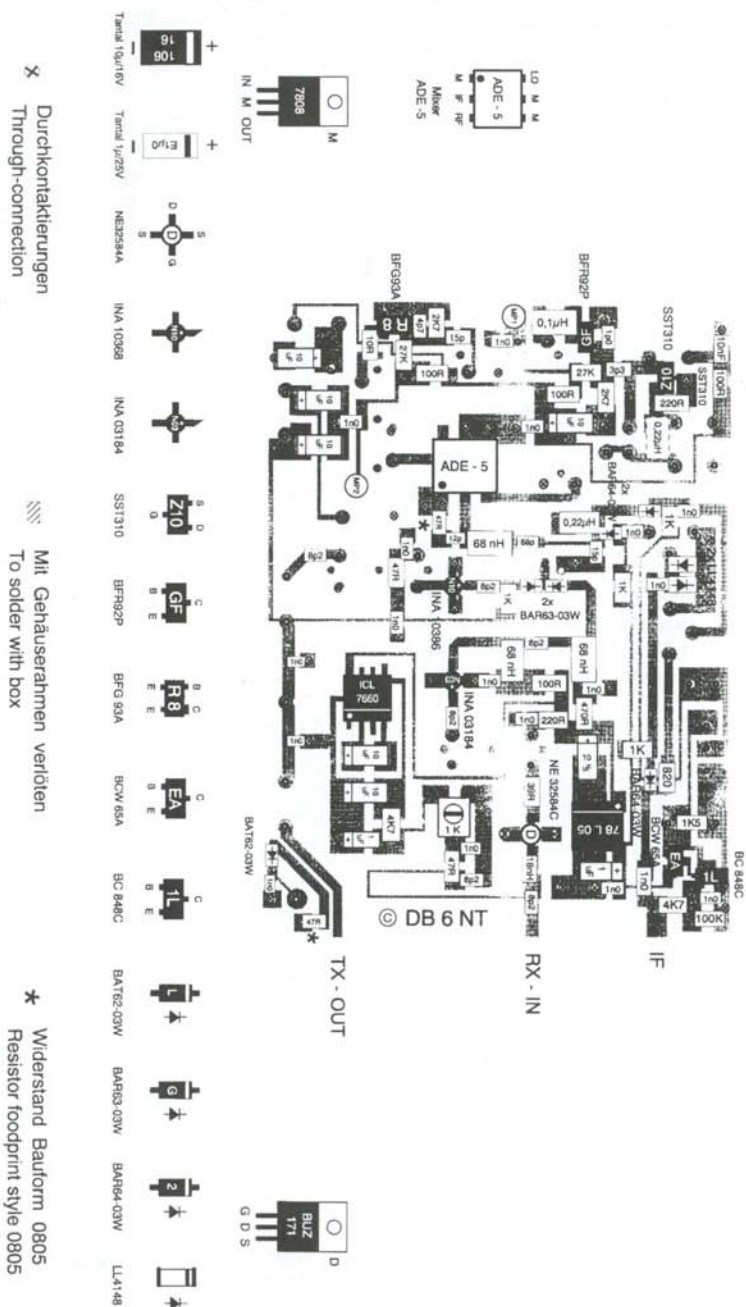
Bild/Figure 4: Construction Hints



Um einen gleichmäßigen Abstand der Leiterplatte beim Einlöten zu erreichen, hat sich ein 10,2 mm starkes Holzstück als Unterlage bewährt.

6. Einstecken des Festspannungsreglers 7808-B in die Leiterplatte (vorher mittleres Beinchen des Spannungsreglers abbrechen). Anhand des Kühlkörpers und

Bild/Figure 5: Parts Layout Top View



des Spannungsreglers das Blechgehäuse für die Bohrungen anzeichnen. (2 Löcher für das PA- Modul 1 Loch für den Spannungsregler) Dabei sollte der Kühlkörper "mittig" auf dem Gehäuse aufliegen, danach folgt das Bohren der 3 Löcher mit einem 3mm Bohrer. Spannungsregler und PA- Modul bleiben zunächst unbestückt.

7. Bestücken der Leiterplatte und Durchführungskondensatoren. Verlöten der Helixfilter, siehe Bestückungsplan. Der Festspannungsregler 7808-A wird mit dem Kühlflansch am Weißblechgehäuse verlötet. Dabei ist das mittlere Masseanschlußbeinchen abzubringen. Der FET BUZ 171 wird voll auf die Leiterplatte gedrückt und dann an den Beinchen verlötet, da sonst der Kühlflansch den Deckel berühren würde (Kurzschlußgefahr). Für die SMD Bauteile sollte 0,5mm Lötzinn verwendet werden. Danach wird die Baugruppe in Alkohol (Spiritus) gewaschen. Sollte ein Ultraschall-Waschbad verwendet werden, ist der Quarz erst danach einzulöten (Quarze werden durch starken Ultraschall beschädigt). Trocknen bei ca. 80°C im Ofen (1Std.), oder über Nacht auf einem warmen Heizkörper.
8. Einbau des Festspannungsreglers 7808-B und des PA-Moduls, dabei sollte etwas Wärmeleitpaste verwendet werden. Das PA-Modul dabei möglichst dicht auf die Leiterplatte aufstecken.

3. Construction

To achieve a successful construction of this transverter the builder has to have experiences in the use and handling of SMD-parts. Furthermore experiences with smaller projects in microwave circuits are valuable. In any case the construction of this transverter is not a beginners project.

The usual ESD protection measures should be obeyed. (see [5] for an excellent survey).

Construction Steps

1. Solder the walls of the tinplate box and trim the PCB for fitting into the tinplate box.
2. Mark the holes for the SMA-connectors

3. Drill holes for SMA-connectors and feed-through caps
4. Solder PCB into the box (Fig. 4). Use a 10.2mm high piece of wood as a ruler to find the right height adjustment.
5. Insert the LM7808 (B) regulator into the PCB (Remove middle pin of the regulator!). Drill two holes for the heatsink and one hole for the regulator into the side wall of the box. The heatsink should be in the mid of the PCB. Diameter of the holes is 3mm.
6. Mount the parts onto the PCB (Fig. 3). Mount the feedthrough caps. Solder the helix filters (Fig. 4). Solder the regulator LM7808 (A) with its heatsinks to the wall of the tinplate box. The FET BUZ171 should be fitted to the PCB by holding it tightly down and soldered. Clean the finished PCB with alcohol. The tuning screws of the resonators should be removed. Dry the module in a stove (1h at 80°C) or over night lying on a central heating.
7. At last mount the LM7808 (B) and the PA-hybrid. For the latter some heat sink compound should be applied.

4. Abgleich

Anlegen der +12V Betriebsspannung durch ein Netzgerät mit Strombegrenzung ca. 1 A. Kontrolle der Betriebsspannungen an den Festspannungsreglern.

Messen der Kollektorspannung des BFR92P Verdopplers am Messpunkt 1. Eindrehen des Ferritkerns in die Oszillatorschule. Nach Anschwingen des Oszillators geht die Spannung auf ca. 5,8V zurück.

Messen der Spannung am Messpunkt 2. Durch wechselseitiges Abstimmen des 384 MHz Bandfilters -F1- wird auf minimale Spannung abgeglichen, ca. 5,5V (maximaler Strom = optimale Ansteuerung).

Die Keramikschrauben verursachen bei sehr häufiger Betätigung Metallabrieb auf ihrer Oberfläche. Erkennbar durch "ruppiges" Abstimmverhalten. Der Belag kann mit Glasfaserstift entfernt werden.

Anschließen einer geeigneten Antenne oder eines Abschlußwiderstandes an die Antennenbuchse der Empfangsteiles. Messen der Spannung am Drainanschluß des NE32584C Vorstufentransistors und Einstellen von ca. 2V durch das 1 K Potentiometer am Gate der FET's.

Anschließen eines 2m Empfängers am ZF-Ausgang in Stellung SSB. RX- und TX- Gain-Potentiometer sind dabei auf Linksanschlag zu drehen (max. Verstärkung). Jetzt muß ein deutlicher Rauschanstieg im 2m Empfänger zu hören sein. Durch wechselseitiges Abstimmen der Helixfilter F3 und F4 sollte auf maximales Rauschen und somit Empfangsverstärkung abgeglichen werden. Ist am 2 Meter Transceiver ein S- Meterausschlag von mehr als S1 zu erkennen, sollte die Verstärkung des Transverters mit dem RX- Gain Reglers entsprechend angepasst werden. Somit ist der Abgleich des Empfangsteils abgeschlossen.

Anschließen des Senderausgangs an eine geeignete Antenne oder einen Abschlußwiderstand. Transverter auf Stellung "Senden" schalten. Ansteuerung durch ein 2m Sendesignal mit 0,5...3 Watt. Messen der Monitorspannung am Richtkoppler. Es ist eine Gleichspannung von ca. 2...3 Volt zu messen. Das entspricht bereits der vollen Ausgangsleistung. Diese Spannung ist der Ausgangsleistung entsprechend proportional. Zurückregeln der Monitorspannung auf ca. 1 Volt durch das Rechtsdrehen des TX- Gain Potentiometers. Jetzt erfolgt der Feinabgleich des Helixkreises -F5- (1296 MHz) und des LO- Filters -F2- (1152 MHz) auf maximale Ausgangsleistung.

Einpegeln der Sendeleistung durch Drehen des TX-Gain Potis. Dabei ist die Monitorspannung zu messen. Es empfiehlt sich die Ausgangsleistung auf ca. 80% des Maximalwertes einzustellen, um somit im linearen Bereich des Transverters zu bleiben.

Anschließen einer Empfangsantenne. Einstellen der Oszillatorfrequenz mittels einer Bake mit bekannter Sendefrequenz. Sollte sich die genaue Frequenz nicht einstellen lassen, ist die im Bestückplan gestrichelt ein-

gezeichnete 0,22µH Drossel parallel zum Quarz einzulöten.

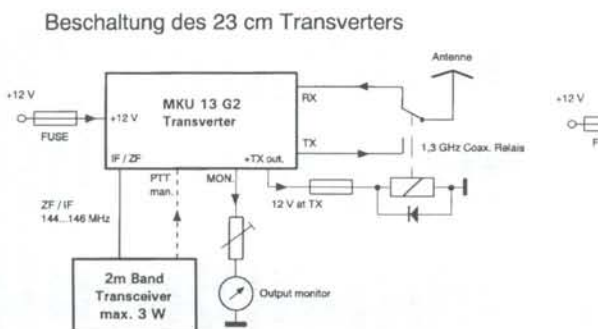
Einkleben von niederohmigen Leitschaumstoff in den unteren Deckel des Gehäuses (Dadurch werden Gehäuseresonanzen und somit Schwingneigungen verhindert). Einbau der Baugruppe in ein Gehäuse, wobei der Transverter zur besseren Kühlung auf das Chassisblech montiert werden sollte. Dafür sind im Kühlkörper entsprechende Gewindebohrungen vorgesehen. Eine gute Kühlung verhindert auch eine Frequenzdrift des Quarzoszillators. Ein geeignetes Koaxrelais dient zur Sende- Empfangsumschaltung.

4. Alignment

The following steps are necessary for the alignment of the transverter:

1. Apply 12V. Use a current limited (< 0.6A) power supply. Check the voltage at the output of the fixed voltage regulators.
2. Measure the collector voltage at the BFR92P (Testpoint M1). Turn the tuning screw of the oscillator coil until the decrease of the collector voltage indicates the proper oscillation. The measurement should read around 5.8V.
3. Measure voltage at M2 (Fig. 2). Tune bandfilter F1 (384MHz) to minimum voltage (about... 5.5V) at M2.
4. Connect dummy load or antenna at input connector of RX.
5. Adjust 10k pot for a reading of 2V at the drain of the RX-FET NE32584C.
6. Connect 2m receiver at IF connector. Turn RX-Gain and TX-gain pots fully CCW. You will observe an increase in noise level. By tuning the helical filters F3 and F4 you can maximise the noise output. If there is an indication of more than S1 at the 144MHz transceiver you should adjust the RX-Gain Pot accordingly.
7. Connect a 50Ω dummy load to the TX output. Switch transverter to transmit by grounding the PTT input. Drive the transverter with 1...3W on 144MHz. Measure the monitor voltage at MON OUT. It should read 2...3V. Adjust TX-Gain pot to a reading of about 1V. Now the the helical

Bild/Figure 6: Configuration w/ 144MHz Transceiver



Die Ausgangsleistung der Transverters MKU 13 G2 sollte bei Betrieb mit einer nachgeschalteten PA MKU 133 HY mit der TX-Gain Regler auf ca. 0,5 Watt eingestellt werden. Die Baugruppen können zusammen mit dem Koaxialrelais in einem wetterfesten Gehäuse mit Kühlkörper direkt bei der Antenne montiert werden. Dadurch wird die Dämpfung durch lange Koaxkabel vermieden.

The components can be attached along with the coaxial relay in a weather-proof case direct at the antenna. This reduces cable losses.

Meteor Scatter

Place	Call	Mode	Locator	Propagation	QSO	SQR	Total
1	LA0BY	M	JO59,JP50,JP61	TR,ES,MS,AU	385	179	68915
2	DD0VF	M	JO61,JN04,JN24,JN15,JN25	TR,ES,MS,AU	351	189	66339
3	PE1HWO	S	JO21	TR,ES,MS,AU	305	170	51850
4	DL8EBW	M	JO31,IN72,IN82,JO11	TR,ES,MS,AU	281	162	45522
5	DF2ZC	S	JO30	TR,ES,MS,AU	189	154	29106
6	DK0OG	S	JN68	TR,ES,MS	197	133	26201
7	DL2OM	S	JO30	TR,ES	199	121	24079
8	LZ1AG	S	KN22	TR,ES,MS	156	77	12012
9	DL3HRT	S	JO61	TR,ES,MS	94	96	9024
10	CT1DNF	S	IN50	TR,ES	118	65	7670
11	DG3GAG	S	JN48	TR,ES	80	85	6800
12	EA6VQ	S	JM19	TR,ES,MS	103	61	6283
13	DL1ELY	S	JO31	TR,ES,MS	21	38	798
14	DF7RG	M	JN68,JO61	TR,ES	11	31	341

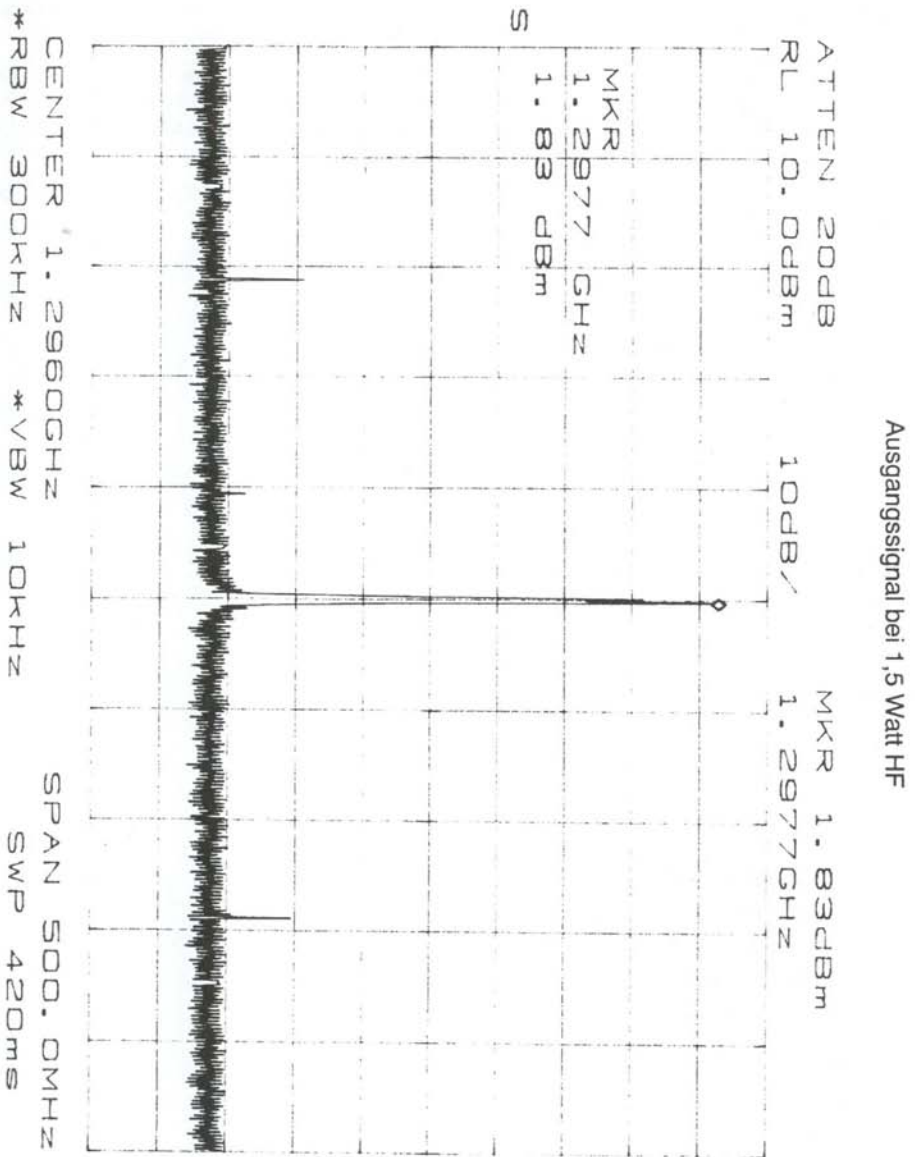
Checklogs:

0	DL1EAP	S	JO31	TR,ES,MS,AU	172	141	24252
---	--------	---	------	-------------	-----	-----	-------

Result of the 144 Mhz Activity DX-Contest 1999, Phone

Place	Call	Mode	Locator	Propagation	QSO	SQR	Total
1	OZ1IEP	S	JO55	TR,ES,MS,AU	473	135	63855
2	DG6PY	M	JO30,JN39,JN56	TR,ES	362	117	42354
3	DJ2JS	M	JO31,JN57,JO40,JO60,JO62,JN48	TR,ES	356	109	38804
4	DD0VE	M	JO61,IN04,IN24,IN15,IN25	TR,ES,MS,AU	254	152	29609

Bild/Figure 7: Output Spectrum



filter F5 and the LO-filter F2 can be readjusted to maximum output.

8. Reduce the TX-gain by clockwise rotation of the TX-gain pot until the TX output starts to decrease. A value of 80% of the maximum assures linear operation.
9. Connect antenna to RX input. Adjust the XO until a known beacon reads the correct frequency. If the correct frequency cannot be adjusted solder a 220nH choke in parallel to the crystal.
10. Take low resistance carbonised foam and glue it into the bottom cover. This damps the resonances of the box. The heatsink should be mounted onto a chassis plate to further reduce the thermal resistance.

[8] "Transverter for 1,3 GHz by DB6NT" DUBUS 3.91 (DUBUS Buch III)

Bezug

Fertige Baugruppen oder Bausätze/Ready made modules and kits:

KUHNE electronic Birkenweg 15 D-95119 NAILA Tel: 0049 (0) 9288 8232 Fax: 0049 (0) 9288 1768 Email: kuhne.db6nt@t-online.de <http://www.db6nt.com>

Alle Rechte beim Autor, DB6NT, Michael Kuhne.

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My special thanks to Lorenz, DL6NCI. His support and the discussions were mandatory for the success of this development. Also my thanks to Gert, DG8EB, Richard, DF5SL, and to DG8NEI, DL4DTU and DG2DWL, who verified the reproducibility of the design by building this transverter.

Literatur/References:

- [1] ROGERS Leiterplattenmaterial Firma Mauritz Hamburg Datenblatt RO4003
- [2] NEC Datenblatt NE32584C
- [3] SIEMENS Datenbuch RF- Halbleiter
- [4] NEOSID Filter Datenbuch
- [5] Philips Halbleiter Datenbuch
- [6] TOKO Datenbuch Helixfilter
- [7] Mini- Circuits Datenblatt Ringmischer

Combiners, Couplers and Hybrids: A Case Study-Part II

Werner Rahe, DC 8 NR

Conrad-Schulz-Weg 5, 82211 Herrsching, 08152/5103

4. Leistungsteiler und -addierer

4.5 Wilkinson-Teiler

Dieser für niedrigere Frequenzen auch mit konzentrierten Bauelementen aufzubauende 0°/3 dB-Koppler ist ebenfalls mit geringen Anpassungsverlusten leicht mit 75Ω -Kabel herzustellen ($Z_L=70,7\Omega$). Die Entkopplung kommt durch die 180° Phasendrehung der beiden $\lambda/4$ -Leitungen, dem Lastwiderstand am Summentor und dem Brückenwiderstand zustande.

Die Wellenwiderstände der Ausgänge 2 und 3 werden durch die $70,7\Omega$ - $\lambda/4$ -Leitungen von 50 auf 100Ω transformiert, so dass durch die Parallelschaltung am Eingang wieder 50Ω entstehen. Der Wilkinson-Teiler ist also angepaßt.

Der Ausgleichswiderstand hat einen Sollwert von $2 \cdot Z_0 = 100\Omega$ und verbraucht bei gleicher Lastimpedanz der Ausgänge keine Leistung. Er sollte jedoch keine Reaktanzen enthalten, besonders keine Eigenkapazität. Ohne erhebliche Stoßstellen kann der Widerstand jedoch kaum extern wie bei anderen Kopplertypen angeschlossen werden. Besonders bei höheren zu übertragenden Leistungen kann die Beschaffung eines entsprechend belastbaren, wegen der Kühlung erdfrei zu montierenden Widerstandes Schwierigkeiten bereiten. Solche Widerstände können jedoch

geliefert werden (KDI (USA) Bezug: Microscan, Ismaning/München).

Für den Wilkinsonteiler gelten folgende Gleichungen:

$$[1] \quad P_{BR} = \frac{P_1}{4} \cdot (\rho_2 - \rho_3)^2$$

$$[2] \quad \rho_1 = \frac{1}{2} \cdot (\rho_2 + \rho_3)$$

$$[3] \quad ISO_{2-3} = \frac{1}{2 \cdot |\rho_1|}$$

P_{BR} : Leistung im Brückenwiderstand

ρ_1 : Eingangs Reflexions-Koeffizient

ISO_{2-3} : Isolation zwischen Tor 2 und Tor 3

Aus Gleichung [3] ersieht man, daß die Isolation des Wilkinson-Teilers nie besser als die Rückflußdämpfung (+6dB wegen des Faktors 1/2) am Summentor sein kann. Entscheidend für eine gute Isolation ist also, daß der Teiler von einer gut angepaßten Quelle gesteuert wird oder als Summierer auf eine gut angepaßte Last arbeitet. Das gleiche gilt für den Brückenwiderstand. Fehlt er z.B., ist die Isolation nur 6dB.

Gleichung [2] besagt, daß die Anpassung am Summentor von der Summe der Fehlanpassungen an den Toren 2 und 3 bestimmt wird.

Aus Gleichung [1] kann man einen "worst case"-Fall konstruieren: - ein Ausgang offen mit $\rho_2 = +1$, der andere kurzgeschlossen mit $\rho_3 = -1$. Dann wird die gesamte Eingangsleistung im Widerstand in Wärme umgewandelt!

Der Wilkinson-Teiler ist neben seiner Anwendung als Leistungsteiler/-addierer zum Zusammenschalten von zwei PA's auch gut geeignet als Addierer für zwei Messsender (Zweitonnemessung) und leistet in Microstrip-Technik bis ins Mikrowellengebiet vorzügliche Dienste z.B. zur gleichmäßigen Aufteilung der Oszillatorleistung auf die S/E-Mischer.

Er läßt sich auch als Breitbandkoppler konzipieren, indem mehrere $\lambda/4$ -Abschnitte mit gestuften Wellenwiderständen in Serie geschaltet werden. Außerdem kann man ihn auch als Teiler mit mehr als zwei Ausgängen realisieren. Bei der Version mit konzentrierten Bauelementen ist auf eine Abschirmung der beiden Spulen voneinander zu achten. In der Simulation zeigte der Koppler über mehr als eine Oktave gute Amplitudenbalance und erwies sich als gutmütig gegenüber Wellenwiderstandsänderungen (Siehe Abb. 15).

4.6 Kapazitiv gekoppelter Hybrid

Ein kaum bekannter Kopplertyp ist der kapazitiv gekoppelte Hybrid, der in Kabel- bzw. in Microstriptechnik oder mit konzentrierten Bauelementen in Pi-Version aufgebaut werden kann.

Sein Anwendungsgebiet erstreckt sich je nach Ausführung vom unteren VHF-Bereich bis etwa ins 23cm-Band (Semirigid-Kabel und SMD-Kondensatoren!). Besonders gut läßt er sich in einem Aufbau mit konzentrierten Bauelementen zum Zusammenschalten von PA's im VHF-Bereich verwenden, wo Kabelkoppler unhandliche Abmessungen besitzen. Auf die Entkopplung der beiden Spulen ist zu achten.

Eine an Port 1 eingespeiste Leistung wird entsprechend dem Koppelfaktor auf Tor 2 und 4 aufgeteilt. Tor 3 ist dann von allen anderen Toren entkoppelt. Von einer von 1 nach Tor 2 über L1 laufenden Welle wird an jedem Ende über C1 und C2 ein Teil der Energie auf die zweite Leitung ausgekoppelt. Die beiden Signale erreichen Tor 4 phasengleich und addieren sich. Die Signale an Tor 3 sind ebenfalls gleich groß. Wegen des Wegunterschieds kurzer Weg Tor 1 über C1 nach Tor 3, zu langem Weg über L1, C1 und L2 ergibt sich jedoch eine Phasenverschiebung von

180° , d.h., sie löschen sich aus. (Die Phasenverschiebungen durch C1 und C2 heben sich auf, da sie auf beiden Wegen auftreten) Im Falle einer Fehlanpassung an z.B. Tor 2 läuft die reflektierte Welle in umgekehrte Richtung, die ausgekoppelten Anteile addieren sich an Tor 3 (und werden dort durch R absorbiert) und löschen sich an Tor 4 aus. Die beiden Ausgänge 2 und 4 sind also vollständig voneinander entkoppelt.

Bei Anwendung als Stehwellenanzeiger beträgt die Richtschärfe (directivity) ca. 20-30 dB. Mit Detektoren an Tor 3 und Tor 4 ergibt sich eine Verwendung als Stehwellen- und Leistungsanzeiger. Der Koppler zeigt konzeptbedingt eine typische Tiefpasscharakteristik. Oberhalb der Designfrequenz wird die Symmetrie der Leistungsaufteilung auf die beiden Ausgänge rasch schlechter und der Koppler wird unbrauchbar. Insgesamt ist der Koppler recht schmalbandig (Siehe Abb. 14).

4.7 Richtkoppler

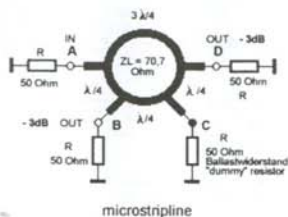
Funkamateure ist der Richtkoppler i.A. nur als Stehwellenanzeiger oder zur Messung der Ausgangsleistung seiner Station bekannt.

Der grundsätzliche Aufbau eines Richtkopplers besteht aus einer Hauptleitung 1-2, die in die HF-Zuführung eingeschleift wird und einer Nebenleitung 3-4 (Koppelschleife), die mit dem Hauptleiter induktiv (über die Länge der Parallelleitung) und kapazitiv (über den Abstand der Leitungen) verkoppelt ist. Beide Leitungen besitzen einen Wellenwiderstand, der der Systemimpedanz entspricht. Die Nebenleitung wird je nach Messaufgabe (Messung der vor- oder rücklaufenden Leistung) an einem der beiden Enden wellenwiderstandsrichtig abgeschlossen.

Durch die über die Länge verteilte Kapazität entstehen in der Nebenleitung zwei entgegengesetzte Ströme I_{c1} und I_{c2} , während der induktive Leitungsstrom I_M auf der ganzen Koppelleitung nur eine Richtung aufweist. Aus Abb. 12 wird ersichtlich, dass sich die Leitungsströme an Tor 3 aufheben können. Das ist der Fall, wenn $I_{c2}=I_M$ wird. An Tor 4 tritt dann eine Addition beider Ströme auf, wodurch an 4 die Spannung $U_4=R(I_{c1}+I_M)$ entsteht. Die Größe dieser Spannung ist da-

Bild/Figure 10: Narrowband Combiners

6 $\lambda/4$ - Ringhybrid (Magic-Tee / Rat-Race Hybrid)



Beschaltung als
0°/180°-Koppler

0°/-180°-Koppler

0°-Koppler

0°-Koppler

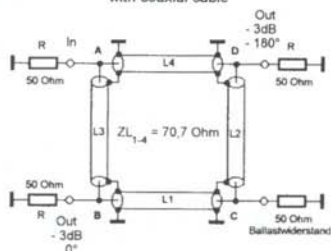
0°/-180°-Koppler

$R = Z = \text{Systemimpedanz} = 50 \text{ Ohm}$

$$Z_L = R\sqrt{2} = 70.7 \text{ Ohm}$$

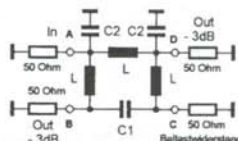
EING.	AUSGÄNGE			
	A	B	C	D
A	-	0°	ϕ	-180°
B	0°	-	0°	ϕ
C	ϕ	0°	-	0°
D	-180°	ϕ	0°	-

mit Koaxialkabel
with coaxial cable



$$\begin{aligned} L_{1-3} &= \lambda/4 \cdot v \\ L_4 &= 3\lambda/4 \cdot v \\ Z_{L1-4} &= R\sqrt{2} \end{aligned}$$

mit konzentrierten Bauelementen
with lumped elements



$$\begin{aligned} L &= R\sqrt{2}/\omega_0 \\ C1 &= 1/\sqrt{2} R\omega_0 \\ C2 &= 2C1 \end{aligned}$$

f (MHz)	L	C1	C2
145	77.7nH	15.5pF	31pF
433	26nH	5.2pF	10.4pF

4 $\lambda/4$ - Ringhybrid (0°/-3dB - Coupler)

$$\begin{aligned} L_{1-4} &= \lambda/4 \cdot v \\ Z_{L1-4} &= R\sqrt{2} \end{aligned}$$

4 $\lambda/4$ - Ringhybrid (Branch coupler)

Für beliebige Teilerverhältnisse P2/P4:

$$Z_{L1} = R\sqrt{1 + (R/Z_{L2})^2} \quad P1 = P2 + P4$$

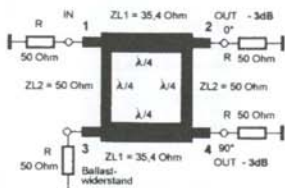
$$Z_{L2} = R\sqrt{P2/P4}$$

$$Z_{L1} = R/\sqrt{2}$$

$$Z_{L2} = R$$

$$\text{alle Leitungen: } l_{\text{mech}} = \lambda/4 \cdot v_K$$

Als 3dB-Koppler mit
 $R = Z = \text{Systemimpedanz}$



Bild/Figure 11: Narrowband Powersplitters and -combiners

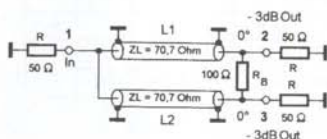
Wilkinson - Teiler (Wilkinson Divider)

mit konzentrierten Bauelementen

Microstrip oder Koaxialkabel

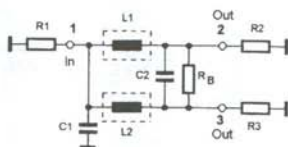
$$R_B = 2R \quad Z_L = R\sqrt{2}$$

$$l_{1,2} = \lambda/4 \cdot \sqrt{\epsilon_K}$$



Praktische Dimensionierung

fo	C1	C2	L
145 MHz	22 pF	11 pF	54,9 nH
433 MHz	7,4pF	3,7pF	18,4 nH



Mit $R_2 = R_3$ und $R_B = 2R_2 = 2R_3$

$$X_{C1} = \frac{R_1}{\sqrt{\frac{2R_1}{R_2} - 1}} \quad X_{C2} = 2R_2 \sqrt{\frac{2R_1}{R_2} - 1}$$

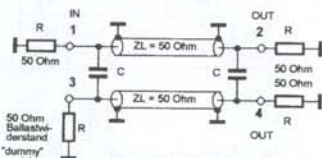
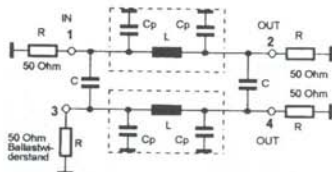
$$X_{L1} = X_{L2} = R_2 \sqrt{\frac{2R_1}{R_2} - 1}$$

Mit $R_1 = 3 = Z_0$ = Systemimpedanz

$$C_1 = 1/\omega_0 Z_0 \quad C_2 = C_1/2 \quad L_1 = L_2 = Z_0/\omega_0$$

Kapazitiv gekoppelter Hybrid (Capacitively Coupled Hybrid) (Quadraturkoppler/90°-Koppler)

microstrip or coaxial cable


with lumped elements
in π -configuration

k = Koppeldämpfung in dB
Coupling in dB

 Θ = elektrische Leitungslänge in Grad
transmission line length in degree

 $\omega_0 = 2\pi f_0$ = Kreisfrequenz

$$Z_L = R = Z_0$$

$$\Theta = \cos^{-1}(10^{-k/20})$$

$$\ell_{\text{mech}} = \frac{\Theta}{360^\circ} \cdot \lambda_0 \cdot \sqrt{\epsilon_K}$$

$$C = \frac{1}{\omega_0 X_C} = \frac{1}{\omega_0 Z_0 \tan \Theta}$$

$$C_p = \frac{(1 - \cos \Theta)}{\omega_0 Z_0 \sin \Theta}$$

$$L = \frac{Z_0 \sin \Theta}{\omega_0}$$

fo	145 MHz			433MHz		1296 MHz	
k(dB)	3 dB	20 dB	30 dB	3 dB	20 dB	3 dB	20 dB
L	38,78	54,63	54,88	13,0	18,3	4,34	6,11
Cp	9,08	19,87	21,28	3,04	6,62	1,0	2,2
C	22,0	2,2	0,7	7,37	0,74	2,46	0,25
ℓ/λ_0	0,125	0,234	0,245	0,125	0,234	0,125	0,234
Θ	45°	84,26°	88,19°	45°	84,26°	45°	84,26°

Praktische Dimensionierung: Component values

$$Z_0 = R = 50\Omega$$

Kondensatorwerte in pF

Induktivitätswerte in nH

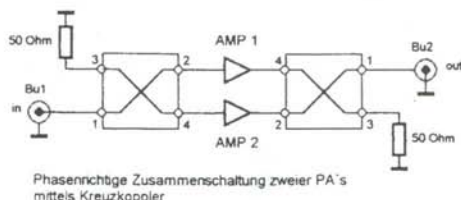
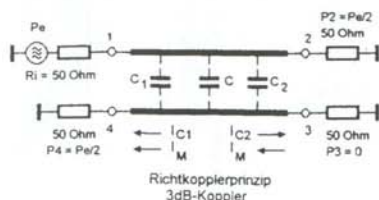
Für 23cm Festmantelkabel

verwenden

For 23cm semirigid lines are recommended

Koppler 1a spl/ DC 8 NR

Bild/Figure 12: Richtkoppler mit SAGE Wireline



Technische Daten:

SAGE Laboratories Inc. "Wireline"

(Bezug: Wacker GmbH, Grüneburgweg 85, Frankfurt/Main)

Kupferfestmantel- ausführung	Spitzenleistung	Übertragbare Spitzenleistung	Außen- durchmesser	Draht- durchmesser
Typ JC 1	200 Watt	2000 Watt	3,7 mm	0,5 mm
Typ HC 1	100 Watt	2000 Watt	2,7 mm	0,3 mm
Richtschärfe (Directivity) > 20 dB				

Berechnung der Kopplerlänge bei vorgegebener Koppeldämpfung und Betriebsfrequenz:

 a_k = Koppeldämpfung in dB

 f_0 = Betriebsfrequenz

$$k = 10^{-a_k/10}$$

Linearer Koppelfaktor

$$f_{3dB} = \frac{90 f_0}{\arcsin \sqrt{(k/k-1)}}$$

Viertelwellenfrequenz, bei der sich eine 3 dB - Kopplung ergibt

$$l = \frac{4700 \text{ MHz} \cdot \text{cm}}{f_{3dB} \text{ (MHz)}}$$

Kopplertlänge in cm

Berechnung der Koppeldämpfung eines beliebigen Kopplers

$$f_{3dB} = \frac{4700 \text{ MHz} \cdot \text{cm}}{l \text{ (cm)}}$$

Viertelwellenfrequenz des Kopplers

$$k = \frac{\sin^2(90 \cdot f_0 / f_{3dB})}{\sin^2(90 \cdot f_0 / f_{3dB}) + 1}$$

Linearer Koppelfaktor

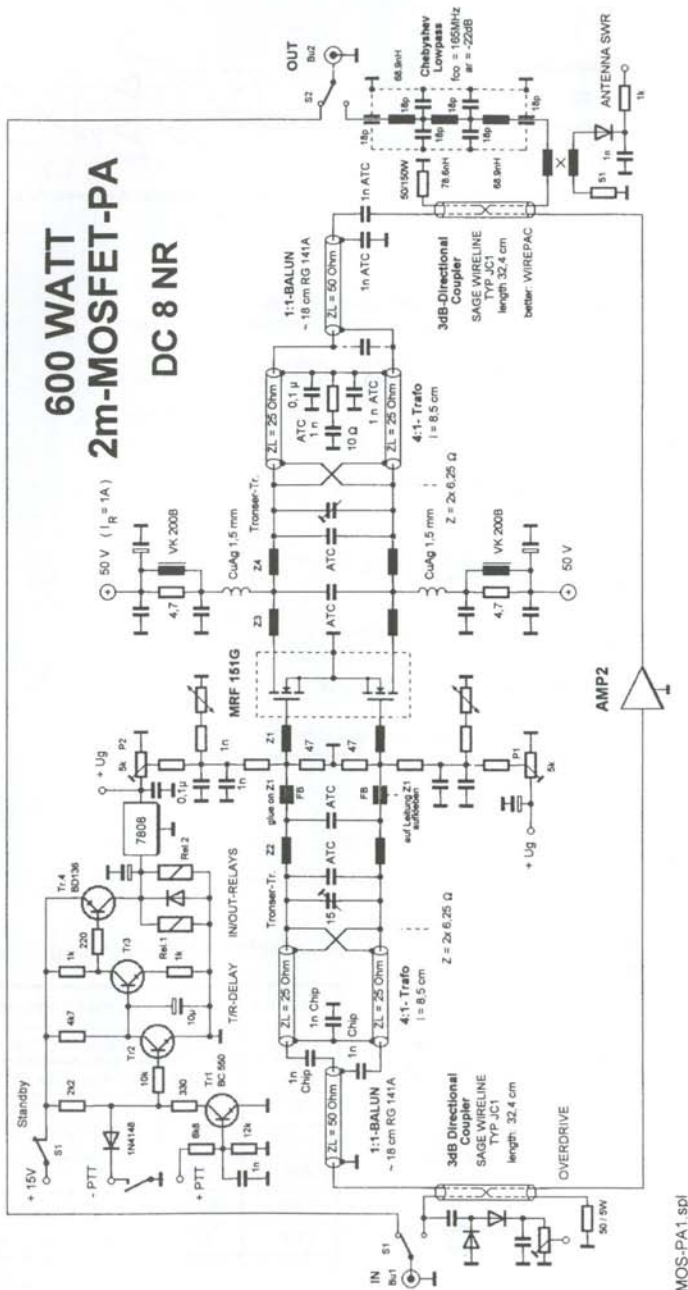
$$a_k = -10 \log k$$

Koppeldämpfung in dB

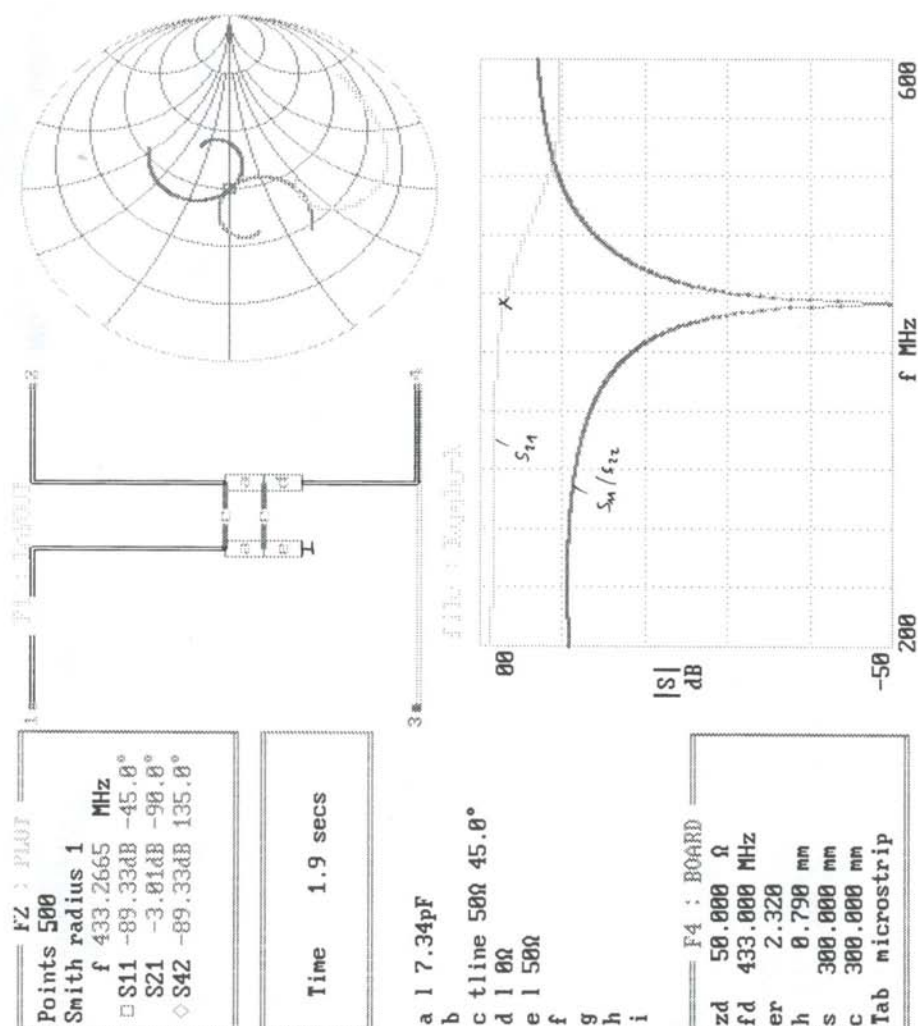
Praktische Dimensionierung: Maße in mm

Frequenz (MHz)	Koppeldämpfung			
	- 3 dB	- 6 dB	- 10 dB	- 20 dB
3,5	zu lang	zu lang	zu lang	860
28	zu lang	660	363	107,5
145	324	127,5	70,1	20,7
435	108	42,5	23,4	zu kurz
1296	36,3	zu kurz	zu kurz	zu kurz
2350	20	zu kurz	zu kurz	zu kurz

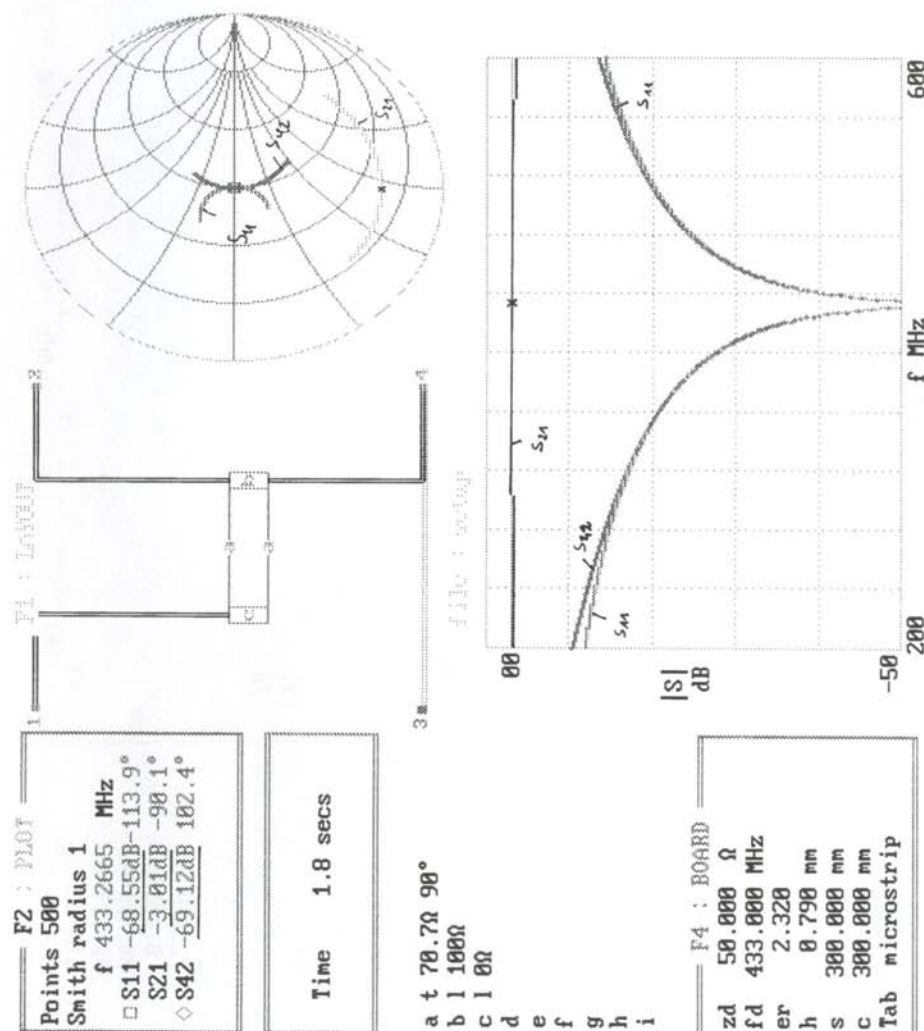
Bild/Figure 13: Leistungsstufe für 144MHz



Bild/Figure 14: PUFF-Simulation Kapazitiv gek. Hybrid



Bild/Figure 15: PUFF-Simulation Wilkinsonteiler



von abhängig, wie weit RL an Tor 2 von Ri abweicht.

Generell hängt die ausgekoppelte Spannung vom Abstand der Leitungen zueinander und der Länge der Koppelleitung ab. Bei einer Länge von $\lambda/4$ wird ein Maximum erreicht. In der Praxis wird die Spannung an 4 (ohne Widerstandsabschluss) mit einer Diode gleichgerichtet und nur Tor 3 mit 50Ω abgeschlossen. Wird an Tor 4 gleichgerichtet, so wird die zum Verbraucher RL vorlaufende Welle gemessen. Ist der Widerstand an 4 angeschlossen, so wird an Tor 3 die reflektierte (rücklaufende) Welle gemessen. Normalerweise wird man die Koppeldämpfung

$$a_k = -10 \log\left(\frac{P_4}{P_1}\right) \text{ so gering wie möglich wäh-}$$

len, da sie u.a. einen Anstieg der Einfügungs-
dämpfung des Kopplers bewirkt: $P_2 = P_1 - P_4$
mit $(P_1 > P_2)$ und entsprechend

$$a_j = -10 \log\left(1 - \frac{P_2}{P_1}\right)$$

Das genaue Maß hängt von der minimal noch detektierbaren Spannung an der Nebenleitung ab. Bei gegebenem Abstand der beiden Leitungen und fester Länge l der Nebenleitung sinkt die Koppeldämpfung mit steigender Frequenz, die ausgekoppelten Spannungen sind also frequenzabhängig

$$(U = k \sin(2\pi \frac{l}{\lambda})) \text{ mit } k \text{ als durch den Aufbau fest-}$$

gelegte Kopplerkonstante).

Macht man die Koppeldämpfung gerade 3dB groß, wird die eingespeiste Leistung an Tor 2 und Tor 4 auf zwei gleich große Teileleistungen ($P_e - 3\text{dB}$) aufgeteilt, und der Richtkoppler lässt sich als Leistungsteiler/-addierer mit galvanischer Trennung der Split-Zweige verwenden. Zwischen beiden Ausgängen besteht eine Phasendifferenz von 90.

Mechanisch ergibt sich allerdings ein Problem, da sich die beiden Verbraucherausgänge diagonal gegenüber liegen, was aus Gründen der weiteren Leitungsführung zu den Verbrauchern ungünstig ist. Dies kann man durch ein Verdrehen der beiden Leitungen vermeiden, was aber z.B. bei einem möglichen Aufbau in Striplinetechnik mit Luftdielektri-

kum wiederum zu Schwierigkeiten führt (konstanter Leiterabstand).

Dieser Nachteil wird bei Verwendung des Dreileiter-Systems SAGE-Wireline vermieden. Bei diesem Kabeltyp befinden sich innerhalb der äußeren Abschirmung aus Kupferlitzengeflecht oder einem starren Kupfermantel zwei voneinander isolierte Drähte. Der Aufbau entspricht also vollständig dem eines konventionellen Richtkopplers. Die Entscheidung zugunsten dieses Systems fiel daher wegen des geringen mechanischen Aufwands und der guten Integrierbarkeit in einen Leiterplattenaufbau leicht. Die notwendigen Formeln zur Berechnung derartiger Koppler finden sich in Abb. 12.

Es sei noch erwähnt, dass vom selben Hersteller der Typ "Wirepac" angeboten wird, der eine Richtschärfe von 30dB besitzt und die Übertragung von noch größeren Leistungen zulässt, jedoch auch wesentlich teurer ist. Außerdem gibt es kommerzielle Koppler, z.B. von ANAREN, die mit den anstehenden Leistungen beaufschlagt werden dürfen. Über deren Preise kann man aber nur spekulieren.

4.8 Gysel Koppler

Einen anderen Weg, N-fach 0°-Koppler mit geerdeten Abschlußwiderständen aufzubauen, zeigt ein Artikel von V.H. Gysel [17].

Abb. 16 zeigt das Prinzipschaltbild. Man kann ihn als entarteten Wilkinson Hybrid auffassen, in dem der erdfreie Brückenwiderstand durch zusätzliche Viertelwellenleitungen eingebettet und damit unsymmetrisch angeordnet werden kann.

Vorteil ist neben der Verwendung von normalen unsymmetrischen 50Ω -Terminationen, die für sehr hohe Leistungen erhältlich sind, auch die Tatsache, daß er mit konventionellen 50Ω -Leitungen aufgebaut werden kann. Ein solcher Gysel-Koppler, aufgebaut mit 0,141 Zoll Semirigid, kann ohne weiteres Leistungen von mehr als 800W übertragen.

Abb. 17 und 18 zeigen das theoretische mögliche VSWR und die Isolation in Abhängigkeit von der normierten Mittenfrequenz für N=2, 4 und 8.

Z2, Z3, Z4 in Abb. 16 sind im einfachsten Fall 50Ω -Leitungen. Dann ist die Impedanz am Summentor $Z_s = Z_0/N$. Das heißt für $N=2$ ist $Z_s = 25\Omega$, für $N=4$ ist $Z_s = 12,5\Omega$ usw. Die Viertelwellenleitung Z1 dient dann zur Transformation auf 50Ω . Ihre Impedanz ist dann $Z1 = \sqrt{2Z_0/N}$. Für den Fall $N=2$ heißt das $Z1=35,3\Omega$, für $N=4$ ist $Z1=25\Omega$, usw.

Es gibt auch Möglichkeiten, durch geschickte Wahl von Z2, Z3 und Z4, diese Transformation zu vermeiden. Dann ist $Z1=50\Omega$.

Die Abb. 19 und 20 zeigen die Simulationsergebnisse eines 4-fach Gysel Kopplers für 432MHz, der mit 0,25" Semirigid aufgebaut ist.

4.5 Wilkinson Coupler

This coupler splits the sum signal via two quarterwave 70.7Ω coaxial or microstriplines. The ports 2 and 3 are in equal phase. The 50Ω loads at port 2 and 3 transform via the quarterwave lines of 70.7Ω to an impedance of 100Ω , which gives in parallel a sum port impedance of 50Ω .

The bridge resistor has a value of $2 \cdot Z_0 = 100\Omega$. In case of perfect symmetry it dissipates no power, because there is no voltage across it.

Any signal travelling from port 2 to port 3 via the two quarterwave lines has a phase difference of 180° because the total line length is a half wavelength. On the other hand signal travelling directly through the bridge resistor has no phase difference. At port 3 there is an inphase signal from the resistor and an antiphase signal from the line via the sum port. Therefore both signals cancel. In fact part of the power is dissipated in the sum port resistor and the other part has to be dissipated by the bridge resistor.

This means, isolation is provided between port 2 and port 3. This holds only if the sum port looks into 50Ω and the bridge resistor is equal $2 \cdot Z_0 = 100\Omega$. In case of finite return loss at the sum port the isolation is degraded. If the sum port is open ($RL=0dB$), isolation is only 6dB. The same holds true if the bridge

resistor is omitted. In case of proper dimension of the coupler and perfect load at the sum port the isolation will be infinite. In practice this can go up to 40dB.

The isolation of the Wilkinson hybrid is heavily dependent on the goodness of match at the sum port. This means, used as a splitter it must be driven from a source with good match or if used as a combiner it must work into a load with good match.

Another issue is the bridge resistor. It must not have any complex impedance, which is caused by inductive or capacitive parasitics. This is not easy to achieve for power resistors. They must have attached a heat exchanger usually beryllium oxide. This introduces parasitic capacitance, which may impair microwave performance.

An important issue is the different behaviour of the Wilkinson coupler and the branch line coupler in case of mismatch on the output ports.

For the branchline coupler holds that in case of equal mismatch the input is always matched even in case of short or open circuit. All the power is routed to the isolated port.

The Wilkinson hybrid behaves opposite: Reflected signals caused by mismatch on ports 2 and 3 cancel partially and are dissipated in the bridge resistor. The input reflection coefficient is proportional to the sum of the reflection coefficients at the coupled ports. It holds:

$$[1] \quad P_{BR} = \frac{P_1}{4} \cdot (\rho_2 - \rho_3)^2$$

$$[2] \quad \rho_1 = \frac{1}{2} \cdot (\rho_2 + \rho_3)$$

$$[3] \quad ISO_{2-3} = \frac{1}{2 \cdot |\rho_1|}$$

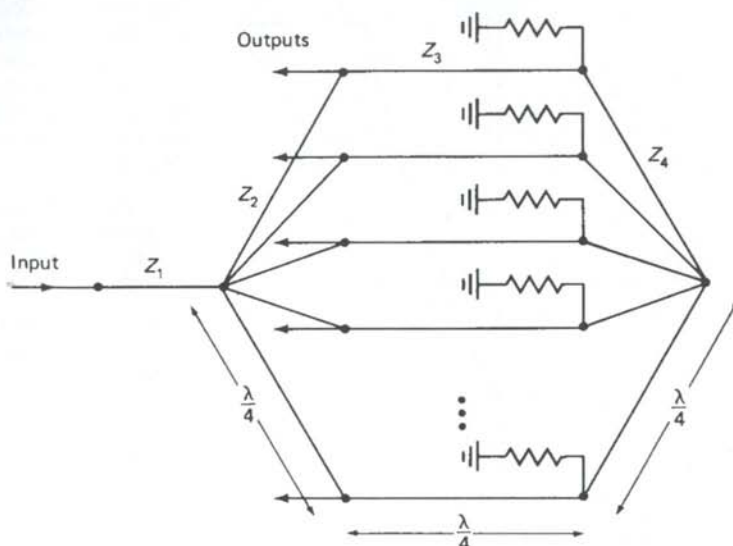
P_{BR} : Power dissipated in bridge resistance

ρ_1 : Input reflection coefficient

ISO_{2-3} : Isolation between port 2 and 3

In a worst case scenario with $\rho_2=+1$ (Open) and $\rho_2=-1$ (Short) all the input power is dissipated in R1!! and the input reflection coefficient is 0, i.e. all power is absorbed and no power reflected.

Bild/Figure 16: Gysel Combiner Diagram



The Wilkinson hybrid has many applications and is standard building block in microwave systems. It can be used to couple PA's, combiner for HF-generators or as divider for splitting LO-signals at mixers.

For broadband combiners several coupler offset at distinct frequencies in the band of interest are staggered.

The simulation (Fig. 15) shows a bandwidth of one octave.

4.6 Capacitive coupled Hybrid

A special form of 90° Hybrid can be constructed with lumped elements or with capacitive coupled 50Ω lines (Fig. 11). It can be dimensions for any coupling factor desired.

Especially for applications in the VHF range it provides advantages in size in comparison to the branch line coupler.

Power inserted at port 1 splits according to the coupling factor to ports 2 and 4. Ports 3 is isolated.

C1 and C2 couple signals from the main line to the second line. They add at port 4 and subtract at port 3.

Signals reflected at port 2 because of mismatch add at port 3 and subtract at port 4. Ports 2 and 4 are isolated as well as port 1 and 3.

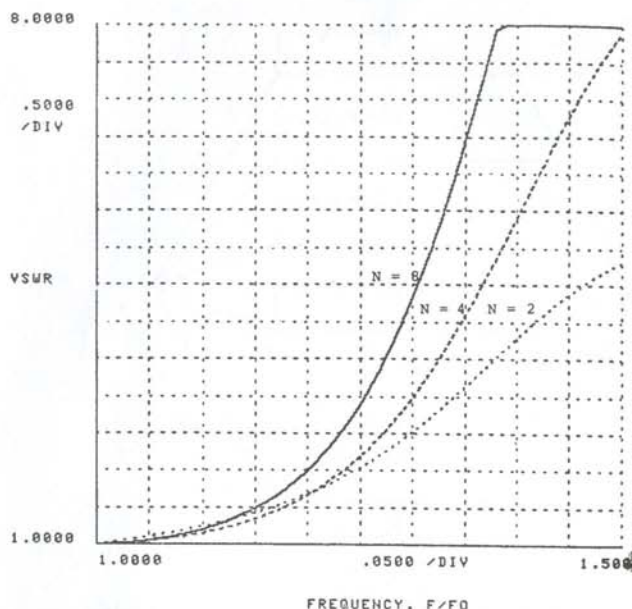
If used as a directional coupler the typical directivity is about 20...30dB. In this case detectors at ports 3 and 4 can provide a DC-value for the RF-power in terms of forward and reflected power.

Fig. 14 shows the PUFF simulation. Interesting is the typical lowpass behaviour of this type of coupler.

4.7 Directional Coupler

The principal structure of a directional coupler can be seen from Fig. 12. A main line 1-2 is coupled to the coupled line by means of inductive and capacitive coupling. Both lines have the characteristic impedance Z_0 .

Because of the distributed capacitance two currents IC1 and IC2 in opposite directions

Bild/Figure 17: Gysel Combiner VSWR

are flowing into ports 3 and 4. The inductive coupling induces a current I_M . If the absolute values are equal, I_{C1} and I_M add in port 4 and cancel in port 3.

The coupled power depends on the distance and length of the two lines. With a length of $\lambda/4$ the coupling factor has a first maximum.

If we use this structure as a directional power meter, you can measure forward power at port 4 and reflected power at port 3. This can be done by connecting a diode detector at the port of interest and terminating the other port in Z_0 .

The coupling ratio $a_k = -10 \log \left(\frac{P_4}{P_1} \right)$ determines the attenuation of the main line, because:

With $P_2 = P_1 - P_4$

$$a_i = -10 \log \left(1 - \frac{P_2}{P_1} \right) \quad [\text{Insertion Loss}]$$

With given geometrical dimension the coupling ratio increases with frequency.

A special case if we dimension the coupler with coupling ratio of -3dB. Then we have symmetrical power splitter/combiner. The phase difference between ports 2 and 4 is 90° . Also the ports are DC-isolated.

From a mechanical point of view the outputs are diagonal in a layout. This is uncomfortable.

A solution is the use of SAGE-Wireline. This is a twisted pair enclosed by a shielding tube. The necessary equation for the dimension of Wireline Couplers can be found in Fig. 12. A high power version is the WIREPAC, which has better directivity and higher power.

4.8 Gysel Coupler

A different way to construct N-Way 0° -couplers is shown in an article by V.H. Gysel [17].

By adding extra quarterwave lines to a N-Way Wilkinson combiner (see Fig. 16), the bridge resistor could be brought out to ground. This is a tremendous advantage, because those terminations are available in good quality up to 6GHz with power levels in excess of 300W. The only restriction of power capability is the power capability of the lines, which could be in the kW-range, if constructed by 250mil semirigid.

Figs. 17 and 18 show the available VSWR and the isolation between adjacent ports versus normalised frequency and for $N=2, 4$ and 8 .

The lines Z_2, Z_3 and Z_4 can be constructed in microstrip, but semirigid would be the choice for high power applications.

In the normal case they are 50Ω lines. At the sum port the resulting impedance is

$Z_S = Z_0/N$. This means for $N=2 \rightarrow Z_S = 25\Omega$, for $N=4 \rightarrow Z_S = 12,5\Omega$ etc. The quarterwavelength Z_1 serves as a transformer to 50Ω . Its impedance is $Z_1 = \sqrt{Z_0/N}$. This means for $N=2 \rightarrow Z_1=35,3\Omega$, for $N=4 \rightarrow Z_1=25\Omega$, etc.

By intelligent choice for the impedances of Z_2 , Z_3 and Z_4 this transformation can be avoided. In this case it holds: $Z_S = Z_1 = 50\Omega$.

Fig. 19 and 20 show the simulation results for isolation, coupling and return loss of a 4-way Gysel combiner made from 0.250" semirigid.

5. Anwendung: 144MHz MOSFET PA

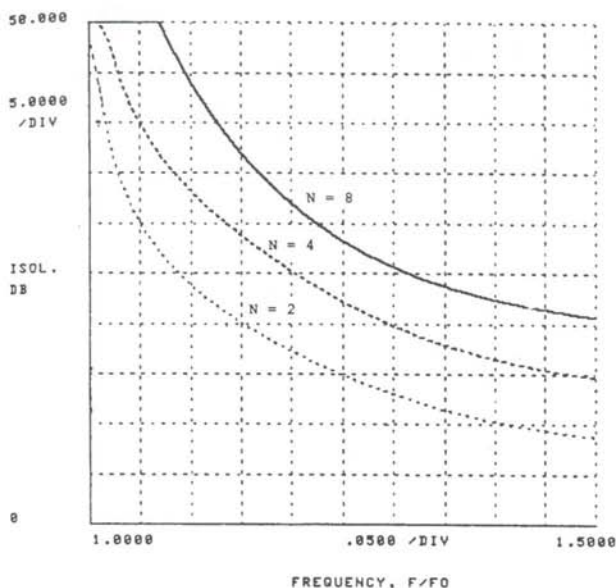
Damit sind alle wesentlichen Details des Konzepts angesprochen. Nur die Berechnung der LC-Transformationselemente von den Leistungsübertragern auf die Ein- und Ausgangsimpedanzen der Transistoren muss noch vorgenommen werden.

Möglicherweise kann man sich die 4:1 Leistungsübertrager auch sparen, da extreme Breitbandigkeit bei VHF/UHF-Endstufen für die schmalen Amateurfunkbänder nicht unbedingt erforderlich ist.

Das vorläufige Schaltbild der 600W-PA ist in Abb. 13 dargestellt. Die Verstärkung dürfte etwa 16-17dB betragen, d.h. 600W Ausgangsleistung (P1dB) werden bei einer Ansteuerleistung von etwa 12-15W erreicht. Die Endstufe lässt sich daher von jedem handelsüblichen Transceiver voll aussteuern. Eine 2/3-Aussteuerung dürfte jedoch sinnvoll sein.

Es sei nicht verschwiegen, dass auch die Peripherie einer derartigen Endstufe (Schutz- und S/E-Zeitfolgeschaltungen, Netzteil) ein

Bild/Figure 18: Gysel Combiner Isolation



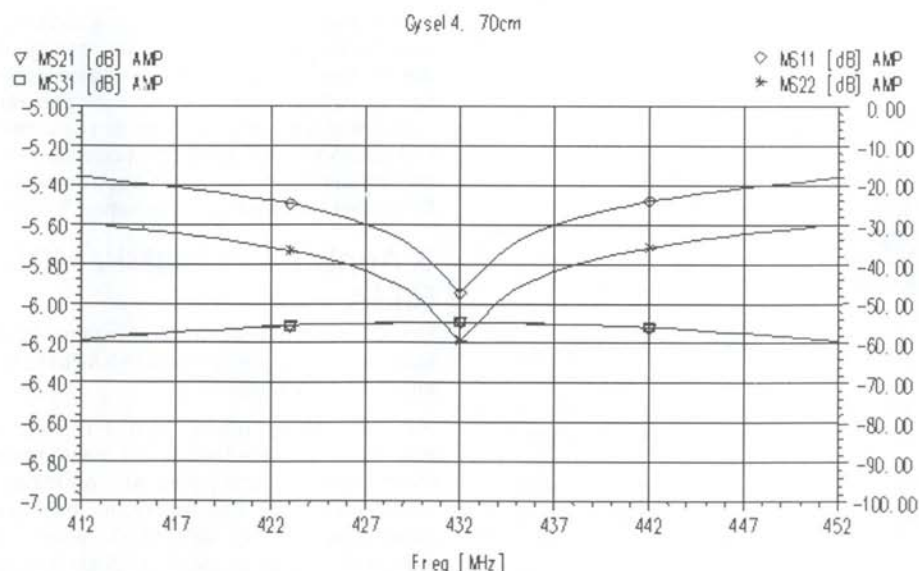
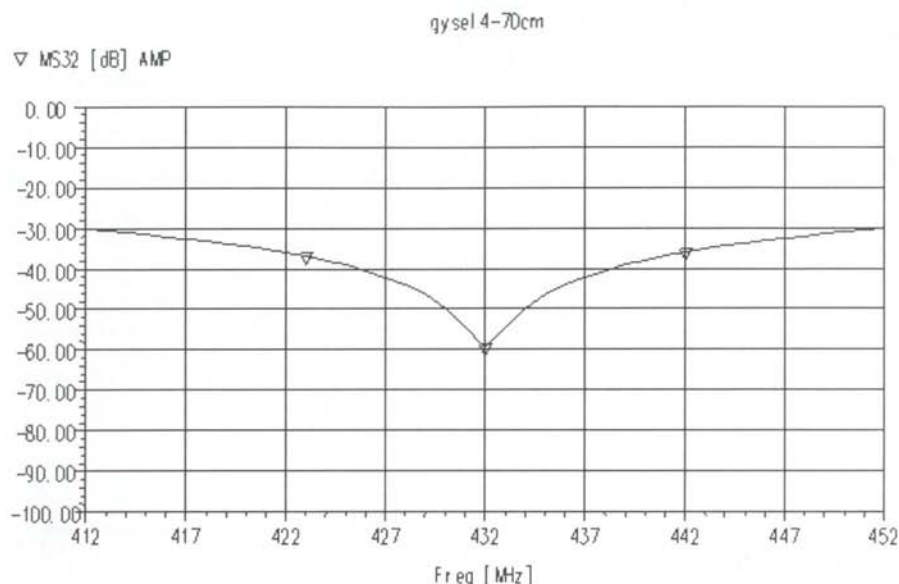
erhebliches Maß an Entwicklungsarbeit erfordert. Es bleibt jedoch zu hoffen, genügend Anregungen und praktische Hinweise gegeben zu haben, die den einen oder anderen dazu ermutigen, sich selber an den Bau einer KW- oder VHF/UHF-Endstufe moderner Konzeption zu wagen - bei den Preisen derartiger Endstufen sicher ein lohnenswertes Projekt.

5. Application: 144MHz MOSFET PA

Fig. 13 shows the circuit diagram of my case study, a 2m-power amplifier with a MRG151G MOSFET from Motorola.

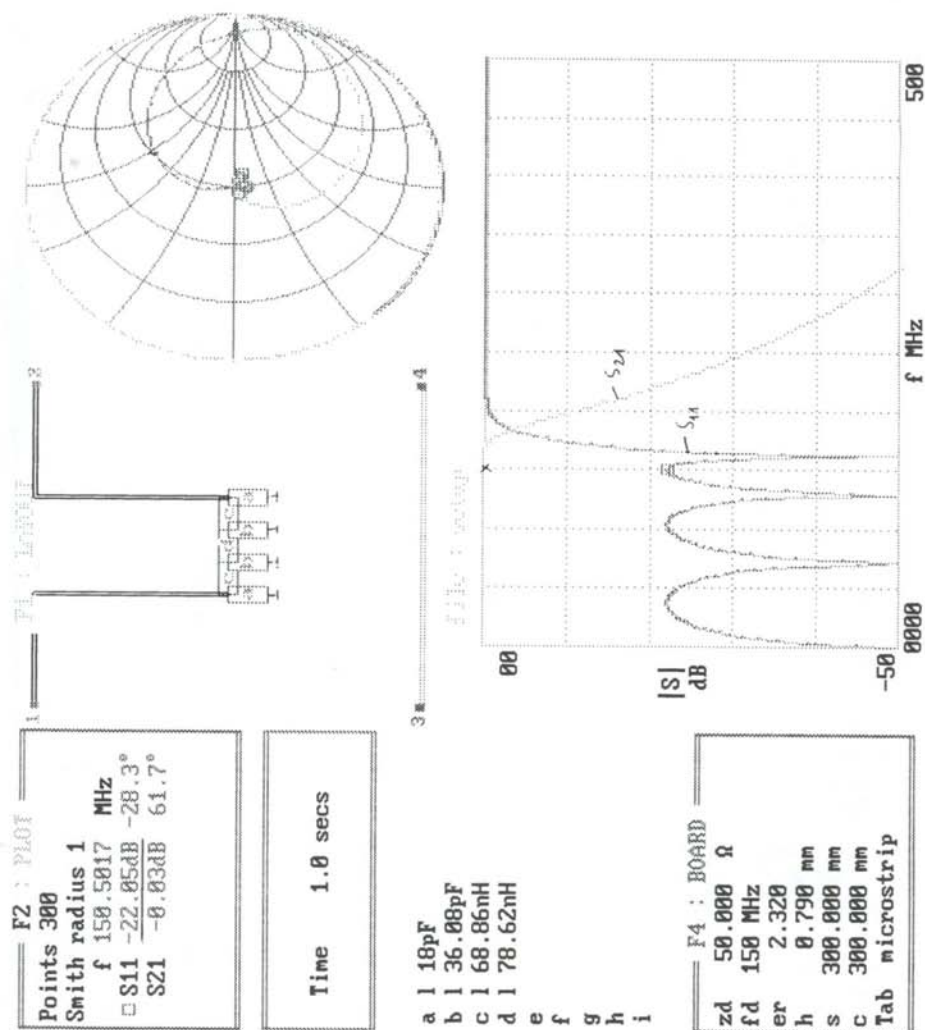
An input balun made from PTFE-cable RG141A is followed by a 4:1 transformer made from semirigid cable with an impedance of 25Ω . By this technique the input impedance of the MRF151G which is $1.2 + j1.2 \Omega$ (Gate to gate) at 150MHz must be matched to 12.5Ω of the transformer.

Bild/Figure 19: 4-way Gysel Combiner for 432-Isolation



Bild/Figure 20: 4-way Gysel -Return Loss&Coupling

Bild/Figure 21: Harmonic Filter for 144MHz



The output impedance of the MFR151G is $8.5+j0.3 \Omega$ (Drain to drain) at 150MHz. This has to be matched to the 12.5Ω of the 4:1 output transformer. A subsequent balun with RG141A cable makes the necessary transformation from balanced to unbalanced. The output power coupler is made from Wireline.

Besides the task of developing the amplifier also the auxiliary circuits like power supply, protection circuits and time sequencers will take an enormous amount of time.

6. Literatur/References

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6. Errata

Magnetic Flux in Cores

The equation on page 24, DUBUS 1/2000 must read:

$$B_{op} = V_{rms} \frac{10^8}{4,44 \cdot f \cdot N \cdot A_Q} + 10 \cdot N \cdot I_{DC} \frac{A_L}{A_Q} \quad [\text{Gauss}]$$

V_{rms}	Voltage across the winding in V
A_Q	Cross section area in cm^2
N	Number of turns
f	Frequency in Hz
I_{DC}	DC-Current in A
A_L	Inductance factor in nH

Magnetischer Fluß in Kernen

Die Gleichung in DUBUS 1/200, S. 14 muß lauten:

$$B_{op} = V_{rms} \frac{10^8}{4,44 \cdot f \cdot N \cdot A_Q} + 10 \cdot N \cdot I_{DC} \frac{A_L}{A_Q} \quad [\text{Gauss}]$$

V_{rms}	Spannung, mit der die Wicklung in V beaufschlagt wird
A_Q	Querschnitt des magn. Weges in cm^2
N	Windungszahl
f	Betriebsfrequenz in Hz
I_{DC}	Gleichstrom durch die Wicklung in A
A_L	Induktanzfaktor des Kerns in nH

Microwave Products

Editor: Rainer Bertelsmeier, DJ9BV

PHEMT* Low Noise Amplifier with Bypass Switch

Technical Data

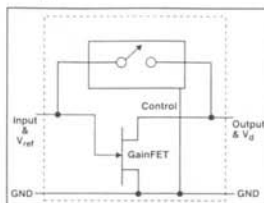
Features

- Operating Frequency
0.1 GHz – 6.0 GHz
- Noise Figure:
1.4 dB at 2 GHz
- Gain: 14 dB at 2 GHz
- Bypass Switch on Chip
Loss = -2.5 dB ($I_d < 5 \mu A$)
 $IIP_3 = +35 \text{ dBm}$
- Adjustable Input IP_3
+2 to +14 dBm
- 2.7 V to 4.2 V Operation
- Very Small Surface Mount Package

Applications

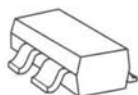
- CDMA (IS-95, J-STD-008)
Receiver LNA
Transmit Driver Amp
- TDMA (IS-136) Handsets

Simplified Schematic



* Pseudomorphic High
Electron Mobility Transistor

Surface Mount Package SOT-343 (SC-70)

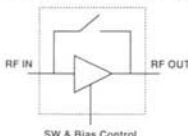


Pin Connections and Package Marking



Package marking is 3 characters. The last character represents date code.

Functional Block Diagram



Description

Agilent's MGA-72543 is an economical, easy-to-use GaAs MMIC Low Noise Amplifier (LNA), which is designed for an adaptive CDMA receiver LNA and adaptive CDMA transmit driver amplifier.

The MGA-72543 features a minimum noise figure of 1.4 dB and 14 dB associated gain from a single stage, feedback FET amplifier. The output is internally

matched to 50 Ω . The input is optimally internally matched for lowest noise figure into 50 Ω . The input may be additionally externally matched for low VSWR through the addition of a single series inductor. When set into the bypass mode, both input and output are internally matched to 50 Ω .

The MGA-72543 offers an integrated solution of LNA with adjustable IIP_3 . The IIP_3 can be fixed to a desired current level for the receiver's linearity requirements. The LNA has a bypass switch function, which sets the current to zero and provides low insertion loss. The bypass mode also boosts dynamic range when high level signal is being received.

For the CDMA driver amplifier applications, the MGA-72543 provides suitable gain and linearity to meet the ACPR requirements when the handset transmits the highest power. When transmitting lower power, the MGA-72543 can be bypassed, saving the drawing current.

The MGA-72543 is a GaAs MMIC, processed on Agilent's cost effective PHEMT (Pseudomorphic High Electron Mobility Transistor). It is housed in the SOT343 (SC70 4-lead) package.

MGA-72543 Electrical Specifications, $T_C = +25^\circ\text{C}$, $Z_0 = 50\ \Omega$, $I_d = 20\ \text{mA}$, $V_d = 3\ \text{V}$, unless noted.

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.	σ
Vref test ^[1]	$f = 2.0\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($V_{ds} = 2.5\ \text{V}$) $I_d = 20\ \text{mA}$	V	0.37	0.51	0.65	0.035
NF test ^[1]	$f = 2.0\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($=V_{ds}+V_c$) $I_d = 20\ \text{mA}$	dB		1.5	1.8	0.06
G_a test ^[1]	$f = 2.0\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($=V_{ds}+V_c$) $I_d = 20\ \text{mA}$	dB	13.5	14.4	15.5	0.13
IIP ₃ test ^[1]	$f = 2.04\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($=V_{ds}+V_c$) $I_d = 20\ \text{mA}$	dB	8.5	10.5		0.67
IL test ^[1]	$f = 2.0\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($V_{ds} = 0\ \text{V}$, $V_c = 3\ \text{V}$) $I_d = 0.0\ \text{mA}$	dB		2.5	3.5	0.01
Ig test ^[1]	$f = 2.0\ \text{GHz}$ $V_d = 3.0\ \text{V}$ ($V_{ds} = 0\ \text{V}$, $V_c = 3\ \text{V}$) $I_d = 0.0\ \text{mA}$	μA		2.0		2.0
NF ₀ ^[2]	Minimum Noise Figure As measured in Figure 2 Test Circuit (Γ_{opt} computed from s-parameter and noise parameter performance as measured in a $50\ \Omega$ impedance fixture)	dB		1.35 1.38 1.42 1.45 1.54 1.70		0.04
G_a ^[2]	Associated Gain at NF ₀ As measured in Figure 2 Test Circuit (Γ_{opt} computed from s-parameter and noise parameter performance as measured in a $50\ \Omega$ impedance fixture)	dB		14.8 14.2 13.6 13.0 11.2 9.2		0.11
P _{1dB} ^[1]	Output Power at 1 dB Gain Compression As measured in Figure 1 Test Circuit Frequency = 2.04 GHz	dBm		+15.3 +3.2 +8.3 +11.2 +14.9 +17.1		0.52
IIP ₃ ^[1]	Input Third Order Intercept Point As measured in Figure 1 Test Circuit Frequency = 2.04 GHz	dBm		+35 +3.5 +6.2 +10.5 +12.1 +14.8		0.67
ACP	Adjacent Channel Power Rejection, $f = 2\ \text{GHz}$, offset = 1.25 MHz, Pout = 10 dBm (CDMA modulation scheme) $f = 800\ \text{MHz}$, offset = 900 KHz, Pout = 8 dBm As measured in Figure 1 Test Circuit	dBc		-55 -60 -57 -60		
RL _{in} ^[1]	Input Return Loss as measured in Fig. 1	dB		10.2		0.22
RL _{out} ^[1]	Output Return Loss as measured in Fig. 1	dB		19.5		1.1
ISOL ^[1]	Isolation $ S_{12} ^2$ as measured in Fig. 2	dB		-23.2		0.16

Notes:

- Standard Deviation and Typical Data as measured in the test circuit in Figure 1. Data based on at least 500 part sample size and 3 wafer lots.
- Typical data computed from s-parameter and noise parameter data measured in a $50\ \Omega$ system. Data based on 40 parts from 3 wafer lots.

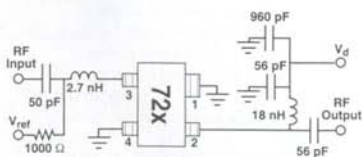


Figure 1. MGA-72543 Production Test Circuit.

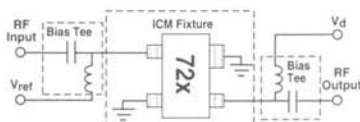


Figure 2. MGA-72543 Test Circuit for S, Noise, and Power Parameters Over Frequency.

MGA-72543 Typical Performance, $T_c = 25^\circ\text{C}$, $Z_0 = 50$, $V_d = 3\text{ V}$, $I_d = 20\text{ mA}$, unless stated otherwise.
All data as measured in Figure 2 test circuit (Input & Output presented to 50Ω).

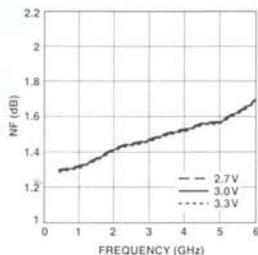


Figure 3. Minimum Noise Figure vs. Frequency and Voltage.

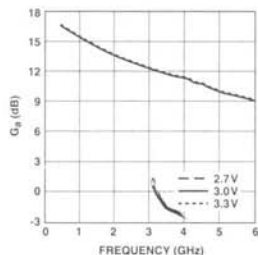


Figure 4. Associated Gain with $F_{\min}$ vs. Frequency and Voltage.

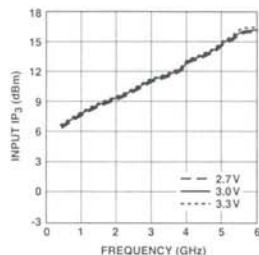


Figure 5. Input Third Order Intercept Point vs. Frequency and Voltage.

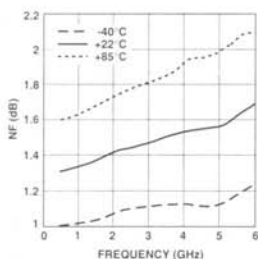


Figure 6. Minimum Noise Figure vs. Frequency and Temperature.

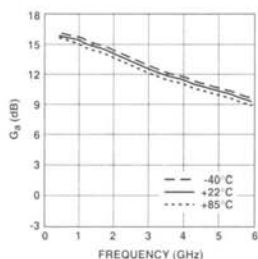


Figure 7. Associated Gain with $F_{\min}$ vs. Frequency and Temperature.

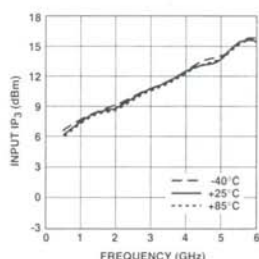


Figure 8. Input Third Order Intercept Point vs. Frequency and Temperature.

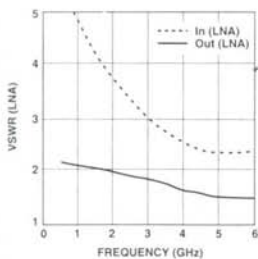


Figure 9. LNA on (Switch off) VSWR vs. Frequency.

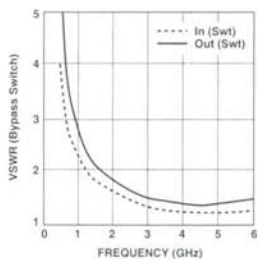


Figure 10. LNA off (Switch on) VSWR vs. Frequency.

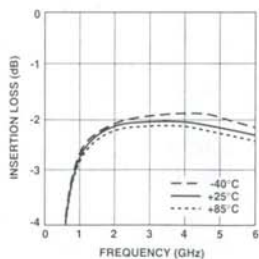


Figure 11. Insertion Loss (Switch on) vs. Frequency and Temperature.

Microwave Europe

Editor: Simon Lewis, GM4PLM

Hello all and welcome to the first Microwave Europe column of a new millennium (dependent on how you count it)! You may have already realized that the column has changed hands and I would like to pass a word of thanks on to my predecessor, John Sorenson OZ1IPU for all his hard work. I hope that you may get some time to operate radio now John!

It is always a little uncertain when a new author takes over a column. Uncertainty for the author because he/she never knows how the audience will take the change and uncertainty for the reader because they have generally been used to one author for sometime and may not be ready for radical changes. I was very proud to have been asked by Rainer DJ9BV, if I would edit the column, and I was convinced that I could make a contribution to DUBUS and so was happy to oblige. After accepting I sat and thought for sometime what I wanted to achieve with the column and what I thought you might like me to do with it! Hopefully what I am about to announce will please you! If it does then great! If not let me know ASAP! Before I announce the changes, I thought that I would like to include a small biography of myself, purely so you can see who is behind the column, in what can be a very faceless environment.

I have been a licensed amateur since the early 1980's and hold the full Class A UK call sign, GM4PLM. I am married to Lyn who is also licensed, she holds a UK class B novice license (2M1EJK). We have two children, David (9) and Connor (7). I work in Glasgow as a Computer Network Manager for a large government finance company, having left the Royal Naval Submarine Service in December last year after 16 years, as a radio communications manager. We have just purchased

a new 22 acre QTH in Ayrshire (IO75TF), called Creech Farm. This dates back to the 1800's and the time of that famous poet, Robert Burns, known in the Scottish language as 'Rabbi Burns', and famous for his unusual poetry. I have always been interested in microwaves and was first active on WBFM in the early 1980's. My time in the navy curtailed most of my operations but in the mid 1990's I revived my microwave activities using a G3WDG narrowband transverter. I am active on all bands from 50 MHz to 10 GHz, mostly using homebuilt equipment. Future plans include becoming operational on EME using a LARGE dish and attempting some LF contacts on 136 KHz. Well I have to use all this land somehow and if I don't put antennas on it, the XYL will have horses all over it!

So what changes do I plan for the column? The first changes I envisage are to make the column more readable and more informative. Columns simply listing call signs and distances worked do not improve technical skills, inform the reader of any news or make the column interesting enough to be the first pages to turn to when DUBUS drops through the door. So I intend to alter the layout of the column to include news and information from the microwave world, any new technical information, mini reviews of new equipment and 'some' operating news as well. Hopefully this will balance the column out and make it more readable to you. Of course, if there is something you would like to see then please let me know, it's your column after all! To complement the column I have also written a web page for follow-up information. Details of the address can be found at the bottom of this issue. So onwards and upwards as they say! Enjoy this issue and let me know what you think of the changes. 73 Simon GM4PLM

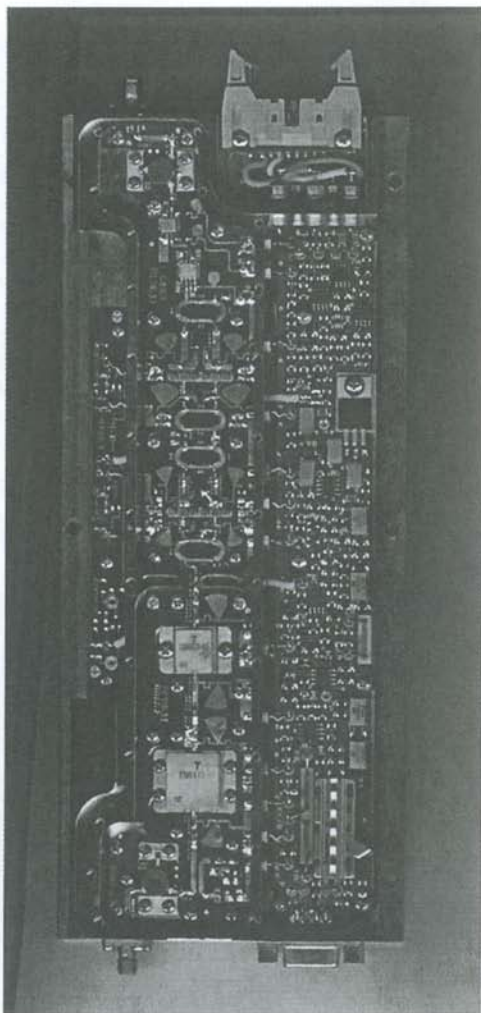
News and Items of Interest

Surplus 10 Watt 5.7 and 10 GHz Solid State PA's Microwavers are always on the look out for ways of increasing their transmitted signals but modern solid state power devices capable of operating at 5.7 and 10 GHz are still very expensive and so most run only low power (1 watt or less) or run surplus Traveling Wave Tube Amplifiers (TWTAs) at around 10 watts. A recent email from Germany has turned up a source of surplus solid-state 5.7 and 10 GHz amplifiers that are more affordable for the average amateur. The MIKOM MLA 9407 and MLA9207 were designed as solid-state power blocks for Electronic News Gathering applications. These are the very nice mobile satellite trucks you can see in the background of outside TV broadcasts! The MIKOM units are consequently robust and well built, capable of surviving some heavy handed portable operations with ease.

The units measure 256 x 105 x 28mm and weigh around 3 Kg. They are solidly built on a one-piece milled chassis, with a bent, stainless steel cover. RF connections are SMA on both input and outputs. Three DC power and control connectors are fitted (1 x 9 pin D and 2 x 16pin IEC connectors). Internally the unit is beautiful and a true work of art. The main board runs from input to output, cascading devices and power couplers along the way. The device is high gain at around 50 dB and so requires very little drive power, removing the need for additional amplifiers in the typical amateur transceiver. Power requirements are 12V DC at 8A and -9.5V DC at 100mA. Interfacing it into a transceiver is very easy. Both 12V and -9.5V DC supplies should be present at all times and the unit is switched from transmit/receive by applying a +5v DC signal to one of the control connectors. A final output stage voltage monitor line is also provided on these connectors.

The units are an excellent addition to a performance 5.7/10 GHz station and removes the need for dangerous TWTAs power supplies (especially on damp mountains whilst portable!) and allows a high

power 12V portable station to be constructed. Although they are supplied as surplus, these are new items and come sealed in original packing and with test data and full connection details as standard. Priced at around 300 UKP (900 DM) they are quite affordable when compared to new commercial amateur kits. Further details from Jochen Zilg at mmwave.zilg@t-online.de



5.7GHz Amp

Equipment Review

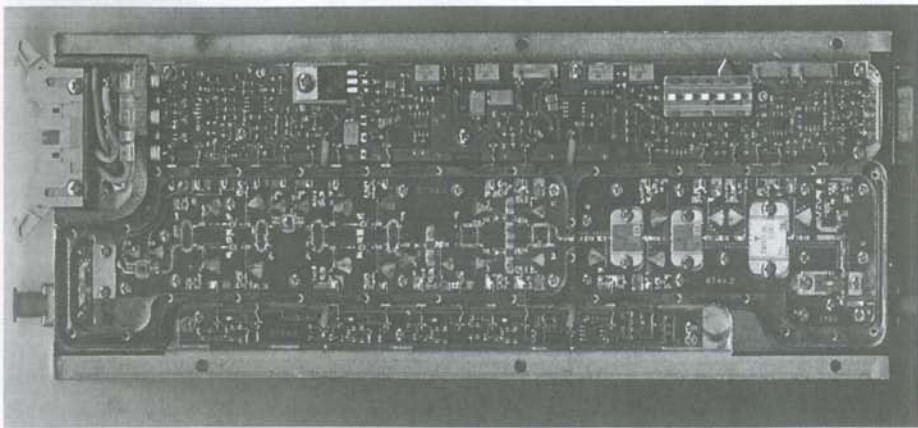
Wimo Precision SHF Yagis. Wimo are a German company who have been around some time. You may have already seen their adverts in DUBUS before. I was having an interesting email conversation with Volkmar, Wimo's owner and I suggested that others may be interested in the range of SHF yagis that Wimo build and manufacture. Very shortly after, an array of test antennas arrived on my doorstep from Germany ready for review. My first impression as I opened the boxes up was 'Wow! They are already built! Wimo use CAD/CAM techniques to design and build their antennas and the SHF Design yagis are supplied built. All that is required is a few minutes assembly time to attach the driven element to the boom and the assembly of mast mounting clamps. Once that is complete the antenna is ready to use, as all the elements are inserted and screwed into place by machine at the factory. The antennas are made of high grade aluminum and will last well even in the weather on the Scottish West coast. So far, so good! The driven element comes as a single assembly comprising a folded dipole with a UT141 hard-line balun. The connector is a top quality silver-plated N type, which is completely molded into the assembly ensuring that it remains weather proof. Antenna clamps are stainless steel, with stainless fittings, meaning that you

should be able to get the antenna off the mast even after a number of years exposed to the weather. Once assembled I tested the antenna on a local beacon using the XYL's washing pole as a temporary support. I do not move into the new QTH till later this year and so this has to make do until I can get my 20m tower in place!. The antennas perform well and have nice radiation patterns. I can thoroughly recommend them and I will be installing them at this QTH without hesitation. I will include a picture of the antennas in the next issue - if it ever stops raining long enough to use the camera again.

Software Review

GABRIEL SAMPOL EA6VQ sent me information on his latest version of the VQLOG PC logging package. Version 2.0g has some useful updates and the whole package is very useful as it is written with the VHF - microwave operator in mind. Many of the features in this excellent program are not found in more general logging software. What's more the program is very reasonably priced. Well worth a look, an evaluation copy can be downloaded at www.qsl.net/ea6vq/vqlog.htm.

Paul Wade's Palm logging software has been under extensive use by the author since the first release in December 1999 and I have



10GHz Amp

come to the conclusion that it's a great little logging program and very useful if you have a Palm! The Palm is a small handheld computer that is perfect for replacing paper logs and is miniature compared to a full-blown laptop and runs for many hours on a set of batteries. The software also contains a bearing/distance calculator as well! It also supports multiband, cumulative events too. A screenshot of the log is shown in Figure 1. I have tried to find a Psion equivalent without success. Anyone know of such a program? Paul's freeware software can be found at www.tiac.net/users/wade/. The site also holds an excellent online microwave antenna handbook that is also worth a visit, a CD ROM of the antenna handbook is available, priced 20 USD.

Internet Spotlight

I know that some people do not have web access, so I will keep the details of interesting web pages simply to the url and what the site covers.

<http://www.ukmicrowavers.org> New UK Microwave Group site

<http://www.g3wdg.free-online.co.uk> RSGB Microwave Component Service

<http://www.downtownmicrowave.com> Microwave kit supplier

http://www.bbc.co.uk/weather/uk_radar.shtm UK Rain Radar Images

<http://home.t-online.de/home/prinz.dl2am/> DL2AM Solid State PA Pages

Beacon and Operating Information

A plea for beacon help comes from Ted Warne, G3YJX, of the Mid Cornwall Beacon and Repeater Group. Ted reports that the future of the 1296 MHz beacon, GB3MCB (1296.860 MHz) is being evaluated, as the beacon is costing 30 UKP per annum in electricity and the group has never received one single reception report since it started operating. Ted asks for reception reports so that the group can assess the viability of the beacon. Time for action! Can all readers with 23cms capable equipment please send a reception report to the group. Ted can be contacted via email at ted.warne@treryn.freemove.co.uk or via packet at G3JYX@GB7TAS or QTHR via normal post. Our action may save another beacon going off-air, it's up to you.

Martyn Kinder G0CZD reports a new 13cm beacon is active from Wales. GB3PYS operates from a site just outside Newton, Powys (IO82HL) Frequency: 2320.925MHz, bearing due East using a sectoral horn. Martyn states it should be audible on a bearing of +10 to +170 degrees and has so far been heard over 80 Km. Its currently only about 10 feet

Microwave: World Firsts and World Records

Band (GHz)	World First QSO			World Record		
	Date	Calls	QRB (km)	Date	Calls	QRB (km)
10	1946-05-06	W2JRM-W2JN	3.3	1994-12-30	VK6KZ/p-VK5NY/p	1912
24	1975-10-14	G3BNL/P-G3EEZ/p	150	1999-08-11	IOLVA-I3EME/IT9	444
47	1984-10-03	HB9AMH-HB9MIN	1	1998-05-15	F6BVA/p-F5CAU/p	193
76	1985-12-30	HB9MIN-HB9AGE	0.5	1995-12-07	HB9MIO/p-DK4GD/p	114
145	1992-12-12	DB6NT/p-DL1JIN/p	1	1997-04-07	DL6NCI/p-DB6NT/p	53
241	1993-05-23	DB6NT/p-DL1JIN/p	0.1	1995-06-07	DB6NT/p-DF9LN/p	2.1
411	1998-01-06	DB6NT/p-DL1IN/p	0.05	1998-01-06	DB6NT/p-DL1IN/p	0.05

If you have an update or a correction, please write to:

Simon Lewis, 181 Kent Drive, Helensburgh, Strathclyde, G84 9RX, UK

above ground - it will go higher when the weather improves. ERP is just less than 10dBW. Reception reports would be appreciated. Martyn Kinder G0CZD martyn@g0czd.clara.net

The amazing UK 47GHz men, G7MRF, G0IVA, G8VZT and G0HNNW, were recently honored by the awarding of the Fraser-Shepherd Award at the UK Sandown VHF Convention. These radio amateurs earned the award through their efforts on 47GHz during 1999. Their trials and experiments involved a large amount of construction and self-training in the use of components and construction techniques essential at these high frequencies. This led to a new UK 47GHz distance record of 161km being established in September 1999. Congratulations Martin (G7MRF), Dave (G0IVA), David (G8VZT) and Paul (G0HNNW) for your excellent work, all done in the true amateur spirit.

Contact Information

News, articles and items for inclusion can be sent via any of the following:

Snailmail: Simon Lewis, 181 Kent Drive,
Helensburgh, Strathclyde, G84 9RX

Email: gm4plm@emn.org.uk

Telephone: +44 1436 679610 (outside UK)
01436 679610 (inside UK)

Fax: As above but telephone first so I can set up the PC!

Microwave	Europe
Homepage: www.emn.org.uk/mv.html	Euro-
pean	Microwave
Homepage: www.emn.org.uk	News

EME News

Editor: Bernd Wilde, DL7APV

What we have this issue :

Results : **REF/DUBUS** and **ARRL** contest, many reports from contest and what dates are **ARRL-2000?**

Possibilities are Sept 23/24, Oct 21/22 and Nov 18/19.

October 21/22 and November 18/19 look like the best two weekends in those months, with the lowest sky noise. The moon rises around midnight (your local time) and sets in the early afternoon. There are good reasons to seriously consider September 23-24 and October

21-22 instead of Oct. 21-22 and November 18-19. The case for Sept. 23-24 over Nov. 18-19 are these: 1- Closer to perigee (lower path loss), 2- Higher declination (longer operating times for northern hemisphere stations), 3- Lower sky noise (better s/n), 4- More hours of night time conditions (less probability of TVI problems for many and generally more stable conditions), 5- Weather is usually milder (for northern climes). (comment from Derwin W5LUU). Like last year the EMERS voted for the dates:

oct 21/22 & Nov 18/19

47 Votes which includes 20 from Europe

Sept 23/24 & Oct 21/22

20 Votes which includes 11 from Europe

Sept 23/24 & Nov 18/19:

2 Votes which includes 1 from Europe

Joel, W5UN has been copied on this message. The above data should be good input for the ARRL to make their final decision on the dates for the contest. 73, Lionel, VE7BQH



DJ5RE assisted by 2 months old Sebastian

144 MHz

DJ5RE reports: After the QRT of our Clubstation DL0AO in June 1998, I missed 2m EME very soon. So I built up a small system in my home location: 2x 12 EI M2, 3,5m stacking, 3/8" stacking-line, 20m 7/8" TX-line, 0,28 dB NF, preamp directly at the HF400 relais, TS 870 with IF-DSP (50 Hz), h.b. transverter, GS35b watercooled.

Here are the results from 10/98 to 4/2000 (with about 8 months of break between): KB8RQ r; OZ9AAR r; SM5BSZ r; SM5FRH r; AA4FQ r; F3VS r; I2FAK r; HB9Q r; VE1ZJ r; W5UN r; SM2CEW r; K7CA r; VE7BQH r; VE3KDH r; IK3MAC r; W5LBT r; DJ5MN r; K5GW r; DK9ZY r (4x10); WA9KRT r; JA4BLC s; RU1A r; PA0JMV s (2Y-2Y); ZS6ALE s; OZ1HNE r; EA6VQ r; W0VD s;

EME-TOPLIST

Call	small	SQR	DX	US	WAS	#
			CC	States	WAC	

144MHz

I2FAK	477	59	111	50	1993	1988 1045
HB9CRQ	395	57	96	50	1994	1987 725
UA9FAD	265	43	73	40	--	-- 400
HB9Q	181	36	49	38	--	1999 230
GM4JJJ	172	38	58	34	--	1986 254
RW1AW	152	28	36	27	--	1999 179
DM2BHG	79	75	24	19	--	-- 126
9A9B	74	16	23	13	--	-- 91
SP7DCS	49	18	19	11	--	-- 51
DL2IAN	47	16	17	14	--	-- 49
PE1OGF	46	14	61	16	--	-- 88
YO2AMU	36	18	24	12	--	-- 57
YO2IS	33	14	16	10	--	-- 34
RW3PF	29	12	11	7	--	-- 31
F5HRY	21	0	8	7	--	-- 21
SP2JXN	15	8	9	0	--	-- 15
DL1SUZ	3	0	3	0	--	-- 3
OK1MS	0	51	100	50	1992	1982 678

432MHz

DL9KR	378	52	82	50	1987	1978 715
DJ6MB	280	41	61	44	--	1984 337
OK1KIR	249	44	62	44	--	1982 349
DL7APV	141	29	35	40	--	1984 169
F1ANH	125	25	31	25	--	-- 159
ON4KNG	115	25	42	18	--	1996 138
YO2IS	115	23	33	23	--	-- 141
OE9ERC	107	24	27	22	--	1993 126
G4ERG	107	23	31	28	--	-- 141
DL8OBU	90	23	29	21	--	-- 104
RW1AW	72	21	24	19	--	-- 75

OK1CA	71	24	26	22	--	1996 121
EA6ADW	66	19	24	19	--	-- 69
S52CW	44	15	17	12	--	-- 50
UT3LL	41	23	17	13	--	-- 45
F5HRY	31	0	14	8	--	-- 31
OK1DFC	12	7	11	7	--	-- 26
ZS6AXT	0	0	32	0	--	-- 152

1296MHz

OE9ERC	140	29	35	28	--	1993 201
OK1KIR	139	31	38	27	--	1989 173
HB9BBD	121	26	34	24	--	1994 142
F1ANH	111	25	31	23	--	1994 152
DJ9YV	109	29	35	19	--	1998 118
EA6ADW	105	24	31	24	--	1994 145
F5PAU	104	24	30	20	--	-- 121
OK1DFC	75	23	29	15	--	1999 85
OK1CA	44	18	22	9	--	-- 59
ZS6AXT	?	?	32	?	--	1993 144

2300MHz

OE9ERC	41	14	19	8	--	-- 44
OK1KIR	38	13	19	9	--	-- 39
F1ANH	17	8	11	5	--	-- 18
EA6ADW	8	4	8	1	--	-- 9
OK1CA	4	3	4	0	--	-- 4
ZS6AXT	0	0	16	0	--	-- 29

5760MHz

OK1KIR	14	10	11	3	--	-- 15
OE9ERC	14	7	12	2	--	-- 16

10368MHz

OK1KIR	13	9	11	2	--	-- 14
OE9ERC	11	8	7	3	--	-- 11

K9MRI s; G3ZIG s; UA4API s; PE1LCH s; SM3MXR r; UA9FAD s; LZ2US r; DL5MAE r; EA3DXU r (2Y-2Y random, works regularly!); W0PT s; PY2DP r; IK1FJL r; SM2CKR r; OE5EYM r; RU1AA r; K2GAL r; IK1MTZ r; RZ1AWT r; I3DLI r; IK2DDR r; PA3DZL s; GM4JJJ r; W7HAH r; VK3CY s (WAC complete); RW1AW s; NP4C s; RK9CC s; EA2LU r; N0AKC s; R1MVZ r (!); S52LM r; 9H1PA s; N2WK s; NJ0M s (2Y-2Y); K5AIH r; J6MB r (!); WA6PY s; SM7SJR r; PE1OGF r; IZ5EME s; PA3CWI s; PA2CHR r; WB4JEM s; OH2BC r; OK1MS r; DM2BHG s; AC3A s (4x9); SV1BTR s; N5BLZ s. So I worked 73 different stations with this 2-Yagi array so far, 47 were new initials for me. My own echos and a lot of

QSO's with small stations prove: You can be in the game with a very compact antenna system. Problem is there are so much stations who don't want to try with such a small-gun. 73's de Tom, DJ5RE

DL1EJA reports : during my moonrise on Sunday evening I was able to work IK3MAC with fb signal O/O. During our QSO he was peaking 519 from time to time. Because I was quite late I was not possible to work more, because I lost the moon with about 10-12 deg Elevation. I was using only a single 15ele Longyagi by Hygain without any preamp! Between my dipole and Transverter is about 35m of 1/2"-Hardline-Cable. Rig is a TS850S with

Transverter by SSB-electronic followed by a GU78B (4CX2500)-PA. From time to time I read my own echos with this setup on moonset very well. If somebody is interested in a S, then let me know. vy 73 Oliver, DL1EJA

EA3DXU reports : Quite good conditions first morning unfortunately poor activity , also some Ss limited my R activity time .18 March W4FF S # 389, UA3PTW, DM2BHG, S53J S # 390, IK2DDR, PA3FOC S # 391 (one yagi) congrats

Rene,
G3ZIG,
IK3MAC,
I3DLI,
SM5FRH,
W5UN.

On second pass better activity , unfortunately I got local noise QRN and I was near bloked for several hours, only the big gun where heard

.wkd:
RU1AA,
EA6VQ,
OK1MS,
F3VS,
IK2FAK,
HB9Q,
KB8RQ,

19 March

wkd: OZ1HNE, SM2CKR, IV3GBO, IK4LWV, VE7BQH very strong, WA6PY S # 392, N5BLZ big surprise ED (sorry for many QRZ), EA2AGZ FB sigs. On last pass heavy QRN after moon rise and poor activity when moon rose 25° elevation, 2 more QSO for a final score of 28 (4 on S) 18 Mul. OE5EYM, 7K3LGC. Equipment 144 Mhz 2 x 17 el M2 + 4CX1500B. 73 de Josep EA3DXU

EA6VQ reports : Very bad static noise all the time, making very difficult even to hear my own echos most of the time. Here is the result of my Ss: 15-April : G7RAU NIL, 16:00 JH0WJF O/O Complete #352, VK2KU O/O Complete #353, JN1CSO NIL, DF1CF O/O Complete #354, DD0VF NIL, RW3PF NIL, PA3FOC NIL, K1UHF O/O Complete #355 & SQR#444, IK0OZK NIL, 16-April: LU7DZ NIL. I will be available for Ss again on May 13/14. Please send your request to Lionel VE7BQH

at ve7bqh@WIN-SEY.COM. 73.

Gabriel - EA6VQ.
8x17 M2 5w1 & 1.2 Kw.

HB9Q reports from March 18th 16.30z to March 19th 03.00z (10h 30min) we have made 66 QSOs and 29 multies, all R. Condx where at times excellent! We also found activity to be quite good, only the USA was (as always) represented very weak. It was nice to work WP4G for country #58 in 18 month of activity. We have now 269 initials and 240 grids. Unfortunately we did not hear/work CX5CJ, LU7DZ and PY2PLL. vy 73 es happy moonbouncing Dan & Mark, HB9Q

I3DLI reports his results: 68 R * 34 multipliers. I need to thank:

S52LM, SM5FRH, UA4ALU, RK9CC, UA4AQL, UA3PTW, UA3MBJ, W5UN, UT1PA, RW1AW, LZ2US, RU1AA, DM2BHG, DL9MS, F3VS, G3ZIG, W1FIG, K9MRI, S53J, QE5EYM, IK1FJI, N2WK, EA3DXU, DK2BU, CT1DMK, K2GAL, SM2CKR, YU1IO, OK1MS, DK3WG, HB9Q, JA0BLU, UA4AAV, OZ1HNE, IK3MAC, F9HS,

1999 ARRL EME Scores

Single Operator, Multiband

1. K5GW
2. OE5EYM
3. N2IQU

Single Operator, 144 MHz

1. SM5FRH
2. W5UN
3. SM5BSZ

Single operator 432 MHz

1. DL9KR
2. K1FO
3. DL9NDD

Single Operator 1296 MHz

1. K5JL
2. K4QI
3. HB9BBD

Multioperator, Multiband

1. JL1ZCG
2. W6TE

Multioperator, 144 MHz

1. KB8RQ
2. IK3MAC
3. F3VS

Multioperator, 432 MHz

1. OH2PO
2. F5FLN
3. F1CH

Multioperator, 1296 MHz

1. ON5RR
2. WA9OUU
3. HA5SHF

Multioperator, 5760 MHz

1. OK1KIR

from QST 05/2000

congrats to all WINER

A. R. I. VII ITALIAN EME CONTEST

Date and Time : from 00.00 UTC of 23rd September 2000 to 24.00 UTC of 24th September 2000
Frequency Bands: 50,144,432,1296,2304,5760,10450 MHz and UP.

Operating Modes : CW , SSB. Only bilateral contact EME will count. Report : M, O, RST.

Categories Band 144 MHz ;

Band 432 MHz

A) antenna max length up to 10 meters

A) antenna max 12,5 meters length

B) ant. >10,01 and <20 m or dish <7 m dia

B) ant.>12,51 and <25 meters length

C) ant. >20,01 and <40 m or dish >7,01 and <10 m dia

C) ant.>25,01 & <50 m or dish <4,5 m

D) ant. >40,01 and <80 m or dish >10.01 m dia

D) ant. >50,01 m or dish >4,51 m dia

E) ant. between 80,01 to 160 meters length

F) ant. over 160 meters length

As for other frequencies (50,1296 MHz and up), categories are one for each band.

Antenna length is defined this way: Boom length in meters, from the last reflector to the last director of the single antenna, multiplied by the number of single antennas which make up the array. Example. Single antennas up to 10 meters boom belong to 144 MHz A category, as arrays made up of 4 x 2,50 meters long single antennas, or 2 x 5 meters and so on. The same procedure will be carried out for 432 MHz, within the length limits specified for this band.

For the stations that use *crossed antennas*, each antenna length will be added up. Example: a 10 meters crossed-Yagi counts as 20 meters; 12 meters horizontal + 8 meters vertical on same boom, counts as 20 meters.

OM and SWL can participate. In the SWL section, also OM are accepted, but just as SWL and they can't make EME transmissions during the contest.

Score 10 points for a bilateral contact, 31 points for a bilateral contact with Italian stations
10 points for a bilateral contact between Italian stations

Remarks on the 144 and 432 MHz bands categories:

If the score of the first station classified in each category does not exceed the first of the preceding category, the category itself is cancelled and its stations will be listed in the lower section.

Example : If the first in E category scores 1000 points and the first in F category scores 990 points, then F category is declassified into E category and its participants compete in E cat. too. In the same way, if the first in C cat. scores 300 p.ts, the first in D cat. scores 290 p.ts, the first in E cat. 280 p.ts and the first in F cat. scores 310 p.ts, we will have a single classification for F category and another for C,D,E all together.

Winners : are those who get the maximum score in each category.

Every single station can participate in more than one band.

PRIZES : Only the first in each category gets a prize; all the others get a certificate.

A winner in more than one category, will receive an award only in one category and in the others (even if he is the first in those categories), the award will go to the second. The first will receive a diploma certifying him as the category winner, the second a plaque certifying his second place.

For the contest score, QSO's among Italian stations are valid. These and foreign stations in Italy, will compete in a separate list from the rest of the world.

SWL stations : each station heard can be put in the log only once.

SCORE : 10 points for a station when listened in QSO, 31 points for an Italian station heard in QSO. For Italian SWL's : 10 points for any station, be it foreign or Italian, when listened in QSO.

Prizes will be awarded during the Italian EME meeting (conference) following the contest and the winners will be informed of the results in advance of the conference date.

The deadline for logs arrival is December 2000.

Logs will be accepted if they contain: date , time, call, sent and received reports, points of each QSO, total score, complete description of the station used, especially of the antenna system, category, full address with e-mail, packet radio and telephone number, if available, for quick confirmation of the log receipt. Send logs to : I1ANP, Mario Alberti, via priv. Maralunga,12, I-19126 La Spezia ITALY, Or by Packet radio, to: I1ANP@IW5BUX.LI.ITOS.ITA.EU

Or by E-MAIL, to : I1ANP@GW-IR5LUN.col.it or enzceru@tin.it

73s Mario I1ANP Italian EME Manager

OH2BNH, EA2AGZ, IK2DDR, I2FAK, F6HVK, YO2IS, PA3DZL, EA3ADW, RA4AOR, DK1KO, DK5YA, SV1BTR, KB8RQ, W0VD, S51ZO, DL5MAE, IV3GBO, IK4WLV, F5LRL, VE7BQH, JH2COZ, JL1ZCG, F6CGJ, IK7EZN, 9H1PA, 9A2PT, SM2CEW, JH0VJW, LA9NEA, DJ6CA, 7K3LGC, EI4DQ. All above for reference. 73s Paolo, I3DLI

IK2DDR reports Hello guys, here my contest result. I was active for 12 hours and I found good conditions and worked 43X100X25 Multip.=107.500 points. Unfortunately I was not so active on Ja window, due TVI, and worked the following stations: 18./19.03 DL5MAE, F3VS, W5UN, SM5FRH, KB8RQ, K2GAL, IV3GBO, UA4ALU, DL9MS, EA3DXU, N2WK, DM2BHG, K9MRI, RW1AW, OZ1HNE, RU1AA, I5WBE, W1FIG, K6MYC, S53J, IK3MAC, I3DLI, YO2IS, G3ZIG, SM2CKR, DK1KO, HB9Q, EA2AGZ, LZ2US, W0VD, OK1MS, IK4WLV, DK5YA, S52LM, OE5EYM, PA2CHR, N5BLZ, I2FAK, VE7BQH, DL7MAT, G4SWX, JL1ZCG, JN1CSO, 73' de IK2DDR, Francesco 4x18 Elem. Cushcraft Modif. 4.83 W.L. 8877

JA0BLU reports the moon condition was very good, but Faraday rotation was very big and changing often. I've got 31 stations with good luck. I was sorry that I couldn't find NA station so much is week end. The window for west(Europe), it was just like 15ms BAND, I was confused who to call first and I was sorry some of station called me to my CQ, but I couldn't get your call sign. I sometimes had bad big noise from spring rain/snow. here is my result of contest. 3/18 W5UN, N2WK, K2GAL, JH5FOQ, RU1AA, 7K3LGC, SM5FRH, DL5MAE, IK3MAC, I2FAK, I3DLI, EA6VQ, UA3PTW, DK1KO #113, DL9MS, EA2AGZ #114 S, F3VS, 9A2AE, #115, HB9Q, G3ZIG, SM2CKR, LZ2US, 3/19, JL1ZCG, K6AAW, #116 S, JN1CSO, DK3BU, #117, DL7MAT, #118, OZ1HNE, DL1MAJ, #119, EA3ADW,



OE3JPC EME antenna

PA3FOC #120 S. Masato JA0BLU (19el 5.5WL(H) x4, 18el 5WL(V) x2), 2x GU74b, IC-746+ MGF1801(0.23dB) & FFTDSP www.parabox.or.jp/~ja0blu/home.htm

NJ0M reports : I thought the weekend 18/19.03 was going to be a disappointment due to not getting many initial S proposals. I did have fun SWL'ing many Ss and calling many of the contest participants. Conditions were good almost all the time we had moon. Some stations I needed were moving up and down the band with me chasing them for a tailend, but to no avail. Most of the "fixed frequency" contesters I called returned QRZs. I did try to devote 5 sequences before I cancelled and moved on. Thanks to those of you who took the time to arrange a S with me. I

was not in the contest for points, just new initials and countries. 3-18 G4ZHI OR/RO #120, DL7FF NC/??, W4FF OR/RO #121, PA3FOC O /NC Nice sigs for 1 Yagi, W6TE NC/??, VE2JWH O /?? weak sigs, W5UN RO/OR, 3-19 EA2AGZ OR/RO #122, PA3FOC O /NC, IK3MAC RO/OR, F3VS RO/OR, G3ZIG RO/OR #123, K6AAW NC/NC, Stations Heard, not worked: SV1BTR, IK1FJI, SM5FRH (called/QRZ), I2FAK (called/QRZ), KB8RQ, DL5MAE, K2GAL(called/QRZ), IW5DAN, EA3DXU(called/QRZ), DL9MS, WA1JOF, WA4MVI, PE1LCH, N7EIJ, AA7A, N5BLZ, OE5EYM, OZ1HNE(called/QRZ), others forgotten. 73 John, NJ0M.

OZ1HNE reports : I was not QRV full time during the DUBUS/REF contest on 144 MHz this year, (too sleepy and went to bed) for a few hours. The conditions here was not as good as reported in other parts of Europe, polarity was changing very fast and a lot of QSB, but it was all GREAT FUN !!!! I missed a few stations replying on my CQ due to the QSB and my sleepiness, sorry for that and see you next time. My final score was: 69 R QSO's and 33 multipliers. Here is what I got in my log: RK9CC, IK1FJI, UA3PTW, RW1AW, DL9MS, S52LM, F3VS, OE5EYM, I2FAK, G3ZIG, VE7BQH, W7HAH, N2WK, K9MRI, LZ2US, IV3GBO, UT1PA, DM2BHG, IK2DDR, SM5FRH, K2GAL, IK3MAC, W0VD, W1FIG, 7K3LGC, JH0WJF, OK1MS, JL1ZCG, DL5MAE, SM2CEW, RU1AA, I3DLI, SM2CKR, 9A2AE, S53J, EA2AGZ, JH5FOQ, SM3AKW, YO2AMU, F6HVK, DK1KO, CT1DMK, HB9Q, I5WBE, YO2IS, I2RV, KB8RQ, S51ZO, PA3DZL, IZ1BPN, IW5DAN, N5BLZ, EA3DXU, SL4BP, YU1IO, DK5YA, IK4WLV, G0RUZ, WA4MVI, W5UN, K6MYC, DL7MAT, JA0BLU, G4SWX, 9H1PA, LA9NEA, UA4ALU, UA4AAV, EA3ADW. Thanks to all, 73 OZ1HNE Jorgen. oz1hne@post8.tele.dk

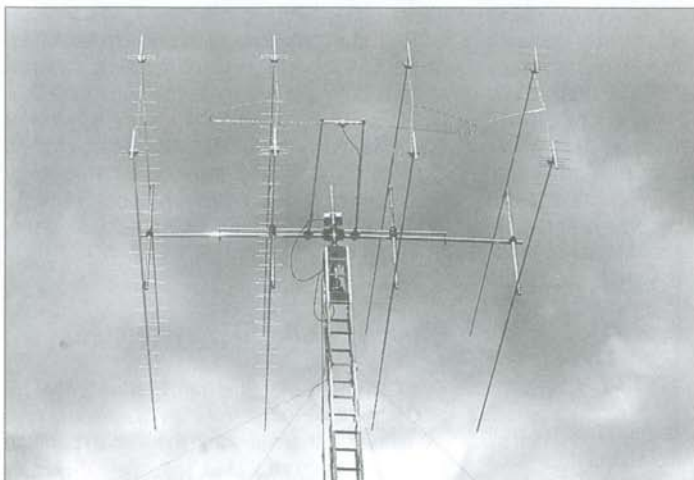
PA3CWI reports: Worked in the weekend before the contest : 12/03 K8EME S, completed after several tries #65, 12/03 DL5MAE R, good signal #66, 18/03 W5UN, IK3MAC, F3VS, KB8RQ, I2FAK, K2GAL, OE5EYM #67, SM5FRH, HB9Q, 19/03 G3ZIG, Heard:

LZ2US, OZ1HNE, JA0BLU, W0VD, RW1AW, I1ANP, G0RUZ, PA2CHR, DK1KO, IK2DDR. Failed Ss with WB9UWA heard well but not completed, UT1PA nil. Found conditions good at times, the big guns were very loud, but did not hear much activity. Hope to be qrv next S weekend in april. 73 de Kees, PA3CWI, JO11tk

RW1AW reports : He has a new antenna 4x19el (5.3wl) instead of the old ant 4x17. he worked new: I4XCC, WA6PY, SM7SJR, KB3PD, ON7RB, PE1OGF, DC7UT, J6MB, ZS6ALE, Z30B, RX1AS, JA4BLC, SM2CKR, IV3CER, RK9CC, 8J1RL, W7UPF, AB3D, VK3CY, PA9KT, JL1ZCG, 7K3LGC, IK1MTZ, N0AKC, KV6J, VK2FLR, SM5CFS, R1MVZ, DJ5RE, JA0BLU, WA2FGK, I2RV, SM3PWW, CT1DMK, LX1DB, IV3GBO, W1FIG, WB9UWA, UA9YLU, WB4G, S53J, N3FA, IW5DAN, RW3PF, DF1CF, VE2JWH, UA3MBJ, JH0WJF, JH0VJW, JR0AEL, SM2BYA, WA3BZT, YO2AMU, IK4DCX. for # 179, not bad for 18 Month QRV, he started in Sep.1998) Vielen Dank für Deinen Bericht Alex.

S51ZO reports : Hello friends ! Here my contest result. I was active for 10 hours. 18 march 2000: F3VS, JL1ZCG, SM5FRH, SM2CEW, DL5MAE, I2FAK, HB9Q, LZ2US, IK3MAC, PA2CHR, SM2CKR, RU1AA, OE5EYM, S53J, OZ1HNE, W5UN, G3ZIG, 19.March: KB8RQ, I3DLI, IK4WLV, K2GAL, IV3GBO. Heard and calling: SV1BTR, EA3DXU, VE7BQH. RIG: TS 850s +LT2S, RX : MGF 1302, TX : 1500 W, ANT : 4 x 14 el. DJ9BV, 73 de Joze S51ZO

S53J report about their EME activity from 12.04. and 15.04.2000. Condition all time was be very changeable, but anyway we got in our log some new DXCC and grid squares. Wkd: 12.04. DK3WG O/RO # 67, NJ0M NIL/NIL, RW1AW O/RO # 68, W7HAH O/NIL NC, GM4JJJ O/RO # 69 new DXCC, PE1LCH NIL/NIL, DL9MS O/NIL NC, 15.04 PE1LCH NIL/NIL, W7HAH RO/O # 70 new WAS. S53J JN75ev : FT847 with Collins filter, TX 2X4CX250B, RX MGF1302, ANT 4X17 2M5WL, 750 m ASL. for S e-mail: joze.zitko@lek.si. 73 de Joze



S52CW 8x7,7wI 9BV

UA4AAV reports DUBUS results : IK3MAC, F3VS, I2FAK, LZ2US, W5UN, SM5FRH, VE7BQH, RU1AA, HB9Q, I3DLI, SM2CKR #, JL1ZCG, 7K3LGC, DL1MAJ #, SM2CEW, G3ZIG, OZ1HNE. TOTAL - 17 QSO. QSL via DK3WG tnx fer info Victor

UA4AQL reports : I worked a following stn's during DUBUS contest at R: SM5FRH, W5UN, I3DLI #40, DL5MAE, I2FAK, JL1ZCG, IK3MAC, HB9Q, G3ZIG #41, F3VS, U1AA, KB8RQ. Total: 12 QSO Heard: OE5EYM, PA3CWI, I1ANP, K2GAL, EA3DXU. I worked with fix. elevation around 17 dgr. Made specialy for the contest time. I don't have elevation rotator yet. My QSL manager is DK3WG 73! de UA4AQL - Al 144: 2x15 el DJ9BV (5dgr fix elev), 0.5db NF , 1.2 kw EME, 700w MS E-mail: ua4aql@qsl.net

UA4AQL reports :Hello EMER's! I think the most young EMER was active during this weekend. This is Yuri - **RA4AOR** (LN29LA). He is son of UA4ALU. He is only 16th years old and have had last own BIRTHDAY at this 16 April! Here are his results: Worked - JA0BLU # S I1ANP # S, DL9MS # S RK9CC # S, UT5ER # S G4YTL # S, OK1MS # R, DL5MAE R, K5GW R, KB8RQ R. Heard: DL8GP UA3PTW OZ1HNE ON7UC. QSL info for him and his father: Yuri Fomichov or Gena

Fomichov, ul. 40 let POBEDY, s. RA-HINKA, SREDNEA-HTUBINSKI m., VOLGOGRADSKAY obl., 404145 RUS-SIA. 73! de UA4AQL

W0VD wkd: MAR 18 SM5FRH, IK3MAC, F3VS, I2FAK, OE5EYM, RU1AA, W5UN, IK1FJI, OZ1HNE, K2GAL, G3ZIG, MAR 19 HB9Q, I3DLI, IK2DDR, KB8RQ for TOTAL POINTS 1500x11 = 16500. I heard SV1BTR very loud but never could hear me EA3DXU

good signal never heard me RW1AW good signal but didn't hear me LZ2US very loud working RW1AW and I never heard again Conditions seemed to be good but few stations on. I guess by the time the moon rise here in midwest USA most of the fellows in Europe was in bed. Heard only 3 stations on from USA those was the ones I worked. I am sure there was other USA stations on but never heard. I got on at 0000z Mar 18 stayed on until 0700z went to bed Got on Mar 19 just after moonrise stayed up until about 0600z calling CQ and tuning the band but just no one I could hear. No one came back to my CQ's. It is hard for me to be locked out by faraday with my Xpols. Where was every one???? Dan W0VD EM27du

W1FIG reports Stations worked night of 3-18 Worked: S53J S #57, DL5MAE R, EA2AGZ S #58, IK3MAC R, EA3ADW S #59, SM5FRH R, F3VS R, I3DLI R #60, IK2DDR R, OZ1HNE R. Heard the following stations night of 3-18: DC7UT, SV1BTR, RU1AA, I5WBE, N2WK, G0RUZ, I2FAK, KB8RQ, W5UN, AA7A. Conditions on 144 MHZ last night were not as good as the night before. Unfortunately I had lots of QRM at moon rise limiting my operation. Worked the following stations the night of 3-19: KB8RQ R, W5UN R, K2GAL R,

OE5EYM R #61, WA6PYS #62 2 yagi, G3ZIG R #63, N5BLZ R #64. Heard the following stations: HB9Q, I2FAK (strong called many times got only QRZ), K1UHF, VE7BQH, KV6J. Went QRT after 0700z. Worked a total of 17 stations (13 R) during the contest. This whole week has been very good for EME. I worked 8 new # the week before the contest and 8 new # during the contest. Unfortunately I have to go (temporarily) QRT on EME as my wife and children want the back yard back. I hope to be back again on EME before the ARRL contest in the fall. 73 Maarten, W1FIG (To see my station visit: <http://home.sprint-mail.com/~mabu>).

WB9UWA reports : I have made some progress in picking up new stations that took several Ss to complete. I will list sn by FFTDSP in 600 hz bandwidth, with agc on. With 3db sn it is possible to piece the calls together over time, 6 db full calls, and 10 db full calls with 600 hz filter. 3/9/00 JA0BLU was detectable on FFTDSP. He had snow on his antenna. 3/11/00 W1FIG 6db sn #26 Finally after many tries. His power is similar to mine and only one more db antenna gain. Smallest station worked to date. JH5FOQ 8 db sn inc. JA0BLU 10 db sn #27 Noisy western skies made many repeat Ss needed. L2RSX detectable, FFTDSP 3/12/00 DL2RSX 3 db sn (noisy here) UT1PA nil. Later found that he was likely off frequency. UT5ER detectable, noisy here. IW5DAN nil 3/14/00 NJ0M 10db sn. Quick QSO! first try with him. #28, KV6J nil, N3FA 3db sn. Sent "RO". inc. PA3FOC detected FFTDSP. single yagi., AA7A 10db sn. inc., N7EIJ bad one-way. mnr 12db. (logger). 3/15/00 Noise level 2 db below dummy load!, K1UHF 6db sn quick qso. first try. #29, 3/17/00 DL2RSX inc., I added 300 KHZ band-pass cavity and MAV-11 (12db gain) amp in RX line to help noise blanker. 2 db of noise blanking noted on dummy load! Ant noise = dummy load with N.B. on. 3/18/00 PE1LCH No show. He had another S. IW5DAN nil, DC7UT partial calls. inc., PA3CWI 10 db sn. calls heard. inc., UT5ER 8db sn. 30 min completion. #30, W5UN R, 25 db sn. 3/19/00 UT1PA 10 db sn. Fast easy QSO! #31, LZ2US nil, OZ1HNE 12 db heard R, EA6VQ 10 db sn. Fast easy QSO. #32, DC7UT 6 db sn. calls

heard., PA3CWI 4 db sn. Calls heard., G0RUZ 6 db sn. freq. drift. inc., IK3MAC 20 db sn. 559 loud. R. He hurt my ears. Thanks all for QSOs and Ss. I did not have much time for R. Too many Ss. When a small window of time was available for R, it was difficult to find all but big-guns. Perhaps better frequency spotting would help smaller stations work R? Jim, WB9UWA 17 dbd + el, 850 - 1080 watts, Stereo RX

144 MHz news

To all 2 Meter EME Stations: Please CANCEL all **CN/W7EME** schedules. I will advise you at a later date if there is going to be an expedition to CN or times or not. 73, Lionel, VE7BQH ve7bqh@wimsey.com

DD0VF reports : After I wkd some R (the big guns) since '94 more "by the way" (VE3ONT my 1st A1A-qso at all hi hi) i tried to make it more serious, after i've got an amp with 500W. I calculated a small 4x7el "array" (and got a good g/t on a unpopular stacking distance) during the wintertime and the antenna was ready on the roof 10 days ago. Note that i have still 1.5dB loss in the coax and the preamp is in the shack. My 1st weekend with Ss was a great experience/surprise for me! Wkd: April 14 I5WBE NC O, N5BLZ, K2GAL, N1BUG NIL, April 15 JA0BLU, OZ1HNE, EA6VQ NC O, IK2DDR NC O, RU1AA NIL strange, N0JM NC O, KB8RQ, SM2CEW, April 16 I5WBE, VE7BQH. Not so much time for R(Ss and the thunder.), called LZ2US (f b 519 hr), but hrd nothing after another periode. 73 de Steffen - DD0VF JO61VA (vhf-qth JO61WB)

G4LOH : Better than last year but just 4 qso's with my single m2 18ele/750W. wkd 18/19.03 SM5FRH; IK3MAC; W5UN and RU1AA. Heard VE7BQH; EA6VQ; F3VS, G3ZIG (Tropo! and EME -310Hz), and F6C?? Still working on the bigger antenna. Regards. Tim G4LOH IO94IA.

EA2AGZ reports: my final score, DUB/REF contest 30x100x18 mult.=54.000 P., wkd 19/3 G4YTL S, very good signal #197, JL1ZCG,

20/3 PA3DZL S,vey good signal #198 73s de Nicolas EA2AGZ.

G7RAU Only managed to work IK3MAC and SM5FRH, both very big signals! heard & called I2FAK, F3VS & JL1ZCG but no joy, frustrating being a small fry hi. Equip: Yaesu 757+Mutek, 2*8874, 2*9 el OZ5HF @ 55masl, 18magl. 73 de G7RAU-Dave, IO90IR Isle of Wight

IK1FJI : I was qrv only for 6 (4+2) during the contest, due a job trip in Germany (Wurzburg,) on sunday morning very early in the morning: i worked: 36 station for 23multi. new stations were :RA3LE#405 and I5WBE#406. i worked also WP4G after a long time. 73,walter ik1fji (4x19xxx 5,73WL 8877/GS35b mgf1801)

Gaby, **OD4NJ** has constructed a 4 x K1FO 12 element antenna. It is up and he is just about ready to go. The only major issue he has is the lack of an amplifier. Due to the economics in Lebanon, Gaby is not in a strong position to purchase an amplifier. Therefore, I said I would ask and see if any one was in the position to donate a 2 x 4CX250 amplifier or similar. Shipping will be quite easy. He is in the position to pay for the shipping. Again, this is a real station with antennas in the air (AZ/EL) and very close to putting Lebanon on the EME Map. I have a .jpg picture. Please contact me if you can help. 73, Lionel, **VE7BQH**, ve7bqh@wimsey.com

Just a note to all that i am now QRV EME 144 and 432 MHz, The station is tiny 144 MHz: 450 watts and 2 X 3 WL XPOL (2X 2m12's horizontal 2X 2m12's vertical w/pol switch). 432 MHz: 2 X 9 WL (IK5QLO style) and 300 watts (a first ever on EME !!!) Radio: Yaesu FT-847 w preamps 1 dB NF (yea!! now I will finally be at the right freq so I can be heard now !!!) 73 from Jeff **K7XQ** CM97QI, k7xq@aol.com



RW1AW new 23cm PA

PA3FOC reports Hello everybody, Here my short report abt last weekend 18/19.03 contest. I suffer tremendously QRM below 144.100 from local PC users, even during the nite, noise was peaking to 57. So I could not do to much on R. It was quiet for a few hours in the european window. So, just wkd: SM5FRH, IK3MAC on R, EA3DXU (1-2 YAGI) and JA0BLU wkd on S. It's working fine this single yagi, but the qrm in the centre off Rotterdam is a disaster! Best 73's to all, looking fr Ss well above 144.100!! Rene, PA3FOC

Tony **PT9FH** (GH11ea) located 8 Km east of Brazil/Bolivia border, is making final adjustments to a 4 x 12 ele K1FO and 2 x 4CX250. Yesterday (14/4) he was listening Europe and USA stations very loud. (no preamp installed hi). He is not making any scheds until he finishes the adjustments. I guess he will be fully operational by Easter. As soon as possible he will subscribe MOON-NET. 73 's de PY2NI Horta GG66RK

SL4BP report : Section: 144 MHz QRP. Rig: FT736R, PA 900W, Type: 2x 4CX250B, Feeder loss: 1.5 dB, Antenna: 4x9 el Vargarda, 17 dBd, Ops: SM4HFI Jan, SM4ATJ Hans, Locator: JP70to, Preamp: SSB (MGF 1302) located 0.5 dB from antenna., RX aid: Single 100 kHz xtal filter with mixer from and back to AF, Spectran FFT, Log for SL4BP: 03/18 LZ2US, SM2CKR, SM5FRH, 03/19 OZ1HNE, W5UN, KB8RQ, IK3MAC, N5BLZ



F6KHM 8x9BV

NC, I2FAK, Total $700 \times 5 = 3500$. On the scraplog also: G3FIG, SV1BTR, HB9Q, IK7EZN? OE5EYM, VE2JWH. 73 Jan and Hans

SM2CKR reports : QRV 18.3 only about 8 hours, but did worked 42 stn ,22 mult. and 11 was new initials. Still using the same equipm. 1.5 KW 8*15 el. 3.1 lambda preamp 0.2 cavity with mfg 1302. SM2CKR KP03dt

S53J reports : We were QRV on 18/19.03 for a few hours, and we got in our 144 MHz log: 25 QSO, 16 multipliers. We have heavy QRM from picado maschine in neighbourhood. 18.03. W1FIG O/RO # 63 S, EA3DXU O/RO # 64 S, PA3DZL O/RO # 65 S, GM4JJJ NIL S, SM2CKR RO/O # 66 R. S53J : FT847 with Collins filter, TX 2X4CX250B, RX MGF 1302, ANT 4X17 2M5WL. for S e-mail: joze.zitko@lek.si . 73 de Joze

Hello EME friends here the 2m-EME report from from R/U stn - March to May:

RW1AW wkd new calls WP4G. On 70cm he added 7M2PDT and WB0GGM.

RU1AA had initial WA3BZT and PA3FOC #294.

RV3IG complete qso with RZ3BA/1

RA3LE had initials with RU1AA, IK1FJI and IK3MAC

UA3MBJ had new stn I3DLI and RZ3BA/1.

UA3PTW his new stn: UT1PA, GM4JJJ, UA9YLU, UA4ALU, N5BLZ, DL9MS and SM2CKR, DL9MS, RZ3BA/1, UA4AQL, NJ0M and SM2BYA, RA4AOR and DL/JH3Eaz #134. On 70cm he finish with SM2CEW, HB9Q, K5JL, PA0AVS, K0RZ and K4QI and F6HYE #39.

UA4AAV worked new stn in contest with SM2CKR and DL1MAJ.

UA4AQL had new initials I3DLI and G3ZIG #41, UA3PTW, N2WK and PE1LCH..

UA9FAD wkd new RW3PF and UA9YLU. On 70 with AL7OB-nc and JA6AHB.

UA9YLU wkd in Feb.: DL5MAE, OZ1HNE, EA6VQ and RW1AW. In

March: DK3WG, UA3PTW, HB9Q, SM2CEW, UA9FAD, RK9CC and OE5EYM. **UT1PA** had new VK3CY, WB4JEM, K7YVZ, UA3PTW, N0AKC, IV3GBO, N2WK, WB9UWA, RK9CC, IZ1BPN and EA3ADW. **UT5ER** elektric power give lot of problems.first weekend, cfm QSO K1UHF and WB9UWA, ON7UC, N0AKC and K6AAW and K7YVZ.

DK3WG new stn with UA9YLU #720 and S53Jand VK2KU #722. On 70cm new HB9Q and F6KHM #367.

73, gl via moon Jurgen, DK3WG

432 MHZ

AL7OB Mike was active on 70 cm during the DUBUS/REF and worked a number of stations. He reports that SM3AKW had a very strange effect on his signal. It sounded like 2 separate signals and he could copy them both. Mike is working on a 30' dish.



OK1DFC new dish and feed

DL4MEA reports: I was standby on the moon since the ARRL 1999, but DUBUS/REF contest was a reason for me to activate my station. I was QRV for about 23h from Saturday evening 2000 until Sunday 1900, including a pause between moonset and moonrise. Time was limited by a inline skate course on Sunday and a need for sleep on Sunday, but nevertheless it was a great fun this time. My total time on the moon was so about 13h. I worked on Saturday, 08.04.2000: K5JL, G4ERG, K1FO, HB9Q, SM2CEW, SM3AKW, W7GBI, DL9NDD, ON4KNG, ON5OF; and on Sunday, 09.04.2000: JA4BLC, RW1AW, DK3WG, OE5JFL, JA6AHB, F5FLN, OH2PO, EA3DXU, OK1KIR, F6KHM, G3HUL, OE5EYM(CW), JA2TY, PA0AVS, DL1YMK, UA3PTW, YO2IS, JR1RCH, OZ6OL, DK0TU, S52CW, UA6LGH, DL7APV, OE5EYM(SSB), I5CTE, KB0VUK, WE2Y, VE6TA. Total is 3700 points by 23 multi = 85100 points. I was wondering much when on Saturday evening I was able to copy many north american stations even through the trees shielding me on the moonset. Maybe these were more dry

then on the other times I had to cross them. Great jobs from EA3DXU, performing like a big gun, also perfect from UA3PTW who really called later when I requested that, also a phantastic job from UA6LGH. Fine from Ernst, OE5EYM, answering my SSB CQ when my echos were absolutely perfect. I believe one should note that SSB on the moon is possible even at lower signal levels compared to tropo because the background noise is much much less. My rig: FT847 trx, 2*TP3069 driver, GS35b final, 7/8" feedline. 6 * 33ele BV-OPT with open wire feedline. KA0RYT cavity preamp + MAR-6 gain amplifier. vy 73, Günter, DL4MEA

EA3DXU reports: Result REF-DUBUS 432 test. Quite good activity in last week end, the conditions was excellent time to time, with strong signalls from big gun's, and DL9NDD ? many times 8 / 9 db over noise in my small antenna, also DL4MEA similar signalls, finally worked 26 stations and 18 M, all R. 8/4 : SM3AKW, DK3WG, SM2CEW, HB9Q #118, OE5EYM, JA6AHB, G4ERG, K1FO, PA0AVS



OE5JFL 1m horn
for 23cm EME

#119, DL9KR, OH2PO, K5JL, N2IQU, DL9NDD. 9/4: JA4BLC, OE5JFL, 7M2PDT, DL4MEA, ON4KNG, OK1KIR, UA6LGH #120, F6KHM #121, K0RZ, PA3CSG, K4QI, G4RGK. Heard and called ON5OF, W7GBI. 73 de Josep EA3DXU (2 x 38 EI M2 + GS23B 1350W)

F6KHM reports from European EME: We worked: DL9NDD 559/559, OE5EYM O/O, SM2CEW 559/559, JA6AHB 559/559, HB9Q 559/559, OH2PO O/O, K1FO 559/549, DL9KR 569/569, N2IQU 549/549 (Try on ssb but to weak!), SM3AKW 559/559, DL1YMK O/O, K5JL 579/569, G4ERG O/O, OE5JFL 559/559, DL4MEA O/O, DK3WG O/O, EA3DXU O/O, K0RZ O/559, Missed K2UYH, ON4KNG, S51ZO, ON5OF (he don't hear me), W7GBI. I've no expirience in eme but i found conditions relatively good and I think activity was poor! WX excellent on Saturday but many wind on sunday, so I stopped early not to damage the array! We have been visited by many friends like F5PAU Francis and F6CGJ Louis during the contest. Our QTH are just separated by few kilometers. Rig: 8 * 8.5BVO, Preamp MGF1302, F6007 Thomson in Coaxial cavity 700W, TX line 10m 1/2Heliac, TRX TS790 Kenwood, I'm working on a new PA with GS35B based on DL4MEA design. 73's F5TTU Xavier

K7LNP Pat (DN30xp) reports that he is getting ready to put Utah back on the 432 EME map. He has 4 x M2 9WL yagis fed with

Cellwave 3/8" Superflex line, a Henry 2004 PA running at full power and a Michigan Microwave Group LNA. The array is assembled, but he still has to mount it on his tower. Pat expects to be full QRV by mid summer

K7XQ reports : Is now QRV on 432 EME with a small station consisting of 2 x M2 432-9 WL (like IK5QLO), 8930 PA with 400 W out and Yaesu FT-847. He hoped to make his 1st QSO during the 2nd part of the REF/DUBUS Contest, and is available on weekends just about anytime and between 0500 - 1400 weekdays for skeds

KJ7F reports : Terry is a new station on 70 cm EME. Before the March SW he had already worked DL9KR, N9AB, K5GW, N2IQU, DF3RU, K1FO, DL4MEA, DL9NDD, G3SEK, G4ERG, N4GJV and DK3WG.

OK1KIR March and April 2000 report: We worked on 9 April at 1121 DL4MEA 539/539 for initial #349 and 1148 EA3DXU O/O. We hrd 16 EU and 2 JA stations in short test of our new PA with RE3XM (similar to YL 1050).



'indoor EME'
operating
position

Working smoothly with 3,4 kV/ 1,1 A on plate and providing us with consistent echoes never heard before with 2xGI7B.

ON4KNG reports : During the last Dubus contest, I had the pleasure to contact on 432 MHz 27 stations and 18 multipliers (SM, DL, HB9, OE, JA, K1, K5, W7, G, EA3, VE6, K0, PA, K4, ON, RW1, OZ, N9). Initials were HB9Q, JA6AHB, W7BBM, W7SZ, RW1AW, and KB0VUK #144. I worked with my usually equipment consisting of 8 x 32 el (11wl) opt-9bv with open tubing (6mm. alu) for phasing lines and a YL1050 power amplifier delivering 1KW into the antenna. 73's de Peter-on4kng

RW1AW reports same rig for 70cm, 12x15el. Alex will be qrv in July on 23cm with a 3.8m dish (F/D 0.333), VE4MA (cirkular) horn NE-324 (0.3DB) +2MGF-4319G LNA, PA line is: GI-7B 2xGS-31B with diagonal coppler (1100-1200w) and 37m 7/8" heliax, (- 2.3dB loss) all homebrew!! He has to finished the water-cooling system. Hew worked on 432 new : OZ4MM, SM3AKW, W7HAH, DL8OBU, VK4AFL, IK5QLO, OK1KIR, WE2Y, KB4CNI, JA5NNS, JA5OVU, UA4API, W7SZ, JA4BLC, JA6AHB, OH2DG, OZ6OL, UT3LL, DL4MEA, OE5JFL, W7QX, DL1YMK, N2IQU, UA3PTW, OH2PO, K5GW, G3SEK, F5FEN, JL1ZCG, YO2IS, N4GJV, K5WXN, NC1I, G4ERG, DJ6MB, HA1YA, IZ5EME, RA3LE, K0RZ, HB9SV, K4AR, CT1DMK, 7M2PDT, WB0GGM, HB9Q, K4QI, G4RGK, PA0AVS, S52CW, N3FA and OE3JPC for # 75 till 12 Month of operation (He started in Apr 1999). 73 Alexander RW1AW KP5OEB St.-Petersburg. Email: RW1AW@MAIL.ADMIRAL.RU Vielen Dank für Deinen Bericht Alex.

YO2IS reports : Hello, was glad to see a nice activity on 432 MHz during the contest. Despite my limited window and the daytime high noise level in my area got lot of fun with the trafic. Conditions over the average, heard several times my echoes !. Was QRV 5 hours saturday and 3 hrs on sunday. Worked where: HB9Q #147, OE5EYM, OH2PO, SM3AKW (Au tone !), DL9KR (loud as usual), RA3LE #148, K1FO, SM2CEW, DK3WG, OE5JFL, DL4MEA, JA6AHB, PA0AVS #149 (after several CWNRR's) 549/529 ! and DL9NDD very easy & fast. Heard & called:

N2IQU, F6KHM, ON5OF, EA3DXU ! (we had also a 2m S signal was quite weak, gave RO, nil from N1BUG), K5JL, I5CTE, G4ERG etc. Nice to see that after ten years, my 432 MHz rig & antenna is still in good shape. May be 3dB more in power could help to avoid looong calls !. Just finished the mechanics on my elevation rotor for the 2m antennas. Hope to "grow" up to 4 antennas in the coming months. 73 Szigy.

432 & up (INTER)-NETnews

ACTIVITY needed . Net activity was very light today.. Not much action.. For those of you receiving the NET NOTES and have the ability to get on the **20 meter NET**, please take the time to stop by and contribute. Without your participation, there will be no NET. (Of course, there is always the 'InterNET') **Joe K1RQG** net control **sat/sun 14.345 10 AM ET!!!!**

Comments from EME-NL

The **March** SW was unusual. Extremely low libration with very sharp pol was reported on 432.. The big focus was the SSB Contest on 1296. Conditions and activity on 23 cm were good, but SSB activity was less intense than in '99.

April activity was spread over 2 weekends. I found conditions not to be especially good on either 70 or 23 cm. 1296 activity was up during the pre-contest SW and during the contest. On the other hand 432 SW operation seemed light. This was probably due to prep for the contest on 1296.

The DUBUS/REF Contest generated plenty of activity on 70 cm, but conditions were far from ideal. Faraday was optimum near 90 degs and signal quality was poor much of the time. I am not sure if the poor copy was due to libration or atmospheric effects resulting from a recent aurora, or a combination of both. I found copy especially bad on Saturday, but not good at any time I was active. Conditions were better on the microwave bands, but activity there was down. On 3 cm, no reports of QSOs were received. The low turnout on the microwave frequencies seems a strong



Koalas at work !! (australien plumber???)

justifi- cation for a separate microwave EME contest weekend. from **K2UYH**

K8VP: new call for KB8ZW. Will be on 70cm and open for Ss..

W1ZX: new email address :w1zx@drix.net

from 1.May 2000 I have new e-mail address.
ok1dfc@volny.cz Best regards Zdenek
OK1DFC

Hey Doug, which connector is loose??



F2TU : Philippe was among the victims of the savage storms that hit Eur in Dec. I had severe storm damage in Dec. A quarter of the QRA's roof flew away with rafters, batten and tiles. My satellite antenna was be-headed by part of the roof. The 6 m dish was crushed by another part of the roof. Fortunately I was already working on a new 8 m dish before this disaster. With a lot of work, I hope to be QRV again this year.

GM00NN Iain writes -- I am still alive but have suffered the worst constant high winds

for as long as I can remember. I have had my 4 yagis for 70 cm built for 7 weeks now, but I am fearful of leaving then up. The winter has been unseasonably warm, but the sporadic winds have been horrendous! On 23 cm, I still have 230 W and 4' dish, but I have just been informed that a 6' Andrew dish is ready for me to collect. This will give me a significant improvement in performance. I hope to have it up by mid March. I will then be ready to try some skeds again after my last "almost promising"

results. I am currently building DB6NT xvtr for 3 cm and have a 10 W TWTA. I also have a 40 W TWT, but will need to build/modify a PSU. I also need to construct a feed for 3 cm.

HB9Q reports : Dear Friends during last weekend we made our first steps on 432 MHz EME. We are very happy to report, that even though we still have to work

on many details our station is capable to work EME. We did work 60 initials during our 10 hour stay on 432 MHz. Our equipment is a 15.28m dish using 2 twin-dipols, one horizontal and one vertical. On RX we can switch from one to the other. On TX we are circular. The PA is a 2x8874 putting out 800W, which is 400W on each twin-dipol. The preamp is an 13 year old GaAs-FET, still working! There now is a lot of optimizing to do to really take advantage of the antenna. We also plan to add 1296 and 144 MHz! We'll keep you posted! vy 73 es happy moonbouncing. Dan & Mark, HB9Q. PS: our home page is still under haevy construction, 432 is not yet added. E-Mail : hb9q@hb9q.ch. WWW: <http://www.hb9q.ch>



OZ6OL's dish

IK5WJD: Alex sends news that he has retired. As a result he has a new e-mail address ikcsg@tin.it.

F6KHM: is new station on 70cm with 8xBV 26ele 600w IN78rj Xvavier F5TTU is personal call F6KHM is club station.

This is F6KHM reports from the last weekend: sat 06/05/00: F6HYE O/O, K5JL 559/559, G3SEK O/449, K1FO 559/549, DJ3FI 549/539, SM2CEW 559/559, Sunday 07/05: F6HYE again!!!, On saturday, conditions seem to be good, I was QRV only during 4H and 1H on Sunday! Own echoes with 100w on Saturday! Best 73's! F5TTU Xavier (F6KHM operator) 8*8.5BVO 600W MGF1302

KB0VUK reports : This was the first contest I had enough power, so I worked almost all I heard. I guess that means I have to work on RX more. In the log are: K1FO, SM2CEW#10, OE5EYM, DL9KR, K5JL#11, HB9Q#12, DL9NDD, SM3AKW#13, K2UYH, JA6AHB#14, DL4MEA#15, PA3CSG#16, K0RZ#17, K4QI#18, ON4KNG#19, N9AB#20. At times DL9KR was 5-6 on the s-meter, WOW! Looks like $16 \times 13 = 28,000$ points. 73 Matt KB0VUK. 4*27'FO 'RYT preamp GS23b

Pat, **K7LNP** from Grid DN30XP will be qrv on 432 with 4 M2 this summer.

SV1BTR: working on new QTH .. hopes to be back on 70cm in a year or so..

S52CW reports Here are the stations I managed to work during this weekend (DUB/REF contest) : DL9KR, HB9Q #51, OE5EYM, OH2PO, OE5JFL, DL4MEA, SM2CEW, K1FO, SM3AKW, DL9NDD, DL7APV #52, K4QI, K5JL #53, K0RZ, K2UYH, G4ERG. Found that conditions were average with quite strong noise during Sunday although I could copy my own echo quite strong from time to time. Not much activity from USA stations also heard only one from JA.

in April : Since I was not very happy with my PA performance in Dubus contest I finally got Bird meter from s57ra to check what is really going on. I was shocked when I found out that my home made indicator failed for quite a big amount of power. It seems that vf confused my meter. So I was actually working with about 300W. Just after a bit of adjustment the power went well beyond KW. Encouraged with that I send out a few E-mails for possible Ss. So I managed to work 6 new initials during

last weekend. Conditions were very good at least here on my side, with loud echos during both days. Also the new ccd camera that I installed a week ago proved very helpfull. On S I worked: RW1AW, EA3DXU, VE6TA, UT3LL, On R I worked : K5GW, K4QI, F6HYE, DL8OBU. As I said good conditions, just activity was a bit low. in mayMay 6th: VK4AFL Sked #60 / DXCC 19, JA6AHB Sked #61, F6HYE Random, HB9SV Random, DJ3FI Random #62, G3LTF Random, May 7th, JA6AHB Random. No copy on sked with AL7OB but the moon was a bit low for me at that time and also quite high noise in the early morning on moon-rise. Otherwise nice conditions with echos readable all the time. 73 de Uros, S52CW qrv on 70cm with 8 x 7,7 DJ9BV & 1.2KW

1296 MHz

DL8OBU reports : I have put up again my 4 x 67el (5.10m long, each 19.9dBd) looking forward the expedition of OX2K Have horiz.pol and full elevation. Heard several stations on the moon with that antenna last year, but my power is very poor: have only 150W HF in the shack only abt. 70 W in the feedpoint. Worked with that ant on EME: TM8EME on random (easily !), OZ4MM, OE9XXI, OE9ERC on skeds (not so easily). Is there any big station interested, to try with me ? I think I will put down the antenna again in September/October. DL8OBU JO42xi 73 de Juergen

HA5SHF results on DUBUS/REF. EME Contest 1296MHz: We worked 11 stations with new dish, (3,1m solid dish from ANDREW). 18.03. OE9XXI, HB9BBD, G3LTF, OE9ERC, F1ANH, SM3AKW, OZ4MM, 19.03. N2IQU, OE5EYM, F5PAU, LX2DB initial# 73,Csaba HA5BGL

OE5JFL Hannes writes : In the 70 cm part of the DUBUS con test I was only on for 2 1/2 hrs. Conditions were quite good at that time, and I worked 35 stations including HB9Q, F6KHM, DL1DWI, YU1EV for initials.

Back in March I tried something very interesting on 23 cm -(similar to the EME test with a dual-dipole-feed on 70 cm back in Nov.) Re-

cently I had extended my spare W2IMU horn with a cone and got a 'mouth' diameter of 1 m with an overall length of 2.3 m. I use this antenna for checking preamps. From simulation the gain should be between 20 and 21 dBi; enough to make some 23 cm EME QSOs with it, considering that I can hear the big guns more than 30 dB out of the noise (in 100 Hz bandwidth). My big dish has 39 dBi gain. So the 18 ~ 19 dB difference should still result in 10 ~ 14 dB of signal strength. Echo testing was successful immediately, both ways (TX dish, RX horn and vice versa). When I transmitted with the horn, the signal was even better, because there was only 0.5 db cable loss. I have 2 dB of loss to the dish. My best echoes were 13 dB, as predicted by my calculation. The DUBUS contest was a good occasion to try some QSOs. Within 3 hours I worked 10 stations on random with this small antenna. QSO'd were HB9BBD, OZ4MM, N2IQU, K2UYH, ZS6AXT, SM3AKW, OE9ERC, F6CGJ, OE9XXI and OE5EYM. A few more replied with QRZ. A highlight was my QSO with ZS6AXT, who is using only a 5 m dish. There fore it should be possible to work a 10 m dish station using a 0.5 m horn! In another test I found that echoes were still audible when receiving with the big dish and transmitting with only 50 Watts at the horn. Although I will prefer to use my big antenna for EME in the future, I think this was a nice demonstration of what is possible on 23 cm. For those interested, I have uploaded pictures and audio files to my WEB (see fotos)

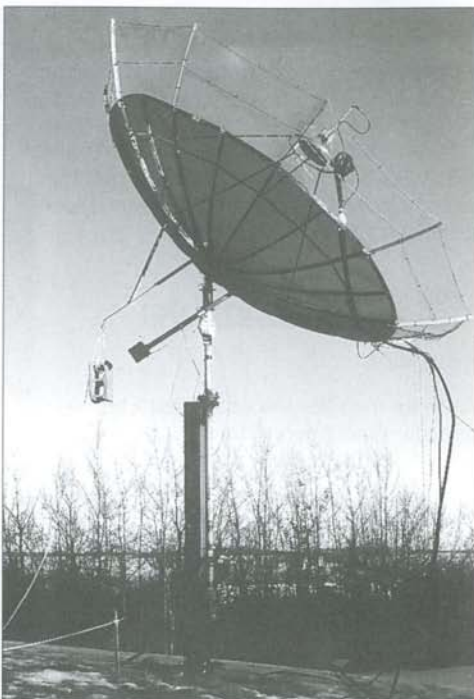
OE9XXI wkd: On 1296 in the REF/DUBUS EME Contest on March 18/19 I achieved 46x31 QSO's for a score of 142.6 k, included initial contacts with W4AD (549/569), W1QC (569/579) and JA8IAD (549/579) for #245. On the 18th at 2010 to 2040 QRZ's to F1?? who replied 2.5kHz high interferred by other OSO's. Heard were F5PL, DL6YDH and W5LUA.

OK1KIR reports for March & April: We worked on 12 March at 1252 ON5RR 539/539 + info they are QRV on 13 cm, 1404 - 1425 9H1ES O/nil (sri, deaf LNA ?), 1514 F1ANH 559/549 , 1750 GW3XYW 559/549, 1801 W2UHI 549/539, 1806 G3LTF 549/549, 1833

K5JL 559/559, 1852 VE6TA 449/439, 2035 LU8EDR O/O # 171 first LU/OK 23 cm EME QSO, DXCC 38 and field GF (31), 2131 W7SZ 449/O #172, 2201 W7QX O/O #173. We heard in March SW on 23 cm: DF3RU, DJ5MN, DK5MV, IK2MMB, JA8IAD, KD4LT, LX1DB, N2IQU, OE9XXI, OZ6OL, PA3CSG, SM2CEW, SV1OE and ZS6AXT. We worked on 1 April at 0805 OE9ERC 559/559, 0913 IK2MMB 539/539 and 0936 F6KPF/p O/ QRZ and 1036 F6KPF/p O/ QRZ "O?".

OK1DFC : I send my report from last EME window. I was a last fourth mount very busy, and I had not time for our hobby. But on April window I installed new feed to my dish. It is new design by OK1CA with septumpolarizer with he use with cassegrein system in other configuration. The advantage by this system is absence 90°part for circular polarization because this system has only TX and RX port direct without hybrid. I save 1,5 dB on RX and TX port. My Sun noise is now 11,2 dB and before new feed I had Sun noise 9 dB. Also my reflection is stronger and clearly. Also radiation angle is more sharply. I have QSO with 18th March 2000 SM3AKW only. On 8th April 2000 I QSOs with GW3XYW 559/559, W2UHI 559/559, DF4PV 539/429, DK7LJ 55/36 SSB # 86, W6HD 559/559 no more stations on Saturday. In appendix you have pictures about my new feed.

VE6TA Found good conditions on 1296 for the Dubus/REF contest, just wish there was a bit more activity. Think that the weather once again had a part in keeping some stations off the air. Managed to work the following all on R; OZ4MM, OZ6OL, SM3AKW, K5JL, F1ANH, OE9XXI, OE9ERC, F6CGJ, W2UHI, K2UYH, N2IQU, W1QC (#43), W5LUA, HB9BBD, ZS6AXT, F5PAU, K4QI, W7SZ, and W3XS (#44). Heard but not worked were, W4AD, VE6NA, DJ5MN, JF3HUC. 73's Grant VE6TA



VE6TA 16 foot dish with dipole

worked OK1CA (549/569) initial, G3LTF (449/569), OE9ERC (579/579), HB9SV (569/579), ZS6AXT (559/589), OK1KIR (449/549), OH2AXH (569/539), OZ4MM (569/579), LX1DB (569/579) and (56/55) on SSB, JA4BLC (559/569), G3LQR (549/569) initial and RW3BP (449/O) initial #54 (excellent signal for a 1.65m dish) for a score of 12x10x100=12k. Unfortunately no French stations and no North American stations were heard. All contacts were made on R. Best 73's Peter OE9PMJ

OK1KIR reports March & April: We worked on 8 April at 1530 OE9XXI 549/449, 1536 ZS6AXT 449/449 and 1752 OZ4MM 559/449. We heard G3LTF, LX1DB, OE9ERC, OH2AXH and OK1CA. Nil in all our skeds.

2304

OE9PMJ wkd :On 2300 on April 8/9 during the contest I used my new 300W Transistor-PA

10368

OK1KIR reports March & April: We worked on 9 April at 1611 partial DL2LAC M/T, 1811 LX1DB O/M for initial # 13 and the first 3 cm LX / OK QSO , 1917 WA7CJO 559/O and 1931 VE4MA M/M for initial #14. Nil in all other skeds except DL2LAC and VE4MA. Moon noise was 1,8 dB whole the time.

ABOUT Doppler

from EME-NL:

For more than 25 years standard EME sked procedure has been to transmit on the sked frequency irrespective of the frequency you hear your own echoes. Over this time period technology has changed greatly. Today just about everyone uses a computer to determine the position of the moon. These programs also predict the affect of Doppler on received frequency. With this information so readily available, does it make sense to TX such that our own echoes and those of the station we are trying to work do not fall on the same frequency? Reception of our own echoes provides very useful feedback during the course of a sked. This is the point of W2UHL's proposal shown at the end of this NL. Frank feels it is time to change the standard sked procedure. I agree with Frank, but suggest a small simplification. When you set your echoes to fall on the same frequency as those of a received station, the station you have received will hear your signals on the same frequency as he hears his own echoes. Thus I suggest that the 1st station to transmit in a sked set his TX frequency so that he will be received at the sked (2nd) station on the sked frequency. The 2nd station now need only to set his own echoes so that they fall on the sked frequency, and the 1st station will hear him on the same frequency as his own echoes. An alternate procedure would be for the 1st station to initially transmit such that he hears his own echoes on the sked frequency. The 2nd station, if he hears the 1st station, sets his frequency so that his echoes fall on the same frequency as he hears the 1st station. If not, he sets his own echoes to fall on

the sked frequency. Then the first station to hear the other station adjusts his frequency to fall on the other station's frequency. This alternate procedure has the advantage of simplicity, but it creates the possibility of a station changing his frequency after the other station has detected him. Of course when running on random, if you set your echoes to fall on the same frequency as those of the station you are calling, he will hear your signal on the same frequency as he hears his own echoes.

Expeditions

OX2K GREENLAND DXPEDITION will be history when the issue is printed I hope you all could work them. See: <http://www.qsl.net/ox2k>

The proposed **GU** expedition in September this year will have to be cancelled. Ian G3SEK and I have decided to do this due to the potential RFI/BCI problems on the island. We were unable to find a suitable site which did not present a serious threat to emergency comms on Guernsey. We also have to think of the existing amateur fraternity, any problems we caused could have a long and lasting effect on them. The cost of the expedition would be quite high and so we do not wish to take the risk of been shut down after a few hours of operation. Other groups (mainly HF) have had big problems in the last couple of years and one actually wiped the entire island's TV out! We will however endeavour to do something else that weekend as we have made preparations and have arranged time off work. Who still needs GW for instance? 73 de Conrad G0RUZ

This is to advise you the **IK0BZYP** operation from IT9 will have overwater shots on both Rise and set. Enrico expects good ground gain. Enrico will be going to Sicily (IT9) the last week of June and the first week of July. This is not a new country but probably a new initial and grid square for most stations. He will be operating 2 Meter HSCW MS and EME for this operation. The station will be a single 4.1wl + 800w. The following EME times are still available:

03.July 06-06.40 east window and 19-19.30
 04.July 0710-0746 east window 19.46-20.16
 05.July 20.30-21.00 and 21.00-21.30
 06.July 21-21.30 and 21.30-22.00
 07.July 21.30-22.00 and 22.00-22.30
 08.July 11.30-12.00 and 12.00-12.30 east window
 22.00-22.30 22.30-23.00
 Sked frequency 144.123. The call will be IK0BZYP, IK0BZYP always be first period (even with eastern station) If he is able to put some elevation on the system he will inform EMEers via MOON-NET. Enrico can be reached by phone +390932851009, portables ++3903498146037 or ++3903496359526 Please send your EME requests to VE7BQH. Please contact Enrico direct at fa00416@flashnet.it for HSCW MS schedules.

Internet-bookmarks

This week I added the third chapter of the EME newsletter collection on my webpage. This chapter has all the articles on antennas, feeds and feedhorns for 432, 1296, 2304MHz. Also some very interesting comparison between several feeds and tune up notes for the W2IMU horn. You also find some dish mount ideas or elevation drive hints. The articles about the beam forming ring written by Per Simon Kildal are not published. I had permission to publish these articles for the book but not for the webpage. Sorry! I hope you like it, it was a lot of work. <http://members.xoom.com/PA3CSG/> Best regards, Geert **PA3CSG**. <mailto:geert-st@dds.nl>

More eme news: MOON NET

<http://www.nlsa.com/moon-net/moon-net.html>
 Post address is moon-net@VM.stlawu.edu Moon-Net. T Instructions are at <http://www.nlsa.com/moon-net/moon-net.html>

Internet **EME CHAT** internet chat channels or pages for eme or vhf-dx online communication on the internet?

K1UHF reports Hello all, I use <http://raven.cybercomm.net/~slapshot/dxing/emelog.html> I have had some nice qso's on an evening when I had no skeds otherwise but wanted to oper-

ate EME. I hope that we all use the same method for real time scheduling. If we have several they will all be less useful. 73, Del (<http://www.qsl.net/k1uhf>)

432 and Above **EME Newsletter** by Allen, K2UYH is at: <http://www.nitehawk.com/rasmit/em70cm.html>

ARRL contest info <http://www.arrl.org/contests/.....>

There is an email reflector for **50 MHz eme**: sixeme@kkn.net It might help you.

If you need to know full rules **Italian EME Contest** you have to look at following address: [HTTP://WEB.TIS-CALINET.IT/IWOBET](http://WEB.TIS-CALINET.IT/IWOBET) (IWO NO IW0)

<http://www.qsl.net/n1bwt/contents.htm>
 10ghz eme infos dish feed etc.

LAST

- 90% of the infos were from internet. How many readers still have the Dubus as the only sources for EME infos? After many hours of collecting infos for you (instead of rebuilding my antenna) there is only one question: What do you want to read? In the last years we tried to find it out, but normally the reply was nearly zero. So any comment will give me a hint if this collection of pictures, qso reports, contest rules & scores combined with many short news is the right mix you want. Or does everyone get all news from internet now?
- Disassembled my 8x9bv array today and found a bad cable pulley on top of the tower, which makes the lift system not running. Just used the lift 10 times and a broken bearing, a part for 1\$ with bad quality which causes hours of repair. Anyway, I try to be on 432 for the OX2K expedition with 4 yagis.
- deadline every first of Feb./May/August/Nov.
- my email DL7APV@t-online.de

73 Bernd DL7APV

EME Contest 2000

Editor: Joachim Kraft, DL8HCZ

Results European EME Contest 2000

On 144 SM5FRH has the lead with a clear margin to following stations. On 432 K5JL made the winning entry closely followed by K1FO. On 1296 OE9XXI made it again. On 2320 OE9ERC has the lead. On 3400 and 5760 there was nil. On 10GHz CT1DMK was the only station. The multiband winner as last year was OE5EYM.

Thanks to all who did participate. There were 106 entries. But we have to think about encouraging the Microwave activity.

Congrats to the winners SM5FRH on 144MHz, K5JL on 432MHz, OE9XXI on 1296MHz, OE9ERC on 2320MHz, CT1DMK on 10GHz and OE5EYM on Multiband.

Activity on 2m, 70cm and 23cm was good. On 9cm and 6cm only poor activity and no logs this time. Please note that from next year onwards logs should go again to F6HYE, Patrick. 73s Joachim, DL8HCZ

N2WK, 2m: I heard many more stations but I was locked out. Many stations QRZ to me. I had the same score as last year (1999). I hope to improve next year! Wayne N2WK

W0VD, 2m: I heard SV1BTR very loud but never could hear me. EA3DXU good signal never heard me, RW1AW good signal but didn't hear me, LZ2US very loud working RW1AW and I never heard again. Conditions seemed to be good but few stations on. I guess by the time the moon rise here in mid-west USA most of the fellows in Europe was in bed. Heard only 3 stations on from USA those was the ones I worked. I am sure there was other USA stations on but never heard. I got on at 0000z Mar 18 stayed on until 0700z went to bed Got on Mar 19 just after moonrise

stayed up until about 0600z calling CQ and tuning the band but just no one I could hear. No one came back to my CQ's. It is hard for me to be locked out by faraday with my Xpols. Where was every one???? Dan, W0VD, EM27ud

DC6UW, 23cm: This year my participation has been hit by Murphy: At the early saturday evening my PA on 23 flashed and remained dead. This happened directly after my QSO with Louis, F6CGJ. Unfortunately several stations called me afterwards and I just scream only. Hope for better luck next time. 73 de Thomas, DF5LY, op at DC6UW station.

IK2DDR 2m: Unfortunately I was active only for a total of 12 hours, and only for one hour on JA window, due TVI and some other jobs. Anyway excellent contest and specially on saturday night i found extremely good conditions, with my own echoes till 16/18 db over the noise. See you on next year. 73'and thank you for so nice contest. IK2DDR-Francesco

I1ANP 2m: On my side no good cond. weather is good, but haved high noise from the city, down 15 degrees impossible to receive, also Faraday go up and down for much time. Was present on sunday evening/night, but not listen any new station for contest. I listened and called, for much time: I3DLI, IV3GBO, OE5EYM 22 minutes only qrz, LZ2US 18 minutes after signal go down, OZ1HNE for 10 minutes after disappear, hrd nr DM2BHG. Ciao Mario I1ANP.

HB9BBD 23cm: I was not qrv on Friday to Saturday. Many regulares were missing. But still the contest was a good opportunity to checkout the systems and enjoy qsoing. DK5MV and DJ5MN, both the same station at the same location was on the band. This is to be avoided. I guess many have worked both

Results 144 MHz

Place	Call	Points	QSO	Multi	PWR	Op
1	SM5FRH	731400	138(+ 0)	53	QRO	SIN
2	IK3MAC	510400	116(+ 0)	44	QRO	MUL
3	F3VS	460000	100(+ 0)	46	QRO	SIN
4	W5UN	416000	104(+ 0)	40	QRO	SIN
5	I2FAK	332100	81(+ 0)	41	QRO	SIN
6	I3DLI	231200	68(+ 0)	34	QRO	SIN
7	OZ1HNE	227700	69(+ 0)	33	QRO	SIN
8	RU1AA	219000	73(+ 0)	30	QRO	SIN
9	HB9Q	191400	66(+ 0)	29	QRO	SIN
10	G3ZIG	162000	60(+ 0)	27	QRO	SIN
11	JL1ZCG	112800	47(+ 0)	24	QRO	SIN
12	LZ2US	108100	47(+ 0)	23	QRO	SIN
13	IK2DDR	107500	43(+ 0)	25	QRO	SIN
14	OE5EYM	89700	39(+ 0)	23	QRO	SIN
15	EA2AGZ	52200	29(+ 0)	18	QRO	SIN
16	JA0BLU	48110	28(+ 3)	17	QRO	SIN
17	IV3GBO	46800	26(+ 0)	18	QRO	SIN
18	S52LM	45900	27(+ 0)	17	QRP	SIN
19	EA3DXU	44800	28(+ 0)	16	QRO	SIN
20	UA3PTW	41600	26(+ 0)	16	QRP	SIN
21	S53J	40000	25(+ 0)	16	QRP	MUL
22	S51ZO	35200	22(+ 0)	16	QRP	SIN
23	DM2BHG	28000	20(+ 0)	14	QRP	SIN
24	N2WK	25200	18(+ 0)	14	QRP	SIN
25	UA4AAV	20400	17(+ 0)	12	QRO	SIN
26	PA2CHR	18700	17(+ 0)	11	QRO	SIN
27	W0VD	16500	15(+ 0)	11	QRO	SIN
27	I1ANP	16500	15(+ 0)	11	QRP	SIN
28	UA4ALU	14000	14(+ 0)	10	QRO	SIN
29	W1FIG	13400	13(+ 4)	10	QRP	SIN
30	UA4AQL	12000	12(+ 0)	10	QRP	SIN
31	RA4AOR	9900	11(+ 0)	9	QRP	SIN
32	CT1DMK	8800	11(+ 0)	8	QRP	SIN
33	YO2IS	7000	10(+ 0)	7	QRP	SIN
34	IK7EZN	6300	9(+ 0)	7	QRP	SIN
34	F6CGJ	6300	9(+ 0)	7	QRP	SIN
35	SM3AKW	5600	8(+ 0)	7	QRO	SIN
36	OH2BNH	5400	9(+ 0)	6	QRP	SIN
37	KV6J	4900	7(+ 0)	7	QRP	SIN
38	SL4BP	3500	7(+ 0)	5	QRP	SIN
39	JF4TGO/8	400	2(+ 0)	2	QRP	SIN
40	W5UWB	100	1(+ 0)	1	QRP	SIN
40	NOVK	100	1(+ 0)	1	QRP	SIN
40	EA1BTZ	100	1(+ 0)	1	QRP	SIN

Results 432 MHz

Place	Call	Points	QSO	Multi	PWR	Op
1	K5JL	227500	65(+ 0)	35	QRO	SIN
2	K1FO	210800	62(+ 0)	34	QRO	SIN
3	SM3AKW	185600	58(+ 0)	32	QRO	SIN
4	DL9KR	181500	55(+ 0)	33	QRO	SIN
5	HB9Q	168000	60(+ 0)	28	QRO	MUL
6	OE5EYM	137200	49(+ 0)	28	QRO	SIN
7	K4QI	93600	36(+ 0)	26	QRO	SIN
8	JA6AHB	85100	37(+ 0)	23	QRO	SIN
9	G4ERG	67200	32(+ 0)	21	QRP	SIN
10	ON4KNG	54000	27(+ 0)	20	QRO	SIN
11	EA3DXU	44200	26(+ 0)	17	QRP	SIN
12	PA0AVS	37800	27(+ 0)	14	QRO	MUL
13	ON5OF	36800	23(+ 0)	16	QRP	MUL
14	DL4MEA	34500	23(+ 0)	15	QRO	SIN
14	DL1YMK	34500	23(+ 0)	15	QRP	SIN
15	OZ6OL	29400	21(+ 0)	14	QRP	SIN
16	VE6TA	26600	19(+ 0)	14	QRP	SIN
17	F6KHM	21600	18(+ 0)	12	QRP	MUL
18	KB0VUK	20800	16(+ 0)	13	QRP	SIN
19	UA3PTW	19200	16(+ 0)	12	QRP	SIN
20	S52CW	17600	16(+ 0)	11	QRP	SIN
21	DK0TU	15400	14(+ 0)	11	QRP	SIN
22	UT3LL	14000	14(+ 0)	10	QRP	SIN
23	JJ1NNJ	13000	13(+ 0)	10	QRP	SIN
24	YO2IS	12600	14(+ 0)	9	QRP	SIN
25	AL7OB	11000	11(+ 0)	10	QRP	SIN
26	S51ZO	10800	12(+ 0)	9	QRP	SIN
27	JA2TY	9000	10(+ 0)	9	QRO	SIN
28	JH4JLV	8000	10(+ 0)	8	QRO	SIN
29	JA4BLC	6000	10(+ 0)	6	QRP	SIN

Results 1296 MHz

Place	Call	Points	QSO	Multi	PWR	Op
1	OE9XXI	142600	46(+ 0)	31	QRO	SIN
2	SM3AKW	113400	42(+ 0)	27	QRO	SIN
3	OZ4MM	110200	38(+ 0)	29	QRO	SIN
4	OE9ERC	106600	41(+ 0)	26	QRO	SIN
5	K5JL	102600	38(+ 0)	27	QRO	SIN
6	F5PAU	99900	37(+ 0)	27	QRO	SIN
7	F1ANH	98800	38(+ 0)	26	QRO	SIN
8	HB9BBD	88800	37(+ 0)	24	QRO	SIN
9	ZS6AXT	83600	38(+ 0)	22	QRP	SIN
10	F6CGJ	74000	37(+ 0)	20	QRO	SIN
11	OZ6OL	73600	32(+ 0)	23	QRP	SIN
12	S59DCD	49300	29(+ 0)	17	QRP	MUL
13	OE5EYM	37400	22(+ 0)	17	QRO	SIN

14	K4QI	36000	20(+ 0)	18	QRO	SIN
15	VE6TA	28500	19(+ 0)	15	QRP	SIN
16	CT1DMK	27000	18(+ 0)	15	QRP	SIN
17	W1QC	26600	19(+ 0)	14	QRP	SIN
18	DH9FAG	25200	18(+ 0)	14	QRP	SIN
19	JH5LUZ	24700	19(+ 0)	13	QRP	SIN
20	EA3UM	23800	17(+ 0)	14	QRO	SIN
21	W3XS	16800	14(+ 0)	12	QRP	SIN
22	JF3HUC	12600	14(+ 0)	9	QRP	SIN
23	JA8IAD	12000	15(+ 0)	8	QRP	SIN
24	G3LTF	4970	7(+ 1)	7	QRP	SIN
25	IK3COJ	400	2(+ 0)	2	QRP	SIN
26	DC6UW	100	1(+ 0)	1	QRP	SIN

Results 2320 MHz

Place	Call	Points	QSO	Multi	PWR	Op
1	OE9ERC	13200	12(+ 0)	11	QRP	SIN
2	OE9XXI	12000	12(+ 0)	10	QRP	SIN
3	ZS6AXT	6300	9(+ 0)	7	QRP	SIN
3	OZ4MM	6300	9(+ 0)	7	QRP	SIN
4	JA4BLC	5600	8(+ 0)	7	QRP	SIN

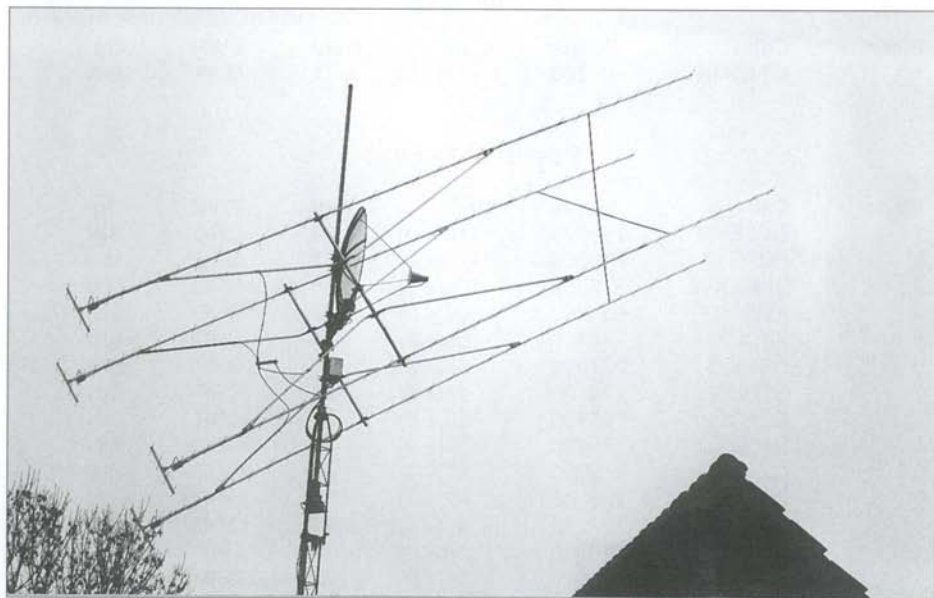
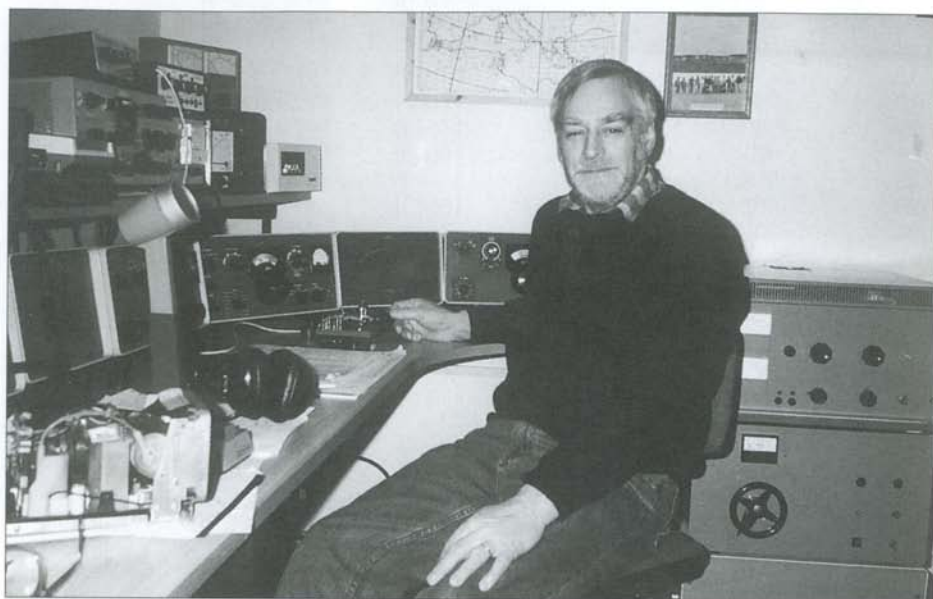
Results 10 GHz

Place	Call	Points	QSO	Multi	PWR	Op
1	CT1DMK	100	1(+ 0)	1	QRP	SIN

Results Multiband

Place	Call	Points	QSO	Multi	PWR	Op
1	OE5EYM	748000	110(+ 0)	68	QRO	SIN
2	HB9Q	718200	126(+ 0)	57	QRO	MUL
3	SM3AKW	712800	108(+ 0)	66	QRO	SIN
4	K5JL	657200	106(+ 0)	62	QRO	SIN
5	K4QI	246400	56(+ 0)	44	QRO	SIN
6	OE9XXI	237800	58(+ 0)	41	QRP	SIN
7	OE9ERC	196100	53(+ 0)	37	QRP	SIN
7	OZ6OL	196100	53(+ 0)	37	QRP	SIN
8	EA3DXU	178200	54(+ 0)	33	QRO	SIN
9	OZ4MM	169200	47(+ 0)	36	QRP	SIN
10	ZS6AXT	136300	47(+ 0)	29	QRP	SIN
11	F6CGJ	124200	46(+ 0)	27	QRO	SIN
12	VE6TA	110200	38(+ 0)	29	QRP	SIN
13	S51ZO	85000	34(+ 0)	25	QRP	SIN
14	CT1DMK	38400	20(+ 0)	17	QRP	SIN
14	YO2IS	38400	24(+ 0)	16	QRP	SIN
15	JA4BLC	23400	18(+ 0)	13	QRP	SIN

G3ZIG, Shack



DL1YMK on 70cm

calls. OE5JFL told me after the contest that he transmitted with the feed only. Conditions were below the previous week. My echoes were 5 to 6 dB lower. More pictures and data at <http://www.hb9bbd.ch>.

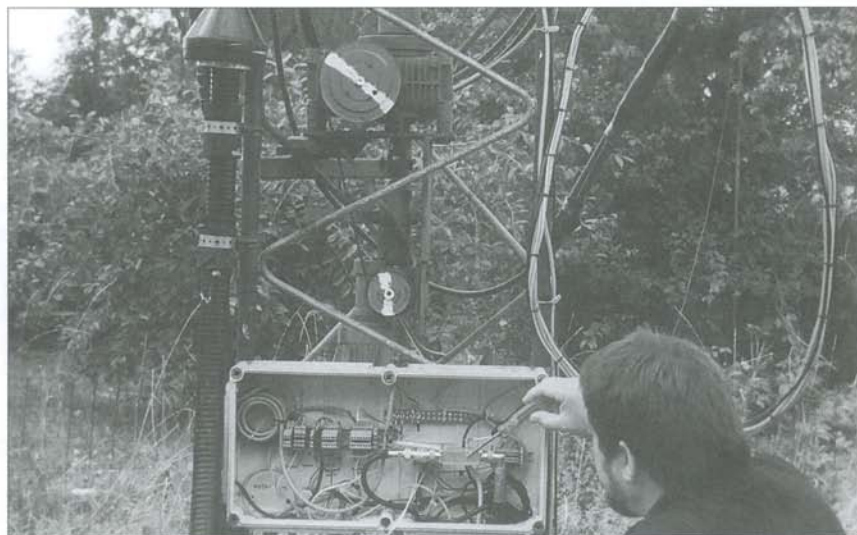
JL1ZCG 2m: Monday March 20, was a holiday in Japan, so I could be QRV all the time. I was very sorry that I could not work over 50 stations in the contest because activity from North America was very poor and Condx to Europe were very changeable. JL1ZCG

IV3GBO 2m: This was my second European EME contest and I had fun. Propagation started good with good own echos, then worsened and set to variable conditions. I'm very disappointed to miss SV1BTR. Jimmy was very loud but I've got only many QRZ IV3... to the next! 73, Giampiero IV3GBO.

I3DLI 2m: I have changed my previous TX cable for an easier way to manage my antenna group in experimenting. The new cable is a bargain one, looking as an half-inch cable, but flexible. Now it's easy to bring the group up and down the tower, but I've paid this facility with a 0.5 dB of extra cable loss. The propagation was mostly changeable to



W1FIG: Antennas



OZ6OL: Preamp Box

S53J: Antennas



OZ6OL, 5m dish for 70cm and 23cm

fair. To me, never excellent. Thanks to the EME crew once more. Paolo, I3DLI

VE6TA 70/23: Was a very enjoyable contest although the aurora we experienced on the second weekend sure made the 432 polarity skewing a problem. Looking forward to next years contest. 73's Grant

UT3LL 70cm: I am sending my first year 432 MHz EME activity. Now I have 137 QSO (49 initials, small - 45, SQR - 26, DXCC - 19, USA - 14). I hope to begin work on 23 cm in May (16 x 28el. DJ9BV, PA - GI7B, O,6dB nf). 73! Valery

YO2IS 70cm: Was glad to pass the #600 QSO mark on 70cm EME, adding three initials. Good condx & activity on 70cm. This was my 5th European-DUBUS contest in row. Best 73's and cu via Moon.. Szgzy, yo2is.

DL4MEA 70cm: I was standby on the moon since the ARRL 1999, but DUBUS/REF contest was a reason for me to activate my station. I was QRV for about 23h from Saturday evening 2000 until Sunday 1900, including a pause between moonset and moonrise. Time was limited but nevertheless it was a

great fun this time. My total time on the moon was so about 13h. I was wondering much when on saturday evening I was able to copy many north american stations even through the trees shielding me on the moonset. Maybe

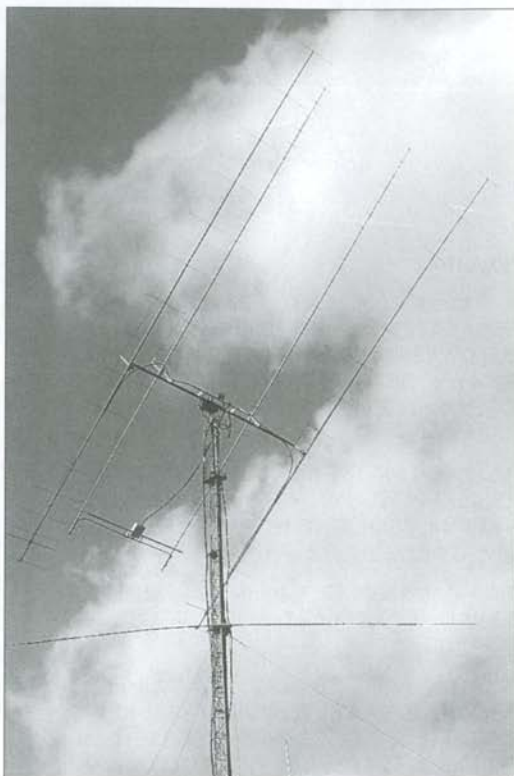
these were more dry then on the other times I had to cross them. Great jobs from EA3DXU, performing like a big gun, also perfect from UA3PTW who really called later when I requested that, also a phantastic job from UA6LGH. Fine from Ernst, OE5EYM, answering my SSB CQ when my echos were absolutely perfect. I believe one should note that SSB on the moon is possible even at lower signal levels compared to tropo because the background noise is much much less. What defects? Absolutely none! Whow, I never thought I would bring it that far. Even when testing a new 24V/12A switched mode power supply for my driver and the K10 keyer. So, thanks for those calling me and if skeds are needed let me know, I now believe I have my station like it needs to be just switched on and working. And - in opposite to the time before - I am now more often at home for weekends. vy 73, Gnter, DL4MEA

W1FIG 2m: This was my first DUBUS EME Contest and I had lots of fun. Conditions on the first moon pass were excellent. During the second moon pass I had terrible line noise, limiting my operating time during th european window. Conditions were good but not as good during the first pass. I worked 8 new initials during the contest bringing my total to 64.

W5UWB 2m: Bad luck! I missed the moonrise for the first day, and only worked SM5FRH on my moonrise the 18th. Nothing heard at all on my moonset.

HB9Q 2m/70cm: We spent only 10h on each band. All QSO's are random. April 8th we did our first test with the new dish (15m) on 432 MHz. We were very happy and it was a lot of fun to work several stations on this new band. We still have to do a lot of improvment to optimize our station on 432 MHz. See www.hb9q.ch for more information and pictures! vy 73, Dan & Mark, HB9Q

W3XS 1296: It was too windy on the first night to untie the 4.8m dish! Great fun as always!



EA3DXU: Antennas

S53J 2m: Saturday afternoon and evening QRM, because of royal darts picado machine (loud processor) in pub next door. We worked only 12 hours.

ON5OF, 70cm: Used a Icom 706 mkII G as a driver, it is not stable and drifts 100Hz per 30 secs up as seen on Hamview DSP screen. We could not work French station because the callsign they used and what they announced before was different, it made us doubt and we did not complete qso !! QRN from Paris area mobiloc system is causing qrn 300 km away in Antwerp area! <http://www.azurvital.com/on5of.htm> (Website EME antenna pictures)

6m News

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

Reports

2. March 2000 0330 F2 from PY5CC: FO0AAA Clipperton, 1030 F2 from 4X: 8Q7DY, 1300 TEP from G: D3SAF JI73 1300 F2 from OK+ON: TR8XX 1630 F2 from CT/EA7: ST2SA, 1920 TEP from West-DL: ZS6AXT

8.3. 1100-1700 TEP from DL, OZ, SM, PA etc: ZS3C KF21, ZS6AXT + RWD KG33, ZS6WB + AVP 44, ZS6PJS KG46, TR8XX. From Italy wkd: S79MX, LU, CX, FR.

7.3. 1150-1300 TEP from Süd-/Mittel-DL: ZS6WB 44, ZS6AXT 33, ZS6PJS 46, ZS6DN/B

8.3. 1120-1730 TEP from DL + Mittel-EU: ZS6WB, ZS6AXT, ZS6AVP, ZS3C KF21, ZS6DN-B, TR8XX, ZS6RWD, ZS6BTE, from OZ also 3C5I; 1830 from IT9: S79MX

9.3. 1140-1330 TEP from DL, ON, OZ: ZS6WB, ZS6AXT from ON: TU2OJ 10.3. 1230 TEP from Süd-DL: ZS6DN/B KG46 2350 Aurora from GM: LA/SM

11.3. 1045-1100 TEP from Süd-DL. DL3RBH JN68 wkd: 3C5I JJ43, hrd TR0A/B. 1115 DK5YA JN49 hrd ZS6DB/B

12.3. 1100-1300 TEP from Mittel+Süd-DL: ZS6EZ 44, ZS7Y 33, ZS6DN/B, TR8XX, TR8CA, Z21FO+Z23JO KH52 1110F2 from I7: VK8MS + VK8AH PH57

13.3. 0840-1000 F2 from PA, ON, HB9: JA-Stns + VK6JQ 13.3. 1230 TEP from Mittel-DL: ZS6DN/B

Von Mitte März bis Mitte April gab es aus dem Mittelmeerraum (EA, I, 9A, F, SV) fast täglich ausgedehnte Öffnungen auf dem 6m-Band nach Südamerika, Südafrika u.a. Hier einige der erreichten Stationen: 9U5D, TR8XX, TR8KPJ, ZP6CW, 5H3US, 7Q7RM, Z22JE,

S79MX LI75, FH/TU5AX LH27, CX8BE, ZP5PT, S92AT, VP6BR, 9G5ZW, 9J2BO, 5R8FU, ZS3C KG21, FR1AN, XQ6ET FE39, FR5DN, A22ZS KG25, V51E, 3C5I, D3SAF JI61, Z21KQ KH52, KH7R BL01, CE3BFZ, ZP6VT, TU2OJ, V51KC, CX1AO, PY0FF, CX6ACY, CE4MLN, 5N9RGP JK51, V5/DJ7KP, CE8BHI FD46, ZD9ZZ, 5T5BN IK28, CX2ABC GF15, + viele andere ZS + PY-Calls.

15.3. 1500 TEP from Süd-DL: 3C5I-B

17.3. 1130-1200 TEP + F2 from Süd-DL + PA: ZS6DN/B KG46, TR8XX

18.3. 0855 F2 from OE2UKL, JN67: VK4FNO QG39 20.3. 11-12 TEP from DL: ZS6, ZS3C, TR8XX

22.3. 1140-1330 TEP from PA + Sd-DL: ZS6DB/B, ZS6WB 2330 F2 from EH7 und 9H: VP6BR Pitcairn!

23.3. 1130- TEP from Mittel-DL: ZS6DN/B 24.3. 1130-1740 TEP from Mittel+Süd-DL: ZS6DN/B, ZS6AVP, ZS6VR, ZS6BTE, ZS6EZ, ZS6BPA, ZR6ZL, 6AXT

26.3. 1150-1220 F2 from West-DL + ON: KH7R BL01 Hawaii!!! 1730-1930 TEP from Mittel-DL: ZS6

27.3. 1000-1145 F2 from DL, PA, OE, I, F, ON, SM, ES, SP: KH7R BL01, KH6HME/B BK29 50.062. SM3VEE aus JP81 kann KH6HME mit 419 hören. Alle QSOs mit QTF 170 Long-path! 1200-1300 TEP from Mittel+Süd-DL: ZS3C, ZS6AXT, ZR5ADQ KG50, TR8CA V51KC JG88 1635 TEP from Süd-DL, PA, G: ZD9ZZ 1820 F2 from I, F, EA: FH/TU5AX LH27

30.3. 2100-2200 TEP from Süd-DL: D3SAF JI61, 5N9RGP/8 JK51, 3C5I/B

1.4. 1700- TEP from Süd-DL: ZS6AXT + 6WB

2.4. 1020- TEP from Süd-DL: ZS6

6.4. 1815- TEP from Süd-DL: ZS6AVP, ZS4TX, 7Q7SIX, ZS6WB, V51KC, ZS5DJ KF59 2000-2400 Aurora over central Europe, from DL: EI, G, GM, I1, SP, F, OE, OK, 9A etc.

8.4. 1000-1400 TEP from total DL: ZS6DB/B, ZS6WB, ZS6Y, V51C, TR0A/B, 3C5I, TR8CA

9.4. 1030-1300 TEP from Mittel-DL: ZS6DN/B, ZS6AXP

10.4. 12201330 TEP from ganz DL: 3C5I/B

12.4. 1600-1700 F2 from I, SV, 9H: VP8DBL GD08 Falkland, from Süd-DL: TEP ZS6 2100 from EA7: ZL2KT, AAA

13.4. 20-22 TEP from Süd-DL: ZD7VC, ZD8VHF-B II22

14.4. 1200- TEP from Mittel + Süd-DL: ZS6

15.4. 1020-1230 TEP from Mittel + Süd-DL: ZS6WB, ZS6PJS 1230 F2 from Süd-DL: 5N3CPR JJ25

16.4. 0945-1030 TEP from Süd-DL: ZS6WB, ZS6PJS

17.4. 1630- TEP from Süd-DL: ZS6AXT

29.4.1530-1700 F2+Es from Süd, Mittel- + West-DL: PZ5RA, GJ25

Expeditions

JP32 LA/DL5ME plant im Sommer eine UKW+KW-Expedition auf die Insel Runde.

JP61 LA6QBA/p ist in diesem Sommer fast jedes Wochenende auf 6m und 2m qrv.

KQ26 Spitzbergen: JW5RIA ist von Mai bis Sept. 2000 auf 6m mit 100 Watt qrv.

MM UU7JM/MM plant im Sommer 2000 einige Felder im schwarzen Meer auf 6m zu aktivieren! PA3HEN/MM ist wieder auf 6m aus dem Mittelmeerraum qrv. QRG 50.140 MHz. MM G0KZG/MM hat jetzt auch eine Anlage für 6m und war Anfang Mai QRV.

7P Lesotho: Vom 4.-22.7. ist eine Gruppe aus DL unter 7P8AA auch auf 6m qrv.

8P Barbados: G4IOQ ist 4 Jahre als 8P9HW mit 100 Watt und HB9CV auf 6m qrv.

9G Ghana: OK2ZW, Zdeno, ist für 2 Jahre als 9G5ZW auch auf 6m qrv.

9V Singapore: 9V1JA ist vom 1.2.-30.11. auf 6m mit Sonderlizenz qrv. 50085 CW + 50115 SSB. CY9 St. Paul: Vom 6.-10.7. ist eine Gruppe aus den USA um WV2B auf KW und 6m qrv.

D3 Angola: D3SAF ist seit März für einige Monate auf 6m qrv. Loc. ist JI73.

FM Martinique: FM5WD ist jetzt mit 100W und 8 Ele. auf 6m qrv und wartet auf Öffnungen nach EU.

FR/T Tromelin: Eine Gruppe aus F plant vom 31.7.-16.8. eine große Expedition inkl. 6m.

HB0 HB0/HB9QQ wird in den kommenden Monaten regelmäßig auf 6m qrv sein. HB0/PI4TUE ist vom 31.7.-16.8. auf 2m + 6m +23cm mit gutem Takeoff nach Norden qrv. Inkl. Meteor-Scatter. Info/Skeds: Martijn PA3GFE. E-mail pa3gfe@amsat.org

HV Vatican: IK0FVC ist in diesem Jahr unter HV0A mehrfach auf 6m qrv.

JX Jan Mayen: LA7DFA ist seit 7. April für 6 oder 12 Monate wieder als JX7DFA auf 2m/6m qrv.

TZ Mali: TZ7TT, Holger, hat die 6m-Yagi from TZ6VV bekommen und will qrv werden.

VP8 Falkland: VP8CMT, GD18 ist jetzt sehr auf 6m aktiv. - VP8AWU will demnächst qrv werden

ZA Albanien: ZA/N7BHC ist für 2 Jahre auf 2m, 6m + 70cm mit guten Rigs qrv. Loc.: JN91 ZA/OK1AR ist seit Anfang Januar für einige Jahre auf 6m und 2m qrv. Loc. JN91.

ZD9 ZD9BV ist jetzt sehr aktiv auf 6m und hat mehrfach nach EU gearbeitet. QSL via W4FRU.

ZX St. Peter+Paul: Im Juli 2000 ist eine Expedition unter ZX0SK + SP auch auf 6m geplant.

KN07/17 HA5OV, HA7PL, HA7UL + HA5CRX planen, sofern gegend Nachfrage besteht, in der ersten Augustwoche erneut via CW-MS qrv zu werden. Rig. 1.5.KW + 2 x 11 Ele. Info: ha5ov@dpg.hu

KN20/30 HB9SUL plant in diesem Sommer aus KN20 oder 30 als TA1ZK via 2m MS qrv zu werden.

GU Guernsey, IN89: G0RUZ plant 10 Tage im Sept./Oktober via EME auf 2m und 70cm mit gutem Rig QRV zu werden. Er will auch 6m und 2m CW-MS machen. Email: conrad.farrow@virgin.net

Tropo News

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

LA0BY, Stefan, schreibt:

Hatte mich von DH8BQA für den Mai-Kontest zu einer Fahrt zum Holmenkollen überreden lassen. Die Bedingungen waren normal, aber viel war aus DL nicht zu hören. DF0TEC/p in JO73CF (Clubstation mit OP DH8BQA) wollte zur vollen Stunde nach Norden rufen, und war wie immer auf 2 m leicht zu arbeiten. Andere DLs hatten ihre Antennen in andere Richtungen, und kamen nicht viel ber die Grasnarbe. Die aufkommende Langweille wurde nur durch den Besuch vom Elch und Hirsch gemildert, hi. Früh am Sonntagmorgen machte sich eine leichte Inversion vor allem auf höheren Frequenzen bemerkbar. Hatte ausser 2 m aber nur 70 cm dabei und konnte auf diesem Band DF0TEC/p, PI4GN und PA6C (beide aus JO33) loggen. Auf 2 m kam plötzlich DK0ALK langsam hoch - er konnte kaum fassen, dass ihn ein LA anruft. Er sass nämlich in JN38TD, gut 1330 km vom mir entfernt im Südschwarzwald. Wir brachten die Verbindung mit 55 beidseitig gut über die Bühne, bevor er wieder im Rauschen versank. Das war ein Glückstreffer! Vorher hatte ich schon OK1KHI/p in JO70NR gehürt, aber dieser mich leider nicht. DK5QN in JO42DC war mit 890 km die zweitgrösste Entfernung. Ansonsten kamen nur ein paar Stationen von der Watterkant ins Log. Trotz dem interessanten DX kamen insgesamt nur 19 QSO auf 2 m und 8 QSO auf 70 cm zustande. Das erklärt, warum diese 24 Stunden Konteste nicht so populär in den höheren skandinavischen Breiten sind. Ein paar Unentwegte sind aber immer QRV. Werde weiterhin unter LA0BY/p von JO59IX im NAC mitmachen. Wie immer rufe ich um 21 Uhr Lokalzeit auf 144,075 MHz Richtung DL. Zu anderen Zeiten rufe ich auch um 144,350 MHz in SSB. Ich werde jetzt auch häufiger auf 70 cm mitmachen, nachdem ich die Antennenanlage auf 2 x 13-ele ausgebaut habe. Andere im NAC aktive Stationen sind LA1T, LA7M, LA2Z und LC3NAT. 73, Stefan (LA0BY) email la0by@qsl.net homepage <http://www.qsl.net/la0by/>

phone +47-67139536, mobile +47-90114432

Beacon-news

DB0ARB 5760.860 MHz, JN69NC, 1 Watt, Schlitz-Antenne, SO, S, SW, W, 1450m NN, A1A

DB0ARB 10358.860 MHz, JN69NC, 1 watt, Schlitz-Antenne, SO, S, SW, W, 1450m NN, A1A
DB0ARB steht auf dem Gr. Arber und sendet seit 25.4.00. Berichte bitte an DJ4YJ.

DB0SGA 144.475 MHz, JN69KA, Predigtstuhl, 5W, 4 x 4 Ele., NWSO, 1124m NN A1A, seit 19.3. QRV

DB0SGA 432.975 MHz, JN69KA, Predigtstuhl, 5W, 4 x 9 Ele., NWSO, 1124m NN A1A seit 19.3. QRV

DB0SGA 1296.975 MHz, JN69KA, Predigtstuhl, 5W, 4 x 2 Ele., NWSO, 1124m NN A1A seit 19.3. QRV Bei DB0SGA handelt es sich um ex DL0SG. Berichte bitte an den Verantwortlichen DJ4YJ

DB0XL 24192.807 MHz, JO53HU, 1 WERP, OMNI, 49m asl, A1A, ab Ende April QRV. Info via DK1KR.

HB9AK 10368.980 MHz, JN47LI, 230 mW, 10dB Slot, OMNI, 1133 m asl. QRV seit 8.3.00 HB9CZF

LY0SIX 50.063 MHz, KO24PS, 7W output, Dipol, 5m über Grund, QRV 2/00 LY2MW

PP2SIX 50.073MHz, GH53MP, Groundplane, 7 Watt, QRV 4/00 PY0FF/B 50.006 MHz, HI36, Fernando de Noronha, 10W, Vertikal. QRV seit 27.3.00

UR4LL 50.085 MHz, KO70XG, Dipol, Omni, Horiz., 8 W, 100m asl, 6m agl, QRV seit 23.4.00 UR4LL

UT5G 50.084 MHz, KN66LS, GP, Omni, Vertikal, 10 W, 60m asl, 45m agl, QRV 4/00 UT7GA

VK8VF 50.057 MHz, PH57 ist QRT. Man bemüht sich einen Ersatz aufzubauen.

Aurora News

Editor: Norbert Götsche, DL8LAQ

Dear Readers, please send your reports via email to dl8laq@gmx.de or packet radio to DL8LAQ @ DB0HB.#HH.DEU.EU. 73, Norbert.

DF2ZC (JO30RN) wkd on 144 MHz:

2000-04-06			
2030 OZ1FDH	JO65CS	59A	50°
2032 SM7WT	JO65QQ	59A	
2040 DK1CO	JO63SX	57A	
2104 SP6GVU	JO81LC	57A	
2109 G4ASR	IO81MX	55A	
2110 DK5WO	JO30AS	57A	
2110 DJ6TK	JO53FG	52A	
2154 OZ2TF	JO46PE	53A	40°
2220 G3UTS	IO94CU	55A	
2225 GM4YXI	IO87WJ	55A	
2229 GW4FRX	IO82MR	57A	
2233 OZ2ZS	JO55RT	55A	
2244 LY2MW	KO24PQ	55A	1284km
2251 SK7VHF/B	JO65KJ	53A	bcn
2251 OZ7IGY/B	JO55VO	54A	bcn no sk4mpi
2258 DJ4TC	JO63PN	55A	
2301 DK5JM	JO43QS	55A	
2311 SP4MPB	KO03GS	52A	
2322 PA0DVM	JO21SX	57A	
2324 G0NFA	IO91NE	54A	
2325 G3YVR	IO91WD	52A	
2329 9A1CAL	JN86EL	52A	
2338 G0CUZ	IO82WM	55A	
2343 G0RRJ	IO91IO	55A	
2348 G7RAU	IO90IR	57A	
2357 G4AJC	IO91VJ	42A	
2000-04-07			
0003 YL3AG	KO26AW	57A	30°
0011 PE1HWO	JO21GV	59A	
0018 PE1LCH	JO23WF	59A	
0025 DL0PR/B	JO44JH	55A	bcn
0025 GB3NGI/B	IO65VB	52A	bcn
0025 GB3MCB/B	IO70OJ	55A	bcn
0025 OZ4UHF/B	JO75KC	52A	bcn
0025 DL0UH/B	JO41RD	51A	bcn
0025 GB3VHF/B	JO01DH	53A	bcn
0025 PI7PRO/B	JO22NC	53A	bcn
0025 F5XAM/B	JO10EQ	53A	bcn
0025 PI7FHY/B	JO22WW	53A	bcn
0025 ON4VHF/B	JO20FP	53A	bcn
0025 PI7CIS/B	JO22DC	57A	bcn
0025 DB0JW/B	JO30DU	55A	bcn
0025 EI2WRB/B	IO62IG	52A	bcn
0038 IK1MTZ	JN35UB	57A	
0057 DL5CR	JO61UA	55A	70°
0059 OK1AJY	JO70NO	53A	
0104 GM4CXM	IO75TW	59A	30°

0108 DJ0ZI JO31CQ 43A 54A
0109 DL9BDM JO33RL 55A 57A

Unfortunately I had to stop at 03:15 hours local time to catch at least 3 hours of sleep... At last the first major aurora from my new QTH in JO30RN! Equipment: 750 W, 17 ele TONNA, 10 m AGL, 360 m ASL. 73 and cu in the next opening, Bernd (b.j.m@t-online.de -http://home.t-online.de/home/df2zc/).

DL6BF (JO32QI) wkd on 144 MHz in CW:

2000-04-06			
2107 9A1CAL	JN86EL	56a	55a 65°
2112 SP6GVU	JO91	53a	55a 65°
2245 SM1TDE	JO97II	55a	55a 30°
2250 LY2MW	KO26AW	55a	55a 30°
2306 SM5IXE	JO78SJ	54a	52a 35°
2358 HA6NQ	JN98WA	57a	55a 35°
2000-04-07			
0001 DJ1OJ	JN58SE	54a	55a 60°
0004 UR5BAE	KN29SN	56a	55a 60°
0006 SP2HNF	JO94FK	56a	55a 60°
0008 OK1FID	JO80CH	57a	59a 60°
0013 IK1MTZ	JN35UB	57a	55a 60°
0014 OM5LD	JN98AH	55a	55a 60°
0033 G4ASR	IO81MX	55a	53a 60°
0035 G0ARJ	IO91FE	55a	55a 60°
0044 OK1DIG	JO60XJ	56a	55a 85°
0048 DF8IK		59A	54a 85°
0101 SP4MPB	KO03GS	57a	55a 50°
0115 G7RWU	IO90IR	57a	57a 0°

Hrd: EI5FK, GM4CXM, IDMP, I1JTQ, IW1AZJ, OE5OLL, OM7DX, SM7RYO, YT1VV... Thanks for report, Heinz.

DL8EBW (DL66a / JO31NF) wkd on 144 MHz in CW:

2000-02-12			
1857 OZ2TF	JO46	55a	55a 20°
2000-04-06			
2038 DF2JQ	JO31	55a	53a 45°
2040 PA3BIY	JO22	55a	53a 50°
2052 DK1KO	JO53	59a	59a 60°
2103 DL5WG	JO52	59a	57a 45°
2116 SP6GVU	JO81	52a	55a 70°

Sri for all I missed in that best Aurora since 1991 in my QTH! I was not very fit due to too much qrl and was qrv only for 2015-2145UT... not have seen any visual Aurora here! In that time I heard stations from following sqrs (but of course I did search for new ones, hi): JN18,JO01,02,11,20

JO21,22,30,31,32,33,40-46,50-55,61,62,63
JN 48,49,57,58,59 and several I did not write
down... See you next time. Thanks for report,
Guido.

DL9BDM (JO33RL) wkd on 144 MHz:

2000-04-06			
2045 SM7WT	JO65QQ 58a	57a	45°
2248 LY2MW	KO24PQ 54a	55a	45°
2305 G7RAU	IO90IR 57a	59a	25°
2311 G4ASR	IO81MX 56a	53a	20°
2322 G3UTS	IO92 55a	52a	40°
2328 G4AJC	IO91 56a	55a	45°
2332 G0CUZ	IO82WM 55a	55a	45°
2340 DL1RNN	JO62QH 54a	55a	45°
2350 SK4BX	JO79OF 55a	54a	45°
2353 SP2HNF	JO94FK 53a	55a	45°
2000-04-07			
0001 YL3AG	KO26AW 54a	53a	40°
0022 HA6NQ	JN98WA 53a	55a	65°
0019 DJ1OJ	JN58SL 59a	59a	50°
0030 IK1MTZ	JN35UB 53a	hrd	70°
0105 OK1DIG	JO60XJ 56a	55a	65°
0114 G8LJU	IO82TC 58a	57a	45° ssb
0119 G8XVJ	IO83RJ 59a	58a	45° ssb
0128 GM4CXM	IO75TW 57a	59a	0°

Equipment: 80W, preamp BFT66 and 17 ele
F9FT 15m asl. Thanks for report, Eilert.

PA3CEE (JO33JI) wkd on 144 MHz:

2000-04-06			
1807 G0KZG/mm	IO47HM 55A	55A	350°
2210 SM1DTE	JO97II 59A	57A	50°
2213 PA3DZL	JO21HM 59A	59A	70°
2220 PA1AT	JO32HA 59A	59A	70°
2222 DD0VF	JO61WB 57A	57A	70°
2229 LY2MW	KO24PQ 59A	59A	60°
2233 YL3AG	KO26AW 59A	59A	45°
2249 G7RAU	IO90IR 57A	57A	50°
2307 SP3DOQ	JO81HU 55A	55A	60°
2336 OK1FID	JO80CH 59A	55A	75°
2340 9A1CAL	JN86EL 59A	59A	80°
2000-04-07			
0002 HA6NY	JN98WC 54A	54A	85°
0012 HA6NQ	JN98WA 59A	59A	85°
0016 IK1MTZ	JN35UB 55A	55A	85°
0028 UR5BAE	KN29SM 57A	57A	70°
0050 OM7DX	JN98CR 59A	59A	85°
0051 OM5LD	JN98AH 59A	59A	85°
0111 OK1AJY	JO70NO 55A	55A	85°

Equipment: 400 W into 2x16 F9FT.

There was a fantastic lightshow going on
above my QTH in the late evening of thursday
the 6th of April. AURORA BOREALIS! From
270 till 50 the sky was white, mixed with
deep red and green colours. I had never seen
such a thing before and I was quite impressed
by this phenomenon that lasted from 21 UTC
until 01 UTC. Impressive! The radio aurora
was superb in spite of a lack of activity. All-
right, there were a lot of gents QRV, but it
could have been more interesting with sta-

tions from YO and LZ. Anyway, I don't com-
plain: I could add 2 new squares! 73, Eltje.

UR5BAE (KN29SM) wkd on 144 MHz:

2000-04-06			
2224 LY2MW	KO24 59A		
2233 DK1C0	JO63 55A		
2311 OZ8ZS	JO55 55A		
2314 PE1LCH	JO23 55A		
2322 SP4MPB	KO03 59A		
2323 DJ4TC	JO63 55A		
2330 DL1EJA	JO32 59A		
2334 G7RAU	IO90 55A		
2338 ON4AMX	JO20 55A		
2000-04-07			
0005 DL6BF	JO32 55A		
0014 DK5JM	JO43 55A		
0018 DJ3VI	JO51 55A		
0022 PA3BIY	JO22 57A		
0026 DH3VE	JN39 55A		
0027 PA3DOL	JO22 57A		
0028 PA3CEE	JO33 59A		
0034 G3LQR	JO02 55A		
0040 DL1EAP	JO31 55A		
0049 PA0WWM	JO22 57A		

Heard in CW ON4YZ, SP2HNF, DL5BCU,
DK1KO, 9A1CAL, DD3SP, PA2DWH,
DK5YY, HA5NQ and in SSB SM7RYO. The
wind was strong and turned my ant from 320
to 30 deg, hi. Good luck and 73. Thanks for
report, Anatoly (...and don't forget the rcvd
report).

DL2IAN writes:

AURORA BOREALIS - Due to that, that i am
not available on 2m I was watching tonight the
real fantastic AURORA BOREALIS. It started
at about 21 UTC here in JN49BC at about 300
deg in red color. One hour later I was watching
this event outside the village with free take off
in all directions from 290 deg to 90 deg in all
colors. Elevation was going up to 90 deg! So
due to that I have changed QTH and not QRV
with my normal rig (4x9 ele, 1 kW) I have at
the moment only an old FT-221R with 10W
output into a 9 element under the roof with
RG58 cable... I have no keyer there so I made
5 qso with my voice beep, hi. QSOs have
been run between 0020 UTC and 0100 UTC
DL1EJA, PA2DWH, G7RAU, PA3BIY and
DF8IK. I heard lots more stations. As you see
you can also work with low power and under
roof antenna during good Auroras. So I think
condx improve rapidly and I also hope to get
QRV in new QTH with some new antennas
and new rig. 73 and gl, Tom.

Es News

Editor: Norbert Götsche, DL8LAQ

Dear Readers, please send your reports via email to dl8laq@gmx.de or packet radio to DL8LAQ @ DB0HB.#HH.DEU.EU. 73, Norbert.

2000-05-18

IW0GPN JN62FB wkd: 1838 EA4AMX IM89AT, 1839 EB4DIZ IM89AT, 1839 EA4AKH IN70UA, 1840 EB4TT IN70XJ, 1844 EA4EHI IM68TV, 1845 EB4ETS IN80BH, 1934 EA5ZF IM99WU, 2003 EA9IB IM85NG. This was the opening in the year 2000 (a week earlier than in 1999), all started at about 1700 UTC and finished at about 2015 UTC. Unfortunately at the beginning I wasn't at home but after 1830 UTC I made some qso with EA stations, but I've noted that the opening in that moment wasn't for me, I was at the border cause some signal in my qth were absolutely nothing while only 20 km south of me they were 9+20dB. 73, Alex.

2000-05-19

YU7EW (KN05HP) wkd: 1655 4X4IF KM72KD 1936 km, 1713 4X1MO KM72KD 1936 km.

2000-05-27

DH0GHU (JN38VN) wkd: 1658 IK8YQQ JN70GR, 1700 I8MPO JN70FP, 1712 IT9IQQ JM77NO, 1739 IT9VDQ JM68QC, 1748 IT9WUF JM68QC, 1755 9H1CG JM75FW, 1803 IT9NAN JM77, 1807 IT9IYZ JM77PB, 1810 IT9HLR JM77PB.

DK3XM (JO43XL) wkd: 1531 YU7EW KN05HP.

DL8EBW (JO31NF) wkd: 1222 SV0EC KN10 hrd, 1548 SP7RJF KO10GS, 1551 UR5BAE KN29SM hrd, 1635 IW9ELR JM68PD hrd, 1653 IW9ELR JM68PD, 1656 IK0BZY JN61GW, 1657 I8MPO JN70 hrd, 1658 I5RUR JN53 hrd, 1659 IW0BET JN61

hrd, 1702 IT9TVF JM68OD, 1706 IT9VDQ JM68, 1714 IK0FTA JN61 hrd, 1715 IT9IQQ JM77 hrd, 1715 IT9NAN JM77 hrd, 1718 IC8FAX JN70FP hrd, 1740 IT9GSV JM77LH hrd, 1748 9H1GB JM75FU hrd, 1755 IK7UXY JN90DC, 1756 9H1CG JM75 hrd, 1759 IW7DPP JN90DG hrd, 1800 ON1BG/17 JN90 hrd, 1835 9H1CG JM75 hrd.

G0FIG (IO90UU) wkd: 1205 SV0EC KN10 hrd, 1211 YZ1RA JN94WG, 1212 LZ5UV KN12PR, 1213 LZ3CQ KN12PQ, 1214 YT1VV JN94US, 1537 SP7QJF KO10ER, 1538 SP7RJF KO10GS, 1632 I8MPO JN70??, 1634 IK8YQQ JN70GR, 1650 IK7UXY JN90DC, 1700 I7CSB JN71QQ, 1703 IK6EIW JN63RJ, 1708 IK7IMP JN90CI, 1717 OK1UGA JO80DD, 1718 SP9QZS JO90NA, 1721 YO2II KN06PE, 1724 HA7UL JN97KK, 1725 HA8MV KN06GU, 1726 OK2PM JN99, 1727 HA4XW JN97LB, 1730 OE3BCA JN87CX, 1732 HA8CE KN06EN, 1734 OM3EA JN88PA, 1757 HA0DG/P KN07VM, 1752 HG0NDG KN07, 1756 YO5BEU KN27GT, 1759 YO5BWD KN27GD.

G4ASR (IO81MX) wkd: 1216 LZ3CQ KN12PQ, 1218 LZ5UV KN12PR, 1219 LZ1QB KN12RO, 1221 YT1VV JN94US, 1720 OE3FVU hrd, 1721 OM3CDR JN88NE, 1721 HA0HO KN07SU, 1722 HA8TK JN96UW, 1723 OK2IGG JN89IE, 1723 HA0HO KN07SU, 1725 OM5KM JN98AH, 1725 YO5BEU KN27GT, 1726 HA8EU KN06DQ, 1726 YO2IS KN05PS, 1728 HG4GHJ JN96LX, 1731 YO5OBR KN07XA, 1732 YO5PLA KN06, 1734 HA2SU, 1735 YO2LFP KN06MD, 1735 4N7AX KN05PC, 1735 HG8AD KN06PP, 1736 YO2HS, 1736 HA5ARR KN06QV, 1740 OM1AVK JN88OD, 1741 HA0DG/P KN07VM, 1744 YU7MS, 1745 HA2PP JN87VE, 1746 YU5CFI KN16WJ, 1747 HG8QG KN06MT, 1747

HA5CBA JN97OM, 1747 HA2RD JN87WB, 1750 YO2LTP KN06MD, 1750 HA7MB KN07BM, 1751 YO2LFP, 1751 HA7UL JN97KK, 1752 YO2LEA KN06WK, 1752 YO7IV/P KN34BL, 1752 YO3JW KN34CK, 1753 YO3ACX KN34BL, 1754 YO7VS KN14VH, 1755 YO5QAQ KN16UG, 1756 YO3APJ KN34AL, 1757 HA8CE KN06EN, 1759 HA8MV KN06GU, 1803 YO5QAQ KN16UG, 1805 ZA/OK1JR JN91VH.

GM4CXM (IO75TW) wkd: 1702 S51WX JN75OS, 1705 S57EA JN76HE, 1705 S57TW JN75EX, 1705 S51AT JN75GW, 1706 S57GTW JN76FA, 1708 S53J JN75EV, 1709 S57A JN65TV, 1709 S57LM JN76HD, 1710 S57S JN76JB, 1712 9A3VD JN75XX, 1712 9A2KK JN85OV, 1713 OE6BAF JN77KF, 1715 9A4SL JN85BW, 1716 9A2YC JN75WT, 1716 9A3JN JN85EL, 1716 9A2TE JN85KK, 1717 9A4VM JN85FS, 1717 T94KU JN94JF, 1718 T97M JN93EU, 1722 9A5FM JN85BT, 1723 9A3SM JN85AT, 1723 9A4WW JN85AU, 1724 9A3UV JN85EV, 1729 YU1CF KN03QN, 1733 YZ7NOU JN94CK, 1737 9A2VR JN95FQ, 1740 YU1EV KN04CN, 1741 IZ6CUS JN63SO, 1756 T94DU JN95DA.

GM4JJJ (IO86GB) wkd: 1712 S51AT JN75GW, 1713 S57EA JN76HE, 1714 S57A JN65TW, 1715 S51DX JN75DW, 1716 S57S JN76JB, 1717 S53J JN75EV, 1717 S51WX JN75OS hrd, 1718 9A3SM JN85AT, 1725 9A2YC JN75WT, 1725 9A4VM JN85FS, 1726 T91EDO JN95DA, 1726 T94DU JN95DA, 1727 9A3GL JN95AD, 1727 T97M JN93EU, 1728 SV1RK KM17VU, 1730 YU1XT KN03IR, 1730 9A5TT JN85TR, 1737 IK4DRY JN54, 1743 HG1DRD JN86KU, 1747 9A2VR JN95FQ, 1750 YU1EV KN04CN, 1753 9A2KK JN85OV, 1755 9A1CAL JN86EL, 1811 ZA/OK1JR JN91VH, 1848 HB9PJT JN47FG.

GM4OGI (IO85DX) wkd: 1706 9A4NF JN73VS, 1707 S51DX JN75DW, 1709 9A3MR JN73TS, 1709 S51AT JN75GW, 1710 S57A JN65TW, 1710 S57TW JN75EX, 1711 S57EA JN76HE, 1711 S57S JN76JB, 1712 S51WX JN75OS, 1714 9A3UV JN85ER, 1714 T97M JN93EU, 1715 S53J JN75EV, 1716 OE5WHN

JN67TR, 1716 S56TGC JN76ND, 1718 9A3VD JN75XX, 1719 OE8HIK JN76KS, 1719 9A3JN JN85EL, 1719 9A2TE JN85KK, 1720 9A4WW JN85AU, 1721 9A3SM JN85AT, 1722 9A2YC JN75WT, 1723 T94DU JN95DA, 1724 T91EDO JN95DA, 1725 T94KU JN94JF, 1734 IZ6CUS JN63SO, 1740 9A2VR JN95FQ, 1743 YZ7NOU JN94TX, 1755 9A1CAL JN86EL.

HB9DFG (JN37SM) wkd: 1722 IT9NAN JM77NT, 1731 IT9VDQ JM68, 1732 IW9ELR JM68PD, 1735 IT9TVF JM68OD (FM), 1746 IT9IYZ JM77PB (FM), 1747 IT9WUF JM68QC, 1752 IW9BJU JM77GG, 1753 9H1CG JM75FW, 1756 9H1GB JM75FU, 1759 IT9GSV JM77LH, 1801 IT9IYZ JM77PB (FM), 1803 IT9HLR JM77 (FM), 1804 IW9FY JM77OS (FM).

During the IT9-opening, nearly the whole 2m-band was crowded with cellular phones. I never had this problem during 9H-openings but the QRM of all these phone calls in 3V and/or 5A while IT9 was open was immense! Very unlucky that 3V or 5A are not so crowded with HAMS like central Europe!

IW1AZJ (JN35UB) wkd: 1715 SV9BMC KM25NH, 1720 SV9ABJ KM25NI, 1725 LA2AB JO59FV, 1727 LA0BY JO59FW, 1730 IT9VDQ JM68PD, 1745 IT9NAN JM77NO, 1747 IT9QAU JM77MN, 1750 IW9BZU JM77GG, 1825 SV1DH KM18. Interesting note: We had on the same time LA and IT9; during LA0BY qso, IT9 caused qrm (S9) from the back of antenna! Never heard before!

OE3EMC (JN78JO) wkd: 1719 SM4VQP JO69NI, 1721 GW4VBM, 1729 G7RAU IO90IR, 1732 G1WUU IO80FK, 1735 M1DGB IO70NF.

OK2PTC (JN89JM) wkd: 1712 M0BKL IO80FK, 1716 G3LTF IO91GG, 1716 G4SUX IO81WL, 1717 G5TTI IO81WL, 1718 2E1EMK IO91, 1718 G4RUW IO91IJ, 1719 G7PUJ IO91XL, 1719 G4AEP/P IO91MB, 1720 GW5NF IO81KQ, 1720 G7GUO IO91OP, 1720 G3JHM IO1LC, 1720 G4APL IO91WH, 1721 G3UGY IO91WH, 1721 G3NVO IO91, 1722 G6XRX IO91, 1722 G4IGO IO80, 1723 G4LRD IO91EC, 1724 GW4HBK IO81KP, 1725 G4RUW, 1725 G4AJC IO91VJ, 1726 G3GMR IO70WT, 1727 G1HWY IO90UV, 1728 G3WZT IO90UX, 1729 G4VVE, 1730

F1ANH/P IN88MR, 1731 F1SAH IN88LS, 1732 F1FSU IN99KC, 1732 F6HRP IN88KN, 1733 F9OE IN78QG 1566 km ODX, 1734 F6KHM IN78RJ, 1738 9H1BN/M.

OM5CM (JN98DF) wkd: 1657 EA3TI JN11DO, 1701 EA3ADW JN11, 1704 EA3DXU JN11CM, 1705 EA3FLN JN11KT, 1707 F6HTJ JN12KQ, 1712 EI7GL IO51TU, 1712 EA3TAJN11AM, 1713 EB3DYS JN11, 1714 GW7SMV IO81LN, 1715 EA5ZF, 1718 G4NOO JO01CO, 1719 G4TIF IO92FH, 1721 G3ZKN IO81VV, 1722 EI5FK IO51RT, 1723 G4HSK JO01FS, 1724 G4BRK IO91DP, 1725 G1WPF IO91RP, 1727 G4CLA IO92LJ, 1728 G8JAY IO81WV, 1736 G7RAU IO90IR, 1739 EI7GL IO51TU, 1741 G6YAY IO80EL, 1743 G4DOL IO80SO, 1743 G3WZT IO90UX, 1744 F1CBC JN09BO, 1748 G4AEP/P IO91MB, 1748 G0RRJ IO91FE, 1749 G3LTF IO91GG, 1749 G6IJJ IO91VH.

OM5LD (JN98AH) wkd: 1707 UTC EA3TI JN11DO, 1712 EB5AYG IM99TN, 1716 G4TIF IO92FH, 1721 EI5FK IO92FH, 1723 G0NNK IO92AL, 1724 GW5NF IO81LQ, 1728 G1WUU IO80FK.

ON4KHG (JO10WK) wkd: 1732 YO2II KN06 hrd, 1733 OM3EA JN88PA, 1737 9H1GB JM75FU hrd, 1743 IT9VDQ JM68QC, 1746 IW7DPP JN90DG, 1753 OM3BWC JN98VG, 1754 9H1CG JM75FW, 1755 IT9QAU JM77 hrd, 1755 IT9GSV JM77LH hrd, 1803 IT9NAN JM77NO, 1807 ZA/OK1JR JN91VG hrd.

PE1HWO (JO21GV) wkd: 1654 IC8FAX JN70CN, 1656 IK0BZY JN61GW, 1701 I8MPO JN70FP, 1708 I8QLS JN70, 1714 IW0EFI JN61WL, 1715 IK8YOQ JN70, 1726 9A3VD JN75XX, 1728 9A3JN JN85EL, 1729 I97M JN93, 1736 YU7VA KN05EJ, 1740 HA2SU JN97AB, 1742 YU7BCL KN05FW, 1752 9A4FW JN95JG, 1755 YU7ZZ KN05BT, 1800 IW7DPP JN90DG, 1803 YO7VS KN14VH, 1821 IT9GSV JM77LH.

YU7EW (KN05HP) wkd: 1223 F6DRO JN03SM, 1234 F1FDW IN94QS, 1235 F/G8MBI JN04FT, 1236 F6FHP IN94TR, 1238 F4ARU IN94VT, 1301 F6APE IN97QS, 1302 F1DUZ IN97NJ, 1303 F1DDE IN97DM, 1304 F8ACF IN87 (C?), 1651 DB6LJ JO43TS, 1651 DK3XM JO43XI, 1747 F4DBY JN03NS, 1747 F4BWJ IN93NP, 1748 F5DUX IN93IN, 1752 F6GLJ IN94QS, 1754 F5ADT IN94VO, 1759 F1ULL JN04OI, 1803 F6HRE IN93GK, 1806 F6FHP IN94TR, 1807 GW4VBM IO83LX, 1808 F1GTU JN05IE, 1808 F5IYW JN04OU, 1809 F/G8MBI JN04FT, 1810 G0PES IO83LS, 1812 M1BVI IO93HG, 1813 G4NRG JO01PN, 1814 G3NNF IO92OL, 1815 GD4NGH IO74QD, 1816 G4VOU IO92JX, 1818 G0KPW JO02MD, 1821 G6YGP IO83NO, 1822

G8TIC IO82VF, 1823 G0PES IO83LS, 1824 EI6AS IO63TH 2117 km, 1824 G3YJR IO93FJ, 1825 G3ZKN IO81UT, 1827 G3KEQ JO01BH, 1828 G4CLA IO92LJ, 1828 G6IJJ IO91VH, 1829 G8VHI IO92FM, 1829 ON1ALJ JO10SS, 1830 G7MJX IO92VA, 1831 G8DKK IO91VX, 1831 ON4PS JO20KQ, 1831 PA3DYS JO21JP, 1832 G4PWX JO02PB, 1833 ON1CDP JO10TU, 1833 G8GXP IO93FQ, 1833 G4NOO JO01CO, 1834 PA3DZL JO21HM, 1835 G4PCS IO91WV, 1835 G4HSK JO01FS, 1835 G4ZFJ JO01JN, 1836 ON1IM JO11UB, 1836 G4ATX JO01MI, 1837 GX0SCR/p IO91ES, 1837 G8JAY IO81WV, 1838 G4AIC IO91VJ, 1838 G4BRK IO91DP, 1839 G0VVE IO91SG, 1840 G8MYK IO92BJ, 1840 G8NOF IO92CM, 1841 G8TPH IO93VO, 1842 G0KPW JO02OD, 1845 G4YTB IO83RF, 1848 PA3EOC JO21FW, 1849 PE1RZJ JO22FJ, 1851 G6ZQE JO02NN, 1857 PA7RP JO22EC, 1858 G3AKU IO92GR, 1858 M1DHO IO92KR, 1859 G8IYG IO82XT, 1902 G4LOH IO94IA.

2000-05-28

DB5WC (JN49EJ) wkd: 1457 IT9NAN JM77, 1550 IK7UXY JN90DC, 1616 SV3CYM KM08VG, 1628 SV3EAO KM08VF, 1630 SV9VCY KM25?

DH0GHU (JN38VN) wkd: 1515 IW9CER JM78QF, 1604 SV3CYM KM08VG, 1607 SV3EAO KM08VF, 1608 SV9ANK KM25NI, 1618 SV1QT KM17UW, 1621 SV1RK KM17VU.

DL8EBW (JO31NF) wkd: 1459 IT9NAN JM77NO, 1502 IT9RYJ JM77MN hrd, 1508 IW9BJU JM77 hrd, 1517 IT9HLR JM77 hrd fm, 1520 ARAB Tel. hrd fm, 1602 SV8CS KM07 hrd, 1612 SV3CYM KM08 hrd, 1614 SV3KH KM07 hrd.

Big pile-ups but we were in wrong position for making good qsos.

2050 144 ER1AN KN46 hrd.

Great ES day without many qsos.

G0FIG (IO90UU) wkd: 1502 IT9RYJ JM77MN, 1513 IZ8BAB JM89IG?

GM4JJJ (IO86GB) wkd: 2003 YU1EV KN04CN, 2003 YU1LA KN04FR, 2004 YZ1KU KN04ET, 2004 YU7ON KN04AX, 2004 YZ7MON KN04AX, 2005 YZ1RA JN94, 2005 YZ1DNN KN04CQ, 2005 YU1EBC JN94, 2008 YZ1EFS KN04ET, 2008 YZ1BUL KN04GS, 2009 YT1VP JN94WG, 2012 4N7AX KN05PC, 2013 YU1LA KN04FR, 2013 YU1AR KN05BW, 2013 OE3IWG JN77PK, 2015 YZ7UN KN05FJ, 2015 YU7ZZ KN05BT, 2017 LZ2FO KN13KX, 2018 YZ1BUL KN04GS, 2020 YU1EW KN05HP, 2059 9A4FW JN95JG, 2100 9A3QB JN95HW, 2100 9A4TM JN95GJ, 2100 YT1VV JN94US.

GM40GI (IO85DX) wkd: 2006 YU1LA KN04FS, 2007 YU1EV KN04CN, 2009 YZ1DNM KN04CK, 2009 YU7ON KN04AX, 2018 YO2LHD/P KN15AD, 2100 YZ7MON KN04AX, 2101 YU1EV KN04CN.

HB9DFG (JN37SM) wkd: 1529 9H1ET JM75, 1539 SV3CYM KM08VG, 1600 SV1XY KM18 (FM), 1612 SV1BJL KM18VB, 1615 SV1BRV KM17, 1618 SV1EN KM18VA.

IK2YXK (JN45OP) wkd: 1919 SM7URQ hrd, 1920 SM7TKR hrd, 1955 SM1FMT JO97 hrd, 1958 OH1XT KP01, 2013 LY2SA KO14LL, 2030 OH5LK KP30ON.

IW1AZJ (JN35UB) wkd: 1514 SV3CYM KM08VG, 1516 SV1OH KM18, 1525 SV1RK KM17VU, 1528 SV1BJL KM18VB, 1530 SV1UG KM17VX, 1535 SV1CDZ KM18MM, 1545 SV1DLW KM17VU, 1547 SV1DNU KM18VB, 1550 ZAN7BHC JN91, 1555 SV1AHB KM17UX, 1556 Z32VB KM01PA, 1600 SV5BYR KM46, 1605 SV0EC KN10CJ, 1607 SV8DTD KM39EA, 1608 SV2BZQ KN10KQ, 1615 SV8QG KM39GC, 1920 OH1AYQ KP12MA, 2011 LY2SA KO14LL, 2015 SP4SKA KO14LC, 2022 SM1FMT JO97FS. I had a very short qso with Albania (ZA/N7BHC), then very late ES with OH at 2200 local time, really not usual!

IW7BVY (JN80OJ) wkd: 2008 SM3BEI JP81.

OE3EMC (JN78JO) wkd: 1525 IT9NAN JM77, 1528 IT9RYJ SM77RN, 1602 IZ8AXJ (FM).

OM5CM (JN98DF) wkd: 1556 9H1CG JM75FW, 1558 9H1ET JM75GU, 1601 IT9NAN JM77NO, 1602 IW9BJU JM77GG, 1605 IT9RYJ JM77MN, 1613 IT9GSV JM77LH, 2033 SM6OPX JO58.

OM5LD (JN98AH) wkd: 1553 9H1CG JM75FW, 1600 9H1ET JM75GU, 1603 IT9GSV JM77LH, 1606 IT9NAN JM77.

ON4KHG (JO10WK) wkd: 1459 9H1CG JM75FW, 1505 IT9RYJ JM77MN hrd, 1506 IZ8BAB JM89 hrd, 1513 9H5IC JM75GV, 1527 IW9BJU JM77GG.

PE1HWO (JO21GV) wkd: 1528 IT9TVF JM68OD, 1538 9H1GB JM75FU, 1539 9H1ET JM75GU.

YU7EW (KN05HP) wkd: 1600 EA5EE IM98RV, 1603 EA6FB JM08PV, 1605 EA6SA JM19KO, 1607 EA7BA IM97CG, 1610 EA6XQ JM19EH, 1621 9H1CG JM75FW, 1627 EB5AVP JM08CQ, 1709 9H1FN JM75FV, 2021 OZ8ZS JO55RT, 2029 GM7JWA IO87, 2104 LA0BY JO59FW, 2107 SM6VKC JO68CG, 2107 SM6VYK JO68EG, 2108 LA6PV JO59KV, 2109 SM6OPX JO58KG, 2110 SM6VQX JO68GH, 2111 SM7DTT JO65LJ, 2111 SM6CEN JO57XO, 2112

SM6SKH JO66IT, 2112 SM6HBI JO57XQ, 2113 SM6WYA JO57XU, 2113 SM7WT JO65QQ, 2114 LA5FA JO59FL, 2114 LA8KV JO59JW, 2114 SM6VYK JO68EG, 2117 LA3BO JO59CD, 2119 LA8WF JO59GV, 2120 GM4JJJ IO86GB, 2136 OZ1BUR JO46MI, 2150 DG0KW JO64MH, 2152 OZ8ZS JO56RT.

2000-05-31

DL8EBW (JO31NF) wkd: 1935 EA5ZF IM99 hrd.

IK0WGF (JN52VC) wkd: 1510 EA1SH IN63IB, 1512 EA5DIT IM99CD, 1517 EB4CJE IN80EC, 1928 G4DOL IO80SO.

IW5DAN (JN53GU) wkd: 1707 GM0PWS IO66UG, 1924 G4STN IO70MG.

IW7BVY (JN80OJ) wkd: 1454 EA1SH IN63, 1506 EA1BLA IN53, 1513 EB1EHO IN73, 1515 EA3ADW JN11.

PE1HWO (JO21GV) wkd: 1507 EA5DGC IM97IT, 1512 EA7IT IM87XI.

YU7EW (KN05HP) wkd: 1626 EA5DWS IM98SR, 1628 EA5AJX IM98KU.

2000-06-06

DJ2QV (JO31PF) wkd: 1912 EA9MH hrd, 1928 EA9IB IM85NG.

IK2YXK (JN45OP) wkd: 1930 CT1ESJ IN60KI, 1934 CT1DIN IN50IM, 1940 CT2GRW IN61.

IW1AZJ (JN35UB) wkd: 1825 CT1ESJ IN60KI, 1827 CT1DRB IM58LO.

IW5DAN (JN53GU) wkd: 1928 CT1FOH IN50, 1931 CT1ESJ IN60.

PA4VHF (JO32EH) wkd: 1925 EA9MH IM85.

PD0RFU (JO32LS) wkd: 1900 EA9MH IM85MG.

2000-06-09

DD0VF (JO61VA) wkd: 1538 EA7GTF IM87CS, 1546 EA7AJ IM87CS, 1610 CN2DX IM63DM 2617km, 1618 EA7DZI IM66VL, 1627 EB7FTF IM67XJ, 1654 CT1DIN IN60IM, 1711 CT1ESJ IN60KI, 1715 CT1DYX IN51PE, 1729 CT1CLR IN50QP, 1732 CT1DMK IN50QP.

DG0DG (JO61SA) wkd: 1613 EA7GTF IM87CS, 1614 CN2DX IM63DM, 1711 CT1ESJ IN60KI, 1722 CT1DIN IN60IM, 1737 CT1FTH IN50, 1739 CT2HSN IN61CC, 1740 CT2HSO IN61CC, 1758 CT1DYX IN51.

DG0OPK/m (JN57-JN59) wkd: 1528 EA4BWN IM89, 1542 EA7GTF IM87, 1556 CN2DX IM66 hrd, 1657 CT1DYX IN60.

DH0GHU (JN38VN) wkd: 1438 CN2DX IM63DM, 1450 EA7GTF IM87CS, 1528 EA7IT IM87XI, 1537 EA7RZ IM86SU, 1606 EA5DIT

IM99CD, 1609 EA5AFP IM98VX, 1622 EA5CHT IM97EK.

DL3NCR (JN48QX) wkd: 1606 EB5BCF IM99TK, 1608 EA7GTF IM87CS, 1610 EA5OM IM99XV, 1610 EA7IT IM87XI, 1614 CN2DX IM63DM, 1618 EA5DIT IM99CD, 1621 EA7CRP IM87FE, 1627 EA5AFP IM98VX, 1704 CT1DIN IN60IM, 1706 CT1DMK IN50QP, 1709 CT1CLR IN50, 1715 CT1EKF IN50SU, 1718 CT1DYX IN51PE, 1728 CT2HSN IN61CC, 1729 CT1AMK IN51QE.

IK2YXK (JN45OP) wkd: 1559 CT1ESJ IN60, 1617 CT1DMK IN50QP, 1626 CT1DYX IN51PE.

IW4DTP (JN54UG) wkd: 1432 EA7GBG IM67, 1443 EA4EHI IM68, 1449 EA4BWB IM89, 1453 EA4CTF IM89, 1459 CT1ELP IM58, 1515 CT1ESJ IN60, 1516 CT4KQ IN60, 1520 CT1AMK IN51, 1526 CT1DMK IN50, 1537 EA1SH IN62, 1550 EA1DDU IN73, 1557 EA1DIH IN51.

IW5DAN (JN53GU) wkd: 1433 EA4EHI IM68, 1525 CT1AMK IN51, 1800 CT1DYX IN51.

IW7BVY (JN80OJ) wkd: 1451 EA1DIH IN51, 1500 EA1BLA IN53, 1523 EA2ADJ IN93, 1526 EA1DDU IN73, 2000 F1DDE IN97.

OE3JPC (JN87EW) wkd: 1522 EA7GBG IM67QI, 1536 EA5DIT IM99CD, 1541 EB4FQP IM68TV, 1546 EA4EHI IM68TV, 1557 EA7GTF IM87CS, 1603 CT1ESJ IN60KI, 1605 CT1ELP IM58KP, 1626 CT1DMK IN50QP, 1634 CT1DYX IN51PE, 1637 EA1CLR IN72QT, 1700 EA1BSK IN52PF, 1710 EA1DIH IN51NW, 1712 EA1DDU IN73FM, 1716 EA1EBJ IN73FL.

OK1VMS/P (JO70GC) wkd: 1555 EA7GTF IM87CS, 1602 CN2DX IM63DM 2587 km, 1603 EA4BWN IM89VI, 1628 EA4CJ IN80DK, 1635 EB4EQP IM68TV, 1637 EA7GBG IM67TI, 1653 CT1DYT IN50, 1703 CT1EKF IN50, 1709 CT1DMK IN50, 1725 CT1DYX IN51QE, 1730 EA1SH IN62CJ, 1733 EA1DM IN73FI, 1735 EA1DIM IN51NW, 1750 EA1YV IN52PG.

OM2IK (JN88SI) wkd: 1601 EA4EHI IM68TV, 1617 CT1ESJ IN60KI, 1635 CT1DYX IN51PE, 1751 EB5ANO IM99BC.

OM3TZZ (JN88SI) wkd: 1525 EA7GBG IM67QI, 1540 EA5DIT IM99CD, 1555 EA4EHI IM68TV, 1557 EA7GTF IM87CS, 1608 CT1ELP IM58KP, 1617 CT1ESJ IN60KI, 1627 EA1CLR IN72KB, 1635 CT1DYX IN51PE, 1642 CT1CLR IN50QP, 1750 EB5ANO IM99BC.

ON4KHG (JO10WK) wkd: 1552 EA6XQ JM19LH, 1617 EB6ADS JM29DV, 1626 EA6SA JM19IR.

PA4VHF (JO32EH) wkd: 1547 EA7GTF IM87, 1602 EA6FB JM08, 1608 EA6SA JM19, 1611 EA6XQ JM19, 1615 EA6NY JM19.

PD0RFU (JO32LS) wkd: 1630 EA6SA JM19IR.

PE1HWO (JO21GV) wkd: 1458 EA7AJ IM87CS, 1502 EA7ERP IM87EE, 1509 EA7DUD IM76SR, 1549 EA6FB JM08PW, 1553 EA6XQ JM19LH, 1614 EA6SA JM19IR, 1712 EA7IT IM87XI.

2000-06-10

IK2YXK (JN45OP) wkd: 1904 MM0BJG IO67HC.

2000-06-11

HA6IGM/p (JN97WV) wkd: 1018 EA3TI JN11DO, 1039 EA2TJ IN92RI.

PA4VHF (JO32EH) wkd: 1110 IW8EAA JN70, 1114 I8MPO JN70.

PD0RFU (JO32LS) wkd: 1100 IK0BZY JN61GW, 1105 9H1CG JM75FW.

PE1HWO (JO21GV) wkd: 1101 I8JIT JN71HN.

2000-06-12

IK2YXK (JN45OP) wkd: 1930 EI5FK IO51RT.

2000-06-13

DK3XM (JO43XL) wkd: 2010 EA2GAZ IN91DV, 2013 EA4BWN IM89VI, 2015 EB4DIZ IM89AT, 2016 EA4AMX IM89AT, 2024 EA4AAQ IN80GL, 2032 EA4CTF IM89AT, 2042 EB4HEB IN80DL.

IK0WGF (JN52VC) wkd: 2009 GW7BXA/P IO71, 2013 EI6AS IO63TH, 2016 M0AEV IO72SV, 2019 M0BKL IO80FK, 2021 GW1MNC IO81DL, 2027 EI5FK IO51RT, 2029 G6YAY IO80EL, 2030 GW8ASA IO81EM, 2030 EI7GL IO51TU, 2033 F9OE IN78QG.

IW5DAN (JN53GU) wkd: 1950 G7RAU IO90, 2004 G4BRK IO91, 2010 EI5FK IO51, 2014 G4DOL IO80, 2022 M0BKL IO80, 2027 G4IGO IO80, 2028 G16ATZ IO74.

2000-06-27

IW5DAN (JN53GU) wkd: 1550 SM0KAK JO89XK, 1714 SV9ANK KN25IN, 1722 IT9QAU JM77MN, 1745 SM4VQP JN69NI, 1808 SV9ANJ KM25NI.

2000-06-28

IW5DAN (JN53GU) wkd: 1512 SV9ANJ KM25NI, 1521 SV1BJL KM18VB, 1531 SV1UG KM17VG, 1532 SV3CYM KM08VG, 1537 SV1CDZ KM18MM, 1539 SV1DNU KM18VB, 1542 SV1BRL KM17UW, 1543 SV1AHB KM17UX, 1552 SV5BYR KM46CG, 2012 OH5LK KP30ON.

Meteor Scatter

Editor: Norbert Götsche, DL8LAQ

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

It happens sometimes that I can't recognize what column of your report includes the number of bursts or pings or the tx/rx report. Please don't forget to give me a short hint. In this column the order is bursts, pings and seconds. And here is again the meaning of the short cuts: c = complete, 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 my email address dl8laq@gmx.de or via PR to DL8LAQ@DB0HB.#HH.DEU.EU.
73, Norbert.

DL8EBW (DL66a / JO31NF) wkd on 144 MHz:

2000-04-10					
2130	2205	G0KZG/MM IO60	26	26	13 10 2 c
2000-04-22					
0400	0435	G0KZG/MM IN68	26	26	8 12 1.5cr*2
1830	1910	G0KZG/MM IN48	27	26	9 5 2.5cr*2
2000-04-23					
0330	0402	G0KZG/MM IN38	26	26	12 15 15 cr*2
2000-04-25					
0315	0346	G0KZG/MM IN19	27	26	8 5 1 cr*2

2000-04-27					
0415	0432	G0KZG/MM IN28	26	26	7 5 1 cr*2
2000-05-12					
0355	0425	LA4XGA JP33VC	27	27	10 17 2 c*1
2000-05-19					
0400	0431	LA4XGA JP33VC	27	27	10 14 1.5c*1
2000-05-26					
0357	0432	LA4XGA JP33VC	27	27	11 15 1 c*1a

Remarks: *1 Regular sked to Geir (1320 km), to test MS-condx. *1a hrd Geir 2.5 min via Aurora-E with 319 all time! *2 There was NO skeds (!) during these trip from Andy due to QRM on board... All infos are welcome via VHFnet or PR (BBS DB0NDK), or phone +202/781170 every sked for MS, also with stations worked before is very welcome! Thanks for report, Guido.

PE1HWO (JO21GV) wkd on 144 MHz:

2000-04-01					
0500	0545	I4XCC JN63GV	26	27	27 18 1 c
2000-04-05					
0525	0555	G0KZG/mm IO58XV	26	26	cr
2000-04-07					
0500	0556	G0KZG/mm IO57	27	26	cr
2000-04-29					
0410	0438	G0KZG/mm IN28	26	27	cr
2000-05-01					
0403	0500	G0KZG/mm IN37	27	27	cr
2000-05-02					
0430	0443	G0KZG/mm IN47TV	47	27	35 cr

Equipment: FT-101ZD + TRV, MGF1302, 4CX250B, 17 ele, 9A4GL soft. Skeds are welcome. PE1HWO @ amat.org. Thanks for report.

Result of the 144 Mhz Activity DX-Contest 1999, Mixed

Place	Call	Mode	Locator	Propagation	QSO	SQR	Total
1	LA0BY	M	JO59,JP50,JP61	TR,ES,MS,AU	385	179	68915
2	DD0VF	M	JO61,JN04,JN24,JN15,JN25	TR,ES,MS,AU	351	189	66339
3	PE1HWO	S	JO21	TR,ES,MS,AU	305	170	51850
4	DL8EBW	M	JO31,IN72,IN82,JO11	TR,ES,MS,AU	281	162	45522
5	DF2ZC	S	JO30	TR,ES,MS,AU	189	154	29106
6	DK0OG	S	JN68	TR,ES,MS	197	133	26201
7	DL2OM	S	JO30	TR,ES	199	121	24079
8	LZ1AG	S	KN22	TR,ES,MS	156	77	12012
9	DL3HRT	S	JO61	TR,ES,MS	94	96	9024

4	DDVT	M	JO01,JO64,JO124,JO135,JO123	TR,ES,MS	234	132	30000
5	DK00G	S	JN68	TR,ES	156	113	17628
6	DL8EBW	M	JO31,IN72,IN82,JO11	TR,ES,MS	83	102	8466
7	DG5DWL	S	JO71	TR,ES,MS	83	88	7304
8	DG3GAG	S	JN48	TR,ES	68	73	4964
9	IW0GPN	S	JN62	TR,ES,MS	64	76	4864
10	EA3CSV	S	JN01	TR,ES	49	55	2695
11	OE3HHB	S	JN87	TR,ES,MS	31	62	1922
12	EB4ERS	S	IN80	TR,ES	25	49	1225
13	DG2LBF	S	JO54	TR,ES	42	12	504
14	DF7RG	M	JN68,JO61	TR,ES	11	30	330

Checklogs:

0	DL1EAP	S	JO31	TR,ES,MS,AU	132	107	14121
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Result of the 144 MHz Activity DX-Contest 1999, CW

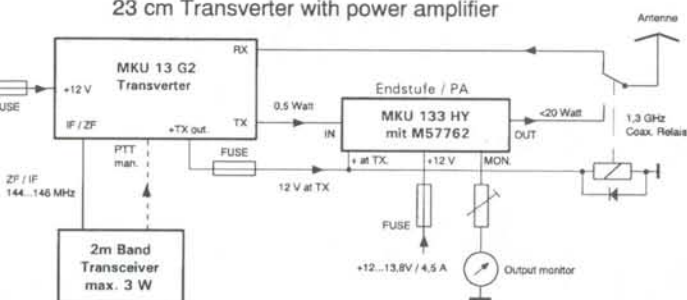
	Place	Call	Mode	Locator	Propagation	QSO	SQR	Total
1	DL8EBW	M	JO31,IN72,IN82,JO11	TR,MS,AU	201	114	22914	
2	DD0VF	M	JO61,JN04,JN24,JN15,JN25	TR,ES,MS,AU	145	134	19430	
3	DK0OG	S	JN68	TR,MS	45	60	2700	

Checklogs:

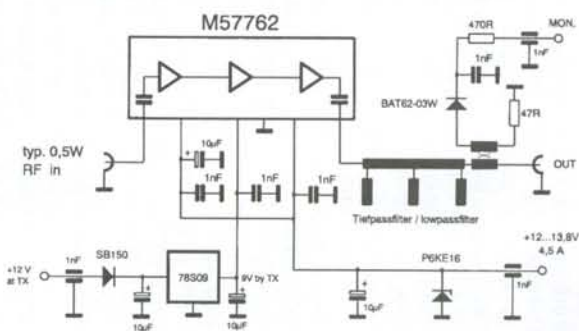
0	DL1EAP	S	JO31	TR,ES,MS,AU	137	121	16577
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TR= Tropo, ES= E-Sporadic, MS= Meteorscatter, AU= Aurora, S= Result from single Locator worked, M= Result from multi Locator worked

23 cm Transverter mit Endstufe
23 cm Transverter with power amplifier



23 cm Endstufe mit M57762 Modul MKU 133 HY
23 cm power amplifier with M57762 MKU 133 HY



INFOS around the VHF-DX-Contest 1999

Thank you very much agn for the activity in this 99-Contest! From following countries we received logs: CT,DL,EA,EA6,I,LA,LZ, OE and OZ. 31 different Logs was send in. So i will hope to get more in 2000, the "Millenium VHF-Contest". Perhabs from more indifferent countries and stations from this year. Any comments,ask and remarks are very welcome, please send it to Wolfgang Knobus, Am Pandyc 27, D-47443 Moers (AX.25 DL1EAP@DB0QS or email DL1EAP@4X4FU.AMPR.ORG).

REMARKS: LOG's send in for 2000 via EMAIL please only in text-format!

73 VHF-DX-Group-DL-West c/o DL1EAP Wolf

SOAP-BOX Active Amateurs comment above the VHF-DX-Contest 99:

DL8EBW Again less time for the hobby, but still mostly there when something was happening ! Had a very great time our May-Ms-

Tour to EA. (trn agn this way to EA2LU, EA1EPM, EA1ABZ a.s.o.) Due to change of job i believe in first part of 2000 i will be a bit more quiter.... but always try to be active when real things are happening. Good luck for all participants and enjoy the year 2000. Thanks again for doing the proper contest work for our group to DL1EAP (2m) and DF2ZC (70cm). 73, Guy.

No other detailed comments for the contest.

Specially thanks to the Funktelegramm (FT by DL8HCZ) to sponsor and spread the VHF-DX Contest 1999. The awards for the place 1-3 in each section will be send soon to all.

The first logs with EA6VQ-LOG with automatically evaluation was send in direct and via email. So it will be one way to have only a few paperwork. So my best wishes for new year 2000 and see you on the 2m or 6m band! Pse look for my new Adress, changed at 19.12.1998. Some Log's send to my old Adress and i get them 3-4 week later. 73, Wolfgang.

News & Comments

Editor: Klaus Tiedemann, DL4EBY

News

13. VHF-UHF-SHF-Tagung in München

Jedes zweite Jahr im März findet in München eine UKW-Vortragstagung statt, auf der die neuen Entwicklungen im UKW-Amateurfunk vorgestellt werden. Ausrichter ist der Distrikt Bayern-Süd, welcher die Veranstaltung wieder in entsprechendem Rahmen (QTH: Fachhochschule) durchgeführt hat, und neben den Vorträgen auch Messplätze und einen Flohmarkt sowie eine preisgünstige Verpflegung organisierte.

Im ersten Vortrag der Tagung referierte OM Konrad Hupfer (DJ1EE) über Anpass-Schaltungen von FET-Leistungsverstärkern im VHF-/UHF-Bereich. Im zweiten Vortrag stellte OM Wolfgang Schneider (DJ8ES) seinen 2m-QRP- Allmode-Transceiver vor, welcher besonders als Nachsetzter für GHZ-Transverter entwickelt wurde. Basis des Transceivers ist ein DDS- (Direct Digital Synthesizer) Oszillator. Der Transceiver wurde und wird derzeit als Nachbau- objekt in einigen AFU-Zeitschriften beschrieben.

Im weiteren Verlauf stellte OM Michael Kuhne (DB6NT) seinen überarbeiteten und verbesserten 1,3GHz-Transverter vor. Die Verbesserungen gegenüber seinem Konzept von 1991 bestehen besonders in der Verwendung neuer, modernerer Halbleiterbauelemente, wobei die Nachbausicherheit weiter erhöht werden konnte. Durch Einsatz eines HEMT-FET in der Eingangsstufe wurde die Empfindlichkeit von 2dB auf 0,6dB erhöht und macht einen extra-Vorverstärker praktisch unnötig,

falls der Transverter in "Antennennähe" montiert wird. Mit 1,5-Watt Ausgangsleistung können die üblichen Modul-PAs ausreichend gut angesteuert werden. Der Transverter wird auch als Bausatz angeboten und kann von OMs mit Erfahrung im Umgang mit SMD-Bauteilen problemlos aufgebaut werden. Einziges notwendiges Messmittel ist ein Vielfachmeßgerät.

Eine interessante Neuerung für 13-/23cm-Operator stellte OM Karl Weiner (DJ9HO) vor. Seinen (in GHz-Kreisen recht bekannten) Duoband-Erreger für Parabolspiegel hat er weiterentwickelt und um einen Saugkreis am 23cm- Erreger ergänzt. Damit wurde die Übersprechdämpfung vom 13cm ins 23cm-Band von 16dB auf bis zu 35dB angehoben.

Damit können nun die 13- und die 23cm-Station gleichzeitig am Duoband-Erreger betrieben werden, ohne dass die Gefahr der gegenseitigen Zerstörung der Eingangsstufen besteht (vorausgesetzt, es wird nicht mit extremer Leistung gearbeitet). DJ9HO stellte in seinem Vortrag sehr anschaulich die Physik von Ganzwellenschleifen dar. Recht ausführlich werden diese Vorgänge in den bekannten "UHF-Unterlagen" beschrieben.

Eine weitere Neuerung gab es im Vortrag von Christian Huber (DL2MFB), denn nun ist es da: Das HANDY für 10GHZ!!! Wer es nicht glaubt, das vom DL2MFB vorgestellte Handy hat wirklich nur eine Grösse von 110x55x30mm und arbeitet auf 10,2 GHz mit 10mW in FM. Das Grundkonzept besteht in der Verwendung eines Durchblasemischers

(Gunnplexer) und als Antennen können wahlweise geschlitze Hohlleiter-Rundstrahler, Horn-Antennen oder Rundstrahler aus Semi-Rigid-Kabel verwendet werden. Die Reichweite des Handys mit der derzeitigen Leistung beträgt mehrere 10km bei freier Sicht und einige hundert Meter bei Reflexion an Bauwerken und Metallflächen im bebauten Gelände.

Interessant dürfte der Einsatz dieser kleinen Funkgeräte auch für die Datenübertragung in der Betriebsart Packet-Radio sein.

Das Problem der Sende-/ Empfangsumschaltung von grösseren (Röhren-)Endstufen behandelte OM Günter Köllner (DL4MEA). Er stellte die Gefahren einer einfachen Vox-Steuerung für den Vorverstärker dar und beschrieb den Einsatz eines Sequenzers und die notwendigen Änderungen am Transceiver.

Soweit ein Bericht von DH0LS, der leider nicht alle Vorträge besuchen konnte, es gab noch weitere Interessante Beiträge, so z.B. über Patch-Antennen im Mikrowellenbereich und einem 13cm-Satelliten-Modul für den FT736. Das Tagungsheft ist erhältlich über den DARC-Distrikt Bayern-Süd. (tnx DH0LS)

13. VHF-UHF-SHF-Convention Munich

Every second year in March, the Munich VHF-UHF-SHF Convention takes place, which shows innovations on these bands. In the high school talks were organized as well as measurement sites, a flea market, together with an affordable lunch.

The first talk (DJ1EE) was about VHF/UHF matching networks for FET power amplifiers. Then, DJ8ES presented his 2m QRP transceiver, especially useful as exciter for SHF bands, which uses a DDS. The description can be found in various amateur radio magazines.

DB6NT presented his improved 1.3 GHz transverter. The difference to his 1991 version mainly uses up-to-date semiconductors, which adds to the ease of reproduction. The use of a HEMT-FET in the RX input section

results in a sensitivity of 0.6dB instead of 2dB. This calls for mounting the transverter close to the antenna. The module delivers 1.5 Watt and is available as kit. Only needed measurement equipment is a multimeter.

An interesting innovation for 13/23cm operator was presented by DJ9HO. His duoband feed for parabolic dishes was improved and a notch stub added at the 23cm feed. This lowers the cross coupling from -16dB to -35dB. This enables to operate both bands simultaneously at the feed without destroying the other input. Karl explained the physics of wavelength-long loops [sri for bad translation, ed.].

Another innovation was described by DL2MFB, the 10GHz Handy!! Those of you, who don't believe it, the size is only 110x55x30mm and it works on 10.2 GHz with 10mW FM. It uses a gunnplexer, antennas may be omnidirectional slot wave guides, horns, or semi rigid verticals. The handy is usable for several 10km (free sight) or some 100m with reflections at buildings and metal planes. They might also be useful for packet radio links.

The problem of high power RX-TX switching was discussed by DL4MEA. He pointed out the danger for the PreAmp of vox driven systems, and provided a sequencer and tips for needed changes on the transceiver.

There were more talks on other topics, like patch antennas, a 13cm satellite module for the FT736, but DH0LS could not attend all of them. Proceedings are available via "DARC-Distrikt Bayern-Sued". (tnx DH0LS)

Comments, Dates

LA0BY schreibt: LA0BY aktiviert möglicherweise von JP82 oder JP30 vom 11.-13. August 2000. Die Frequenz wird 144.155 MHz sein, wie ueblich. Skeds ueber das VHF-Net sind moeglich, jedoch wird random bevorzugt (SSB im Schauermaximum).

LA0BY/p may activate JP82 or JP30 from 11.-13. August 2000. The operating frequency will be 144,155 MHz as usual for MS. Some skeds may be arranged through the VHF-net from the site, but operation will be mostly random (SSB during the shower maximum).

The latest info on all activities will be available at <http://www.qsl.net/la0by/dxped.htm> (tnx Stefan)

HB9AFO writes: After some months of inactivity due to health and qrl problems, I'm back 'at work' with a lot of tests on 10&24 GHz ATV.

We are preparing a new mediterranean ATV microwaves expedition for the beginning of july. All the news on my new personal web site: <http://www.von-info.ch/hb9afo>

Michael, HB9AFO ist nach Krankheit wieder aktiv, und plant einige 10GHz und 24GHz ATV Tests. Eine neue Mikrowellen-Expedition ins Mittelmeer steht fuer Anfang July auf dem Plan. Weiteres auf seiner Web-Seite (s.o.).

Weinheim:

The Weinheim VHF Convention takes place September 9th and 10th 2000 in Mannheim ("Maimarkthalle"). Our new contact person for talks is Dipl.-Ing. Gerhard Ries, DJ3UY, dj3uy@t-online.de.

Die Weinheimer UKW-Tagung findet dieses Jahr am 9./10. September 2000 in der Mannheimer Maimarkthalle (am Autobahnkreuz A6

/ A656) statt. For more info, weitere Informationen: <http://www.ukw-tagung.de>. Unser neuer Referentenbetreuer ist Dipl.-Ing. Gerhard Ries, DJ3UY, dj3uy@t-online.de

Selbstbauwettbewerb:

Einsendeschluss für den Selbstbaukontest des OV Weinheim ist der 1. September (jeden Jahres) - siehe Heft 3/1999. Die Einsendungen gehen an der OV Weinheim.

Please remember to send in your supplements for the "Weinheim home made equipment contest"! Deadline is September 1st (each year). Contact the Weinheim hams for more details.

You are invited to submit your reports and articles via EMail / disk / FAX / letter...

- EMail (Internet): tklaus@snafu.de, FAX: +49-30-795 98 14, Thanks, Klaus.

DUBUS Toplist

Editor: Norbert Goettsche, DL8LAQ

DUBUS 50 MHz Top List

NR	CALL	WW	WK	DC	TR	AU	MS	ES	F2
1	ON4KST	JO20	784	155	801	1415	1509	7920	16498
2	DL7QY	JN59	764	138	741	1665	2186	9027	16353
3	PA0RDY	JO22	753	0	725	1617	1597	****	16320
4	ON4PS	JO20	640	125	752	1740	1902	6520	16358
5	G4IGO	IO80	627	0	578	1308	2528	7301	16188
6	G4UPS	IO80	603	0	0	0	0	0	0
7	ON4GG	JO20	595	0	741	1757	1695	7243	16547
8	ON4ANT	JO20	576	0	710	1757	1695	7243	16547
9	SV1DH	KM17	568	173	0	0	0	0	0
10	PA2TAB	JO32	559	132	762	1370	1809	5797	15339
11	G6HKM	JO01	552	0	347	1883	780	5674	16112
12	DL8HCZ	JO53	550	115	365	1250	1356	3350	0
13	IZ5EME	JN52	530	114	583	0	1712	5216	15152
14	SP6GZZ	JO81	529	0	515	1394	1826	8103	14443
15	F8OP	JN26	523	0	631	1023	1369	5508	13547
16	OK1DDO	JO60	512	96	620	1423	1340	6100	13300
17	I4XCC	JN63	511	0	707	0	1427	3349	18627
18	DL3AMA	JO51	504	97	519	1431	1600	4001	12180
19	GW4LXO	IO81	500	0	300	650	1200	7500	10000
20	SP4MPB	KO03	451	0	520	1836	1507	8290	0
21	SP6GWB/P	JO80	444	86	696	1734	1880	7908	10594
22	DL4ALI	JO50	431	87	464	628	1850	3969	12195
23	DL6NCI	JO50	427	106	514	1294	505	7815	14239
24	F1GTU	JN05	418	0	699	815	1421	3268	16400
25	DL9GU	JN49	402	0	721	450	0	8500	15625
26	OK1IBL	JO60	377	77	530	1320	1717	6941	11816
27	PA3FYM	JO22	375	0	1238	2019	0	****	16373
28	HB9SJV	JN26	374	90	526	768	1474	5784	14658
29	OK1FAV	JO60	374	83	0	579	1093	6250	10366
30	ES1CW	KO29	372	71	530	1968	2116	5253	9263
31	OK1VBN	JN78	370	60	455	0	897	5793	0
32	SP2IQW	JO94	367	68	631	1537	1470	4034	10964
33	DL6BF	JO32	365	71	1193	1326	0	4955	11582
34	OK1FFD	JO60	364	81	580	1231	1067	6250	13300
35	SP6MLK/P	JO80	351	63	437	1295	1322	8557	27874
36	HB9AOF	JN36	350	82	500	0	0	5400	10663
37	DF7RG	JN68	345	80	652	1576	824	4864	14802
38	F5DE	JN05	341	82	860	0	1368	3638	12539
39	SM3BIU	JP73	336	77	907	1704	1982	4414	0
40	YL3AG	KO26	336	63	691	1817	0	8115	12106
41	OK1MAC	JN79	336	0	0	0	0	0	0
42	PE1HWO	JO21	333	71	835	1092	1610	5935	11443
43	F5PAU	IN88	333	78	0	0	0	0	0
44	PE1OGF	JO21	332	76	0	0	0	0	0
45	SM7JUQ	JO65	331	84	372	1349	1062	3900	14070
46	YO2IS	KN05	325	0	270	1155	1404	6942	14292
47	DL7ARM	JO62	315	0	909	1189	1245	8324	15817
48	ES2RJ	KO29	313	59	345	1726	2052	4642	0

49	F8CS	JN27	313	68	336	0	0	7454	9753
50	ES6QB	KO37	310	74	450	625	0	5145	13410
51	DL1SUZ	JO53	301	66	546	1434	865	5921	10544
52	DL2DR	JO31	299	34	1003	0	0	4769	12047
53	OZ7IS	JO65	296	81	410	1294	850	3100	0
54	DJ6XV	JO31	286	55	401	0	1130	4805	10165
55	OK2ZW	JN89	286	85	0	0	0	0	15580
56	LZ1AG	KN22	281	74	375	0	0	3782	10628
57	HB9STY	JN36	280	65	367	0	1431	4448	7810
58	F1FIH	JN23	273	98	796	0	1637	2492	15613
59	IK5OIY	JN52	262	0	332	0	1444	2826	8305
60	DL3YEE	JO42	261	0	540	1056	1300	2700	13053
61	ES1AJ	KO29	261	51	415	1710	1850	3340	0
62	OK1UDX	JN79	260	50	440	1054	0	3513	7505
63	ES1II	KO29	259	52	335	1569	0	3325	0
64	OK1VQ	JO60	259	46	245	539	0	2002	2755
65	PA4VHF	JO32	257	58	559	902	755	4832	11534
66	ES2WX	KO29	257	53	336	1063	1847	4651	0
67	ON5SE	JN29	257	78	0	0	0	0	0
68	I3ZVN	JN55	254	65	532	0	0	5742	8422
69	ES2NA	KO29	252	52	415	352	1843	3340	9276
70	SP2JXN	JO94	249	55	0	0	0	0	0
71	OE3OKS	JN87	243	45	467	0	0	7985	0
72	DL7YS	JO62	240	60	342	461	1086	3547	8767
73	DL7HG	JO63	240	53	0	0	0	0	0
74	ES5DE	KO38	239	56	228	606	0	5299	8249
75	DL5BBL	JO42	237	0	414	1008	0	3975	5863
76	ES1MW	KO29	232	52	315	650	0	2855	0
77	IW2DVK	JN45	230	51	534	0	1649	7332	9837
78	CT1BGE	IM58	215	1	0	0	0	0	0
79	LY2SA	KO14	213	0	374	726	904	3877	2491
80	SP5HEJ	KO02	206	0	568	0	1838	4699	0
81	ES5MC	KO38	205	58	432	1786	0	5143	13142
82	YU1VP	JN94	201	50	1766	0	1450	3666	1650
83	OK2PPP	JN99	201	40	0	0	0	3200	0
84	OK1DKS	JO70	198	42	934	0	0	1973	8514
85	HB9Q	JN47	197	60	0	0	0	0	0
86	ES4NG	KO39	191	47	412	725	0	3105	0
87	PA2CHR	JO22	187	72	1334	909	0	5215	13966
88	DL8EBW	JO31	186	50	247	1050	1150	5800	0
89	ES5RY	KO38	177	36	317	0	0	3640	0
90	CT1DIN	IN60	174	37	1581	0	0	3169	0
91	SP6AZT	JO81	169	0	612	0	1168	4327	0
92	HB9RUZ	JN47	168	54	406	0	960	3585	0
93	DJ2XS	JO53	164	0	440	419	0	4155	0
94	DL8GAP	JN48	159	50	365	0	0	3070	11343
95	G7LRQ	IO91	154	41	0	0	0	3574	0
96	OH2BNH	KP20	147	37	391	948	0	3246	0
97	DL5GAC	JN47	147	0	129	690	0	5100	11900
98	DF1EQ	JO31	138	0	279	0	0	2769	0
99	OK2XTE	JN79	138	42	162	0	0	2419	0

100DL5IO	JN49	134	0	113	340	900	3100	12995	33	OK2VMD	JN89	428	58	1662	1765	2031	3605
101ES1RF	KO29	129	32	340	650	0	2800	0	34	RX1AS	KN59	427	0	1709	1905	2271	2547
102DL5UH	JN48	129	35	103	0	0	5943	0	35	F8OP	JN26	425	0	1228	1196	2028	2720
103F1JKY	JN25	128	35	688	0	815	2043	7197	36	YU7MS	KN05	419	62	1319	1856	2160	2438
104DK2BJ	JO30	127	43	275	0	0	1799	0	37	PA4VHF	JO32	416	0	1536	1337	2085	2086
105ES3RM	KO28	127	31	210	692	0	3111	0	38	ES2WX	KO29	415	40	1370	1950	2270	2071
106DG3HS	JO53	117	39	422	0	0	3070	0	39	YO2IS	KN05	407	0	1360	1916	2130	2556
107ESSQA	KO38	115	28	0	0	0	2852	0	40	OK1FM	JN69	403	56	1843	1438	2200	2150
108CT1DDW	IN60	110	50	2100	0	0	4699	0	41	ON4ANT	JO20	399	0	1420	1965	2124	2725
109CT1FAK	IN50	108	1	0	0	0	5395	0	42	IW1AZJ	JN35	399	60	1115	1188	2151	2780
110I2FUM/2	JN45	107	0	137	0	0	2023	0	43	DL7AKA	JO62	396	0	1747	1916	2065	3620
111S53J	JN75	105	33	0	0	0	0	0	44	DH3YAK	JO31	395	57	1424	1162	2038	2650
112IN3TWX	JN56	95	0	396	0	0	1890	8100	45	OK1MAC	JN79	392	0	1536	1681	2005	2511
113PA0JUS	JO22	87	0	325	1706	0	9650	0	46	ES6RQ	KO37	391	37	1500	1840	2172	1725
114DJ6MB	JO30	64	0	0	661	0	5968	0	47	OK1JKT/P	JO60	389	52	1701	1764	2121	2269
115DJ8ES	JO43	58	20	1306	0	0	2100	0	48	F8CS	JN27	387	54	1161	1468	2124	3231
116S51WI	JN75	53	12	0	0	0	2486	0	49	UA3MBJ	KO88	374	0	1560	2006	2573	2392
117OK2QI	JO80	51	0	0	0	0	2149	0	50	HB9CRQ	JN47	374	64	1404	1288	2060	2959
118LA8AK	JO28	37	0	250	607	1145	1189	0	51	DL1SUN	JO53	367	0	1824	1724	1845	2333
119ON4LCV	JN29	9	9	267	0	0	1211	0	52	DL1KDA	JO30	366	59	1388	1924	2101	2339
120HB9MIO/P	JN37	8	0	805	0	0	0	0	53	I4YNO	JN54	366	63	1374	1374	2122	2276
121OK1HRR	JO70	1	1	0	0	0	1277	0	54	SM7JUQ	JO65	365	41	1902	1646	1921	2332

DUBUS 144 MHz Top List

NR	CALL	WW	WKDC	TR	AU	MS	ES
1	DK1KO	JO53	669	0	2124	2057	2210 3285
2	DK3WG	JO72	660	1	2243	2034	2295 2782
3	PA3BIY	JO22	618	64	1550	2026	2205 3143
4	DF8LC	JO53	600	70	2105	2045	2226 3291
5	DL8EBW	JO31	570	63	1454	1918	2112 2214
6	DL8HCZ	JO53	561	0	1615	1976	2096 3527
7	PA0RDY	JO22	561	0	1582	1979	2272 2819
8	PA3FOC	JO21	522	59	1373	2010	2209 2326
9	OH5LK	KP30	521	0	1962	2041	2235 2891
10	SP6GZZ	JO81	520	0	1670	1794	2017 2717
11	DK6AS	JO52	516	0	1460	1885	2510 2260
12	I2FAK	JN45	512	0	1797	1508	2405 2995
13	HA1YA	JN87	511	72	1548	1876	2183 2885
14	SP9EWU	JO90	509	62	1710	1927	2154 2531
15	OE3JPC	JN88	504	0	1584	1821	2128 2769
16	DJ7OF	JO51	489	63	1512	1518	2152 2156
17	I4XCC	JN63	486	0	1177	1803	2275 3257
18	DL5DTA	JO61	481	58	1344	1578	2045 2057
19	LY2WR	KO24	480	57	2051	2075	2347 3007
20	OZ1DOQ	JO65	467	58	1885	1940	1981 2888
21	DL8LAQ	JO43	461	0	1376	1806	1934 3302
22	ON4GG	JO20	459	0	1420	1965	2150 2124
23	IZ5EME	JN52	455	65	1590	0	2040 2893
24	DK0OG	JN68	453	0	1708	1722	2172 3320
25	PA2CHR	JO22	453	0	1432	1683	2240 3201
26	OH7PI	KP32	451	0	1902	1926	2151 2489
27	YU7EW	KN05	451	67	1404	1755	2179 2430
28	DD0VF	JO61	445	61	1736	1275	2017 2328
29	OK2ZW	JN89	445	56	1417	1775	2113 2471
30	SP4MPB	KO03	440	0	1886	1764	2038 2697
31	DL3AMA	JO51	439	56	1785	1803	1925 2083
32	DL7FF	JO62	430	0	1516	1379	2057 2312
33	OK2VMD	JN89	428	58	1662	1765	2031 3605
34	RX1AS	KN59	427	0	1709	1905	2271 2547
35	F8OP	JN26	425	0	1228	1196	2028 2720
36	YU7MS	KN05	419	62	1319	1856	2160 2438
37	PA4VHF	JO32	416	0	1536	1337	2085 2086
38	ES2WX	KO29	415	40	1370	1950	2270 2071
39	YO2IS	KN05	407	0	1360	1916	2130 2556
40	OK1FM	JN69	403	56	1843	1438	2200 2150
41	ON4ANT	JO20	399	0	1420	1965	2124 2725
42	IW1AZJ	JN35	399	60	1115	1188	2151 2780
43	DL7AKA	JO62	396	0	1747	1916	2065 3620
44	DH3YAK	JO31	395	57	1424	1162	2038 2650
45	OK1MAC	JN79	392	0	1536	1681	2005 2511
46	ES6RQ	KO37	391	37	1500	1840	2172 1725
47	OK1JKT/P	JO60	389	52	1701	1764	2121 2269
48	F8CS	JN27	387	54	1161	1468	2124 3231
49	UA3MBJ	KO88	374	0	1560	2006	2573 2392
50	HB9CRQ	JN47	374	64	1404	1288	2060 2959
51	DL1SUN	JO53	367	0	1824	1724	1845 2333
52	DL1KDA	JO30	366	59	1388	1924	2101 2339
53	I4YNO	JN54	366	63	1374	1374	2122 2276
54	SM7JUQ	JO65	365	41	1902	1646	1921 2332
55	DL6BF	JO32	363	50	1542	1932	1814 2332
56	ES2RJ	KO29	358	40	1190	1861	2000 2127
57	YL3AG	KO26	356	33	1552	1912	0 2448
58	OE3OKS	JN87	356	59	1441	1273	1867 2788
59	S50C	JN76	355	61	1463	1530	2233 3356
60	DL7YS	JO62	353	53	1512	1528	1826 2136
61	SM3BIU	JP73	353	32	1460	1844	2260 2242
62	YU1WP	JN94	346	53	1422	1850	2236 2825
63	IK1PAG	JN35	346	0	1186	0	2254 2725
64	PA2DWH	JO22	345	59	1230	1950	2150 2250
65	OH2BNH	KP20	344	37	1334	1787	2003 2003
66	UR5BAE	KN29	341	52	1994	1924	1866 2492
67	UT1PA	KO21	340	0	1901	1934	1806 2425
68	YU7VA	KN05	340	60	1316	1399	1954 2446
69	YU7EF	KN05	340	58	1135	987	2248 2440
70	PE1OGF	JO21	338	58	1391	1602	1959 2259
71	G3LQR	JO02	337	0	1776	2031	0 2406
72	SP6AZT	JO81	335	0	2080	1463	1710 2566
73	OK1DKS	JO70	334	56	1230	1308	0 3530
74	F6DKW	JN18	331	52	1519	1602	2051 2755
75	DJ1LP	JO64	331	46	1347	1071	2058 2301
76	DL5GAC	JN47	330	0	1264	1876	2135 3079
77	DK1KR	JO53	324	0	1481	2103	0 2026
78	DB6BX	JO32	321	55	1534	1541	1921 2126
79	ON4KHG	JO10	321	50	1185	1592	2094 2312
80	OK1MG	JO70	319	49	1526	1590	0 2632
81	F1FIH	JN23	317	52	1305	999	1829 2934
82	F5HRY	JN18	309	54	1276	1695	2038 2758
83	ES2XM	KO29	308	37	1389	2198	0 2222
84	OE6IWG	JN77	308	54	1221	1110	2220 2126
85	SP3MFI	JO91	307	0	1697	1632	1802 2617
86	PA2TAB	JO32	304	53	1302	1239	2103 2183
87	G4YTL	IO91	303	0	1450	1774	2143 2172

88	ES4EQ	KO39	302	39	1541	1840	2240	2245	143	F1GTU	JN05	225	0	1650	967	1934	2400
89	SP6GWB/P	JO80	301	47	1780	1581	1875	2437	144	DG3XA	JO43	224	42	1371	1061	1839	2331
90	OK1FFD	JO60	301	54	1388	1720	1991	2154	145	OK1VBN	JN78	223	45	1578	1682	1915	2209
91	I1JTQ	JN35	301	0	1106	1269	1825	2742	146	ES5EJ	KO38	218	30	1422	1804	0	2070
92	OK1AXH	JO70	300	0	2142	1486	1366	1768	147	ES0IW	KO19	216	32	1545	1687	0	1861
93	ON4KST	JO20	299	54	1435	1612	1940	2383	148	PA5DD	JO22	216	41	1302	1491	1982	2244
94	PA0WWM	JO22	296	49	1303	1839	1997	2247	149	9A4EW	JN95	216	0	1075	0	1956	2293
95	SM5BSZ	JO89	293	0	1764	1824	1938	0	150	DL5BBL	JO42	215	0	1416	1290	0	2028
96	OK1DFC/P	JO60	292	51	1775	2099	2024	2016	151	DC6DY	JO31	212	0	1416	1045	1914	2292
97	SP2JXN	JO94	289	41	1650	1690	0	2634	152	OK1DDO	JO60	211	46	1329	1500	1720	2418
98	IN3TWX	JN56	283	0	1100	0	1609	1750	153	UR7GN	KN66	208	0	1830	0	2010	1940
99	ES3GZ	KO28	281	35	1495	1720	2134	2101	154	ES0NW	KO19	207	30	1060	1720	1797	1965
100	LA8AK	JO38	280	0	1496	1804	1804	2413	155	OK1SC	JO70	204	0	1490	1673	0	1729
101	ES5WE	KO38	278	32	1406	1695	1934	2530	156	IK1LGV	JN44	204	0	1466	0	1613	1890
102	DF1IAZ	JN49	278	56	1038	1143	2069	1873	157	RW3PF	KO93	203	30	1031	1840	2134	2191
103	ON4PS	JO20	276	47	1449	1435	1822	2259	158	YU7ON	KN04	203	37	914	0	1897	2273
104	G4IGO	IO80	274	0	2761	1917	1903	2833	159	SP5HEJ	KO02	201	0	1830	1705	1312	2313
105	DL1BKK	JO43	273	0	1513	928	0	2712	160	UY5HF	KN66	201	0	1750	0	1820	2032
106	DK2BJ	JO30	272	46	1476	1924	0	2205	161	ES8RO	KO28	199	27	1802	1800	0	1780
107	HB9DFG	JN37	272	50	1367	1299	1921	2302	162	DL2DR	JO31	199	39	1158	980	0	2057
108	PE1HWO	JO21	272	54	1315	1374	2184	2257	163	DL8AAV	JO52	198	44	1236	1127	0	2144
109	RZ6BU	KN84	272	0	1172	960	2017	2953	164	IT9VDQ	JM68	197	45	1676	0	2169	2491
110	UA4NM	LO48	270	0	1215	1850	2510	2290	165	DL9BDM	JO33	197	0	1538	1248	1659	2321
111	G6HKM	JO01	269	0	1304	1555	1660	2269	166	G6RAF	IO92	197	0	1507	1722	2078	2400
112	OK1IBL	JO60	266	50	1438	1462	2003	3398	167	DF9QX	JO42	197	0	1446	1070	1455	3320
113	IK5OIY	JN52	265	0	1048	0	2095	2253	168	ES0SM	KO08	196	31	1578	1767	1991	0
114	OZ1IPU	JO57	262	40	1387	1187	1566	2452	169	DK2DB	JN48	195	0	1239	1136	0	3106
115	GW4LXO	IO81	261	0	2750	1550	2000	2220	170	F1HDF/P	JN18	194	0	1452	0	0	2425
116	DH8GV	JO33	261	42	1565	1018	1102	2450	171	ES1OX	KO29	194	18	1016	1449	1158	2121
117	RK2FWA	KO04	261	0	912	1759	2125	2010	172	OE5VRL/5	JN78	192	0	1665	1573	1990	2157
118	LY2SA	KO14	260	42	1569	1742	2163	2088	173	PA0JUS	JO22	192	38	1409	1050	0	2167
119	OK1HAG	JN79	260	0	1441	1749	1909	3463	174	ES7RDR	KO27	189	31	1200	1750	1000	2101
120	F6CKZ	JN09	258	0	1552	1330	1721	3408	175	ES0HD	KO18	187	23	1550	1918	0	0
121	DL1SUZ	JO53	257	45	1238	1661	1811	2006	176	UA3MHJ	KO87	186	0	1227	1943	2405	1948
122	DK8EL	JO31	256	0	1199	1051	1870	1996	177	DH0GHU	JN38	186	41	1170	0	2117	1937
123	LA1AG	KN22	256	42	915	0	1779	2503	178	HB9MIO/P	JN37	185	0	1316	975	0	2183
124	OM7AQ	JN98	253	49	1484	1294	1907	2483	179	S59AM	JN65	184	0	1377	0	1945	1788
125	ES1RF	KO29	252	30	1184	1820	1978	2084	180	DG3HS	JO53	184	35	1152	1091	0	2306
126	GM4JJJ	IO86	251	41	3253	1804	1868	2554	181	ES5RY	KO38	183	32	1198	1695	2002	1409
127	DH9NBB	JN49	249	54	1363	1228	1846	2039	182	UA3T	LO16	183	0	1163	1941	2145	0
128	YU1VG	JN94	248	47	1407	826	1727	2294	183	HB9RUZ	JN47	183	48	1060	1050	0	3014
129	DG1BA	JO43	245	0	1674	1280	1588	2239	184	YU7KB	JN94	183	42	853	0	1874	2256
130	DG1VL	JO61	245	44	1373	1223	1817	2325	185	OK1IAS	JO60	182	34	1392	1444	0	2138
131	OK1PG	JO70	243	50	1773	1243	0	3488	186	YZ7MON	JN95	180	37	1004	0	1837	2279
132	LA1ZX	KN32	243	0	1162	0	1945	2729	187	DL3YEE	JO42	178	0	1574	1450	1480	2106
133	F5PAU	IN88	241	46	1630	0	0	2425	188	DK5WO	JO30	177	35	1474	1219	0	1993
134	DK1VI	JN49	241	0	1148	1107	1604	3131	189	DK9RL	JN69	177	0	1311	1513	1286	3316
135	OK2QI	JO80	238	50	1475	1686	1380	2050	190	SP2IQW	JO94	174	28	1611	1611	997	1877
136	OK1KEI	JO70	235	0	1861	1259	983	2067	191	HB9AOF	JN36	173	45	1201	670	1675	2166
137	UT7GA	KN66	234	0	1877	1446	2131	2617	192	OK1VEI	JO70	170	0	1677	1197	1398	0
138	OK2PNN	JN89	234	0	149	1216	0	3771	193	ES1AO	KO29	169	25	1162	1176	1792	2136
139	PA0ZM	JO32	227	42	1028	1771	2061	2246	194	OK1KRY	JN69	166	40	1437	977	0	1830
140	G3XDY	JO02	226	38	1355	2049	1835	2124	195	ON4ZN	JO21	163	32	1390	980	0	2149
141	F5DE	JN05	225	40	1891	1671	1892	2399	196	ES1JL	KO29	163	17	1379	1596	0	0
142	OK1VMS	JO70	225	44	1692	1232	0	2225	197	DL0UL/P	JN48	163	0	1026	0	1342	2019

198	DG0CAL	JO52	161	0	1160	0	1543	2105	253	F6OBT/P	JN19	73	11	0	0	0	0
199	UA4AQL	LO20	161	0	1124	1841	2158	2195	254	YU1AAV	KN04	71	21	828	0	0	2031
200	ES1AW	KO29	158	25	1230	1680	0	1924	255	OK1HRR	JO70	66	16	762	0	0	1890
201	SP9FG	JN99	156	30	1647	1283	0	1698	256	CT1BGE	IM58	65	0	0	0	0	0
202	OK1CA	JO70	156	0	1540	1065	950	2096	257	G7LRQ	IO91	60	16	1088	0	0	0
203	HA8MV	KN06	156	34	895	1384	1736	2080	258	SP6MLK/P	JO80	58	16	853	756	0	1446
204	ES0BI	KO18	154	21	1439	1823	1528	0	259	DG7SFL	JN49	57	11	759	0	0	1750
205	DJ6XV	JO31	152	34	1337	992	0	2007	260	ES3BM	KO29	54	11	1128	0	0	0
206	ES2QN	KO29	152	22	1175	1460	0	2116	261	ON4LCV	JN29	50	10	857	0	0	0
207	OZ7IS	JO65	151	32	1128	1294	1901	1845	262	F5OIH/P	JN08	49	8	666	0	0	0
208	ES6PZ	KO38	151	20	1101	0	0	2532	263	JX7DFA	IQ50	45	0	1	1120	2211	0
209	UT5JCW	KN64	150	0	0	0	0	0	264	IW3HTU	JN55	43	13	1180	0	0	0
210	CT1FAK	IN50	149	25	2129	0	2250	2488	265	F1JKY	JN25	41	10	798	0	400	991
211	DK0PX	JN48	147	0	1161	0	1815	1649	266	JW1QD	JN44	37	10	1000	0	0	1358
212	ES1CW	KO29	142	21	1192	1570	0	2143									
213	OK2PMN	JN88	141	0	871	1547	887	2101									
214	DL0GTH	JO50	139	23	1124	0	0	0									
215	OK2UFB	JN99	136	27	1526	0	0	1983									
216	RW4AK	LO20	136	0	1126	1480	2158	2301									
217	ES5QA	KO38	135	35	1665	1788	1555	2236									
218	OK2KDS	JN99	134	0	1568	0	0	1983									
219	DG5NEX	JN49	133	0	1234	0	1333	1941									
220	DL3IAS	JN49	130	36	988	1123	1830	1866									
221	OK1DTG/P	JO70	127	27	1351	1352	0	0									
222	RU3ZD	KO81	126	0	1713	2126	1755	2363									
223	DL5IO	JN49	126	0	1073	925	1450	1899									
224	YU7AZX	KN04	126	30	914	0	1389	2173									
225	LA7DFA	JP33	125	0	630	1816	1803	0									
226	F1PYW	JN38	124	30	936	888	1522	1958									
227	HB9S/P	JN36	123	24	1135	0	0	0									
228	S53J	JN75	123	27	1123	1036	983	1984									
229	DL3NAW	JN59	120	0	1019	0	1961	1237									
230	OK1VDA	JO70	119	27	938	641	0	2220									
231	F6FGO	JN25	118	31	1390	0	0	2218									
232	OK2KJU	JN89	115	32	1318	1766	0	1494									
233	DL0SP/P	JO62	112	20	1315	785	0	1608									
234	OK2XTE	JN79	111	33	1362	0	0	2267									
235	DJ8ES	JO43	106	19	1306	0	0	1856									
236	DL5NEN	JN59	106	30	748	0	1767	1640									
237	ON7WR	JO20	106	24	0	0	0	1834									
238	I3ZVN	JN55	98	32	1212	0	0	2237									
239	OK2PHM	JN89	97	20	829	1265	0	2262									
240	ES1II	KO29	95	13	979	1570	0	0									
241	YU1EBC	JN94	94	28	907	0	1427	2179									
242	LA/DL7YS/P	JO37	93	22	1207	0	1673	0									
243	DK0FLT	JN59	93	18	975	0	0	0									
244	CT1DIN	IN60	91	18	1218	0	0	2338									
245	OK1UDX	JN79	91	19	537	0	0	0									
246	CT1DDW	IN60	90	17	2100	0	0	2500									
247	OL5Z	JN89	90	21	928	1527	0	0									
248	ES2QH	KO29	86	15	1072	1108	1517	0									
249	CT1CAD	IM67	85	18	1304	0	0	2249									
250	ES1DF	KO29	77	0	961	1080	0	0									
251	DL3AZI	JO51	76	0	969	0	1543	0									
252	SM4SJV	JP70	73	11	1262	870	0	1160									
253	F6OBT/P	JN19	73	11	0	0	0	0									
254	YU1AAV	KN04	71	21	828	0	0	2031									
255	OK1HRR	JO70	66	16	762	0	0	1890									
256	CT1BGE	IM58	65	0	0	0	0	0									
257	G7LRQ	IO91	60	16	1088	0	0	0									
258	SP6MLK/P	JO80	58	16	853	756	0	1446									
259	DG7SFL	JN49	57	11	759	0	0	1750									
260	ES3BM	KO29	54	11	1128	0	0	0									
261	ON4LCV	JN29	50	10	857	0	0	0									
262	F5OIH/P	JN08	49	8	666	0	0	0									
263	JX7DFA	IQ50	45	0	1	1120	2211	0									
264	IW3HTU	JN55	43	13	1180	0	0	0									
265	F1JKY	JN25	41	10	798	0	400	991									
266	JW1QD	JN44	37	10	1000	0	0	1358									

DUBUS 432 MHz Top List

NR	CALL	WW	WKDC	TR	AU	MS	ES	
1	DJ9BV	JO43	219	0	2154	1863	1440	0
2	PA0RDY	JO22	207	0	1979	1807	1376	0
3	DK3WG	JO72	207	74	1547	1494	0	0
4	G3LQR	JO02	206	0	2031	1613	0	0
5	PA0EZ	JO22	199	35	1787	1445	0	0
6	PA0WWM	JO22	195	36	1547	1836	0	0
7	OZ7IS	JO65	188	32	1499	1048	1294	0
8	HA1YA	JN87	186	43	1438	1221	0	0
9	DL8QS	JO43	182	33	1513	1513	0	0
10	OK1AXH	JO70	181	0	1861	1239	0	0
11	DB6BX	JO32	174	34	1550	662	0	0
12	DL7QY	JN59	173	0	1640	1848	1292	0
13	DJ6MB	JO30	171	0	1278	1733	0	0
14	G3XDY	JO02	169	27	1350	1619	0	0
15	LY2WR	KO24	167	26	1995	1593	1935	0
16	F6DKW	JN18	163	23	1519	0	0	0
17	DF8LC	JO53	161	0	1615	1361	0	0
18	DK6AS	JO52	161	0	1569	775	0	0
19	SP6MLK/P	JO80	160	31	1780	0	0	0
20	DK1KO	JO53	160	0	1643	694	0	0
21	DB6NT	JO50	158	31	1823	0	0	0
22	SP6GWB/P	JO80	154	30	1780	759	0	0
23	SP6AZT	JO81	154	0	1538	1087	0	0
24	DK1KR	JO53	154	0	1400	1827	0	0
25	PA4FP	JO33	152	0	2116	1010	0	0
26	SM7ECM	JO65	151	24	1389	1073	0	0
27	OZ2OE	JO45	150	0	2216	1020	0	0
28	YL3AG	KO26	149	19	1571	1041	0	0
29	SM6ESG	JO67	148	26	1436	712	0	0
30	DH3NAN	JO50	147	0	1437	1008	0	0
31	OK1CA	JO70	146	0	1670	0	0	0
32	DL3YEE	JO42	140	0	1574	1728	0	0
33	ES2WX	KO29	140	17	1232	1415	0	0
34	OK1KEI	JO70	138	0	1682	1185	0	0
35	OK1VEI	JO70	136	0	1532	811	0	0
36	DL1SUN	JO53	136	0	1157	1071	0	0
37	SP9FG	JN99	135	25	1660	0	0	0

38	OK1KIR/P	JO60	133 28 1773	0	0	0	93	ES2XM	KO29 92	11 1271 1259	0	0
39	SP9EUW	JO90	133 30 1589 1558 1664	0	0	0	94	DJ1LP	JO64 91	9 1414	0	0
40	OH5LK	KP30	131 0 1386 1196	0	0	0	95	DG5NEX	JN49 91	0 1187	0	0
41	PA0JUS	JO22	130 26 1340	0	0	0	96	G4LRT	IO92 90	0 1394 410	0	0
42	DL1BKK	JO43	128 0 1513 565	0	0	0	97	PE1HWO	JO21 90	18 1290	0	0
43	LA8AK	JO38	124 0 1373 981	0	0	0	98	OK1KPA	JN79 89	0 1176	0	0
44	G6HKM	JO01	124 0 1289 281	0	0	0	99	DK0PX	JN48 89	0 1168	0	0
45	PA0ZM	JO32	123 24 1184 1693	0	0	0	100	OK1OKL	JO60 88	0 1199	0	0
46	G6RAF	IO92	122 0 1730	0	0	0	101	DJ8ES	JO43 88	12 1087	0	0
47	PA2CHR	JO22	122 31 1357 323	0	0	0	102	ES2RJ	KO29 87	17 1261 1123	0	0
48	OE5VRL/5	JN78	121 0 1524 1031	0	0	0	103	DK9RL	JN69 87	0 1185	0	0
49	F5PAU	IN88	119 24 1630	0	0	0	104	DK1VI	JN49 87	0 1125 870	0	0
50	DL4VCG	JN39	119 0 1335	0	0	0	105	IZ5EME	JN52 86	20 1458	0 1670	0
51	OZ1IPU	JO57	118 18 1387	0	0	0	106	DG1VL	JO61 86	16 1245	0	0
52	OK1VMS	JO70	116 23 1434 972	0	0	0	107	DG0CAL	JO52 86	0 1160	0	0
53	PA0BAT	JO31	115 21 1301	0	0	0	108	S50C	JN76 86	18 977	0	0
54	OK2QI	JO80	114 25 1410	0	0	0	109	DL1SUZ	JO53 85	18 1218 665	0	0
55	DL0UL/P	JN48	113 0 1238	0	0	0	110	UY5HF	KN66 84	0 1670	0	0
56	DL6BCT	JO43	113 0 1152	0	0	0	111	OE3JPC	JN88 84	0 1132 1450 1469	0	0
57	DJ6XV	JO31	113 19 1128 976	0	0	0	112	HB9MIO/P	JN37 84	0 1096	0	0
58	SP6GZZ	JO81	112 0 1549 870	0	0	0	113	HB9AOF	JN36 84	15 926	0	0
59	PE1OGF	JO21	112 18 1288	0	0	0	114	DG3XA	JO43 84	13 905	0	0
60	ON4PS	JO20	111 21 1335	0	0	0	115	ES0HD	KO18 83	19 1565 614	0	0
61	ON4ZN	JO21	111 21 1132	0	0	0	116	DC6DY	JO31 83	0 1190	0	0
62	DK0OG	JN68	110 0 1459 745	0	0	0	117	OH2BNH	KP20 82	12 1235 1046	0	0
63	UA3MBJ	KO88	110 0 1306 1541	0	0	0	118	F6CKZ	JN09 80	0 1302	0	0
64	ON7WR	JO20	110 23 1163	0	0	0	119	DF1EQ	JO31 80	0 1249	0	0
65	GW4LXO	IO81	109 0 1550	0	0	0	120	ES4EQ	KO39 80	16 1160 907	0	0
66	DL7FF	JO62	109 0 1507 772	0	0	0	121	ES0IW	KO19 79	17 1342 906	0	0
67	DH9NBB	JN49	109 24 1363	0	0	0	122	OK2KDS	JN99 79	0 1212	0	0
68	HB9MIN/P	JN37	109 0 1300	0	0	0	123	I4YNO/4	JN54 77	15 886	0	0
69	DL3AMA	JO51	109 21 1015 1219	0	0	0	124	DL5NEN/P	JN59 76	16 964	0	0
70	F1HDF/P	JN18	108 0 1204	0	0	0	125	DH3YAK	JO31 75	13 1165	0	0
71	DL0GTH	JO50	106 20 1113	0	0	0	126	F1GTU	JN05 75	0 1114	0	0
72	DL4KG	JO31	105 21 1273	0	0	0	127	OK1FFD	JO60 74	23 1339	0	0
73	UT1PA	KO21	105 0 1238 1761	0	0	0	128	OK1MG	JO70 74	18 1045	0	0
74	DF9QX	JO42	105 0 1136 721	0	0	0	129	DG6GP	JN48 74	13 1024	0	0
75	DL2DR	JO31	104 21 1158	0	0	0	130	DL7YS	JO62 73	17 1100	0	0
76	DK5WO	JO30	104 20 1150	0	0	0	131	OK1KRQ/P	JN69 73	16 1091	0	0
77	DK4XH	JO43	104 20 1133 808	0	0	0	132	OK1SC	JO70 71	0 1310 758	0	0
78	ES6RQ	KO37	103 19 1452 1148	0	0	0	133	UR7GN	KN66 70	0 1790	0	0
79	OK1AIY/P	JO70	102 0 1490	0	0	0	134	OK2PWY	JN89 70	17 1135	0	0
80	DL1KDA	JO30	102 22 1286 999 1334	0	0	0	135	PA5DD	JO22 69	16 959	0	0
81	OK1DKS/P	JO60	102 23 1118	0	0	0	136	OK2PNN	JN89 69	0 918	0	0
82	UT7GA	KN66	101 0 1877	0	0	0	137	OK1DTG/P	JO70 68	14 1436	0	0
83	HB9CRQ	JN47	101 0 1010	0	0	0	138	DL0SP/P	JO62 67	0 1018	0	0
84	ON4GG	JO20	98 0 1407	0	0	0	139	SM7JUQ	JO65 65	15 1232	0	0
85	F5HRY	JN18	98 18 1222 583	0	0	0	140	LY2SA	KO14 65	15 1164 638	0	0
86	ON4ANT	JO20	96 0 1406	0	0	0	141	UR5BAE	KN29 64	18 1517	0	0
87	DH8GV	JO33	94 19 1259	0	0	0	142	DL9MCC	JN58 64	18 875	0	0
88	DL6BF	JO32	94 15 882 894	0	0	0	143	ES5WE	KO38 62	11 1406	0	0
89	OK1KRY	JN69	93 23 1350	0	0	0	144	DD0VF	JO60 62	17 1106	0	0
90	OK1DFC/P	JO60	93 22 1179	0	0	0	145	DL8AAV	JO52 62	15 914	0	0
91	RX1AS	KN59	93 0 0	0	0	0	146	DG7SFL	JN49 61	10 947	0	0
92	DK2DB	JN48	92 0 1331	0	0	0	147	DL3IAS	JN49 61	12 886	0	0

148	F6FGO	JN25	60	11	1016	0	0	0	203	CT1FAK	IN50	20	4	1588	0	0	0
149	ES0NW	KO29	59	17	1213	675	0	0	204	OK1HAG	JN79	20	0	650	753	0	0
150	ES0SM	KO08	59	20	1202	925	0	0	205	OK2PMN	JN88	13	0	362	0	0	0
151	UA4NM	LO48	58	0	1230	1310	0	0	206	RW3PF	KO93	10	2	338	0	0	0
152	OM7AQ	JN98	57	13	922	0	0	0	207	CT1DIN	IN60	7	2	334	0	0	0
153	OK2UFB	JN99	56	20	1232	0	0	0	208	RW4AK	LO20	6	0	679	0	0	0
154	LA/DB1DI/P	JO37	55	12	1013	0	0	0	209	UA4AQL	LO20	5	0	676	0	0	0
155	OK1PG	JO70	54	18	1773	0	0	0									
156	YO2IS	KN05	54	0	1020	1741	0	0									
157	DH0GHU	JN38	53	12	852	0	0	0									
158	OK1VBN	JN78	53	11	753	723	0	0									
159	ES3GZ	KO28	52	10	1035	0	0	0									
160	DL5BBL	JO42	51	0	841	722	0	0									
161	OL5Z	JN89	51	12	761	0	0	0									
162	DL9BDM	JO33	50	0	1278	0	0	0									
163	SP2JXN	JO94	49	15	1149	0	0	0									
164	S53J	JN75	49	9	688	0	0	0									
165	ES1JL	KO29	48	11	1324	0	0	0									
166	DK0FLT	JN49	48	14	695	0	0	0									
167	ES1RF	KO29	47	10	875	682	0	0									
168	I2FUM/2	JN44	47	0	875	0	0	0									
169	HA8MV	KN06	47	15	619	1500	0	0									
170	F5OIH/P	JN08	46	5	651	0	0	0									
171	DL5NEN	JN59	46	13	630	0	0	0									
172	SM3BIU	JP73	45	3	917	763	0	0									
173	F5DE	JN05	45	6	740	0	0	0									
174	GM4JJJ	IO86	44	15	1457	297	0	0									
175	I3ZVN	JN55	43	13	1197	0	0	0									
176	DK2BJ	JO30	43	9	720	0	0	0									
177	OK2KJU	JN89	42	13	731	0	0	0									
178	OE1LPW	JN88	41	12	1114	0	0	0									
179	OK1HRR	JO70	40	13	765	0	0	0									
180	OK2PHM	JN89	39	9	746	0	0	0									
181	G7LRQ	IO91	36	12	1208	0	0	0									
182	OK2VMU/P	JN99	36	11	880	0	0	0									
183	SM4SJY	JP70	36	6	691	554	0	0									
184	ES1AO	KO29	35	12	1131	0	0	0									
185	DF0RU	JO62	35	0	682	0	0	0									
186	ES0ZA	KO19	33	8	1077	0	0	0									
187	OK2XTE	JN79	32	11	658	0	0	0									
188	ES1DF	KO29	32	7	511	0	0	0									
189	ES1CW	KO19	32	7	500	688	0	0									
190	SP5HEJ	KO02	31	0	1347	850	0	0									
191	F1FIH	JN23	30	7	796	0	0	0									
192	ES0IC	KO18	30	7	673	0	0	0									
193	ES5MG	KO38	28	9	626	0	0	0									
194	ER5MG	KO38	28	9	626	0	0	0									
195	ES0BI	KO18	28	7	378	0	0	0									
196	ES1CR	KO29	27	12	930	0	0	0									
197	ES5QA	KO38	26	8	803	0	0	0									
198	ES0QY	KO18	25	8	650	0	0	0									
199	ES1AW	KO29	24	7	512	0	0	0									
200	CT1DDW	IN60	23	3	2100	0	0	0									
201	ES1II	KO29	22	4	506	0	0	0									
202	IW3HTU	JN55	21	6	1110	0	0	0									

Regeln/Rules

Die **DUBUS TOP-List** veröffentlicht regelmäßig Eigenangaben von UKW-Amateuren über die Zahl der von Ihnen gearbeiteten Felder auf den UKW-Bändern. Für die Topliste zählt nur ein QTH und ein Rufzeichen (Kann ein Portabel Standort 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 Vor- und Nachdruck und berichten Sie Ihren Felder-Stand entweder an DL8LAQ oder für Nur-EME an DL7APV. Um die Zahl der Einträge immer aktuell zu halten, wird jeder Eintrag pro Band nur dann weiter veröffentlicht, wenn er mindestens einmal pro Jahr von dem Rufzeichen-Inhaber durch Einsenden des untenstehenden Formblatts auf den neuesten Stand gebracht wurde. Nach Ablauf der Frist wird jeder Eintrag automatisch gelöscht.

DUBUS TOP-List publishes unconfirmed claims of squares worked by VHF/UHF-operators. Only one call sign or one QTH (may be portable) can be used for these claims. Only QSO's via terrestrial propagation are valid for this TOP-List. EME-Standings (EME-QSO's only) should be reported to the EME-News editor. QSO's via satellites and relays are not valid. The TOP-List will be published regularly. Please report your standings to DL8LAQ or for EME-ONLY to DL7APV. To have a clear picture of competition and activity each claim one each single band has to be updated at least once a year. Otherwise this entry will be deleted automatically.

DUBUS 1296 MHz Top List

NR	CALL	WW	WKDCODX
1	PA0EZ	JO22	133 231302
2	PA0WWM	JO22	128 231298
3	PA0RDY	JO22	124 01286
4	DL4VCG	JN39	119 01335
5	F6DKW	JN18	119 21273
6	OK1AXH	JO70	118 01444
7	G3XDY	JO02	118 221341
8	G3LQR	JO02	118 01274
9	HB9AMH/P	JN37	114 01351
10	DB6NT	JO50	108 221243
11	SM7ECM	JO65	100 171326
12	DB6BX	JO32	99 251125
13	SM6ESG	JO67	97 191445
14	SP6GWB/P	JO80	95 241580
15	PA0BAT	JO31	93 201368
16	DL6NAQ/P	JO40	92 401253
17	OK1KIR/P	JO60	92 221208
18	SP6MLK/P	JO80	91 231580
19	OE5VRL/5	JN78	91 181524
20	F5PAU	IN88	89 191630
21	OZ2OE	JO45	88 01425
22	G6DER	IO93	86 01306
23	DL7QY	JN59	86 01261
24	DK1KR	JO53	85 01097
25	DK0OG	JN68	82 01160
26	DL3YEE	JO42	82 01136
27	OK1KEI	JO70	81 01316
28	OZ1IPU	JO57	81 161096
29	PA4FP	JO33	81 0 939
30	OK1VEI	JO70	80 01313
31	F1HDF/P	JN18	80 9 886
32	OZ7IS	JO65	79 171205
33	DK6AS	JO52	78 01421
34	DL1BKK	JO43	77 0 995
35	HB9AOF	JN36	77 15 975
36	OK1IDF/P	JO60	76 16 1176
37	F5HRY	JN18	74 111064
38	DL0UL/P	JN48	74 0 962
39	OK1AIY/P	JO70	72 01490
40	HB9MIO/P	JN37	72 01000
41	OZ1DOQ	JO65	71 171322
42	DH3NAN	JO50	71 01143
43	DH9NBB	JN49	71 131016
44	OK1CA	JO70	70 01421
45	PA0JUS	JO22	70 01265
46	G6HKM	JO01	69 01193
47	DK5WO	JO30	69 161137
48	DL2DR	JO31	68 131158
49	ON7YK	JO20	68 01079
50	DC4XH	JO43	67 141090
51	DL0GTH	JO50	67 161073
52	HB9RG	JN47	67 0 920
53	DF1EQ	JO31	67 0 908
54	G4PMK	IO93	66 01302
55	OK1VMS	JO70	65 181302
56	PA0ZM	JO32	63 151329

57	OK1OKL	JO60	63 01177	117	G7LRQ	IO91	28 8 746
58	ON4PS	JO20	63 141098	118	DK1VI	JN49	28 0 710
59	OK1DKS/P	JO60	62 131207	119	UT7GA	KN66	28 0 680
60	G4LRT	IO92	62 01152	120	DK9RL	JN69	27 0 891
61	SP9FG	JN99	61 161492	121	I4YNO/4	JN54	27 8 769
62	DG5NEX	JN49	61 01060	122	IW3FZQ/4	JN54	27 7 732
63	OK1FFD	JO60	60 141058	123	ES0SM	KO08	26 8 873
64	ON7WR	JO20	60 141046	124	F6FGO	JN25	26 4 839
65	ON4GG	JO20	60 0 982	125	HB9RUZ/P	JN47	25 9 640
66	DF9QX	JO42	57 01066	126	OZ8VO	JO56	24 0 951
67	ON4ANT	JO20	57 0 914	127	OK1DTG/P	JO70	24 8 742
68	DJ6XV	JO31	56 11 946	128	OK2QI	JO80	23 71275
69	DC8UG	JO30	56 10 900	129	F1FIH	JN23	23 6 605
70	DC0DA	JO31	55 01034	130	OK1VBN	JN78	22 9 950
71	DJ8ES	JO43	55 101025	131	OH5LK	KP30	21 01349
72	DL1SUN	JO53	54 01162	132	OK1PG	JO70	21 9 985
73	LY2WR	KO24	53 141026	133	PE1OGF	JO21	21 6 588
74	PE1HWO	JO21	52 141315	134	HA8MV	KN06	21 9 576
75	PA5DD	JO22	52 121302	135	OK2BFF/P	JO80	21 8 536
76	DL3NQ	JN49	51 9 920	136	OK2VMU/P	JN99	20 7 570
77	DB1BX	JO32	51 12 905	137	UA3MBJ	KO88	20 0 301
78	DK0FLT	JN59	51 12 684	138	OK1KRY	JN69	19 7 865
79	DL1KDA	JO30	50 12 940	139	OK1KPA	JN79	19 0 783
80	LA8AK	JO38	49 01373	140	OK2BBF	JN89	19 8 563
81	PA2CHR	JO22	49 15 828	141	F5OIH/P	JN08	17 5 517
82	GW4LXO	IO81	48 0 990	142	IW3HTU	JN55	16 4 838
83	DL3IAS	JN49	48 9 769	143	SP6AZT	JO81	16 0 820
84	DK0PX	JN48	47 0 942	144	S53J	JN75	16 6 410
85	SP9EWU	JO90	46 12 946	145	DL5NEN	JN59	16 16 320
86	F6CGB	JN18	45 0 700	146	ES1RF	KO29	15 5 506
87	DJ1KP	JO40	45 0 698	147	DL7YS	JO62	15 2 410
88	DG0CAL	JO52	44 01160	148	DG7SFL	JN49	15 3 358
89	DL1SUZ	JO53	44 14 968	149	SM4SJV	JP70	14 3 628
90	HB9BBD	JN47	43 111015	150	ES1AJ	KO29	14 5 531
91	I25EME	JN52	42 101036	151	ES2XM	KO29	14 5 478
92	DJ6MB	JO30	42 0 876	152	DF0RU	JO62	14 0 373
93	OE3JPC	JN88	42 0 702	153	DL0SP/P	JO62	14 2 347
94	HA1YA	JN87	41 13 862	154	ES2WR	KO29	13 5 694
95	ES2RJ	KO29	40 9 765	155	ES0Z	KO18	13 5 453
96	OK1KRQ/P	JN69	39 11 962	156	RX1AS	KN59	13 0 0
97	DK2DB	JN48	39 0 873	157	SM7JUQ	JO65	12 71061
98	DC6DY	JO31	39 0 865	158	ES1NJ	KO29	12 4 507
99	LA/DB1DI/P	JO37	38 91013	159	ES1MW	KO29	11 4 507
100	YL3AG	KO26	38 10 867	160	ES0W	KO18	11 5 443
101	S50C	JN76	37 9 626	161	DL5UH	JN48	10 4 671
102	F1GTU	JN05	36 0 896	162	OK1SC	JO70	10 0 440
103	DK2BJ	JO30	36 10 885	163	OM7AQ	JN98	10 5 426
104	I0LVA/0	JN62	35 01152	164	OK2PWY	JN89	10 6 357
105	DG1VL	JO61	35 6 723	165	OK2KJU	JN89	10 6 347
106	ES2WX	KO29	35 9 692	166	OK2PHM	JN89	10 0 341
107	DG6GP	JN48	33 7 732	167	IT9VDD	JN68	9 1 899
108	DH3YAK	JO31	33 5 715	168	ES1OX	KO29	9 5 772
109	ES4EQ	KO39	33 9 636	169	ES1DW	KO29	9 5 330
110	ES6RQ	KO37	33 9 600	170	YO2IS	KN05	8 0 472
111	DJ1LP	JO64	30 0 922	171	OK1HRR	JO70	8 2 292
112	URTGN	KN66	30 0 820	172	ES1TCA	KO29	7 2 246
113	I2FUM/2	JN44	30 0 779	173	DL3AMA	JO51	7 3 162
114	ON4KHG	JO10	30 6 642	174	UY5HF	KN66	6 0 520
115	ES5WE	KO38	29 71249	175	ES2NA	KO29	6 4 349
116	I3ZVN	JN55	28 91197	176	GU6WDK/P	IN89	6 0 348

177	OK2XTE	JN89	6	2	206
178	SP5HEJ	KO02	5	0	433
179	GJ6WDP/P	IN89	5	0	282
180	DF5JJ	JO31	5	3	281
181	F8UM	JN15	5	0	220
182	ES0NW	KO19	5	2	190
183	ES1AW	KO29	3	2	269
184	OK2UFB	JN89	3	2	142
185	ES1WQ	KO29	2	2	337
186	ES2NT	KO29	2	1	149
187	ES6RAT	KO28	2	1	125
188	ES1JL	KO29	2	2	108
189	DG3XA/P	JO43	1	1	289
190	ES2QN	KO29	1	1	198
191	OK2PMN	JN88	1	0	74
192	OH2BNH	KP20	1	1	23

DUBUS 2320 MHz Top List

NR	CALL	WW	WKDCODX
1	PA0EZ	JO22	79 15 973
2	DB6NT	JO50	68 15 1119
3	PA0RDY	JO22	65 01000
4	PA0WWM	JO22	63 15 1022
5	G3LQR	JO02	58 01006
6	DL6NAQ/P	JO40	53 11 932
7	OK1KIR/P	JO60	51 10 1115
8	SM6ESG	JO67	47 7 1054
9	DL7QY	JN59	47 01018
10	PA0BAT	JO31	45 12 923
11	DL1BKK	JO43	45 0 760
12	OE5VRL/5	JN78	44 11 1291
13	G6DER	IO93	44 01265
14	PA4FP	JO33	44 0 727
15	OK1AIY/P	JO70	43 01296
16	DL0GTH	JO50	42 7 1052
17	SM7ECM	JO65	42 9 942
18	OZ1IPU	JO57	38 7 1028
19	DC8UG	JO30	35 8 900
20	OK1OKL	JO60	34 0 830
21	DF1EQ	JO31	34 0 678
22	DL0UL/P	JN48	33 0 960
23	G3XDY	JO02	33 8 947
24	F5HRY	JN18	32 6 785
25	ON7WR	JO20	32 8 756
26	HB9MIO/P	JN37	32 0 744
27	DJ1KP	JO40	32 0 454
28	OZ2OE	JO45	31 0 876
29	DC0DA	JO31	31 0 775
30	DL3NQ	JN49	29 8 890
31	OZ7IS	JO65	29 9 860
32	ON7YK	JO20	29 0 733
33	DL3YEE	JO42	28 0 912
34	G4LRT	IO92	27 0 1022
35	DH9NBB	JN49	27 7 654
36	DL4VCG	JN39	27 0 553
37	DF9QX	JO42	26 0 915
38	PA5DD	JO22	26 8 867
39	DK0PX	JN48	26 0 853

40	OZ1DOQ	JO65	25 7 830
41	DL2DR	JO31	25 0 823
42	IO1VA/0	JN62	25 0 612
43	DK0OG	JN68	24 0 675
44	G4PMK	IO93	22 0 1249
45	DK2DB	JN48	22 0 873
46	OK1DKS/P	JO60	22 4 602
47	DB1BX	JO32	22 7 525
48	DL3IAS	JN49	21 6 604
49	F1HDF/P	JN18	20 3 621
50	I3ZVN	JN55	19 7 603
51	DJ8ES	JO43	18 7 1025
52	HB9AMH/P	JN37	18 0 933
53	OK1DFC/P	JO60	18 4 549
54	G4DDK	JO02	17 0 969
55	LA/DB1DI/P	JO37	17 7 825
56	S51WI	JN75	17 5 533
57	DG5NEX	JN49	16 0 465
58	OK1KRQ/P	JN69	15 4 350
59	SP6GWB/P	JO80	14 4 587
60	HA1YA	JN87	14 5 476
61	DK1KR	JO53	13 0 792
62	ON4PS	JO20	13 6 574
63	OK2BFF/P	JO80	13 6 418
64	DJ6XV	JO31	12 3 396
65	DK6AS	JO52	11 0 620
66	IW3FZQ/4	JN54	11 3 403
67	PA0JUS	JO22	10 5 705
68	IZ5EME	JN52	10 3 552
69	I2FUM/2	JN44	10 0 354
70	OK2BFF	JN89	10 6 308
71	OK1KEI	JO70	9 0 786
72	SP9FG	JN99	9 5 717
73	IW3HTU	JN55	9 2 542
74	OK2VMU/P	JN99	9 4 376
75	DL1SUN	JO53	9 0 349
76	LA8AK	JO38	8 0 677
77	OK1CA	JO70	8 0 291
78	F1FIH	JN23	8 1 239
79	F6CGB	JN18	7 0 407
80	DG6GP	JN48	7 2 388
81	DH3NAN	JO50	7 0 331
82	F1GTU	JN05	7 0 313
83	SP6MLK/P	JO80	7 3 272
84	OK1PG	JO70	6 4 855
85	S50C	JN76	5 2 346
86	OK1KRY	JN69	5 3 189
87	OK2QI	JO80	4 2 305
88	F5PAU	IN88	4 0 260
89	OM7AQ	JN98	3 3 281
90	DF2CA/P	JN57	3 0 206
91	GW4LXO	IO81	3 0 200
92	OK1VBN	JN78	3 2 158
93	DL1KDA	JO30	3 2 98
94	DG1VL	JO61	2 2 91
95	SP9EWU	JO90	1 0 134
96	G8BKE/P	IO80	1 1 114

DUBUS 3400 GHz Top List

NR	CALL	WW	WKDCODX
1	DB6NT	JO50	44 6 741
2	PA0EZ	JO22	29 5 835
3	DL6NAQ/P	JO40	25 4 860
4	G3LQR	JO02	23 0 924
5	PA0WWM	JO22	23 5 850
6	PA0RDY	JO22	19 0 643
7	PA0BAT	JO31	18 3 568
8	DC0DA	JO31	17 0 660
9	G6DER	IO93	15 0 859
10	DL1BKK	JO43	15 0 703
11	DL3NQ	JN49	15 5 637
12	DL7QY	JN59	15 0 565
13	DC8UG	JO30	13 6 724
14	DF1EQ	JO31	13 0 532
15	DL2DR	JO31	13 0 470
16	PA5DD	JO22	12 4 867
17	HB9MIO/P	JN37	12 0 463
18	DB1BX	JO32	12 4 425
19	PA4FP	JO33	11 0 464
20	DK2DB	JN48	11 0 331
21	G4PMK	IO93	10 0 845
22	DK0PX	JN48	9 0 632
23	G4LRT	IO92	9 0 509
24	DL0UL/P	JN48	9 0 239
25	DL0GTH	JO50	7 2 466
26	DL4VCG	JN39	6 0 339
27	OZ2OE	JO45	5 0 772
28	DJ8ES	JO43	5 3 578
29	DJ6XV	JO31	5 3 396
30	GW4LXO	IO81	3 0 117
31	S51WI	JN75	3 1 98
32	DK0OG	JN68	3 1 78
33	DF9QX	JO42	2 0 143
34	DG1VL	JO	2 1 91
35	DF2CA/P	JN57	2 0 24
36	OZ1IPU	JO57	1 1 209
37	G8BKE/P	IO80	1 1 114
38	GU6WDP/P	IN89	1 0 6

DUBUS 5760 MHz Top List

NR	CALL	WW	WKDCODX
1	PA0EZ	JO22	29 61017
2	DB6NT	JO50	39 101000
3	SM7ECM	JO65	36 47 960
4	HB9AMH/P	JN37	36 0 929
5	HB9MIO/P	JN37	34 0 694
6	F1HDF/P	JN18	30 4 638
7	SM6ESG	JO67	25 6 951
8	G3LQR	JO02	23 0 949
9	PA0WWM	JO22	23 8 863
10	PA0BAT	JO31	23 9 723
11	F5HRY	JN18	20 4 517
12	DL1BKK	JO43	19 0 689
13	I3ZVN	JN55	19 7 573

14	OE5VRL/5	JN78	18	6	901	3	F5HRY	JN18	59	8	877	63	DC8UG	JO30	20	6	753
15	OZ1IPU	JO57	18	6	807	4	G3WDG	IO92	55	0	1135	64	DB1BX	JO32	20	7	705
16	F1GHB/P	IN88	17	0	669	5	F1HDF/P	JN18	55	8	867	65	DK8ZP	JO40	20	0	537
17	OK1KIR/P	JO60	17	3	393	6	PA0WWM	JO22	54	13	850	66	DL4VCG	JN39	20	0	533
18	OK1UWA/P	JO70	16	0	998	7	G4KGC	IO92	53	0	1135	67	DF9QX	JO42	19	0	504
19	PA5DD	JO22	15	6	867	8	SM7ECM	JO65	53	8	1110	68	DK2DB	JN48	19	0	432
20	S51WI	JN75	15	4	586	9	PA0BAT	JO31	53	13	785	69	G4LDR	IO91	18	0	1118
21	DL0UL/P	JN48	14	0	660	10	G3LOR	JO02	52	0	1006	70	LA/DB1D/P	JO37	18	6	825
22	IO1VA/0	JN62	14	0	557	11	HB9AMH/P	JN37	51	0	939	71	SP6GWB/P	JO80	18	5	679
23	G6DER	IO93	13	0	947	12	DB6NT	JO50	50	14	1000	72	DL5NEN/P	JN49	18	6	466
24	OK1AIY/P	JO70	12	0	693	13	DK1KR	JO53	47	0	868	73	ON4KHG	JO10	17	5	452
25	S51JN/P	JN65	12	4	557	14	OK1JKT/P	JO60	47	12	845	74	ON7YK	JO20	16	0	494
26	DL3NQ	JN49	12	4	318	15	DL4EAU/P	JO51	47	9	826	75	F5PAU	IN88	16	2	430
27	DC8UG	JO30	11	5	724	16	OE5VRL/5	JN78	45	11	1136	76	OK1KRQ/P	JN69	16	3	325
28	OZ7IS	JO65	11	4	593	17	HB9MIN/P	JN37	45	0	939	77	HB9AMH	JN37	15	0	567
29	DC0DA	JO31	11	0	451	18	DJ1KP	JO40	45	0	656	78	IW3FZQ/4	JN54	15	5	519
30	DK2DB	JN48	11	0	315	19	DM2AFN	JO61	41	9	662	79	DL7QY	JN59	15	0	492
31	DL7QY	JN59	10	0	565	20	HB9MIO/P	JN37	40	0	744	80	OK1UWA/P	JO70	15	0	434
32	OK1OKL	JO60	9	0	611	21	DL3YEE	JO42	40	0	700	81	IW5ADB	JN53	14	0	1053
33	DL6NAQ/P	JO40	9	2	452	22	G4BRK	IO91	39	0	1115	82	G4PMK	IO93	14	0	958
34	OZ1DOQ	JO65	9	4	442	23	I6XCK/6	JN63	39	0	702	83	DC0DA	JO31	14	0	639
35	DB1BX	JO32	9	4	425	24	DK0FLT	JN59	39	10	683	84	I4XCC	JN63	13	0	496
36	DK0PX	JN48	9	0	409	25	DC8EC	JN57	39	12	661	85	OZ1DOQ	JO65	13	5	472
37	IW3FZQ/4	JN54	9	4	291	26	DL3NQ	JN49	38	9	712	86	PA4FP	JO33	12	0	555
38	DL2DR	JO31	9	0	201	27	DK0OG	JN68	38	7	78	87	GW4LXO	IO81	12	0	309
39	IW3HTU	JN55	8	3	542	28	SM6ESG	JO67	37	6	1275	88	G4KNZ	IO91	12	0	247
40	HB9MIN/P	JN37	8	0	286	29	PA5DD	JO22	37	10	867	89	OK1DKS/P	JO60	11	2	616
41	LA/DB1D/P	JO37	7	5	746	30	IO1VA/0	JN62	37	8	850	90	DJ6XV	JO31	10	3	285
42	DL0GTH	JO50	7	2	674	31	LX1DU	JN29	37	0	700	91	F6CGB	JN18	9	0	677
43	G4PMK	IO93	6	0	958	32	DH9NBB	JN49	36	9	654	92	DJ8ES	JO43	9	4	593
44	OK1DKS/P	JO60	6	1	318	33	I6CXB/6	JN63	35	0	751	93	G4LRT	IO92	8	0	824
45	DC8EC/P	JN57	6	1	278	34	G3GNR	IO70	34	0	1275	94	IW3QCV	JN65	8	2	532
46	I2FUM/2	JN44	6	0	201	35	HB9RG	JN47	34	0	761	95	F5HRY/P	JN08	8	2	491
47	OZ2OE	JO45	5	0	679	36	OK1AIY/P	JO70	34	0	736	96	DL1KDA	JO30	8	4	477
48	DJ8ES	JO43	5	5	578	37	DL6NAQ/P	JO40	32	8	656	97	F6CGB/P	JN12	7	0	823
49	DF1EQ	JO31	5	0	461	38	OK1IVAM	JO60	32	7	640	98	SP6MLK/P	JO80	7	4	355
50	F6CGB	JN18	5	0	407	39	G4DDK	JO02	31	0	901	99	DF1EQ/P	JO31	7	0	283
51	DJ6XV	JO31	5	2	176	40	DL6NCI	JO50	31	6	481	100	ES0SM	KO08	5	2	384
52	DK0OG	JN68	5	2	78	41	DL1BKK	JO43	30	0	842	101	DG0CAL	JO52	5	0	255
53	OK2VMU/P	JN99	4	2	376	42	DL0UL/P	JN57	30	0	646	102	LA8AK	JO38	5	0	212
54	DL4VCG	JN39	4	0	339	43	DL0GTH	JO50	30	7	240	103	OK2QI	JO80	4	1	303
55	PA4FP	JO33	4	0	235	44	EA6ADW/P	JM19	29	7	1090	104	G8BKE/P	IO80	4	1	242
56	DG1VL	JO61	4	2	191	45	OK1DFC/P	JO60	29	6	668	105	F5OIH/P	JN08	4	1	149
57	F8UM/P	JN05	4	0	162	46	DG1VL	JO61	29	4	654	106	OK2VMU/P	JN99	3	2	376
58	OK1KRY	JN69	3	2	175	47	OZ1IPU	JO57	28	7	941	107	DH3NAN	JO50	3	0	134
59	F6CGB/P	JN24	2	0	375	48	DL3IAS	JN49	28	9	584	108	PA0JUS	JO22	2	2	245
60	G8BKE/P	IO80	2	1	242	49	OK1OKL	JO60	27	0	795	109	SP9FG	JN99	2	2	115
61	HA1YA	JN87	2	2	120	50	DK0PX	JN48	25	0	567	110	DG5NEX	JN49	1	0	173
62	OK2QI	JO80	2	1	108	51	OK1KIR/P	JO60	25	5	553	111	HA1YA	JN87	1	1	120
63	ES2WX	KO29	2	2	89	52	S50C	JN76	25	9	457	112	OK1KRY	JN69	1	1	78
64	GJ6WDK/P	IN89	1	0	136	53	OK1KEI/P	JN79	25	7	375	113	DL0SP/P	JO62	1	1	28
65	OK1KRQ/P	JN69	1	1	96	54	F1GHB/P	IN88	24	0	669	114	SM4SJY	JP70	1	1	0
66	SP6MLK/P	JO80	1	1	1	55	DL1VAA	JO61	24	4	661						
67	SP6GWB/P	JO80	1	1	1	56	S51WI	JN75	24	6	586						
						57	DK4GD/P	JN48	24	0	566						
						58	ON7WR	JO20	23	9	756						
						59	I3ZVN	JN55	23	7	573						
						60	OZ2OE	JO45	22	0	789						
						61	DL2DR	JO31	22	4	603						
						62	S51JN/P	JN65	21	8	637						

DUBUS 10 GHz Top List

NR	CALL	WW	WKDCODX
1	F6DKW	JN18	74 111215
2	PA0EZ	JO22	72 131017

DUBUS 24 GHz Top List

NR	CALL	WW	WKDCODX
1	HB9MIN/P	JN37	12 0 396
2	DB6NT	JO50	11 4 301
3	DC8EC/P	JN57	10 2 301
4	HB9AMH/P	JN37	10 0 286

5	HB9MIO/P	JN37	10	0	172
6	IOLVA/O	JN62	8	3	444
7	OE5VRL/5	JN78	8	3	273
8	DJ1KP	JO40	8	0	273
9	PA0EZ	JO22	7	3	391
10	IW3EHQ/P	JN66	7	1	278
11	EA6ADW/PJM19	7	2	226	
12	DK0OG	JN68	7	2	193
13	S51JN/P	JN65	6	3	293
14	OK1AIY/P	JO70	6	0	281
15	G4DDK	JO02	6	0	268
16	IW3FZQ/4	JN54	6	3	250
17	PA0BAT	JO31	6	2	195
18	DK4GD/P	JN48	6	0	184
19	G3WDG	IO92	5	0	392
20	DL3NQ	JN49	5	2	287
21	G3LQR	JO02	5	0	261
22	SM6ESG	JO67	5	1	242
23	OK1KIR/P	JO60	5	2	227
24	I3ZVN	JN55	5	2	210
25	OK1OKL	JO60	5	0	185
26	DF2CA/P	JN58	5	0	142
27	DL6NCI	JO50	4	3	280
28	OK1UWA/PJO70	4	0	188	
29	OK1DFC/P	JO60	4	2	185
30	DK8ZP	JO40	4	0	178
31	DK0PX	JN48	4	0	168
32	F1GHB/P	IN88	4	0	158
33	G3GNN	IP70	4	0	154
34	DL3YEE/P	JO42	4	0	151
35	DL2DR	JO31	4	1	98
36	F5HRY	JN18	4	1	96
37	F1HDF/P	JN18	3	1	230
38	OK1AIY-P	JO60	3	0	227
39	G4KNZ/P	JO02	3	0	173
40	IW3HTU	JN55	3	1	160
41	DG1VL	JO61	3	2	113
42	DL0GTH	JO50	3	1	108
43	SM7ECM	JO65	2	1	168
44	DF1EQ	JO31	2	0	133
45	DB1BX	JO32	2	1	90
46	DK2DB	JN48	2	0	48
47	PA5DD	JO22	2	1	43
48	ON7YK	JO20	2	0	34
49	G4KGC	IO92	1	0	392
50	DC0DA/P	JO32	1	0	104
51	G8BKE/P	IO80	1	1	100
52	F5OIH/P	JN08	1	1	90
53	CT1FP	IN50	1	1	82
54	CT1DMK	IN50	1	1	82
55	DJ6XV	JO31	1	1	75
56	F6CGB/P	JN37	1	0	74
57	OK1OGS/PJN69	1	0	60	
58	GW4LXO	IO81	1	0	58
59	OZ1IPU	JO57	1	1	55
60	DL7QY	JN59	1	0	13
61	DL4VCG	JN39	1	0	9
62	SP6MLK/P	JO80	1	1	1
63	SP6GWB/PJO80	1	1	1	

DUBUS 47 GHz Top List

NR	CALL	WW	WKDCODX
1	HB9MIN/P	JN37	8 0 182
2	HB9MIO/P	JN37	8 0 166
3	HB9AMH/P	JN37	5 0 166
4	IW3FZQ/4	JN54	5 1 163
5	DK4GD/P	JN47	5 0 123
6	DF2CA/P	JN58	4 0 15
7	OE5VRL/5	JN78	3 2 203
8	I3ZVN	JN55	3 1 179
9	IW3EHQ/P	JN65	3 1 111
10	DL2DR	JO31	3 1 95
11	OK1OKL	JO60	2 0 96
12	OK1UWA/PJO70	2	0 96
13	OK1AIY-P	JO60	2 0 96
14	DB6NT	JO50	2 2 95
15	DL6NCI	JO50	2 2 83
16	DC0DA/P	JO31	2 0 69
17	DK0PX	JN48	2 0 62
18	DF2CA/P	JO60	2 0 59
19	DL3YEE/P	JO42	2 0 45
20	DC8EC/P	JN57	2 1 29
21	DL/HB9AMH/P	JN48	0 184
22	G8BKE/P	IO90	1 1 54
23	IW3HTU	JN55	1 1 49
24	OK1AIY/P	JO70	1 0 12
25	OK1KIR/P	JO60	1 1 5
26	PA0BAT	JO31	1 1 1
27	CT1FP	IN50	1 1 1
28	CT1DMK	IN50	1 1 1
29	SP6MLK/6	JO70	1 1 1

DUBUS 76 GHz Top List

NR	CALL	WW	WKDCODX
1	HB9MIO/P	JN37	4 0 114
2	DK4GD/P	JN47	4 0 114
3	DF2CA/P	JO50	4 0 4
4	DB6NT	JO50	2 1 77
5	DC0DA/P	JO50	2 0 48
6	G8BKE/P	IO91	1 1 17
7	OK1AIY/P	JO70	1 0 12
8	DC8EC/P	JN57	1 1 5
9	OE9FKI	JN47	1 0 2
10	HB9AMH/P	JN37	1 0 1
11	HB9MIN/P	JN37	1 0 1

DUBUS 145 GHz Top List

NR	CALL	WW	WKDCODX
1	DB6NT	JO50	1 1 3
2	IW3EHQ/P	JN65	1 1 2

DUBUS 241 GHz Top List

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