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600 Watt 23cm PA by DJ3FI

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Title: DJ3FI`s 23cm Power Amplifier

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Editorial

Dear DUBUS Reader!

Here is the first issue for the new year 2004 with a couple of hopefully interesting technical articles. This issue focuses a bit on the 23cm band - a band that becomes more and more popular for DX and EME, probably also due to the higher noise and RFI problematic on 2m and 70cms.

But we have some more news for you! After a break of six years a new DUBUS TECHNIK book is available now. It is number 6 and in the same size and format like the previous ones (see also the back cover). Order your copy now if you want to be sure to get one. Technik books 1, 2, 4 and 5 are sold out and there is only a limited number of Technik 3 available.

We now have a new DUBUS distributor for France. Patrick, F6HYE, has "retired" after 16 years of successful work for DUBUS - thank you, Patrick! And much fun with your new hobby! Jose Balanca, F1EIT together with his YL Fabienne Ansel do the job now and made a good start already with many French subscribers for 2004. Welcome Fabienne and Jose!

After many years without any distributor for Malta now we have Joseph Falzon, 9H1VW, who will help us with the DUBUS representation in this country. Welcome, Joseph!

In the past we had several requests regarding the promised follow-up parts of the oscillator article from Gerhard, DK4XP. The agreement with DK4XP about this series of articles was made a long ago, but unfortunately Gerhard has many other commitments now, and is not able to continue. We apologize for this but it is beyond our control. Anyway the article from SM6VFZ in this issue brings some practical results based on DK4XP's articles.

From the DX operating side of the DUBUS activities we have positive news: with the kind help of DF7KF, DL8YHR and others, 5T5SN will erect a 6m and a 2m beacon in Mauretania very soon (Locator IK28ac). We think that this will be an interesting location for Tropo and Es towards Europe.

Please keep sending your technical articles, activity reports and info. DUBUS needs YOUR contribution. Many thanks!

Vy 73 from Joe, DL8HCZ / CT1HZE
and the DUBUS team!

Liebe DUBUS Leser!

Hier ist die erste Ausgabe für das neue Jahr 2004 mit einigen -hoffentlich- interessanten technischen Artikeln. In dieser Ausgabe liegt der Schwerpunkt etwas auf dem 23cm-Band. Dieses Band wird immer populärer für DX und EME. Wahrscheinlich liegt dies u.a. auch in der zunehmend problematischer werdenden Stör- und TVI-Situation auf 2m und 70cm.

Aber wir haben weitere Neuigkeiten: Nach einer sechsjährigen Pause gibt es jetzt ein neues DUBUS Technik Buch. Siehe auch Heftrückseite. Es ist die Nummer 6 und entspricht in Größe und Umfang den vorherigen Ausgaben. Wir empfehlen, jetzt ein Exemplar zu bestellen, wenn Sie sicher sein wollen, eines zu erhalten. Die Technik-Bücher 1, 2, 4 und 5 sind ja bereits ausverkauft. Von Technik 3 gibt es noch einige Restexemplare.

Wir haben einen neuen Distributor für Frankreich. Partick, F6HYE, hat nun nach 16 Jahren erfolgreicher Arbeit für DUBUS aufgehört und widmet sich einem neuen Hobby. Danke, Patrick! Jose Balanca, F1EIT, ist nun zusammen mit seiner YL Fabienne Ansel neuer Distributor für Frankreich und ist bereits mit vielen Abonnenten für 2004 sehr gut gestartet. Willkommen im Team, Fabienne und Jose!

Nach vielen Jahren ohne Distributor in Malta konnten wir nun Joseph Falzon, 9H1VW, dafür gewinnen. Er wird DUBUS in diesem Land vertreten. Willkommen, Joseph!

In der Vergangenheit haben wir einige Anfragen nach der versprochenen Fortsetzung des Oszillator-Artikels von Gerhard, DK4XP, erhalten. Leider hat Gerhard zwischenzeitlich viele andere Verpflichtungen und kann den Artikel nicht fortsetzen. Wir möchten uns dafür entschuldigen, können es aber leider nicht ändern. Die Absprache mit DK4XP wurde vor langer Zeit seitens des ehemaligen Chefredakteurs der DUBUS gemacht. Immerhin setzt der Artikel von SM6VFZ in dieser Ausgabe einiges von DK4XP's Artikeln in die Praxis um.

Nun zur praktischen Seite der DUBUS-Aktivitäten. Hier gibt es Positives zu berichten: Dank der Hilfe von DF7KF, DL8YHR u.a. wird 5T5SN in Mauretanien (IK28ac) in Kürze eine 6m und 2m-Bake in Betrieb nehmen. Wir denken, dass dies ein interessanter Baken-Standort für Es und Tropo Richtung Europa ist.

Wir bitten, weiter so zahlreich technische Artikel und Aktivitätsberichte einzusenden. Vielen Dank!

Vy 73 von Joachim, DL8HCZ / CT1HZE
und vom ganzen DUBUS-Team!

Verstärker für das 23cm-Band mit der Triode YD 1336

Hubert Tiedmann, DJ3FI

1. Einleitung

Die gewählte Röhre wurde für Fernsehumsetzer entwickelt. Hier haben die Transistoren wegen ihrer unbegrenzten Lebensdauer die Röhren verdrängt. VHF-UHF Amateure bestreiten ihre Konteste und EME-QSO's überwiegend mit Röhren-Endstufen. Die begrenzte Lebensdauer der Röhre (10.000 – 20.000 Stunden) reicht auch bei gebrauchten Röhren noch für genügend Konteste. Es macht daher Sinn, einen Röhrenverstärker für das 23 cm-Band zu betreiben, da die Röhre bei diesen Leistungen auch einige Vorteile hat.

Der Sockel der Röhre ist baugleich mit den Typen TH 308, TH 329, YD 1333 bis YD 1337.

Die Anodenverlustleistung dieser Röhren reicht von 700 W bei der TH 308 bis 1900 W bei der YD 1335. Entsprechend sind die Baulänge und der Durchmesser des Anodenradiators sowie die inneren Kapazitäten unterschiedlich. Der Eingangskreis hat einen weiten Abstimmbereich, mit ihm lassen sich alle genannten Röhren anpassen. Soll die TH308 eingesetzt werden, ist lediglich der Anodentopf um 1 cm zu verlängern.

2. Aufbau des Verstärkers

Der Verstärker ist in koaxialer Topfkreis-Technik aufgebaut. Hierbei arbeitet die Triode in Gitterbasis-Schaltung. Zwei koaxiale Resonanzkreise sind ineinander geschachtelt. Es wurden Messingrohre mit dem auf den erforderlichen Wellenwiderstand abgestimmten Durchmesser verwendet. Die Kontaktierung der Koaxanschlüsse erfolgt an der Anode und am Gitter über Federkontaktstreifen. Beim Kathoden- und Heizungsring sind die Rohre zur Kontaktierung geschlitzt. Bodenplatte und Anodenplatte sind ebenfalls mit Fingerkontakten versehen.

Der Luftschacht über dem Anodenradiator besteht aus einem Teflonring und einem geschlitzten Aluminiumring. Über den Aluminiumring wird auch die Anodenspannung zugeführt. Der Luftschacht ist an der oberen Abdeckung beweglich angebracht damit kein seitlicher Druck auf die Röhre ausgeübt wird.

3. Der Ausgangskreis

Der koaxiale Schwingkreis zwischen Gitter (Masse) und Anode arbeitet im 3/4 λ Mod. Abgestimmt wird kapazitiv mit einem Stempel im ersten Spannungsmaximum ca. 30 – 50 mm von der unteren Bodenplatte. Die Auskopplung der Sendeleistung erfolgt kapazitiv am oberen Teil des Topfes. Mit diesem kapazitiven Spannungsteiler wird die Transformation vom Arbeitswiderstand der Röhre (ca.2,5 k Ω) auf den Wellenwiderstand der Leitung vorgenommen. Die Auskopplung am oberen Topfende hat den Vorteil, dass dort für alle Frequenzen Spannungsmaximum ist, so dass der Kreis im ¼ λ Mod ebenfalls bedämpft wird und somit in der Nähe von 430 MHz nicht schwingen kann. Um Eigenschwingung zu vermeiden, ist es wichtig, dass die Kontaktfedern am Gitterrohr am gesamten Umfang fest anliegen damit keine Energie vom Ausgangskreis auf den Eingang gelangt. Der obere Teil des Topfes wird von der Abschlussplatte, der Röhre (Anode) und der mit 0,1 mm starken Kaptonfolie isolierten Messingplatte abgeschlossen. Diese Kondensatorplatte hat eine Kapazität von 600 – 800 pF. Sie wird mit einem Teflonring zentriert und mit einer 0,2 mm Teflonfolie und einer Messingplatte abgedeckt. Damit ist der Topf HF-dicht abgeschlossen.

4. Der Eingangskreis

Die Röhre wird zwischen Gitter (Masse) und Kathode angesteuert. Mit dem Koaxkreis im Eingang wird die Eingangsimpedanz der Kathode auf den Wellenwiderstand des Kabels transformiert. Weiterhin müssen die Heizleistung zugeführt und die Kathode sowie der Gitterring gekühlt werden. Das Koaxsystem (Gitter und Kathodenrohr) hat die elektrische Länge von 1 λ. Abgestimmt wird mit einem Alu-Ring, der isoliert und beweglich als Schieber ausgeführt ist. Befindet sich der Schieber in einem Spannungsmaximum, wirkt er überwiegend kapazitiv und damit verlängernd auf den Kreis. Im Strommaximum wirkt er als Stromverdrängungsschieber und vermindert die Induktivität und damit den Wellenwiderstand, was den Kreis verkürzt. So ergibt sich ein verlustarmer Resonator mit weitem Durchstimmbereich, so dass sich alle Röhren dieser Baureihe anpassen lassen. Am offenen Ende des Koaxsystems wird mittels einer Scheibe an einem N Stecker kapazitiv eingespeist. Der Abstand der Scheibe zum Kathodenrohr bestimmt die Spannungsteilung und damit die Transformation von dem Widerstand der Röhre auf den Wellenwiderstand des Kabels (50 Ω). Voraussetzung ist, der Kreis ist mit dem Schieber auf Resonanz abgestimmt, sodass am Einspeisepunkt ein Spannungsmaximum entsteht.

Im Kathodenrohr befindet sich durch Teflonbuchsen isoliert das Rohr für den Heizkontakt. Die Heizspannung wird über Drosseln und Durchführungskondensatoren dem Kathodenrohr und dem Heizungsrohr zugeführt. Die Kühlluft für die

Kathodenseite wird durch das innere Rohr zugeführt und verlässt den Kathodenraum über seitliche Bohrungen in der Fassung. Dann strömt die Luft durch das Gitterrohr und tritt durch Bohrungen in der Bodenplatte aus.

5. Der Kathodenspannungsregler

Soll die Röhre bei einer Anodenspannung von 3 kV und einem Ruhestrom von 80 mA betrieben werden, so ist eine negative Gittervorspannung von ca. 38 V nötig. Um diesen Betrag muss die Kathode positiv vorgespannt werden. Zur Vermeidung von Überschlägen in der Röhre sollte auch in Ruhe ein kleiner Strom von 3 – 10 mA fließen. Dieser Strom wird durch den Widerstand R1 bestimmt.

Wird das TX Relais aktiviert, so stellt sich ein Strom von ca. 70 mA ein, der von den Widerständen R2 + R3 bestimmt wird. Soll ein höherer Strom fließen, so muss der Abgriff am Widerstand R2 in Richtung Kathodenanschluss verschoben werden bis die Zenerspannung von D1 überschritten ist und der Transistor angesteuert wird. So lässt sich der Arbeitspunkt auf 80 mA und höher einstellen. Der Widerstand R6 übernimmt einen Teil der Last des Reglers und begrenzt den Strom durch die Röhre, wenn der Transistor durch einen Überschlag in der Röhre einen Emitter-Kollektor-Schluss bekommt.

6. Einschalten und Abgleichen

Wenn Lüfter, Heizung und Hochspannung einschaltbereit sind, werden die Grundeinstellungen vorgenommen. Der Koppelstempel des Eingangskreises wird auf 1 mm Luftspalt zum Kathodenrohr eingestellt und der Auskoppelstempel auf 2 mm zum Gitterrohr. Dann wird die Schelle von R2 für den Spannungsteiler in die Mitte geschoben. In die Anodenspannungs-Zuführung wird ein Widerstand von ca. 1 k Ω geschaltet. Nun können der Lüfter und die Heizung eingeschaltet werden.

Da die Röhren alle älter als 10 Jahre sind, ist es nötig, sie ca. 30 Minuten zu heizen, um dann die Anodenspannung über einen Hochlastwiderstand aufzuschalten. Dieses ist wegen der Erwärmung des Widerstandes nicht lange möglich, sollte dann unterbrochen und wiederholt werden, so werden Schlüsse festgestellt und Spannungen und Ströme überprüft.

Ist der Ausgang des Verstärkers mit Lastwiderstand und Leistungsmesser abgeschlossen, kann die volle Hochspannung eingeschaltet werden.

Zum ersten Abgleich steuert man mit 5-10 W an. Dann wird der Schieber bewegt, bis der Anodenstrom auf ein Maximum angestiegen ist. Nun lässt sich der Anodenkreis auf maximale Ausgangsleistung trimmen. Die Reflektionswerte des Eingangs sollte mit Richtkoppler gemessen auf minus 16 – 20 dB abgeglichen werden. Dieses geschieht durch verändern der Kopplung. Da bei einer Gitterbasisschaltung der Ausgangswiderstand und der Eingangswiderstand mit der Röhre in Reihe liegen, hat die Auskopplung und Abstimmung auf der Anodenseite einen Einfluss auf die Anpassung des Einganges. Der Abgleich des Einganges ist nach der Optimierung der Ausgangsleistung erneut zu überprüfen.

Zur Optimierung der Ausgangsleistung folgender Hinweis: Nähert man den Koppelstempel dem Gitterrohr (festere Kopplung), so wird der Arbeitswiderstand kleiner. Die Verstärkung geht zurück, an der Anode ist die Spannung größer, dadurch sinkt der Gitterstrom. Bei lockerer Kopplung verhält es sich umgekehrt. Man hat höchste Verstärkung, muss aber die Ansteuerung zurücknehmen, da der Gitterstrom schnell unzulässig hoch wird. Durch eine zu lockere Kopplung wird die Betriebsgüte zu hoch und der Kreis wegen der geringen Bandbreite leichter verstimmbar durch thermische Veränderungen in der Röhre. Durch Veränderung der Kopplung lässt sich für eine gegebene Steuerleistung die Einstellung für höchste Ausgangsleistung finden.

7. Gemessene Werte / Measured Results

Siehe untenstehende Tabelle.
See table below.

Pin (W)	Pout (W)	g (db)	Ua (kV)	Ia (mA)	Uk (V)	Ig 1 (mA)	Q An. (W)	η (%)
0	0	-	3,1	80	39	0	248	-
4,8	200	16,1	3,0	520	46	0	1360	12,8
11	400	15,6	2,9	750	47	0	1775	18,3
28	600	13,3	2,8	880	49,5	22	1864	24,3
35	750	13,3	2,8	980	52	30	1994	27,3

8. Röhrendaten / Tube Data

Parameter	Sym bol	Unit	Wert - YD 1334/1336	Wert YD 1335
Heiz-spannung	Uf	V	6 – 6,3	6 – 6,3
Heizstrom	If	A	4,8 -5,8	4,8 -5,8
Kapazität Anode-Gitter	Cag	pF	6,8 – 8	6,8 – 8
Kapazität Gitter-Kath.	Cgk	pF	20 – 30	20 – 30
Kapazität Anode-Kath.	Cak	pF	0,09 – 0,18	0,09 – 0,18
Steilheit	s	mA/V	ca. 70	ca. 70
Anodensp.	Ua	V	max. 3500	max. 3500
Anodenverl.-Leistung	Qa	W	1800	1900
Gitterstrom	Ig	mA	5	5
Kathoden-strom	Ik	mA	max. 700	max. 800
Gitter-spannung	Ug	V	max. – 200	max. - 200
Vorheizzeit	th	sec.	180	180

9. Diskussion der Ergebnisse

Die veröffentlichten Werte wurden mit einer neuen Röhre erzielt. Die Leistungsmessung erfolgte mit HP432A und vorgeschaltetem 30dB-500W-Abschwächer von Bird, in Reihe mit einem 20dB-Dämpfungsglied von HP. Die Zusammenschaltung der Abschwächer ergab eine Dämpfung von 50,1dB. Die Kabeldämpfung von 1m HCF ½" wurde nicht berücksichtigt. So kann die Leistung am Ausgang der PA ca. 5% höher sein. Es wurde zum Test bis zu einer Ausgangsleistung von 900 Watt angesteuert.

Die Frage ist nun, wie hoch darf man die Röhre aussteuern, was sagen die Hersteller-Daten und wie sind diese auszulegen. Es liegen vom Hersteller keine Daten für SSB oder CW Betrieb vor, da diese Betriebsarten für UHF-Röhren nicht vorgesehen sind. Der Röhrenhersteller gibt für einen TV-Verstärker folgende Einstellung an:

Ua 3kV, Ia 650mA, Steuerleistung 7W, Ausgangsleistung 200W, bei einem geforderten Intermodulationsabstand von 54 dB. Für diese hohe Linearität ist der A Betrieb erforderlich mit einem stabilen Arbeitspunkt im linearen Bereich der Kennlinie. Für den Funkamateur macht es keinen Sinn, eine Endstufe mit 54 dB Intermodulationsabstand zu bauen, da die Transceiver, von denen die Stufen angesteuert werden, nur Werte von 25 – 35dB aufweisen. Höhere IM-Werte sind für Sprachübertragung nicht erforderlich.

Es bietet sich für SSB der AB-Betrieb mit ca. 100 mA Ruhestrom an und für CW der C-Betrieb. Damit ist eine Ausgangsleistung von 600 W möglich ohne die Lebensdauer bedeutend zu vermindern.

Bei 500 W Ausgangsleistung können die Herstellerwerte eingehalten werden.

Mit dieser Leistung ist die Endstufe im Kontestbetrieb hinreichend mit gutem Ergebnis getestet worden.

10. Spezielle Bauteile

Federkontakt-Streifen (Finger Stock), Form S
Fa. Feuerherdt, Berlin, Tel.:030/7559094
R1 Hochlast-Draht-Widerstand mit verstellbarem Abgriff, 100Ω 15 W, Fa. Bürklin, Best. Nr. 64E110
R6 Hochlastwiderstand 33Ω 50 W RH50, Fa. Dale
Rp 5x Sicherheits-Metallschicht-Widerstand 1.8 MΩ 1W Fa. Bürklin, Best. Nr.20E932
Lüfter: G2E108-A01-01 von Fa. EBM GmbH & Co.
Distributor: Fa. Breuell & Hilgenfeld, Hamburg
Tel.: 040/538092-20 E-Mail: info@breuell.de

11. Quellennachweis / Literature

Valvo Handbuch, Senderöhren für Nachrichtensender,1977

12. TNX

Herzlich bedanken möchte ich mich bei Norbert DL9EAJ, der mir die gesamten Zeichenarbeiten abgenommen hat.

Amplifier for the 23cm-band with the YD 1336 Triode

Hubert Tiedmann, DJ3FI

1. Introduction

The chosen tube was originally developed for use in TV repeater stations. Here transistors have replaced tubes due to their unlimited lifetime, but VHF/UHF/SHF-radioamateurs still make their contests and EME-QSOs mostly with tube amplifiers. The limited lifetime (10,000 to 20,000 hours) is sufficient for amateur operation, even if the tube was already used.

It makes sense to use a tube amplifier on 23cms because the tube also has some advantages at these power levels.

The socket for the YD1336 is the same as for the TH 308, TH 329, YD 1333, YD1335 and YD 1337. The anode dissipation of these tubes ranges from 700 W with the TH 308 to 1900 W with the YD

1335, so the length and diameter of the anode radiator and the internal capacitances are different. The input circuit of this amplifier has a broad tuning range, so all the above mentioned types could be matched. However, if a TH308 is used, the anode resonator has to be lengthened by 1 cm.

2. Construction of the Amplifier

The amplifier is constructed as a coaxial resonator and the triode is working in a grounded grid circuit. Two coaxial resonance circuits are built into each other. Brass tubes with a diameter matching to the necessary impedance were used. The contact of the coaxial feeds at the anode and grid is made from finger stock material. The tubes at the cathode and heater ring are slotted to make better contact. The base plate and anode plate also have contacts made of finger stock.

The chimney above the anode radiator is made from a Teflon ring and a slotted aluminium ring. The anode voltage is supplied through this aluminium ring. At the upper side the chimney can be moved in order to prevent any mechanical pressure on the tube.

3. The Output Circuit

The coaxial circuit between the grid (ground) and the anode is 3/4 λ. The tuning is capacitive at the first voltage maximum, located ca. 30 to 50mm from the lower base plate.

The power output coupling is also done capacitively, on the upper side of the cavity. This realizes the impedance transformation between the load resistance of the tube (ca. 2.5 kΩ) and the impedance of the feedline. The output coupling at the upper end of the cavity gives the advantage that it is the voltage maximum for all frequencies and the resonance in ¼ λ mode is also attenuated, resulting in no oscillation possibility around 430 MHz.

To avoid unwanted oscillations it is also important that the contacts from the finger stock are pressed tightly all around the grid ring, so no energy can leak from the output circuit to the input.

The upper side of the cavity is terminated by the terminating plate, the tube (anode) and the brass plate that is insulated with a 0.1mm sheet of Kapton. This results in a capacitor of 600 to 800pF. This plate is centered with a Teflon ring and covered with a 0.2mm Teflon sheet and a plate of brass. This makes the unit closed for any RF.

4. The Input Circuit

The tube is driven between the grid (ground) and the cathode. The coaxial input circuit transforms the input impedance from the cathode to the impedance of the feedline. The power for the heater filaments also has to be supplied, and the cathode and the grid ring have to be cooled.

The coaxial system (grid and cathode tube) has the electrical length of 1 λ. The tuning is done with an insulated and moveable ring of aluminium. When this ring is located in a voltage maximum its effect is more capacitive and makes the circuit electrically longer. When the ring is located in a current maximum, its effect is pushing away the current, lowering the L and the impedance and making the circuit electrically shorter. This results in a resonator with low losses and a broad tuning range, making it possible to match all the above mentioned tubes.

At the open end of the coaxial system a capacitive input coupling is realized with a round disk and an N-connector. The distance from the disk to the cathode tube determines the ratio of the voltage and thereby the transformation from the impedance of the tube to the impedance of the feedline (50 Ω). The required condition is that the main circuit is tuned to resonance to have a voltage maximum at the input point.

Inside the cathode tube there is another tube for the filament contact that is insulated with Teflon washers. The filament voltage is supplied to the cathode tube and the filament tube through a choke with feedthrough capacitors.

The air for cooling the cathode is supplied to the inner tube and leaves the cathode area through holes at the side of the socket. Then the air goes through the grid tube and leaves the unit through holes in the base plate.

5. Regulation of the Cathode Voltage

If the tube is to work at an anode voltage of 3 kV and a bias idle of 80 mA, we need a negative bias voltage of around 38 V at the grid. Since the grid is DC-grounded, the cathode has to be made 38 V more positive. In order to prevent any flash-over in the tube there should be always a small current of 3 to 10 mA. This current is determined by the resistor R1.

If the TX relay is switched on there is a current of around 70mA. This current is determined by R2 and R3. If a higher current is necessary the tap at R2 has to moved towards the cathode until the Zener voltage of D1 is reached and drives the transistor. 80mA and more can be achieved. The resistor R6 takes a part of the load of the regulator and limits the current through the tube in case of a emitter-collector short circuit after a flash-over.

6. Switching On and Tuning

If the blower, heater supply and high voltage are ready for use, the primary adjustments can be made.

The coupling of the input circuit is adjusted to 1mm distance to the cathode tube. The output

coupling is adjusted to 2mm distance to the grid tube. The R2 divider is set to the middle. Into the anode voltage feedline a resistor of 1 kΩ is inserted. Now the blower and the tube's heater can be switched on.
As all these tubes are older than 10 years it is necessary to heat them for 30 minutes before supplying the anode voltage via a high load resistor. This may not be possible for a long time due to the heat in the resistor, so the process may have to be stopped and repeated again and again. In this way, short-circuits can be determined and voltages and currents can be checked.
If the output of the amplifier is terminated with a dummy load and a power meter, the full anode voltage can then be supplied. For the first matching, 5 to 10 Watts are supplied to the input. Now the tuning ring is moved until the anode current is at a maximum. Then the anode circuit can be tuned to maximum power output. The reflection at the input should be measured with a directional coupler and tuned by changing the input coupling to give a return loss of at least 16 to 20 dB (SWR <1.4). Due to the grounded grid circuit the output and input impedances are in series with the tube. This means that the output coupling and tuning of the anode also has some influence on the input matching. So after optimising the output the input has to be checked and retuned again.
A hint for optimising the output power: if the tuning ring is moved closer to the grid tube (tighter coupling) the working resistance is getting lower. The amplification is going down and the voltage at the anode is going up, resulting in a lower grid current. The opposite happens with a loose coupling: we have higher amplification and have to reduce the driving power, because the grid current gets too high. If the coupling is too loose the working Q gets too high, and due to the small bandwidth of the circuit it becomes sensitive to detuning due to thermal changes from the tube. For a given input power the tuning of the coupling always allows to find the highest output power.

7. Measured Results
See table in the German text.

8. Tube Data (See table)

9. Discussion of the results
The values were achieved with a new tube. The power was measured with a HP432A power meter and a 30dB/500W attenuator from Bird in series with a 20dB attenuator from HP. Both attenuators gave 50.1 dB. The cable loss from 1m HCF ½in was not considered, so the power at the output of the PA may be some 5% higher. For test purposes the amplifier was driven up to 900 watts of output power.

Parameter, Symbol		Unit	YD 1334/1336	YD 1335
Filament Voltage	Uf	V	6 – 6,3	6 – 6,3
Filament Current	If	A	4,8 -5,8	4,8 -5,8
Capacity Anode-Grid	Cag	pF	6,8 – 8	6,8 – 8
Capacity Grid-Cath.	Cgk	pF	20 – 30	20 – 30
Capacity Anode-Cath.	Cak	pF	0,09 – 0,18	0,09 – 0,18
Mutual Conductance	s	mA/V	ca. 70	ca. 70
Anode Voltage	Ua	V	max. 3500	max. 3500
Anode Diss. Loss	Qa	W	1800	1900
Grid Current	Ig	mA	5	5
Cathode Current	Ik	mA	max. 700	max. 800
Grid Voltage	Ug	V	max. – 200	max. - 200
Heat. Time	Th	sec.	180	180

The question is what the maximum input power for the tube should be, and how to interpret the manufacturer's data. Of course, there are no data available for SSB or CW, because these tubes were made for other applications. The manufacturer provides this for a TV transmitter: Ua 3kV, Ia 650mA, Input power 7W, Output power 200W, for a necessary intermodulation value (IM) of 54dB. For this high linearity the tube must work in class A mode, but for radio amateurs this is not required because the driving transceivers only have IM of 25 to 35 dB. So for SSB, class AB operation with around 100mA bias current should be a solution. For CW only, class C mode is OK of course. With this an output power of 600 watts is possible without any big decrease of the tube's lifetime.
At 500 watts output all specifications of the manufacturer are fulfilled. With this power the PA was tested under contest conditions with good results.

10. Special parts
Finger Stock, Form S: Fa. Feuerherdt, Berlin, Phone: +49 30 7559094.
R1 High power wirewound resistor (with adjustable tap) 100 Ω 15 W: Fa. Bürklin, Munich, Order Nr. 64E110.
R6 High power resistor 33Ω 50 W RH50, Fa. Dale.
Rp 5x Safety-metalfilm-resistor 1.8 MΩ 1W: Fa. Bürklin, Order Nr. 20E932.
Blower: G2E108-A01-01 Fa. EBM GmbH & Co. Distributor: Fa. Breuell & Hilgenfeld, Hamburg, Tel.: ++49 40538092-20 info@breuell.de

Parts List

Teil	Anz.	Einh.	Benennung	Werkstoff	Z. Nr.
1	1		Abdeckung für Luftschacht	Aluminium	3
2	1		Haltering für Teflonschacht	Aluminium	17
3	1		Teflonschacht	PTFE	20
4	1		Luftschacht	Aluminium	12
5	1		Röhrenabschluss	Aluminium	18
6	1		H.V. Platte für Anode	Messing	7
7	1		Abdeckung HV Platte	Messing	5
8	1		Zentrierung HV Platte	PTFE	6
9	1		Abschluss Anodentopf	Messing	8
10	1		Kupferwinkelstück	Kupfer	12
11	1		Kathodenrohr	Messing	14
12	1		Heizungsrohr	Messing	22
13	1		Zentrierung Heizungsrohr	PTFE	24
14	1		Isolierung Kathodenschieber	PTFE	10
15	1		Kathodenschieber	Aluminium	10
16	1		Anodentopf	Messing	13
17	1		Halterung Kathodenrohr	Messing	9
18	1		Zentrierung Kathodenrohr	PTFE	9
19	1		Zentrierung Heizungsrohr	PTFE	24
20	1		Stift für Kathodenschieber	Hartgewebe	11
21	1		Bodenplatte Anodentopf	Messing	1
22	1		Gitterrohr	Messing	25
23	1		Luftschacht Kathode	PTFE	24
24	1		Bodenplatte Gitterrohr	Messing	19
25	1		Gewindebuchse	Messing	2
26	1		Koppelplatte Input	Messing	2
27	1		N - Einbaubuchse		2
28	4		Haltebolzen	Messing	2

	Datum	Name
Bearb.	02/2003	Couhorn
Gepr.	02/2003	Tiedmann
Norm		

Stückliste 1

DJ 3 FI — Linear Amplifier 1296 MHz

Blatt / Blätter — Zust. / Änderung / Datum / Name — Ers. für / Ers. durch

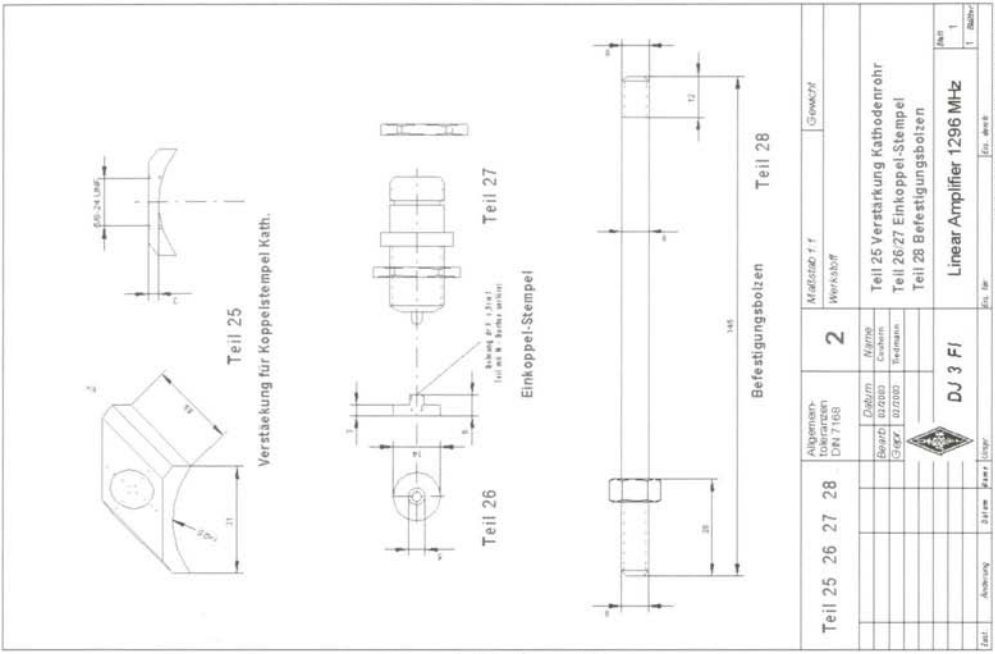
Teil	Anz.	Einh.	Benennung	Werkstoff	Z. NR.
29	1		Radiallüfter Fa. EBM Typ: G2E 108- AA - 01	———	———
30	1		Zentrierung Kathodenrohr	PTFE	11
31	1		Kupferrohr 18 x 1 55 lang Kathodenbelüftung	Kupfer	19
32	1		Kupferrohrwinkel Kathodenbelüftung	Kupfer	19
33	1		Kupferrohrwinkel Kathodenbelüftung	Kupfer	19
34	1		Kupferrohr 18 x 1 30 lang Kathodenbelüftung	Kupfer	19
35	1		Abstimmstempel	Messing	23
36	1		Schlauch 18 x 3 195 lang	PVC	23
37	1		Abstimm C	Messing	23
38	2		Gewindeplatte	Messing	26
39	1		Feststellring	Messing	26
40	1		Buche für Auskopplung	Messing	26
41	1		Auskoppelstempel mit 7/16 Buchse		27
42	1		Kappe für Abstimmung	Aluminium	28
43	1		Stellring	V2A	28
44	1		Gewindespindel	V2A	28
45	1		Buchse für Durchführungs C	Messing	28
46	1		Folie für Anodenblock-C über H.V Platte	Teflon	16
47	1		Folie für Anodenblock-C unter H.V Platte	Kapton/Teflon	16
48	1		Röhre YD 1335 /1336		4
49	1		Isolation	Teflon	
50	1		Mutter aufgelötet	Messing	
51					
52					
53					
54					
55					
56					

	Datum	Name
Bearb.	02/2003	Couhorn
Gepr.	02/2003	Tiedmann
Norm		

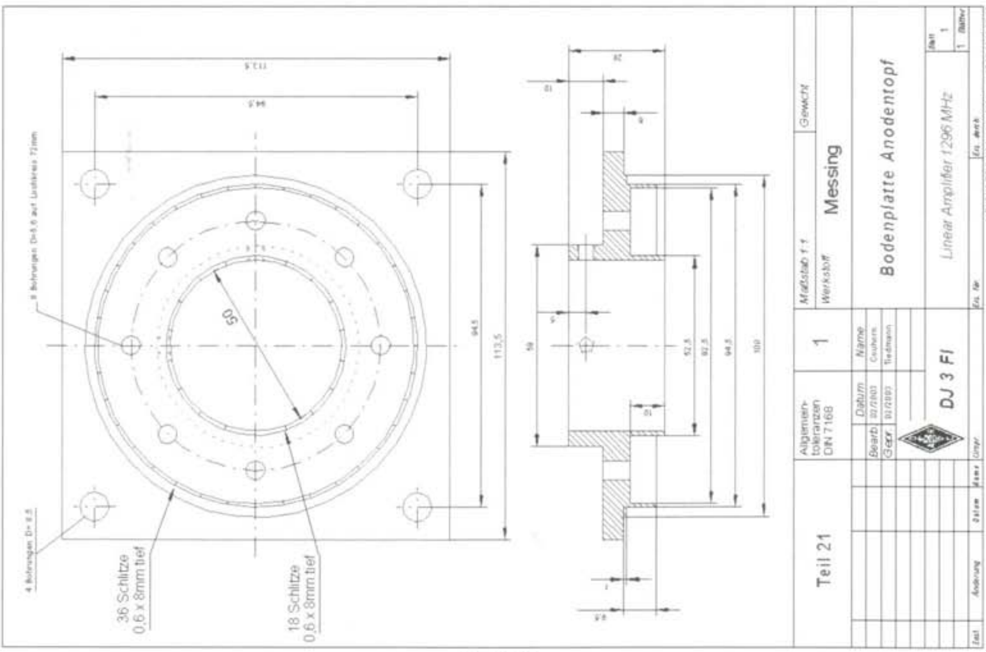
Stückliste 2

DJ 3 FI — Linear Amplifier 1296 MHz

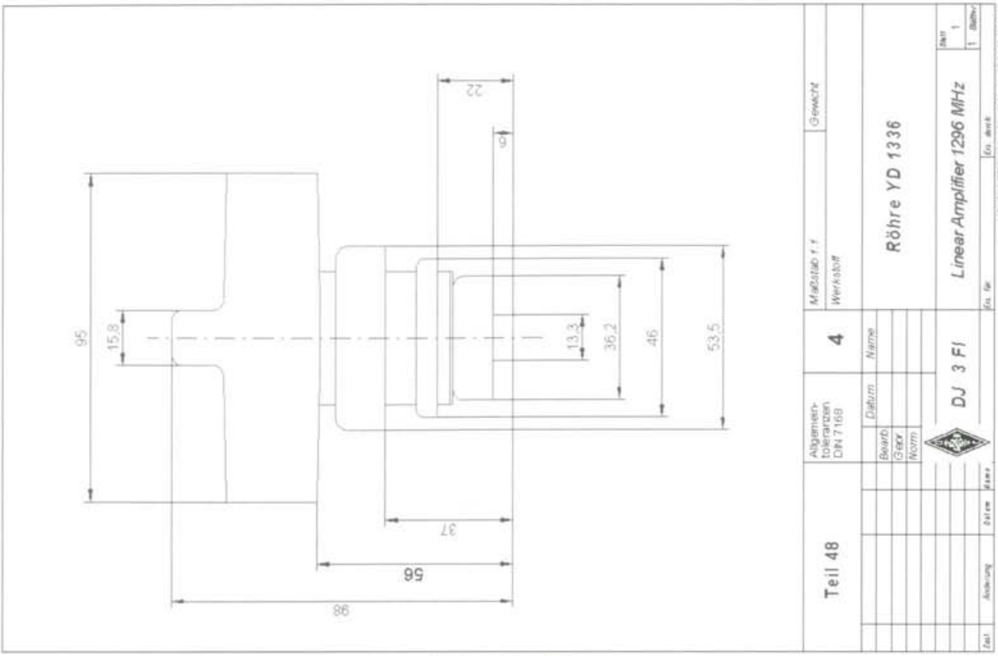
Blatt 2 / Blätter — Zust. / Änderung / Datum / Name — Ers. für / Ers. durch



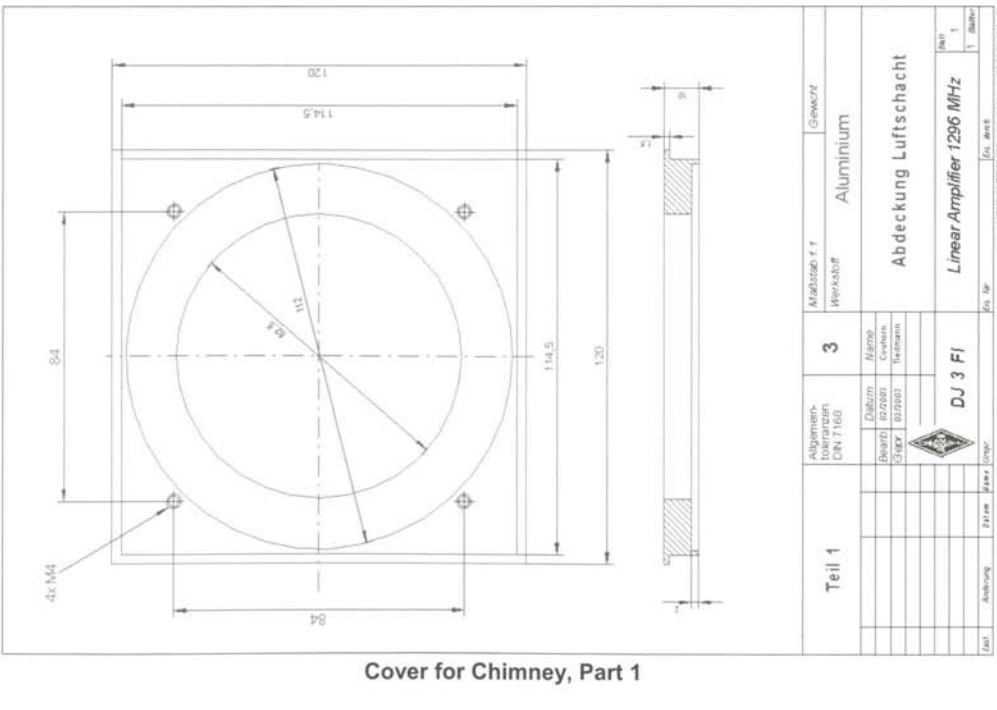
Part 25, 26, 27 and 28



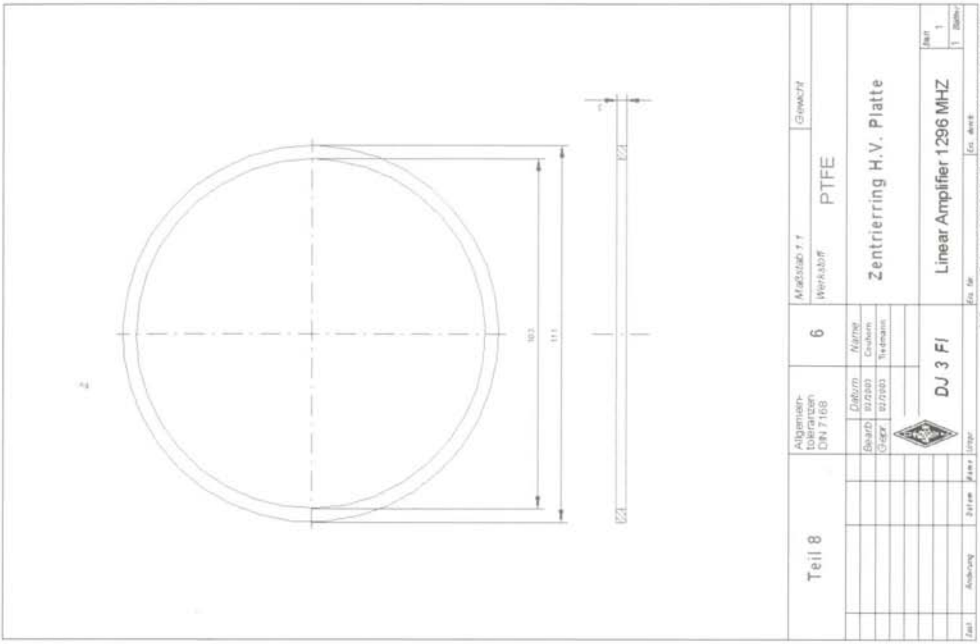
Part 21



Tube YD 1336

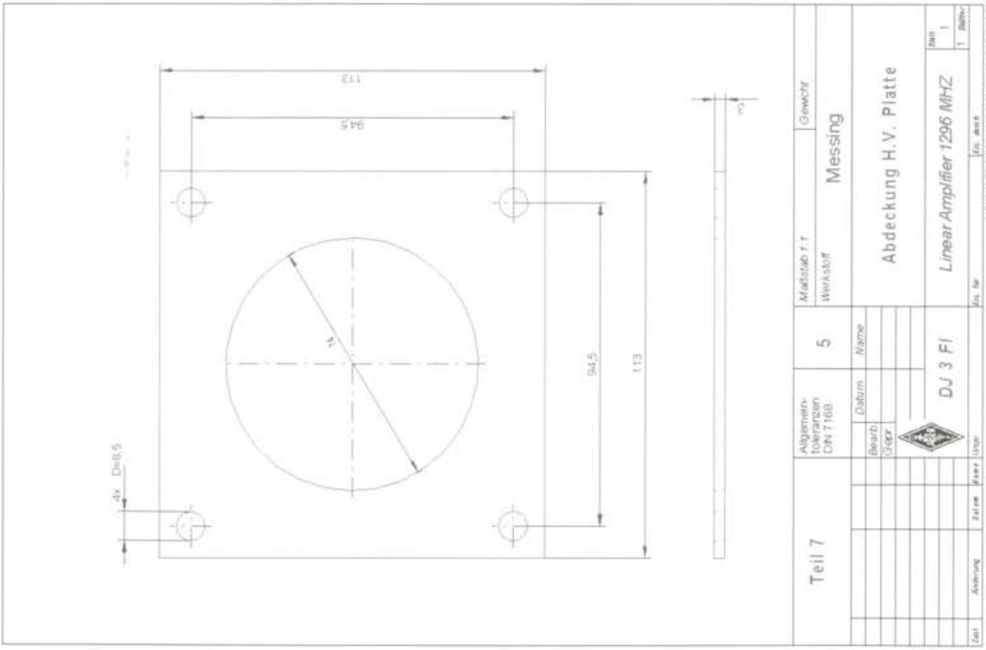


Cover for Chimney, Part 1



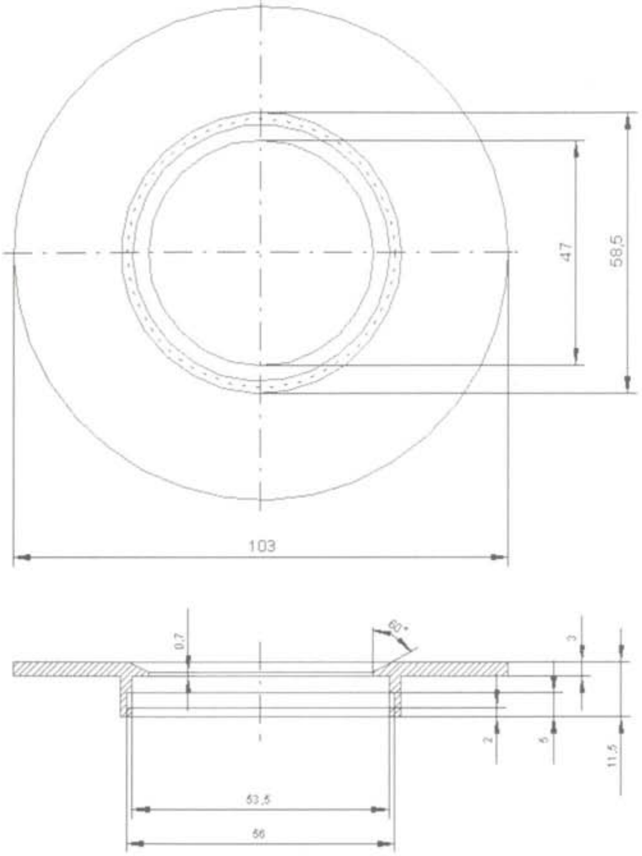
Teil 8
Allgemein-toleranzen DIN 7168
6
Maßstab 1:1
Gewicht
Werkstoff
PTFE
Zentrierring H.V. Platte
Linear Amplifier 1296 MHZ
DJ 3 FI
Datum
Name
Bearb
Gepr
103
111

Part 8



Teil 7
Allgemein-toleranzen DIN 7168
5
Maßstab 1:1
Gewicht
Werkstoff
Messing
Abdeckung H.V. Platte
Linear Amplifier 1296 MHZ
DJ 3 FI
Datum
Name
Bearb
Gepr
4x D=8,5
94,5
113

Part 7



Teil 6	Allgemein-toleranzen DIN 7168	7	Maßstab 1:1 / Gewicht / Werkstoff **Messing**
	Datum	Name	
Bearb.	02/2003	Couhorn	**H.V. Platte**
Gepr.	02/2003	Tiedmann	
	DJ 3 FI		Linear Amplifier 1296 MHZ — Blatt 1 — 1 Blätter
Zust. / Änderung / Datum / Name	Urspr.	Ers. für:	Ers. durch:

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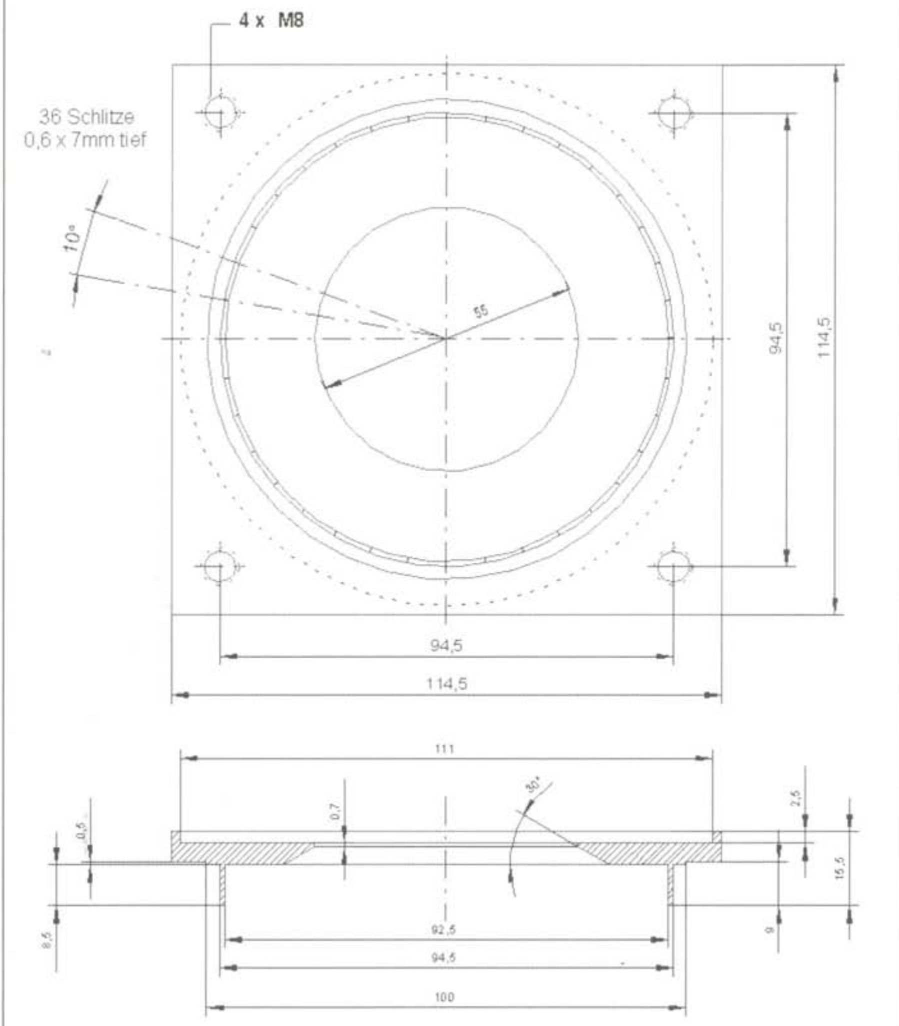
Part 6



Teil 9				Allgemein-toleranzen DIN 7168	8	Maßstab 1:1 / Gewicht / Werkstoff
				Datum	Name	
				Bearb. 02/2003	Couhorn	Abschluss Anodentopf
				Gepr. 02/2003	Tiedmann	
				DJ 3 FI		Linear Amplifier 1296 MHZ — Blatt 1 — 1 Blätter
Zust.	Änderung	Datum	Name	Urspr.		Ers. für: / Ers. durch:

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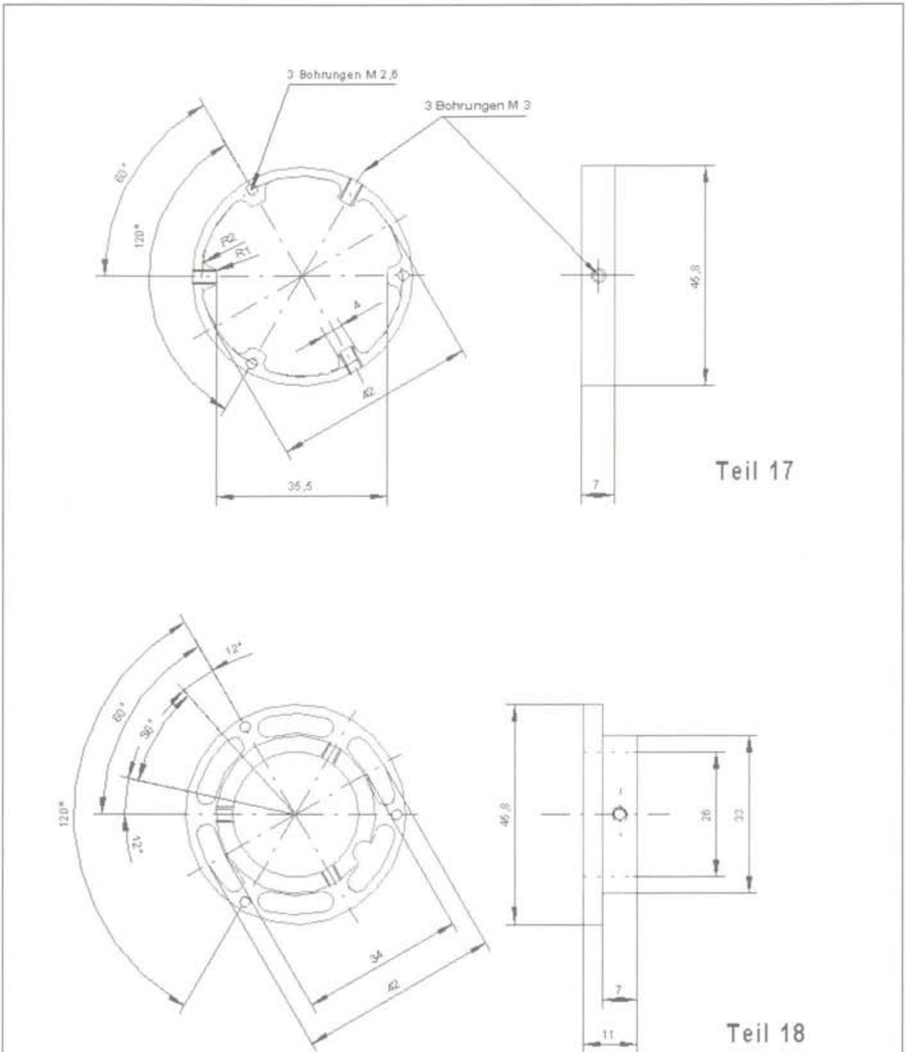
Part 9



Teil 17 18	Allgemein-toleranzen DIN 7168	9	Maßstab 1:1 / Gewicht
			Werkstoff 17 Messing 18 Teflon

	Datum	Name	
Bearb.	02/2003	Couhorn	Halterung Kathodenrohr
Gepr.	02/2003	Tiedmann	

DJ 3 FI

Linear Amplifier 1296 MHZ — Blatt 1 — 1 Blätter

Zust. | Änderung | Datum | Name | Urspr. | Ers. für: | Ers. durch:

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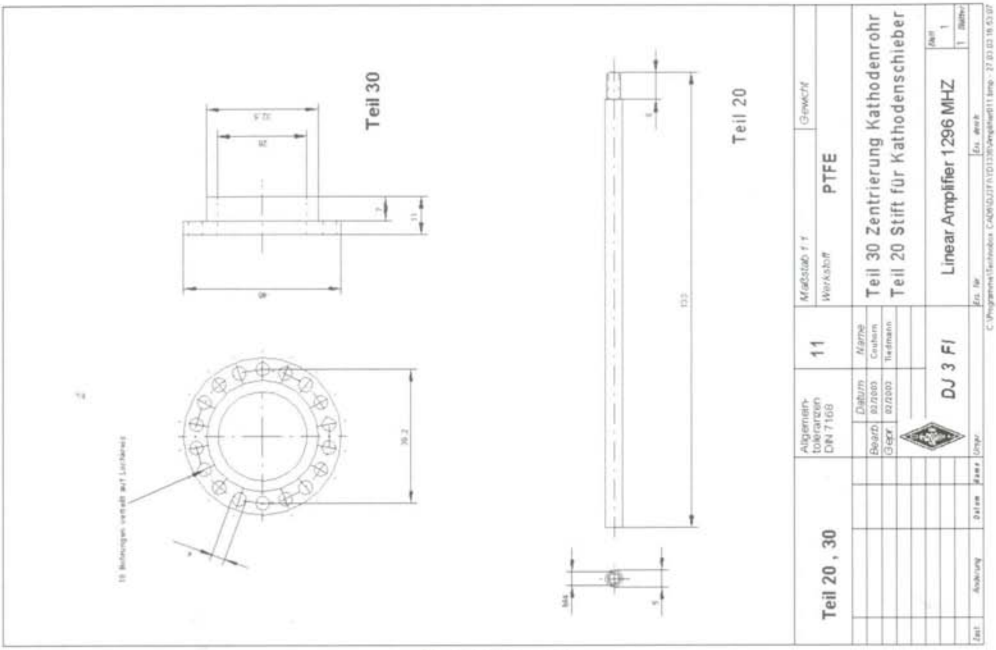
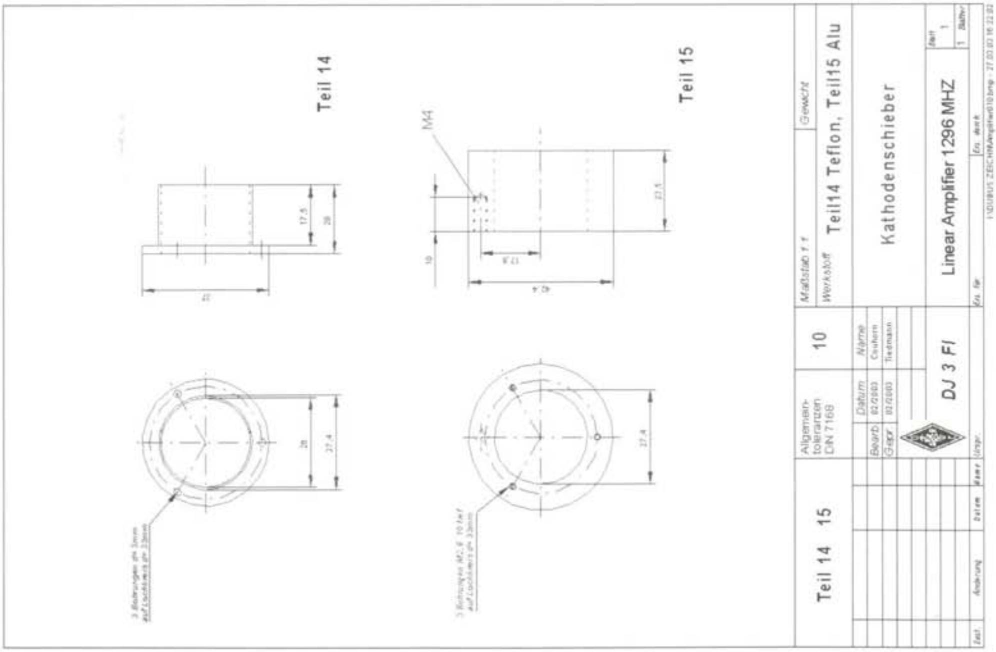
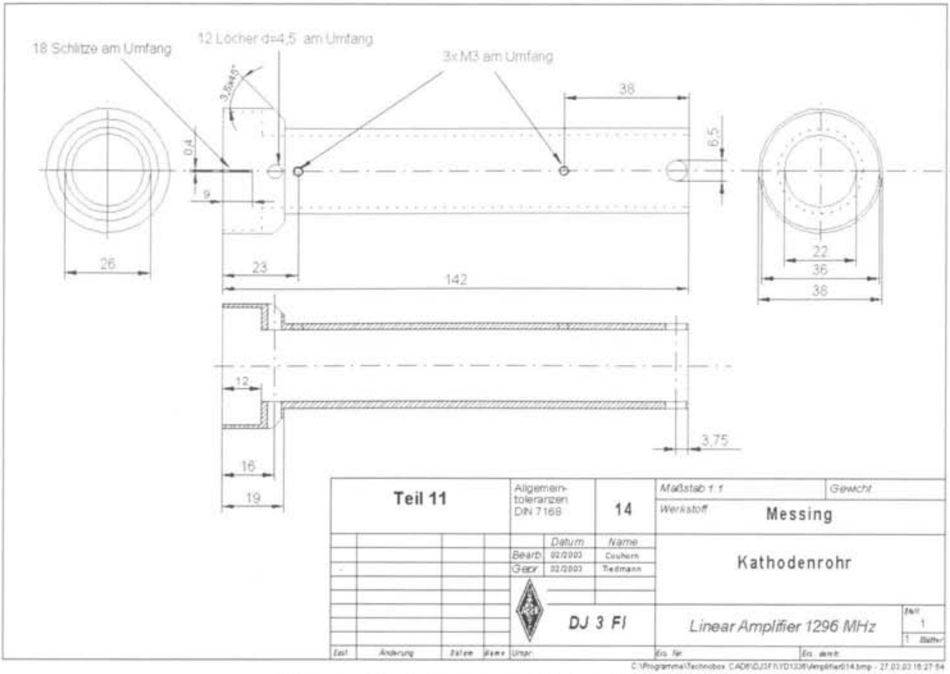
Part 17, 18



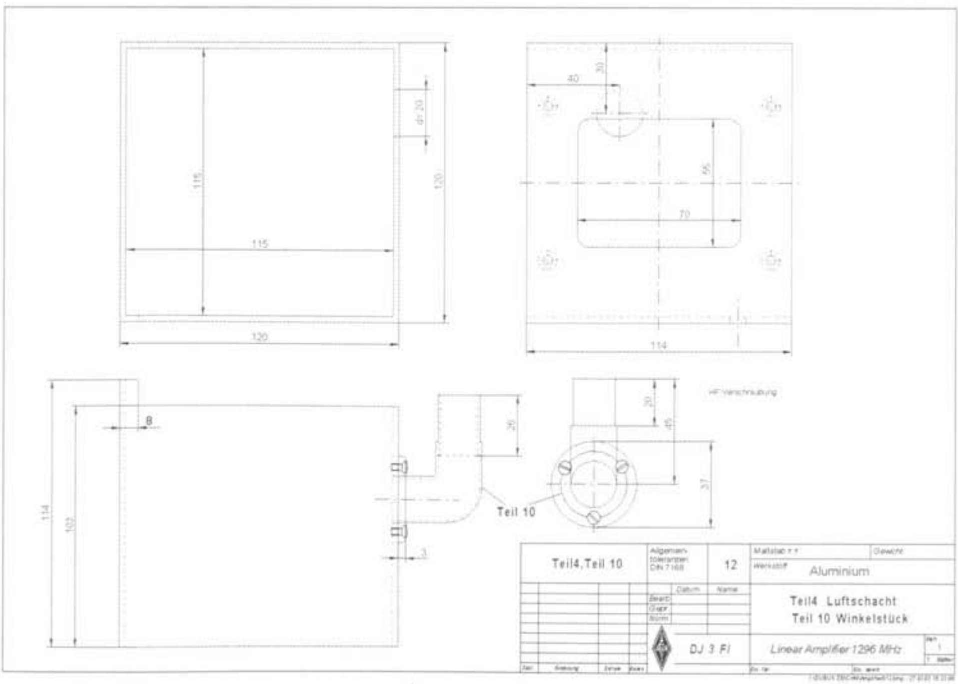
Part 30 and 20

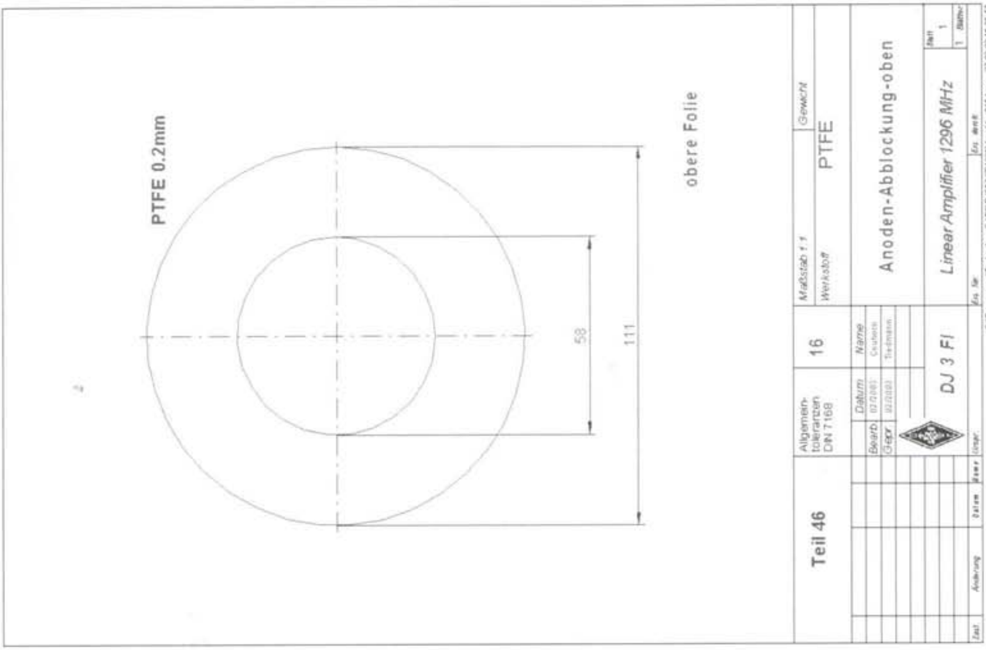


Part 14 and 15

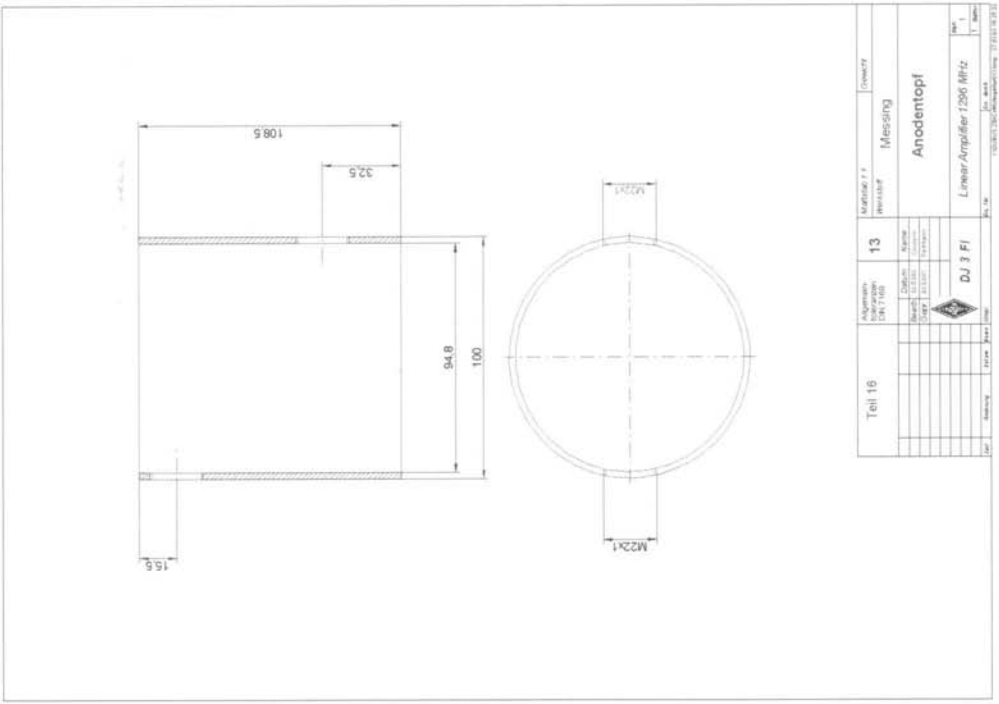


Part 11 (top), Part 4 and 10 (bottom)

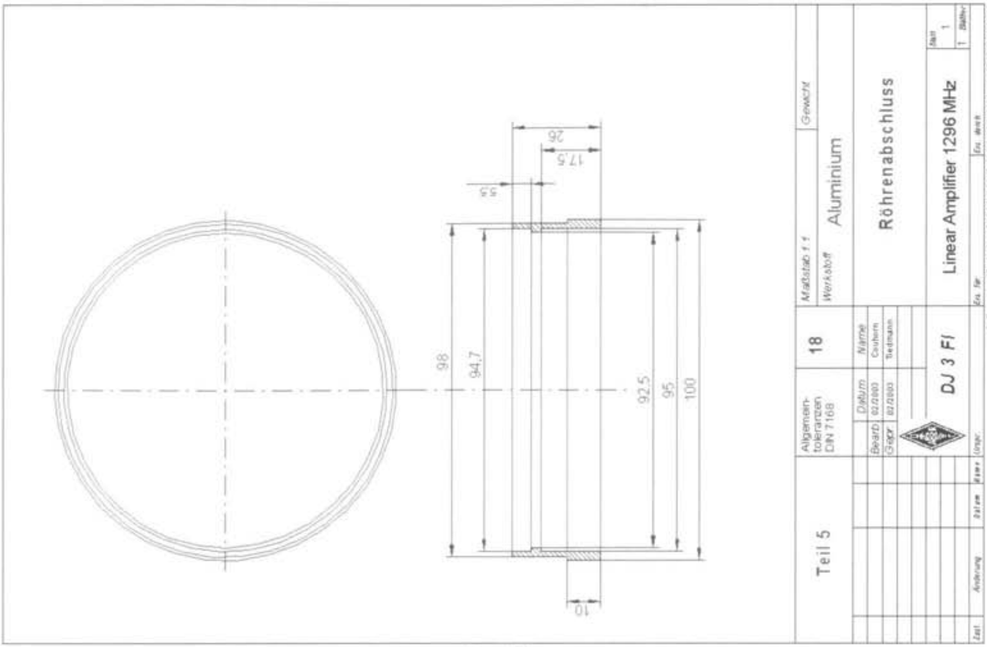




Part 46 and 47



Part 16

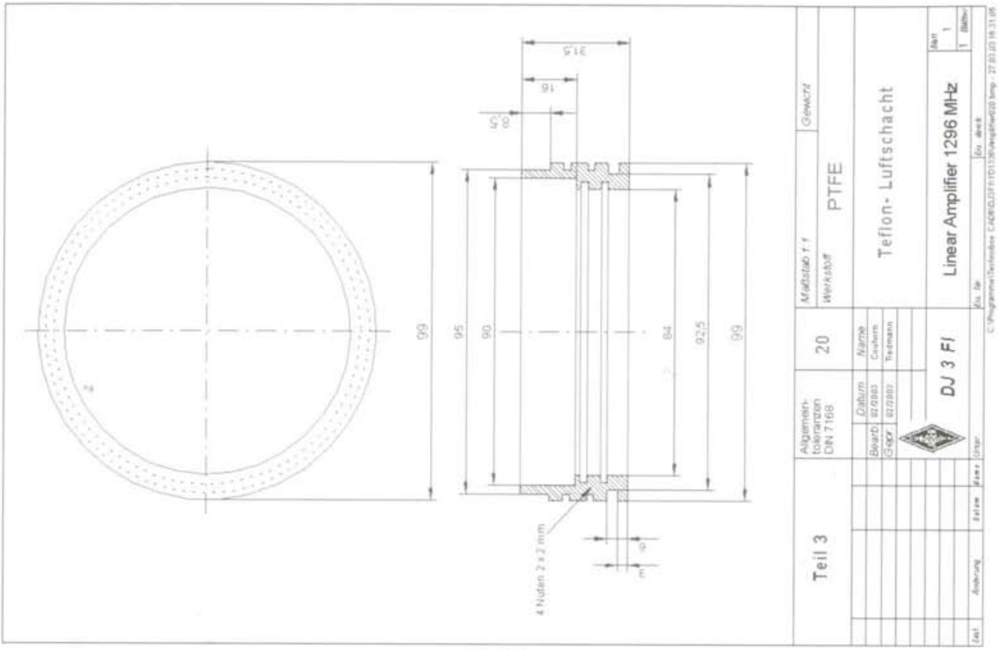


98
94,7
92,5
95
100
10
5,5
17,5
26
Teil 5
Allgemeintoleranzen DIN 7168
18
Maßstab 1:1
Gewicht
Werkstoff
Aluminium
Röhrenabschluss
Datum
Name
Bearb. 02/2003 Couhorn
Gepr. 02/2003 Tiedmann
DJ 3 FI
Linear Amplifier 1296 MHz

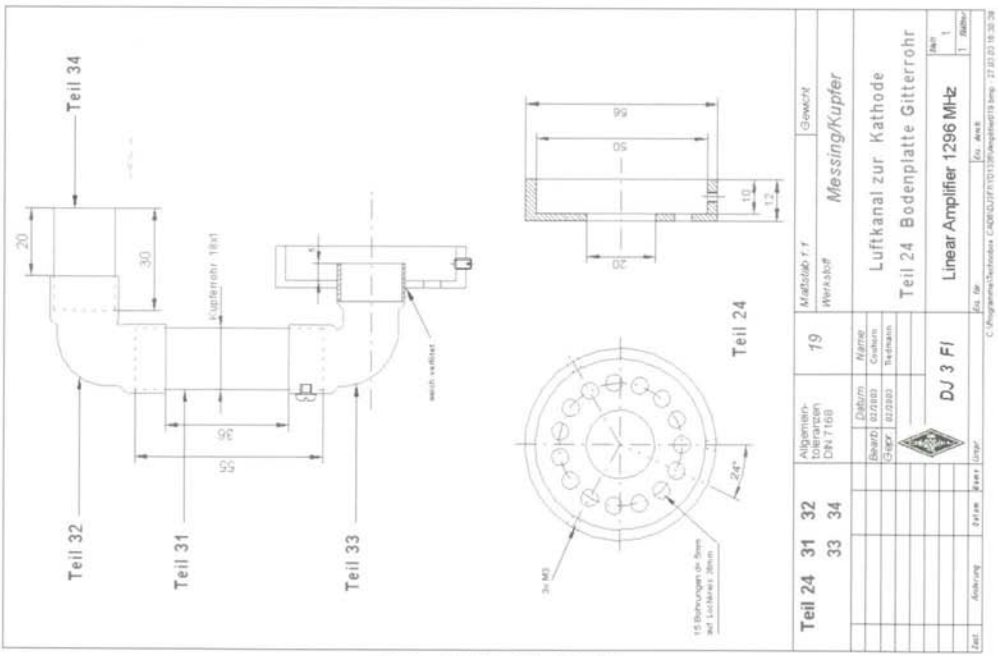
Part 5

93,5
99,5
111,5
3,5
Teil 2
Allgemeintoleranzen DIN 7168
17
Maßstab 1:1
Gewicht
Werkstoff
Aluminium
Haltering für Teflonschacht
Datum
Name
Bearb. 02/2003 Couhorn
Gepr. 02/2003 Tiedmann
DJ 3 FI
Linear Amplifier 1296 MHz

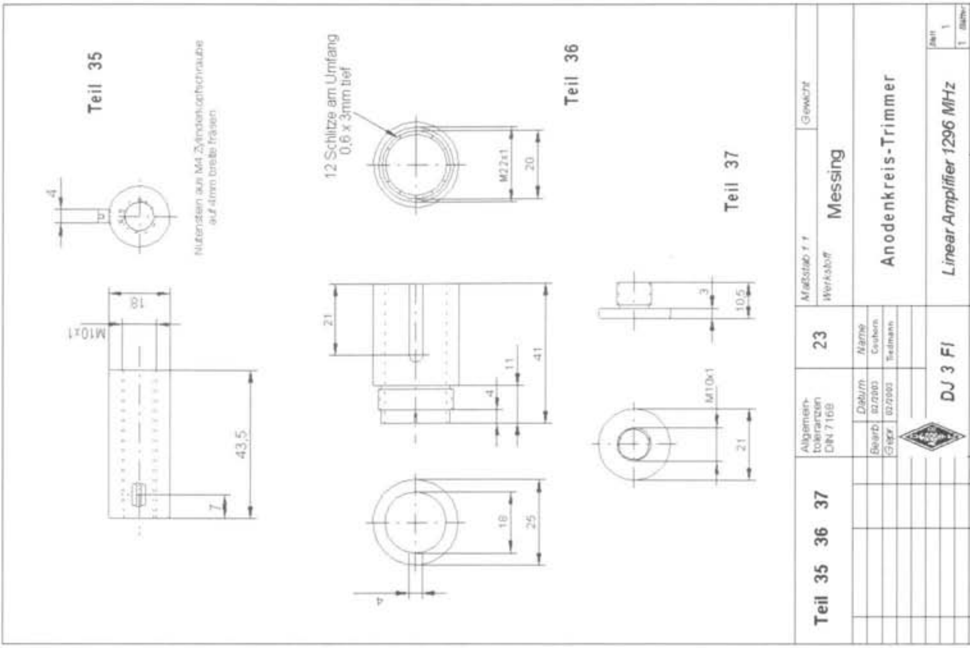
Part 2



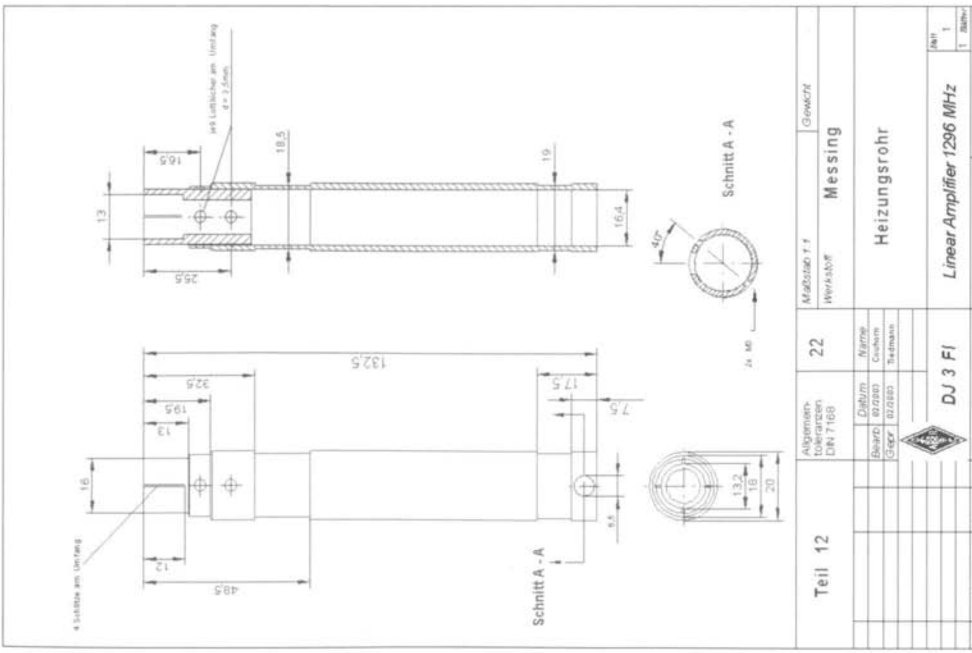
Part 3



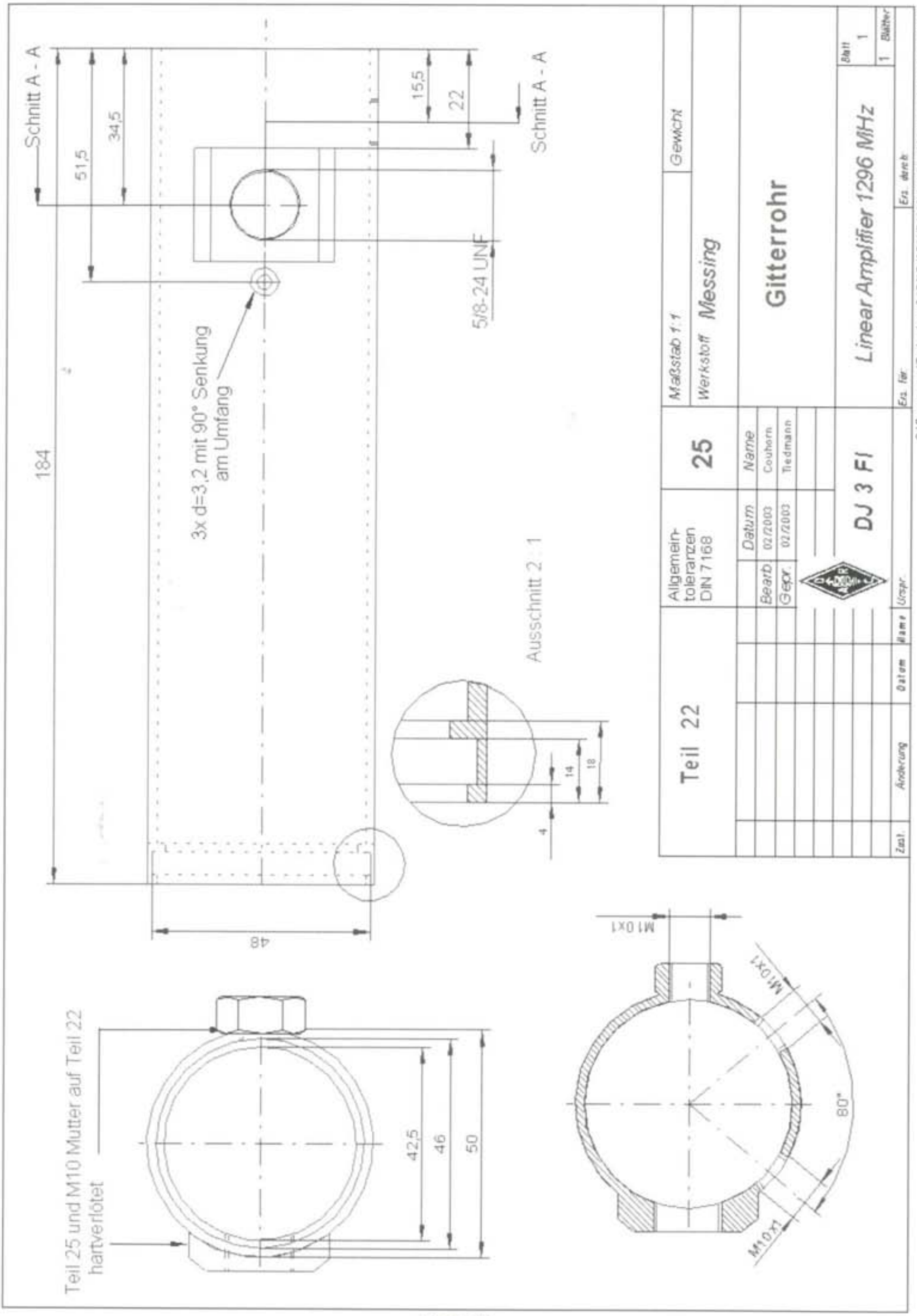
Parts 24, 31, 32, 33, 34



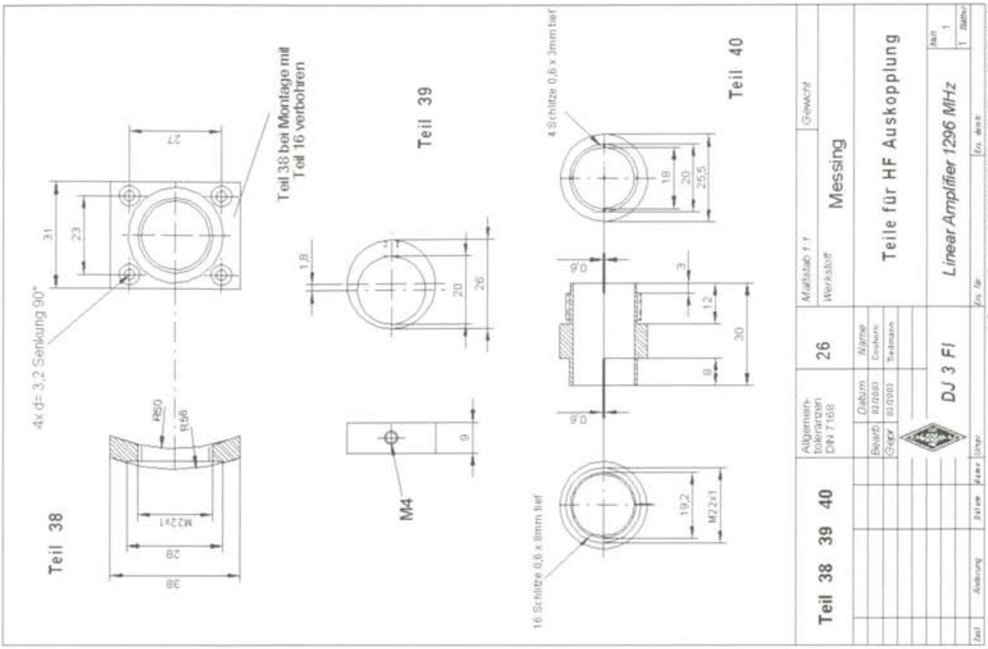
Part 35, 36, 37



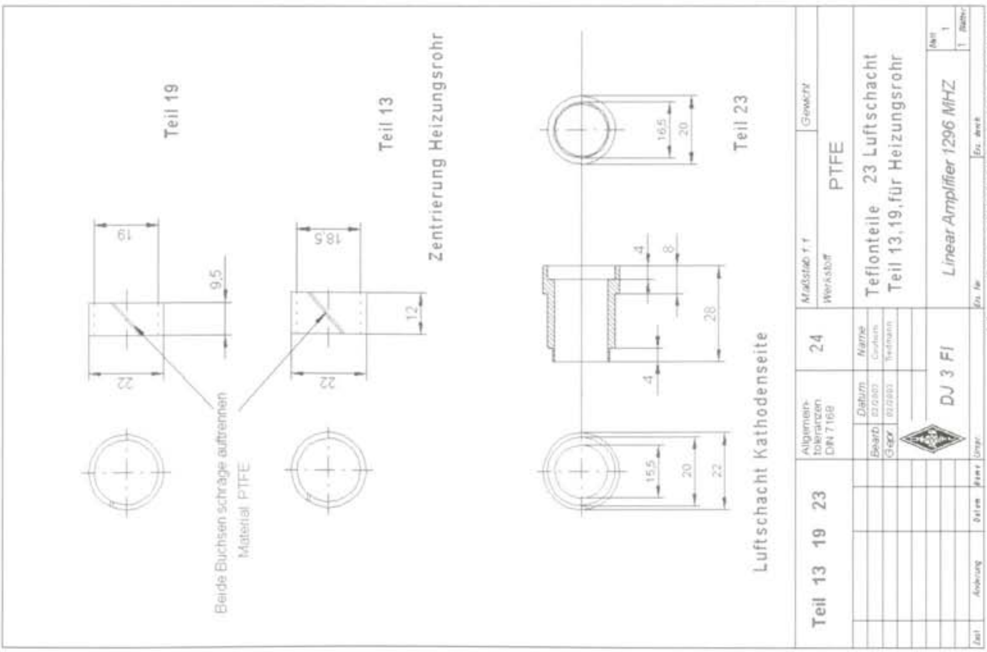
Part 12


Schnitt A - A
184
51,5
34,5
15,5
22
Schnitt A - A
5/8-24 UNF
3x d=3,2 mit 90° Senkung am Umfang
Ausschnitt 2 : 1
4
14
18
48
M10x1
Teil 25 und M10 Mutter auf Teil 22 hartverlötet
42,5
46
50
M10x1
M10x1
80°
Teil 22
Allgemein-toleranzen DIN 7168
25
Maßstab 1:1
Gewicht
Werkstoff Messing
Gitterrohr
Datum
Name
Bearb. 02/2003 Couhorn
Gepr. 02/2003 Tiedmann
DJ 3 FI
Linear Amplifier 1296 MHz
Blatt 1
1 Blätter
Zust.
Änderung
Datum
Name
Urspr.
Ers. für
Ers. durch

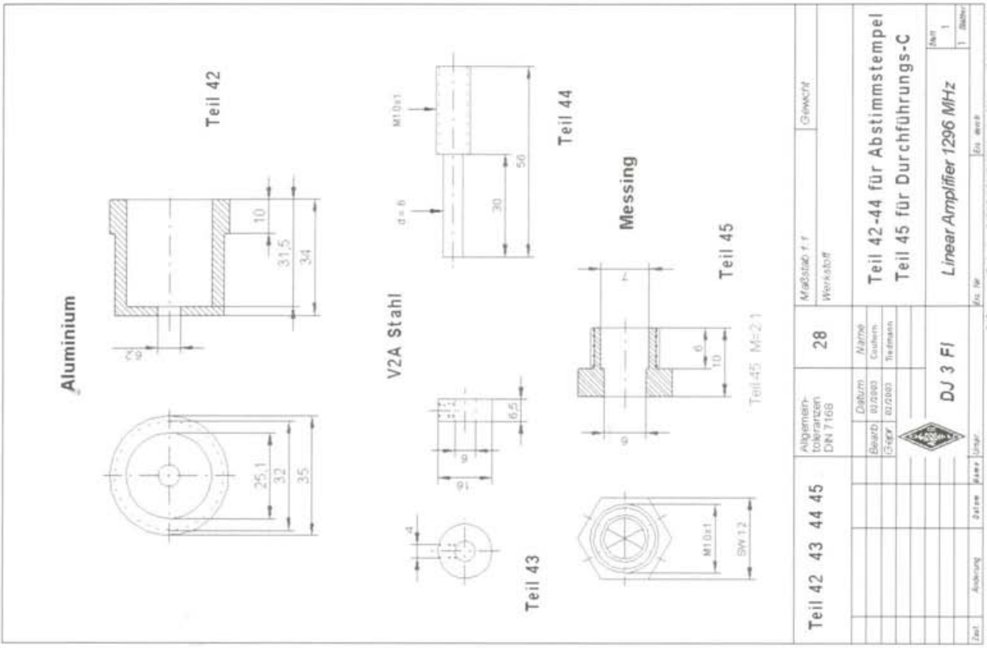
Part 22



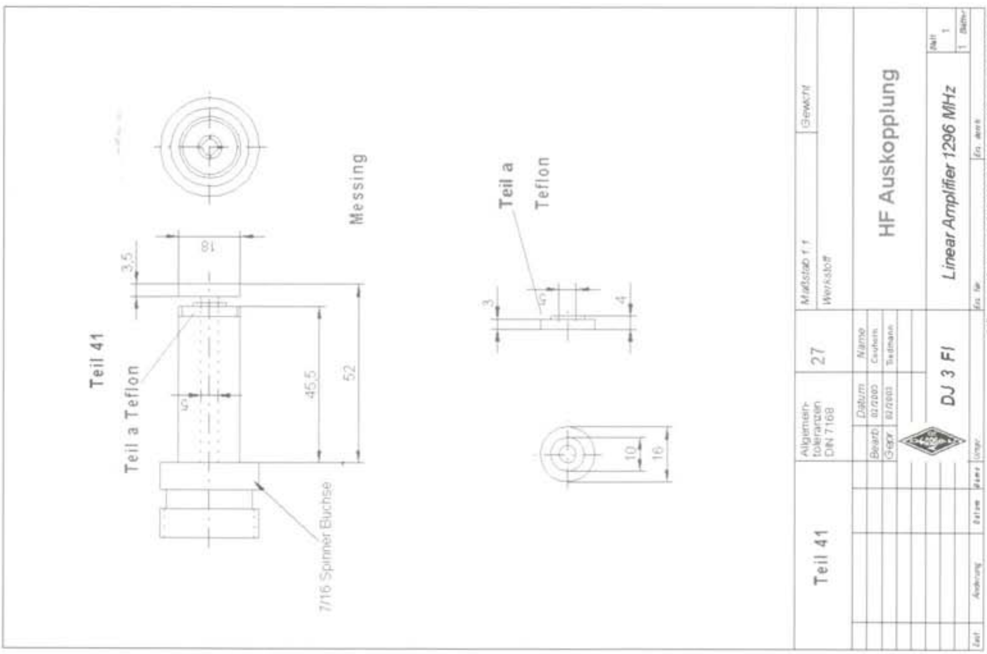
Part 38, 39, 40



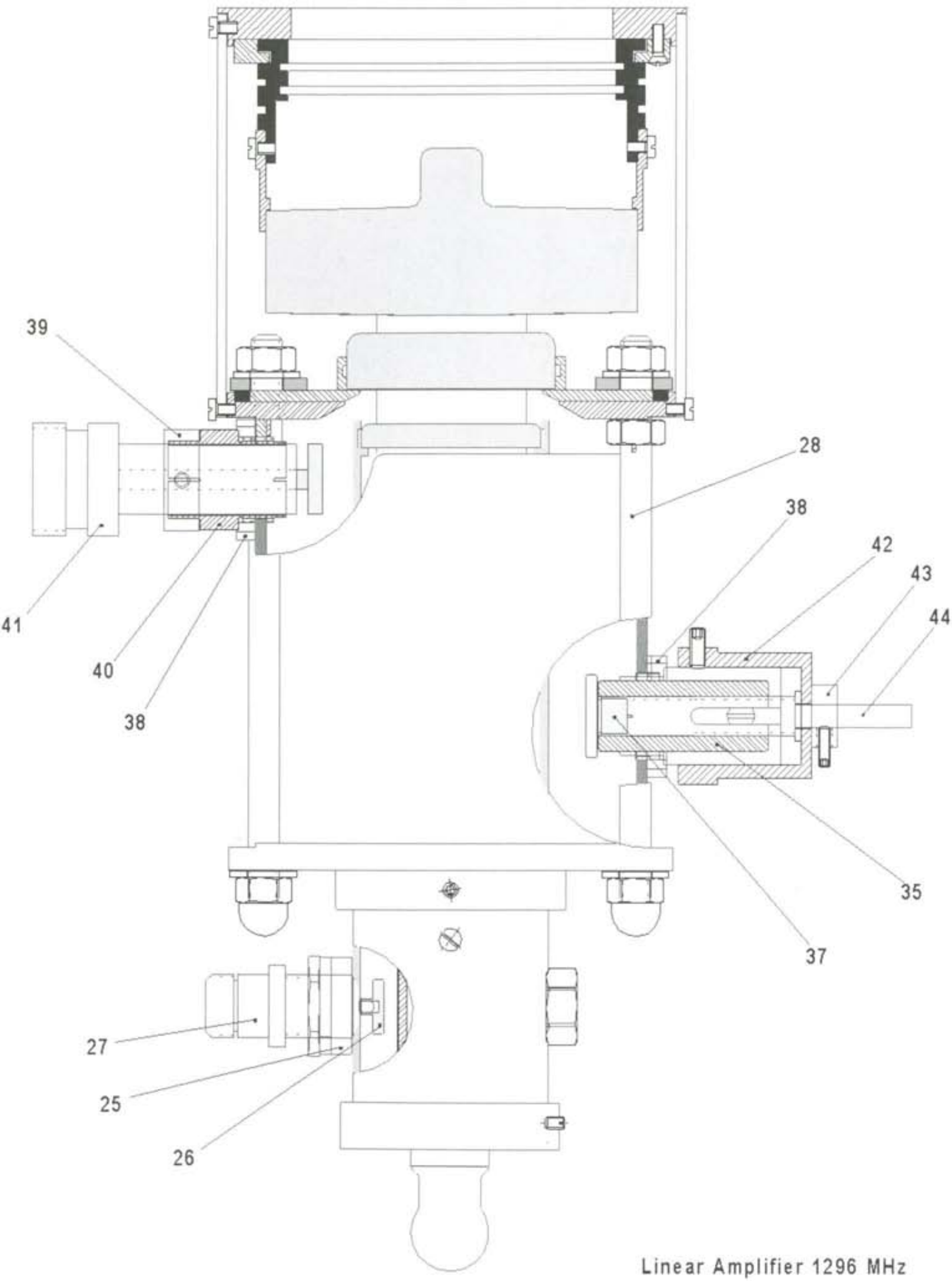
Parts 13, 19, 23



Part 42, 43, 44, 45



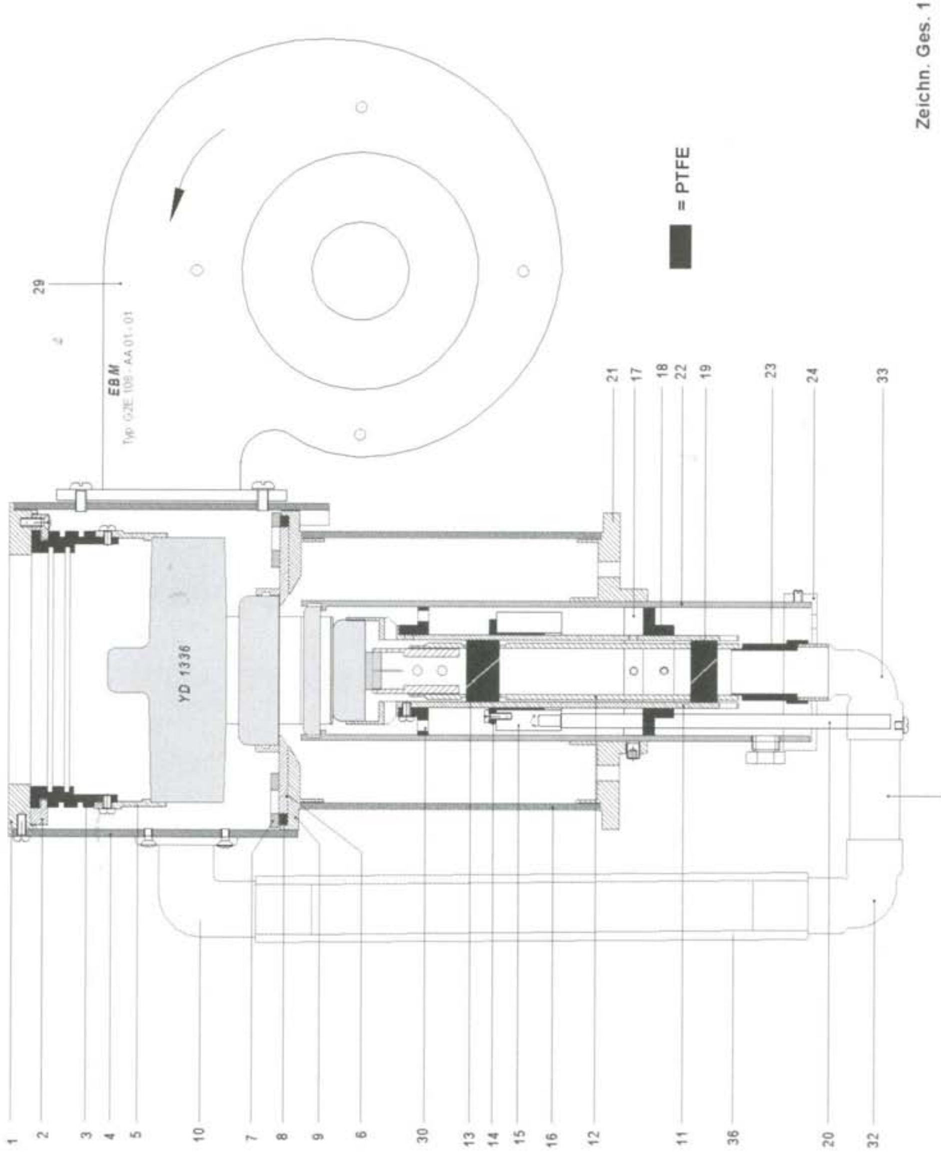
Part 41



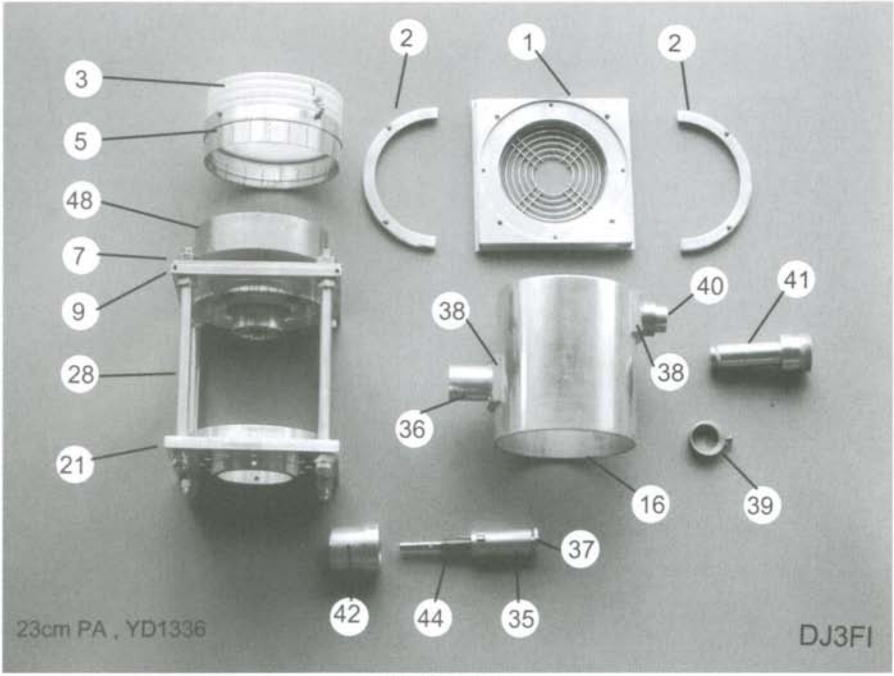
Linear Amplifier 1296 MHz

Zeichn. Ges. Nr.7

PA Komplett, Ansicht auf Koppelstempel

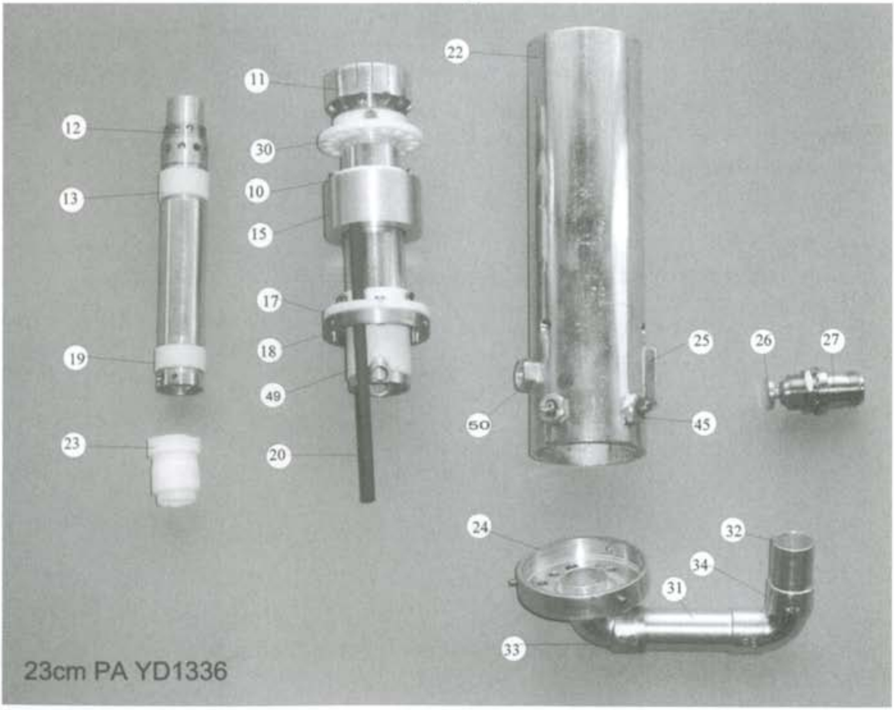


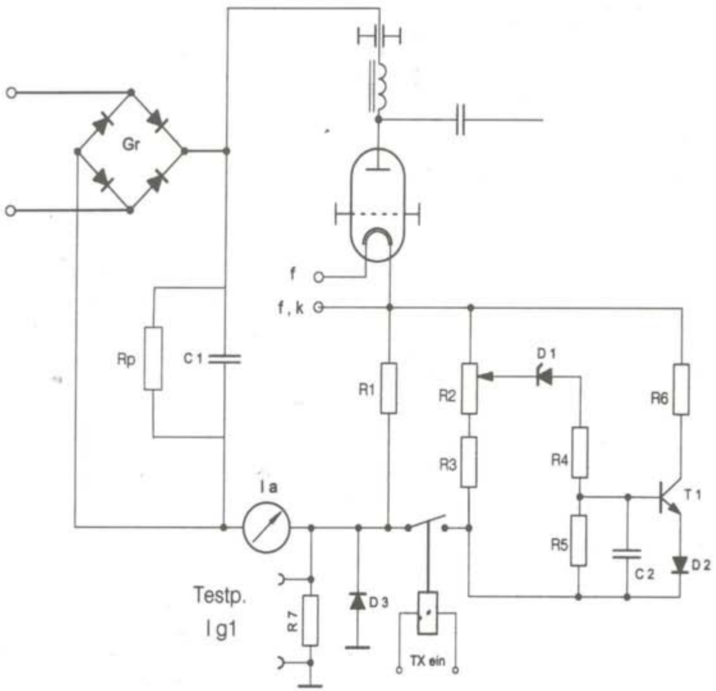
23cm PA DJ3FI, Querschnitt mit Nummerierung der Teile



Anode parts

Cathode parts



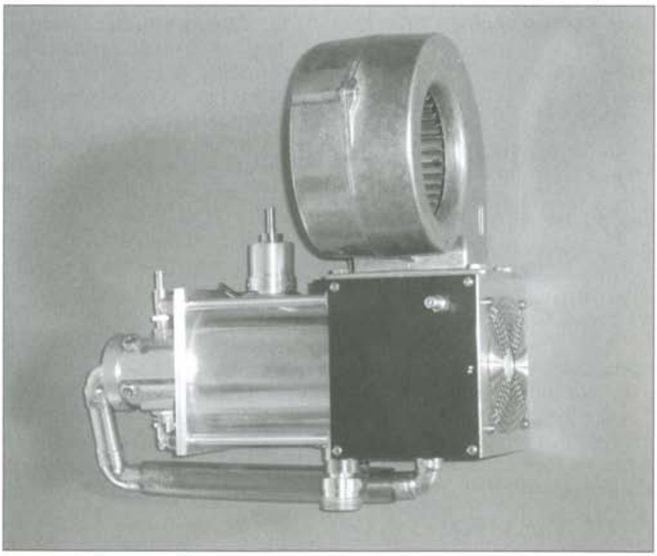


R 1 = 4,7 k Ω
R 2 = 100 Ω
R 3 = 470 Ω
R 4 = 47 Ω
R 5 = 1,5 k Ω
R 6 = 33 Ω
R 7 = 10 Ω
Rp = 5x 1.8M
D 1 = ZX 33
D 2 = BY 255
D 3 = BY 255
C 1 = 8 – 20 µF
C 2 = 10 nF
T 1 = BUX 48

Stromversorgung für Verstärker mit YD1336 dj3fi

Circuit Diagram

Complete PA



Using MRF284 a Motorola [(1)] LDMOSFET on our bands

Franck Rousseau, F4CIB [(2)]

1. Introduction

As I request more technical articles for our favorite magazine, here is my 2 cents contribution!
I'd read with interest F5EFD [(3)(4)], Maurice Niquel, and F1ANH [(5)], Jean-Pierre Lecarpentier, articles about conversion of Motorola devices on 23 and 13cm but wasn't able to get such devices.
These devices were really a good opportunity to replace expensive power bricks but also the well-known 2C39 cavities amplifiers, so I tried to find a good replacement to my M57762 power module.
Being lucky to find a MRF284 device and its demonstration board, I decided to try to make it work on 1296MHz and to share this experience with you…
Transistor characteristics really sound interesting for our ham applications: Broadband (1GHz-2.6GHz), class A & AB specified.
Being QRV only on 23cm no tests have been done on 13cm, but it should work too.

2. Transistors Characteristics

Performances quick overview extracted from product datasheet [(6)]:

Specified Two–Tone Performance @ 2000 MHz, 26 Volts

- Output Power = 30 Watts PEP
- Power Gain = 9 dB
- Efficiency = 30%
- Intermodulation Distortion = –29 dBc

Typical Single–Tone Performance at 2000 MHz, 26 Volts

- Output Power = 30 Watts CW
- Power Gain = 9.5 dB
- Efficiency = 45%

Capable of Handling 10:1 VSWR, @ 26 Vdc, 2000 MHz, 30 Watts CW Output Power

3. Evaluation schematic

As I got a demonstration board with devices, the schematic is only an adaptation from the original one with a bill of materials update. (Sorry some comments should remain in French as the original paper was written in that language!)

4. PCB layout and wiring

See Figures on next page.

5. Tuning

All measurements have been done on professional calibrated equipment:

- Network Analyzer HP8753: Forward Gain S21 and Input Return Loss S11.
- Power Meter HP438A: RF Output Power.
- DC Power Supply HP6632: DC Sources and Measures.

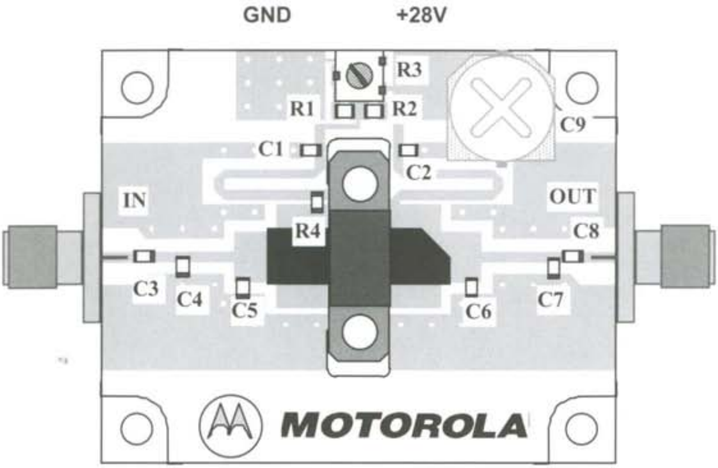
Single DC supply is required, so first step is to set the bias current with the help of the adjustable resistor. Set the bias to 200 mA and forget it!
Without any capacitors, the amplifier runs as an attenuator, all input power goes back to the source, so it helps to insert an isolator!
Let's first add some stuff in the input area…
Best matching network is done with 3.9 pF closed to DC block cap (but not only DC block, it's part of input network!) and 1.5 pF on the 30 Ohm line.
The 3.9pF capacitor`s position is the most critical, 1.5 pF along the 30 Ohm line helps to center the tuned frequency at 1296MHz.
After that step the gain is already around 9-10 dB, though Input Return Loss (IRL) is close to –13 to -14 dB.
In the same way, next thing to set is the output network.
2.2 pF soldered at the 30 Ohm line center and 3.9 pF as close as possible of DC block capacitor (not only once again, keep that in mind…) will push the gain up to 14dB, while IRL remains at –14dB.

6. Measurements results

1dB compressed power, P_{1dB}, (Output power level while gain drop of 1 dB) has been measured at 45,5 dBm (35 W) in accordance with the device specifications.
Under following stress conditions: VCC = 28 V, Input Power = 31.6dBm, the output power level has been measured at 45.2 dBm, while the DC current rose to 2.41 A.
Computing Power Added Efficiency (PAE) gives 47% which exceeds the specifications, but that's not a surprise as the device is able to work up to 2 GHz. The lower the frequency, the more nervous is the transistor! (See Fig. on next page!)

7. Conclusion

As expected, as MRF282 and MRF286, the MRF284 works without any problems on 1296 MHz.
Its output power twice as a power brick and its gain should be a good alternative to these such

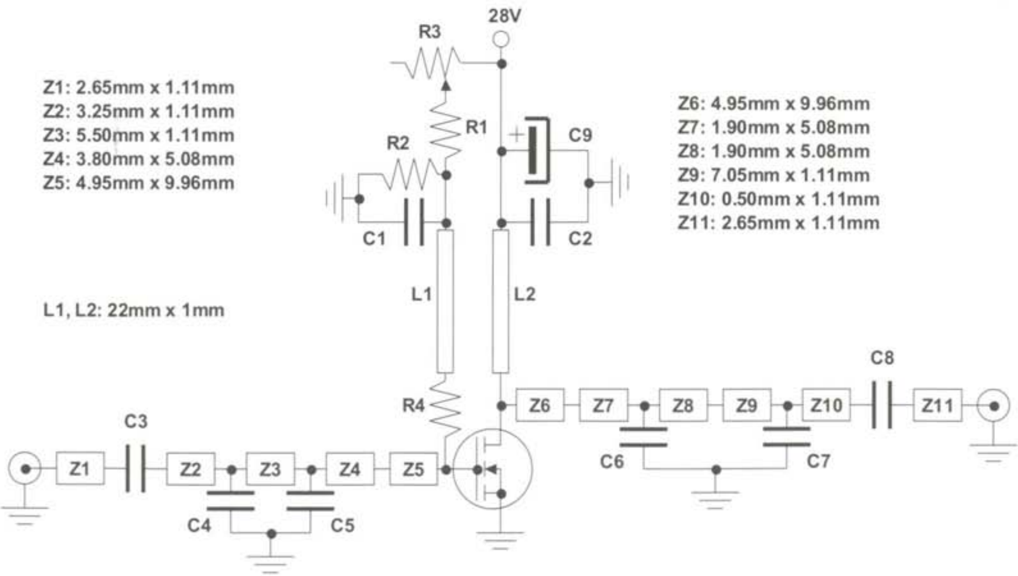


R1: 4.7 KΩ 0805 chip
R2: 1.2 KΩ 0805 chip
R3: 5 KΩ adjustable SMD
R4: 1.2 KΩ 0805 chip
C1, C2: 100 pF ATC100A chip
C3: 1 pF ATC 100A chip
C4: 3.9 pF AVX chip
C5: 1.5 pF AVX chip
C6: 2.2 pF AVX chip
C7: 3.9 pF ATC100A chip
C8: 4.7 pF ATC100A chip
C9: 47 µF 50 V electrolytic

Fig. PCB Layout

expensive power modules. Now, the trick is to find a good and cheap source. These transistors are used in cellular base stations... Should be a clue for some of you!
I think Power Added Efficiency optimization could be pursued, but today a 2.5A DC/DC converter seems to be really easy to build.
Just read the following article....

Fig. Circuit Diagram

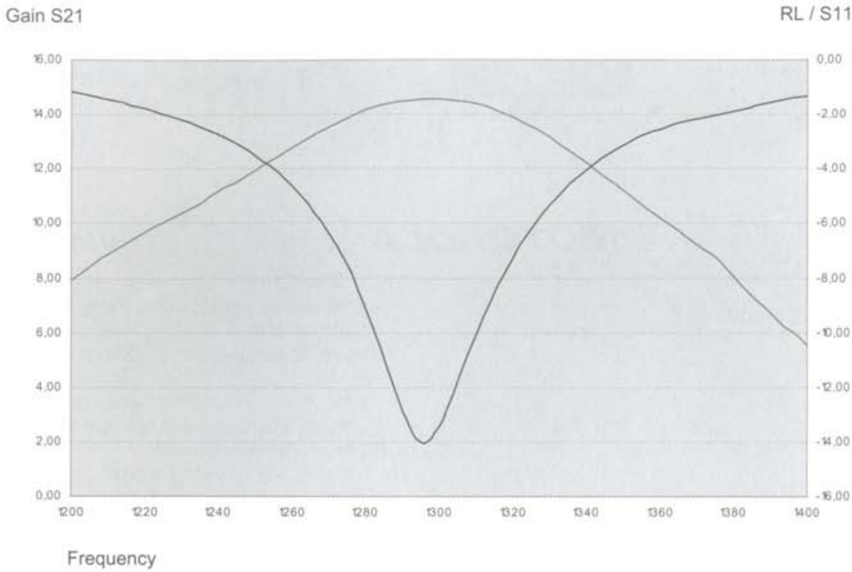


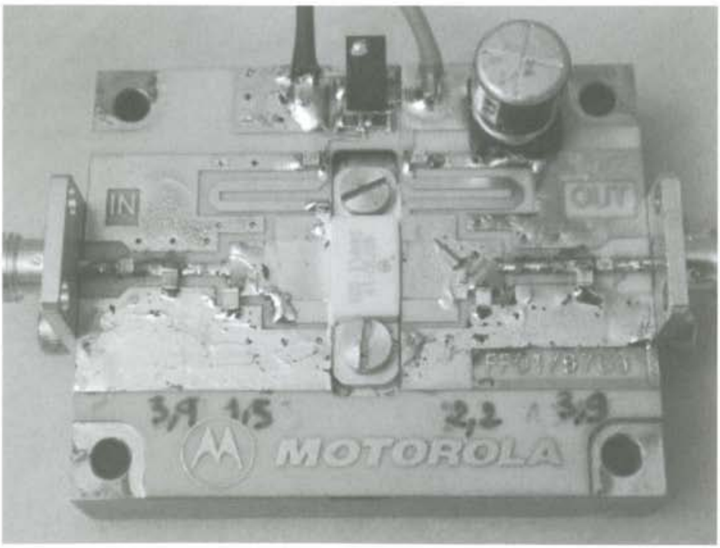
Substrat ROGERS RO4003 H=0.508mm T=35µm εr=3.48

8. References

1. http://www.motorola.com/
2. ROUSSEAU Franck – 18 rue Colbert – Porte B AppT 31 – 31400 Toulouse – France – email: f4cib@ref-union.org
3. F5EFD – Hyper n°56 – Février 2001 – Amplificateur 4W 13 cm à transistor LDMOS
4. F5EFD – Hyper n°65 – Novembre 2001 – Amplificateur 70 W sur 1296 MHz
5. F1ANH – Hyper n°73 – Juillet-Août 2002 – Ampli 2300 MHz à MRF282; 12 ou 24 VDC
6. http://e-www.motorola.com/brdata/PDFDB/docs/MRF284.pdf

See also Microwave Parts in this issue !





Einsatz des Motorola MRF284 LDMOSFET im Amateurfunk

Franck Rousseau, F4CIB

Einleitung

Mit Interesse habe ich die Artikel von F5EFD [3][4], Maurice Niquel und F1ANH[5], Jean-Pierre Lecarpentier, über den Einsatz von Motorola-Transistoren auf dem 23cm und 13cm-Band gelesen. Leider war es mir nicht möglich, die dort verwendeten Typen zu bekommen.

Diese Transistoren wären eine gute Möglichkeit, die teuren Power-Module und auch die bekannten 2C39-PAs zu ersetzen.

Deshalb habe ich versucht, einen Ersatz für mein M57762 PA-Modul zu finden.

Ich konnte mit etwas Glück einen MRF284 bekommen, inkl. zugehörigem Demo-Board.

Ich entschied mich, einen Aufbau für 1296 MHz zu realisieren und meine Erfahrungen hier mitzuteilen.

Die angegebenen Eigenschaften dieses Transistors klingen für Amateurfunk-Anwendungen sehr interessant: Breitband (1 bis 2.6 GHz), Klasse A und AB. Da ich nur auf 23cm qrv bin, habe ich keine Tests auf 13cm durchgeführt. Das ganze sollte aber dort auch arbeiten.

Eigenschaften des Transistors

Hier ein kurzer Überblick der Eigenschaften des Transistors, die dem Datenblatt entnommen sind [6]:

Zweiton-Performance bei 2000 MHz / 26 Volt

- Output Power = 30 Watts PEP
- Gewinn = 9 dB
- Wirkungsgrad = 30%
- Intermodulation Distortion = –29 dBc

Typ. Einton-Performance bei 2000 MHz / 26 Volt:

- Output Power = 30 Watts CW
- Gewinn = 9.5 dB
- Wirkungsgrad = 45%

VSWR von 10:1 ist möglich, bei 26VDC, 2000 MHz, 30 Watt CW Ausgangsleistung

Entwicklungs-Board / Schaltung

Da ich ein Entwicklungsboard mit Transistor zur Verfügung hatte, stellt die Schaltung nur eine Abwandlung des Originals mit einer neuen Stückliste dar.

PCB Layout und Verdrahtung

Siehe Abbildung vorige Seite.

Abstimmung

Alle Messungen wurden mit folgendem professionellen und geeichten Equipment durchgeführt:

- Network Analyzer HP8753: Forward Gain S21 and Input Return Loss S11.
- Power Meter HP438A: RF Output Power.
- DC Power Supply HP6632: DC Sources and Measures.

Nur eine einfache DC-Spannung wird benötigt. Als erstes wird der Ruhestrom mit dem Einstellwiderstand auf 200mA eingestellt.

Ohne irgendwelche Kondensatoren verhält sich der Verstärker wie ein Abschwächer, sämtliche Eingangsleistung geht zur Quelle zurück. Deshalb hilft es, einen Isolator zu verwenden.

Zuerst wird im Eingangsbereich bestückt.

Die beste Anpassung wird mit 3.9pF nach Masse (DC Block, aber auch Teil des Eingangsnetzwerks!) und 1.5 pF auf der 30 Ohm Stripline erreicht.

Die Lage des 3.9pF Kondensators ist sehr kritisch.

Der 1.5 pF Kondensator auf der 30 Ohme Stripline hilft die eingestellte Frequenz bei 1296 MHz zu halten. Danach beträgt die Verstärkung bereits etwa 9 bis 10dB. Der Input Return Loss (IRL) liegt nahe –13-14 dB. Genauso wird als nächstes das Ausgangsnetzwerk bestückt: 2.2pF auf der 30 Ohm-Steifenleitung und 3.9 pF möglichst direkt nach Masse als DC-Block (aber auch Teil der Anpassung!). Nun geht die Verstärkung hoch auf 14 dB. Der IRL bleibt bei –14dB.

Meßergebnisse

Die 1dB kompr. Ausgangsleistung wurde in Übereinstimmung mit den Spezifikationen mit 45.5dB, (35 W) gemessen. Unter Stress-Bedingungen (28V, Input 31.6 dBm) wurde ein Output von 45.2 dBm bei 2.41A DC gemessen.

Die Power Added Efficiency (PAE) ergibt 47%, was die Spezifikation übertrifft. Dies ist aber keine Überraschung, das der Transistor bis 2 GHz arbeiten kann. Je niedriger die QRG, desto „nervöser" der Transistor! (Siehe Abb.)

Zusammenfassung

Wie erwartet arbeitet der MRF284 – genauso wie MRF282 und MRF286 – ohne Problem auf 1296 MHz. Der Output beträgt das Doppelte von dem der teuren Power-Module. Nun muss versucht werden, Quellen für diese Transistoren aufzutun. Sie werden in Basisstationen im Mobilfunktelefonnetz eingesetzt... Eine Optimierung der Power Added Efficiency könnte weiter verfolgt werden.

Aber ein 2.5A DC/DC-Konverter scheint zur Zeit recht einfach realisierbar.

(Siehe nachfolgender Artikel!)

28 V Switched Power Supply for LDMOS-PA`s

Achim Vollhardt, DH2VA / HB9DUN

In recent months, LDMOS PAs for 23 cm became more and more popular. While these new devices have better efficiency (50% vs. 35 %) than the well known Mitsubishi Modules, the supply voltage of 28 V is new to most hams. Although higher voltages result in lower currents and therefore less problems with contact resistances, most ham radio stations are based on 12 V main supply voltage. This is in particular true for portable stations, as they rely on lead acid batteries as main power source. Together with these new PA units, the need for a simple, most efficient power supply appeared.

Due to the ongoing development on switched power supply circuits, many devices and applications are available. Even for newcomers, which are familiar only with standard linear regulators like the 78XX/79XX famliy, switched power supplies are becoming a real alternative when dealing with high power applications. As a target example, a power supply for the G3WDG 50W PA will be presented.

Component selection

The power requirements of the G3WDG 23cm PA are 28 V@ 4.5A max. (126W). To generate this voltage from a 12 V source, we are going to use the so called boost topology, which is sketched in figure 3.

Basic components of a switching regulator are the inductor, the diode and the switch (which is essentially a MOSFET). When arranged in this boost topology, the input voltage is increased ('boosted') to a higher value. For a more in depth discussion of a boost converter see [1]. When looking on the schematics, we can start identifying the first possible sources of power losses, which will become important later:

- the ohmic resistance of the inductor
- the ohmic resistance of the switch when turned on
- the forward voltage of the diode

To complete the boost topology to a full switching regulator, we need a feedback circuit, which is controlling the regulator's properties according to load demands. While this had to be built with discrete components in former years, the industry is providing us today with several highly integrated switching power supply controllers, which include overcurrent sensing, soft start features and a sense feedback for adjusting the output voltage. I chose the LT1680 from Linear Technologies for this application, as this device is specifically made for a boost topology based on a 12 V input. In addition, this controller is able to handle the high gate capacitances which come with the high power MOSFET devices needed.

Beside the controller IC, the inductor is the central device in such a converter. It must be able to provide the needed inductance for the switching converter operation even when biased with a high current. When the rated current is exceeded, the core won't be able to handle any more magnetic flux, the inductor saturates. This can result sometimes in catastrophic failure modes and is reason for many people not to build switched regulators. Therefore, one has to be very careful when selecting the inductor. When in doubt, take the larger one! In this case, I chose the DMT-3 inductor from Coilcraft, which happens to be the largest inductor in their catalogue. According to its datasheet, it is able to sustain 35 uH of inductance when biased with 12 A. This will be necessary, as our converter will sink above 10 A from its power supply when operating at 100% efficiency and even more, if we lose some percents, which we certainly will..

The next component to chose is the MOSFET switch. Basic parameters like maximum VDS and IDS should be well above 28 V and 12 A respectively. To minimize ohmic losses during the MOSFET's on-time, look for lowest possible RDSon. This should be in the order of 10 mOhm. In addition, there is another loss mechanism not mentioned before: the dynamic losses of a MOSFET switch. An ideal mechanical switch has either R=0 or R=oo with an instant transition between both states. In both cases, no power is lost in the switch. A real MOSFET switch however has inherent rise- and falltimes, where the resistance has a finite value and therefore the MOSFET dissipates power. This power can easily be calculated:

P = 0,5 * Vout * (Iout / (1 - DC)) * (Tr + Tf) * f

with 1-DC = Vin/Vout (DC: Duty Cycle) and switching frequency f.

It can be seen, that the rise-/falltimes can significantly contribute to converter losses. To minimize these, I chose the FQP85N06 as MOSFET. With a RDSon of 10mOhm and rise-/falltimes around 200ns, this is a very good device for our needs. Of course this is only true, if the gate can be charged and discharged faster than this. Even with the cited LT1680 controller, this can be a problem, as we deal here with times in the order of 200 ns and gate capacitances of 5 nF and more. A simple calculation shows us, that 12 V * 5 nF = 60 nC, 60 nC/ 200 ns = 0.3 A. This means, that our gate driving circuits has to be able to drive a current pulse of more than 0.3 A for a risetime of 200 ns and less! To further enhance the overall efficiency, one can now use so-called MOSFET drivers specifically designed to perform such tasks. The used device from Texas Instruments (UCC37322) can drive/sink up to 9 A to a gate.. fair enough. If you don't want to use it, simply connect the controller-IC output to the MOSFET gate directly.

Last but not least, we arrive at the diode. When using now a diode at a forward current of 10 A and a forward voltage drop of 0.7 V, we already let the diode produce 7 W of heat, which is 7% in an 100 W application. To minimize this losses, we can now choose low forward voltage schottky diodes, which are capable of 10 A+. In addition, parallelling diodes will give us some more improvements, as the forward voltage is not constant, but decreases with lower forward current (I assume that every reader knows the basic I/U curve of a diode). I used the MBR20100CT dual schottky diode and used two devices in parallel, which gives me four diodes in total. One also distributes the heat mechanically a little bit to make cooling easier.

We discussed now the basic losses in a switching regulator. When digging deeper in to the subject, there are some more things to improve, not only in efficiency, but also reliability (remember the catastrophic failure modes?). Those items are partially correlated: a cool circuit (high efficiency) will last longer than a hot circuit. This is particularily true for the used capacitors, and who ever opened a PC power supply will see, that in this case, bigger is better. This holds for the capacitance, the voltage and the size. Larger capacitances will give us less voltage ripple on the output, and increased voltage rating gives us more safety not to cross the operating limits. But together with the mechanical size, this also gives us an important hint to the equivalent series resistance (ESR) of the cap. When operating at the switching frequency of 100 kHz, this series resistance will degrade the capacitors performance and together with the ripple currents, it will heat up the capacitor. Not only we again lose here efficiency, but increased temperatures reduces the capacitors lifetime and leads to blow-up (eye-witnessed..)! I therefore strongly recommend using low ESR electrolytic capacitances with a temperature rating of 105 deg C (search your preferred suppliers catalogue). When in doubt, take the bigger one, as when comparing the sizes of capacitors with same value and voltage rating, the bigger ones have usually lower ESR. This holds only true for modern age devices.. don't try to use these parts sitting in your drawer for 20 years.

To squeeze now the very last percents of the switching regulator, identify the high-current copper traces of your circuit and solder some copper wires (1.5-2.5 mm2) across. This will increase their cross section and decrease the resistance, which is certainly observable at the currents we are dealing with.

Circuit description

After carefully evaluating of all the components, it's time to build up the circuit. The schematics is shown in Fig. 9. Aside from the already described components, there are some more blocking capacitors for the controller IC, the current sense resistor, the slope compensation and the voltage divider for setting the output voltage. The latter one can be calculated easily with

$$V_{out} = R1 / (R1 + R2) * 1.25\ V$$

taking R1 = 2.2 kOhm and R2 = 47kOhm, this gives us almost exactly 28 V. The current sense resistors are calculated with the formula given in the datasheet to 0.06 Ohm , which are implemented as three 0.2 Ohm resistors (SMD 2512 case). The slope compensation counteracts an inherent instability of this type of topology. While I won't describe the mechanism here in detail (see datasheet for an explanation), this instability results in decreased efficiency and a high-pitched sound emitted by the circuit, although the more 'experienced' hams won't hear it anymore... While this sound may be known to many of us as 'normal' for switched regulators, surprisingly our design is completely silent when operating properly.

The PCB layout can be seen in Fig. 5 and 6. The used material is standard FR4, 89 x 56 mm, 1.6mm thickness with 35um copper. Note the close proximity of the power devices. While this is not exactly a HF application, short traces are also important here due to the high currents involved.

A common problem when using switching regulators at a ham radio environment is the switching frequency, which is radiated over the supply lines. To make the regulator 'silent', we used a metal box and inserted two little separate chambers at the in- and output, where some lowpass filtering is performed. The needed high-current inductors were taken out of an old PC power supply. The high frequency performance is not so important here as for the main inductor, as the basic component at the input/output lines is the DC current. Feedthroughs into all chambers are done with three 1 nF feed-through caps.

Results

Two units have been built so far by the author and Charles Suckling, G3WDG. To test the behaviour under load, the author used high power resistors. With the enhanced high-current traces and the gate driver, 93 % efficiency could be verified at 4.58 A output current. This is equivalent to a output power of 128 W and an input power of 138 W. The remaining 10 W are lost mainly in the FET and the diodes, but one also can feel the inductor and the current sense resistors gettling slightly warm. Nevertheless, 10 W are easily dissipated with a handy heatsink. Testing together with the 50 W 23cm PA kit was done by G3WDG, showing good performance of the combination of the two designs. While measurements showed, that even without the output power filter, no sidebands are generated within the PA, the filter is recommended to keep your own shack 'quiet'. The remaining ripple with the filter is about 20 mV pk-pk (Figure 8).

A 'long-time' test was performed by constantly drawing 128 W power from the regulator for over 7 minutes and temperatures measured on and in the closed box. With an ambient temperature of 20 deg C, the location just outside the MOSFETs heated to about 30 deg C and the inside air temperature to about 40 deg C. The load resistors definetly were warmer..

Conclusion

We presented a high power, high performance switching regulator circuit designed for 12 V use of modern LDMOS power amplifier kits. The overall efficiency is > 90% at > 100W regulated power. As far as possible, standard market components ware used. Test were performed with artificial loads as well as with a 23cm PA.

Acknowledgements

I would like to thank first of all Charlie, G3WDG for the nice 23 cm PA design, without which I probably would have never start designing this. He also was beta tester for the circuit. I further would like to thank Coilcraft, Texas Instruments and Fairchild for supplying samples.

Literature

[1] Carl Nelson, LT1070 Design Manual, Application Note 19, www.linear.com

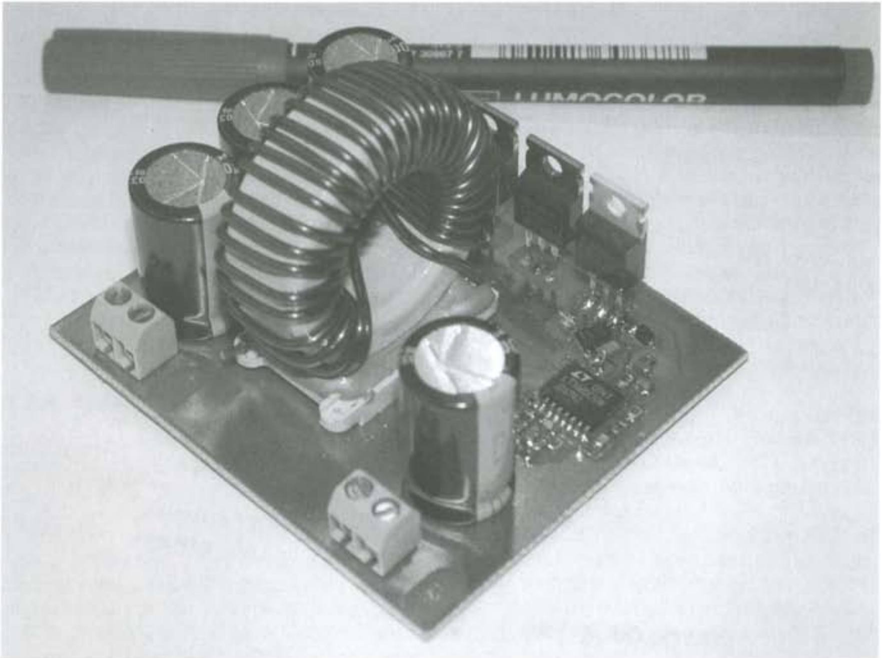
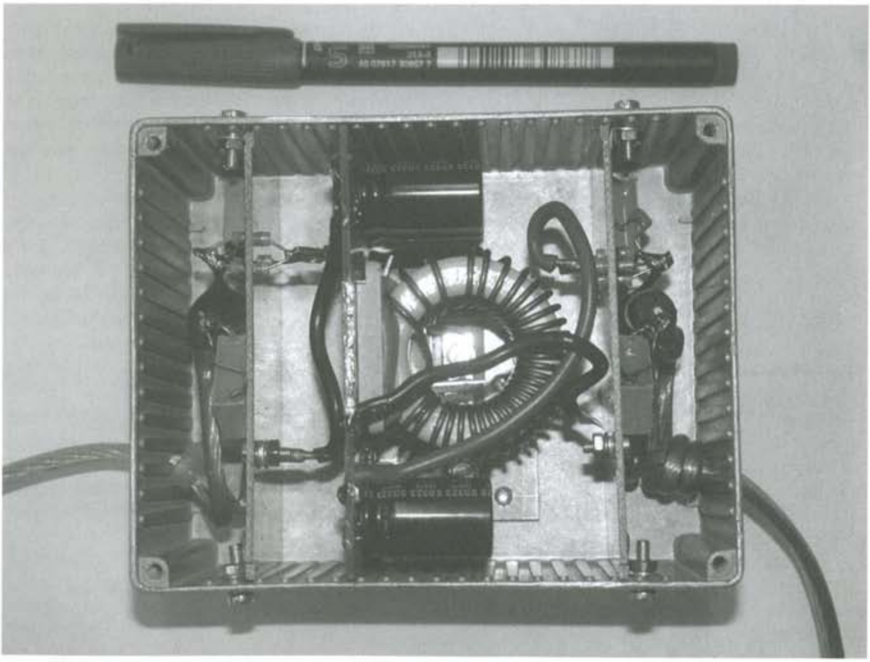


Fig 1. (top): Complete board

Fig 2. (bottom): Board in the box



28 V - Schaltregler - Stromversorgung für LDMOS - PA`s

Achim Vollhardt, DH2VA / HB9DUN

In den vergangenen Monaten wurden LDMOS PAs für das 23cm Band populär. Zwar haben diese neuen Bauelemente einen besseren Wirkungsgrad als die allgemein bekannten Mitsubishi Leistungsmodule (50% gegenüber 35%), die Versorgungsspannungs von 28 V stellt jedoch Neuland für die meisten OMs dar. Trotz den geringeren Problemem mit Kontaktwiderständen aufgrund der geringeren Ströme bei der höheren Spannung, werden die meisten Amateurfunkstationen mit 12 V betrieben. Dies trifft insbesondere auf die tragbaren Stationen zu, welche auf Bleibatterien als Stromversorgung angewiesen sind. In Verbindung mit den neuen Leistungsverstärkern ergab sich so ein Bedarf an einer einfachen Stromversorgung mit höchstmöglichem Wirkungsgrad.

Aufgrund der anhaltenden Entwicklung auf dem Gebiet der geschalteten Stromversorgungen, sind diverse Bausteine und Schaltungen erhältlich. Selbst für Neueinsteiger, welche sich bisher nur mit Spannungsreglern der 78XX/79XX Baureihe beschäftigt haben, werden Schaltregler zu einer echten Alternative für Hochleistungsanwendungen. Als Beispielanwendung wird eine Stromversorgung für die G3WDG 50W PA vorgestellt.

Bauteileauswahl

Der Betriebsstrom der G3WDG 23cm PA ist 4.5 A bei 28 V Drainspannung (126 W). Um diese Spannung aus einer 12 V Versorgung zu erzeugen, verwenden wir die sogenannte 'Boost'-Topologie, welche in Bild 3 dargestellt ist.

Grundlegende Bestandteile jedes Schaltreglers sind die Induktivität, die Diode und der Schalter (welcher effektiv ein MOSFET ist). Wenn man diese in der Boosttopologie verwendet, wird die Eingangsspannung auf eine höhere Spannung ge'boosted'. Für eine detaillierte Erklärung verweise ich auf [1]. Mit einem Blick auf den Schaltplan können wir die ersten möglichen Quellen für Leistungsverluste erkennen, welche später noch wichtig werden:

- der ohmsche Widerstand der Induktivität
- der ohmsche Widerstand des MOSFET Schalters
- die Vorwärtsschwellspannung der Diode

Um die Boost-Topologie zu einem vollwertigen Schaltregler zu vervollständigen benötigen wir noch eine Rückkoppelschleife, welche die Eigenschaften des Schalters entsprechend der Last einstellt. Diese musste früher mit diskreten Bauteilen aufgebaut werden. Heutzutage existieren auf dem Markt verschiedene hochintegrierte Schaltregler Kontroll-ICs, welche eine Überstromerkennung, Softstarteigenschaften und eine Feedbackschleife für die Spannungsregelung beinhalten. Ich habe mich für den LT1680 von Linear Technologies entschieden: der Regler wurde speziell für die Boost-Topologie mit 12 V Eingangsspannung entwickelt. Weiterhin kann er direkt das Gate eines Hochstrom-MOSFETs ansteuern, welche im allgemeinen hohe Gate Kapazitäten haben.

Neben dem Kontroll-ICs ist die Induktivität die zentrale Komponente eines solchen Reglers. Sie muß selbst bei hohen Strömen noch genug Induktivität für den Betrieb des Schaltreglers bereitstellen. Wird der maximale Strom überschritten, kann der Spulenkern keinen zusätzlichen magnetischen Fluss mehr aufnehmen, die Induktivität ist in Sättigung. Dies kann zu einem katastrophalen Versagen der Schaltung führen und ist der Grund für die Abneigung vieler OMs gegenüber Schaltreglern.

Aus diesenm Grunde muß man bei der Wahl der Induktivität sehr vorsichtig sein. Im Zweifel lieber eine Nummer größer wählen! Ich habe mich für die DMT-3 Induktivität von Coilcraft entschieden, welche die größte Drossel in ihrem Katalog ist. Laut dem Datenblatt hat sie selbst bei einem Strom von 12 A noch eine Induktivität von 35 uH. Dies wird auch notwendig sein, da unser Schaltregler mehr als 10 A von seiner Stromquelle abverlangen wird, und dies auch nur bei 100% Wirkungsgrad. Da wir eher einige Prozente darunter liegen werden, werden es sicherlich mehr als 10A werden..

Das nächste auszuwählende Bauteil ist der MOSFET-Schalter. Die maximalen Werte für Vds und Ids sollten deutlich höher als 28 V und 12 A liegen. Um die ohmschen Verluste zu minimieren, welche anfallen solange der MOSFET leitend ist, benötigen wir minimales RDSon. Dies sollte im Bereich von 10mOhm liegen. Weiterhin gibt es einen weiteren, noch nicht diskutierten Verlustfall: die dynamischen Verluste des MOSFET. Ein idealer mechanischer Schalter hat entweder R=0 Ohm oder R=oo Ohm mit einem augenblicklichen Übergang zwischen den beiden Zuständen. In beiden Zuständen ist der Schalter verlustfrei. Ein realer MOSFET hat intrinsische Anstiegs- und Abfallzeiten, während derer er einen endlichen Widerstand darstellt, an dem Leistung verloren geht. Diese Verlustleistung kann einfach berechnet werden:

$$P = 0{,}5 \cdot V_{out} \cdot (I_{out} / (1-DC)) \cdot (T_r+T_f) \cdot f$$

mit 1-DC = Vin/Vout (DC: Duty Cycle) und Schaltfrequenz f.
Man erkennt, dass die Anstiegs- und Abfallzeiten tr und tf deutlich zu den Verlusten des Schaltreglers beitragen. Um diese zu minimieren habe ich den FQP85N06 als MOSFET gewählt. Mit einem Rdson von 10 mOhm und Flankenzeiten um die 200ns ist dies ein recht guter FET für unsere Anwendung. Diese Zeiten können natürlich nur dann erreicht werden, wenn die Ansteürschaltung des FET-Gates die Gate-Kapazität auch schnell genug laden und entladen kann. Dies kann mit dem LT1680 trotz seiner recht hohen Treiberströme problematisch werden, da wir eine Gate-Kapazität von ca. 5ns in 200ns laden müssen. 5nF sind bei 12V 60nC, 60nC in 200ns sind 0.3 A, das bedeutet, dass unser Kontroll-IC für 200ns Anstiegszeit einen Strom von 0.3 A liefern muss. Um hier also weitere Prozente herauszuschinden, kann ein sogenannter Gate-Treiber, welcher für genau diesen Zweck entwickelt wurde, verwendet werden. Ich habe den UCC37322 von Texas Instruments eingesetzt, welcher bis zu 9A liefern Puls-

ströme liefern kann.. das sollte reichen. Bei Nichtverwendung wird der Steuerausgang des Kontroll-ICs direkt an das MOSFET Gate angeschlossen.

Kommen wir nun zur Diode. Wenn wir bei einer Diode eine typische Vorwärtsspannung von 0.7V annehmen und einen Betriebsstrom von 10A sind dies bereits 7W Verlustleistung, was bei einer 100W Anwendung 7% Verluste entspricht. Um diese Verluste zu minimieren, verwenden wir Schottky Dioden mit niedriger Vorwärtsspannung, welche für 10A und mehr ausgelegt sind. Zusätzliche Verbesserungen ergeben sich durch Parallelschaltung von Dioden, da die Vorwärtsspannung nicht konstant ist, sondern sich mit niedrigerem Strom verringert (ich gehe davon aus, dass der Leser die prinzipielle I/U Kurve einer Diode kennt). Ich habe die die MBR20100CT Doppel-Schottkydiode verwendet und zwei von ihnen parallelgeschaltet, welches insgesamt vier Dioden ergibt. Als Nebeneffekt wird die Verlustwärme auch mechanisch etwas verteilt, dies vereinfach die spätere Kühlung.

Wir haben nun die grundlegenden Verlustmechanismen eines Schaltreglers diskutiert. Wenn man sich detaillierter mit dem Thema befaßt, lernt man weitere Verbesserungsmöglichkeiten kennen, die sich nicht nur mit dem Wirkungsgrad, aber auch mit der Zuverlässigkeit beschäftigen (Stichwort: katastrophales Versagen). Dies ist zum Teil gekoppelt: eine kühle Schaltung (hoher Wirkungsgrad) lebt länger als eine heisse. Für die Kondensatoren gilt dies insbesondere und wer jemals ein PC-Netzteil geöffnet hat erkennt, dass hier 'größer ist besser' gilt, und zwar für Kapazität, Spannungsfestigkeit und mechanische Größe. Eine höhere Kapazität ergibt einen geringeren Ripple aus der Ausgangsspannung und eine höhere Spannungsfestigkeit mehr Sicherheitsspielraum um im Betriebsbereich des Bauteils zu bleiben. Zusammen mit der mechanischen Größe bekommen wir jedoch zusätzlich einen Hinweis auf den äquivalenten Serienwiderstand (engl. ESR). Bei der Betriebsfrequenz von 100 kHz verringert der ESR die Leistungsfähigkeit des Kondensators. ZUsammen mit den Rippleströmen, welche durch den Kondensator fließen, verursacht der ESR aber auch eine Erwärmung des Bauteils. Dies ist nicht nur ein weiterer Verlust von elektrischer Leistung, sondern auch eine Verringerung der Lebensdauer bis hin zum explosiven Versagen (auch schon erlebt..)! Elektrolyt-Kapazitäten mit niedrigem ESR und einem Temperaturlimit von 105 Grad C sind hier dringend empfohlen (gibts im nächstbesten Elektronikkatalog). Im Zweifel den größeren Elko nehmen, da bei gleichen Kapazitäten und Spannungsfestigkeiten das größere Bauteil normalerweise einen niedrigeren ESR hat. Dies stimmt allerdings nur bei modernen Typen, bitte nicht die uralten Komponenten aus der Bastelkiste verwenden.

Um nun die allerletzten Prozente an Wirkungsgrad aus der Schaltung zu quetschen, lötet man am besten Kupferdraht (1.5-2.5mm2) auf die Leiterbahnen, welche die hohen Ströme durchleiten müssen. Damit wird ihr Querschnitt erhöht und der Widerstand verringert.. der Effekt ist durchaus bemerkbar bei den vorliegenden Stromstärken.

Schaltungsbeschreibung

Nach der umfangreichen Diskussion der Komponenten bauen wir nun unsere Schaltung auf. Der Schaltplan ist in Abb. 9 dargestellt. Zusätzlich zu den bereits beschriebenen Bauteilen enthält er noch Abblockkondensatoren für den Kontroll-IC, einen Widerstand zur Stromüberwachung, die Slope Kompensation und den Spannungsteiler für die Ausgangsspannung. Letzterer kann einfach wie folgt berechnet werden:

Vout = R1 / (R1 + R2) * 1.25V

mit R1=2.2kOhm und R2=47kOhm ergibt das ziemlich genau 28V. Der Widerstand zur Stromüberwachung wird mit der über das Datenblatt zu 0.06 Ohm bestimmt, die kann mit einer Parallelschaltung von drei 0.2 Ohm Widerständen (SMD 2512) erreicht werden. Die Slope-Kompensation verhindert eine mögliche Instabilität, welche bei der Boost-Topologie auftreten kann. Ohne diesen Prozess im einzelnen zu erläutern (siehe dazu auch LT1680 Datenblatt), sei hier angemerkt, dass die Instabilität sich durch verringerten Wirkungsgrad und einen sehr hohen Ton auszeichnet, welcher von der Schaltung erzeugt wird. Dieser Ton, welcher von den 'erfahreren' OMs wahrscheinlich nicht mehr wahrgenommen werden kann, wird allgemein mit Schaltreglern assoziiert. Überraschenderweise ist unser Schaltregler bei ordnungsgemässem Betrieb vollkommen ruhig.

Abb. 5 + 6 zeigen das Leiterplattenbild. Es wird normales FR4 Material, 89 x 56 mm, mit 1.6mm Dicke und 35um Kupferauflage verwendet. Die Leistungsbauteile sind alle dicht beisammen angeordnet. Dies ist zwar nicht wirklich eine HF Anwendung, durch die hohen Ströme sind jedoch auch hier kurze Wege vorteilhaft.

Ein verbreitetes Problem von Schaltreglern im Amateurfunk ist die Abstrahlung der Schaltfrequenz über die Zuleitungen. Um den Schaltregler 'ruhigzustellen' wird er in ein Metallgehäuse eingebaut. In zwei internen Kammern am Ein- und Ausgang sind Tiefpassfilter eingebaut. Die benötigten Hochstrom-Spulen kommen aus einem alten PC-Netzteil. Die Hochfrequenzeigenschaften sind hier nicht so entscheidend wie für die Schaltinduktivität, da die Hauptkomponente der Ein-/Ausgangsleitungen Gleichstrom ist. Die Durchführungen in die Kammern sind mit je drei 1nF Durchführungskondensatoren realisiert.

Ergebnisse

Zwei Exemplare wurden vom Autor aufgebaut, ein weiteres von Charlie Suckling, G3WDG. Um den Schaltregler unter Vollast zu testen, wurden Hochlastwiderstände verwendet.
Mit den verstärkten Hochstromleiterbahnen und dem Gate-Treiber wurde jeweils ein Wirkungsgrad von 93% bei 4.58 A Ausgangsstrom ermittelt. Dies entspricht einer Ausganslеistung von 128W und einer Eingangsleistung von 138W. Die verbleibenden 10W werden größtenteils im FET und den Dioden verloren, die Induktivität und die Stromüberwachungswiderstände werden ebenfalls leicht warm. Dennoch können die 10W sehr einfach mit einem kleinen Kühlkörper abgeführt werden. Tests mit einer 50W 23cm PA wurden von

G3WDG durchgeführt, welche die Kompatibilität der beiden Designs bestätigten. Obwohl Messungen ohne die beschriebenen Tiefpassfilter zeigten, dass keine Seitenbänder in der PA erzeugt werden, ist das Filter empfohlen, um das Shack 'ruhig' zu halten. Der verleibende Ripple mit dem Filter ist in Bild 8 zu sehen, er beträgt 20mV pk-pk.

Ein 'Langzeit'-Test wurde mit einer Belastung von 128 W für über 7 Minuten durchgeführt. Hierbei wurden die Temperaturen außen am Gehäuse und innen gemessen. Mit einer Umgebungstemperatur von 20 Grad C wurde die Stelle direkt außerhalb des MOSFET 30 Grad C warm und die Luft im inneren knapp 40 Grad C. Die Lastwiderstände waren noch etwas wärmer.

Zusammenfassung

Es wurde ein Hochleistungs-Schaltregler mit hohem Wirkungsgrad vorgestellt, der es ermöglicht, moderne LDMOS Leistungsverstärker an 12V zu betreiben. Der Gesamtwirkungsgrad beträgt mehr als 90% bei über 100W Ausgangsleistung. Soweit möglich wurden kommerzielle Standardbauteile verwendet. Tests wurden sowohl mit künstlichen Lasten als auch mit einer 23cm PA durchgeführt.

Danksagungen

Zunächst möchte ich Charlie, G3WDG für die wunderbare 23cm PA danken, ohne die ich sicherlich nicht diesen Schaltregler entwickelt hätte. Er war ebenso Beta-Tester für diese Schaltung. Weiterhin danke ich Coilcraft, Texas Instruments und Fairchilds für die Bauteilemuster.

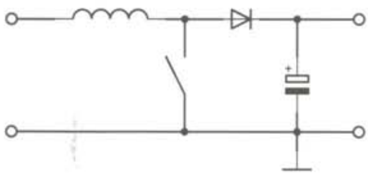


Abb. 3: Prinzipschaltbild
Fig. 3: „Boost“ Circuit

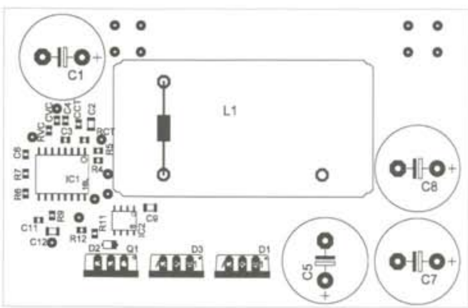


Fig. 4: Bestückungsplan - Oberseite

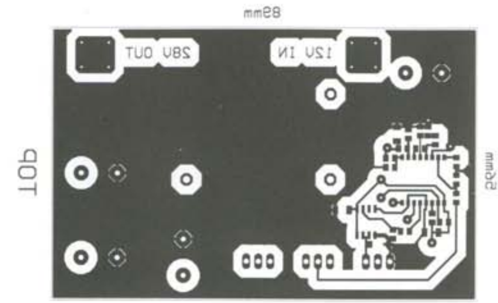


Fig. 5: Layout top side - Oberseite

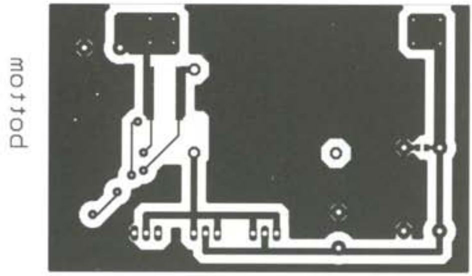


Fig. 6: Layout bottom side - Unterseite

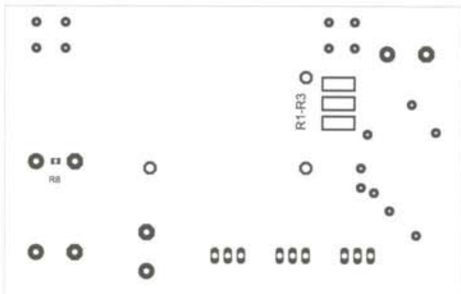


Fig. 7: Bestückungsplan – Unterseite

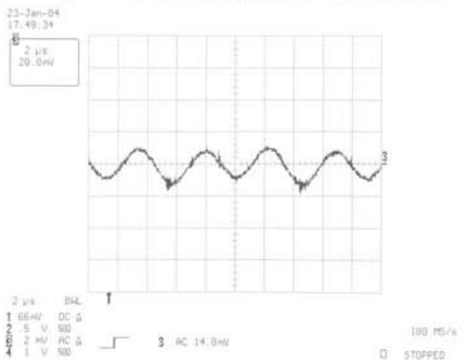


Fig. 8: Ripple

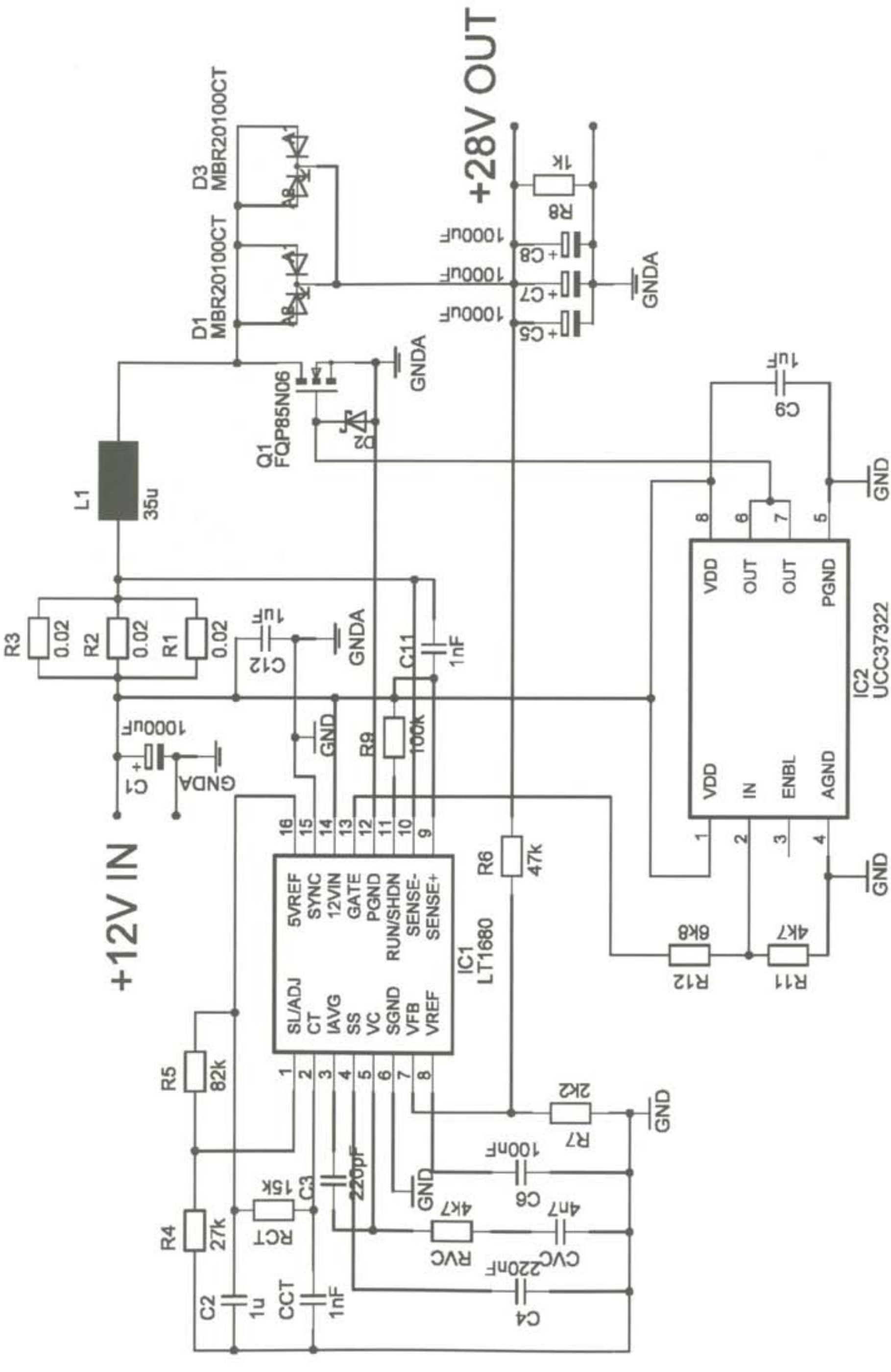


Fig. 9: Circuit Diagram / Schaltbild

L-Band Oscillator Chain

Daniel Uppström, SM6VFZ

Introduction

When converting up to and down from the bands above 1 GHz one needs some sort of local oscillator (LO). Modern PLL ICs are now available for frequencies up to 2-3 GHz, but the classical approach of using a crystal oscillator at something like 100 MHz followed by multiplier stages is still competitive and features in general less phase-noise than a PLL solution operating directly at the target frequency. By using SMD components only, an oscillator chain with high performance and stability has been implemented in a small board size. It delivers a signal in the L-band region centered at 1.2 GHz, which is achieved by a total multiplication factor of twelve. By the insertion of varactor diodes in series with the crystal it is possible to fine-tune the frequency or lock it to an external frequency normal. Most testing and evaluation have been done with a crystal at 96 MHz and a target frequency of 1152 MHz (which is needed for conversion between 1296 and 144) but the circuit is designed to be versatile for a variety of applications and tests at other frequencies have been done as well, se table 1. Spuriouses were -40 dBc or better in all listed cases.

Output	(xtal) Freq.	Measured Output Power (mW)
1128	(94)	18
1152	(96)	20
1278	(106.5)	12
1291	(~107.6)	11

Table 1

Circuit description

The oscillator circuit is of butler type and follows much of the guidelines mentioned in (1). The overall gain of the two transistors (Q1 and Q2) is designed to be moderate in order to avoid spurious oscillations. The oscillation voltage is also cut at 0.6 V peak-to-peak by the two anti-parallel schottky diodes D1. This ensures that the transistors work in a linear fashion. If the diodes were not present, the amplitude of oscillation would be determined by the saturation point of the transistors and the circuit would behave non-linear and let low-frequency noise mix with the carrier. This noise would then directly add up to the phase-noise of the LO which would worsen the performance. By lightly loading the transistors the effect of temperature variations on frequency and power level is also reduced.

The crystal operates in series resonance mode at the fifth overtone, which is achieved by tuning C3 to be resonant with L1 at this frequency region. The coil L2 tunes out the holder capacitance. By introducing the varactors D2 and D3 it is possible to pull the frequency upwards somewhat. Since it is often necessary to pull more symetrically around the specified frequency, a coil, L4, can also be introduced to shift the pulling range to cover downward frequencies as well. But coils always have some loss which will hurt the Q of the resonance circuit and increase phase-noise. For best performance the crystal should probably be ordered some 3 kHz low so that L4 can be excluded. See (1). Resistor R3 removes excessive gain in the oscillator and helps maintain a well defined oscillation and a low phase-noise. It should be noted that in some cases a little more gain is needed for the oscillator to behave well and the value of R3 could be increased or the resistor could even be removed. This seems to be more important the higher the oscillation frequency is.

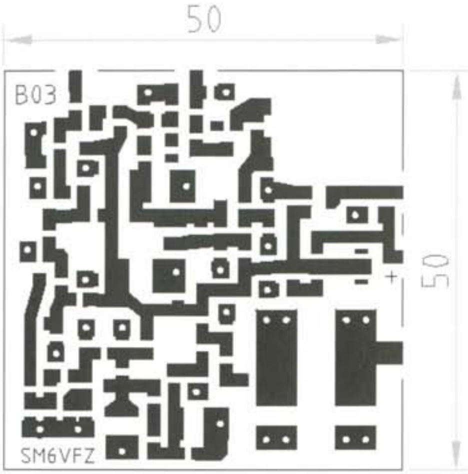
The oscillator is followed by a buffer stage (Q3) that isolates it from the chain and also makes it possible to connect an external circuit in order to monitor the frequency. By feeding the oscillator signal to some PLL/FLL-circuit and the resulting error signal to the Vtune port, the frequency could be locked to some frequency normal. See for instance (2). If no such locking is necessary, a tuning voltage is available from VR1. The tuning voltage is applied through the coil L3 which should be self-resonant near the operating frequency for best performance.

The oscillator signal is amplified in Q4 and fed into Q5 which then behaves nonlinear due to the high signal level. The fundamental frequency is damped in a fixed value filter while the second harmonic is able to pass through to the next stage. The collector circuit of Q6 forms part of a highly selective filter which, when properly tuned, turns the stage into a tripler. To achieve the needed total factor of twelve, the frequency is then doubled in Q7 which is also followed by a selective filter that needs some tuning. The coil L9 should have a value that makes it operate near the self-resonance frequency.

Construction and tuning

The board material is 1.6 mm thick FR4 and it measures 50x50 mm. One side is completely unetched and serves as ground layer. All holes indicated in the layout are simply through connections to ground that needs some millimeters of wire. Since the board is rather thick it radiates at high frequencies and some screening should be mounted around it.

The tuning procedure starts by setting VR1 to its middle position and connecting it to Vtune. With a frequency counter connected to the "osc out" port (or a receiver losely connected), C3 can be tuned for oscillations in the right frequency region. It should also be checked that the exact frequency could be set by VR1. When the oscillator seems to behave well, the filters in the chain could be tuned. Points of resonance should first be searched for where the trim capacitors are not very far from their middle positions. Notice also that the optimum point of C17 is quite dependent on C20 and vice versa. When the right points are found, an output power in the region of 10-13 dBm should be expected, depending on output frequency. Unwanted spuriouses should be more than 40dB below the carrier if properly tuned. If one tolerates a little less spurious suppression it should be possible (but tricky!) to tune the circuit without access to a spectrum analyzer. One could then get along with just a power meter and a frequency counter, although spectrum analysis is of course highly recommended.



Layout

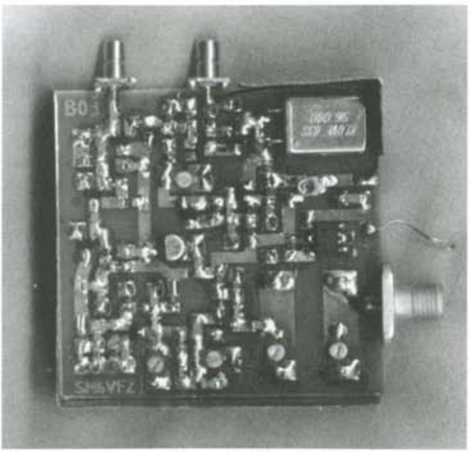


Fig.: L-Band Oscillator Chain

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(2) Luis Cupido (CT1DMK): Locking VCXOs to 10 MHz for Microwave and mmWave Local Oscillators, DUBUS 3/2002, Locking VCXOs ... Universal Version, Locking ... to a GPS 1 pps Output, DUBUS 1/2003

L-Band Oszillator-Kette

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Einleitung

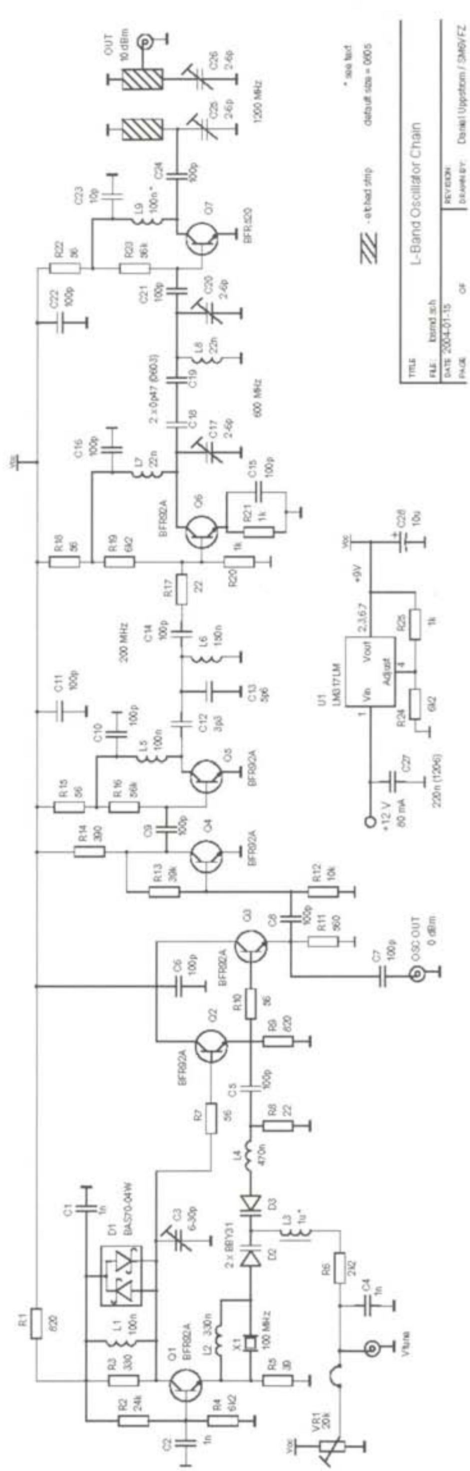
Wenn man auf bzw. von den Bändern oberhalb 1 GHz umsetzt, benötigt man einen Local Oscillator (LO). Moderne PLL ICs sind zwar inzwischen für Frequenzen bis 2-3 GHz verfügbar, aber die klassiche Methode eines Quarzoscillators bei um 100 MHz gefolgt von Verfielfacherstufen ist immer noch konkurrenzfähig und hat normalerweise den Vorteil eines geringeren Phasenrauschens als eine PLL-Lösung, die direkt auf der Zielfrequenz arbeitet.

Durch die ausschließliche Verwendung von SMD-Bauteilen wurde eine Oszillator-Kette mit hoher Performance und Stabilität auf einem kleinen Board realisiert.

Es wird ein Signal im L-Band geliefert, das auf 1.2 GHz zentriert ist und insgesamt durch eine 12-fache Multiplikation erzeugt wird.

Durch die Verwendung von Varactor-Dioden in Serie mit dem Quarz ist es möglich, die Frequenz fein abzustimmen oder an ein externes Frequenznormal zu koppeln.

Part	Value	Size	Comment
R1, R9	820	0805	
R2	24k	0805	
R12	10k	0805	
R3	330	0805	
R4, R19, R24	6k2	0805	
R5	39	0805	
R6	2k2	0805	
R7, R10, R15, R18, R22	56	0805	
R8, R17	22	0805	
R11	560	0805	
R13	39k	0805	
R14	390	0805	
R16, R23	56k	0805	
R20, R21, R25	1k	0805	
VR1	20k		AVX ty-pe:CVR4
C5,C6,C7,C8, C9,C10,C11, C14,C15,C16, C21,C22,C24	100p	0805	
C1, C2, C4	1n	0805	
C3	6-30p		Murata / Panasonic
C12	3p3	0805	
C13	5p6	0805	
C17, C20, C25, C26	2-6p		Murata / Panasonic
C18, C19	0p47	0603	
C23	10p	0805	
C27	220n	1206	
C28	10u / 16V		
L3	1u	0805	Murata
L6	150n	0805	Epcos type SIMID
L4	470n	0805	Epcos
L2	330n	0805	Epcos
L1, L5, L9	100n	0805	Epcos
L7, L8	22n	0805	Epcos
Q1, Q2, Q3, Q4, Q5, Q6	BFR 92A	SOT -23	Philips
Q7	BFR 520	SOT -23	Philips
U1	LM317 LM	SOI C8	National
D1	BAS70-04W	SOT -23	ST
D2,D3	BBY31	SOT -23	Philips
X1	100 MHz etc.		5th overtone series resonant



Die meisten Tests und Untersuchungen wurden mit einem 96-MHz-Quarz und einer Zielfrequenz von 1152 MHz durchgeführt. (Diese wird für die Umsetzung zwischen 1296 und 144 MHz benötigt.) Die Schaltung ist aber so ausgelegt, dass sie für verschiedene Frequenzen variabel ist und es wurden auch Test mit anderen Frequenzen durchgeführt. Siehe hierzu Tabelle 1. Unerwünschte Harmonische werden in allen Fällen -40dB oder besser unterdrückt.

Output	(xtal) Freq.	Gemessene Ausgangsleistung (mW)
1128	(94)	18
1152	(96)	20
1278	(106.5)	12
1291	(~107.6)	11

Tabelle 1

Die Schaltung

Es handelt sich um einen Butler-Oszillator, der sich überwiegend nach den Richtlinien von (1) richtet. Die gesame Verstärkung der zwei Transistoren Q1 und Q2 wurde niedrig gehalten, um unerwünschte Harmonische gering zu halten.
Die Oszillator-Spannung wurde ebenfalls auf 0.6 V Spitze-Spitze durch zwei antiparallele Schottky-Dioden (D1) begrenzt. Dadurch wird lineares Arbeiten der Transistoren abgesichert.

Ohne diese Dioden würde die Amplitude der Schwingung durch die Sättigungspunkte der Transistoren begrenzt. Die Schaltung würde sich unlinear verhalten und Rauschen niedriger Frequenz würde sich mit dem Träger mischen. Dieses Rauschen würde sich dann direkt zum Phasenrauschen des LO addieren und die Performance verschlechtern. Durch leichtes Belasten der Transistoren wird der Einfluß von Temperaturschwankungen auf Frequenz und Höhe der Ausgangsleistung verringert.
Der Quarz arbeitet in Serienresonanz auf dem 5. Oberton. Dies wird durch die Abstimmung von C3 auf Resonanz mit L1 in diesem Frequenzbereich erreicht. Die Spule L2 stimmt die Halter-Kapazität ab. Durch das Einfügen der Varactor-Dioden D2 und D3 ist es möglich, die Frequenz etwas nach oben zu ziehen.
Da es oft nötig ist, um eine bestimme Frequenz symmetrisch herum ziehen zu können, kann eine weitere Spule (L4) eingefügt werden, um den Ziehbereich zu verschieben und auch niedrigere Frequenzen zu erreichen.
Aber Spulen haben immer auch Verluste, die die Güte des Schwingkreises verringern und das Phasenrauschen erhöhen. Für beste Performance sollte deshalb wahrscheinlich der Quarz etwa 3 kHz niedriger bestellt werden, so dass man L4 weglassen kann. (Siehe (1)).
Der Widerstand R3 verhindert zu starke Verstärkung im Oszillator und hilft eine gut definierte Schwingung und niedriges Phasenrauschen zu erhalten. Man sollte hier anmerken, dass in einigen Fällen etwas mehr Verstärkung für den Oszillator benötigt wird, damit dieser sich „gutartig" verhält und R3 sollte vergrößert werden oder sogar ganz weggelassen werden.
Dies scheint um so wichtiger sein, je höher die Oszillator-Frequenz ist.

An den Oszillator folgt eine Puffer-Stufe (Q3), die die ihn von der Kette isoliert und es außerdem ermöglicht, eine externe Schaltung anzukoppeln, um die Frequenz zu überwachen.
Durch Einspeisen des Oszillator-Signals in eine PLL/FLL-Schaltung und des resultierenden Fehlersignals an den VTune-Port, kann die Frequenz an ein Frequenznormal gekoppelt werden.
Siehe z.B. Referenz (2). Falls solch eine Kopplung nicht nötig ist, ist eine Steuerspannung von VR1 verfügbar. Die Steuerspannung wird durch die Spule L3 zugeführt, die für beste Performance ihre Eigenresonanz nahe der Arbeitsfrequenz haben sollte.
Das Oszillator-Signal wird mit Q4 verstärkt und an Q5 gegeben, der dann aufgrund der hohen Pegel nicht linear arbeitet.
Die Grundfrequenz wird durch ein fest dimensioniertes Filter gedämpft, während die 2. Harmonische hindurch bis zur nächste Stufe gelangt.
Der Kollektor-Kreis von Q6 stellt den Teil eines hochselektiven Filters dar, das, wenn es ordnungsgemäß abgestimmt ist, die Stufe als Verdreifacher arbeiten lässt. Um den benötigten Faktor 12 zu erhalten, wird die Frequenz mit Q7 verdoppelt, ebenfalls gefolgt von einem selektiven Filter, das besonders abgestimmt werden muss.
Die Spule L9 sollte einen Wert haben, der eine Arbeiten nahe der Eigenresonanz ermöglicht.

Aufbau und Abstimmung

Die Platine ist 1.6mm dickes FR4 in der Größe 50 x 50mm. Eine Seite bleibt komplett ungeätzt und dient als Massefläche. Alle Löcher im Layout sind einfache Durchkontaktierungen mit einigen mm Draht nach Masse.
Da die Platine relativ dick ist, schwingt sie auf hohen Frequenzen und es sollte eine Abschirmung um sie herum aufgebaut werden.

Die Abstimmung beginnt mit der Einstellung von VR1 auf die Mittelstellung und des Anschlusses an Vtune. Mit einem Frequenzzähler, der am „osc out" – Port angeschlossen wird (oder einem lose angekoppelten RX), kann C3 auf einen Wert für Schwingungen im richtigen Bereich abgestimmt werden. Man sollte auch kontrollieren, dass die exakte Frequenz mit VR1 eingestellt werden kann. Sobald der Oszillator gut zu arbeiten scheint, können die Filter in der Kette abgestimmt werden. Die Resonanzpunkte sollten zuerst dort gesucht werden, wo die Trimmer nahe der Mittelstellung sind.
Es ist zu beachten, dass der optimale Punkt bei C17 ziemlich von C20 abhängt und umgekehrt.
Wenn die richtigen Punkte gefunden wurden, sollte eine Ausgangsleistung von etwa 10-13dBm erwartet werden, je nach Output-Frequenz.
Unerwünschte Harmonische sollten mehr als 40 dB unterhalb des Carriers liegen, wenn sauber abgestimmt wurde. Wenn man mit etwas schlechteren Werten auskommt, sollte es möglich (ist aber nicht ganz einfach!), die ganze Schaltung ohne Spektum Analyzer abzugleichen. Man geht dann die Stufen nur mit Power-Meter und Frequenzzähler durch. Natürlich ist ein Spektrum-Analyzer der bessere Weg.

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Practical and Cheap Solution of Circular Waveguide for 10 GHz

Ivo Chladek, ZS6AXT, OK2WCG

Tropo operation on microwave frequencies from home usually requires some low loss feedline to reach the antenna on the top of your tower or roof. This is of course so unless you mount your transverter, PA and LNA in a waterproof enclosure somewhere around the dish and live with the access problems when something goes wrong with it.

Before starting on my 10 GHz home tropo setup, good consideration was given to possible options. Great help were articles as listed in the references and comments from few microwave guys. In the end decision for a circular waveguide (WG), "plumber's delight" was made. The following description is certainly nothing new for many, but it may give some new ideas to others. Similar arrangement can be used for 5760 MHz and probably even for 24 GHz if a suitable size of tubing is available.

WG is certainly the feedline with lowest losses in the microwave range of frequencies. For 10 GHz it is WR90 (although WR75 can be used too), but unless you get some surplus it is expensive. In addition, one needs flanges, bends etc. and in general it is quite clumsy and heavy. Loss is about 10 dB / 100 feet, i.e. over 3 dB /10 m.

The other alternative is circular WG, which is not very often used by commercial users. However, suitable size of copper tubing is available, as used by plumbers for water installations. It is the 21mm I.D. copper tubing, with 0,5mm thick wall, which is just the right size for 10 GHz WG. In addition, straight and angle couplings are available, all of that for reasonable prices. Such copper tubing is also not as heavy as WR90 WG. There is just one disadvantage: polarization may change in the length of such WG, especially when using angle couplings, thus one end of such feedline must have adjustable polarization. However, 10 m length of this WG, assembled with three 45 degree and two straight connections, plus two coax to WG transitions has just 2,2 dB loss in my case. Similar second 10 m length measured about 0,1 dB more. This was measured in home conditions, with very basic equipment. Considering the costs, availability of materials for this WG and ease of assembly, it is really a feedline worth considering.

Coax to WG transition

This is the only bit complicated and critical part of the WG assembly. It consists of the following parts:

-Short piece of the 21mm I.D. tubing, about 15 – 25 cm long,

-Brass plate 16x16 mm, 2 mm thick,

-SMA panel mount connector with four fixing holes and the center lead of 1mm diameter, at least 9,5 mm long and

-Thin round brass plate of 22 mm diameter.

Both ends of the tubing should be square, flat and with clean smooth edges. Drill a 3 mm diameter hole exactly 12,2 mm from one end of the tubing. Prepare the SMA mounting plate by drilling 3 mm hole in the center and four SMA fixing holes tapped for M2,5 screws. Select a short stainless steel M3 screw with nut and fix the SMA mounting plate to the WG tubing. Solder together such, that the solder does not get into the tapped M2,5 holes. Remove the M3 screw and enlarge the hole to 4 mm. Clean the edges of this hole. Cut the TEFLON on the center lead of the SMA to such length, that it is just flush with the inner wall of the WG. The protruding bare center lead should be at least 6,5 mm, but rather 7 mm long, to give chance for optimization. Mount the SMA connector with four M2,5 short screws. Stainless steel type screws are the best here.

For the accurate optimization of the transition one needs a 10 GHz signal source, directional coupler and some spectrum analyzer or similar indication. If you do not have access to such equipment, cut the probe length to exactly 6,5 mm, it should be close enough to optimum. That is of course if the distance of the probe center is exactly 12,2 mm from the WG end, since the optimal probe length depends on this distance.

For the proper adjustment we need some sort of dummy load fitted to the other end of the WG since it's open end has quite a bad SWR, like 2:1. A wooden handle of a broomstick, sharpened over about 7 cm length and inserted into the WG may do the job. With the open end (probe side) the return loss will be about 10 dB. Take a metal plate (I used a PCB off-cut) and move it to this WG end. When just few mm away from the open end, return loss will increase, usually well over 20 dB. With a file, remove a small piece of the probe. Do not cut it with sidecutters, you may shorten it too much! After each probe shortening, maximum of return loss should be with the metal plate closer to the WG end. Shorten the probe few times, until return loss maximum is with the metal plate pressed to the end of WG. It should be at least 25 dB, in my case close to 30 dB. Accuracy of such measurement depends on the quality of directional coupler, it's lower coupling will give more accurate results.

After optimization, solder thin layer of solder onto the edge of the WG and then solder the round plate to cover the WG end. It must be watertight, if used outside. Check the return loss, it should be the previously measured optimum value.
Solder the straight coupling to the open end such, that the WG goes to about the center of it. For the coax to WG transition which will be in the shack, make few longitudinal cuts into the other end of coupling with a thin hacksaw, since this end will be fixed to the incoming WG by means of a hose pipe clamp, so that the polarization can be optimized.
The above described technique of the probe length adjustment was used here also for the optimization of 10 GHz W2IMU horn, which is probably the best choice for dishes with f/D= 0,5 – 0,6. In this case one does not need the WG dummy load. Horn should be however aimed into reasonably open, reflections free space, during measurements.

WG assembly and alignment

Surprisingly, assembly of the WG parts is not critical. It is advisable to clean the inside of the tubing before assembly. In the straight couplings, ends of the WG tubing should be square, cleaned and touching each other. In the angle couplings push the tubing ends as far as possible. The easiest way is to assemble most of the WG run on the ground; it is quite difficult to do good soldering of the joints up in the air. Gas torch soldering irons are best suited for this job. All joints should be watertight. Do not use any acidic solder flux. According to W1GHZ not more than 45 degree angle couplings should be used for best results. After assembly, inject signal into the shack side of the WG and measure output at the other end. This should be terminated by a good 50 Ohm load with a detector. By slow turning of the coax to WG transition in the shack adjust for maximum output at the other end and fix the position with the hose pipe clamp.

Some practical applications

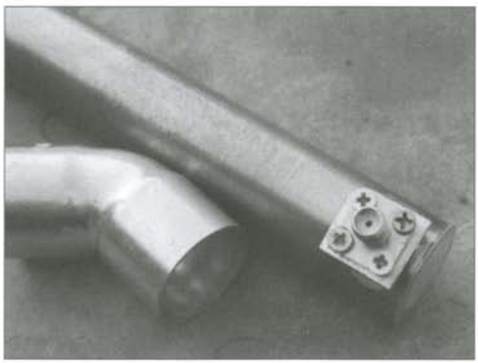
There are many practical applications of such circular WG. These are not only for tropo, but also for EME use. Sensitive equipment like transverter can stay in the ham shack, while only PA and LNA will be outside, close to the feedhorn, together with the coaxial relay. Due to the low loss in such WG, drive level for the PA can be low and the LNA does not need to have high gain.
In my case I use two runs of the WG for tropo, since the transverter has separate outputs for TX and RX. Thus only one coaxial relay is necessary. With a single WG run two more coaxial relays may be required. Saving of two such relays will more than cover the cost of the second WG. When using a TWT for tropo, it can be mounted in the ham shack, some 3 dB loss in the WG may be tolerated, considering how many problems with the HV PSU will be eliminated.
And for further experimentation: Bit larger diameter tubing, about 35 mm can be used for two bands WG, namely 3 and 6 cm. However, dimensions of the coax to WG transitions will have to be recalculated since these depend on the WG wavelength. Necessary details can be found in the W1GHZ article listed in References. Coax to WG transitions, one for each band, could be perhaps at right angles; it may work.

Measuring equipment used

Coax to WG transition: HP signal generator, HP 141 spectrum analyzer and 20 dB directional coupler.
WG loss measurement: 200 mW signal from transverter, diode detector calibrated with the use of 1dB SMA attenuators, 20 dB directional coupler and 50 Ohm SMA microwave dummy load.
The above measuring equipment is certainly not "state-of-art", but for amateur conditions it was found good enough, after the measured results were confirmed by few contacts.

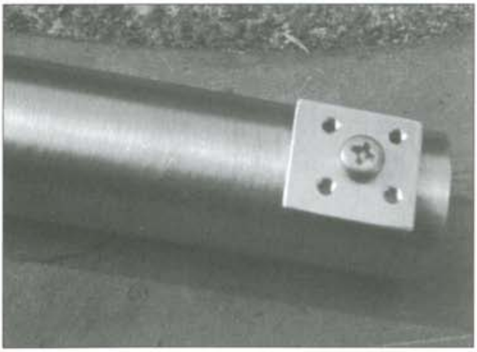
References

Proceedings of Microwave Update 1999:
-Paul Wade, W1GHZ: Understanding Circular Waveguide – Experimentally.
-Dick Knadle, K2RIW: Circular Waveguide Frequencies, More Accuracy, More Experiment Data.

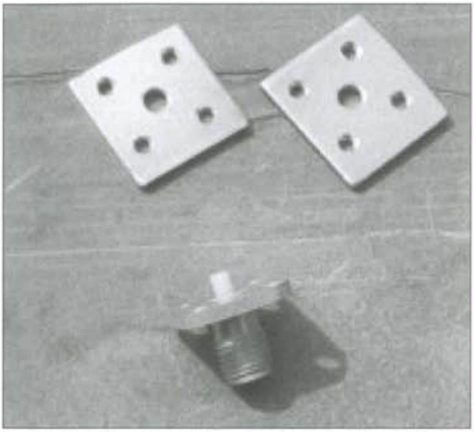


Complete transition and 45 degree coupling

Der Übergang und ein 45 Grad - Verbinder



Brass plate fitted for soldering
Die Messingplatte vor dem Verlöten



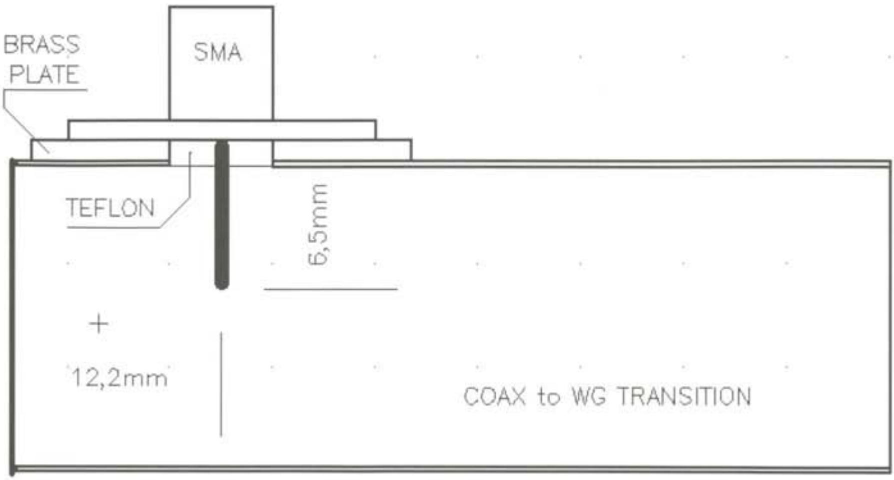
SMA and brass plates
SMA-Flanch und Messingplatten

Complete transition
Der fertige Koax-Wellenleiter-Übergang

Ein praktischer und günstiger zirkularer Wellenleiter für 10 GHz

Ivo Chladek, ZS6AXT, OK2WCG

Tropo-Betrieb auf den Mikrowellenbändern von der häuslichen Station aus erfordert ein sehr dämpfungsarmes Kabel zur Antenne auf der Spitze des Mastes bzw. Daches. Natürlich nur, wenn



Tranverter, PA und LNA nicht in einem wasserdichten Gehäuse direkt am Spiegel untergebracht sind. Dann hat man aber ggf. Probleme mit dem Zugang, wenn mal etwas nicht funktioniert.
Bevor ich zuhause meine Tropo-Station für 10 GHz aufgebaut habe, wurden Überlegungen über alle möglichen Optionen angestellt. Sehr hilfreich dafür waren die in den Referenzen aufgelisteten Artikel und auch einige Kommentare von ein paar Mikrowellen-OPs. Letztendlich fiel die Wahl auf einen runden Wellenleiter (Waveguide, WG) der Marke „Klempners Wonne"
Die folgende Beschreibung mag sicherlich für viele nichts Neues sein, kann aber Anregung für neuen Ideen für einige sein.
Eine ähnliche Konstruktion kann auch für 5760 MHz und wahrscheinlich auch für 24 GHz verwendet werden, sofern passende Rohrdurchmesser zur Verfügung stehen.

Der Wellenleiter ist sicher die dämpfungsärmste Möglichkeit Mikrowellen zu übertragen. Für 10 GHz wird WR90 (WR75 kann aber auch verwendet werden) verwendet. Das ist sehr teuer, sofern man nicht Zugang zu günstigem Surplus-Material hat. Außerdem braucht man spezielle Flansche, Krummüngen etc. Das ganze wird recht schwer und ziemlich klobig. Die Dämpfung liegt bei 10db/100feet, d.h. etwas über 3dB / 10m.
Die Alternative dazu ist runder Wellenleiter, der im kommerziellen Bereich recht selten eingesetzt wird. Es gibt jedoch eine passende Größe von Kupferrohr, das von Klempnern für Wasserleitungen verwendet wird. Es handelt sich um ein Rohr mit 21mm Innendurchmesser und einer Wandstärke von 0.5mm. Dies ist eine passende Größe für 10 GHz. Natürlich gibt es passende Winkel und gerade Stücke, die auch verwendet werden können. Und das alles zu akzeptabelen Preisen. So ein Kupferrohr ist sogar leichter als WR90. Es gibt nur einen Nachteil: Die Polarisation kann kann sic him Laufe eines solchen Wellenleiters ändern, besonders wenn Winkelstücke verwendet werden. Deshalb ist es nötig, an einem Ende des Wellenleiters die Polarisation einstellen zu können.
Immerhin haben 10m dieses Wellenleiters, mit drei 45 Grad Winkel-Stücken und 2 geraden Verbindungsstücken plus zwei Koax-WG-Übergängen, nur 2,2 dB Verlust bei mir. Bei einem zweiten 10m langen Aufbau wurden 0.1 dB mehr gemessen. Dies wurde amateurmäßig mit einfachen Messgeräten gemessen-
Wenn man über die Kosten, die Verfügbarkeit des Materials und die Einfachheit des Zusammenbaus dieses Wellenleiters nachdenkt, kann diese Lösung wirklich bedenkenwert sein.

Der Übergang von Koax auf Wellenleiter

Dies ist der einzige etwas komplizierte und kritische Teil dieses Wellenleiters. Der Übergang besteht aus folgenden Teilen:

- Ein kurzes 15 bis 25 cm langes Stück des 21mm Kupferrohres
- Eine 2mm starke Messingplatte 16 x 16 mm
- Eine SMA-Flanschbuchse mit 4 Löchern zum Festschrauben, Innenleiter 1mm Durchmesser und mind. 9.5mm lang
- Eine dünne runde Messingplatte mit 22mm Durchmesser

Beide Enden des Rohres müssen sauber senkrecht abgesägt sein und die Kante glatt gefeilt werden. Dann wird ein 3 mm Loch exakt 12,2 mm von einem Ende des Rohres gebohrt.
In die Messingplatte für die SMA-Buchse wird in die Mitte ein 3mm Loch gebohrt sowie vier Löcher mit Gewinde für M2,5 Schrauben. Mit einer kurzen M3 Edelstahlschraube und Mutter wird die Platte am Rohr fixiert. Nun wird die Platte angelötet. Dabei aufpassen, dass kein Lot in die vier Löcher für die M2.5 Schrauben läuft. Nun die M3-Schraube entfernen und das Loch auf 4mm vergrößern und entgraten und glatt schleifen.
Das Teflon, das um den Innenleiter der SMA-Buchse liegt wird nun so beschnitten, dass es genau bündig mit der Innenwand des Rohres verläuft und nicht mehr übersteht.
Der nach innen ragende Innenleiter der Buchse sollte mindestens 6,5 mm überstehen, besser sollten es 7mm sein, um Optimieren zu können.
Nun die SMA-Buchse mit den vier kurzen M2.5 Schrauben befestigen. Möglichst Edelstahl-Schrauben verwenden.
Um eine gute Optimierung des Übergangs zu erreichen, benötigt man eine 10 GHz Signalquelle, einen Richtkoppler, eine Spektrum Analyzer oder ähnliche Indikatormöglichkeit. Falls keine Meßmöglichkeit vorhanden ist, sollte der Innenleiter auf exakt 6.5mm gekürzt werden. Damit sollte man dicht genug am Optimum liegen. (siehe Abb.)
Der Wert gilt natürlich nur, wenn der Abstand exakt 12,2mm vom Rohrende beträgt. Die optimale Länge des Innenleiters hängt von seiner Entfernung vom Rohrende ab!
Für eine richtige Justierung muss eine Art Dummy Load an das andere Ende des Wellenleiters angeschlossen werden, da dieser im offenen Zustand ein ziemlich schlechtes SWR von etwa 2:1 hat.
Ein Stück hölzerner Besenstiel, der auf 7cm Länge dem Rohr angepasst wurde und in den Wellenleiter eingeführt wird, kann die Dummy Load Funktion erfüllen. Wenn das Ende der Einkoppelseite des Wellenleiters offen ist, beträgt der Return Loss etwa 10 dB.
Führt man eine Metallplatte (z.B. einen Abschnitt PCB) an dieses offene Ende heran, geht der Return Loss einige mm bevor man das Rohr erreicht, auf gut über 20 dB.

Nun mit einer Feile den Innenleiter ein kleines Stück kürzen. Hiebei keine Zange benutzen, man könnte damit zuviel abschneiden.

Nach jedem Kürzen des Innenleiters rückt das Maximum des Return Loss immer näher an das Rohrende heran. Nach einigen Kürzungen sollte das Maximum dann erreicht sein, wenn die Platte fest ans Rohr gepresst wird. Es sollten wenigstens 25 dB erreicht werden. Bei mir wurden knapp 30dB erreicht. Die Genauigkeit der Messung hängt von der Qualität des Richtkopplers ab, eine niedrigere Auskopplung wird genauere Ergebnisse liefern.

Nach der Optimierung wird eine dünne Schicht Lot auf das Ende des Rohres aufgebracht und die Messingscheibe aufgelötet. Falls dieses Stück im Freien eingesetzt werden soll muss dieser Abschluß wasserdicht sein. Anschließend noch mal den Return Loss überprüfen. Es sollte der zuvor eingestellte optimale Wert sein.

Nun wird eine gerade Rohrkupplung auf das offene Ende so gelötet, dass das Rohr zentriert verläuft.

Am Koax-Wellenleiter-Übergang, der sich im Shack befindet, werden mit einer feinen Metallsäge einige Schnitte längs auf der Rohrseite gegenüber der Einkopplung gemacht. Dieses Ende wird nämlich dort mit einer Rohrschelle gegenüber dem ankommenden Wellenleiter befestigt, so dass die Polarisation eingestellt bzw. optimiert werden kann.

Die oben beschriebene Technik der Justierung der Länge des Innenleiters wurde auch für die Optimierung des 10 GHz Horns nach W2IMU benutzt, das wahrscheinlich das beste Horn für Spiegel mit einem f/D von 0,5 bis 0.8 ist.

In diesem Fall braucht man auch keine Dummy Load im Wellenleiter: Man benutzt das Horn, das während der Messungen aber in möglichst offenen reflektionsfreien Raum zeigen sollte.

Zusammenbau und Justierung des Wellenleiters

Überraschenderweise ist der Zusammenbau der teile des Wellenleiters unkritisch. Ratsam ist es, das Innere der Rohre vor dem Zusammenbau zu säubern.

In den geraden Kupplungsstücken sollen die Enden des Wellenleiterrohres gerade und sauber einander berühren. Bei den gewinkelten Verbindungsstücken sollen die Enden des Rohres so weit wie möglich hineingedrückt werden. Am einfachsten ist es, möglichst viel des ganzen Wellenleitersystems auf dem Boden liegend zusammen zu löten. Es ist recht schwierig, die Verbindungen hoch in der Luft vernünftig zu verlöten. Am besten lötet man mit einem Gasbrenner. Alle Verbindungen müssen wasserdicht sein. Säurehaltiges Lotzinn sollte nicht verwendet werden.

W1GHZ empfiehlt keine Winkel von mehr als 45 Grad zu verwenden, um beste Ergebnisse zu erhalten.

Nach dem kompletten Zusammenbau wird im Shack ein Signal eingespeist und der Output am anderen Ende gemessen, das mit einer 50 Ohm-Last und einem Detektor abgeschlossen wird.

Nun wird der Koax-Wellenleiter-Übergang im Shack langsam gedreht, bis der Output am anderen Ende maximal ist. Diese Position wird dann im Shack mit einer Schelle fixiert.

Praktische Anwendung

Es gibt viele praktische Anwendungsmöglichkeiten für derartige runde Wellenleiter. Sie können nicht nur für eine Tropo-Anlage, sondern auch bei EME eingesetzt werden. Empfindliche Teile der Anlage wie der Transverter können im Shack bleiben, PA und LNA können nahe der Antenne zusammen mit dem Relais montiert werden. Wegen des geringen Verlustes des Wellenleiters braucht man weniger Treiberleistung und auch der LNA braucht nicht so viel Verstärkung zu haben.

Ich selbst benutze zwei solche Wellenleiter für meine Tropo-Anlage, da mein Transverter getrennte Ausgänge für TX und RX hat. So brauche ich nur ein Koaxrelais.

Mit nur einem Wellenleiter werden zwei weitere Koaxrelais benötigt. Deren Einsparung deckt die Kosten für den zweiten Wellenleiter mehr als ab.

Wenn man für Tropo eine PA mit einer TWT benutzt, kann diese im Shack verbleiben. Die 3 dB Verlust sind hinnehmbar, wenn man die Probleme bedenkt, die das HV-Netzteil bereiten kann.

Zum weiteren Experimentieren bietet sich Rohr mit einem etwas größerem Durchmesser von 35mm an, das für 2-Band-Wellenleiter, nämlich für 3cm und 6cm benutzt werden kann. Jedoch müssen dann die Koax-Wellenleiter-Übergänge neu dimensioniert werden. Details findet man in dem Artikel von W1GHZ, der in den Referenzen genannt ist. Koax-Wellenleiter-Übergänge für jedes einzelne Band, könnten dann ggf. bei richtigen Winkeln realisiert werden.

Verwendete Meßgeräte

Koax-Wellenleiter-Übergänge: HP Signalgenerator, HP141 Spektrumanalysator, 20dB Richtkoppler.

Wellenleiter, Messung der Verluste: 200 mW Signal aus dem Transverter; Dioden-Detektor, geeicht mit 1dB SMA-Dämfungsgliedern, 20DB Richtkoppler; 50-Ohm-SMA-Mikrowellen-Dummy-load.

Dieses Meß-Equipment ist sicher nicht der Stand der Technik, für Amateurzwecke wurde es aber als ausreichend empfunden, nachdem die gemessenen Ergebnisse durch einige QSOs bestätigt werden konnten.

New Software UKW Tools

Jonathan Naylor, G4KLX

The purpose of this software project is to provide a set of tools which allow for microwave operators and mobile radio implementors to be able to survey locations. It grew out of my need for a Linux implementation of the G4JNT GEOG suite of BASIC programs for DOS. This work well under DOSEMU under Linux but they are limited to just the UK. By its nature (it is based on UK-only NGRs) it is not easy to adapt it to cover outside of the UK.

UKW Tools from version 0.3.0 can make use of the SRTM and GTOPO30 data files that are publically available. The SRTM (Space Shuttle Radar Topography Mission) data covers most of the world at approximately 90m intervals but has inaccuracies, the GTOPO30 data covers the whole world at approximately 900m intervals and is accurate. UKW Tools can use both sets of data either seperately or together in order to provide the best data possible, without paying for it. Despite the imperfections, it is still very useful for creating good terrain models for mapping anything from 2m FM repeater coverage to optical paths for high microwave or optical operation. Or in my case, to help me choose a new QTH which should be good for anything above 136 kHz.

The SRTM data was mentioned on page 73 of DUBUS 4/2003 in the extreme right hand column.

The UKW Tools software is available from www.qsl.net/g4klx/software.htm as UKW Tools (just underneath LinWSJT) and it runs under both Linux and Windows. The bad news is that you have to download a lot of data from NASA to run it. Western Europe fills two CDs easily, so a broadband connection is a must to get it.

Here are a few screen captures to see part of the program in operation.

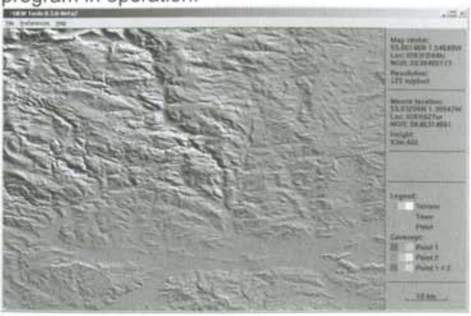


Fig. 1

The first picture is the main screen of UKW Tools and this is the main control centre for the rest of the program. Here you can see a pseudo-3D map of a part of Derbyshire, the county where I live. The area on the right gives information about what is happening on the map. From here the other functions can be started. You can see that there is a location in the centre of the map marked as Alport Heights.

Fig. 2

The second picture is a line of sight coverage plot from the location marked as Alport Heights. This is a major communications site and pictures of it can be seen on my pictures page. The green area (here almost black and mostly in the lower half of the picture) represents the coverage from the top of the mast to any structure which is 8m above ground level, I have also included some local towns on the map. UKW Tools can plot two such sites simultaneously so that overlapping coverage can be seen.

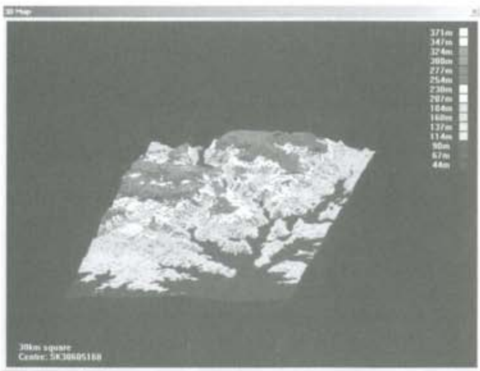


Fig. 3

The third picture is a 3D plot of a 30km square centred on Alport Heights. The palette may be changed as can the viewing angle and other parameters. (The original picture is with colors).

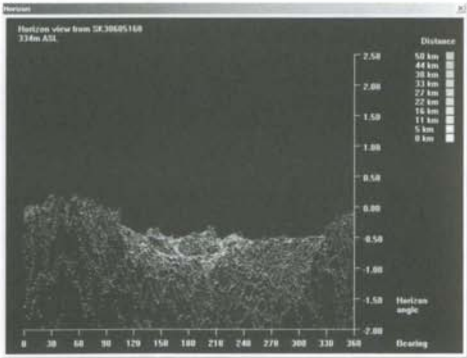


Fig. 4

The fourth picture is the horizon view from Alport Heights up to a distance of 100kms. As you can see, in most directions it has a sub zero elevation angle and it is an excellent location. That is why there are seven communications masts there including the Home Office and more mundane things like the GB3DY 70cms amateur repeater on RB10.

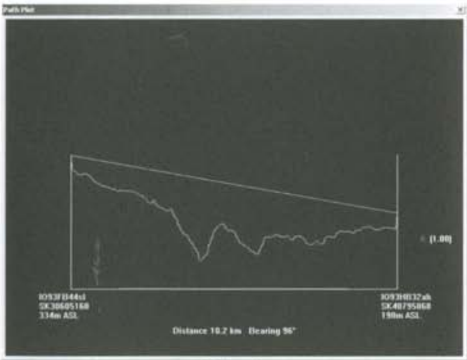


Fig. 5

The fifth picture is of a path plot from Alport Heights to the mast of Zycomm Electronics in Ripley. It is not a great distance but it does show the quality of the SRTM data. At some point I would like to compare this plot with the one generated by a commercial package which we have at work. The first large valley from the left is where Ambergate is located, this is where my first house was, as you can see it was not a good location for anything above 136kHz.

Like LinWSJT, UKW Tools requires the wxWindows library. Unlike LinWSJT it is very portable to Windows etc. I have already had a go at porting UKW Tools 0.3.0 to Windows with success. You will need a copy of MinGW and MSYS as well as the Windows version of wxWindows which is named wxMSW. The versions that I used were MinGW 3.1.0-1, MSYS 1.0.9 and wxMSW 2.4.2. Apart from some changes in the GUI, it all works fine. In fact all of the screenshots were made under Windows 2000.

The latest version of UKW Tools is 0.3.0 which represents a massive update on 0.2.3 and is probably the first release that looks and feels like something more than the G4JNT GEOG suite ported to Linux. There is a moderately detailed README file within the package that explains how to use it.

The Zip file ending with WinBin is a compiled copy of UKW Tools for Windows 2000 and XP machines. It contains no form of installer at present but I hope to include one soon, however it does allow Windows users to try UKW Tools without having to install a complete development environment. It even runs under Linux using Wine. It is slightly out of date compared to the main release but this will be rectified in due course.

Deutsche Zusammenfassung:

G4KLX hat eine Software "UKW Tools" im Januar 2004 in der Version 0.3.0 veröffentlicht. Sie ermöglicht Landkarten mit Flächen der optischen Sicht von einem QTH aus, Geländeschnitte usw. grafisch darzustellen. Dazu werden Daten, die von der NASA frei erhältlich sind (SRTM, Radarbilder der Erde vom Space Shuttle) verwendet. Diese haben eine Auflösung von etwa 90m, aber einige Ungenauigkeiten.
Sie sind für die ganze Welt verfügbar. Ausserdem können GTOPO30-Daten verwendet werden, die genau sind und aus 900m-Abschnitten bestehen.
Das Programm kann beide Datenquellen gleichzeitig auswerten und so die Genauigkeit verbessern. UKW Tools läuft unter Windows und Linux und kann kostenlos im Internet downgeloadet werden unter: www.qsl.net/g4klx/software.htm
Für den Download der SRTM Daten benötigt man eine schnelle Internetverbindung bzw. Flatrate, da alleine die Daten für Europa ca. zwei CDs füllen.
Das Programm bzw. die Info-Texte dazu sind nur in Englisch verfügbar, weshalb sich eine komplette Übersetzung des Artikels erübrigt. (DL8HCZ)

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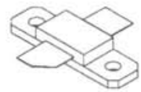

CASE 360B–05, STYLE 1
NI–360
MRF284R1

CASE 360C–05, STYLE 1
NI–360S
MRF284LSR1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	65	Vdc
Gate–Source Voltage	V_{GS}	±20	Vdc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	87.5 0.5	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain–Source Breakdown Voltage (V_{GS} = 0, I_D = 10 µAdc)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 20 Vdc, V_{GS} = 0)	I_{DSS}	—	—	1.0	µAdc
Gate–Source Leakage Current (V_{GS} = 20 Vdc, V_{DS} = 0)	I_{GSS}	—	—	10	µAdc

NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

REV 13

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TYPICAL CHARACTERISTICS

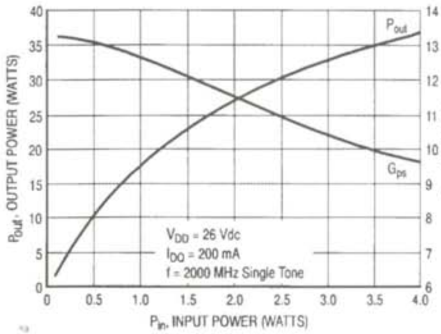


Figure 5. Output Power & Power Gain versus Input Power

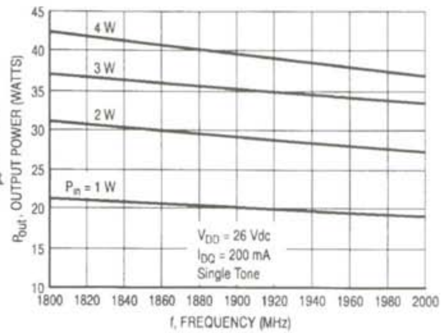


Figure 6. Output Power versus Frequency

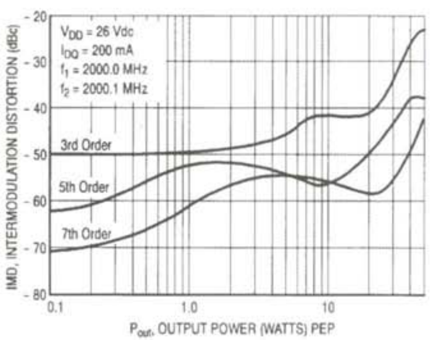


Figure 7. Intermodulation Distortion Products versus Output Power

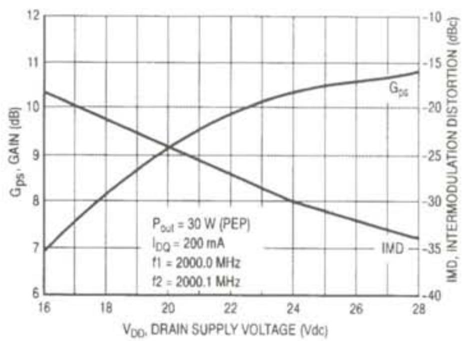


Figure 8. Power Gain and Intermodulation Distortion versus Supply Voltage

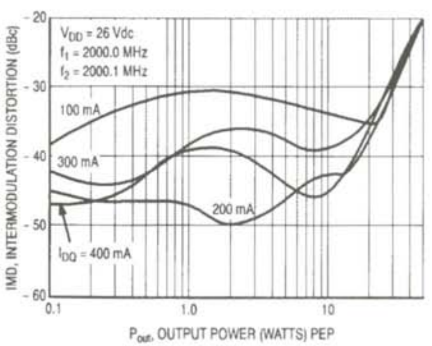


Figure 9. Intermodulation Distortion versus Output Power

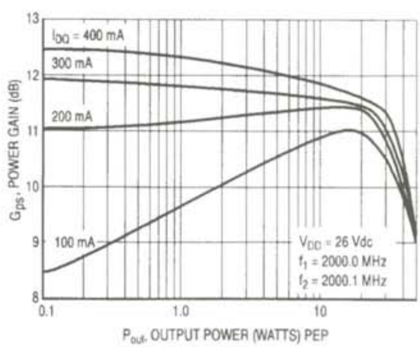


Figure 10. Power Gain versus Output Power

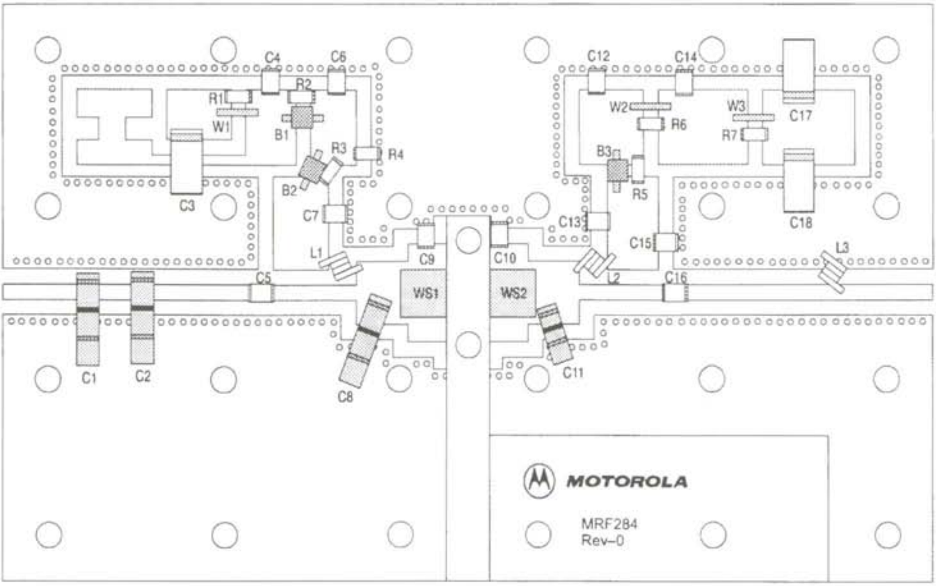
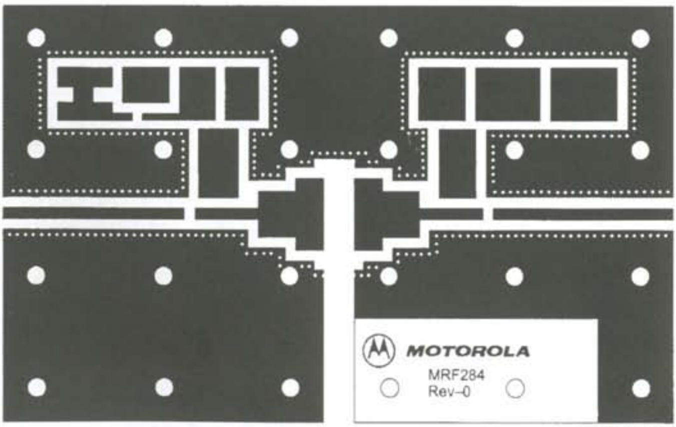


Figure 2. 1.93–2.0 GHz Broadband Test Circuit Component Layout



(Scale 1:1)

Figure 3. MRF284 Test Circuit Photomaster
(Reduced 18% in printed data book, DL110/D)

Microwave Europe

Simon Lewis, GM4PLM/DL4PLM

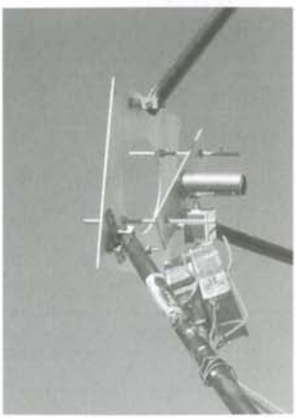
Hello and welcome to another column. Winter has us in its grip again as I write this and it is certainly not a time to be portable! The hills just a few miles to the south of my QTH in Scotland are deep in snow and in the lowlands here in Düsseldorf it is very cold and quite a lot of snow this weekend. But this type of weather certainly reminds us that we should extremely vigilant and prepared should we go out portable even on much lower ground. If you are one of the adventurers that do brave the weather please ensure you are well prepared. The news regularly carries details of unwary people that get into difficulties due to them being ill prepared. Please don't become a news item! Of course sitting in front of the fire on the farm sends the mind into warmer weather and the thoughts of spring. Make this year different, build for a new band, operate in some of the contest and activity periods, but above all, get out and enjoy the bands.

Please note! Again little news received from Europe! Come on – let know what is happening in EU so we can advise everyone!

Until next time – 73 Simon DL4PLM/GM4PLM

Amateurs Receive Mars Express!

Using what he described as "just a quick throw-together" system, Charlie Suckling, G3WDG, has received a signal in the UK from the European Space Agency's Mars Express spacecraft. Unfortunately the Beagle 2 lander it carried was lost on landing during the Christmas period but Charlie reports he heard the Mars Express signal on X band (8.4 GHz) on December 9 using a 3 metre diameter dish. In a message to James Miller, G3RUH, who provided him with advice on setting up his equipment, Charlie said his system noise factor was about 1 dB, and he used Miller's S-Band 2.25-turn helix scaled to 8.4 GHz as the feed (LHCP). Signals seemed very consistent for about two hours, the signal level was very approximately 0 dB S/N in 2.5 kHz. G3WDG also adds that it was not too hard to locate the signal, about 10 minutes of searching plus or minus 100kHz and tweaking his azimuth and elevation settings. In mid-November a team of German amateurs were able to copy the Mars Express signal from a far more sophisticated setup in Bochum, Germany, using a 20 meter parabolic antenna. Reception of the Mars Express signal provided a test run for the facility, which will serve as the ground control station for AMSAT-DL's Phase P5-A Mars orbital mission planned for 2007. AMSAT-DL President Peter Gülzow, DB2OS, said it was the first time ever that a signal of an interplanetary deep-space probe was received in Germany. It was probably also the first time ever that such a signal was received by Amateur Radio operators he added. You can find a full report on the AMSAT-DL Web site.



G3WDG 8 GHz Receiver and Feed

WG 24/47GHz switches available surplus!

Peter G3PHO reports "At long last a plentiful supply of waveguide switches for both 24GHz and 47GHz has found its way to the amateur surplus market, the RelComm Techology model RDW SR002 three port waveguide switch. It's in WR28 (which is the same as the British WG22). I have been using a manual WR28 four port switch for several years and have had no problems using it with WR42 (WG20) butt-jointed directly against it. All that's needed is, with a needle file, to carefully elongate two diagonally opposite holes on the WR42 flanges so that screws can be fitted through the flange into the threads on the waveguide switch.The RelComm switch is electrically operated by means of a short pulse of 8.2V DC. In practice this means if you are running from a +12V portable supply you'll need to drop the supply by means of a 1 amp regulator to around 8 or 9 volts. A 3 pin 7808 or 7809 will do the trick.The six pin connector shown here has multicoloured wires coming from it. Changeover switching connections are as follows:

GREY: Ground(0 VOLTS)
RED: +8.2V DC switched
BROWN: +8.2V switched

To change the relay from RX to TX merely apply the 8.2V to either the Grey or the Red lead. To switch back to RX apply the 8.2V to the other lead, using Grey as the common ground. The remaining wires at the connector are from reed relays that can be used to control other modules in your system (eg switch on a PA, etc) or to control indicator LEDs to show when you are in TX or RX mode.You can easily work out these connections using your ohmmeter. By the way, when we first got hold of our relays we applied 9V from a small battery to the Red lead. Sure, the switch went over with a nice thud but it wouldn't go back when we moved the battery to the Brown lead! Reason ... the new 9V battery was flattened! This relay needs a high current pulse for it to latch. The little battery hadn't got the "guts" to work a second time!

These WR28(WG22)switches are available from the Wellington VHF Group, PO Box 12 259, Thorndon, Wellington, New Zealand. Email Leon Toorenberg, ZL2AOC at: leon@surveylab.co.nz

He will give you a quote on price. When we bought a number of these switches a couple of months ago the price was $50 New Zealand plus postage to the UK. It worked out at around £23 (UK pounds Sterling), including post, for one unit. That's around $47 US a fantastic bargain! Leon has a UK bank account as well as his usual NZ one. We arranged to pay into the UK account and so avoid any bank charges, etc. Those of you outside the UK may need to enquire at your bank about transfer of funds or merely send Leon US dollars. Check with him first to get an updated quote. In January 2004, Leon told me he had lots of these switches for sale!! Specs from the manufacturer: 26.5-40GHz (they work fine on 24 AND 47GHz and are tested!). Insertion Loss: 0.25dB Maximum Isolation: 50dB minimum Connectors: WR28 (UK WG22)

News Microwave Items

DB6NT has been busy over the past few months and has introduced a number of new items on his sales lists. An 8.4 GHz converter and preamp are now available allowing you at home to have a listen for the Mars probes like G3WDG. The IF is at 1270 MHz. For those more affluent of you, a new 10 GHz solid state PA is now available with an output of 50 Watts this will certainly get you heard on the band! But be prepared to sell the wife! Also a new range of MOSFET amplifiers for 23cms has been released and are well worth looking at. You can find details of all the latest items at the DB6NT website.

Microwave Organisation Changes in UK

Not much news yet on the new arrangements for the UK Microwave Group (UKuG) and the details on how they will support the UK microwave community. These details are still being discussed with the RSGB and the only news is that the society have agreed that the UKuG can provide the support of the 2004 contest calendar and the programme for this has now been agreed. You can find more information on the webpage of the Microwave Newsletter editor, Peter Day G3PHO. The group will also take charge in running of the Microwave News – previously an RSGB publication. This will now pass to the UKuG who will run and support the publication of this very popular newsletter.

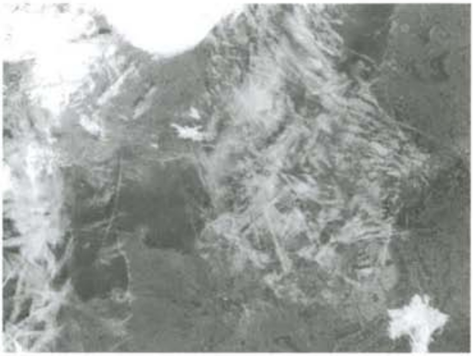
The contest calendar for 2004 (until July) for the UKuG is as follows. The rules follow the contest calendar. All dates shown are Sundays, except where specifically indicated. Detailed rules can be found on the web site of Peter Day G3PHO.

O = Open, R= Restricted section, WB = Wideband

Date	UTC	Contest	
March 28	0900-2100	Low Band uWave Contest (1.3G/2.3G/3.4GHz)	O
April 4	0900-2100	1. 24 GHz Cumulative	O
	0900-2100	1. 47 GHz Cumulative	O
May 1 (Sat)	1400-2200	RSGB 10 Ghz Trophy	O
May 9	0900-2100	2. 24 GHz Cumulative	O
May 9	0900-2100	2. 47 GHz Cumulative	O, WB, R
May 23	0900-2100	1. 5.7 GHz Cululative	O, WB, R
May 23	1400-2200	1. 10 GHz Cumulative	O, WB, R
June 6	0900-2100	3. 24 GHz Cumulative	O
June 6	0900-2100	3. 47 GHz Cumulative	
June 20	0900-2100	2. 10 GHz Cumulative	O, WB, R
June 20	0900-2100	2. 5.7 GHz Cumulative	O, WB, R

Interesting AC Scatter Pictures

Recently talking to Nick GM4OGI about AC scatter from GM to JO31 he informed me of some interesting pictures found on the Internet. I guess the reproduction of this picture in printed form will not do it justice but this picture highlights how AC scatter can be such a useful mode on uwave frequencies! This image shows a myriad of contrails from AC over Southern G and N France.



Portugal: ATV on 10 GHz

On 19/8/03 at 16:30utc CT1FP, CT1AMG and CT1BKF made an ATV QSO from IN51NV to IM59HI at a distance of 285.5 Km on 10455MHz with P4. Weather was dry and temperature was 26C. Tx 0.4W / RX 0.65 dB NF with 90cm Dishes both ends. They believe this sets the CT record for ATV distance on 10GHz, and also the Iberic distance record on ATV 10GHz. (tnx to CT1DMK for QSP)

CT1FP working 10 GHz ATV

Links

Peter Day G3PHO - http://www.g3pho.org.uk/

DB6NT - http://www.kuhne-electronic.de/

Mars Reception / AMSAT-DL - http://www.amsat-dl.org/p5a/reception_g3wdg.htm

UK Microwave Group –
http://www.microwavers.org

Microwave Japan

Seiji Fukushima, Ph.D, JH6RTO

On the 13th of January 6-m EME QSOs became legal in Japan. The following four topics are picked up, which happened recently in Japan.

First Six-metre EME from Japan JH6RTO, Seiji

Because the Japanese telecom authority regarded EME communications as the amateur satellite services, the 6-m EME had not been permitted in Japan for many years. Now it is legal in a small segment of 50.0-50.1 MHz. As long as I know, four Japanese amateurs succeeded in 6-m EME QSOs on the first day- January 13th this year, JST. It became effective at 1500Z on the 12th of January. The first-day QSOs reported are:

01/13 JH2COZ worked W7GJ on JT65B using a single 8-element Yagi
01/13 JE1BMJ worked WA4NJP on JT65?
01/13 JM1SZY worked W7GJ on JT65B
01/13 JA1DXA worked W7GJ on JT65B

JA1DXA is a new callsign of JH7OHF, Katsu, who participated in the dxpeditions of K5K, T32R, and VK9ML. In addition to the first-day QSOs, I received the following logs:

JM1SZY, Akira wkd using 2x10el Yagis and a 1kW amplifier:
01/13 1000Z SM7BAE 6m JT65B
02/08 1038Z WA4NJP 6m JT65B

JH2COZ, Yasuhiro wkd on 2m JT65B:
02/08 KE7NR, K7MAC, P6GWB.

Figures 1 and 2 are JH2COZ, Yasuhiro's 8-el Yagi for 6-m EME and his shack, respectively.

Fig 1.: JH2COZ`s Yagi for 6m EME

Fig. 2: Shack from JH2COZ, Yasuhiro

Geminids and Quadrantids MS Summary, JH6RTO, Seiji

Here is a log collection of the major winter meteor showers.

JI1FLB, Den (PM95ws) wkd:
2003/12/14 1415 JF3IPR 6m JT6M 27 27 493km
and hrd: JE2XBY on 6m, JF1RYU on 6m JT6M, and JR8MCR QN02ut 798km on 2m FSK441

JI4POR (PM65nk) wkd on 2m FSK441:
2004/01/03 JA7BJP QM07gn 705km
2004/01/03 JM1LQW PM96qa 569km
2004/01/03 JI1FLB PM95ws 613km

JA7BJP, Satoru (QM07gn) wkd on 2m FSK441:
2003/12/13 JA9BOH PM86fa 26 26 403km
2003/12/14 1205 JR8MCR QN02ut 26 27 540km

JR8MCR (QN02ut) wkd on 2m FSK441:
2004/01/03 JI4POR PM65nk 1104km
2004/01/03 JA9BOH PM86fa 879km

JA9BOH, Kimio (PM86fa) wkd on 2m FSK441:
2003/12/13 2042 JA7BJP QM07gn 26 26 403km
2004/01/03 0145 JR8MCR QN02ut 27 27 879km

JH9TJT (PM86hk) hrd on 2m FSK441:
2003/12/13 2104 JA7BJP QM07gn 370km
2004/01/03 2319 JR8MCR QN02ut 831km

Each mode of the WSJT modes has been being popular in Japan as described in these two topics of EME and MS communications. Many, many thanks to K1JT, Joe.

249 GHz Domestic Distance Record Updates, JA1KVN, Bunpei and collegues

JA1KVN, Bunpei and JA1ELV, Nori sent me a couple of reports that they updated the Japanese 249GHz dx records.

From Nori, "The first trial was performed on the 22nd of November, 2003 in Ohtone-machi, Saitama Prefecture. Conditions: wx cloudy, temperature 12 degrees C, and, humidity 35%. Time in JST (UTC+9).

14:37 JA1KVN/1-JA1ELV/1 55 47 FM
15:00 JA1KVN/1-JA1ELV/1 539 559 CW
15:25 JA1KVN/1-JA1ELV/1 52 44 SSB

The latitude and longitude of JA1KVN and JA1ELV is N36-09-40-01, E139-40-15-02 and N36-09-09-08, E139-41-28-07, respectively. The distance was measured as 2.06km. My equipment is a homebrew 1-microwatt transverter and a 35-cm dish, as shown in **Fig. 3**."

Fig. 3: JA1ELV, Nori's transverter

Bunpei reports "The second update was successfully done on the 13th of December, 2003 in Ohira-machi, Tochigi Prefecture. Conditions: wx sunny, temperature 15 C, and humidity 25%.

JA1KVN/1-JA1GLD/1 (N36-20-10, E139-40-55) 59 57 FM 2.79km
JA1KVN/1-JG1MFR/1 (N36-20-10, E139-40-55) 52 52 FM 2.79km
JA1KVN/1-JG1MFR/1 (N36-19-28, E139-39-07) 58 54 FM 4.7km

During our trial, JA1KVN's QTH is always the same, N36-21-23-08, E139-42-01-05 at Mt. Ohira.

Figure 4 is a transmitter used at our experiment. My colleagues used the similar ones. The final diodes are anti-parallel 6th-order harmonic mixers MA4E2039 available from M/A-COM and the antennas are 45-cm TDK with homebrew feeders. The output power is estimated to be -30dBm. In conclusion, the Japanese dx record on 249GHz is 4.7km now." Congratulations! (Editor)

Fig. 4: JA1KVN, Bunpei's tvtr and antenna

Simple, one-board 5.7GHz Tansverter - JA0DFR, Hisakazu

This is a brief report of my simple 5.7GHz transverter. A lot of people could reproduce the same one because of its extreme simplicity. You could understand quite easily that this circuitry uses only 5 MMICs as key components. Let's begin with the transmission part at the right of Fig. 5. The final amplifier is just two cascaded NEC MMIC NE3210S01s that output 10 or 12 dBm. So this transverter is really QRPP if you use this as it is.

Looking down from the TX stage, you will see the two cascaded Hittite MMIC HMC320MS8Gs as a RX amplifier. The IC is a narrow-band one while you can use it without any adjustment on 5.7 GHz. Finally, the mixer is on the left hand. It is a Mini-Circuits MBA-591L with LO/RF of 4950-5900MHz and IF of 0-1000MHz. When a LO power is 4 dBm, its conversion loss is 9 dBm. Due to the wide coverage of IF and LO/RF, 144-1296-MHz bands are acceptable as the IF transceiver.

Some characteristics are summarized: voltage 13.5 V, currents 50 (RX) and 110 (TX) mA, output power 10dBm, case size 40x68x10 mm only! The entire transverter is shown Fig. 6. The LO is not included so an adequate one should be prepared separately. The LO power recommendation is 5-10 dBm for IF of 144 and 432 MHz but you need 10 dBm for 1296 MHz because 1296 MHz exceeds the specification of the mixer IC.

References: www.minicircuits.com and www.hittite.com

Editor's address: S. Fukushima, 1182-2506 Hase, Atsugi 243-0036 Japan. Email jh6rto@m.ieice.org
URL http://www.geocities.com/ah0r/

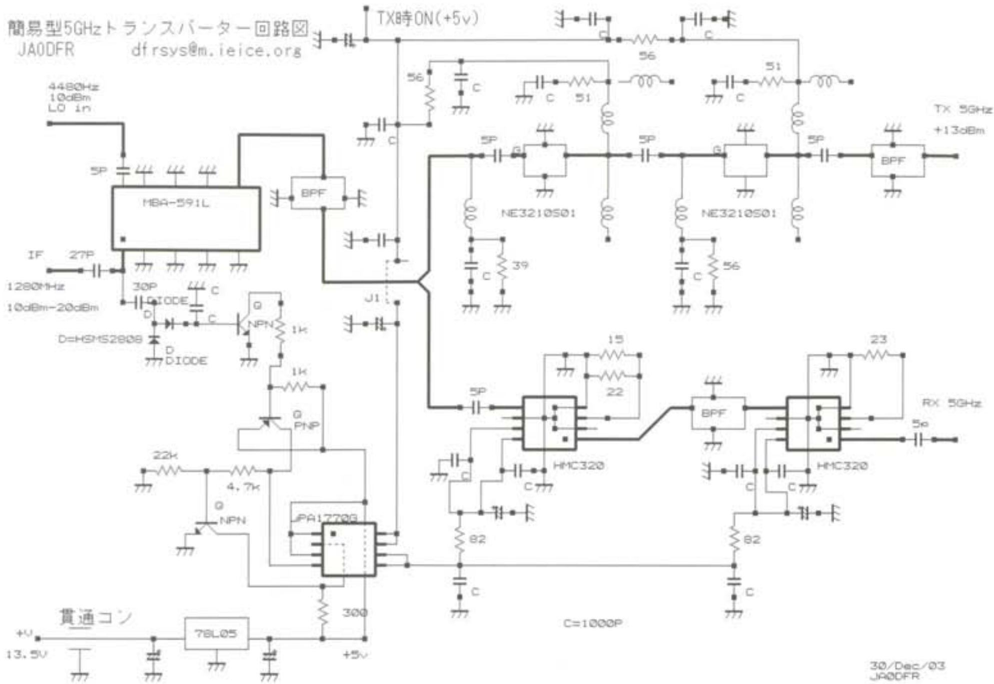


Fig. 5: Circuitry of the 5.7GHz transverter

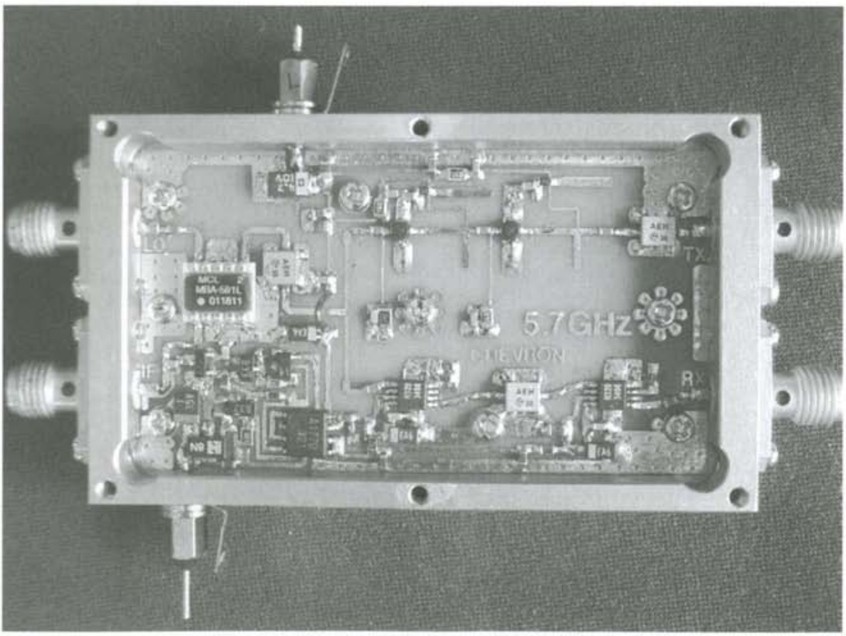


Fig. 6: Photo of the transverter

Microwave USA

Kent Britain, WA5VJB

1st 241 GHz VUCC and new 241 GHz word record

On their 4th attempt, WA1ZMS/4 worked W2SZ/4 17 Feb on 241 GHz. This QSO earned Brian his 5th grid for the ARRL VUCC award and a new world **241 GHz record of 79.6 km**.

A technique commonly used by the VLF crowd on 76 KHz was used for this QSO, QRSS CW. With a direct synthesizer fed by a 5 MHz Ultra Low Noise OCXO from Wenzel, they were able to keep the 241 GHz CW signals in 1 Hz filters for DSP processing. While some of the QSO could be copied by ear, most of the signals were observed on the computer. Dots were about 1 second long, Dashes 3 seconds, with each station sending the exchange several times taking well over an hour to complete the QSO.

The equipment was 30 cm dishes (53 dBi) and -1 dBm from a tripled 80.666 GHz Oscillator.
The weather varied from -8C, Humidity 53%, Dewpoint -16C, Calculated loss .68 dB/km at the WA1ZMS's end, with -8C, Humidity 22%, Dewpoint -26C and Calculated loss of .27 dB/km at the W2SZ end of the QSO. Absolutely amazing work.

WA1ZMS's Cards for the 1st 241 GHz VUCC

As expected (see last issue`s column p. 56) the 241 GHz world record was extended already before to **61.8km** on Dec. 3rd 2003 at 0148z by a QSO between W2SZ/4 (WA1ZMS op) FM07fm and W4WWQ/4 EM97xe. The weather at the time of the QSO was -6.1C Dew Point: -17C Relative Humidity: 40% Station pressure: 876mb These WX conditions result in a total atmospheric loss of 0.541dB per km.

WA1ZMS`s 30cm dish for 241 GHz

Pair of dishes

241 GHz station

Microwave Update 2004

I would like to invite everyone to Microwave Update 2004 Conference October 14th to the 16th. I will be co-hosting the conference with W5LUA at the Harvey Hotel DFW. The Harvey is just a few km from the North Entrance of the Dallas-Fort Worth International Airport. Lots of good speakers and our world famous "Surplus" tour. For more information please check:
www.microwaveupdate.org

FAI News

Reports, Info, Theory

Editor: Dom Dehays, F6DRO
f6dro@aol.com

FAI SEASON 2004

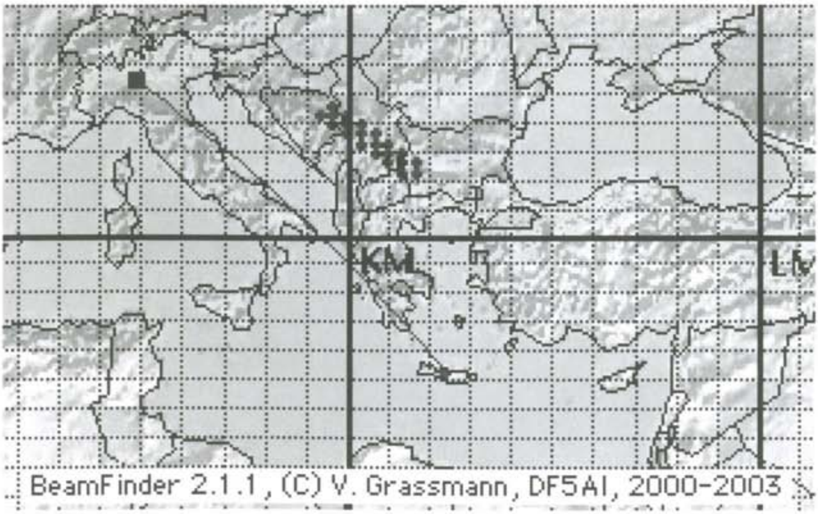
2003 was not very good for FAI. In my opinion, it was not because of conditions, but because of low activity. Very few openings were reported, and more surprising, almost nothing from the usual SCP around JN36, wich ususally provides the vast majority of the FAI QSOs.
Furthermore I received very few reports from the operators who worked stations via FAI. Thank you anyway to those who did.
What can we do to improve the situation?
Main problem is to get warned that FAI conditions are OK, and to get infos in real time of the scatterer position. This can easilly be done using the tools we get already: Cluster or/and ON4KST web site.
Another problem is that for a scatterer to be located, we must try it.
I suggest that the well equiped and familiar with FAI stations run daily skeds, in case a sked works: please spot the info on the cluster network.
These skeds should be run, using the places known to be the most often working: like JN36/JO10, ect...
We could publish the known skeds in this column, so that everyone is aware and can try to listen on them. So please send me your informations, as soon as possible, in case you decide to try to run skeds.
Let's hope this, will help to increase activity. Don't forget to send me your reports for any FAI qso during the next season (May to September).

FAI on the Edge

Northern Italy to Crete

Volker Grassmann, DF5AI

In this column, FAI opportunities are shown which might encourage radio amateurs to conduct unusual dx propagation tests.



FAI scatter volumes (dot marks) corresponding to the path I - SV9.

Please contact the author at feedback@df5ai.net or, alternatively, visit the www.df5ai.net webpage if a detailed analysis of antenna headings, target areas and scatter volumes is required in serious propagation tests.

2-m-EME News

Bernd Mischlewski, DF2ZC
e-mail: BerndDF2ZC@t-online.de

Stan, **OK1MS (JO70)** is more than happy with his DXCC. In November 2003 he received the award he had been working towards for so many many years. Congratulations!
Stan's award is no. 14. During last year he worked quite a number of new stations (all on cw):
N9LR, SP2OFW, K0GU, W4SW, N1KI, PA0OOM, IK1UWL, JF4TGO/8, WW8M, DF2CQ, W0EKZ, W4ZRZ, OH1FF, DF0BV, SV3KV, KL6M, PA2DWH, SM3XZF, RN6BN, 5T6M (the first QSO on 2m OK/5T), DF7KF, IW5CNS, SK6EI, DK3EE, W4AD, PE1LWT and F8CXO #840. In ARRL EME contest OK1MS scored 78x36 (all CW). Stan is looking forward to skeds via e-mail: ok1ms@seznam.cz

OK1MS (JO70SL): 8 x 15 ele. DJ9BV (mod.)

Jac, **PA3DZL (JO21)** worked in January (all JT65B worked with his 4x17 el array):
06 Jan
21:18 EA3DXU JN11CM
22:08 KB8RQ EM79SV
07 Jan
22:08 OE3FVU JN78VE # 296
22:42 S52LM JN65TX
08 Jan
00:10 KB8RQ EM79SV
00:34 WA8CLT EN80LA
12 Jan
07:59 K7XQ CM97QI # 297
26 Jan
10:30 KG6DX QK23KL # 298, DXCC
13:38 UA9SL LO71NS
29 Jan
22:59 K7MAC DN13TU
23:33 DK8ZJ JO54AG
30 Jan
00:02 W8WN EM77BQ
15:38 ES6RQ KO28WA
23:41 KB8RQ EM79SV (wkd with only 100 W out)

Joop, **PA0JMV (JO21)** sent an impressive list of stations worked with his 2 yagi setup: "Hi friends, stations with a * behind the call are new initials. The degradation figures are from ZT3 by N1BUG (path loss and bg-noise)
03 Jan
NQ2O* JT65b (2x17/1k) -4.8dB
10 Jan
N7WNX* JT65b (2x9/1k) -1.8dB
11 Jan
K7MDL* JT65b (2x10/150w) -1.9dB
SP7DCS* CW (4x21/QRO) -1.9dB
VK7MO* JT65b (1x10/400w) -1.9dB
24 Jan
VK2KRR* JT65b (4x13/400w) -2.4dB
25 Jan
F6FHP JT44 (4x6wl/qro) -2.6dB
IK7EZN JT65b (4x?/qro) -2.6dB
SV1BTR* CW (16x6/qro) -2.6dB
26 Jan
OH1JCS JT65b (2x8/150w) -3.2dB (14 minutes qso!)
30 Jan ZS6DDG* JT65b (1x17el/200w)
(Derek is using 35m coax, no preamp. After 5 x NC skeds it was now pretty easy, even at degr. of -4.8dB). So it seems to me that JT65b really does its job when both stations are performing technically correct (freq drift << 10Hz and low phase noise). AND: there is NO need to be active ONLY when the predicted DEGR figures are below -1dB. VERY small stations can be worked as well when the forecast doesn't look excellent. Working successfull EME is being ACTIVE ANY TIME, paying attention to every 0.1dB you can improve, and hope for luck :-). More results and pictures of some worked small stations on my homepage: www.planet.nl/~pa0jmv

Adrian, **YO4FRJ (KN34)** managed to find few more days of 2m and 70cm cw EME operation in January 2004. On 2m, first station found and worked in 2004, W5UN (RO/O), was on random at January 4th at 23:00: big signal from Dave, like a "local" station. On January 9th, at 21:00 Adrian worked with SM7WSJ (O/RO) on sked. Hakan's signal reports were more than +10dB over noise with his new antenna system. Next morning, on January 10th, YO4FRJ worked on random with W3EME (O/RO) and WB9UWA (O/RO) from 03:30 to 03:59. Mike's signals were +20dB and Jim's signals "only"+16dB over noise. Same morning conclude the sked with WA4MVI (RO/O) at 04:30 in good conditions. Later in the evening, during the next moon pass, worked I2FAK (RO/O) on random very strong like usual at 20:26 and failed the sked with SP7DCS. However, Adrian found mixed conditions during that

day. On January 11th, he noticed very good conditions, despite some ionosphere perturbances reports higher in latitude in Western Europe. Average reported echoes were at +15dB over noise most of that time. He worked K9MRI (RO/O) at 04:51 on random very fast. Joe's signal was very strong with more than +15dB over noise. Then, Adrian finished on sked with SP7DCS (RO/O) at 05:00 very easy. Chris did a great job with +15dB over noise. At 06:18 DK8ZJ (RO/O) was worked on random with +10dB over noise signal, followed by PE1LWT at 06:28 with "only" 2 x Xpol antenna system and Linrad. Jürgen's signals were affected by some QSB, but with a strong +12dB over noise average. At 06:41 worked on random N5BLZ With (559/O) close to Adrian's local Moonset. Ed's signals were reported very strong (more than 20dB over noise) affected by some QSB, despite the local noise at YO4FRJ's QTH in that direction. The same day, after the next moonrise, Adrian worked on random very fast PA0V (RO/O) at 21:08. Nanko's signals were very strong (peak at +20dB over noise but also affected by strong QSB).
Soon after that, failed to the sked with SM3BYA. NIL on both sides. Skeds are welcome to: yo4frj@xnet.ro

RK3FG wkd with JT65 in Jan 2004: K1JT and K7MAC.

UY2QQ is a new EME station from KN77 with 4x 12 el LY and GS35.

Less EME Activity? by WB9UWA

There have been comments onMoon-net about less EME activity. Tere are many reasons for a decrease in 2 EME activity. Here is my top 10 list.
10) Lower world ham population.
9) Worse world economy.
8) Restrictive antenna installation rules.
7) Fewer hams becoming VHFers.
6) Fewer VHFers exploring EME.
5) Current EMEers exploring more bands.
4) Current EMEers getting too old to do antenna maintainance.
3) CW forever EMEers getting bent out of shape over new digital modes.
2) Many EME "first" have already been done.
1) Poor EME conditions.
In this article, I will explore the last reason; "Poor EME conditions". There is much that could be said about the role of the Sun and EME conditions. I won't say them here because I am not an expert. There are several factors that affect conditions. Most of them are predictable.
1) Path loss (Perogee or Apogee; There is a 2db difference.).
2) Sky temperature.
3) Sun noise (New moon or overactive sun).
4) Local noise levels (line noise, carriers and other broadband noise).
5) Effects from Solar flares. (I'll leave that one general on purpose).
I first became QRV on 2M EME in late 1999. I started with a very small array, so I was not well in tune with the band. By late 2000, Ihad a bigger, but moderate sized array. Most recently I have been noticing less performance from my array even after switching to Xpol. It seemed like in the "good old days" (being 2001), perogee would nearly always be at minimum sky temperature. Now it is not the case.
I decided to do a limited study on sky noise vs Perogee, vs time. Using Z-track as my resource, I took a snapshot of only the day of Perogee, over a range of the years 1996 to 2011. Please note that often only one day away from perogee, there is a substantial change in sky temperature, but the trends are still there. Also this study does not account for new moon, whether the active side of the sun faces Earth, or what the sky temperature is at Apogee or some other time of the month. This study does not factor in declination either. Perhaps someene would take it upon themself to add these other factors and reach some interesting conclusions.
So to be clear, I am looking at the sky temperature, on one day each month (Perogee). Instead of giving you the raw data here, I made some observations about each year.
Max = Maximum sky temperature in db at perogee in the year.
AVG = Average sky temperature in db (add all temps and divide by 12)
Min = Minimum sky temperature in db at perogee in the year.
> 2 = The number of months containing perogees that have a sky temperature of 2db or less.
The year 2001 was an exceptional year. We will not have another one quite like it until 2010. Do not sell the station yet. 2006 will be nearly as good as 2001 was. If we can get through 2004, 2005 should be a better year. You can see by the data that there are cycles, but they are not very regular.
You can also make a case in that in the current year, there will be many low degradation days around 2db.
This is true, but they will be at or near Apogee. The Apogee, Perogee issue relates to actual signal path loss. These are easurable hard numbers that show on your S-meter. The sky noise is something that can become less meaningful if your local noise level is high. You can see why there is so much-confusion about when to be QRV. here are many weekends in each month that have moderate overall degradation, but no single weekend tends to stand out as the obvi ous choice. It is in these times especially that we need to all do our best to observe times of Activity Weekend and Activity Nite.
Jim Shaffer, WB9UWA

Year	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
Max	10	3.8	3	4.3	4.3	2.7	2.5	4.3	10.6	10	2.8	3	4.4	4.5	2.1	3.2
Avg	5.5	2.1	2	3	3	1	1.6	3	7	4	1.8	2.1	3.1	2.7	1	1.8
Min	2.4	1.2	1.2	2.1	.6	.2	.6	2.1	3.2	1.6	1.3	1.4	2.4	.7	.3	6
> 2	0	6	5	0	2	11	6	0	0	2	8	7	0	4	11	6

EME News

Editor: Bernd Wilde, DL7APV

Intro

The **11th International EME Conference** will be held on August 6, 7 and 8, 2004, at The College of New Jersey.
Papers on VHF-UHF and Microwave techniques will be presented, and they will be of interest to a large number of radio amateurs.
Registration for the Conference is now open. Papers are also being accepted for the Proceedings.
Please visit: www.qsl.net/eme2004
or email at: info@eme2004.com 73, Marc N2UO

DUBUS/REF EME Contest, 2nd part March 27/28

Digital
432.044 appears to be calling freq.
Watch/monitor 432.030 - 432.050 MHz digital modes freq for JT44 and 65.

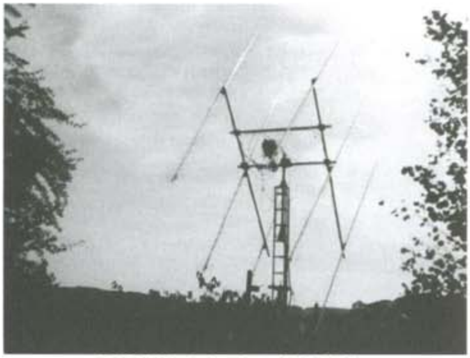
After the **ARRL contest** many µwave EMEers see the must of a new contest or change of a well known contest.
At one or two weekends operating six bands is a big problem. Changing feed at bad wheather or be on the right band at wrong time are the common problems as well as the "three Band division of 13cm" 2304/2320/2400 MHz.

Some proposals:
ZS6AXT
So let's get the ideas for this contest from as many of you, as possible. In my humble opinion there should be no more than two bands per weekend. Repeated contacts should be allowed at least after say 24 hours, to increase activity with low numbers of stations. QRO and QRP categories should be introduced. I hope that we get somebody who will organize such contest. I am prepared to do the logs evaluation, if necessary. So - sharpen your pen and give your ideas! 73, Ivo

F2TU
For ARRL contest weekend, I have to change 10 times of sources for the 23, 13, 6, 3 cms... The European contest is already a better solution. For making well, one would need 3 weekends:
1- 144/1296
2- 432/2300
3 - 5760/ 10 GHz with 1day for each.
Who will manage to make modify this contest?
73 Philippe

WA6PY
I agree with the need of separate Microwave EME contest. In my opinion contest should start from 2.3 GHz and UP. 2.3 GHz band is difficult and probably this is the reason why activity on this band is low. 1296 today is like 144 MHz 20 years ago and I would not include this band. We had discussions regarding separate Microwave EME Contest for many years now, but we should just agree date and rules and go. VY 73 Paul

OK1CA
I agree with the separate Microwave EME Contest or the microwave weekend, the part of the ARRL EME Contest. I propose on day 2,3 GHz, the second day 5,6 GHz and the both days 10 GHz. Franta



DK8VS 6x9wl at 432 MHz

432 MHz

EA3DXU
Activity very low in Feb 7/8. I was fortunate to complete with 1 new #, and the first ever 2Y / 1Y EME QSO on 432 Mhz band working OK1DFC on JT65B. Feb 8 OK1DFC O/O JT65B sked on his Moonset # 160. 2x38 el M2 + GS23B; 73 de Josep

HB9JAW
Here a small report and comment to 2003 ARRL EME Contest from first Weekend:
By the start off the contest elevationreadout had a water problem, no way of fixing it at 2 in the morning outside. The next pass 70cm HV supply and Amp broke, 2m preamp blown up and 23cm much down in performance. A absolute desaster. Only worked JW/SM2BYA #, this manually without readout...hi
Second weekend:
On 432mc worked following new station:
SM5IOT #, OK2BDO #, GW3XYW #, N2IQ #, KU4F #, KE2T/4 , DK8VS #
On 1296mc I worked to following new stations:
KA0Y #, W7BBM #, K2UYH #, W7SZ #, OE5EYM #, DL4MUP # JH5LUZ #, JA8IAD #. Just before the end of the contest UR5LX called, but he faded away. To weak. Score: 43 Qso x 27 multi

HB9BBD helped me improving my RX. Before the second weekend, he tuned my IMU horn to the best possible. Now signals and echos are much stronger then before but there is still a lot to learn and improve on 1296mc for me. All the best and see you soon. 73 de Michel HB9JAW

KE2N

Now that the dust has settled, here are my results on 432.

I concur with other observations that the first weekend was fair and the second was poor. Murphy intervened Saturday of the first weekend with a vaporized coax connector out on the tower. I could hear the solar flare on the Sunday of the first weekend - it raised my noise floor!

First leg : DL9KR, HB9Q, F6KHM, N2IQ, OH2PO, K5GW, JW/SM2BYA, N9AB, WA4NJP, K1FO, K4EME, UA3PTW, KU4F, SM2CEW, OZ4MM, K2UYH, JA6AHB, second leg: HB9JAW.

It seems like I only hear/worked the big guns.

Ken (16x28 el, coax fed, 0.33 dB nf. 0.8 dB feedline loss 1500 watts output)

PA2CHR

EME Contest, Nov. 15/16:

During the 2nd. part of the ARRL contest I made: 6 QSO's with 6 multipliers on 70 cm. Conditions where like the first part: up and down, lots of polarisation chance. New stations where: KU4F and N9AB on 70 cm. Total score is 70 cm: 16 QSO's with 14 multipliers. I was also very happy to work FY5DG on Nov. 19 for DXCC # 43 on 70 cm. Rig 70 cm: FT847, MGF1302 pre-amp, nf: 0.32 dB, YL1050, 4 x 35 el.BVO/11wl. Hm, gain: 23.0 dBd. Good DX to all and best 73's, Chris, PA2CHR

PA3DZL

Wkd 2003: HB9Q, F6KHM # 126, JW/SM2BYA # 127 new DXCC, DL9KR, HB9Q.

2004: EA3DXU O/O JT65b # 128, KL6M O/O CW # 129. The QSO with Josep, EA3DXU was my first 2Y to 2Y QSO, UFB signals !! Also my first QSO on 70cm in JT65b. JT65b is more difficult on 70cm then on 2m due to doppler and freq.drift 73's de Jac, Ant.: 2 x 21 el. 6.6L Yagis

OK1DFC

I made QSO with DL9KR 559/559 UFB signal from Jan and with OZ4MM 539/549 also UFB signal from Stig. Sorry I am only during Moonset and Moonrise QRV but it is possible to do skeds. Partly QSO JT65B with EA3DXU OOO and received RO, but no final RRR, moon below horizon. Hope to hear some of you, too. Regards, Zdenek. 1,5kW / single 38 el M2 / 0,34dB N/F, CW/JT65B

QRP EME on 432?

Yes, if you do have a station running 4 yagis and 50W, 2 yagis and 100W, or 1 yagi and 200W you are capable working HB9Q on CW random!

HB9Q (JN47cg) is QRV since April 2000 on 432 and 1296 EME. They are also QRV on 144 EME since 1983.

On 432 MHz they have worked so far 235 initials, 46 DXCC, 34 maidenhead, 197 grid square, 23 states of USA and WAC July 2002.

On 432 they are using the following station: 15.28m dish, f/d: 0.53, cross-dipole RX: switchable H/V, TX: circular 7/8" hard-line, GaAs FET 0.40 dB NF tuned by HB9BBD, 8874 by HB9SV, 1000W, SSB Electronics LT 70 MKII into IC-756 (modified) NF Filter: DSP 599zx, Additional visual DSP by AF9Y (FFTDSP)

In summer 2003 they worked on fine-tuning their 432 station getting very good results. During the 2003 ARRL EME Contest they have worked 119 stations in 40 multipliers. All QSO's were on random CW. Several stations were QRP!

This are a few examples of QRP stations worked recently:

Dec. 2003				
Call	Ant.	P/w	Mode	Comm.
JJ3JHP	4x21el	50	CW	
DL7UDA	4x21el	70	CW	PA was QRT!
SK6EI	2x28el	100	CW	first EME QSO
A71AW	3m dish	100	CW	first EME QSO
Jan. 2004				
VK3BRZ	4x15el	120	CW	first EME QSO
I1PIK	4x31el	120	CW	first EME QSO
Feb. 2004				
PE1ITR	2x28el	180	CW	
VK7MO	1x17el	200	JT44	first EME QSO
VK3HZ	1x21el	200	JT44	1. EME QSO
DG1KJG	4x27el	200	CW	
ES6RQ		200	CW	
GW4DGU	2x4m	220	CW	
DL7UAE	2x9el	300	JT65B	
DJ8MS	4x13el	300	CW	
PA5DD	1x28el	800	CW	
JA9BOH	2x2.8m	1000	CW	
OK1DFC	1x38el	1000	CW	

Satellite stations and good tropo and contest stations have a fair chance to work them. They are also QRV JT44/JT65B. Interested? Contact them at dan@hb9q.ch. For more info visit www.hb9q.ch

Expeditons

The 3B9C exp. will be qrv from March 16th about 4 weeks with 70cm EME 2 yagi + 100w.

432 & up (net) news

DL4KG

I just want to inform the 432 MHz EME community that a very heavy wind gale tilted my tower and destroyed my open feeder system. Fortunately the antennas survived. I was able to repair the tower but tempertures and snow did not allow to repair the feeder system. I will be QRT until further notice. 73 de Gerald www.qsl.net/dl4kg

DL8OBU
DL8OBU is qrt on 70cms EME.

KL7FH
Father and son team KL7FH and KL9A are QRV on 432 FT847 100W 16x12el w/polarity rotation ready for first QSO. Anyone interested in trying?
-Chris KL9A and Frank KL7FH, Grid BP51BB
kl7fh@gci.net

LU7DZ
is fully operational on 432 now with four good yagis, 1500 watts and hearing sun noise. He is actively looking for skeds now. His E-mail lu7dz@yahoo.com.ar

N5ITO
I have new 736-R coming soon and I have a 100 watt amp for 432. Antenna's are Cushcraft DX-420 Colinear arrays. 2X2 with AZ/EL 80 elements total. Old testings shows the DX-420 has around 12.5 dBd so I figure I'm running around 16-17Dbb. Running 7/8 hardline to the antenna. 73 Dave

PE1LWT
Will start EME with 2 BVO70-8.5 antenna using as a xpol yagi next spring. 73's Jurgen

SV1BTR
In the meantime with the help of my good friend Marko LZ2US my new 70cm array is up for some time now, with 8*39jxx. 13wl. No power yet on that band but hopefully soon.
Soon I will be posted abroad (Malta or Philippines) for 1-2 years so will be coming back to operate only in contests and in a few weekends with high declination, 73 Jimmy

DK3WG writes: I am the QSL Mgr for more than 25 Russian/Ukrainian EME-stn. I answer QSL requests direct and also via bureau.
Recently I checked the situation of 2002. I received QSL cards for only 30% of the initials! If QSL- card supply drops further down I will stop the service.
The most of the Russians told me, that they do not receive (and mostly do not send) cards via bureau ! We have a lot of post-robbers, I am posting to Russia/Ukraine only "Registered-letters" and check it. Even also in this mode letters from time to time are lost and I must ask for new cards.
I am missing answer for my letters with QSL cards from 24 initals:
9A2AE, DK1PZ, DK4JN, EA3PL, F5JJI, F8SQ, HA5BDJ, I5MPK, K5GW, K8ISK, KD0GS, N2HLT, N6OVP, W0RRY/5, W8MQW, WA5ETV, OE5EYM, OK1DIG, OM1TL, OK3DQ-now OM3DQ, VE1BVL/1-now VE1ZJ, ZL2AQE.
Best 73, see you via the moon. Jurg, DK3WG

Active Italian EME stations

432 MHz	Loc.	Ant.	Pwr/W	qrv
I0UGB	JN62BO	3mt.dish	800	N
IK0BZY	JN61GW	1x33BV	600W	Y
IK0EQJ	JN61FO	4x26el	1K	Y
IK1HWG	JN44DS	4x21FT mod	700	n
IK1MTZ	JN35UB	8x26el	3CX800	Y
IZ2FOB	JN45MQ	4x19FT	300	Y
IN3AGI	JN56	8x32el.	TH338	Y
IN3KLQ	JN56RG	2x21FT	600	Y
IK4DCO	JN64GB	4x26el.,	1,5K	N
IK4DCX	JN64GB	4x26el.,	1,5K	N
I5CTE	JN53OS	4x26el	650	Y
I5MPK	JN53JU	32x27el.,	500	Y
IK5WJD	JN53PS	4x25elBV	8877	Y
IZ5EME	JN52NS	8x25el.,	1K	Y
I6PNN	JN72BL	4x26el.,	700	N
1296 MHz				
I0UGB	JN62BO	5,08 mt.	TH308	Y
IZ1BPN		4 mt.dish	300	Y
IK2MMB	JN45PQ	3,5mt. D	TH308	Y
IK2RTI	JN55AD	4,8mt.D	230	Y
IK3COJ	JN65BL	3mt.dish	250	Y
I6PNN	JN72BL	4 mt.dish	400	N
2304				
IK2RTI	JN55AD	4,8mt.dish	130	Y
I6PNN	JN72BL	4 mt.dish	140	Y
5,7GHz				
IK2RTI	JN55AD	4,8mt.dish	25	Y
I6PNN	JN72BL	4 mt.dish	28	Y
10GHz				
IK2RTI	JN55AD	4,8mt.dish	20	y
IW4BTJ	JN54PN	4mt.dish	45	Y
Team:	I4CHY	I4BER,	I4JED	
I4TTZ	JN54KI	7 mt.dish	55	Y
Team	I4TMA	I4BER	I4ZAU	
I4QIG	IW4APQ	IW4BYP	IZ4BEH	
IQ4DF	JN54VJ	7 mt.dish	70	y
I5PPE & IK5WJD	JN53NS	3 mt. dish	20	y

Info de I1ANP, Mario

UT3LL & his new dish

23cm

UT3LL

I am very glad that in second part ARRL-contest 2003 I have made my first EME QSOs on 1296 MHz. See the photos of his 1296 MHz new dish and 432+2400MHz antenns. 73 Valery

OE9XXI

On November 15/16 during the ARRL EME Contest I achieved a final score of **79x31** on 1296 and 1x1 on 2300. Initial contacts on 1296 were SK0UX (549/549), VA7MM (549/559) 2kHz above my echo, UR5LX (O/O) for DXXCC 51 and IZ1BPN (449/559). Many times I have had haevy QRM from a neighbours TV SAT LNC radiating IF signals, I sent several QRZs to UT3LL but I realized his callsign too late and he dissapeared. I sent also several QRZs to GJ3Q? (marginal signal). Concerning initial counting I found following multiple callsigns from my logs and QSL cards of the last few years:
DD0SB = DL2SBY
DJ5MN = DL5MAE / DJ3MY / DK5MV / DF4MAA / (?)DO6ME (Oct 14, 01)
DL0ZAB = DL4DTU / DL1HRH / DL1HTT / DL3HRT / DL3HXS
DL6YDH = (?)DH0OAH (Oct 21, 00)
F5VHX = F/G8MBI
F6ETI = F8COZ
IY4FGM = IY4ARI
Other callsigns appearing only once are (?)DC3SAW (Apr 20, 02) and (?)DM3UH (Apr 20, 02), possibly that are also guest OPs of any stations. The (?) indicates that it is supposed, all others are confirmed.
Since about a year an advanced cancer with painful skeleton metastases hampers many of my activities. From medical therapeutic view, recovery looks not promising, but don't be worry - I will not give up! Despite this problem, I had a lot of nice QSOs on Feb 7 during the SSB Contest on 1296 included two way SSB contacts with VA7MM (43/56) and VE7BBG (43/56) for a score of 37 (18+1). On Feb 8/9 unfortunately I missed the moved sked with EA9/DL3OCH but worked him on Feb 13 as ZB2/DL3OCH (O/O) on JT44 for an initial and new DXCC. 73's Peter OE9PMJ

HB9BBD

Wkd in ARRL contest:
18.10.03
F1ANH, JH5LUZ, IK2MMB, HA5SHF, OE9XXI, LA8LF, OM6AA #195, OZ6OL, G4CCH, OZ4MM, JA6CZD, OE5EYM, JA6AHB, DF3RU, F6CGJ, OH2DG, G3LTF, SM3AKW, HB9Q, OK1CAQ, IK3COJ, DL4MUP, F5VHX, N2UO, DJ5MN, DL3HRT, W9IIX, DK0ZAB, W2DRZ, K5JL, W7BBM, F2TU, W7SZ, WA6PY, K5GW, I0UGB, K2UYH, PA0SSB# 196, ON4QQ# 197, K7XQ, DL1YMK, WA4NJP, JA8ERE, HB9JAW, ON5RR, JH1EFA.
19.10.03, OE9ERC, HB9SV, JH1KRC# 198, JR4ZZS# 199, ZS6AXT, F6KHM, G4DZU, G3LQR, PA3CSG, DL3HXS, W2UHI, W7GBI.
15.11.03
JA8IAD, UT3LL#200, DL8OBU, IK2RTI, K9BCT, VE6TA, K0YW, SM2CEW, VE7BBG#201, WA4OFS, SK0UX#202, VK5MC, UR5LX#203, OE5JFL,
16.11.03
9H1ES, JF3HUE, DJ9YW
Final score: **75x31**. 73, Dominique

VA7MM will be QRV on 1296 MHz. Station is comprised of 3m dish, 200 W into circularly polarized feed, 0.4dB receive NF. GPS frequency reference will be deployed. 73, Mark, VE7CMK
VA7MM Moon Bounce Team, Coquitlam, British Columbia, CN89OG, e-mail: va7mm@rac.ca
OPs, M. Mattila, VE7CMK, ve7cmk@hotmail.com
Toby Haynes, VE7CNF.: haynes@npsnet.com

UR5LX is active 1296 EME. He wkd in Jan 2004: 9 Jan G4CCH, 10 Jan G4CCH, OE9XI, 11 Jan HB9SV#, GW3XYW# **first QSO GW-UT**, OZ6OL#, JA6AHB# **first JA-UT** QSO, 12 Jan IK2MMB # 19 **first QSO I-UT**. Loc.: KO70wk, 3,2 m dish, 150 w FHX35, 73! Sergej. http://www.ur5lx.vhf-dx.net
Results from the **R/U-stn** Jan 2004:

DL0SHF/DK7LJ

Is now QRV on 23cm. We got it! If you work hard enough, you get it. The 750+W PA is right behind the feedpoint of the 9m dish. Echoes are smashing. Absolutely noise free in FM. Per made the first QSOs. 73 de Christoph

DL3OCH`s EA9 and ZB2 DXpeditions

I had a lot of fun during the dxpeditions, although it was a very long drive of 2300 km from Weingarten to Gibraltar. Everything seemed to work fine until I tried to make some EME QSOs on 8 Feb from Ceuta (EA9/DL3OCH, IM75HV). I set up the antenna and tried to QSO DJ9YW. The "Gurardia Civil" (local police) showed up and wanted to see my permission. They took my passport and my German license and checked everything. I started to operate, but they became upset because I had to start my car engine to have enough power. They thought I was pulling their leg when I pointed my antenna to the moon. It was very hard to explain. They did not speak English or German and my Spanish is just enough to order something in a restaurant. We did not have to wait long for more police to come to see what was going on. After about 30 minutes there were 9 policemen. Fortunately I was able to complete with Heinrich (FIRST DL-EA9). Then the boss arrived and I had to turn off everything and take down the antenna. Some of these guys wanted us to stop and some of

them thought that it was ok. They nearly had a fistfight. The wrong group won, and I had to go to the police department. After a while, somebody who seemed to know something about radio came. He looked at my equipment and asked me about the frequencies that I used. They all came to the conclusion that I could continue. That was good, but the moon was gone. I tried to rearrange the skeds and I was able to work OE9ERC and K2UYH the next day (Feb 9th). The WX turned very bad and it was not possible to make any other skeds. I had to wait 2 extra days because the ferry was not running as a result of the storm. We eventually could make it to Gibraltar. There, somebody from the intelligence services showed up, but it was easy to explain what I was doing and he left. At times I had problems with bad QRM on the sked frequency, but was able to move some of the skeds around and completed (ZB2/DL3OCH, IM76HC) 3 QSOs with DJ9YW, OE9XXI and OE9ERC, which were FIRST ZB-DL and ZB-OE. I was also briefly QRV on EME from Spain (EA7, IM86) where I QSO'd DJ9YW, OE9XXI and OE9ERC. I made 5300 QSOs on HF and now have to fill out lots of QSL cards. More trips are planned for the future. Heinrich is developing a circular yagi that should give me 3 dB more gain. I hope to use this new antenna next summer. Special thanks goes to DJ9YW and OE9ERC for their support of the dxpeditions and to Andreas who assisted with the driving and setup. See Bodo's webpage at www.qsl.net/dl3och/zb2.htm for additional pictures and details.
Equipment: IC-706 + Transverter (by DJ9YW), PWR: 83 Watt at dipole, ant: 59 element, 19.7dB

ZB2/DL3OCH's 1296 EME operating position in Gibraltar (IM76)

2320MHz

OH6NVQ
I am intersted to try a sked. Did some echotesting, I can hear my echoes quite well now! Only qrv 2320 MHz. 150w @feed and 3m dish. 73's Tomas oh6nvq@sral.fi

EME-TOPLIST

Call		Sqr	DX	US-	WAC		Initials
	Small		CC	States		WAS	#
			144 MHz				
I2FAK	540	64	122	50	1988	1993	1241
HB9Q	476	66	112	50	1986	1994	954
PA2CHR	338	55	79	50	1993	2002	526
CT1DMK	154	0	52	0	--	--	160
DM2BHG	140	26	40	28	--	--	221
YO2AMU	132	18	44	20	2001	--	167
OK1DIG	125	28	37	25	--	--	155
RW3PF	99	23	26	13	--	--	103
DD0VF	92	23	33	19	--	--	101
OK1MS	?	58	103	50	1982	1992	812
			432 MHz				
DL9KR	391	53	83	50	1987	1978	768
DJ6MB	310	43	63	44	1984	--	368
OK1KIR	254	45	63	44	1982	--	359
DL7APV	174	32	38	42	1984	--	228
OE9ERC	148	30	36	28	1993	--	226
HB9Q	143	31	37	25	2002	--	194
UA3PTW	103	26	30	22	2002	--	117
S52CW	92	27	29	22	--	--	110
UT3LL	78	26	21	20	--	--	84
OK1CA	71	24	26	22	1996	--	121
CT1DMK	61	0	21	0	--	--	64
PA2CHR	54	20	22	13	--	--	65
OK1DFC	39	17	19	11	--	--	42
OK2BDQ	29	14	16	7	--	--	32
			1296 MHz				
OE9ERC	168	32	40	30	1993	--	268
OK1KIR	148	32	39	28	1989	--	190
DJ9YW	132	29	40	23	1998	--	154
HB9Q	102	25	29	20	2001	--	129
CT1DMK	96	0	24	0	--	--	102
OK1DFC	78	23	32	15	1999	--	98
OK1CA	76	26	26	19	--	--	108
OK1UWA	12	10	11	5	--	--	22
UT3LL	8	6	6	1	--	--	8
			2300 MHz				
OE9ERC	54	16	25	9	--	--	58
OK1KIR	39	13	19	10	--	--	41
OK1CA	19	11	15	2	--	--	20
OK1UWA	11	7	10	1	--	--	12
			3400 MHz				
OK1CA	1	1	1	1	--	--	1
			5760 MHz				
OE9ERC	23	12	16	4	--	--	25
OK1KIR	16	10	12	3	--	--	17
CT1DMK	15	0	10	0	--	--	16
			10368 MHz				
OK1UWA	24	10	14	3	--	--	25
CT1DMK	21	0	11	0	--	--	22
OK1KIR	19	9	13	2	--	--	21

OE9ERC	11	8	7	3	--	--	11
I5PPE	9	9	14	3	--	--	26
OK1CA	7	4	5	1	--	--	8

UT3LL 432 MHz & 24 GHz antennas

Software/Internet

1296 MHz 50W amps see :
http://www.g3wdg.free-online.co.uk/
It's available as a kit from him.
Nice maps all over the world look at http://www.wm7d.net/azproj.shtml
I did put some schematics + pictures of the **Siemens HV** convertor I have in use on my site. It's part of the FM1800/11200 amplifier (11.2GHz) which uses a **RW 1125** also. Take a look at http://pa0c.mine.nu . Click the10 GHz button and follow the Siemens link on that page. 73 Henk PA0C
Designer SV is available for download from Ansoft. It is the free student version of Design. This software is very capable and can be used to optimize your favorite RF preamp on your favorite band. Circuits can be input to a scematic in much the same way as in PCExpress. It is designed to run on Windows 2000 or Windows XP. Here is the web site to download it from: http://www.ansoft.com/downloads.cfm

Alain, ON4KST has released a new **chat channel**, especially for **EME JT65** (and other modes). Have a look at www.on4kst.info you will find that the chat channel not only offers generic chatting facilities, but also a wealth of other information, and all is user-configurable. 73 – Franz OE3FVU

SETI

Heppenheim, Germany.: First scientific **meeting in Europe**, in March of 2004.
SETI League members should watch the organization's website at *www.setileague.org*/seticon for further details on the upcoming meeting, as they become available.
The SETI League and the **11th International Ham Radio Moonbounce Conference** are pleased to announce that they have scheduled Prof. Joseph Taylor, **K1JT** as featured speaker at their joint SETICon04 Awards Banquet at The College of New Jersey on 7 August 2004.

MARS Express at DL0SHF

It seems to be the first time that amateurs are able to track spacecraft at another planets orbit.
The reception of MARS EXPRESS is very successful at DK7LJ/DL0SHF. Signal level is quite good at 8,4 GHz. Here are some words on the equipment used:
7,5m precision dish with a tracking accuracy of 0.001 degree. 10 GHz LNA at feed horn ! followed by a filter for 8,4 GHz and again a 10 GHz amp. Another filter and another amp followed by 60m hardline. Then a 10 GHz designed mixer fed with an HP generator sets the signal to ca 1,5 GHz where it goes into an ICOM receiver, which is normally used in the 23cm EME station.
What do Per DK7LJ and friends get ? The signal is too weak to decode any data. But the center carrier or whatever it is can be received. The ESA Mars Express peaks ca 15 to 20 dB in 2,4 kHz bandwidth with a good amount of doppler shift caused by the Earth's rotation.

I have updated the DL0SHF page, and there is a link to a (german) site where you find screenshots of the spectra, of Per DK7LJ, the antennas and more. Also I have updated the information about DL0SHF.
http://www.dl0shf.de.vu (nags you with pop-ups)
http://www.qsl.net/dl0shf
http://www.df9cy.de/dl0shf (thats were it really is)
73 de Christoph http://www.df9cy.de

MARS Signals?

Detecting signals from the Mars Global Surveyor
Doug McArthur (VK3UM)

During the period August 26-29 2003, NASA's Jet Propulsion Laboratory (JPL) in cooperation with the Stanford Research Institute (SRI) will be conducting a test of the Mars Relay transmitter aboard the Mars Global Surveyor (MGS) spacecraft currently in orbit around Mars. The test involves the spacecraft transmitting a 1 watt 437.1 MHz CW carrier for reception by the 46 meter dish at SRI. Amateurs with 70cm EME class stations using DSP techniques may be able to detect this signal also. Well here was a challenge. This is my account of how I went about it and the results achieved.

I should initially explain that I have been actively involved with EME (Earth Moon Earth) for over 20 years and have, after considerable effort and with the help of close friends, erected a 10 metre fully steerable (computer controlled) parabolic reflector. At 437.1 MHz it has a gain of 30.5dBi. The dish surface is fully specified to 7.5 GHz and usable to 10.3GHz. (Kennedy reflector, all aluminium welded construction, installed on a home brew mount)

The first thing I needed to establish was the feasibility of actually detecting the MGS signal. Given the 1 watt transmitter output to a unity gain antennae at a distance of 55,770,000 kms it is fair to say, that even with what you may consider is a large antennae, the signal would not exactly "*blow your head off*"! In fact the free space loss at that distance is 240.08 dB. Mind you this is some 20 db less than the EME path on 432 MHz but the MGS was not running the power or antennae gain of my fellow EMErs!

Using my EMECalc software (obtainable from www.qsl.net/vk3bez/vk3bez.htm) it could be seen that given my receiver capabilities, I could only expect to receive MGS at a S/N equivalent to **–1.2dB in a 1 Hz** bandwidth. This was based upon my receive system temperature of 97°K. (degrees Kelvin) In fact this figure was not correct as I failed to account for another 3dB loss due to the space craft radiating right hand circular polarisation. I am only capable of receiving linear horizontal or vertical polarisation. At the time I believed I should be able to detect the signal and pressed ahead to check and confirm my systems capability.

The receive antennae feed system (and used for transmit) consists of two sets of folded dipoles in an H configuration, remote switchable for both horizontal or vertical polarisation. The spacing has been designed to align the radiation pattern at the 10dB point corresponding to the rim of the dish. This provides a reasonable compromise between antennae gain and antennae temperature. The pre amplifier or low noise amplifier (LNA) at the feed consists of a home brew cavity with a FHX35 HEMFET. Y factor and noise figure measurements indicate it has a noise figure of better than 0.35dB and with the relay switching and feed losses provides a receiver noise figure of about 0.7 dB or 51.5°K. Given a Sky temperature of 15°K (hopefully Mars would be in the quiet part of the sky) and ground noise (dish spill over) the actual system noise temperature is about 1.25dB or 97.2°K for elevation angles above 4°. The preamplifier at the feed is followed up at the shack end with an identical LNA which then passes through a 3 cascaded precision stepped attenuators. (10, 1.0 and 0.1 dB steps). These attenuators form the key element to my measuring capability. At this point I have two down converters 432-28 MHz and 432-15 MHz. The former I use to feed my DJ9BV automatic noise figure meter whilst the latter feeds a W & G Peglemesser (SPM6 precision tuneable selective voltmeter). This output also feeds sound card and another accurate HP AF voltmeter. The output of the down converters also feed an Icom 751 (receive only) whilst at 432 MHz (switched attenuator output) I also feed the receive section of Icom IC910H. Other test equipment allows for signal generation and frequency measurement when required.

I should explain what Y factor measurements are and how they are used. Y factor measurements (in this case) are simply the difference between two noise source level measurements. One of these sources should be known or the level derived from another source. The Y factor, measured generally in dB, is simply the difference between the two sources. If you know one then you can derive the other. I prefer to use the substitution measurement and you will note that my precision attenuator is placed in the 432 MHz signal path. The reference indicator is the 2.5 dB (full scale) analogue level meter which part of the precision selective voltmeter.

As an example, to measure Sun noise, I would first direct the array at the quiet area of the sky (Aquarius) and note the level meter reading. I would then direct the antennae at the Sun and add attenuation until the previous level is again obtained on the meter. The Y factor is the amount of added attenuation inserted. This value can then be entered in my software and knowing the Solar Flux Index (SFI) at the time you can derive your Receive System noise temperature. The Sun is not always a good choice of a noise source as it level can vary significantly. Those fortunate to have a large array then choosing a known noise source like Cygnus A is a better and a more accurate noise source. Sagittarius is not a good choice neither as it is not a point source which may impact adversely on your measurement. You can see that buy using the substitution method you do not require a heap of expensive test equipment. There is so much you can achieve by the simple substitution method and I get some enjoyment in deriving the SFI from my measurements and then checking the results off the web. It is rare to be more that 10 SFI units out and if there is a discrepancy you have a problem Houston!

If all of the above seems just too complicated and the figures difficult to understand then down load the software and you will find that by substituting your figures all the hard work and calculations are done for you. More over the software provides for "reverse engineering" calculations to derive other unknowns. It is better than the average game programs as it has a large number of buttons and variables you can play with even if you don't know what you are doing!!

Back to checking out the system. Given that my normal operation is at 432 and the MGS is transmitting on 437.1 MHz it was essential to know just how much degradation may occur at the higher frequency. By using the Sun Noise measurement procedure, as described above, the system gain was found to be 10 dB less (due to fixed tuning in inherent with the down converter). The Y factor however was within 0.2 dB and totally acceptable. The difference I normally see between the horizontal and vertical dipoles (impedance variation at LNA input) was also much the same (0.25 dB) so I was fairly confident that at the higher frequency would not be detrimental to the receive performance. I also performed a quiet sky to Cygnus A check at the time and confirmed that the System Noise Temperature was normal as expected. (Y factor measured at 3.5dB)

The only way I believed I would be able to detect the Spacecraft was by use of **DSP software**. **Spectran**, written by I2PHD and IK2CZL is simply brilliant. I have used it for several years observing Aircraft Doppler Shift and Meteor Activity on both 144 and 432 MHz. The simplest description I can give here is that it takes the receiver audio input to a sound card and displays the signal in an amplitude time domain format on the screen as a white trace or line. Its main feature is to digitally reduce the bandwidth down to 0.032 Hz (selectable) and thus realise a most significant signal to noise improvement. (refer www.qsl.net/padan/spectran.html)

When the bandwidth is narrowed the "signal window" is narrowed as well. In this case the viewable signal window at 0.032 Hz is only 10 Hz and at 0.125Hz it is 80Hz wide. That is fine if you know the exact frequency, and have the time to allow for the overhead processing required to resolve and then display the signal. With a 1GHz processor, it takes about 10 seconds to display a signal in a 0.125 Hz bandwidth. In other words, when you vary your tuning the displayed signal is delayed by 10 seconds. Remember of course that you have to be within 80 Hz of the signal frequency to even see the signal display!

The problem we face with the MGS is that the frequency is not constant as the Doppler Shift between you and the spacecraft is varying rapidly for most of the viewable time. It is rotating around Mars and Mars and our selves are also moving at differing relative speeds. To calculate the Doppler shift requires some pretty smart mathematics to derive just where you should be tuned. As was described earlier, the space craft antennae (in use) is pointing towards the Martian surface and will be blocked by the body of the spacecraft except for a 5 –15 minute period as it enters (ingress in spacecraft tracking parlance) or exits (egress) "occultation" or blockage by the planet.
During the approach to us the Doppler shift is positive (occultation egress ..received frequency is higher than the signal frequency) and as it heads away from us it is negative. (occultation ingress, re-

ceived frequency is lower than the signal frequency) In round figures it in the order of 4 KHz but varies from orbit to orbit! MGS will be entering and exiting occultation (blockage by Mars with respect to Earth) with each 118-minute orbit. Again remember that the UHF antenna (with about 0 dBi of gain, EIRP~30 dBm) will only be viewable from Earth for a few minutes (5 to 15 minutes) just before ingress and just after egress during each orbit.

As you can see, given the combination of varying Doppler Shift, the narrow bandwidth with a very narrow signal display window, it is vital that you know just where to tune at any given time. Fortunately I was supplied with one-minute predictions accurate to the Hz. I was some what taken aback when I first received them in an e-mail. After a cursory glance hit then hit the print button only to find there was 81 pages! I learnt to edit what I wanted first after that!

The next thing I had to do was to relocate my main computer down to the EME shack some 200 metres distance. This was necessary to run Spectran as the maximum speed I could muster was essential for fast decoding . My dish tracking and house keeping is done on a small IBM Notebook where speed is not important.

When I tuned on the computer and tuned to the appropriate frequency, low and behold Murphy has already predicted my actions and was producing the weakest of weak signal precisely where I did not want it! After removing the covers from the computer the source was traced to one of the Crystal Oscillators on the video card. Grabbing a bare alligator clip (no lead) I attached it to the Crystal case and the birdie moved outside the desired frequency range! Be aware that when using Spectran it is essential to keep audio leads well shielded with no current loops etc as its sensitivity is extreme and it loves to display 50Hz traces!

Now to check out the antennae tracking. Not a problem expected here, just click on Mars and away we go. This is my own tracking software that I (and many others) have been using for years. I was only using it the previous weekend looking at Jupiter's IoB pulses and "working a few off the moon". Clicked on Mars and away hummed the motors. Hang on, Mars is not setting it is rising!!! A day later I finally tracked the tracking error to the 2000 Epoch Ephemeris data having a 12-hour right ascension error! All the other Planets were spot on of course only Mars was wrong! Murphy again!

Now we were tracking Mars and JPL was about to turn on MGS at 1200 UTC on August 25th 2003. Incidentally, given its distance from Earth, the transit time for the signal to reach Earth is 3:05 minutes. Thus when commanding the "bird" it takes 6:10 minutes for you to know that your actions worked!

My first attempt to detect the MGS signal (CW only) was from 1221 UTC, (some 20 minutes after switch on) and at 1226 I "painted" a very weak signal at 437.103.500 (in a 1Hz BW) for 25 seconds. At this time I had not receiving the accurate Doppler calculations for my location and was relying upon the predicted "4 kHz shift". What immediately appeared suspicious was the observed signal was not exhibiting the characteristic Doppler Shift as expected. MGS at that time would have exhibited about a 1.5Hz per second downward shift. The signal I was "painting" showed little shift what so ever. Over the next few days I saw this very same signal on many occasions and finally deduced it was as a result of aircraft reflection from a source unknown.

During the first night I listened to 3 orbits from 5 to 15 minutes just before ingress and after egress. Unfortunately no signals were detected.

The following day, 26th September 2003, I received the Doppler predictions for my location. This allowed me a greater degree of confidence to know exactly where and when to tune. As a consequence it allowed me to narrow the bandwidth to the maximum possible. Alas still nothing, although at times one was becoming "line happy" thinking you could see a coherent line in the snow. This is very similar to "hiss happy" that many of us are familiar but in a visual format!

It was not until 28th September (after monitoring many orbits) that at 1328 I noticed (0.5Hz BW) a broken trace exactly where I expected to find the signal. The trace indicated that the signal's amplitude was varying at about a half second rate. I switched polarisation from Horizontal to Vertical and it seemed to "paint in" the missing signal for that time period. In other words it appeared that the signal might have been the result of the spacecraft spinning. I watched it for about 90 seconds and during that time the Doppler shift appeared to follow the identical signature as predicted. At 1356 I again saw a similar signal for another 15 seconds or so in the right Doppler "ball park area". I saw nothing after that time until I ceased tracking at 1410.

I reported my findings and asked about the possibility of the signal variation and received the following response. *The spacecraft is 3 axis stabilized, so signal variations cannot be explained by spin modulation. Also, the antenna on the spacecraft is circularly polarized* ... which to me indicates that what I was seeing may not in their opinion have been the signal in question? (all I was really saying is that the amplitude variation could not be explained by spacecraft spin ... what you saw certainly could have been the spacecraft ... particularly since the Doppler signature seemed to match well.) All the same I do feel fairly confident that it was the MGS given the exact Doppler signature it exhibited. Why I had not seen the signal in earlier orbits? I believe was due to the background sky noise. It was lower on the 28th and would have remained that way for the next few days. Unfortunately I was unable to track MGS on the following night prior to JPL turning it off at 1956 on the 29th due to 80 kph+. I could dearly liked to have confirmed categorically the received signal was MGS. Murphy again!

It was a fun exercise commensurate with our Amateur radio pursuits and if nothing else showed just what can/can not be achieved. A bit like proving Ohms Law I suppose? The result is known before hand .. but achieving it can be challenge.

Over view of the Mars Global Surveyor **Refer http://mars.jpl.nasa.gov/mgs/**

Proposal: EU EME Contest 2005

Due to the obviously high demand we propose a change for the European EME Contest for 2005. We propose 3 weekends:
1st weekend: 144 MHz and 1296 MHz
2nd weekend: 432 MHz and 2.3 GHz
3rd weekend: 5.7 (+ 3.4?) GHz and 10 GHz.
For the first and second weekend we suggest 48 hours for the both bands. For the third weekend the same could be done OR may be 24 hours 5.7 GHz on Saturday and 24 hours for 10 GHz on Sunday. Any comments would be most welcome. Also if there is need for a 3.4 GHz section. In any case the contest will be (at least) on 3 weekends next year.
73, Joe, DL8HCZ. info@dubus.de

DXCC	CALL	Loc	ANT.	PWR/KW	Rem.	QSL mangr
ES	ES6RQ	KO28wa	12x14el. BV	1.5	Qrt	
	ES8X	KO18xc	4x	1	Exp. 2003	
EU	No stn				Exp 1991	
RA1	RW1AW	KP50eb	12x15	1.5	Qrt	DK3WG
	UA1ZCL	KP78tx	5,7m D	1.5	Qrt	(qsp)
	RA3DCR/1	KO55jr	4x29	0.3	Qrv?	Qsp
	RA3LE	**KO64ar**	**8x10wl**	**1.5**		**qsp**
	RA3YCR	KO73dh	8x26	1	Silent key	
	RW3PF	**KO93cd**	**4x24**	**1**	**50-170°az el<30°**	**DK3WG**
	RW3PX	**KO84tf**	**4x21**	**1**		**qsp**
	RW3RW	LO02rw	4x21	1	Not active	
	RZ3BA/1	KO56bc	1x38	1	Not winter time	RW3BP
	UA3PTW	**KO93bs**	**20x15 BV**	**1.2**	**Qrv**	**DK3WG**
	UA3TCF	LO26iu		0.5	qrt	DK3WG
	RA4AOR	**LN29la**	**12x29 BV**	**0.1**	**Son from UA4ALU**	**DK3WG**
	RV4AQ	LN28fg	4x18 BV	0.5	Not active	
	UA4ALU	**LN29la**	**12x29 BV**	**0.1**		**DK3WG**
	UA4API	LO20qc	4x19	1	Not active	DK3WG
	UA4NM	LO48up	4x25	0.8	qrt	DK3WG
	RA6AAB	KN94wr	4x30	1	Silent key	
	UA6LGH	**KN97lf**	**16x25 KR**	**1**		**qsp**
RA9	**UA9FAD**	**LO88da**	**8x16**	**1.5**		**DK3WG**
	UA9XEA	LP63un	4x	1	qrt	(qsp)
	UA9YLU	MO92eo	4x 7.5m		Will	DK3WG
UK	No stn					
UR	UR5LX	KO70wk		1.5	Qrt	DK3WG
	UT1PA	**KO21fc**	**4x10wl**	**1**	**El. >45°**	**qsp**
	UT3LL	**KO80ac**	**4x27**	**0.4**		**qsp**
	UT5DL	KN18ep	8x25	1	Not active	(qsp)
	UT5EC	**KN78mm**	**8x27**	**1**	**Random only**	**qsp**
	UT5UAS	KO50gk	6m-D	0.2	qrt	
	UT7VF	KN68mq	4x17 KR	1	Silent key	
	UY5HF	**KN66hp**				

Info on 70cms EME stations and exped. from ES, UA and UR

Tropo Reports

2m, 70cm and up

Editor: Wolfgang Schneider, DJ8ES
DJ8ES@gmx.de

Dear DUBUS-Readers,
Om Ivo Chladek (ZS6AXT) has sent the following very interesting report about the situation on VHF-, UHF and especially microwaves in South Africa:

VHF-, UHF- and SHF-activity in ZS is virtually non-existant at present. ZS tropo records in the bands 23, 13 and 6 cm are 23 years old and in the bands 10, 24 and 47 GHz are 10 years old. On all bands the distances achieved are very short as compared with Europe or USA. Nobody is QRV on the bands 13 cm and above, so that my first QSOs in the 13 and 6 cm bands were done on EME!
In 2002 myself, ZS6AXT and John, ZS6JON started to improve that. I have built up QRP portable transverters for all bands from 13 to 3 cm. We started in the 6 cm band, where the record was just 26 km (!) established in 1978. The 6 cm portable transverter had 400 mW and antenna was for the first two tests just an old horn with few dB gain. On my side I used the EME setup, 5m dish, with circular polarization, which due to surface inaccuracies works as a 3m one and 20 W transmitter power.
On 7. December 2002 we tried it in initial tests over 30 and then 50 km. In both tests signals were 59 on SSB. Next test was on 23 January 03 and signals were 519/529 only over the distance of 92 km. ZS6JON/p was operating only from the side of a motorway to the north, no high site. I built a 20 dB horn and on 27. February 2003 we made it over the distance of 151 km with 51/55 SSB reports. Tests over larger distance were negative. Only later, when checking my preamp on sunnoise I discovered that it was shot! Still, we did it.
After these tests we decided to improve the equipment and antenna further. The portable transverter is upgraded now, with a new basic unit which has cup filters on both, TX and RX side and output power just under 1 W. The previous transverter had just PCB printed filters. We got hold of a 60 cm dish and will use circular polarization for both ends. We have earmarked good spot bit over 300 km far and we hope to make it, to come closer to the distances achieved in northern hemisphere.
Next band which will be tested soon is 13 cm, where we have 4 W portable transverter power and 1 m dish. On my side, it will be again my EME setup, centre of my dish is 6 m above the ground and it just about clears the surrounding houses. Present ZS record (1979) here is 198 km. All equipment for the above bands is designed and built by myself. After that we will go for 3 cm, where the present record is standing at 268 km, established in 1993.
Hopefuly more ZS/ZR stations will join by then, so that we will be able to try rainscatter and other modes over greater distances. For contact please E-Mail: ZS6AXT@GLOBAL.CO.ZA
vy 73, Ivo Chladek (ZS6AXT, KG33VV)

2m

LZ3GM, KN32rl, wkd (>800km):

25/11/03 11:00	RA4AOR	LN29LA	1535km
25/11/03 11:08	UT2IO	KN88XA	1025km
25/11/03 11:11	UA6MA	KN97VE	1102km
25/11/03 11:12	RV6LJK	KN97VE	1102km
25/11/03 11:13	RN6MT	KN97LN	1064km
25/11/03 11:22	RV6LJK	KN97VE	1102km
25/11/03 18:50	UA9XEA/6	KN97KG	1044km
25/11/03 19:31	RW3WR	KO71IM	1144km
25/11/03 19:58	UT2HN	KN79OI	970km
25/11/03 20:03	UT2QA	KN86KS	884km
25/11/03 20:09	UY5ON	KN89CW	1066km
25/11/03 20:54	RA3WDK	KO81BR	1218km
25/11/03 21:21	UR5LX	KO70WK	1093km
25/11/03 22:54	UR5LLW	KN89TQ	1119km
26/11/03 09:03	RV3ZR	KO80CL	1112km
26/11/03 09:15	RA3QTT	LO01GQ	1420km
26/11/03 09:28	RN3QR	LO00BK	1310km
26/11/03 09:42	RW3PF	KO93CD	1428km
26/11/03 10:22	UR5LX	KO70WK	1093km
26/11/03 10:25	RW3WR	KO71IM	1144km
26/11/03 10:29	UT2IO	KN88XA	1025km
26/11/03 10:38	UY5ON	KN89CW	1066km
26/11/03 10:51	UT8AL	KO61WP	1128km
26/11/03 15:43	UR4MBN	KN98ON	1136km
26/11/03 15:45	UR5MGW	KN98QO	1149km
26/11/03 16:00	UT5ER	KN78ER	878km
26/11/03 18:36	UY2QQ	KN77OT	848km
26/11/03 19:18	UX7LT	KN89TR	1122km
26/11/03 19:34	UR5EOA	KN78LK	883km
26/11/03 20:38	UA3RBO	LO03NG	1569km
26/11/03 23:11	UA4AQL	LO20QB	1608km
26/11/03 23:53	RA4AOR	LN29LA	1535km
27/11/03 16:11	RN6BN	KN95LC	967km
27/11/03 19:36	RA3QTT	LO01GQ	1420km

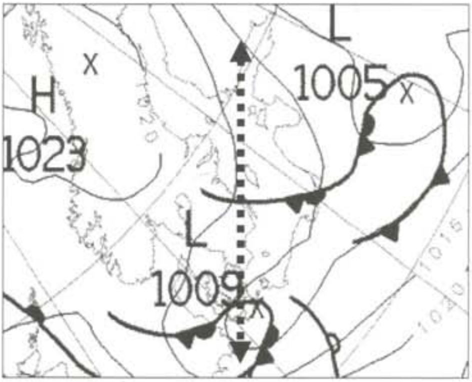
Rig: 3wl BVO ant, MGF1302, 100 W.
tnx for info Ivan

PA5DD, JO22FE, wkd Jan – Feb ´04:

06/01/04 18:52	OZ6TY	JO55XE	590km
06/01/04 18:51	OZ1BNN	JO55PM	577km
06/01/04 18:50	DL3TW	JO44SK	415km
06/01/04 18:48	SK7MW	JO65MJ	660km
06/01/04 18:45	OZ1ALS	JO45VA	468km
06/01/04 18:13	OZ9KY	JO45VX	545km
06/01/04 18:09	OZ1IEP	JO55XU	633km
06/01/04 18:07	OZ2LD	JO54TU	552km
06/01/04 18:06	OZ2PBS	JO55XJ	602km
03/02/04 19:27	OZ1ALS	JO45VA	468km

03/02/04 19:23	OZ7CQ	JO55GL	538km
03/02/04 19:22	OZ1ANA	JO55DK	523km
03/02/04 18:56	OZ6TY	JO55XE	590km
03/02/04 18:55	OZ1BEF	JO46OE	542km
03/02/04 18:53	OZ1DLD	JO45RL	490km
03/02/04 18:48	SK7MW	JO65MJ	660km
03/02/04 18:46	DL0RSH	JO43SV	382km
03/02/04 18:44	OZ1HLB	JO55RT	606km
03/02/04 18:44	OZ1IEP	JO55XU	633km
03/02/04 18:43	DL3TW	JO44SK	415km
03/02/04 18:43	OZ9KY	JO45VX	545km
11/02/04 17:48	SP1FPG	JO73GN	681km
11/02/04 17:47	LA4YGA	JO48AE	710km
11/02/04 17:45	GW3HWR	IO71XN	603km
11/02/04 17:44	**OH2KW**	**KP20IJ**	**1533km**
11/02/04 17:41	**OH1NOR**	**KP00XL**	**1409km**
11/02/04 17:39	SP3MGM	JO73QE	731km
11/02/04 17:36	**OH5LK**	**KP30ON**	**1664km**
11/02/04 17:34	**ES6RQ**	**KO28WA**	**1493km**

tnx for info Uffe



Tropo on Feb. 11th from PA to OH/ES on 2m: 1600km on the front side of a high pressure system are quite rare

RW3PF, KO93CD, wkd 26/11/03 (>700km):

08:33 UY5HF	KN66HP	559/579	825km
09:40 LZ3GM	KN32RL	579/579	1428km
12:52 RN6BN	KN95LC	59/59	895km
14:27 UR5GIM	KN76CL	59/59	794km
14:30 LZ2QA	KN43EK	579/559	1298km
15:50 UU1DX	KN74BW	599/599	959km
16:00 YO4GJH	KN35XG	56/59	1146km
16:35 LZ2PI	KN23XU	579/579	1367km
16:47 RA6DA	KN96HA	569/559	792km
16:51 UU2JD	KN75AC	599/579	943km
16:53 UT5JCW	KN64SN	57/58	1012km
19:42 LZ5GM	KN32QL	599/599	1431km

tnx for info Peter

DL8EBW, JO31NF, wkd (>700km):

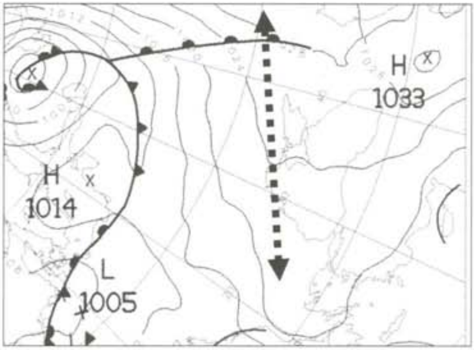
06/11/2003 19:24	SK7HW	JO76JU	800km
06/11/2003 19:48	SM7XFD	JO77JO	864km
06/11/2003 20:02	SM6LIF	JO67RT	837km
06/11/2003 21:10	SM4XIO	JP70NI	1129km
06/11/2003 21:16	SK6HD	JO68SD	872km
06/11/2003 21:33	SK6HD	JO68SD	872km
06/11/2003 21:34	SM6VSZ	JO67EB	733km

Rig : ICOM IC-275-H, 11 el DL6WU, GU74b
tnx for info Guido

LZ1KG, KN31CS, wkd on 26/11/03 (>600km):

07:28 UT5JCW	KN64SN	672 km
11:12 UY5HF	KN66HP	745 km
12:10 UT2QA	KN86KS	1015 km
12:38 UR5LX	KO70WK	1217 km
20:28 RV3ZR	KO80CL	1236 km
20:31 RA4AOR	**LN29LA**	**1668 km**
20:33 RN6MT	KN97LN	1196 km

Rig: IC275E, 2x 16el F9FT, 12m agl
tnx fr info Mitko



Tropo on Nov 25/26th from LZ to UA3/4 with QRBs on 2m up to 1700km

DL8BDU, JO43AA, wkd (>700km):

13/08/03 04:02	F8BON	IN96CV	979km
13/08/03 04:03	F6KSV	IN97RJ	875km
13/08/03 04:06	F5GHP	IN96LE	1003km
13/08/03 04:10	EA1NQ	IN73EM	1460km
13/08/03 04:16	F6FHP	IN94TR	1108km
13/08/03 05:10	F6APE	IN97QI	882km
13/08/03 05:13	F1YJ	JN17ET	705km
13/08/03 05:25	F5APM	IN97HG	927km
13/08/03 05:26	F6CJA	JN07UU	729km
13/08/03 05:41	F1DUZ	IN97NJ	891km
13/08/03 05:43	F6DZA	IN87GS	1003km
13/08/03 05:44	F5EGD	JN07IL	808km
13/08/03 05:47	F6FYA	JN07II	819km
13/08/03 05:51	F1SAC	IN96HA	1033km
13/08/03 05:55	F8DBF	IN78RI	1028km
13/08/03 05:56	F4ACE	IN96KC	1014km
13/08/03 05:58	F6FMR	IN99TE	727km
13/08/03 05:59	F5MKM	JN07XU	719km
13/08/03 06:01	F3VX	IN97SK	867km
13/08/03 06:05	F5HGO	JN05AI	1032km
13/08/03 06:09	F5FT	IN87GS	1003km
13/08/03 06:13	F5MGD	JN07AW	800km
13/08/03 06:13	G3OYF	IO81RL	742km

13/08/03 06:20	GW5NF	IO81KQ	774km
13/08/03 06:22	GW8JLY	IO81JM	785km
13/08/03 08:31	F6FAI	IN88HM	947km
13/08/03 08:55	F5SVO	IN97IG	923km
13/08/03 10:04	MU0FAL	IN89RL	836km
01/11/03 20:49	G4ASR	IO81MX	752km
01/11/03 23:03	F8KCF/P	JN36BP	722km
08/12/03 16:10	MM3ERP	IO87RJ	828km

Rig: TR-751E, PreAmp 0,65dB, PA 450W
tnx for info Klaus

DH9NFM, JO50RF, wkd (>700km):

05/09/03 15:01	HA8V	KN06HT	774km
06/09/03 15:13	9A2RY	JN84OF	795km
06/09/03 15:14	IK0DDP/6	JN63KC	799km
06/09/03 19:55	T90O	JN94IR	818km
06/09/03 22:19	9A1O	JN95IT	729km
07/09/03 10:49	9A3V	JN74OC	737km

tnx for info Chris

OZ4VW, JO45VT, wkd Nov ´03 (>700km):

06/11 22:58	F2YT	57/59	JO10GK	765km
07/11 18:16	LY2HM	53/52	KO15CX	779km
07/11 18:19	YL3DW	57/59	KO26CW	900km
07/11 19:08	LY2IC	55/53	KO14WW	899km
08/11 19:34	SP7TEE	55/55	JO91SS	786km

tnx for info Arne

70cm

PA3DZL, JO21HM, wkd (>600km):

19/03/03 21:36	GM6VXB	IO97AQ	805km
19/03/03 22:40	SM6ESG	JO67CC	791km
08/07/03 20:26	OZ9KY	JO45VX	600km
10/08/03 20:03	LA4C	JO29OG	862km
10/08/03 20:15	LB8SE	JP20MN	1005km
10/08/03 20:29	LA6MV	JO59EJ	947km
10/08/03 21:05	LA6LCA	JO59FE	928km
15/09/03 19:15	YL3AG	KO26AW	1391km
06/11/03 19:12	SK4BX	JO79OF	1084km
06/11/03 19:17	SM7HGY	JO86DR	953km
06/11/03 23:31	SM3LBN	JP80IO	1254km

Rig: 400W, 2x21 el. 6.6wl, PreAmp 0.3dB
tnx for info Jac

RW3PF, KO93CD, wkd 26/11/03 (>500km):

08:35	UY5HF	KN66HP	579/579	825km
11:29	UT2IO	KN88XA	579/579	570km
11:36	UA9XEA/6	KN97KG	559/559	655km

tnx for info Peter

DH9NFM, JO50RF, wkd (>500km):

04/10/03 20:03	G8P	JO01QD	717km
04/10/03 20:22	ON4KBE	JO20BI	521km
04/10/03 21:13	IK1PJU/1	JN44GK	680km
04/10/03 22:47	F6HLC	JN26HS	633km
04/10/03 23:01	G5LK/P	JO01OC	728km
05/10/03 05:06	PA6NL	JO21BX	547km

tnx for info Chris

PA2CHR, JO22XA, wkd (>1000km):

10/11/03 19:52	ES2WX	KO29JN	1439km
10/11/03 20:14	ES2RJ	KO29JN	1439km
10/11/03 21:39	SM1NJC	JO97DO	1005km

Rig: FT847, PreAmp MGF1302 with NF: 0.32 dB, YL1050, ant 4 x 35el BVO/11wl
tnx for info Chris

DL8OBU, JO42XI, wkd (>900km) in CW:

10/11/03 18:30	OH6HFX	KP14	1515 km
10/11/03 18:40	ES2RJ	KO29	1220 km
10/11/03 19:19	OH4LA	KP20	1275 km
10/11/03 20:30	SM2DXH	KP03	1412 km
10/11/03 20:40	OH6QR	KP22	1413 km
09/12/03 19:20	SM4DXO	JP70	985 km
09/12/03 19:26	SK4AO	JP70	982 km
09/12/03 19:50	SM3BEI	JP81	1083 km

tnx fr info Jürgen

PA5DD, JO22FE, wkd:

10/02/04 20:11	G8OHM	IO92AJ	454km
10/02/04 20:08	G8VHI	IO92FM	426km
10/02/04 18:30	OZ1DLD/P	JO45SK	490km
10/02/04 18:23	SK7MW	JO65KN	661km
10/02/04 18:18:	OZ1FF	JO45BO	451km
10/02/04 18:14	OZ9KY	JO45VX	545km
10/02/04 18:12	OZ6HY	JO45WA	472km
10/02/04 18:11	OZ1IEP	JO55XU	633km

tnx for info Uffe

23cm + up

DH9NFM, JO50RF, wkd (>400km):

04/10/03 15:35	ON7WR	JO20EP	503km
04/10/03 16:55	IK4ADE	JN54OE	672km
04/10/03 17:07	IK3COJ	JN65BN	521km
04/10/03 17:09	IW4BET/4	JN54OE	672km
04/10/03 17:52	PA0WMX	JO21XI	406km
04/10/03 18:00	PA5DD	JO22IC	514km
04/10/03 20:07	G8P	JO01QD	717km
05/10/03 06:34	I4CVC	JN54WH	658km
05/10/03 07:10	I4LCK/4	JN54PD	676km
05/10/03 07:38	IW3RMR	JN66PA	487km
05/10/03 09:05	PI4ZLD	JO11WM	551km
05/10/03 09:08	PA0S	JO21FW	524km
05/10/03 11:06	PA3AWJ	JO21GW	519km
05/10/03 11:56	ON4CDU	JO20KW	471km
05/10/03 12:04	PA6NL	JO21BX	547km
05/10/03 12:28	S57C	JN65XM	555km

tnx for info Chris

OZ4VW, JO45VT, wkd Nov ´03 (>500km):

1296 MHz:

06/11 20:13	DK1VC	57/59	JO31RG	528km
06/11 22:31	SM4DHN	59/59	JP60VD	538km
07/11 15:48	SM3LBN	57/55	JP80IO	672km

2320 MHz:

06/11 22:34	SM4DHN	59/59	JP60VD	538km

tnx for info Arne

DL8OBU, JO42XI, wkd (>1000km) in CW:
10/11/03/03 18:45 ES2RJ KO29 1220 km
tnx fr info Jürgen

OZ1FF, JO45BO, wkd 23cm on 17. Feb ´03:
SK7MW (JO65KN), G3XFY (JO02OB), SM7ECN (JO65NQ), SK0UX (JO99BM), DL1SUN (JO53PN), SM6VTZ (JO58XJ), LA2Z (JO59EJ), DJ6JJ (JO31LG), SM7GEP (JO77IP), PA0S (JO21FW), PA0EHG (JO22HB)
tnx fr info Kjeld

PA3DZL, JO21HM, wkd (>300km):
1296 MHz:

13/07/03 21:26	G4JTJ	IO92SD	356km
13/07/03 22:09	G4BRK	IO91DP	438km
10/08/03 20:31	LA6MV	JO59EJ	947km
10/08/03 21:06	LA6LCA	JO59FE	928km
10/08/03 21:15	SM6DJH	JO58	878km
16/09/03 18:49	OZ9KY	JO45VX	600km
16/09/03 18:53	OZ2LD	JO54TU	595km
16/09/03 19:04	OZ1FF	JO45BO	509km
06/11/03 18:25	SM6DJH	JO58PI	870km
06/11/03 18:28	SM6AFV	JO57GQ	784km
06/11/03 18:32	SK7MW	JO65MJ	703km
06/11/03 19:03	OZ6OL	JO65DJ	665km
06/11/03 19:07	SM6CEN	JO57XO	824km
06/11/03 19:25	SM6OEW	JO67DA	787km
06/11/03 19:29	OZ2LD	JO54TU	595km
06/11/03 20:41	F5HRY	JN18EQ	353km
06/11/03 21:36	F6HMQ	JN18GP	352km
06/11/03 23:34	SM3LBN	JP80IO	1254km
07/11/03 00:03	OZ1CTZ	JO46OE	599km

Rig: 150W, 23el F9FT yagi, PreAmp 1.0dB

2320 MHz:

13/07/03 22:14	G4BRK	IO91DP	438km
13/07/03 22:17	G3XDY	JO02OB	242km
13/07/03 22:22	G4FEV	IO92RG	364km
10/08/03 21:08	LA6LCA	JO59FE	928km
11/08/03 20:07	LA6LCA	JO59FE	928km
06/11/03 18:43	SK7MW	JO65MJ	703km
06/11/03 20:48	F5HRY	JN18EQ	353km

Rig: 50W, 95cm dish, PreAmp 1.0dB
tnx for info Jac

PA5DD, JO22FE, wkd Jan – Feb ´04:
23cm:

20/01/04 18:59	OZ6OL	JO65DJ	620km
20/01/04 18:57	DL3TW	JO44SK	415km
20/01/04 18:55	SK7MW	JO65MJ	660km
20/01/04 18:46	SM7ECM	JO65NQ	681km
20/01/04 18:29	OZ1BGZ	JO65AP	623km
20/01/04 18:25	OZ2LD	JO54TU	552km
20/01/04 18:22	OZ1FF	JO45BO	451km
20/01/04 18:17	OZ9KY	JO45VX	545km
17/02/04 20:02	OZ2OE	JO45VV	538km
17/02/04 18:36	OZ1FF	JO45BO	451km
17/02/04 18:34	SK7MW	JO65KN	661km
17/02/04 18:21	SM7ECM	JO65NQ	681km
17/02/04 18:14	OZ2LD	JO54TU	552km
17/02/04 18:11	OZ9KY	JO45VX	545km
17/02/04 18:10	OZ1BGZ	JO65AP	623km

13cm:

27/01/04 18:49	SK7MW	JO65MJ	660km
16/02/04 11:49	G0RRJ	IO91FE	441km

tnx for info Uffe

Personality – ZS6AXT

DUBUS wants to introduce active dxers from europe and overseas. Today: ZS6AXT.
OM Ivo Chladek lives in Krugersdorp (KG33VV), 25 km west from the centre of Johannesburg. It is the highest point of the area, few metres below 1800m.a.s.l. Virtually all equipment and antennas for VHF, UHF and SHF are homemade and mostly own design.
Ivo started in Feb. 1948, licensed as club station operator in Dec. 49 (that time it was difficult to get private licenses in OK) and then about 1956 got his license as OK2VCG, changed to OK2WCG, which he holds until now. That time he was qrv on 2m and 70cm tropo, MS and satellites and also preparing 70 cm EME.
In 1968 he left for ZS and here after settling down started on VHF again, satellites. In 1988 he made the first QSOs on 23 cm EME with a 2,6m home-made dish, 11 stations were worked. In 1989 he built a 5m dish and continued on 23cm, later also on 70 cm. So far he has worked 188 stations on 23 cm and 152 on 70cm.
In 1997 Ivo started on 13cm and so far he has worked 31 stations. However, he had to remove the 70 cm antenna from the dish. This is now with ZS6JON, who should be QRV on 70 cm soon.
In 1999 he started on 6cm and so far worked 13 stations. This is all with the homemade 5m dish. Now Ivo is preparing for 3 cm EME with another solid 2,4m dish. In the meantime with ZS6JON they are preparing to break all ZS distance records, in the 13, 6 and 3 cm bands. So far they managed it on 6cm.
OM Ivo was also active on 6m for the last 15 years and has 135 countries worked so far. VHF activity in ZS is virtually non-existant with the exception lately of digital modes which do not appeal to him. Thus since he is QRV on 2m, 70 and 23cm tropo, but he does not operate there.
E-Mail: ZS6AXT@GLOBAL.CO.ZA

E-Mail-Account DJ8ES

Because of spam I have to change my Email-account. Please send your next Tropo-Report to:

E-Mail: DJ8ES@gmx.de

6m News

Reports, Expeditions, Infos

Editor: Joachim Kraft, DL8HCZ

6m-Logbook from DL (Day, Month, UTC):
26.11. 2040-2200 Es from all DL: TS7N JM54
Not too much to report on 6m from DL during the last 3 months. A few Es openings and Auroras occurred in December but nothing special.

But in some regions of the world there is still live on 6m even in this part of the solar cycle. As an example here the list of my TEP obvervations when qrv as **CT1HZE from southern Portugal (IM57nh) from September to November 2003.** Solar flux was mostly between 90 and 130. Here the list:

8.9.	1900	ZD8VHF 519
11.9.	1555-1615	ZD8VHF 559
	1622-1637	TR0A 558 1715 TR0A 519
12.9.	1530-1545	TR0A 519
14.9.	2015-2206	ZD8VHF 559
15.9.	2030	ZD8VHF 519
20.9.	1950-2107	PP1CZ/B 419 2107 PY1RO
21.9.	1558-1700	TR0A 559 1653 7Q7RM 559
22.9.	2150	ZD8VHF 539
23.9.	1540	TR0A 529
	2020-2220	PP1CZ/B 529 2023 PY1RO
	2030	PY2SFY 539 2220 ZD8VHF
24.9.	2130-2230	ZD8VHF 559 + PP1CZ 529
25.9.	2045-2240	ZD8VHF 559 – 599
26.9.	2205	ZD8VHF + PP1CZ 559
27.9.	1950-2120	ZD8VHF 559
28.9.	1519	TU2OJ IJ76 55
	2120-2130	ZD8VHF 559
29.9.	1655	7Q7RM 529
	1850-1920	ZS6TWB/B 539
	2025-2125	ZD8VHF 559-579
	2030	PY1RO GG87 549
	2150-2200	PY2SFY GG77 + TR0A 419
30.9.	2020-2220	ZD8VHF 579
	2210-2220	PP1CZ 519
1.10.	2200	ZD8VHF569, PP1CZ, PY1RO
2.10.	1545	3C0V 51 hrd
	2100	ZD8VHF 599, PP1CZ 529
3.10.	2100-2240	ZD8VHF 539,
	2130-2200	PP1CZ
4.10.	2145-2230	ZD8VHF 559, PP1CZ 539
5.10.	2115-2225	ZD8VHF 549, PP1CZ 519
6.10.	2025-2125	ZD8VHF 579, PP1CZ 529
7.10.	2145	ZD8VHF 599
8.10.	2020-2200	ZD8VHF 579 2155 PP1CZ 51
9.10.	2005-2120	ZD8VHF 559
10.10.	2025	ZD8VHF 559
11.10.	2105-2240	ZD8VHF 579, PP1CZ 559
	2113	PY1RO 599
12.10.	2150	ZD8VHF 539, PP1CZ 529
13.10.	2135	ZD8VHF 529, PP1CZ 419
16.10.	1814	PY2SFY 529, PP1CZ 559
	1830	PY1RO 59,1854 LU9EHF529
17.10.	2025-2140	ZD8VHF 559
18.10.	2125	ZD8VHF 579, PP1CZ 559
19.10.	2205	ZD8VHF 539
21.10.	2210	PP1CZ (OP himself) 59 59
23.10.	2105	ZD8VHF 599
25.10.	2050	ZD8VHF 579
26.10.	2130	PY1USK 52, ZP6CW 419
	2130-2230	ZD8VHF 579-549
27.10.	2235-2250	ZD8VHF 599, PY1USK 54, LU9EHF 519, PP5LD 52, PY5DJ 529, PY2PAI 53, PY2PRS GG66 559
30.10.	1630	TR0A 559
31.10.	2010	PY1RO 59, PY2SFY 529
3.11.	2110	ZD8VHF 559
4.11.	1442	TR8CA 539 TR0A 529
	2120	ZD8VHF
5.11.	1615-1730	7Q7SIX 419, TR0A 579
	2230	LU9EHF 519, ZD8VHF 579
6.11.	1520	RW1AY/MM JG67ot 59 59 TR0A 559, ZS6TWB 539
	2000-2130	ZD8VHF 549
7.11.	1419	RW1AY/MM JG68lj 59 59
	2015	ZD8VHF 559
8.11.	1610	TR0A + TR8CA 599
9.11.	1500	RW1AY/mm53, ZS6TWB 529

Nothing until Nov. 14th when oberservations stopped due to my QSY to DL. Experience from the last years shows that Dec./Jan. are the months with very little chances for TEP. So this timeframe was very bad for the FR/E expedition and resulted in no 6m TEP-QSO from Nov. 24th to Dec. 15th!
The best timeframe for TEP for me was from 1 week prior the September equinox to 6 weeks after. Many days with the ZD8VHF (II22TB) and PP1CZ (GG99) beacon in for hours and absolutely no other signal on the band.
Activity from ZD8 stations is zero now and also from Brazil very low activity now compared with the previous 2 years.

My rig in CT: IC706, 4 ele Yagi, 8m a.g.l., 96m a.s.l., with a free horizon all over the atlantic from ZD8 and PY to the Carribean and U.S. BTW even with this superb location it is aboltutely impossible for me to work any F2-scatter with only 10 W output. Even 100 W is not enough quite often although I was the only calling station. And also TEP-QSOs with 10W are not possible too often.
I am quite sure that TEP from CT to ZD8 and may be also PY is possible quite often during the maximum of the solar cycle.

As expected almost no TEP from mid January to mid February 2004. But the spring TEP season started again in mid February:

CT1HZE, IM57nh, hrd in 2004:

17.2.	2250	ZD8VHF 559
18.2.	2240-2300	ZD8VHF 559
19.2.	2200	ZD8VHF 559
20.2.	2300	ZD8VHF 539
21.2.	1755-1815	TR0A 539 2120-2215 ZD8VHF
22.2.	2055-2225	ZD8VHF 559
23.2.	2210	ZD8VHF 559
24.+25.2.		NIL
26.2.	2205	ZD8VHF 549
28.2.	2200	ZD8VHF 559
29.2.	1645	TR0A 529, TR8CA 55

Aurora-E from VE4 to Europe!

On January 10th 2004 VE4/KG0VL (Loc. EO26) hrd GB3LER/B from 0059-0110z on 6m with max. 48A, QTF 10. Jeffrey says the sig sounded like a mixture from Aurora and Aurora-E. Before, at 23:30 also TF3SIX (HP84) was heard. No QSOs...

Ak (Boulder) for Jan 10th was 24, so nothing sprcial. On Jan. 9th to 11th there were weak to mediocre Aurora openings from N-DL on 2m + 6m.

Expeditions and News:

/MM G0KZG/MM, Andy has changed plans again and plans to be qrv again on 6 + 2m in May/June 2004 from a ship in the North sea.

/MM RW1AY/MM is qrv on 6m from **JG67, 68, 77** with 100w and wire antenna until April 2004.

3B9 Rodriguez: From 16. March 2004 a big group will be qrv for 4 weeks also on 6m under 3B9C.

KP39/49/38 The OH8K group plans to activate these squares in June also on 6m.

KP18/26/27 The OH8K group plant to activate these squares in August also in 6m.

5U Niger: 5U7JB (US-Op) ist qrv on 6m for a longer period. Loc. JK13, QSL via ON5NT.

5V Togo: 5V7BR is qrv on 6m since Nov 17th 2003 with 100w and 5 ele Yagi. Loc.: JJ08.

7X Algeria: 7X0AD (JM16jr) says that there is good chance now to get a licence for 6m. He states that he will be qrv soon.

9Q Zaire: SM5DIC is qrv as 9Q0AR on 6m until the end of March.

D2 Angola: 4L4FN, Ed, is qrv as D2PFN for a longer period and it was expected that he gets a yagi for 6m soon.

FT1Z Amsterdam Isl.: New licenced Op Sebastien, FT1ZL, is qrv now until the end of 2004 on 6m. Loc.: MF82.

HI Dom. Rep.: HI3TEJ is qrv with 100w + 5 ele on 6m. Loc. FK59. QSL via ON4ANT, now ON4IQ.

S0 DL8YHR still plans to activate West Sahara on 6m (incl. EME) in summer 2004. But there are licence problems with 6m. Obviously also some of the previous 6m operations had no licence, including S01HA... If S0 will not be possible, alternativsey ZB2, Gibraltar, may be activated.

TF TF/SM6CMU will be qrv on 6m from several squares on Iceland from June 3rd to 10th.

J3 Grenada: W7XU plans a QRO 6m activity during the coming summer Es season.

J7 Dominica: J7/W6JKV will be qrv with QRO and good take off to EU from June 24th to July 5th on 6m.

JW Svalbard: JW5RIA is qrv again until June on 6m from Bear-Isl., JQ94.

LA LA/PA2DW will be qrv from several squares in LA during the whole month of July also on 6m.

PJ7 St. Maarten: K4BI + K2ZD will be qrv on 6m from July 2nd to 12th.

S9 Sao Tome: S9TX (ex S92TX) ist qrv on 6m now for about 1 year with 100w + 5 ele Yagi. Loc. JJ30. QSL via W7KNT

SV/A Mount Athos: SV2ASP/A ist qrv now on 6m and made his first Tropo QSOs with SV1's. So far he only has a dipole and 30w but a small yagi will follow soon. He promised to be active in the coming summer Es season.

TN Congo: CT3HK is qrv on 6m as TN3S until October 2005. QSL via Madeira Team, P.O. Box 19, P-9001-901 Funchal, Madeira Isl., Portugal.

Obviously he needs to be a bit more encouragement for 6m operation....

VP2M Montserrat: VP2MEG is qrv now with 100w and a 4 ele yagi on 6m. He is a resident.

VP9 Bermuda: VP9/N0JK will be qrv again on 6m from June 10th to 15th. And VP9/W3CMP will be qrv again on 6m from June 26th to July 5th.

VQ9 Chagos: VK9LA is qrv on 6m for one year.

YA Afghanistan: G4KUX is qrv until April 2004 on 6m as YA4F from Kabul, MM44ON. He is good for DXCC now. Also YA1D is very active on 6m now.

YK Syria: YK1AO, Omar, has announced that he will erect a 6m antenna but nothing heard so far...

XV Vietnam: XV9DT is qrv for some years from Hanoi also on 6m. OL20.

ZA Albania: DL7AJA plans to be qrv from Mai 23rd to June 5th on 6m from JN91.

ZF Cayman: ZF1DC and K4BI (ZF2BI) will be qrv on 6m from June 1st to 9th.

ZL New Zealand: GM3WOJ is moving permantly to ZL and will be qrv on 6m als ZL1CT. He hopes to work many EU's in the peak of next cycle.

Beacons

Check the 6m beacon list at the end of this issue. There are many updates, corrections and proposals included which you will not find anywhere else.

Meteor-Scatter

LA/PA2DWH in Norway 2003

PA2DW, Dick

2m MS-operation during the holidays.... According to my XYL that is not a good idea, so I kept it limited to some hours in the evening. Some indicated my last years operation an "expedition". Although taking the whole family and camping gear to Norway is an expedition in itself, my radio-operation was never intended an expedition!

In the last days before departure I decided to take some radio-gear with me on our holiday-trip, so it was a real ad-hoc decision. I took my FT817 and the TE-systems 1452G (normally driving my GS35b final) with me and as I had no time to arrange a proper antenna, I decided upon an old 4 el Flexa yagi. I made a direct connection to my car-battery, so could run nearly 300W, completely independent from the mains! See picture below.

The first tests I ran in JO58, although near a beach with seemingly good take-off, with PA3BIY. He could not hear a single ping hi! It was until we came to JP41 the day after and I drove up a high spot, that we made a successfull QSO.

We stayed 2 days in JP41 and I worked a couple of DL and PA stations. We then went to our destination in JP31, Lusterfjord, nearby the Jostedal Glacier where we wanted to go for Glacierwalking (see picture 2).

On the campingsite I asked for a nearby high spot with good visibility to the south and when I replied his question "what is that good for" you could spell his thoughts "this guy is totally ...." The road up to that high spot was one normally to be taken with a 4-wheel drive so it was actually an expedition for my heavy station car hi! I went up there almost every evening during our stay in JP31, so got used to the steep road and bad pavement after a couple of days.

Underneath a picture with an impression of the place and my "mains-independent station".

I worked a lot of stations from OZ, PA, DL one HB and one OH (OH6MAZ, on backside of my antenna!), but no G's where to be heard at all! I was obviously too much closed-in by the

mountains for that direction. S53VV was obviously too far out for that small 4 el yagi...

But I also missed a lot of other stations, sorry for those who desperately tried.

Mostly I worked in FSK441, some QSO's in high speed CW.

After JP31 we went straight east towards JP51 square. On the way I tried some operation from JP42, but that was a very bad QTH for the south and no roads nearby upwards...

In JP51 I had a nice spot on a campingsite nearby lake Femund. To the south the take-off was not excellent, but I worked a couple of stations, again mostly FSK441, but two in HSCW.

To the North I had a nice take-off, so I finally worked some aurora! I had experienced only once before a hughe (!) pile-up in aurora (that was in 1978, being on a "real expedition" as GM5CJF in IO99/IP90) so it was a special experience! I worked no further south than OZ, but was heard by PA3CEE (Eltje, next time we make it!).

A few days later, right after a MS-QSO with DD3SP, my amplifier gave up. Later I found it was a silly mechanical matter, but being out in the campingsite with family etc, it was too hard to find it and fix it...

We went via SM4 back towards home, spending canoeing in Vaermland one week.

Since I had no QRO, I only worked a couple of stations from JO69 in NAC with the bare FT817 and still the 4 el yagi. Best DX was OZ1IEP, not bad!!

I enjoyed the holiday-operation and will surely take my gear again next time and of course a better antenna. The only thing

I would like to ask of some operators is to take things less seriously and not regard me as an expedition! That is the only way my family will let me do it and we will all have fun.

This year our holiday plans again are going north, provided that the weather will not be too bad! We plan to be there in whole month of July and go as far up as Lofoten Islands.

Watch the DX-cluster for any announcements/info! By the way, I have changed my callsign just after coming back from holidays, so PA2DWH is now PA2DW! Best 73, Dick/PA2DW

RW3AZ/1 Expedition Log

QTH: KO57AV, PSKOVSKAYA OBL.

All QSOs wkd on 144 MHz FSK (all random):

2003-08-08							
0420	0459	OK1DFC	JO60TM	27	26	C	
0530	0535	DJ8MS	JO63CT	27	37	C	11sec
0600	0640	PE1HWO	JO21GV	27	27	NC	13sec
0620	0630	HA8CE	KN06EN	27	26	C	
0645	0700	DL6BF	JO32QI	27	27	C	
0830	0909	DJ9CZ	JO31BC	27	27	C	
0910	0924	OZ2M	JO65FR	26	26	C	
0925	0945	SP6IWQ	JO80HK	27	26	NC	
0945	0955	DK1KO	JO53CT	27	27	C	
0955	1004	DL9AN	JO63SN	27	27	C	
1005	1043	DJ7OF	JO51HG	27	27	C	
1100	1120	DJ9FG		27	27	C	
1130	1200	DL7UAE	JO62PH	27	27	NC	
1915	1925	DL9MS	JO54WC	27	27	C	20sec
1930	1950	DL5ZA	JO51HK	27	26	NC	
1950	2000	DK3BU	JO33NO	27	26	C	
2033	2040	DJ9MG	JO52TC	27	26	C	22sec
2040	2053	DH3YAK	JO31RS	27	28	C	
2103	2106	S57TW	JN75EX	27	27	C	
2120	2130	OZ1LPR	JO44WX	27	27	C	
2131	2143	OK2BRD	JN99ET	27	27	C	
2145	2206	OZ1IEP	JO55XU	27	26	C	
2003-08-09							
0515	0520	DL5WG	JO52VK	27	27	C	
0520	0540	DJ4UF	JO30BR	27	26	C	
0610	0615	OE3MWS	JN88DC	27	26	C	
0700	0710	DC7OH	JO62OK	27	27	C	
0710	0714	DK1KO	JO53CT	27	27	C	
0714	0730	DH7FB	JO62SM	27	27	C	
0744	0815	DL1EAP	JO31IK	27	27	NC	
0816	0830	DL8BDU	JO43AA	27	27	C	
0837	0844	DL4DWA	JO61QH	27	37	C	
0844	0859	IZ4AIK	JN63HV	27	26	NC	
0900	0910	OK1YK		27	27	C	
0911	0916	HA6ZB	JN97MM	27	27	C	
0925	0934	SP6IWQ	JO80HK	27	26	C	
0945	0953	DG0KW	JO64MH	27	27	C	
0953	1002	OK1FFD	JO60CF	27	27	NC	
1002	1006	DF2ZC	JO30RN	27	26	C	15sec
1008	1016	SM7JUQ	JO65WX	27	27	C	
1102	1200	DG5CST	JO60DC	27	27	NC	
1202	1206	PA0JMV	JO21PM	27	27	C	20sec
1216	1236	OZ1LPR	JO44WX	27	27	C	
1240	1244	PA2CHR	JO22XA	27	27	C	20sec
1248	1303	SM7FMX	JO65KN	27	27	C	
1313	1322	DL7FF	JO62TJ	27	27	C	
1324	1350	SM6CMU	JO57XK	27	26	NC	
1350	1353	OZ1PIF	JO65AN	27	26	C	
1400	1411	SP2OFW	JO93AC	27	27	C	
1455	1530	PA3CSG	JO21MM	27	26	C	
1615	1640	PA0C		27	27	NC	
2250	2257	S57EA	JN76HE	27	26	C	
2300	2345	IZ4AIK	JN63HV	27	26	NC	
2003-08-10							
2345	0010	PA3BIY	JO22EB	27	27	C	
0010	0018	DL5GAC	JN47UT	27	26	C	
0026	0033	OK1FFD	JO60CF	27	27	C	
0045	0057	DG6JF/P		27	27	C	


RW3AZ


RA3AH


RA3ABZ

0125 0133 OE1SOW JN88FF 27 26 C
0530 0548 DD1JN/P 27 26 C 10sec
0630 0655 S53VV JN65UM 27 27 C
0700 0715 DJ3LE JO44TN 27 27 C
0715 0730 SM6CMU JO57XK 27 27 C
0800 0830 OZ2TF JO46PE 27 27 C
0830 0837 DG0DG/P 27 26 C
0845 0900 DL8GP JN39IH 27 27 C 20sec
0910 1015 RK2FWA KO04FT 37 37 C
0915 0922 HA75MS JN87UO 27 27 C
0932 0945 DG9BEM JO43CD 27 NC
0945 0950 DL0GER JN49CC 27 27 C
0950 1000 OE6IWG JN77PK 27 27 C 15sec
1033 1040 IV3DXW JN65QQ 27 26 C
1121 1150 9A3JH JN75AD 27 27 NC
1151 1215 DL1RNW JO62GH 27 27 C
1300 1305 DG0DG/P 27 26 C
1305 1320 DC6AH JN68?? 27 26 C
1320 1400 DL5MCG JN58KH 27 27 NC
1425 1439 DF7OG 27 27 C
1450 1456 DL3TW JO44SK 27 26 C
1510 1600 ON4KHG JO10XO 27 36 NC
1715 1727 DL8EBW JO31NF 27 27 C
2330 2359 LZ2FO KN13KX 27 26 NC
2003-08-11
0000 0040 IZ4AIK JN63HV 27 26 C
0040 0055 PA3BZL JO22SB 27 26 C
0114 0140 PA2DWH JO22GD 27 27 C
0140 0159 DD9EN 27 27 C
0210 0225 DL1EAP JO31IK 27 26 C
0506 0530 IV3DXW JN65QQ 27 27 C
0655 0710 DL1DWI 27 26 C
0718 0722 S51MQ JN75NT 27 26 C
0750 0806 OK1WCF JO80JJ 27 26 C
0810 0830 IW1BCV JN44FS 27 26 NC 2079km
0830 0900 I2FAK JN45PB 27 27 C 2013km 6sec
0907 0927 HA5KDQ JN79LN 38 27 C 12sec
0930 0955 I6BQI JN72BK 27 27 NC 2050km
0955 1005 DJ5BV JO30KI 27 27 C
1054 1130 I6BQI JN72BK 27 27 NC 2050km
1157 1202 DL9MCC JN58UA 27 26 C
1202 1245 IK2DDR JN55GN 25 27 C
1250 1330 HA5OV JN97NJ 27 NC
1328 1400 DJ9YE JO43HV 27 27 NC
1430 1500 SP4MPB KO03GS 27 NC
1503 1510 DJ9YE JO43HV 27 27 C
1750 1820 DM1CG JO31IC 27 38 NC
1820 1840 HA5OV JN97NJ 27 27 NC
1924 1931 G4LOH IO95IA 27 37 C vy strong
1951 2002 DC9YC JO31PJ 27 27 C
2031 2036 IV3HWT JN65ST 27 27 C
2036 2100 DJ2IE JN48HV 38 37 NC
2100 2104 I6BQI JN72BK 27 27 C 2050km
2115 2125 PE1L 27 26 C
2157 2201 DJ8ES JO43SX 27 27 C
2201 2207 ON4KHG JO10XO 27 27 C
2219 2224 HA5CBA JN97OM 27 27 C
2229 2247 PA1T JO33JF 27 27 C
2240 2300 DJ2IE JN48HV 38 37 NC
2300 2330 PA3DOL JO22MM 37 NC
2330 2359 DL5ROB JN68HG 38 27 NC
2003-08-12
0356 0403 F5SE JN29AF 27 27 C
0532 0547 PA3DOL JO22MM 27 28 C
0718 0731 14XCC JN63GV 27 27 C
0831 0855 PA3BGM JO33CE 27 27 C
0923 0934 DJ5HG 27 37 C
0943 0957 PA2DW JO22 37 37 C
0957 1030 DK7LZ JO30MM 27 27 C
1037 1048 DF8IK JO30JT 27 26 C
1057 1107 DG9YIH JO32QI 27 27 C
1107 1120 PE1GNP JO31IX 27 NC
1120 1140 DG9BEM JO43CD 27 NC
1247 1310 SM3BUI JP73ST 27 26 NC
1739 1755 DJ2IE JN48HV 27 27 C
1756 1820 SP4MPB KO03GS 27 NC
2032 2045 DH8BQA JO73CF 37 27 C
2050 2105 G3UTS IO94CU 27 NC
2105 2118 LA5KO JO59FH 27 37 C
2130 2200 SM5CUI JO89WW 37 35 NC
2003-08-13
0000 0020 OE3JPC JN87EW 27 NC
0110 0120 DF1IAZ JN49LD 27 NC
0121 0128 PA0C JO22FD 27 27 C
0135 0144 OK1UAK JO70MB 28 28 C 23sec
0145 0156 OK1WCF JO80JJ 38 26 C 18sec
0205 0210 SM5CUI JO89WW 38 37 C 30sec
0221 0240 OK2BDS 26 26 C
0245 0254 OK1DCF JO80BJ 26 26 C
0307 0330 OE3FVU JN78UE 26 NC
0331 0350 S55AW JN75DS 38 26 NC

Ops: Alex, RW3AZ, Harry, RA3AH and Vladimir, RA3ABZ

YZ7MON BCC Meteor Scatter Contest Log 2003
YZ7MON (KN05FG)
wkd on 144 MHz in FSK441:

2003-12-11
2003 2013 SM7DLZ 27 27 10/5.5sec
2013 2021 DL3LST 27 26 10/380
2021 2031 F1EBK 27 26 8/2.6sec
2048 2053 PE1AHX 26 27 10/360
2053 2058 DC9YC 26 27 10/1sec
2108 2119 SP2IQW 26 26 10/1.5sec
2123 2129 LA0BY 26 27 9/280
2129 2137 PA0BAT 27 27 9/2.8sec
2159 2146 DG1LY 27 27 9/2.7sec
2147 2155 PE1IKX 27 27 9/800
2228 2247 SM7FMX 26 27 11/640
2003-12-12
0007 0014 DL1GGT 27 27 10/700
0014 0021 ON4KHG 28 28 6/260
0054 0100 PA1BVM 28 27 11/2sec
0100 0122 DL4EBV 27 27 10/380
0130 0141 DJ9YE 27 27 10/2sec
0203 0215 DL0AO 27 27 7/2sec
0404 0416 PE1HWO 27 27 10/480
0519 0544 DL1RNW 27 27 10/520
0613 0617 LZ2FO 27 26 10/2sec
0627 0632 DJ2QV 27 27 9/11sec
0638 0649 OZ5AGJ 27 27 7/800
0729 0746 RX1AS 27 26 12/2.2sec
0746 0805 IC8FAX 27 27 9/1.7sec
0806 0814 PA0JMV 27 27 11/800
0833 0840 DK5LA 27 27 11/4.8sec
0850 0857 F6CRP 27 27 11/460
0903 0909 ON4AVJ 27 26 8/8sec
0914 0920 DL8BDU 27 26 8/420
0922 0929 DK4TE 27 27 8/320
0936 0956 SP4MPB 27 26 17/1.7sec
1022 1037 EA3AXV 26 27 9/260
1056 1103 DG0KW 26 26 11/1sec
1120 1125 HA75MS 26 26 20/9sec
1356 1405 DK7BY 26 26 10/680
1406 1412 G3WZT 27 27 10/480
1427 1520 F6FHP 27 27 11/440
1606 1625 HB9BZA 27 26 10/480
1630 1642 DF7KF 27 27 10/380
1731 1742 OK1XOD 27 27 5/220
1825 1837 LZ9M 27 27 7/160
1932 1935 DL7UDA 27 26 11/560
1936 1947 DL6ZAU 27 26 9/1sec
1957 2003 PA5KM 27 27 10/820
2025 2047 DF1HF 27 26 10/2sec
2055 2102 GW3LEW 26 26 11/300
2103 2113 PA3ECU 27 27 10/700
2122 2229 SM7XON 27 27 10/2.5sec
2153 2207 DL3IAS 26 27 10/280
2207 2223 IV3MPI 27 27 8/160
2225 2237 I5TWK/8 27 27 10/1sec
2241 2301 LA5KO 26 26 9/6.5sec
2322 2333 F1DUZ 27 26 10/640
2333 2348 PA2DW 28 27 18/800
2003-12-13
0000 0006 LZ1BB/P 28 27 15/200
0008 0015 9A1CAL/P27 26 11/580
0019 0030 LZ2MM 27 27 10/2sec
0046 0052 OZ2M 26 27 5/620
0113 0128 F1NSR 26 27 10/760
0140 0154 DO1EL 27 27 9/7sec
0156 0207 DJ9FG 27 26 14/1sec
0246 0254 S51AT 27 27 10/340
0255 0312 EA5ZF 27 27 7/380
0324 0358 IW2HAJ 27 27 5/2sec
0508 0515 EA3DXU 27 27 9/360
0521 0528 SM1HPV 26 27 17/1.5sec
0549 0603 DL1RTL 26 27 9/4sec
0603 0608 DL0VV 27 27 10/5sec
0645 0653 G7KTP 27 27 9/3.3sec
0658 0712 IW1CHX 27 27 10/780
0722 0727 DJ9CZ 27 27 10/1.5sec
0803 0807 ES6RQ 27 27 20/4sec
1012 1017 DG9YIH 27 27 10/380
1243 1252 DG2KBC 26 27 9/360
1330 1344 OH6ZZ 26 26 10/2sec
1533 1613 YL3DW 26 26 10/8.7sec
1705 1710 G4ZTR 26 26 11/380
1726 1733 LA3BO 28 38 10/300
1745 1817 F4CYZ 28 28 10/320
1840 1850 DF0WD 28 26 12/2sec
1853 1907 F1ORL 27 26 8/1sec
1941 1955 PE1ITR 27 27 6/1.5sec
2009 2017 PA1LA 27 26 8/3sec
2018 2023 DL4DWA 27 27 10/4sec
2049 2106 DL2RUG 27 27 10/620
2109 2122 DL2JWN 27 27 10/3sec
2123 2126 DC6RN 27 27 11/3sec
2127 2130 PA9RX 27 27 10/2sec
2139 2150 DF7BT 27 27 8/940
2151 2156 DJ9ME 27 27 8/440
2222 2233 OH3XR 27 27 9/880
2240 2257 DF7OG 27 27 10/2sec
2302 2312 DF8IK 27 27 10/7sec
2316 2320 SP2CHY 27 27 10/10sec
2335 2343 DB5WC 27 27 9/9sec
2347 2354 DL1SAN 27 27 7/360
2003-12-14
0002 0011 SM0IKR 27 26 7/580
0049 0053 S57TW 27 27 10/1sec
0053 0059 PA3BIY 27 27 10/3sec
0112 0129 DF3YF 27 27 9/2sec
0147 0201 DH1FM 28 27 12/1.5sec
0214 0219 IK4PMB 38 37 10/2sec
0240 0247 OK1TEH 27 26 8/1sec
0247 0254 PE1GNP 27 26 7/1sec
0307 0314 OK1KF 27 26 10/1sec
0449 0504 G0RRJ 27 27 10/1.5sec
0513 0522 F5LRL 27 27 10/900
0544 0602 G4AEP 27 27 5/300
0623 0646 DG5AAG 27 27 10/3sec
0707 0720 IW1BCV 27 27 10/4sec
0721 0747 DL5ZA 27 27 11/2sec
0751 0800 Z32UC 27 27 12/340
0831 0837 DL5WG 27 27 11/680
0923 0935 PA5AO 27 26 10/23sec
0953 1004 OM4IMM 28 27 11/5sec
1010 1020 G3YYD 28 27 10/840
1022 1043 F1MPQ 27 28 5/320
1057 1110 OE6IWG 27 27 4/320
1129 1142 OZ7Z 27 27 10/680
1152 1206 LA2AB 27 36 12/600
1235 1248 SM7WSJ 27 27 5/1.8sec
1448 1507 GW7SMV 27 26 5/500
1703 1707 RW3PF 26 27 9/2sec
1719 1733 RW3AC 27 27 10/5sec
1736 1742 OH1FA 27 27 11/240
1742 1750 RK3AF 27 27 11/5sec
1751 1800 ES6DO 27 27 11/11sec
1801 1821 OH3KLJ 28 27 11/1sec
1908 1915 DO1YDS 26 27 10/3sec
1924 1940 PA3BGM 26 27 9/7sec
1944 1956 GW8ASA 27 26 5/420
1959 2005 DL8EBW 27 27 10/4.2sec
2008 2016 PE2PE 27 27 8/1.5sec
2017 2021 DH8IAT 27 26 6/380
2021 2032 DK7LZ 27 27 7/4sec
2152 2159 RV3ZR 26 27 10/1sec

2320 2339 DG8UAW 28 27 10/4sec
2351 2357 HA1BC 28 37 17/3sec
15.12.03
0011 0022 PE1RLF 26 27 5/640
0026 0035 DK5DQ 28 28 9/3sec
Rig: C5400E, MGF1302, GS35B (700W), 4x4 el Loop, 2x11 el DL6WU. Ops: S54AC, YT7WA, YU7KB, YU7MS, YU7ON, YU7PS and YZ7MON

Hello MS Friends,

Although, we had equipment for HSCW, unfortunately we haven't done any CW connection because activity on WSJT's was high all the time.

We have notice that many operators still don't know procedure of MS work. There are more impatient operators (which quit after second try) then in case of good old way of work. Beside of complete we have a list of 37 NC QSOs too.

This year we didn't have serious technical problems like past years.

It was real pleasure to meat MS friends again. Reflections was satisfactorily for WSJT during the whole contest and especially good in two final nights, without peculiar maximum. Thanks to each and everyone who was calling us. Congratulations to winners. See you in 2004. 73, Ilija YZ7MON. Ilija Djukic, YZ7MON, Grobljanska 32, 22308 Golubinci, Serbija

PA3DZL (JO21HM) on 144 MHz:

2003-05-02
1752 LA6K JP43VC 26 29 HSCW new square
2003-06-01
2220 LY2AAM KO06VB 27 39 HSCW new square
2003-08-01
1600 ES8X KO18XC 26 37 HSCW new square
2003-08-12
0430 OH9O KP37KC 26 27 HSCW new square 2118km
2003-08-14
0715 OH6KTL KP02OJ 27 27 WSJT 1st WSJT QSO
0913 I6BQI JN72BK 27 26 WSJT
2003-08-15
0709 LY2BAW KO25KA 26 26 WSJT
0725 S57LM JN76HD 26 26 WSJT
0750 S53J JN75EV 27 27 WSJT
0839 LY2BUU KO15XH 27 27 WSJT new square
1036 I6BQI JN72BK 27 26 WSJT
2003-08-18
1050 HA3UU JN96JO 27 39 WSJT
2003-11-18
0329 YU7KB JN94XX 27 28 WSJT
0414 OH8K KP44HE 27 26 WSJT 1976
2003-12-10
0145 YT7WA KN05EJ 27 26 WSJT
0209 CT1DYX IN51QD 27 27 WSJT new square
2003-12-11
0020 ES6RQ KO28WA 27 27 WSJT
0112 EA3DXU JN11CM 27 27 WSJT
73's de Jac, PA3DZL.

Holiday Activity from LY & ES & YL

Perseids report, all qso were on FSK441, heard only LA0BY on SSB when I was in ES5, but I couldn't call him.

LY/IK4PMB (KO25KA from Tadas QTH, LY2BAW):

2003-08-09
0820 IV3DXW 27 26
0927 G0GMS 26 26 10 Sec. burst
1019 OZ1LPR 27 27
1255 GW4DGU 26 37 1964km
1353 I6BQI 27 26
1523 HA6ZB 26 27
1745 DL4KG 26 26
1840 PE1GNP 26 26
1935 IW2BSQ 26 26 1940km
Rig. FT736, 4CX800, 8WL LY M2.

ES5/IK4PMB (KO38IJ from Tom's QTH, ES5RY):

2003-08-12
0830 OM3KDX 27 27
0004 LY2BAW 55 55 Tropo
0040 OE5KE 46 36
0224 S50C 37 27
0237 OE3MWS 46 38 22 Sec. burst
Rig. FT7400, S.S. PA 300W, 3WL M2

Many thanks to Tadas LY2BAW and Tom ES5RY for their nice hospitality. 73, Anto, IK4PMB.

F1FIH (JN23GS) wkd on 144 MHz:

2003-07-09
0540 DK7BY JO33RJ 27 26
2003-07-10
0415 ZA/DL6LAU JN91RH 26 26
2003-07-11
0542 SP9LCV JO90KF 27 27
2003-07-12
0554 YO3DMU KN34BJ 26 26
2003-07-15
0540 LZ2FO KN13KX 26 26
2003-07-17
0404 LZ2FO KN13KX 26 26
0450 F5RRS JN36EB 54 36
0505 SM7EOI JO86FP 26 26
2003-08-04
0444 OK1FFD JO60CF 26 27
2003-08-05
0322 LZ2FO KN13KX 26 26
0339 HA5TS JN97LL 37 27
2003-08-06
0400 LY2MW KO24PQ 26 26
0536 YU7AZX KN04AX 27 27
2003-08-09
0918 DH8BQA JO73CF 27 27
2003-08-10
0302 OM3KDX/P KN19DB 27 27 new#
0430 DL0VV JO64AD 27 27
2003-08-11
0336 LZ2FO KN13KX 27 26
0409 OM3WBC JN98VG 27 26
0525 OK1WCF JO80BJ 27 26
0558 OM3KDX/P KN18DX 27 27
2003-08-12
0502 OK1DCF JO80BJ 27 26
0530 OM3KDX/P KN18DX 27 27
1408 OZ1PIF JO65AN 27 26
2003-08-13
0532 LZ1KWT KN22TK 27 27
2003-08-14
0507 YU1CF KN03QN 27 27
0527 LZ2FO KN13KX 37 37
0625 LZ1BB/P KN43AP 26 26
2003-08-15
0620 SM1BSA JO97DP 26 27
2003-08-16
0536 RK2FWA KO04FT 27 26 new#
0618 OM5CM JN98DF 27 27
0736 HA3UU JN96JO 27 27
All Ms QSO in WSJT mode and Random
Rig: TS790E, MGF1302 line coax (0.23dB NF), GS35b, 2 x 16 DJ9BV. 73' de Michel.

DL8EBW, JO31NF, wkd on 2m :

DL8EBW (JO31NF) wkd on 144 MHz:

2003-07-25
0430 0444 LA4XGA JP33 26 27 3 2 0.2 FSK C *1
2003-08-01
0354 0402 ES8X KO18 27 26 3 2 0.2 FSK CR
0426 0441 LA4XGA JP33 27 27 3 4 0.2 FSK C *1
2003-08-02
1235 1315 OH9O KP12 26 - 3 2 2 FSK NC *2
2003-08-08
0255 0455 OH9O KP48 26 26 4 2 0.2 FSK C # 2188km new MS ODX here!
2003-08-10
1717 1735 RW3AZ/1 KO57 27 27 4 6 0.2 FSK CR #
2220 2245 EA3KU JN00 28 26 3 1 3 FSK CR
2247 2252 EA3AXV JN01 28 26 M M 1 FSK CR
2300 2306 S51MQ JN75 27 27 6 1 4 FSK C
2003-08-11
0005 0029 OH9O KP37 27 27 5 - 0.2 FSK CR # agn super 2078km
0104 0113 OM3KDX KN18 28 26 5 M 0.2 FSK CR
1058 1131 HA75MS JN87 27 27 9 M 4 FSK C
1941 2012 SM3PXO JP63 27 26 8 2 0.6 FSK CR
2050 2102 RU1AA KP40 27 28 M M 9 FSK CR
2108 2118 ES1RF KO29 27 27 4 - 0.2 FSK CR
2148 2154 LA8G JP44 27 27 6 2 2 FSK CR
2205 2233 OH6GDX KP02 49 27 4 - 30(!) FSK CR S9+
2320 2332 LZ1AG KN22 28 27 7 1 2 FSK CR
2003-08-12
0400 0441 SM2ECL KP05 27 26 M M 50(!) 150lpm C+IONO
0905 1208 UT1E KN57 26 27 5 2 8 FSK CR#
1445 1504 YU7AZX KN04 28 27 6 2 2 FSK CR
1600 1635 RA3XAL KO74?? 26 26 5 1 16(!) FSK C #
2015 2223 LZ1KWT KN22 27 27 6 4 10(!) FSK CR
2003-08-13
0001 0002 HA5OV JN97 29 29 1 - 30(!) SSB CR
0005 0015 YU1IO KN04 29 38 3 1 7 SSB NCR no R
0042 0049 LA8G JP44 29 37 3 7 30(!) SSB CR
0201 0202 SM3BEI JP81 39 38 1 - 40(!) SSB CR
0800 0827 OH9SCL KP46 27 26 5 3 2 FSK C 2049km
1039 1059 SM5TSP JP90 27 27 5 0 18(!) FSK CR
2003-08-15
0420 0436 LA4XGA JP33 27 27 4 1 3 FSK C *1
0500 0517 LY2BAW KO25 27 26 4 - 3.5 FSK C
2003-10-04
0500 0526 LA4XGA JP33 26 26 2 3 0.1 FSK C *1
2003-10-10
0357 0431 LA4XGA JP33 26 28 4 4 0.2 FSK C *1
2003-10-17
0400 0407 LA4XGA JP33 27 27 2 - 0.2 FSK C *1
2003-10-24
0357 0431 LA4XGA JP33 26 27 8 3 0.3 FSK C *1
2003-11-07
0500 0521 LA4XGA JP33 27 27 2 1 0.1 FSK C *1
2003-11-07
0500 0521 LA4XGA JP33 27 27 2 1 0.1 FSK C *1
2003-11-14
0000 0100 CS1GDX IM59 26 - 1 - 0.1 FSKNC 1861k
0457 0506 LA4XGA JP33 27 27 4 - 0.2 FSK C *1
2003-11-17
2300 0008 OH8K KP44 26 26 6 3 0.2 FSK C 1911k
2003-11-28
0455 0517 LA4XGA JP33 26 27 3 1 0.2 FSK C *1
2003-12-13
0959 1018 RU1AA KO48 28 27 5 - 0.2 FSK CR BCC
2003-12-14
0729 0736 9A1CAL/p JN82 27 27 M M 1.0 FSK CR BCC
0748 0757 OH3XR KP11 27 27 3 2 1.0 FSK CR BCC
1803 1812 LZ5UV KN12 27 27 5 2 0.2 FSK CR BCC
1832 1836 HG75M JN96 27 27 M M 3.0 FSK CR BCC
1958 2001 YZ7MON KN05 27 27 M M 2.0 FSK CR BCC
2015 2050 UR5SKB KN28 26 - 3 4 0.2 FSKNCR BCC
2003-12-29
2119 2201 ES6DO KO27 27 27 3 1 0.2 FSK C
2003-12-30
0459 0527 SP3VSC JO92 27 27 7 3 0.2 FSK C
2004-01-02
0557 0635 LA4XGA JP33 26 26 2 3 0.2 FSK C *1
2004-01-03
2001 2016 RK1B/1 KO69 26 27 3 3 0.6 FSK CR #632
2004-01-09
0459 0514 LA4XGA JP33 26 27 3 1 0.1 FSK C *1
2004-01-23
0455 0535 LA4XGA JP33 26 26 2 2 0.2 FSK C *1

Remarks: # new square; *SC Sidescatter-QSO (my antenna beaming to radiant); *1 Regular friday morning MS-sked each week to LA4XGA; *2 test qso for the expedition of the OH8K gang.

PERSEIDS 2003 What shall I say - it was a very high activity in FSK and I saw a lot of long bursts (most complete tx periode) but I did miss the great fun on the SSB random qrg, while everybody was playing digital - never the less there was some and they realy had tremendous signals! I copied LA8G always on SSB with more than 10-15 1min bursts around 13-08 00-02UT - after I gone to run the tropo towards EA. A second maximum I have not seen. Next good shower, please be patient and come back to SSB also and enjoy the long burst there again... Rig: IC-275-H, 11el DL6WU, GU74b (*1 40W @TV time), DTR, MG1302. 73, Guido.

2m-MS in Africa

The TO4E expedition to Europa Island (FR/E, close to Madagascar) worked also 2m MS FSK in December. There were reports that a QSO with ZS6WB (KG44) was completed.

70cm Meteor Scatter

Surprisingly very good meteor reflections occurred during the Geminid shower on December 14th 2003.

SM2CEW (KP15) completed with DF5JJ (JO43) within 15 minutes from 2000 to 2015z. 39 / 27 reports were exchanged. Max. lengths were 100 and 180ms. Mode was FSK-MS.

Also DL7FF (JO62) heard good reflections from SM2ILF around 2245z on the same evening on 70cms.

Meteor Shower Calendar

by Guido Jünkersfeld, DL8EBW

April to June 2004

Name	Date	Max.	ZHR	RA	DEC	v (km/s)	Source
ursa-Majorids	01.04.-02.04.	01.04.	20				BMS50
beta-Pavonids	11.03.-16.04.	07.04.	13	308	-63		5IY97
April-Piscids	08.04.-29.04.	20.04.	low	007	+07		IMO04
Lyrids	**16.04.-25.04**	**23.04.**	**18**	**271**	**+34**	**49**	**IMO04 *1**
pi-Puppids	15.04.-28.04.	24.04.	var.	110	-45	18	IMO04
delta-Piscids	24.04.-24.04.	24.04.	low	011	+12		IMO04
alpha-Scorpids	16.03.-12.05.	03.05.	10	240	-27		5IY97
eta-Aquariden	**19.04.-28.05.**	**05.05.**	**60**	**338**	**-01**	**66**	**IMO04 *2**
Halleids	**03.05.-21.05.**	**08.05.**	**25**	**338**	**-01**		**BMS50 *2**
Piscids	**06.05.-10.05.**	**08.05.**	**30**	**012**	**+19**		**BMS50 *2**
epsilon-Arietids	**24.04.-27.05.**	**09.05.**	**low**	**044**	**+21**		**IMO04 *2**
nu-Piscids	**11.05.-14.05.**	**12.05.**	**20**	**016**	**+27**		**BMS50 *2**
May-Arietids	04.05.-06.06.	16.05.	low	037	+18		IMO04
Sagittarids	15.04.-15.07.	19.05.	5	247	-22	30	IMO04
o-Cetids	05.05.-02.06.	20.05.	14	028	-04		IMO04
nu-Scorpiids	19.05.-20.06.	25.05.	9	261	-37		BMS50
eta-Pegasids	20.05.-09.06.	31.05.	9	333	+27		BMS50
alpha-Scorpiids	01.06.-17.06.	05.06.	15	251	-22		BMS50
lamb.-Sagittariids	04.05.-09.07.	8.-15.06.	12	275	-25		BMS50
Arietids	**22.05.-02.07.**	**07.06.**	**60**	**044**	**+24**	**37**	**IMO04 *3**
zeta-Perseids	**20.05.-05.07.**	**09.06.**	**40**	**062**	**+23**	**29**	**IMO04 *3**
Ophiuchids	19.05.-02.07.	10.06.	20	269	-23		BMS50
June-Lyrids	11.06.-21.06.	16.06.	5	287	+35		5IY97
gamma-Draconids	.06- .09	17.06.	4	269	+48		BMS50
Lyrids	12.06.-21.06.	17.06.	8	282	+44		BMS50
Taurids-Perseids	25.06.-20.06.	18.06.	10	054	+31		BMS50
Sculptorids	10.06.-27.06.	25.06.	8	005	-35		BMS50
54-Perseids	22.06.-30.06.	26.06.	30	068	+34		BMS50
Corvids	25.06.-03.07.	26.06.	13	192	-19		BMS50
beta-Taurids	05.06.-17.07.	28.06.	24	086	+19		IMO04
Sagittariids	07.06.-18.07.	30.06.	8	285	-25		BMS50

Kommentar / Comments: ***1** Der Lyriden-Schauer ist sicher als der erste gute MS-Schauer nach 3 Monaten MS-Abstinenz zu beurteilen - wie schon in den letzten Jahren, wird aber auch dieses Jahr nicht mit einem Großereignis gerechnet und so wird es für HSCW/FSK- aber nicht für SSB MS reichen. – The first good shower after a 3 month gap, but like in the last years do not expect a big event. Probably good for HSCW and FSK but not enough for SSB-MS.

***2** Der Zeitraum 3.-12. Mai ist für Meteorscatterfreunde und dies speziell in den südlichen Breiten mit eine der guten Zeiten im Jahr. Tatsächlich können in den eta-Aquariden gleiche Weiten erzielt werden wie bei den berühmten Leoniden im November! – The time frame from May 3rd to 12th is quite nice fort he MS enthusiasts especially in the more southern latitudes. Distances like in the famous Leonides in November could be reached.

***3** Obwohl es im Zeitraum Anfang Juni nicht soweit geht, bestechen diese Schauer aber durch die Häufigkeit der Reflexionen - teilweise kommt es durch die Überlappung von Radianten bis zu mehr als 60-80 Meteoriten pro Minute (ZHR). Die Reichweite ist aber begrenzt auf unter 2000km. – Max. QRBs are lower (below 2000 km) but plenty of reflections are possible due to the overlap of radiants from several good showers. (60-80 reflections per hour).

Legend / Erklärungen: see DUBUS 4/2003, page 89

Aurora Reports

Editor: Stefan Heck, LA0BY
LA0BY@darc.de

Editors note:

This time we have chosen to add one 50 MHz report. But normally we will not include 50 MHz unless the reported contacts are really very special. That is from very Southern locations or over unusually large distances.

73, Stefan (LA0BY)

------------------ 50 MHz reports ------------------

IW0GPN in JN62FB wkd on 50 MHz:

2003-11-20

1900	G0JHC	IO83PQ		10	1713 km
1908	G0JHC	IO83PQ	SSB	10	1713 km
1914	M0DDT	IO91	SSB	10	1464 km

tnx for info, Alex

----------------- 144 MHz reports ----------------

9A2SB in JN95 wkd on 144 MHz:

2003-11-20

1555	G4RRA	IO80BS	57A	55A	340	1755km
1605	SP2OFW	JO93AC	59A	59A	5	845km
1608	DK8ZJ	JO54AG	59A	52A	5	1147km
1612	SP4JWD	KO03FR	59A	55A	10	924km
1632	SP4MPB	KO03MT	57A	52A	350	940km
1638	OZ6OL	JO65DJ	59A	55A	345	1184km
1845	PC5C	JO33GD	57A	55A	350	1212km
1850	PA5KM	JO11UL	59A	55A	350	1275km

Rig: IC202+100W, 10el. DL6WU
tnx for info, Zlatko

DG2BCP in JO43DC wkd on 144 MHz:

2003-11-20

1625	G8ISY	IO91VC	59A	59A	621 km
1628	G1KHX	IO81MI	59A	59A	789 km
1629	G3EDD	JO02DE	59A	58A	549 km
1631	ON6MG	JO10VK	59A	59A	428 km
1632	PA3GFY	JO32SB	59A	59A	126 km
1633	G3BNE	JO01BJ	59A	59A	587 km
1635	ON4SN	JO21FB	59A	59A	346 km
1637	DO9OAM	JO41XM	59A	59A	209 km
1640	DK1FUN	JN49MR	59A	59A	379 km
1641	DD6BKR	JO72CM	59A	59A	403 km
1644	F5RMK	IN98OJ	59A	59A	825 km
1646	OE9NPI	JN47UJ	59A	59A	642 km
1650	F3BKM	IN98ME	59A	59A	849 km
1653	S53J	JN75EV	55A	55A	913 km
1656	F6CGS	JN18FW	55A	55A	617 km
1658	G4RUW	IO91IJ	59A	59A	679 km
1700	OE3FVU	JN78VE	58A	59A	759 km
1704	F5FT	JN18DO	59A	59A	653 km
1709	G4XG	IO93XE	55A	55A	555 km
1710	G4VPD	IO92BJ	57A	59A	688 km
1712	M0CKM	IO90QT	59A	59A	661 km
1713	G8RSA	JO01BO	59A	59A	578 km
1715	HB9KAI	JN47CG	59A	59A	648 km
1717	OK1CID	JO80CA	55A	57A	645 km
1720	F6EBH	JN19WT	59A	59A	477 km
1722	GW8ASA	IO81EM	59A	59A	828 km
1721	SM7XWX	JO69MO	59A	59A	779 km
1724	F1EBE	JN09NN	57A	59A	634 km
1726	F1ORL	JN08VP	59A	59A	673 km
1727	F8BRK	JN99VF	59A	59A	908 km
1729	F1BZG	JN07VU	58A	56A	742 km
1730	SM6OPW	JO58RG	57A	59A	607 km
1732	G0VOK	IO83RG	53A	53A	721 km
1737	F1BQX	JN18DP	58A	57A	650 km
1739	GW8ASD	IO83LB	57A	57A	756 km
1751	DD1UN	JN49RO	55A	55A	397 km
1754	DC6NY	JN59MI	57A	57A	459 km
1757	G7KTP	IO92RB	55A	53A	607 km
1800	HB9BQ	JN37VN	53A	55A	617 km
1806	F1ORH	JN19BK	53A	55A	591 km
1807	PE1BTV	JO22KL	58A	55A	240 km
1809	F6IRS	JN38VN	58A	57A	506 km
1813	F4AJQ	JN18QM	59A	59A	615 km
1840	SP9JDP	JN99HW	57A	55A	796 km
1855	EI2AI	IO51PQ	55A	55A	1161 km
1857	G4YPV	IO93VI	55A	55A	566 km
1918	IW2NOR	JN45ON	57A	59A	841 km

RIG: TS-2000, GS35B, 4 x 3,6 WL DJ9BV, all QSO in SSB
tnx for report, Peter

DJ8MS in JO63CT wkd on 144 MHz:

2003-11-20

1409	OH5LK	KP30ON	56a	55a	1170 km
1840	HA1YA	JN87GF	55a	55a	793 km
1840	IV3DXW	JN65QQ	55a	56a	907 km
1851	S54G	JN65TM	57a	57a	927 km
1855	S51DI	JN76VL	53a	55a	854 km
1859	HB9DFG	JN37SM	52a	57a	772 km
1901	OK2PTC	JN89JM	52a	59a	572 km
1903	HA7WJ	JN97MP	55a	55a	836 km
1905	9A3JH	JN75AD	53a	57a	972 km
1909	OK2AF	JN89AR	53a	55a	525 km
1910	S57Q	JN76PB	57a	59a	889 km

tnx for info, Toralf

DK8ZJ in JO54AG wkd on 144 MHz:

2003-10-29

2047	SK0UX	JO99bm	55A	55A	30
2052	OZ6EI	JO45tt	55A	55A	30
2058	SK6DK	JO67eh	55A	57A	30
2110	SK6BA	JO64hm	55A	59A	SSB
2120	LA6MV	JO59vi	59A	59A	SSB
2130	SK6HD	JO68sd	57A	59A	30
2140	SP2MKO	JO93cb	55A	55A	30
2142	SM5DFF	JO88cn	57A	57A	30
2207	LY2BAW	KO25ca	53A	53A	30

220	SP4JWD	KO03fr	53A	55A	30
239	SP9AI	JN99mt	52A	57A	30
240	OK2MW	JN99sq	59A	59A	30
242	PA5KM	JO11wl	55A	58A	30
243	DJ8MS	JO63ct	55A	57A	30
253	OK1CZ	JO70ee	58A	59A	30
258	HB9QQ	JN47kj	59A	59A	30
313	OH2NY	KP20cm	52A	59A	30
003-10-30					
800	LA8WF	JO59gv	55A	57A	30
805	LA7VS	JO59ek	57A	57A	30
813	SM0KAK	JO89xk	53A	58A	30
817	SM6FOV	JO78br	55A	55A	30
906	PA3AYD	JO21nn	53A	55A	30
911	DL1EJA	JO31db	55A	55A	30
957	LA4CQ	JP20qp	53A	55A	30
958	OH1LT	JP00xo	55A	57A	30
003	DL9MCC	JN58 ??	55A	53A	30
005	OH1NOR	KP00xl	58A	59A	30
011	MM0CEZ	IO75xm	53A	55A	30
016	SM5EFP	JO69wj	55A	57A	30
027	LA3PK	JO59kv	55A	55A	30
029	LA3EDA	JP50cg	55A	57A	30
033	SM7EOI	JO87fp	55A	59A	30
035	SM6DOK	JO67cx	53A	58A	30
039	LA0BY	JO59fw	57A	55A	30
042	SM4RPP	JO79hh	55A	55A	30
050	SM3UFF	JP80hf	55A	56A	30
114	OK1FID	JO80ci	53A	55A	30
123	OE3JPC	JN87ew	55A	57A	30
125	SP5HEJ	KO02mc	55A	58A	30
128	HB9DKM	JN37sl	55A	59A	30
150	DL7AJQ	JO62mo	55A	53A	30
200	ON4CLQ	JO11se	55A	55A	30
206	SM7DLZ	JO86bs	57A	59A	30
212	UT8AL	KO61wp	55A	59A	30
218	OE5XBL	JN68pc	55A	55A	30
222	PA2M	JO21pj	59A	57A	30
226	ON4KHG	JO10xo	59A	59A	30
231	G0ORC	IO93ga	55A	55A	30
238	SP4JWD	KO03fr	55A	54A	30
003-11-17					
732	SM0BSO	JO99bg	55A	55A	10
003-11-20					
350	SM0LQB	JO89xk	59A	57A	80
358	SM7IWG	JO87ip	59A	59A	80
402	LY2BJ	KO25er	59A	59A	80
410	DL6JU	JN49ht	53A	53A	80
416	SP4MPB	KO03ht	55A	52A	80
420	RW3PF	KO93cd	55A	59A	80
424	DL7BU	JO51ut	55A	57A	80
427	DJ9MG	JO52tc	57A	57A	80
430	LY2BUU	KO15xh	59A	59A	80
433	RA3DRC/1	KO55jr	55A	59A	80
436	OK1VHF	JO70eb	53A	55A	80
438	HA6NQ	JN98wa	53A	57A	80
440	OM3TZZ	JN88ti	53A	59A	80
442	UT8AL	KO61wp	55A	59A	80
444	DK3SWD	JO62kl	55A	57A	80
1446	S54M	JN86cl	52A	53A	80
1454	UR5LX	KO70wk	59A	59A	80
1456	OK1MHZ	JO70va	55A	55A	80
1503	S54G	JN65tm	55A	55A	80
1508	OK2POI	JN98bl	53A	55A	80
1510	PA2CVQ	JO31gw	57A	52A	80
1512	RA3XR	KO85gb	55A	57A	80
1516	YL2PA	KO26ba	52A	59A	80
1518	YL2CQ	KO17em	57A	59A	80
1521	SM1NJC	KO97do	59A	59A	80
1523	OK1FPR	JO80ce	59A	59A	80
1528	UA3XAC	KO85hc	52A	59A	80
1530	UA3DHC	KO95aw	57A	57A	80
1533	DK5WO	JO30as	55A	59A	80
1537	OK1SC	JO70ob	59A	59A	80
1540	OK1MZM	JN69pr	59A	59A	80
1541	HA5AB	JN97mj	55A	57A	80
1543	OK2ZW	JN89hi	55A	59A	80
1548	OK1YA	KO70gc	59A	59A	80
1551	SP3JBI	JO91br	57A	59A	80
1555	SP6RGB	JO71sf	53A	55A	80
1559	YU7EW	KN05se	53A	59A	80
1602	S51AT	JN75gw	52A	57A	80
1605	OM5NZ	JN97cx	53A	55A	80
1607	9A4EW	JN95kg	55A	59A	80
1609	9A2SB	JN95gm	52A	59A	80
1613	OK2PM	JN99ao	55A	55A	80
1616	SP9FUC	JO90ea	55A	55A	80
1618	F6FLB	JO00wx	55A	59A	80
1620	G3YVR	IO91wd	55A	57A	80
1623	G3RDE	IO82qe	57A	57A	80
1625	9A1CMS	JN86fm	52A	55A	80
1629	OM3KZA	JN99if	55A	59A	80
1632	DL7GW	JO62sc	55A	55A	80
1635	OK1XN	JO70dd	59A	59A	80
1636	9A2DF	JN86hg	59A	59A	80
1638	9A3TU	JN95eh	55A	58A	80
1639	OK5AL	JN97ex	59A	59A	80
1641	OK1YM	JN79qv	59A	59A	80
1643	OK2AF	JN89ar	59A	59A	80
1644	OK1VW	JO70kb	59A	59A	80
1646	HA5KG	JO97bh	57A	57A	80
1648	HA8AR	KN06mq	55A	59A	80
1650	HA6NN	JN98vc	57A	59A	80
1652	HA5MO	JN97qk	55A	59A	80
1654	OK2BFI	JN89qh	59A	59A	80
1655	HA7WJ	JN97np	59A	59A	80
1657	LZ2FO	KN13kx	55A	57A	80
1700	YO8DDP	KN36uf	55A	57A	80
1702	OM3TZO	JN88us	59A	59A	80
1706	OK2KOS	JN99ct	59A	59A	80
1708	SP9FG	JN99xg	59A	59A	80
1711	OK2SIA	JN99dp	55A	59A	80
2058	OE5XBL	JN68pc	59A	59A	80
2100	DF2JQ	JO31hl	59A	59A	80
2103	DF7KF	JO30gu	59A	55A	80
2122	S51ZO	JN86dr	59A	57A	80
2126	HA5OV	JN97nj	55A	55A	80
2129	OM5ZW	JN98ct	53A	55A	80
2131	HA3UU	JN96jo	55A	58A	80
2134	HA5NF	JN97rw	55A	55A	80
2142	OK2BEJ	JN79sj	52A	53A	80
2156	G7RAU	IO90ir	59A	57A	30
2201	SM7SPG	JO66md	59A	59A	30
2206	SK6DH	JO67eh	59A	59A	30
2213	SP6LTC	JO70vv	55A	57A	80
2216	DF2ZC	JO30rn	59A	55A	80
2219	OE5XBL	JN68pc	55A	56A	80
2222	OK2PKX	JN99aj	59A	59A	80
2226	OM7CM	JN98nr	53A	55A	80
2238	DL9MS	JO54wc	59A	55A	80
2255	GM4VVX	IO78ta	55A	57A	80

RIG: 4x12el, 750 Watt, tnx for report, Martin

DL1SUN in JO53PN wkd on 144 MHz:

2003-11-20

1245	DF2JQ	JO31HL	57a	57a
1251	LY2BJ	KO25ER	55a	57a
1254	SP2RS	JO94BK	55a	53a
1302	PA4PS		59a	59a
1313	RW3PF	KO93CD	55a	55a
1318	PAØJMV	JO21PM	59a	59a
1328	HA6NQ	JN98WA	55a	57a
1331	DF7KF	JO3ØGU	59a	59a
1340	SP4MPB	KOØ3HT	56a	56a
1403	SM7WT	JO65QQ	59a	59a
1405	YL85HA	KO26WW	59a	59a
1409	SM5EFP	JO79WJ	59a	58a
1434	DF1CF	JN57FP	57a	57a
1455	OK1VHF	JO7ØEB	59a	59a
1458	UA3DHC	KO95AW	59a	59a
1505	YL2CQ	KO17EM	59a	59a
1507	M5MUF	IO92JP	55a	59a
1508	F6DWG/P	JN19AJ	59a	59a

tnx for report, Norbert

DL6YEH in JO32VA wkd on 144 MHz:

2003-11-20

1621	SP2RS	JO94GK	53a	55a	763 km
1623	GW3LEW	IO71PS	53a	55a	857 km
1643	S51AT	JN75GW	53a	53a	836 km
1653	UX0CQ	KN69AK	51a	53a	1722 km
1654	I1DMP	JN35UB	57a	57a	774 km
1749	S54G	JN65TM	53a	55a	839 km
1904	S51ZO	JN86DR	57a	57a	850 km
1915	IZ4BEH	JN54WL	55a	59a	891 km
1920	HA8V	KN06HT	55a	59a	1091 km

tnx for info, Andreas

DL8BDU in JO43AA wkd on 144 MHz:

2003-11-20

1616	S54M	JN86CL	59A	54A
1620	S53J	JN75EV	59A	55A
1622	SM4BDQ	JP80FG	55A	57A
1624	HB9BZA	JN36BE	57A	54A
1627	S54G	JN65TM	59A	57A
1629	M0CYR	IO83LV	52A	55A
1631	HB9DFG	JN37SM	59A	59A
1634	SP2FAV	JO94MA	54A	55A
1635	G3EDD	JO02DE	59A	59A
1654	F1PUX	JN16XL	57A	59A
1655	OK2VSO	JN89XK	53A	57A
1656	OK2BRA	JN99ET	59A	59A
1658	SP6TTQ	JO90BK	57A	59A
1659	F2LQ	IN98EB	59A	58A
1701	OK2PZA	JN99CS	57A	57A
1703	US5WDC	KN19SG	45A	59A
1708	OE3PLW	JN78NV	59A	59A
1710	F5FT	JN18DO	59A	59A
1712	F1DUJ	JN07AT	59A	59A
1713	F5RBA	JN37HL	57A	59A
1715	SP8NCJ	KO12NC	59A	58A
1716	IK4DRY	JN64BL	59A	59A
1717	F1BQX	JN18DP	59A	59A
1718	DL0FHU	JN58AK	59A	59A
1720	DF5DL	JN58TB	59A	59A
1723	F1OOC	JN08QJ	59A	59A
1724	F1DLT	JN27XG	59A	59A
1726	F4CYH	JN26BH	59A	59A
1727	DG2KBC	JN58MI	57A	57A
1730	M1AHY	IO83EV	55A	54A
1815	F1DES	JO20BV	59A	59A
1818	DL4EBV	JO31HK	59A	59A
1818	DL5ZG/P	JO51MV	59A	59A
1819	DK7KF	JO31XA	55A	58A
1825	DC6NY	JN59MI	57A	56A
1828	SP2CAS	JO93BO	42A	42A
1837	DL6YEH	JO31TK	59A	59A
1844	G4ERP	IO81XW	55A	57A
1847	S53VV	JN65VW	55A	56A
1853	OK2VWB	JN99WS	32A	53A
1855	RW3WR	KO71IM	54A	57A
1858	F5OAU	JN27XG	59A	59A

The third column below holds the mode, which is printed for the 1654–1825 contacts (F1PUX to DC6NY) and blank for the rest.

1634	SP2FAV	JO94MA	54A	55A	
1635	G3EDD	JO02DE	59A	59A	
1654	F1PUX	JN16XL	57A	59A	SSB
1655	OK2VSO	JN89XK	53A	57A	SSB
1656	OK2BRA	JN99ET	59A	59A	SSB
1658	SP6TTQ	JO90BK	57A	59A	SSB
1659	F2LQ	IN98EB	59A	58A	SSB
1701	OK2PZA	JN99CS	57A	57A	SSB
1703	US5WDC	KN19SG	45A	59A	SSB
1708	OE3PLW	JN78NV	59A	59A	SSB
1710	F5FT	JN18DO	59A	59A	SSB
1712	F1DUJ	JN07AT	59A	59A	SSB
1713	F5RBA	JN37HL	57A	59A	SSB
1715	SP8NCJ	KO12NC	59A	58A	SSB
1716	IK4DRY	JN64BL	59A	59A	SSB
1717	F1BQX	JN18DP	59A	59A	SSB
1718	DL0FHU	JN58AK	59A	59A	SSB
1720	DF5DL	JN58TB	59A	59A	SSB
1723	F1OOC	JN08QJ	59A	59A	SSB
1724	F1DLT	JN27XG	59A	59A	SSB
1726	F4CYH	JN26BH	59A	59A	SSB
1727	DG2KBC	JN58MI	57A	57A	SSB
1730	M1AHY	IO83EV	55A	54A	SSB
1815	F1DES	JO20BV	59A	59A	SSB
1818	DL4EBV	JO31HK	59A	59A	SSB
1818	DL5ZG/P	JO51MV	59A	59A	SSB
1819	DK7KF	JO31XA	55A	58A	SSB
1825	DC6NY	JN59MI	57A	56A	SSB
1828	SP2CAS	JO93BO	42A	42A	
1837	DL6YEH	JO31TK	59A	59A	
1844	G4ERP	IO81XW	55A	57A	
1847	S53VV	JN65VW	55A	56A	
1853	OK2VWB	JN99WS	32A	53A	
1855	RW3WR	KO71IM	54A	57A	
1858	F5OAU	JN27XG	59A	59A	

RIG: 400W, 15-ele Yagi, tnx for report

DL8EBW in JO31NF wkd on 144 MHz:

2003-10-30

2332	UT8AL	KO61WP	55a	53a	40	1844 km
2004-02-11						
1739	G4HGI	IO83PL	59a	59a	30	712 km
1747	OZ6TY	JO55XE	59a	59a	30	545 km
1755	GM4BYF	IO85JV	55a	53a	30	856 km

tnx for report, Guido

DL8LAQ in JO43XU wkd on 144 MHz:

2003-10-29

1650	GM0TGE	IO87TF	53A	59A	
1848	DL3DXX	JO61VC	55A	57A	
1850	DM5JL	JO70HX	41A	57A	
1851	DL9MCC	JN58UA	55A	55A	70°
1854	I4XCC	JN63GV	52A	55A	70°
1855	9A6WW	JN86HF	53A	53A	75°
1857	DF1IAZ	JN49LD	51A	51A	
1906	OK1DFC	JN79GW	53A	57A	
1933	DL1YAW	JO41DX	52A	59A	55°
1944	RA3LE	KO64AR	52A	55A	45°
2126	LY2CI	KO14VW	52A	57A	40°

217	F5SE/P	JN19XH	53A	56A	40°
235	SP4JWD	KO03FR	52A	53A	70°
251	RA3AQ	KO85SP	52A	57A	40°
255	S51ZO	JN86DR	52A	52A	60°
257	DL2IAN	JN49BC	51A	51A	60°
300	DL5GAC	JN47UT	52A	55A	70°
301	HB9DFG	JN37SM	53A	56A	70°
303	DL1GGT	JN58AO	51A	53A	70°
304	HA1BC	JN87PU	51A	53A	70°
305	F5LRL	JN26MV	51A	55A	45°
308	PA3CWN	JO33AH	52A	57A	45°
313	SM5EFP	JO79WJ	53A	57A	30°
332	LA0BY	JO59FW	53A	57A	20°
344	SM5FNU	JO89CR	52A	55A	30°
348	SM0LQB	JO89XK	41A	55A	30°
351	G3WZT	IO90	52A	53A	30°
352	G4RGK	IO91ON	54A	55A	35°
354	SM0WXV	JO89VL	52A	55A	30°
357	YL3DW	KO26CW	52A	55A	40°
359	DM3WSO	JO62TN	51A	55A	
03-10-30					
02	OK2PM	JN99AO	51A	55A	60°
04	OK2BDS	JN79WF	51A	55A	60°
09	YU7EW	KN05HP	51A	55A	80°
12	HA1AD	JN87RT	41A	57A	80°
15	HA5CW	JN97PM	51A	58A	80°
16	HA5PT	JN97MK	52A	55A	80°
18	OK2PWY	JN89KW	41A	57A	80°
23	HA8V	KN06HT	51A	59A	80°
26	S51ZO	JN86DR	52A	55A	80°
55	RW3WR	KO71IM	57A	59A	60°
59	SP4BY	KO13OD	52A	53A	60°
02	SP6GVU	JO81LC	52A	59A	60°
04	UY5UG	KO50FE	41A	55A	60°
06	OM7CMK	JN98NR	41A	55A	60°
11	OK1ZHS	JO70VA	51A	57A	60°
12	OM5CM	JN88DH	51A	57A	60°
16	HA7WJ	JN97MP	41A	56A	70°
22	UR5LX	KO70WK	54A	59A	60°
23	HA0HO	KN07SU	51A	59A	60°
28	UY5UG	KO50FE	41A	55A	60°
33	SP7ASQ	JO91RS	41A	55A	60°
37	OE1SOW	JN88FF	53A	55A	60°
40	OK2YT	JN88IW	51A	55A	60°
42	OK1MHZ	JO70VA	51A	55A	60°
57	ES5PC	KO38HJ	52A	57A	30°
59	RX1AS	KO59FX	53A	58A	30°
15	SM3BEI	JP81NG	54A	57A	0°
03-10-31					
09	DL6YEH	JO31TX	53A	55A	
19	DH7FB	JO62SM	53A	52A	
45	I4LCK	JN54PD	52A	59A	80°
43	LY2BJ	KO15NV	41A	57A	
10	UT8AL	KO61WP	55A	59A	40°
16	DL6KR	JO30NQ	51A	56A	
18	YL2HA		51A	57A	
19	ON4CLQ	JO11SE	53A	559	30°
21	G4BRK	IO91DP	51A	53A	30°
23	DK2VA	JN39LF	52A	57A	40°

2323	ON4PS	JO20KQ	53A	57A	30°
2324	LY2BUU	KO15XH	53A	59A	40°
2327	HB9DFG	JN37SM	51A	56A	40°
2329	HB9DKM	JN37SL	51A	55A	40°
2330	RW3WR	KO71IM	59A	59A	40°
2331	DH0GHU	JN38VN	51Å	53A	40°
2332	RA3WDK	KO81BL	51A	59A	40°
2339	G4AEP	IO91NJ	53A	55A	40°
2345	GM0TPH	IO92IO	51A	55A	
2350	LY2BAW	KO25KA	55A	59A	40°
2003-11-01					
0007	UR5LX	KO70WK	51A	55A	60°
0009	DJ5JY	JO42HA	51A	56A	40°
0013	SM1CQA	JO97JN	52A	55A	40°
0017	OK2TT	JN89KU	51A	55A	60°
0018	DL1ALB	JO50KW	52A	57A	60°
0036	HA8BI/7	JN97MI	52A	57A	80°
0037	HA8V	KN06HT	55A	59A	80°
0038	S57TW	JN75EX	53A	55A	80°
0039	UR5SKB	KN28EW	41A	55A	80°
0043	OK1JL	JO70WN	51A	59A	70°
0046	OK1FID	JO80CI	55A	59A	80°
0047	SP6LTC	JO70VV	53A	55A	70°
0050	DL2IAN	JN49BC	52A	53A	70°
0052	G0PQF	JO01BU	55A	57A	30°
0054	SQ6ELV	JO80CQ	55A	59A	60°
0056	UY5UG	KO50FI	51A	59A	60°
0057	SP5ES	KO02MF	51A	55A	60°
0100	DD3SP	JO72EN	57A	59A	50°
0101	SP6LB	JO70UU	54A	55A	60°
0106	HB9BZA	JN36BE	55A	55A	70°
0123	HA6NY	JN98WC	53A	57A	70°

RIG: TS-850S, LT2S, 300W, 17el F9FT
tnx for report, Norbert

DL9MCC in JN58UA wkd on 144 MHz:

2003-11-20

1901	DK2AR	JO42UA	57a	58a	340	467 km
1906	EI2HI	IO51JQ	52a	57a	330	1547 km
1911	F6DQZ	JN19NE	55a	55a	330	644 km
1922	9A2PU	JN75JE	51a	55a	330	393 km
1924	DL1ANA	JO50TW	52a	57a	330	324 km
1927	G3PJW	IO83PM	53a	57a	330	1180 km
1929	OK2SBL	JN99HQ	53a	55a	330	539 km
1933	G7RAU	IO90IR	57a	59a	330	986 km
1939	DJ1ZB	JN68GD	51a	54a	330	63 km
1944	OK1TEH	JO70FD	53a	59a	330	310 km
1948	OK2BEJ	JN79HJ	51a	55a	330	263 km
2047	GI6ATZ	IO74AJ	59a	59a	SSB	
2055	GI4OWA	IO64IX	53a	55a	330	1518 km
2059	G4OCR	IO93UK	53a	59a	330	1035 km
2108	EI5FK	IO51RT	53a	55a	330	1504 km
2113	PD0RFU	JO32LS	55a	59a	330	626 km
2116	G4RRA	IO91OF	57a	57a	330	967 km
2120	HA3UU	JN96JO	53a	59a	330	556 km
2122	DF8IK	JO30JT	57a	59a	330	472 km
2127	DO3MHA	JN58SP	55a	59a	330	71 km
2204	OZ8ZS	JO55RT	55a	52a	10	866 km
2213	OZ1CLL	JO65QQ	55a	57a	10	860 km
2220	DL9MS	JO54WC	55a	55a	10	676 km
2240	OK1VT	JN79IX	55a	59a	30	309 km
2243	DF2ZC	JO30RN	55a	53a	30	418 km
2259	DJ9CZ	JO31BC	55a	55a	30	528 km
2316	DF2JQ	JO31HL	55a	56a	30	530 km
2332	DL7FF	JO62TJ	51a	55a	30	505 km
2338	PA0JMV	JO21PM	52a	55a	40	603 km
2341	DL8YE	JO31MH	52a	52a	40	496 km

tnx fer report, Hans

F1FIH in JN23GS wkd on 144 MHz:

2003-11-20

1724	DM1CG	JO31IC	59a	59a	15 SSB
1725	ON6ZK	JO20KW	59a	59a	15 SSB
1730	G1POK	IO91VI	59a	59a	15 SSB
1740	ON7CL	JO20JU	59a	59a	15 SSB
1743	G8IZY	IO91VC	59a	59a	15 SSB
1848	PE1AHX	JO21OS	59a	59a	15 SSB
1857	ON4LN	JO20IV	59a	59a	15 SSB
1902	G8HGN	JO01FO	59a	59a	15 SSB
1911	GW8JLY	IO81JM	59a	59a	15 SSB
1933	ON2AEO	JO10OW	59a	59a	15 SSB
1935	ON4IMM	JO11UB	59a	59a	15 SSB
1937	DK5WO	JO30AS	59a	59a	15 SSB
1942	ON1AEN	JO10VW	59a	59a	15 SSB

tnx fer report, Michel

F5SDD in JN23RF wkd on 144 MHz:

2003-11-20

1733	M5BXB	IO91XR	55A	55A	SSB	1031km
1912	F6HHR	JO10AV	55A	55A		890km
1932	EI4DQ	IO51WU	55A	55A		1398km
1941	DF2ZC	JO30RN	55A	55A		829km
1944	ON1AEN	JO10VM	52A	55A	SSB	820km
1954	DK5DQ	JO31PG	55A	55A		905km
2123	DL1RTL	JO62PH	55A	55A		1167km
2125	DF8A?	N.C	55A	55A		

RIG: IC211E, 11 elts F9FT, PA 2*4X150 (400W)
tnx fer report, Dave

F6CRP in IN96KE wkd on 144 MHz:

2003-11-20

1637	DF5DE	JO40CX	55A	53A
1641	LY2IC	KO14WW	55A	55A
1644	SP4MPB	KO03HT	59A	59A
1647	SP4BY	KO13OD	55A	55A
1655	SP2MKI	JO93AC	55A	57A
1656	M0CYR	IO83LV	57A	59A
1658	GW0MDQ	IO83LH	55A	59A
1659	DL2ALF	JO50IW	55A	55A
1701	OK2PM	JN99A0	51A	55A
1703	PA1LA	JO32LS	59A	57A
1745	HA8V	KN06HT	59A	59A
1749	EI9GQ	IO51TV	59A	59A
1754	F8DO	JN26IF	54A	55A
1756	G4IUF	IO93FX	55A	57A
1757	SG9YIH	JO32QI	56A	53A
1807	SP4JWD	KO03FR	56A	56A
1848	OK1DCF	JO80BJ	55A	59A
1923	SP9HVV	KO00LA	55A	55A
1924	OE5XBL	JN68PC	55A	55A
1929	S51ZO	JN86DR	55A	55A
1932	OK1VHF	JO70EB	59A	59A
1937	SP6A	JO81MC	56A	56A
1938	OK2KOS	JN99CT	55A	55A

RIG: FT847 + 2 x 4CX350 + 2x11 el - MGF1302. tnx for info

F9OE/p in IN78QG wkd on 144 MHz:

2003-11-20

1711	OK1DCF	JO80BJ	1516 km
1716	ON4KHG	JO10XO	672 km
1723	EI5FK	IO51RT	482 km
1732	OE5KE	JN78DF	1396 km
1738	G3KEQ	JO01BH	480 km
1747	OZ6OL	JO65DJ	1400 km
1756	SP4JWD	KO03FR	1845 km
1800	PA5KM	JO11WL	705 km
1808	EI2HI	IO51WQ	455 km
1819	DG9YIH	JO32QI	963 km
1822	DF7QF	JO30GU	855 km
1850	DL2DXA	JO61VC	1357 km
1852	SP7OGP	KO01AM	1793 km
1859	PA2M	JO21JP	770 km
1904	OK1VKC	JO70OA	1450 km
1907	S54M	JN86CL	1575 km
1911	HA8V	KN06HT	1892 km
1923	OE5XBL	JN68PC	1325 km
1926	F5HRY	JN18EQ	517 km
2230	GM4BYF	IO85JV	853 km

tnx for report

G3XDY in JO02OB wkd on 144 MHz:

2003-11-20

1923	HA8V	KNØ6	1514 km
1927	S51ZO	JN86	1239 km
2114	I2FAK	JN45	974 km

tnx fer report, John

G4ASR in IO81MX wkd on 144 MHz:

2003-11-20

1917	HA5OV	JN97NJ	59A	59A	080°	1661km
1918	HA5CW	JN97GO	57A	59A	080°	1611km
1919	IV4DXW	JN65QQ	57A	57A	080°	1381km
1920	IK4PMB	JN54LL	57A	59A	080°	1322km
1922	DF3VM	JN39LO	57A	57A	080°	745km
1924	HB9BZA	JN36	57A	57A	080°	945km
1925	IK4DRY	JN64BF	55A	55A	080°	1409km
1925	I1DMP	JN35UB	55A	55A	090°	1097km
1927	F5VHX	JN04FT	57A	59A	090°	836km
1928	DJ7GK	JN58WH	55A	55A	090°	1130km
1930	IN3KLQ	JN56RG	55A	55A	090°	1223km
1931	DO3MV	JN58IP	52A	55A	090°	1037km
1934	HB9DKM	JN37SL	57A	57A	090°	904km
1935	S51MQ	JN75NT	57A	57A	090°	1484km
1938	DK7FC	JN49HI	55A	53A	095°	866km
1940	OM3TZZ	JN99TI	55A	55A	080°	1611km
1942	DL4DWA	JO61QH	53A	53A	080°	1127km
1946	F6BEG	JN25JS	55A	55A	075°	892km

1946	F6GYH	JN19FV	55A	54A	080°	444km
1953	HA8V	KN06HT	55A	57A	080°	1792km
2016	EI4DQ	IO51WU	55A	55A	035°	355km
2105	DF2JQ	JO31HL	53A	55A	065°	662km
2110	OK2SBL	JN99HQ	53A	55A	060°	1531km
2110	SP6IWQ	JO80IK	55A	59A	060°	1376km
2115	OK2BSH	JN89WW	55A	55A	060°	1471km
2116	OK1XN	JO70DB	55A	59A	060°	1222km
2118	OK1TEH	JO70FD	53A	55A	060°	1231km
2120	F5CWU	JN07IK	52A	55A	050°	570km
2125	F6FHP	IN94TR	59A	59A	050°	828km
2220	DL7UK	JO41SX	55A	59A	055°	855km
2223	F6GNJ	JN08TV	53A	55A	060°	472km
2235	SK6DK	JO67EH	53A	57A	020°	1147km
2239	GM3WFJ	IO86FR	59A	55A	355°	531km
2242	GM4VVX	IO78TA	55A	55A	010°	678km

tnx fer report, David

G4KLX in IO93FB wkd on 144 MHz:

2003-10-29				
1810	DL8BDU	JO43AA	53a	52a
1820	EI5FK	IO51RT	53a	53a
1834	OK1VT	JN79IX	54a	54a
1841	OK1AGE	JO70ED	55a	55a
1856	OE5XBL	JN67AW	54a	55a
1913	OM3RM	JN87WV	57a	57a
2003-11-20				
1745	OK1DCF	JO80BJ	57a	57a
1809	OK1VHF	JO70EB	56a	55a
1818	IV3DXW	JN65QQ	55a	56a
1834	9A1EZA	JN86HF	57a	56a
1851	DM2BHG	JO51MW	54a	52a
1854	F8LDX	IN99GK	58a	57a
1856	F5HRY	JN18EQ	59a	59a
2218	OK2PKX	JN99AJ	55a	55a

Rig: IC-910H, 100W, 9-ele F9FT. tnx for report, Jonathan

G4RRA in IO80BS wkd on 144 MHz:

2003-11-20					
1514	LY2BJ	KO25ER	53a	55a	1943 km
1541	LY2IC	KO14WW	57a	57a	1906 km
1546	HA0HO	KN07SU	59a	59a	1861 km
1622	OH1FA	KP10PL	55a	55a	1996 km
1703	EU3AI	KO22DE	55a	56a	1944 km
1718	HA8BR	KN06IP	57a	57a	1851 km
1744	HA8V	KN06HT	59a	57a	1838 km
1915	YO2IS	KN05PS	55a	55a	1932 km

nx for info, Paul

G4XBF in IO91QD wkd on 144 MHz:

2003-11-20			
605	LY2BJ	KO25ER	1721 km
612	ES6RQ	KO28WA	1855 km
632	LY2IC	KO14WW	1681 km
642	EU3AI	KO22CE	1708 km
715	HA6NA	JN98VC	1503 km
831	US5WU	KO20DI	1746 km
834	SP9HVV	KO00LA	1523 km
938	YU7EW	KN05HP	1676 km

2102	SP5GJH	KO02RU	1517 km

tnx fer report, Mike

G8HGN in JO01FO wkd on 144 MHz:

2003-11-20					
1507	GM4TOE	IO87HF	59A	59A	15
1516	PD0RKC	JO33AD	52A	51A	25
1517	PE1OPK	JO23UE	55A	59A	25
1519	GM4UPL	IO77XL	57A	58A	25
1525	OZ1ZD	JO46HI	55A	55A	25
1527	PA0LWJ	JO22NS	56A	56A	25
1529	PA3HHF	JO22SA	55A	59A	25
1536	F1DES	JO20BE	54A	57A	30
1541	DK5WO	JO30AS	59A	59A	45
1543	DO9OAM	JO41XM	59A	59A	45
1544	DG0NA	JO63UX	57A	57A	45
1545	DG4YIR	JO42NB	57A	57A	45
1546	DL1MP	JO31CH	55A	53A	45
1550	DJ9OI	JO44OI	57A	58A	50
1554	F1CPX	IN97DD	57A	58A	45
1556	PD0ORT	JO23RE	57A	59A	45
1557	DB6NT	JO50VJ	56A	56A	45
1559	DO2MON	JO41EQ	54A	55A	45
1605	DD6OM	JO62OQ	55A	57A	45
1606	ON6MG	JO10VK	55A	55A	45
1609	DC6IA	JO30IV	57A	59A	45
1610	DG6AAO	JO42WQ	58A	57A	70
1615	SP8NCJ	KO12NC	55A	55A	55
1617	DJ6BC	JO31HI	56A	57A	55
1618	PA3GFY	JO23SB	59A	59A	55
1620	DL1RNW	JO62GH	58A	59A	55
1622	DK5TX	JO41JW	55A	55A	55
1623	DL8YAU	JO41HS	57A	59A	55
1624	DG0OBU	JO50WW	57A	57A	60
1630	DG2BCA	JO42AG	56A	57A	60
1645	DG5CST	JO60DS	57A	57A	60
1647	HA6ZB	KN07BV	57A	57A	65
1648	SP7CNL	JO91QQ	57A	57A	65
1651	DL1RMO	JO62HD	56A	56A	65
1653	DH2AAK	JO41SM	57A	59A	65
1655	OK1KDO	JN69KL	54A	54A	65
1656	DF6WE	JO31GO	59A	57A	65
1702	DL2IAN	JN49BC	59A	59A	65
1703	DG2FAJ	JN49FS	57A	57A	65
1706	DL4EBV	JO31HK	49A	59A	65
1710	F4DXX	IN97LH	55A	55A	65
1715	DG4FDQ	JO40HM	58A	59A	65
1716	DG2KBC	JN58MI	57A	59A	65
1718	IK1EGC	JN35UF	59A	59A	65
1719	DL4DWA	JO61QH	58A	59A	65
1720	DG1NSE	JN59NO	55A	58A	65
1738	F6IXI	JN19BB	55A	59A	60
1815	OE5OLL	JN68SI	56A	56A	65
1821	GJ0JSY	IN89XE	57A	59A	65
1832	DL5YET	JO41EV	58A	59A	55
1834	DL6ZAU	JO40JF	56A	56A	55
1835	DO1LK	JO53CQ	55A	57A	55
1837	DL9YBZ	JO31KU	56A	56A	55
1902	F1FIH	JN23GS	56A	59A	75
1903	DF7AP	JO51FI	57A	59A	75
1904	F1JRD	JN13WO	57A	55A	75
1906	F0CXO	JN26PP	56A	58A	75
1908	DO1NF	JN69AM	56A	59A	75
1910	OK2PMX	JN88IW	47A	59A	75
1912	DH9NBB	JN49WS	56A	58A	75
1913	OK2VSO	JN89XK	56A	59A	75
1915	SP8HED	JO80IK	54A	59A	75
1916	DD1WKS	JN39KK	57A	59A	75
1921	DB1EPO	JO31HG	54A	57A	65
1923	F4CYH	JN26BH	57A	59A	70
1924	S51MQ	JN75NT	57A	57A	70
1925	F1BBL	JN08PP	54A	55A	75

RIG: FT-847, 150 W, 2 x 15-ele, all contacts in SSB
tnx for info, Bob

G8IZY in IO91VC wkd on 144 MHz:

2003-11-20					
1559	DJ2QV	JO31PF	59A	59A	60
1600	PE1AHX	JO21OS	59A	59A	
1604	MM0CIN	IO75OP	59A	59A	
1607	PD2JVE	JO22VJ	59A	59A	
1615	DB8WJ	JO33TH	59A	59A	60
1618	PE2DB	JO22MD	59A	59A	
1627	DG2BCP	JO43DC	59A	59A	
1630	DK3EE	JO41GU	59A	59A	
1636	DG5CST	JO60DS	59A	59A	70
1639	ON7CL	JO20JU	59A	59A	
1646	DB8KJ	JO30CM	59A	59A	
1656	DO1FOX	JO31PU	59A	59A	
1700	DK9TF	JO31NF	59A	59A	
1709	GJ0JSY	IN89XE	59A	59A	
1715	DK9AT	JO43XO	57A	58A	
1720	HA6ZB	KN07BV	59A	55A	75
1722	DL5YET	JO41EV	59A	59A	
1730	F1JRD	JN13WO	59A	59A	70
1743	F1FIH	JN23GS	55A	57A	
1746	PA0LWJ	JO22NS	57A	57A	
1748	SP9JDP	JN99HW	57A	NC	
1752	DB4ET	JO31OG	55A	57A	
1752	PD0ORT	JO23RE	59A	57A	
1753	DK7LZ	JO30MR	57A	57A	
1756	F0EBT	JN18AM	55A	55A	
1800	DO9OAM	JO41XM	58A	55A	
1801	F0DKT	JN18JH	57A	55A	
1802	F1DES	JO20BE	59A	55A	
1804	F1EBK	JN18BW	55A	55A	
1805	DB8AH	JO31FO	59A	57A	
1807	SP5XMU	KO02LG	55A	55A	
1809	SP9QMP	JO90FB	57A	55A	
1810	DG2DAA	JO62GU	59A	59A	
1811	F4DSD	JN23JO	59A	55A	
1813	HA8UG	JN97SA	59A	59A	
1814	HA8V	KN06HT	59A	59A	
1816	DG8KAD	JO30AV	59A	59A	
1818	F1BGN/P	JN08KB	59A	55A	
1820	SP9MCY	JO90OG	59A	57A	
1823	IW4BET	JN54QL	55A	57A	
1825	F1EYB	JN23	55A	NC	
1827	F1PW	JN06DM	55A	55A	
1833	DL9YBZ	JO31KU	59A	59A	
1835	DB3BW	JO42AC	59A	55A	
1837	DL6ZAU	JO40JF	56A	57A	
1839	DL8YAU	JO41HS	59A	55A	
1847	F1DLZ	JN19FH	57A	54A	
1848	DH0GHU	JN38VN	59A	57A	
1850	OK2MWR	JN99HQ	59A	57A	
1852	OK1UGA		59A	57A	
1853	F1TXI	IN96VK	57A	59A	
1855	HA6ZB	KN07BV	55A	55A	
1856	DL4EBV	JO31HK	59A	57A	
1858	F6IRS	JN38VN	58A	58A	
1900	SP6HED	JO80IK	59A	55A	
1902	DK5WO	JO30AS	59A	55A	
1904	OK1TEH	JO70FD	59A	59A	
1905	SP9OJQ	JN99IW	58A	57A	
1908	F8ATS	JN18DP	59A	59A	
1910	OE3PLW	JN78NV	55A	58A	
1912	DF9IC	JN48IW	59A	59A	
1913	F4EGD	JN07IL	57A	59A	
1916	DC6RN	JN59WK	59A	59A	
1917	F6IXI	JN19BB	59A	59A	
1919	F1EYB	JN23KK	59A	59A	
1921	FIBBK	JN08PP	59A	59A	
1924	DK2GL	JN38WI	59A	59A	
1926	DB8AT	JO51CP	57A	57A	
1927	DL1QH	JO31NP	58A	57A	
1928	DJ2JS	JO31SL	59A	59A	
2057	DM1CG	JO31IC	59A	59A	
2102	PA3FRV	JO23VE	57A	57A	
2107	GW7SMV	IO81LN	59A	59A	
2112	EI8IP	IO63MQ	59A	59A	

All contacts in SSB. tnx for info, Bob

GM0CLN in IO85HV wkd on 144 MHz:

2003-11-20			
1611	OK1JL	JO70WN	1405 km
1613	S54M	JN86CL	1710 km
1615	DL3AMB	JO61EA	1171 km
1616	SP6IQW	JO80HK	1458 km
1618	DL4MO	JO50EN	1087 km
1619	DK6NJ	JN59WL	1247 km
1621	HB9DFG	JN37SM	1194 km
1622	G3BNE	JO01BJ	550 km
1624	OK1KDO	JN69KL	1302 km
1625	OK1YKO	JN78GX	1431 km
1628	OM3TZZ	JN88TI	1651 km
1629	DL4FCH	JO40ID	1028 km
1631	DJ1HA	JO30JN	898 km
1634	DL8WF	JO61CU	1112 km
1636	DJ4EJ	JN48GB	1190 km
1657	OK1DCF	JO80BJ	1430 km
2232	G4ALY	IO70VL	604 km
2234	EI4BZ	IO51UW	545 km
2256	GW4FRX	IO82MA	431 km
2305	GW8IZR	IO73TI	289 km
2307	GW0GEI	IO73TG	298 km

tnx for info, Colin

;W7SMV in IO81LN wkd on 144 MHz:

003-11-20

950	DM1CG	JO31IC	55a	55a	679 km
957	PD4HDB	JO32HN	55a	55a	669 km
959	PA3FXO	JO22GD	59a	59a	524 km
000	PD4R	JO22XE	55a	57a	621 km
002	PA4AR	JO32HM	55a	57a	669 km
006	G8IZY	IO91VC	59a	59a	203 km
007	ON4IMM	JO11UB	59a	59a	472 km
105	PE1AHX	JO2ØOS	59A	59A	581 km
109	DF8XR	JO32MF	57A	59A	695 km
110	PE1MFP	JO21JO	55A	57A	541 km
112	PE1CZG	JO22PE	55A	57A	576 km
113	PE1IKX	JO11TL	59a	59a	461 km
114	PA1DYK	JO22VA	59a	56a	609 km
118	PAØTEN	JO32EE	59a	59a	650 km
119	PE1FNL	JO22MC	55a	55a	558 km
120	SP9APC	JN99QU	55a	55a	1583 km
125	PE1MQK	JO21TU	55a	55a	598 km
126	PE1LJS	JO22OI	55a	55a	572 km
128	GØCUH	IO7ØLG	55a	55a	201 km

ll contacts in SSB. tnx for info, Jamie

IA6NN in JN98VC wkd on 144 MHz:

)03-11-20

;49	DK8ZJ	JO54AG	59A	55A	my first AU QSO
'04	OK1DCF		59A	59A	firstOK-HA on AU?
'17	DK5DQ	JO31PG	55A	55A	c?

IG: FT290, 20W (!), 7-ele DL6WU.
x for report, Andy

A8V in KN06HT wkd on 144 MHz:

)03-11-20

;06	SM7WT	JO65QQ	59A	59A	0	
;07	OZ1LO	JO55VC	59A	59A	0	
;08	PA0V	JO33II	59A	57A	0	
;11	DL9MS	JO54WC	59A	57A	0	
;13	OZ6OL	JO65DJ	59A	55A	0	
;19	DL4MO	JO50EN	55A	55A	0	
;22	OZ1LPR	JO44UW	59A	58A	0	
;23	DL6BF	JO32QI	59A	57A	0	
;30	LY2BJ	KO25ER	59A	57A	0	
;30	SP4MPB	KO03HT	55A	53A	0	
;34	G4MKF	IO91HJ	58A	56A	330	
;38	PA5DD	JO22IC	59A	55A	0	
44	SM6CMU	JO57XK	57A	58A	0	
51	DK5EE	JO41GU	55A	55A	0	SSB
55	SM7FMX	JO65KN	59A	58A	340	SSB
01	OZ2PJ	JO65ER	57A	55A	340	SSB
08	PE9DX	JO33MD	59A	55A	350	SSB
12	G3UTS	IO94CU	59A	57A	340	
23	DK2AR	JO42UC	55A	57A	340	
39	RK3AF	KO85QR	55A	57A	10	
40	EW6FS	KO35LB	59A	59A	10	
45	SP5GJH	KO02RU	59A	59A	15	
49	SP3AME	JO83FG	56A	56A	15	
51	OZ1JTE	JO65ER	59A	55A	15	
54	DJ3VI	JO43VI	57A	55A	0	
54	SP2BNJ		56A	59A		

1657	RA3DCI	KO06CB	55A	55A	20	
1658	UA3DHC	KO95AW	59A	59A	20	
1659	SP2RS	JO94GK	56A	55A	0	
1702	UA4AQL	LO20QB	59A	55A	20	
1703	RA3QTT	LO01GQ	59A	59A	20	
1705	RV3RA	LO02QP	57A	57A	20	
1706	RU3EC	KO82TK	59A	59A	20	
1711	DG3LSM/P	JO61EG	59A	55A	0	
1715	UR5LX	KO70WK	59A	59A	20	
1730	DL8YET	JO30MH	59A	52A	330	
1733	PA2DW	JO22GD	57A	55A	330	
1739	DK2CF	JO41GG	55A	55A	330	
1740	SP6RGB	JO71HF	59A	55A	330	
1741	DL3LST	JO61FI	57A	59A	330	
1742	G4RRA	IO80BS	57A	57A	330	
1744	DL3BRC	JO62TM	59A	59A	330	
1745	F6CRP	IN96KE	59A	59A	300	
1753	DF7KF	JO30GU	59A	59A	340	
1800	DF2ZC	JO30RN	59A	59A	320	
1808	GW4FRX	IO82MR	59A	58A	330	
1804	G8IZY	IO91VC	59A	59A	330	SSB
1818	M5BXB	IO91XR	59A	59A	320	SSB
1825	DH4FAH	JO40KC	59A	55A	300	
1831	OZ1CLL	JO65GQ	59A	59A	0	
1834	G4DEZ	JO03AE	59A	55A	330	
1838	G3WZT	IO90UX	59A	57A	320	
1841	DL7AU	JO62WD	59A	55A	330	
1843	PA3GDD	JO21AI	57A	55A	330	
1845	DK5DQ	JO31PG	59A	59A	340	
1850	G4FUF	JO01GN	57A	57A	340	
1854	GW3LEW	IO71PS	59A	58A	330	
1857	DL3AMB	JO61EA	57A	59A	330	
1858	DL2TG	JO61SG	59A	59A	330	
1858	LY2CI	KO14WV	59A	59A	0	
1902	G3YVR	IO91WD	59A	59A	330	
1904	DJ8UAT	JO61TL	57A	55A	330	
1906	OK1DPU	JO60VP	59A	59A	330	
1908	OK1MHZ	JO70VA	59A	55A	330	
1909	DJ9MG	JO52TC	59A	59A	340	
1909	F9OE	IN78QG	59A	59A	300	
1910	DL2JWN	JO60IW	59A	59A	340	
1913	DL2HWA	JO50WE	59A	59A	340	
1904	DM2DXG	JO51MV	59A	59A	340	
1905	DL2UP	JO31SR	59A	59A	340	
1908	DL6YEH	JO32VA	59A	55A	340	
1919	DL7VZF	JO61WW	55A	53A	340	
1921	EU3AI	KO22CE	57A	57A	0	
1923	ON4LN	JO20IV	59A	55A	330	
1924	G3XDY	JO02OB	59A	59A	330	
1926	OK1SC	JO70OB	59A	59A	330	
1926	DL4WA	JO60BO	59A	59A	330	
1930	DF2JQ	JO31HL	59A	57A	330	
1933	DL6NAA	JO50VF	59A	59A	330	
1935	DK3IK	JN39JF	57A	55A	330	
1936	OK1FHT	JO70DA	59A	57A	330	
1938	SQ6ELV	JO80CQ	59A	59A	330	
1940	OK1WU	JO70TP	57A	57A	300	
1940	OK1PF	JN69QS	59A	59A	330	
1943	DK5YA	JN49NX	57A	57A	330	
1946	G3JHM	IO91LC	59A	55A	320	
1947	DL3WW	JO60FL	57A	57A	340	
1949	G4KWQ	IO92AQ	55A	55A	330	
1954	G4ASR	IO81MX	57A	55A	330	
1956	G4SWX	JO02PB	59A	59A	330	
2125	OK2SBL	JN99HQ	59A	55A	330	
2134	PA3DZL	JO21HM	55A	55A	330	
2156	OZ1CLL	JO65GQ	55A	55A	0	
2204	OZ6OL	JO65DJ	59A	57A	0	
2206	OZ8ZS	JO55RT	57A	55A	0	
2210	OZ2M	JO65FR	59A	57A	0	
2253	DF2ZC	JO30RN	57A	55A	340	

RIG: TM255E, PA 900W 4 x 11 el. Yagi 35m AGL
tnx for info, Gabi

HB9BZA in JN36BE wkd on 144 MHz:

2003-11-20

1450	PA3FOC	JO21FW	53A	55A	25°	
1458	DF2JQ	JO31HL	53A	57A	20°	
1523	GW4DGU	IO71SV	41A	hrd	15°	
1530	PA0V	JO33II	56A	57A	25°	
1536	ON4LN	JO21IV	52A	55A	30°	
1541	DK8ZJ	JO54AG	53A	hrd	30°	
1547	PA1LA	JO32LS	56A	59A	15°	
1550	G7RAU	IO90IR	53A	55A	15°	
1602	PE9DX	JO33MD	55A	55A	20°	SSB
1607	PA0PVW	JO22VA	55A	57A	15°	SSB
1613	PA1GYS	JO22WW	56A	55A	15°	
1618	G4HGI	IO83PL	57A	59A	20°	
1625	DL8BDU	JO43AA	54A	57A	15°	
1634	DF2ZC	JO30RN	55A	57A	35°	
1640	DL4HG	JO53CM	57A	57A	30°	
1740	G4MKF	IO91HJ	53A	55A	30°	
1744	F6HPP/P	JN19PG	54A	hrd	30°	SSB
1756	G4DEZ	JO03AE	53A	55A	10°	
1806	DK3WG	JO72GI	55A	55A	340°	
1810	G4RGK	IO91ON	53A	55A	340°	
1812	PA1LA	JO32LS	56A	55A	10°	
1826	G3JHM	IO91LC	55A	55A	15°	
1854	DM1CG	JO31IC	56A	57A	20°	SSB
1858	DL9OBD	JO42QN	57A	57A	20°	SSB
1901	PE1AHX	JO21OS	56A	59A	20°	SSB
1923	G4ASR	IO81MX	57A	57A	15°	
1924	G4XBF	IO91QD	55A	55A	20°	
1927	DK5DQ	JO31PG	56A	59A	30°	
1931	PA0BAT	JO31FX	56A	59A	35°	
1933	PA3DZL	JO21HM	55A	59A	35°	
1936	DF7KF	JO30GU	55A	55A	40°/87°	
1940	F6DWG/P	JN19AJ	54A	hrd	40°	
1945	SP6IWQ	JO80HK	51A	hrd	325°	
1947	OK1DCF	JO80BJ	56A	59A	325°	
1950	OE5XBL	JN68PC	55A	55A	320°	
1952	DL1GGT	JN58AO	55A	55A	320°	
2056	DJ9YE	JO43HV	55A	55A	15°	
2120	OK1AID	JO80EO	52A	55A	345°	
2122	SP6A	JO81MC	51A	55A	345°	
2124	DL3LST	JO61FI	55A	59A	345°	
2126	OK1MZM	JN69PR	51A	55A	345°	
2128	ON4KHG	JO10XO	55A	55A	335°	
2300	G7RAU	IO90IR	52A	55A	30°	

RIG: 800 W, 11-ele-yagi. tnx for info, Robert

HB9DFG in JN37SM wkd on 144 MHz:

2003-10-29

1721	DJ9YE	JO43hv	58A	55A	030°	713 km
1728	GM1XOI	IO85at	53A	55A	005°	1213 km
1822	DF7KF	JO30gu	57A	52A	030°	378 km
1826	PA3CEE	JO33ji	55A	55A	030°	651 km
1830	PA2DW	JO22gd	56A	53A	030°	557 km
1834	DK1KR	JO53vj	56A	55A	030°	719 km
1840	DL8BDU	JO43aa	56A	54A	030°	613 km
1849	PA1T	JO33jf	58A	59A	030°	637 km
1855	DL1EAP	JO31ik	55A	55A	030°	440 km
1911	DF2JQ	JO31hl	55A	52A	030°	445 km
1944	G7RAU	IO90ir	57A	55A	040°	734 km
2222	PA5DD	JO22ic	58A	57A	030°	549 km
2225	PA3FOC	JO21fw	57A	57A	030°	539 km
2234	GM0NAI	IO75ru	57A	53A	005°	1243 km
2245	GM0TGE	IO87tf	53A	57A	005°	1269 km
2258	MM0CEZ	IO75xu	52A	56A	005°	1220 km
2302	DL8LAQ	JO43xu	56A	51A	030°	724 km

2003-10-30

0015	EI4DQ	IO51wu	57A	53A	340°	1223 km
0035	G3LTF	IO91gg	57A	57A	030°	773 km
0039	GI6ATZ	IO74aj	59A	57A	010°	1212 km
0045	PE1AHX	JO21os	59A	57A	020°	502 km
0047	G8HGN	JO01fo	57A	56A	030°	683 km
0055	G4AEP	IO91nj	57A	57A	030°	745 km
0059	DL1DAX	JO31rm	56A	57A	030°	445 km
0103	G3XDY	JO02ob	56A	57A	030°	679 km
0110	G4ASR	IO81mx	55A	54A	030°	901 km
0115	PA3COB	JO32mf	57A	57A	030°	525 km
0120	GM4BYF	IO85jv	56A	52A	005°	1187 km
0134	PA3DTM	JO22ia	53A	53A	030°	540 km
2120	DK1KR	JO53vj	56A	59A	030°	719 km
2129	DF5LBY	JO43rs	56A	57A	030°	708 km
2131	DK5DQ	JO31pg	59A	57A	030°	417 km
2137	DJ3AK	JO51gj	57A	57A	030°	482 km
2139	OK1DFC	JN79gw	59A	59A	045°	579 km
2142	DL2ARD	JO60ar	59A	55A	030°	484 km
2145	G3WZT	IO90ux	57A	57A	030°	686 km
2147	DL6YEH	JO32va	59A	57A	030°	501 km
2155	ON4IMM	JO11ub	57A	53A	030°	482 km
2203	ON4LN	JO20iv	57A	55A	030°	428 km
2209	G4BRK	IO91dp	53A	54A	030°	808 km
2212	PE1GNP	JO31ix	54A	55A	030°	499 km
2215	PE1AIQ	JO22rm	57A	55A	030°	576 km
2218	DM1CG	JO31ic	59A	57A	030°	403 km
2222	PA5WT	JO22hg	53A	55A	030°	568 km
2240	OZ1LPR	JO44uw	55A	55A	030°	838 km
2315	DF6LPC	JO53kp	53A	55A	030°	720 km
2328	DL8LAQ	JO43xu	56A	51A	030°	724 km

2003-10-31

0025	DL7ANR	JO62pm	55A	53A	030°	691 km
0032	DL1RNW	JO62gh	57A	59A	030°	642 km
0035	PA2M	JO21jp	59A	59A	030°	500 km
0038	DF3OJ	JO41wu	57A	55A	030°	510 km
0043	GW4DRR	IO73rh	57A	58A	030°	1069 km

047	ON4PS	JO20kq	57A	55A	030°	402 km
053	DO1FOX	JO31pu	57A	55A	030°	482 km
054	M5BXB	IO91xr	56A	56A	030°	719 km
100	PA3BIY	JO22eb	59A	59A	030°	554 km
103	PA3FOC	JO21fw	59A	59A	030°	539 km
111	DK7FC	JN49hs	55A	51A	030°	263 km
116	GM0CLN	IO85hv	53A	55A	005°	1194 km
118	ON4BBD	JO21na	56A	51A	030°	427 km
124	DH5FS	JO61ua	59A	57A	030°	593 km
003-11-20						
558	SM7ALC	JO65rl	57A	57A	20	974 km
602	G4XBF	IO91qd	57A	57A	20	715 km
605	G4HG	IO83pl	59A	59A	20	980 km
607	SM7WT	JO65qq	59A	59A	20	993 km
619	G4FUF	JO01gn	57A	57A	20	676 km
621	GM0CLN	IO85hv	59A	59A	20	1194 km
624	GM4BYF	IO85jv	59A	59A	10	1187 km
632	DL8BDU	JO43aa	59A	59A	20	613 km
637	LY2BJ	KO25er	56A	56A	20	1471 km
643	ON4LN	JO20iv	59A	59A	20	428 km
646	G4RRA	IO80bs	59A	59A	20	904 km
658	SP4MPB	KO03ht	58A	58A	20	1155 km
707	DM3UH	JO61cu	59A	59A	20	587 km
709	PA5KM	JO11wl	59A	59A	20	514 km
712	PA1GYS	JO22ww	59A	59A	20	614 km
716	OK1IAS	JO60eb	59A	59A	20	453 km
729	OK1VHF	JO70bs	59A	59A	20	600 km
731	DF5DE	JO40cx	57A	57A	20	388 km
738	ON7CL	JO20ju	57A	57A	SSB	421 km
740	PE9DX	JO33md	59A	59A	SSB	626 km
752	PA2DW	JO22gd	56A	56A	350	557 km
801	DJ0SP	JO32kb	55A	55A	10	507 km
808	GW3LEW	IO71jp	59A	59A	350	1025 km
813	DF8IK	JO30it	55A	55A	350	371 km
817	PA3FOC	JO21fw	59A	59A	350	539 km
828	DF2ZC	JO30m	55A	55A	30	338 km
831	PC5C	JO33gd	58A	58A	30	629 km
839	PE1AHX	JO21os	59A	59A	SSB	502 km
843	DG9BEM	JO43cd	59A	59A	SSB	627 km
853	PA3BIY	JO22eb	59A	59A	30	554 km
855	PA0BAT	JO31fx	59A	59A	30	612 km
559	DJ8MS	JO63ct	57A	57A	30	773 km
902	GW3FRX	IO82mr	59A	59A	30	945 km
925	DF2JQ	JO31hl	59A	59A	30	555 km
341	PA3CSG	JO21wd	58A	58A	30	421 km
352	DL6NDK	JO53av	55A	55A	30	730 km
357	DL9MS	JO54wc	55A	55A	30	792 km
103	MM0CEZ	IO75xu	53A	53A	10	1220 km
118	DF7KF	JO30gu	55A	55A	30	378 km
127	OE5XBL	JN68pc	56A	56A	320	434 km
128	S55M	JN65tm	55A	55A	320	516 km
319	G7RAU	IO90ir	53A	53A	30	734 km

x for info, Chris

<2GSO in JN45NP wkd on 144 MHz:

03-11-20

531	ON4LN	JO20IV	55A	55A	25
549	PA3FOC	JO21FW	55A	55A	25
712	DJ3AK	JO52GJ	56A	56A	25
1715	G3JHM	IO91LC	55A	55A	25
1722	DL8YE	JO31MH	58A	58A	25
1728	DF7VX	JO41KP	55A	55A	25
1741	ON4KHG	JO10XO	57A	57A	25
1830	DL6NA	JO50VF	55A	55A	25
1852	PA5DD	JO22IC	56A	56A	25
1855	PA2DW	JO22GA	54A	54A	25
1902	DL6YCY	JO41CV	53A	53A	25
1906	GW4FRX	IO82MR	56A	56A	25
1912	G4DEZ	JO03AE	57A	57A	25

tnx for info, Enrico

IK4PMB in JN54LL wkd on 144 MHz:

2003-11-20

1711	DF2ZC	JO30RN	55A	55A	726 km
1720	PD0RFU	JO32DN	55A	59A	962 km
1721	DL8YE	JO31MH	59A	59A	814 km
1727	PA2M	JO31JP	59A	59A	855 km
1732	G4HGI	IO83PL	55A	55A	1411 km
1739	DK5DQ	JO31PG	59A	59A	803 km
1743	PA3FOC	JO31FW	55A	55A	894 km
1746	DF7KF	JO30GU	57A	55A	782 km
1752	G3JHM	IO90RC	55A	54A	1069 km
1755	G4DEZ	JO03AE	59A	55A	1254 km
1803	PA3DW	JO22GD	55A	54A	975 km
1811	SP1FPG	JO73GN	59A	59A	1043 km
1819	G4XBF	JO01QD	55A	55A	1030 km
1821	DL1RNW	JO62GH	59A	59A	879 km
1844	G4KWQ	IO92AQ	59A	55A	1316 km
1856	PA0BAT	JO31FX	59A	59A	809 km
1859	DF0WD	JO42FD	59A	55A	872 km
1919	G4AJR	IO71MX	59A	57A	1442 km
1921	G4XBF	JO01QD	59A	53A	1030 km
1932	DF5DE	JO40CX	55A	54A	751 km
1935	G4MKF	IO91HJ	59A	59A	1197 km
1938	SP2OFW	JO93AC	59A	59A	1090 km
1940	G4RRA	IO80BS	59A	57A	1313 km
1943	DL6NAA	JO50VF	59A	59A	642 km
1946	OK1DXQ	JO70NO	59S	59R	749 km
1953	OK1DCF	JO80BO	55A	55A	784 km
2315	PA3DZL	JO21HM	55A	55A	914 km

RIG: FT225RD + Mutek, 8877 PA, 11el F9FT
tnx for info, Anto

IW0GPN in JN62FB wkd on 144 MHz:

2003-11-20

1746	DF2ZC	JO30RN	35	1020 km
1814	DK5DQ	JO31PH	35	1101 km

tnx for info, Alex

IZ4BEH in JN54WL wkd on 144 MHz:

2003-11-20

1900	G4HGI	IO83PL	59A	58A
1905	DF7VX	JO41KG	55A	55A
1910	DJ9MG	JO52TC	59A	59A
1913	DL6YEH	JO32VA	55A	55A
1915	DL5DHM	JO71EK	59A	59A
1919	DL1RTL	JO62PH	55A	55A
1925	DF0WD	JO42FD	59A	59A
1927	DL5ST	JO60GU	59A	57A
1930	G3JHM	IO91LC	59A	59A
1932	GW4HDR	IO83GH	52A	55A
1935	DK1HO	JN49JX	57A	57A
1940	DL5NTA	JO60QP	59A	59A
1942	DL4DWA	JO61QH	59A	59A
1945	DK4RC	JO60EQ	59A	59A
1947	DL7AV	JO62WD	55A	55A
1950	DL3WW	JO60FM	59A	59A
1951	DH3DAM	JO31PH	59A	59A
1953	DL2TG	JO61SG	59A	59A
1955	GW4FRX	IO82MR	55A	55A
1957	G4AEP	IO91NJ	55A	55A
2120	DF5DE	JO40CX	55A	55A

tnx for info, Rob

LA0BY in JO59FW wkd on 144 MHz:

2003-11-16						
1431	GM4ILS	IO87IP	53A	53A	330	830 km
2003-11-20						
1510	SP5GJH	KO02RU	57A	59A	70	1036 km
1513	RA3DRC/1	KO55JR	55A	57A	70	1285 km
1543	DL2DXA	JO61VC	52A	55A	80	1004 km
1607	SP2BDR	JO83UA	55A	55A	SSB	887 km
1626	DL1RTL	JO62PH	53A	55A	50	866 km
2136	SP4MPB	KO03HT	52A	55A	40	918 km
2003-11-22						
1830	PA1GYS	JO22WW	55A	55A	280	827 km
1834	DK7HH	JO53CJ	53A	55A	290	728 km
2004-01-09						
1920	LA1QDA	JP20QH	52A	54A	340	285 km
1937	SM7UYJ	JO65OP	55A	57A	40	504 km
2004-01-22						
1503	GM4VVX	IO78TA	59A	59A	350	874 km
1655	DK8ZJ	JO54AG	57A	58A	20	631 km
2004-01-25						
1805	GM4ILS	IO87IP	57A	57A	340	830 km
1808	OH2NY	KP20CM	55A	59A	0	761 km
1813	OZ1DD	JO45VT	59A	59A	20	460 km
1814	PD0RFU	JO32LS	55A	55A	20	825 km
1846	DK1KO	JO53CT	59A	57A	20	681 km
2004-02-11						
1647	PA2DW	JO22GD	55A	43A	350	940 km
1648	LA4YGA	JO48AE	55A	55A	350	239 km
1650	G4KWQ	IO92AQ	55A	55A	310	1108 km
1652	G4HGI	IO83PL	53A	55A	310	1074 km
1656	DL7YAV	JO41GO	55A	57A	320	934 km
1701	SP4JWD	KO03FR	57A	57A	45	918 km
1702	LY2BJ	KO25ER	55A	59A	45	945 km
1712	PE1AHX	JO21OS	57A	56A	SSB	965 km
1714	PA1GYS	JO22WW	55A	59A	0	827 km
1716	DL6NDK	JO53BV	55A	55A	0	672 km
1721	SP3MGM	JO73QE	55A	59A	40	808 km
1728	SP2IQW	JO94GM	57A	56A	SSB	773 km
1735	DG8LG	JO54VP	59A	58A	SSB	594 km
1814	DF6LPC	JO53KP	55A	53A	40	700 km

LZ1KG in KN31CS wkd on 144 MHz:

2003-11-20

1838	DF7KF	JO30GU	53A	51A	340	1811 km

My first Aurora QSO ever. RIG: IC275E, 2x16 F9FT
tnx for report, Mitko

LZ3GM in KN32RL wkd on 144 MHz:

2003-11-20

1811	DF7KF	JO30GU	56A	53A	340	1811 km

My first Aurora QSO ever, hrd also DF2ZC, PA0JMV, DF2JQ
RIG: 100 W. tnx for report, Ivan

OE3FVU in JN78UE wkd on 144 MHz:

2003-11-20

1650	PD2DB	JO22MD	59a	59a	SSB	882 km
1652	DK3EE	JO41GV	59a	59a	SSB	661 km
1701	G1POK	IO91VI	56a	59a	SSB	1199 km
1701	DG2BCP	JO43CE	59a	58a	SSB	770 km
1707	PD2JVE	JO22VJ	59a	59a	SSB	849 km
1707	PE9DX	JO33MD	59a	59a	SSB	826 km
1736	F6HPP	JN19PG	59a	59a	SSB	923 km
1832	GW8ASA	IO81EM	55a	55a	SSB	1435 km

tnx for info, Franz

OK2PM in JN99AO wkd on 144 MHz:

2003-10-29						
1608	SM6ENG	JO67CQ	55A	55A		976 km
1618	OZ6OL	JO65DJ	55A	55A		751 km
1628	SK4BX	JO79OF	55A	55A		1085 km
1645	SM6YFF	JO68GO	55A	55A		1061 km
1655	SM6NET	JO68SD	55A	55A		993 km
1705	OZ1CLL	JO65GQ	55A	55A		770 km
1718	DJ3LE	JO44TC	55A	55A		763 km
1721	DK2ZF	JO43WJ	55A	55A		704 km
1759	PA1T	JO32JJ	55A	55A		845 km
1830	DJ4TC	JO63PN	55A	55A		548 km
1834	DK3BU	JO33NO	59A	56A		873 km
1840	SM1CXE	JO97FJ	57A	56A		866 km
1845	SK6HD	JO68SD	59A	58A		993 km
1848	SM7LZQ	JO77DS	55A	55A		940 km
1854	DJ9YE	JO43SV	55A	55A		754 km
1936	LA3BO	JO59CD	55A	55A		1173 km
1950	DL8BDU	JO43AA	51A	55A		791 km
2024	SK6DK	JO67EH	55A	55A		934 km
2105	SM5DFF	JO88CN	56A	56A		1002 km
2115	SM4IVE	JO79SD	57A	55A		1073 km
2125	LY2BAW	KO25KA	59A	59A		759 km
2159	YL2AJ	KO16OY	55A	55A		688 km
2210	DL9OBD	JO42QN	57A	57A	SSB	688 km
2224	DG6JF/P	JO33QN	55A	55A	SSB	857 km
2230	SK6BA	JO67HM	57A	57A	SSB	949 km
2233	OZ4VW	JO45UX	57A	57A	SSB	902 km
2246	SM7MRD	JO65NP	57A	57A	SSB	748 km
2254	SM7DLZ	JO86BG	57A	57A		752 km
2333	ES6RQ	KO28WA	59A	59A		1065 km
2338	GM0TGE	IO87TF	55A	55A		1586 km
2344	OZ8ZS	JO55RT	55A	55A		819 km
2359	RA3AQ	KO85SP	55A	57A		1470 km
2003-10-30						
0004	DL8LAQ	JO43XU	51A	55A		729 km
0019	LY2BJ	KO25ER	58A	57A		803 km

043 G7RAU IO90IR 57A 57A 1378 km
053 EI4DQ IO51WU 52A 55A 1848 km
101 G4ASR IO81MX 53A 55A 1493 km
120 GM0LVI IO86JJ 52A 52A 1600 km
128 GM4BYF IO85JV 52A 55A 1583 km
134 GM4VVX IO78TA 54A 55A 1731 km
232 ES5PC KO38HJ 53A 55A 1124 km
236 LY3OD KO24OH 55A 55A 717 km
ig: 80W, PA0MS antenna. tnx for report

)N4KHG in JO10XO wkd on 144 MHz:

)03-07-26
333 GM4VVX IO78TA 51A 54A 340°
)03-08-18
331 G4AJC IO91VJ 55A 55A 340°
331 G3UOF IO93UF 52A 55A 340°
338 DL4KUG JO64PB 52A 55A 340°
341 DL3NUA JO64XB 53A 55A 340°
357 LY2BAW KO25KA 55A 59A 25°
311 GM0VHR IO85RL 54A 57A
311 GM0TGE IO87TF 53A 55A 340°
322 GM4VVX IO78TA 55A 59A
327 SK6DK JO67EH 53A 55A
)03-08-21
'15 SM7EOI JO86FP 57A 59A 350-60°
'26 EW6FS KO35LB 55A 56A
'32 GM1XOI IO85AT 57A 59A
)03-10-29
)51 ES6RQ KO28WA 55A 59A
)02 GI4SJQ IO64SK 55A 53A
'30 RA3LE KO64AR 55A 57A
'54 SP4JWD KO03FR 53A 54A
01 DJ1TO JO62SL 52A 56A
05 G0GMS IO82XT 51A 52A
08 OZ6TY JO55XE 54A 57A
16 GM4ILS IO87IP 56A 57A
51 LY2BJ KO25ER 57A 59A
03-10-30
04 OZ5N JO46SI 55A 56A
15 OK1CZ JO70EC 51A 41A
19 OK1FID JO80CI 52A 55A
20 EI6GF IO62RG 51A 52A
23 DL3DXX JO61VC 53A 57A
28 OK1AID JO80EO 51A 55A
10 SP6IWQ JO80HK 55A 56A
12 OK2PWY JN89KW 54A 59A
14 OK2TT JN89KU 55A 55A
16 DM2DXG JO51MV 56A 59A
18 DL1GGT JN58AO 57A 59A
i1 OM5CM JN98DF 52A 57A
i5 OK1TM JO70EC 53A 55A
i6 IK1SPR JN34TQ 56A 59A
i9 I1DMP JN35UB 55A 55A
i9 9A6WW JN86HF 56A 55A
8 DH5FS JO61UA 55A 55A
5 SM0KAK JO89XK 51A 54A
4 IK1EGC JN35UF 55A 55A 45°
8 DL5JIN JO60QP 52A 58A
0 DL1VDL JO61WB 57A 59A

2212 HA6NY JN98WC 56A 55A
2215 OK1FRD JO80DD 53A 55A
2216 DL3NCR JN48QX 59A 57A
2218 DK0IG JN58SE 55A 56A
2221 HA5UK JN97OM 54A 55A
2225 DK8ZJ JO54AG 59A 59A
2226 OE5KE JN78DF 55A 57A
2240 OZ1HXL JO55EG 52A 55A
2245 G4YTK IO93AQ 51A 54A
2249 GW3LEW IO71PS 56A 57A
2343 EI4DQ IO51WU 54A 54A 0°
2345 GM0CLN IO85HV 53A 53A
2003-11-20
1713 OM3KZA JN99IF 56A 55A 0-90°
1714 SP9AI JN99MT 59A 59A
1715 F9OE IN78QG 55A 59A
1719 S57TW JN75EX 59A 59A
1720 LZ2FO KN13KX 59A 59A
1721 9A3JH JN75AD 57A 57A
1723 IV3DXW JN65QQ 55A 55A
1726 SP6RGB JO71SF 54A 54A
1728 OK1VKC JO70OA 56A 55A
1729 OK1XN JO70DB 55A 59A
1733 HA5PT JN97MK 56A 55A
1735 HA0HO KN07SU 55A 59A
1740 HB9DKM JN37SL 59A 57A
1741 IK2GSO JN45NP 57A 57A
1743 F8OP JN26MM 59A 59A
1749 IK1SPR JN34TQ 56A 59A
1750 S51MQ JN75NT 53A 55A
1753 I1DMP JN35UB 54A 54A
1807 S54G JN65TM 53A 55A
1836 US5WU KO20DI 53A 59A
1840 OK2MWR JN99HQ 55A 55A
1845 SP6A JO81MC 53A 55A
1847 HA5CW JN97PM 53A 56A
1848 OK2KOS JN99CT 55A 55A
1903 PB4FUN JO33KC 56A 53A SSB
1907 PD4HDB JO32HN 59A 57A SSB
1909 F0DZG JN28OS 59A 59A SSB
1910 DL1RMO JO62HD 59A 59A SSB
1914 SP9OJQ JN99IW 57A 58A SSB
1915 SP9MCY JO90OG 56A 59A SSB
1918 HA6NQ JN98WA 56A 57A SSB
1919 SP9QMP JO90FB 57A 57A SSB
1920 F5OTA JN38CP 57A 57A SSB
1931 OM5UM JN99EO 53A 55A
1943 F6DRO JN03TJ 55A 57A
2014 GW4FRX IO82MR 55A 57A
2127 HB9BZA JN36BE 55A 55A 270°
2146 GM0LVI IO86JJ 53A 55A 340°
2149 GM3WFJ IO86FR 41A 51A 330°
2203 SM7SPG JO66MD 53A 57A 30°
2224 SK6DK JO67EH 57A 57A 0°
Rig: 300W, 9-ele DK7ZB. tnx for report, Gaëtan

PA2CHR in JO22XA wkd on 144 MHz:

2003-11-20
1620 SP2BDR JO83UA 59A 59A 60 804 km

1652 UR5SKB KN28IW 55A 59A 60 1370 km
1821 IW2NOR JN45ON 59A 59A 20 756 km
1853 9A1EZA JN86HG 59A 57A 75 1006 km
1905 IZ4AIK JN63HV 55A 55A 85 1031 km
1909 HA1YA JN87GF 59A 59A 70 930 km
1922 I1JTQ JN35UB 59A 59A 80 784 km
IZ4AIK and HA1YA came in on vertical polarization!
tnx for info, Chris

PA3DZL in JO21HM wkd on 144 MHz:

2003-10-29
1916 I4YNO JN54KP 55a 55a 60° 893 km
2127 IZ4BEH JN54WL 55a 55a 65° 950 km
2142 IK2UJS JN55 55a 59a 65° 817 km
2003-10-30
0234 ES5PC KO38HJ 55a 53a 40° 1588 km
0241 SM0KAK JO89XK 57a 57a 5° 1212 km
1812 LA7VH JO59EK 53a 51a 20° 951 km
2001 GW3LEW IO81PS 57a 57a 30° 506 km
2003-11-20
1503 SM2CEW KP15CR 57a 59a 20° 1864 km
1655 UR5SKB KN28IW 57a 57a 55° 1452 km
1841 US5WU KO20DI 59a 59a 50° 1380 km
1846 HA6NQ JN98WA 59a 59a 65° 1159 km
1855 S51MQ JN75NT 59a 57a 75° 997 km
1857 F6DRO JN03TW 55a 55a 75° 872 km
1901 F8OP JN26MM 59a 59a 75° 557 km
1903 HA5PT JN97MK 59a 57a 70° 1133 km
1908 OK1DXW JO70HC 57a 59a 70° 719 km
1913 OK2OV JN99FU 55A 59A 70° 990 km
1915 OM2CP JN89UR 55A 55A 70° 943 km
1918 F6HTJ JN12KQ 59A 59A 75° 991 km
1920 HA7WJ JN97MP 53A 55A 75° 1122 km
1923 HB9BQU JN37VD 59A 59A 70° 538 km
1925 HA3HV JN86UK 55A 55A 70° 1107 km
1933 HB9BZA JN36BE 59A 55A 70° 603 km
1934 F6BEG JN25JS 59A 55A 65° 639 km
1938 OK2VWB JN99FS 55A 53A 70° 993 km
1942 HA5OV JN97NJ 59A 58A 75° 1141 km
2133 HA8V KN06HT 55A 55A 80° 1272 km
2146 GW4FRX IO82MR 57a 52a 30° 534 km
2151 MM0CEZ IO75XU 59a 59a 20° 746 km
2234 G4DEZ JO03AE 55a 51a 40° 362 km
2252 I2FAK JN45OB 57a 57a 80° 794 km
2301 S55M JN65TM 55a 55a 85° 939 km
2308 I1JTQ JN35UB 55a 55a 85° 753 km
2309 IK1EGC JN35UF 55a 55a 85° 735 km
2312 I1DMP JN35UB 55a 55a 85° 753 km
2314 IK3PMB JN54LB 54a 55a 85° 954 km
tnx for report, Jac

PA5DD in JO22IC wkd on 144 MHz:

2003-11-20
2326 S55M JN65TM 53A 55A 980 km
2315 I2FAK JN45OB 56A 57A 849 km
1936 HA1YA JN87GF 59A 59A 1008 km
1931 S54M JN86CL 55A 54A 1041 km
1926 DL3JXN JO60HR 54A 55A 571 km
1924 YU7OP KN05AO 54A 55A 1331 km

1922 DJ0YZ JN49NA 55A 59A 463 km
1921 OK2BDS JN79WF 55A 57A 849 km
1920 HA5OV JN97NJ 57A 59A 1159 km
1918 9A1CMS JN86FM 56A 56A 1052 km
1916 IZ2CPO JN45TP 57A 55A 802 km
1915 HA8BI/7 JN97MI 58A 57A 1156 km
1913 SN70L JO91 55A 56A 987 km
1911 HA3HV JN86UK 56A 59A 1132 km
1910 OK1VKC JO70OA 57A 59A 770 km
1909 F8OP JN26MM 59A 59A 620 km
1907 OK2CPD JN89UF 54A 55A 970 km
1905 EU3AI KO22CE 55A 55A 1328 km
1903 DL9DWR JO61TK 57A 59A 619 km
1901 DL2TG JO61SG 55A 57A 617 km
1900 HA5PT JN97MK 55A 55A 1151 km
1859 S51MQ JN75NT 57A 59A 1032 km
1857 YU1LA KN04FR 55A 59A 1418 km
1855 HA7WJ JN97MP 53A 57A 1139 km
1854 I1JTQ JN35UB 57A 55A 812 km
1852 IK2GSO JN45NP 56A 56A 786 km
1850 OK2PM JN99AO 53A 55A 976 km
1849 YU7KB JN94XX 54A 55A 1370 km
1848 F5CWU JN07IK 57A 58A 591 km
1847 F5RAB JN08RJ 54A 57A 471 km
1845 DL2JWN JO60IW 53A 55A 569 km
1844 OK2KOS JN99CT 56A 57A 979 km
1843 UT5DL KN18EP 55A 59A 1308 km
1841 OK1XN JO70DB 55A 59A 707 km
1840 LY2CI KO14WV 55A 57A 1302 km
1837 SP3QDM JO82EF 54A 55A 796 km
1835 DL5ZG/P JO51MV 56A 57A 435 km
1833 SP3JBI JO91BR 55A 59A 921 km
1832 DL5AXJ JO50SS 53A 53A 497 km
1831 DL8WF JO61CU 55A 55A 515 km
1741 9A4EW JN95KG 55A 55A 1285 km
1739 S57TW JN75EX 58A 59A 979 km
1738 S51KK JN76HB 52A 55A 985 km
1654 UR5SKB KN28IW 57A 55A 1453 km
1642 SP2BNJ JO94HK 54A 59A 961 km
1620 OK1VHF JO70EB 59A 59A 713 km
1615 OK1SC JO70OB 56A 59A 768 km
1613 ES6RQ KO28WA 57A 59A 1493 km
1610 SM7BYB JO76XR 57A 59A 891 km
1552 I1DMP JN35UB 57A 57A 812 km
1551 SP2RS JO94GK 55A 55A 956 km
1550 OK2PTC JN89JM 56A 58A 896 km
1546 F5VHX JN04FT 57A 57A 867 km
1545 DM3SWD JO62KL 55A 57A 558 km
1543 OK1KDO JN69KL 53A 59A 644 km
1543 OK1VW JO70KB 54A 56A 746 km
1539 HA8V KN06HT 55A 59A 1289 km
1537 9A2AE JN86HF 56A 55A 1083 km
tnx for info, Uffe

PD0EBF in JO21LQ wkd on 144 MHz:

2003-11-20
1505 GM4VVX IO78TA 59a 59a
1510 G4UXC IO92BC 59a 59a
1522 GM4TOE IO87HF 59a 58a

1540	DG5AAG	JO51CT	56a	56a
1544	G1POK	IO91VI	59a	59a
1546	M1KGC	IO91BM	53a	55a
1559	EI3GE	IO63XD	59a	58a
1645	G8APZ	JOØ1DO	59a	59a
1718	HA5CW	JN97MM	59a	55a
1721	OE6IWG	JN77PK	58A	56A
1750	DM1CG	JO31IC	55A	55A
1825	EI2JD	IO63VS	55A	55a
1828	EI7IW	IO63RI	55A	55a
1838	GW8JLY	IO81JM	57a	55a
1855	F6HVK	JN27LH	57a	

RIG: FT847, 11 el yagi, 25 watt, all contacts in SSB
tnx for info, Henk

PE2DB in JO22MD wkd on 144 MHz:

2003-11-20

1414	SM6ONH	JO68MN	59A	55A	873 km
1417	SM6NVH	JO68HP	57A	59A	866 km
1422	GM4AWA	IO86HL	57A	57A	727 km
1607	SP7CNL	JO91QQ	55A	55A	982 km
1623	SP1NQE	JO84LL	55A	55A	832 km
1643	OK2VZE	JN89JM	59A	55A	874 km
1644	OK2PTC	JN89JM	59A	55A	874 km
1649	HA6ZB	KN07BV	59A	59A	1173 km
1651	OE3FVU	JN78UE	59A	59A	877 km
1659	IW1BCV	JN44FS	59A	55A	857 km
1700	SQ9ACK	JO90IA	59A	59A	982 km
1707	SP7CNL	JO91QQ	59A	59A	982 km
1709	S51KK	JN76HB	55A	55A	970 km
1710	SP7EBM	JO91QR	55A	55A	982 km
1712	SP7RJF	KO10GS	59A	59A	1219 km
1714	SP7BCV	JO90WB	57A	57A	1059 km
1715	IK1EGC	JN35UF	59A	59A	793 km
1718	IW2BDH	JN45OJ	59A	59A	810 km
1720	IW2NLJ	JN45HB	59A	59A	830 km
1721	HA8AR	KN06MQ	57A	57A	1303 km
1725	OE6IWG	JN77PK	59A	59A	901 km
1728	YU7EWY	KN05HP	55A	51A	1344 km
1941	IW2DAL	JN45NN	55A	55A	790 km
1959	SP5ZCC	KO02PF	59A	59A	1105 km
2005	SP4LVH	KO13ND	53A	53A	1221 km
2006	SP5WCK	KO12CJ	53A	55A	1165 km

RIG: Icom 746PRO, GS-31B, 2M5WL, all contacts in SSB
tnx for info, Marcus

RA3WDK in KO81BR wkd on 144 MHz:

2003-11-17

1529	OH5LK	KP30on

2003-11-20

1615	ES5RY	KO38ji
1619	DL9MS	JO54wc
1622	UA3DHC	KO95aw
1625	RA3XR	KO85gb
1626	UA3XAC	KO85hc
1628	EW6DX	KO45jl
1631	LY2CI	KO14wv
1639	DJ9MG	JO52tc
1641	DL2ARD	JO60ar
1642	OK1YA	JO70gc
1645	OK1YKO	JN78gx
1645	SP2OFW	JO93ac
1646	SP6IWQ	JO80sk
1647	SP6GZZ	JO80jo
1648	OM3TZZ	JN88ti
1649	OE5KE	JN78df
1652	DK3WG	JO72gi
1654	RA3QTT	LO01gq
1656	UT2IO	KN88xa
1658	DK2BDS	JN79wf
1702	DL4DWA	JO61qh
1706	OK1MHZ	JO70va
1709	UA9XEA/6	KN97qk
1832	DL6NAA	JO50vf
2240	OH5LK	KP30on
2251	ES2DF	KO29gg

RIG: 50W, 11-ele DL6WU. tnx for report

S53VV in JN65UM wkd on 144 MHz:

2003-11-20

1703	SP4BY	KO13OD	56A	55A	345	
1707	G4HGI	IO83PL	58A	59A	340	
1709	GM4BYF	IO85JV	55A	52A	345	1653km
1711	DK5DQ	JO31PG	56A	55A	345	
1712	DL6CGC	JO52MB	56A	57A	345	
1713	DM2DXA	JO51MV	56A	56A	345	
1714	DL2JWN	JO60IW	55A	57A	345	
1715	DM2BHG	JO51MW	56A	55A	345	
1716	G3UTS	IO94CU	57A	57A	345	
1718	DJ9MG	JO52TC	58A	59A	345	
1718	DF0WD	JO42FD	58A	59A	345	
1719	DL3HWF	JO61AG?	56A	56A	345	
1720	DL1YAW	JO41DX	56A	56A	345	
1721	DM3UH	JO61CU	58A	59A	345	
1722	DK5JM	JO43QS	55A	55A	345	
1723	GW6TYO	IO81AO	57A	57A	345	
1724	SP2OFW	JO93AC	58A	59A	345	
1725	DL1BXX	JO32	55A	59A	345	
1728	DL2OBO	JO41RT	56A	55A	345	
1729	GW4FRX	IO82MR	57A	57A	340	
1732	F6GYH	JN28NC	55A	53A	310	
1735	DF5DE	JO40CX	57A	57A	310	
1738	G4IGO	IO80NW	56A	56A	310	
1743	G3JHM	IO91LC	57A	55A	335	
1749	SP5GJH	KO02RU	55A	55A	335	
1804	DJ0SP	JO32KB	55A	55A	330	
1806	PA3FOC	JO21FW	57A	55A	330	
1808	DK3WG	JO72GI	59A	55A	330	
1810	DK2CF	JO41GG	55A	55A	340	
1812	ON4BBD	JO21NA	55A	55A	315	
1821	PC5C	JO33GD	57A	55A	330	
1825	SP4MPB	KO03HT	55A	55A	330	
1839	DK2AR	JO42UC	52A	55A	325	
1842	PA2M	JO21JP	56A	55A	330	
1847	DL8BDU	JO43AA	56A	55A	350	
1852	G4RGK	IO91ON	58A	57A	320	
1900	DL3WW	JO60FL	56A	55A	320	
1903	GW4HDR	IO83GH	57A	57A	330	
1905	PA0GHB	JO11WH	56A	55A	325	
1911	PG2M	JO21FW	57A	57A	330	
1915	DG9YIH	JO32QI	58A	57A	340	
1917	EI4BZ	IO51UW	56A	55A	320	1760km
1921	DL1RNW	JO62GH	59A	59A	320	
1923	G8DGR	IO91JH	55A	53A	320	
1925	DL5DSM	JO71EK	57A	59A	320	
1926	DK4RC	JO60EQ	57A	59A	320	
1930	OK1GP	JO60KF	58A	59A	315	
1933	DK3IK	JN39JF	56A	55A	315	
1934	DF1CF	JN57FP	59A	59A	315	
1936	DG3LSM/p	JO61EG	59A	57A	320	
1938	F5SE	JN29AF	55A	53A	305	
1944	DL2DXA	JO61VC	57A	57A	315	
1946	DL1GGT	JN58AO	59A	55A	315	
1947	OE5XBL	JN68PC	59A	59A	315	
1948	OK1DCF	JO80BJ	59A	59A	310	
1950	OK1DXQ	JO70PO	52A	51A	315	

RIG: 250W and 16el LY. tnx for info, Stane

SP5ES in KO02MF wkd on 144 MHz:

2003-10-29

2212	LA3BO	JO59CD	59A	59A
2218	SM5DFF	JO88CN	52A	55A
2226	RA3IS	KO76WT	55A	55A
2227	LA2PHA	JO38IB	53A	55A
2233	RA3AQ	KO85SP	55A	55A

2003-10-30

2131	DK5DQ	JO31PG	55A	55A
2134	RA3IS	KO76WT	57A	59A

2003-10-31

0122	PA0V	JO33II	52A	52A
0107	PA3BIY	JO22CB	53A	53A
0104	PA3FOC	JO21FW	54A	52A
0054	DL8LAQ	JO43XU	55A	51A

2003-11-20

2201	DL9MS	JO54WC	53A	53A
2204	DK1KO	JO53CT	55A	55A

RIG: FT100D, V2000 vertical. tnx for report, Marcin

SP7OGP in KO01AM wkd on 144 MHz:

2003-11-20

*	DK3WG	JO72gi	55a	55a	300
1840	G4FUF	JO01gn	55a	55a	300
1843	G7RAU	IO90ir	59a	55a	300
1851	F9OE	IN78qg	55a	55a	330
1853	OK2POI	JN89JW	55a	55a	330
1857	OK2BDS	JN79wf	57a	55a	330
1900	DL6NAA	JO50vf	55a	55a	330
1903	*	JO11wl	55a	55a	330
1904	G3JHM	IO91lc	55a	55a	330
1906	F6GYH	JN18FV	55a	55a	330
1908	S51OQ	JN75nt	57a	55a	330
1910	F5VHX	JN04ft	55a	55a	330
1911	DK5YA	JN49nx	57a	55a	330
1919	YU1LA	KN04fr	56a	55a	330
1923	HB9Q	JN47cg	55a	55a	330

RIG: 50 W and 14 ele, (*) forgot to write down details
tnx for info, Piotr

UR5LX in KO70WK wkd on 144 MHz:

2003-11-20

1437	YL3AG	KO26aw	59a	59a
1453	DK8ZJ	JO54ag	59a	59a
1456	DL9MS		59a	59a
1503	SP2MKO	JO93cb	59a	59a
1516	EW6DX	KO45jl	55a	57a
1521	OZ1LO	JO55vc	59a	59a
1522	DK3WG	JO72gi	59a	59a
1525	PA0V	JO33ii	57a	57a
1531	OK1YK	JN78g	57a	57a
1542	RZ4HF	LO43qm	57a	59a
1552	RK9AT	LO93kk	55a	59a
1606	DL1YAW	JO41dx	55a	54a
1638	SP1FPG	JO63gn	59a	59a
1657	UA9XEA/6	KN97	59a	59a
1700	UR5SKB	KN28iw	55a	53a
1704	UY5HF	KN66hp	59a	59a
1715	HA8V	KN06st	59a	59a
2139	DK1KO	JO53ct	59a	59a
2154	RN3AP	KO85rq	59a	59a
2159	LY2IC	KO14ww	59a	59a
2202	EW6GB	KO45cn	59a	59a
2214	SP4MPB	KP03ht	57a	57a
2220	RA3LBK		55a	55a

tnx for info, Sergej

YU7BCL in KN05FW wkd on 144 MHz:

2003-10-30

2128	SP2FAV	JO94MA	57A	57A	0	905 km
2131	DJ9YE	JO43HV	59A	59A	0	1223 km
2133	SP4MPB	KO03HT	55A	55A	0	876 km
2146	DL6YEH	JO32VA	57A	57A	330	1143 km
2150	ON7EH	JO20FV	57A	57A	330	1302 km
2202	DK5DQ	JO31PG	57A	57A	330	1133 km
2208	PA5WT	JO22HG	57A	57A	330	1347 km
2210	ON4LN	JO20IV	55A	55A	330	1284 km
2215	G4ZTR	JO01KV	55A	55A	330	1571 km
2221	PA5DD	JO22IG	56A	56A	330	1334 km
2222	DF2JQ	JO31HL	57A	57A	330	1185 km
2243	OZ8ZS	JO55RT	53A	51A	0	1265 km
2300	OZ2M	JO65FR	52A	52A	0	1224 km

2003-11-20

1555	SP2OFW	JO93AC	53A	51A	0	815 km

tnx for report, Nesha

YU7EW in KN05HP wkd on 144 MHz:

2003-11-20

1325	DL9MS	JO54WC	53A	51A	350	1128 km
1521	OZ6OL	JO65DJ	55A	55A	350	1231 km
1536	OZ1LO	JO55VC	55A	55A	350	1221 km
1555	SP2OFW	JO93AC	59A	59A	0	849 km
1557	DK8ZJ	JO54AG	57A	53A	0	1248 km
1601	SP4JWD	KO03FR	55A	57A	355	898 km
1612	SP4MPB	KO03HT	55A	55A	0	907 km
1633	DL3NUA	JO64XB	55A	53A	0	1049 km
1644	G3JHM	IO91LC	53A	42A	350	1703 km
1657	SP4BY	KO13OD	57A	55A	345	854 km
1704	EU3AI	KO22CE	55A	55A	345	772 km

1713	DM3UH	JO61CU	55A	55A	345	924 km
1716	DG3LSM/p	JO61EG	55A	53A	345	871 km
1726	PE2DB	JO22MD	55A	51A	SSB	1344 km
1734	DK5DQ	JO31PG	55A	53A	340	1162 km
1750	ON4LN	JO20IV	55A	55A	330	1310 km
1755	DF2ZC	JO30RN	55A	55A	330	1117 km
1757	DF7KF	JO30GU	55A	55A	330	1189 km
1759	DF2JQ	JO31HL	55A	54A	330	1214 km
1818	OK1DCF	JO80BJ	59A	59A	330	625 km
1904	G4DEZ	JO03AI	57A	55A	335	1706 km
1908	SP3JBI	JO91BR	55A	57A	335	700 km
1923	G7RAU	IO90IR	57A	55A	330	1711 km
1934	G4XBF	IO91QD	55A	52A	330	1675 km
2127	DK1KO	JO53CT	55A	55A	0	1174 km
2240	DL2ARD	JO60AR	55A	55A	5	850 km
2252	OK1VT	JN79IX	55A	55A	5	653 km

tnx for info, Pista

---------------- 432 MHz reports ----------------

9A2SB in JN95 wkd on 432 MHz:

2003-11-20

1649	DL1SUN	JO53PN	59A	59A	20	1036km
1657	PA5DD	JO22IC	59A	54A	350	1247km
1706	DK3WG	JO72GI	59A	57A	40	814km
1710	PA3DZL	JO21HM	59A	55A	350	1221km
1715	PA0EZ	JO22OF	59A	59A	350	1225km
1718	DL8OBU	JO42XI	59A	53A	30	984km
1725	G4RGK	IO91ON	59A	57A	350	1568km
1730	G3LQR	JO02QF	55A	55A	350	1456km
1900	G3XDY	JO02OB	55A	55A	350	1459km
1905	GW4DGU	IO71SV	55A	55A	340	1821km
1910	G4BRK	IO91DP	55A	53A	345	1632km

Rig: HM transverter 50 W , CF300 Preamp. 23 el. DJ9BV yagi
tnx for info, Zlatko

DL1EJA in JO31DS wkd on 432 MHz:

2003-11-20

726	PA5DD	JO22IC	55A	55A	115 km
750	G4RGK	IO91ON	52A	55A	489 km
752	OZ1CTZ	JO46OE	55A	53A	527 km
805	EI5FK	IO51RT	53A	51A	1018 km
838	DL3YEE	JO42GX	55A	55A	203 km
856	DK8VS	JN39NF	59A	55A	289 km
900	DL4WK	JO63SQ	59A	59A	532 km
918	F6CRP	IN96KE	55A	55A	823 km

tnx fer report, Oliver

DL1SUN in JO53PN wkd on 432 MHz:

2003-11-20

516	PA3DZL	JO21HM	59a	55a
538	OZ2M	JO65FR	55a	55a
540	DJ6MB	JO3ØNR	59a	59a
545	SP2CNW	JO93AD	59a	59a
550	DF6NA	JN49XS	55a	55a
553	DL4OL	JO52BC	55a	59a
555	DJ2QV	JO31PF	57a	57a
556	DL6BF	JO32QJ	57a	57a

1600	OK1TEH	JO7ØFD	59a	59a
1602	DF9QX	JO42HD	55a	55a
1605	DO1CTL	JO6ØLT	59a	57a
1607	UA3PTW	KO93BS	57a	52a
1612	DG6CST	JO6ØDS	55a	55a
1615	LY2CI	KO14WV	55a	59a
1616	SP2MKO	JO93CB	55a	55a
1623	DB3BW	JO42AC	55a	55a
1627	SM6HBI	JO57XQ	57a	55a
1630	SM6ESG	JO67CC	53a	53a
1633	G3LQR	JOØ2QF	55a	55a
1635	PA5DD	JO22IC	59a	59a
1637	S51ZO	JN86DR	59a	57a
1641	OM1TL	JN88ND	59a	59a
1642	I4LCK	JN54DD	59a	55a
1644	DK5RQ	JN68BV	59a	59a
1645	OE3JPC	JN87EW	55a	59a
1646	9A2SB	JN95GM	59a	59a
1649	OK1AIG	JO7ØNN	55a	55a
1713	PA4FP	JO33BC	59a	59a
1738	DL1EJA	JO31DS	53a	55a
1739	EI5FK	IO51RT	53a	51a

tnx for report, Norbert

DL8OBU in JO42XI wkd on 432 MHz:

2003-11-20

1623	UA3PTW	KO93	54A	54A
1628	DF6NA	JN49	55A	56A
1632	SP2MKO	JO93	59A	56A
1633	DK8VS	JN49	53A	53A
1636	SP2CNW	JO93	59A	55A
1639	LY2CI	KO14	59A	52A
1644	S51ZO	JN86	59A	52A
1700	OE2LCM	JN67	59A	56A
1703	OE3JPC	JN87	59A	59A
1710	OK1TEH	JO70	59A	56A
1714	I4LCK	JN54	59A	59A
1720	9A2SB	JN95	59A	56A
1726	OM1TL	JN88	59A	59A
1804	EI5FK	IO51	55A	56A

tnx for report, Jürgen

F6CRP in IN96KE wkd on 432 MHz:

2003-11-20

1715	PA5DD	JO22IC	57A	57A
1717	DF2JQ	JO31HL	51A	57A
1720	DF6NA	JN49XS	55A	54A
1729	DK8VS	JN39NF	55A	55A
1730	EI5FK	IO51RT	55A	55A
1741	G4RGK	IO91ON	55A	55A
1812	DJ4TC	JO63PN	55A	55A
1857	G4BRK	IO91DP	59A	56A
1858	G3XDY	JO02OB	59A	59A
1900	G0RRJ	IO91FE	51A	55A
1904	GW4DGU	IO71SV	55A	55A
1913	SP6IWQ	JO80HK	55A	55A
1918	DL1EJA	JO31DS	55A	55A

RIG: FT847 + 100 w amp + 2x 21 el - MGF1302
tnx for info

G3XDY in JO02OB wkd on 432 MHz:

2003-11-20

1856	F6CRP	IN96	675 km
1900	9A2SB	JN95	1458 km
1903	DF6NA	JN49	663 km
1907	OK2MWR	JN99	1247 km
1909	S51ZO	JN86	1239 km
1913	DL6NAA	JO5Ø	765 km
1914	HB9DKM	JN37	682 km
1916	OE3JPC	JN87	1174 km
1917	F5VHX	JNØ4	808 km
2052	DK6AS	JO52	653 km

tnx fer report, John

GW4DGU in IO71SV wkd on 432 MHz:

2003-11-20

1907	9A2SB	JN95gm	55A	55A	1821km
1917	S51ZO	JN86dr	55A	55A	1603km

tnx for info, Chris

HB9BZA in JN36BE wkd on 432 MHz:

2003-11-20

1648	DL6BF	JO32QI	52A	56A	35°/65°
1650	G3LQR	JO02QF	56A	59A	35°
1653	PA0EZ	JO22OF	54A	56A	30°
1656	PA5DD	JO22IC	57A	57A	30°
1659	PA3DOL	JO22MT	52A	57A	20°
1705	PA3COB	JO32MF	53A	55A	30°
1709	DJ2QV	JO31PF	52A	57A	32°/75°
1713	PA3DZL	JO21HM	59A	59A	35°
1718	PA0BAT	JO31FX	54A	56A	30°
1724	DJ6MB	JO30NR	55A	55A	25°
1906	G3LQR	JO02QF	55A	hrd	30°
1910	DF5JJ	JO43XO	53A	41A	30°

RIG: 800 W, 11-ele-yagi. tnx for info, Robert

PA2CHR in JO22XA wkd on 432 MHz:

2003-11-20

1659	S51ZO	JN86DR	59A	59A	75	952 km
1703	I4LCK	JN54PD	55A	57A	75	961 km
1917	OK2MWR	JN99HO	55A	55A	65	927 km

Used 15 deg elevation for OK2MWR. tnx for info, Chris

PA3DZL in JO21HM wkd on 432 MHz:

2003-10-30						
2340	G4BRK	IO91BP	56a	55a	45°	449 km
2346	G3XDY	JO02OB	55a	55a	45°	242 km
2003-10-31						
0030	DK8VS	JN39NF	59a	59a	65°	310 km
0033	DF8IK	JO30JT	59a	57a	65°	170 km
0034	HB9BZA	JN36BE	54a	57a	65°	603 km
0121	OE3JPC	JN87EW	57a	57a	65°	932 km
0124	DK5RQ	JN68BV	55a	57a	60°	608 km
2003-11-20						
1512	G3LQR	JO02QF	57a	58a	20°	237 km
1519	DL1SUN	JO53RO	55a	59a	35°	516 km
1522	DJ6MB	JO30	55a	55a	35°	202 km
1524	DF6NA	JN49XS	55a	55a	45°	423 km
1533	G4RGK	IO91ON	57A	59A	35°	374 km

1539	PA3ECU	JO32CF	57A	59A	35°	134 km
1541	DF9QX	JO42HD	59A	59A	40°	283 km
1543	DJ9RX	JO43RE	59A	59a	40°	377 km
1548	DB3BW	JO42AC	55a	55a	35°	244 km
1614	DL3JIN	JO60LX	55a	55a	40°	583 km
1630	DJ9DL	JO31NC	57a	58a	40°	180 km
1637	DL7FF	JO62TJ	57a	57a	40°	624 km
1641	SP2CNW	JO93AD	55a	59a	45°	928 km
1645	DK5RQ	JN68BV	59a	59a	45°	608 km
1647	DK3WG	JO72GI	57a	57a	45°	685 km
1705	S51ZO	JN86DR	59a	59a	65°	1000 km
1711	9A2SB	JN95GM	55a	59a	65°	1219 km
1713	HB9BZA	JN36BE	59a	59a	65°	603 km
1715	HB9DKM	JN37IL	55a	59a	65°	474 km
1717	OE1SOW	JN88FF	51a	55a	65°	922 km
1721	OM1TL	JN88ND	57a	59a	65°	970 km
1723	PA4FP	JO33BC	59a	59a	65°	203 km
1725	OE2LCM	JN67NU	55a	55a	55°	734 km
1735	DF1QQ	JO32TD	55a	55a	55°	217 km
1808	EI5FK	IO51RT	54a	54a	315°	907 km
1823	DJ4TC	JO63PN	55a	57a	330°	628 km

tnx for report, Jac

PA5DD in JO22IC wkd on 432 MHz:

2003-11-20

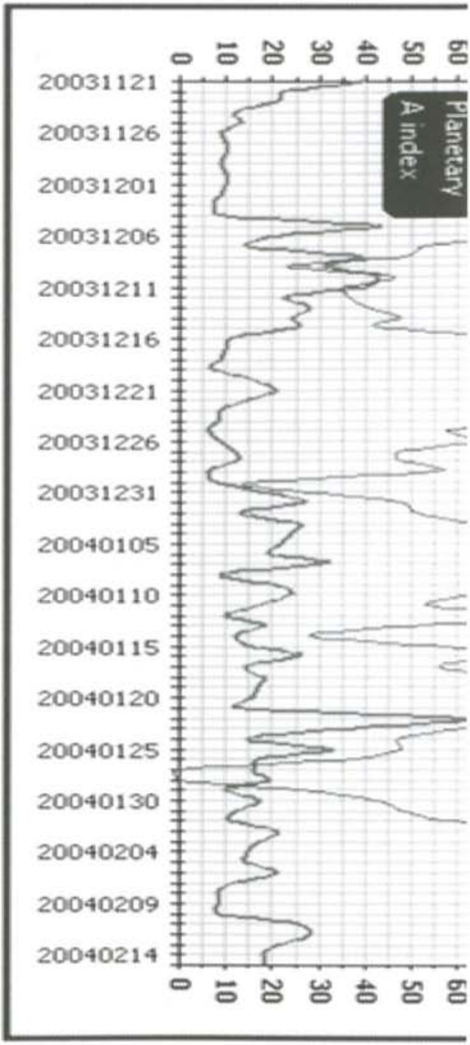
1822	DK9TF	JO31NF	57A	56A	193 km
1807	EI5FK	IO51RT	52A	52A	906 km
1729	DF1QQ	JO32TD	56A	55A	200 km
1728	F5VHX	JN04FT	56A	55A	867 km
1725	DL1EJA	JO31DS	55A	55A	116 km
1722	DL1RG	JO62MN	56A	57A	570 km
1721	DM2DXG	JO51MV	56A	56A	435 km
1720	DK1VI	JN49HH	58A	58A	415 km
1718	DK2WV	JN58	53A	59A	601 km
1715	F6CRP	IN96KE	57A	57A	781 km
1713	UR5SKB	KN28IW	55A	57A	1453 km
1712	OK1AIG	JO70NN	54A	55A	744 km
1710	HB9DKM	JN37SL	57A	59A	552 km
1702	OK1TEH	JO70FD	57A	59A	715 km
1701	OE3JPC	JN87EW	59A	59A	953 km
1700	I4LCK	JN54PD	57A	55A	1009 km
1658	9A2SB	JN95GM	54A	59A	1247 km
1656	HB9BZA	JN36BE	57A	57A	665 km
1655	DL5DSM	JO71EK	52A	55A	670 km
1651	S51ZO	JN86DR	57A	59A	1028 km
1644	DJ2QV	JO31PF	59A	59A	204 km
1635	DL1SUN	JO53PN	59A	59A	473 km
1633	DL3JIN	JO60LX	57A	58A	585 km
1632	DJ6MB	JO30NR	57A	57A	227 km
1630	DJ9DL	JO31NC	59A	59A	201 km
1629	DL7FF	JO62TJ	58A	59A	609 km
1607	DL2WY	JO43NL	57A	55A	336 km
1558	SP2CNW	JO93AD	55A	59A	908 km
1534	OZ1CTZ	JO46OE	57A	57A	542 km

tnx for info, Uffe

PD0EBF in JO21LQ wkd on 432 MHz:

2003-11-20

1633	DL5YET	JO41EV	55a	52a	tnx for info, Henk



Planetary A Index November 2003 to February 2004. Only one strong peak on Jan. 22/23 and mediocre ones on Dec. 5th and 10/11. Source: http://dxlc.com/solar

Reports of SK4MPI/B, JP70nj, via Aurora on 2m:

Date	Time	from area
25.11.	1445-1600	OH5 (KP30), N-DL (JO53)
30.11.	1510-1730	SM3, SM2 (KP15)
5.12.	1450-1915	OH6 (KP02), N-DL (JO42)
6.12.	1440-1605	OH6, OH2 (KP30)
7.12.	1740-1845	SM3 (JP82), SP4 (KO03), PA (JO33)
8.12.	1130 + 1605	OH5 (KP30)
	1640-1935	N-DL (JO53)
	2200	OZ (JO65)
9.12.	1540	OH6 (KP02)
10.12.	0945	OH5 (KP30)
	1525-1735	OH1 (KP00), N-DL (JO32)
11.12.	1400-1645	OH6 (KP02), GM (IO87), PA (JO33)
12.12.	1420-1730	OH5 (KP30), N-DL (JO53)
13.12.	1430-1540	OH6 (KP30)
14.12.	1820-1830	SM3, N-DL (JO53)
15.12.	1355	OH5 (KP30)
16.12.	1729	OH5 (KP30)
20.12.	1505-2010	SM2 (KP15), N-DL (JO53), SP2 (JO94), OH1
22.12.	1605-1700	OH5 (KP30), OH6 (KP02)
23.12.	1525	OH6 (KP02)
27.12.	2145	SM3 (JP82)
31.12.	1555-1905	OH6 (KP02), PA (JO33), DL (JO53)
1.1.	0145	SM0 (JO89)
5.1.	1640-1815	N-DL (JO53), UA1 (KP50)
7.1.	1235-1420	LA (JP33), N-DL (JO53), PA (JO33)
	1910	OH6 (KP02)
9.1.	1550-2100	OH6 (KP02), N-DL (JO53), UA1 (KP50), LA (JP33), SP (JO94)
10.1.	1755	OH6 (KP02)
11.1.	1745	N-DL (JO53)
12.1.	1605	OH5 (KP30)
13.1.	1710	OH5 (KP30)
14.1.	1825	OH5 (KP30)
15.1.	1440	OH6 (KP02)
16.1.	1130 / 2130	OH6 (KP02) / OH8 (KP24)
17.1.	1815-1829	OH6 (KP02), OH8 (KP24)
18.1.	2110	UA1 (KO59)
19.1.	1404-1645	OH5 (KP30), NDL (JO53, PA (JO32)
20.1.	1310 / 1500	OH5 (KP30) / SP4 (KO03)
22.1.	1215-1845	OH5 (KP30), DL (JO53), SP2 (JO94)
	2240	N-DL (JO53)
23.1.	0950	OH5 (JO32)
	1610-2000	N-DL (JO33)
24.1.	0115	N-DL (JO33)
25.1.	1430-2000	OH6 (KP02), N-DL (JO53)
26.1.	1440	OH5 (KP30)
27.1.*	1350	OH5 (KP30)
28.1.	1740	OH5 (KP30)
30.1.	1230 1510*	OH5 (KP30)
2.2.*	1225	OH5 (KP30)
3.2.	1240	OH5 (KP30)
	1755*	SM2 (KP04)
10.2.*	1725	OH5 (KP30)
11.2.	1300-1900	OH5 (KP30), N-DL (JP53, 33)
12.2.	1230-1630	OH5 (KP30), PA (JO33), UA1, OH6
13.2.	1540	OH6 (KP02)
14.2.	1320	OH6 (KP02
	1950-2200	N-DL (JP53), SM2 (KP15)
15.2.	1030 / 1550	SM0 (JO89) / SM2 (KP25)
17.2.	1945	SM2 (KP15)
18.2.	1655	OH5 (KP30)
23.2.	1800-1915	OH5 (KP30), SM2 (KP15)
27.2.	1940-2015	OH1 (KP10), N-DL (JO53)
1.3.	1510-2000	OH1 (KP10), N-DL (JO53), SM2

* report of LA2VHG JP53eg

New Products

Editor: Joachim Kraft, DL8HCZ

New PA from DanAmps
Dual 50 & 144 MHz PA

DanAmps (a Danish company owned by OZ2ELA and OZ1J) plans to sell a new Dual 50 & 144 MHz Linear Amplifier starting from autumn 2004.

This amplifier is fully microprocessor controlled with automatically band switch.

Conservative rated 1500 Watt RF output with no time limit in all modes will make also the WSJT users happy.

Here some more features and specifications:

T/R-QSK shift with RF output vacuum relays for high reliability.

3,5 kW+ power supply with unique unicore transformer.

Frequency Coverage: 50-52 MHz and 144-148 MHz one band at any time.

Power Output: Minimum 1500 Watt at any mode no time limit with approx. 60 Watt drives.

Input VSWR: < 1,5:1 within amateur bands.

Harmonics: More than 50 dB below rated output.

IMD distortions: Better than 35 dB below rated output.

Protection: Cover interlocks, inrush power-on current, all supply voltages and currents, excessive drive, load mismatch, RF/DC flash over, severe mistuning, SWR faults, tube temperature, primary and secondary fuses, cooling fans.

Tube cooling: Variable DC controlled forced airflow depend on tube temperature for minimum noise.

PSU cooling: Variable DC controlled forced airflow depend on transformer temperature for minimum noise.

ALC: Grid-current derived, 0 to –11 Volts via panel adjustable.

RS 232 port: All measurements data accessible on personal computer via RS 232 standard port.

Primary Power: 190 – 264 Volt (210, 220, 230 & 240 V nominal taps, 10% tolerance), 50-60 Hz, single phase, 20 A maximum 360 - 440 Volt (400 V nominal tap, 10% tolerance), 50-60 Hz, dual phase, 12 A maximum (internal manual switching).

Tubes: Two GU74B/4CX800A Svetlana High Performance Ceramic Metal Tetrode.

Dimensions: 44,5 (W) X 20 (H) X 43,0 cm (D)

Weight: approx. 35 Kg.

Price: Arround 4100 Euro.

Fore more info you can email info@danamps.com

And there is a website www.danamps.com

Neu von WiMo
USB CAT-Interface

Endlich ein CAT-Interface für USB! Viele moderne Notebooks haben nur noch USB- und keine COM-Schnittstelle. Bei Desktop PCs ist die einzige COM-Schnittstelle häufig schon belegt. Es können beliebig viele USB-CAT Interfaces an einen PC angeschlossen werden. Die USB-Interfaces unterstützen Win 98/ME / 2000/XP, Linux 2.4.0 und höher, Apple Macintosh OS-8/OS-9/OS-X. MS-DOS wird NICHT unterstützt!

Nach der Treiberinstallation erscheint jedes USB-Interfaces als COM-port in der Systemkonfiguration. Deshalb arbeitet das Interface mit jeder Software, die auf normale serielle COM-Schnittstellen zugreifen kann.

In den USB-Interface sind die erforderlichen Pegelwandler für die Funkgeräte bereits enthalten, so daß die Original-Pegelwandler der Hersteller (z.B. CT-62, IF-232, CT-17) nicht mehr benötigt werden. Zur Steuerung von CW und PTT sind zwei weitere Interfaces eingebaut so dass auch dafür kein extra Interface mehr benötigt wird.

Im Gegensatz zu den einfachen USB/seriell-Adaptern hat das MicroHAM USB-Interface ein einstreuungsfestes Metallgehäuse. Alle Eingänge sind über 3-polige LC-Filter entstört, das Interface selbst produziert keine Störstrahlung.

Stromversorgung erfolgt unter Einhaltung der Spezifikation über den USB-Anschluß, zusätzliche Stromversorgung ist nicht erforderlich.

Fig.: MicroHAM USB-Interface

6 verschiedene Modelle für YAESU / ICOM / KENWOOD / Ten-Tec / Elecraft K2 sind erhältlich. Der empfohlene Verkaufspreis beträgt 42.- EUR, Lieferung erfolgt komplett mit Treiber-CD und Anleitung.

Bezug: WiMo Antennen und Elektronik GmbH, Am Gäxwald 14, 76863 Herxheim. Tel. 07276 96680 FAX 07276 6978

http://www.wimo.com

email: info@wimo.com

Fig. left: Danamps PA

News & Comments

Editor: Joachim Kraft, DL8HCZ
info@DUBUS.de

Beacons

Beacons for Mauretania (5T)

5T5SN will erect beacons for 6m on 50.028 MHz and for 2m (close to 144.300 MHz) very soon. The Call will be 5T5SN/B. May be also 5T5SIX and 5T5VHF. Locator is IK28AC. This project was initiated by DUBUS. DF7KF will supply 2m-TX, PSU and keyer, W3CMP will supply the 6m-TX. Tnx also to DL8YHR for coordination and help! (DL8HCZ)

New 2m Beacon for EA8

In order to bring more light into the speculations about the Es – Doublehop-Es – Tropo-Es propagation discussion very soon a 2m beacon will be qrv from La Palma Island (IL18BS). Pwr around 50W and 2 yagis, one to EU another to USA! This is another project initiated by DUBUS. DF7KF will supply TX, PSU and keyer. DL7AJA will supply antennas and will bring the beacon to EA8. DL6FAW coordinates everything on La Palma. Many thanks to all for supporting a really most important beacon project! (DL8HCZ)

LA9SHF new on 10 GHz

LA9SHF is qrv on 10368.890 from JO59FS with 1.3 W power and 10dB horn. QTF is 180. So good for OZ/DL. (LA8GKA)

DB0FAI QRP

The 2m high power beacon DB0FAI, Locator JN58IC, is running around 30WERP only since a couple of months now. Reason is a PA failure and 2 spare transistors BLY94 are needed. It is quite difficult to find them. Anyone who could help, please contact: DL5MCG@amsat.org

GB3MCB Info

The lease of the tower has been extended now to April 2005. So the 2m and 6m beacon continue to be qrv from IO70OJ. The 70cm beacon is QRT because the antenna was lost. The 23cm beacon has been stolen.... (G3YJX)

New 6m beacon on VP5

W3CMP is organizing a new 6m beacon on Turks and Caicos Islands (VP5). Locator FL41.

DB0XL QRT

The 10 GHz beacon DB0XL (JO53HU) is QRT now. It is planned now to erect this beacon on 10368.805 and 24048.805 GHz in the Schwerin area, JO53QP, at the DB0SI QTH (90m asl). Callsign will also change to DB0SI.

New 24 GHz Beacon QRGs in DL

Here the proposed new QRGs for the 24 GHz beacons (144 MHz down in frequency) in DL. Several beacons are already qrv on the new QRG.

DB0SI	24.048.805	JO53QP	(ex DB0XL)
DB0VI	24.048.815	JN39NK	
DB0JL	24.048.820	JO31MC	
DB0FGB*	24.048.833	JO50WB	
DB0KI	24.048.840	JO50WC	
DB0GW	24.048.850	JO31JK	
DL0WY	24.048.853	JN67AQ	
DB0ARB	24.048.860	JN69NC	
DB0JK	24.048.865	JO30LX	
DB0HW	24.048.875	JO51GT	
DB0TUD	24.048.885	JO61UA	
DB0ECA	24.048.895	JN57UU	
DB0CU	24.048.900	JN48BI	
DB0NCO	24.048.905	JN59MI	
DB0HEX	24.048.910	JO51HT	
DB0RG	24.048.912	JO51GO	
DB0AJ	24.048.920	JN57	(QRT)
DB0KHT	24.048.930	JO40FE	
DB0JO	24.048.940	JO31SL	
DB0KNL	24.048.950	JO40RW	
DB0MFI	24.048.960	JN58KR	
DF0ANN	24.048.965	JN59PL	
DB0AS	24.048.985	JN67CR	

* confirmed to be qrv on new QRG

KL7GLK beacon on 144.289 MHz

Larry, KL7GLK, writes:

The 2 metre beacon KL7GLK is currently running low power, 4-5 watts into a turnstile antenna overlooking the Chesapeake Bay (Grid FM18, no KL7GLK is not in Alaska!), with a clear view to the horizon, over water, of 20 km (at its antenna height, on a cliff).

On the tower, and facing towards Northern Europe, is a pair of 13 element vertical polarized beams with a theoretical gain of 15 db. Its not been actually measured. In its "European Mode" the beacon can put 100 watts, and this has been directly measured at the antenna input, into this array, giving something on the order of 2-3kw ERP. The power could be higher, but our government limits the input to 100 watts in this type of operation without special authorization. The beam width is fairly narrow, but by the time it would/could reach Europe the spread should be considerable. Of course, it has never been heard there so all this is to be taken with 'a grain of salt' - lots of theory but no results.

It is not operated in this mode (high power) often since it can annoy the devil out of local 2 meter hams in its beam path. It can be accessed and switched from low power to hi-power directly by a uhf control link, but to this date that occurs only when there is a possibility of it being heard in Europe. If 50 Mhz is open to Europe it will be turned on providing someone with access to the beacon control link, and aware of the 50 Mhz openning, will activate it. Once activated, it will transmit for 1 hour then automatically resume low power operation unless reset.

Unfortunately those few of us associated with the beacon have had waining interest in VHF over the years (I personnaly can date my 6 meter days continously back to 1964 as ON5YE and 9A1LJ/M1Q- the old San Marino calls)- the torch will have to be carried by younger blood I'm afraid, if serious 2

meter transatlantic studies are to take place.
But still, in a haphazard manner, on a sporadic"ham radio" basis, the beacon does transmit towards Europe. If 6 opens this season, who knows?
I often monitor 50.110Mhz (very easy and painless since the squelch can be set and it rarely breaks open and therefore doesn't annoy the family) and so do others who can also activate it. 73's Larry, KL7GLK
P.S. There is also a 6m beacon running with 4W ERP and a turnstile antenna on 50.075 MHz, callsign also KL7GLK.

New Beacon List

On the following pages you will find a completely new beacon list for 6m, 4m, 2m and 70cms. Many hundred hours were spent to check the data and verify them. If you find differences to other lists you can be almost sure that the data from the DUBUS list are the correct one´s because in most cases we checked the data personally with the beacons´s keeper! We will try to make the same effort for the microwave beacons during the next 3 months. So please send any corrections and updates to info@dubus.de TNX! DL8HCZ

Stations, OPs and Expeditions

Cayman Islands, ZF1A.

ZF1DC and K4BI, along with at least 3 more ops will be doing an ARRL June VHF QSO Party contest effort on 6M, 2M & 2M EME from an excellent site on Grand Cayman. The contest crew will be arriving several days prior to the contest (2nd full weekend in June) to set up and staying a few days afterward. They will pay attention to the EU path on 6. Callsign has yet to be finalized, but the C.A.R.S. has kindly offered us ZF1A should we wish to use it. Jim, K4BI / ZF2BI

Bermuda, VP9

N0JK will be returning to VP9 for the ARRL June 2004 VHF QSO Party. Probable dates are June 10 - 15. The purpose of the trip is the contest, but he will keep an eye out for Europe. Station will be 100 watts and the 6M5X on 6M, 100 watts and Jr. Boomer on 2M. Jon, N0JK

W3CMP will be going back to VP9 from June 26th to July 5th, 2004. Will be at VP9GE's again. Purpose of trip is to use up rest of QSL cards I had printed, make sure 2 mtr VP9DUB beacon is operating properly and to try to work areas missed last time, e.g., UK and Northern Europe. I will ask everyone who has worked VP9 previously to standby so those who haven't can get a crack at it. Should have "adequate" antenna and power on 6 mtrs; hope to have a bigger antenna on 2 meters and have WSJT running properly this time.
73 Chris Patterson, W3CMP

3B9, Rodriguez Isl.

From March 16th the 3B9C expedition will be qrv also on 70cm EME. With AO-40 qrt now this may result in more EME...?

PY5CC in GG53

PY5CC, Peter Sprengel, well known 6m DXer is QRT from GG54RE since July 2003 and moved to GG53QW. Peter expects to be qrv again in mid 2005.

SM6CMU/TF Expedition

SM6CMU, Ingo, will be qrv from TF from June 3rd to 10th on 2m for CW/FSK-MS and on 6m as well.

LA/PA2DW Expedition

Dick, PA2DW (ex PA2DWH) plans to be qrv on 2m FSK and CW-MS during the whole month of July from several squares in Norway. The trip will go up to Lofoten Islands. This is a holiday operation and not a "big" expedition.

9A4QV Info

Adam, 9A4QV, who was qrv /mm on 6m from the Mediterranean sea in 2002 and before reports that he has been working offshore in Libya for one year now. So far it was impossible to get a licence from the 5A autorities.

Microwave from a Balloon

A group of Swedish Ops plans to become qrv on all microwave bands from a hot air balloon in smmer 2004 from the area JO78/79/89. All bands from 23cm to 47 GHz are planned and it is hoped to reach altitudes up to ~4000m(ASL).
The people involved at the moment are:
SM0SBI, SM4LMV, SM7EYW (SK7MW Op), SM4VLM and SM4XDJ who is the organizer for this project. All comments/questions regarding this project can be posted to microballoon@osa.t.se. All people above are recipients to this email address. A website for this project is online at:
www.osa.t.se/microballoon/

PC7CW/MM

Theo was qrv again /MM since the end of February for 6 weeks from the mediterreanean see. This time he only took his FM handheld for 2m/70cm. So only stations close to the coastlines had good chances for QSOs. Last year Theo worked 700km QSOs on 70cm FM with his handheld and rubber duck off the CT coast.

OH5NYI/MM

DL2SB will be qrv again for one day in July and for one day in August as OH5NYI/MM from the Baltic see between DL and OH on 2m with 50w and HB9CV. Squares like JO85 will be crossed. QRG is 144.300 and 144.288. In the weeks between the /MM trip he will be qrv as OH5NYI from KP31MC on 2m and 6m. No MS operation!

GØKZG/MM Update

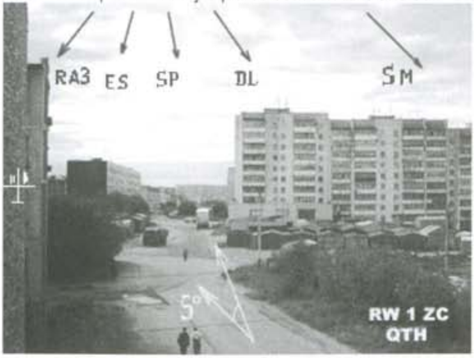
Andy, G0KZG/MM, has changed plans again. He will be qrv from a new ship in Mai / June from the North Sea. He hopes to be qrv again on 144 MHz Meteor-Scatter and Tropo, running the usual high power station. Since the beginning of February he was /MM also, but had only a very little rig.

Bornholm Expedition

DL1EJA and others will be qrv from Bornholm (JO75 and 74) from June 10th to 23rd. They plan to operate on 6m, 2m, 70cm and may be 23cm.

RW1ZC/MM qrv again

RW1ZC/MM is qrv again /MM on 2m from March to July off the 5T-coast. In March and July at the start and the end of the cruise he is qrv from many squares between EA8 and 5T.



RW1ZC take-off from Russia to EU

RW1ZC who is also active on 2m MS from his home QTH has sent the above picture to illustrate his difficult local take-off.

SV/A Mount Athos qrv on 6m now!

Monk Apollo, SV2ASP/A, made his first 6m tropo QSOs on January 8th. 1st SV/A – SV was SV1DH, of course. He was working with 30w and a dipole. A short yagi was expected to be erected soon. Apollo promised to be qrv in May/June for the Es-season. With his IC756PRRO and IC706 there is still a chance also for a 2m activity in the future.

OH8K Expeditions 2004

OH8K (OH9O) has at least following DXpedition-plans for the summer 2004:

June 2004: **KP49, KP39 and KP38**, and in August 2004: **KP18, KP28 and KP27**, both mainly random FSK.

We have looked hill-top QTHs, so QRBs up to 2200km should be possible. Rig: 144 MHz 2x16ele and 50 MHz 5ele, 2x IC-7400. More details later. 73 de Aulis, OH6JW

S0 2004

DL8YHR, Frank, still plans to become qrv in June/July 2004 from S0, Western Sahara on 2m and 6m via EME. So far it was not possible to get a licence for 6m. Also the recent expeditions and S01HA did not have a 6m licence....

Alternatively Frank is checking the possibility of activating Gibraltar, ZB.

Helgoland qrv

From April 23rd to 25th there will take place an amteur radio meeting on the island of Helgoland (Loc. JO34we). The special station DA0HEL will be qrv on April 24th on 2m and may be 70cm (no MS operation!). The OP can be reached via mobile phone on this day at: ++49 178 5791777

CT1HZE qrv im summer 2004

DL8HCZ will be qrv again on 2m and 6m in from Mai to mid July from IM57nh. I will be looking especially for Es-openings. Hope to work many of you (again). Joe, DL8HCZ/CT1HZE

23cm from Ireland

EI5FK, IO51, plans to be qrv on 23cms soon with 10w and one yagi antenna.

JP32 on 2m

LA2YMA is qrv on 2m via FSK-MS from the rare JP32lk square. Rig is 40w and a 9 ele. Yagi.

JP93 on 2m

SM3JBO is qrv on 2m FSK-MS from JP93ih.

Azores on 2m

CU2IJ, Luis, is a new station who will be active on 2m FSK-MS soon with 70W and 12 ele Yagi. Locator is HM77

HB0 qrv in April

HB0/HA5KHC/p will be qrv from Liechtenstein (JN47) on 2m and 70cm Tropo from April 1st to 8th.

OY qrv in Mai

ON5DRE and ON4QJ will be qrv from Faroer Islands on 2m via Tropo from Mai 3.-13.

T98KFN activity

CT1FKN is qrv now from Bosnia-Herzegowina until August 6th as T98FKN on 2m and 70cms.

IO65 qrv in Mai

MM0BQI/p will be qrv the first week of May on 6m from IO65.

Comments

15 W ERP for German beacons?

In the end of December 2003 the German authorities have released a new draft for new amateur radio regulations in Germany ("AFUV 2004"). According to this draft all unattended and automatical stations have to be limited to 15 Watt ERP in the future. Also beacon transmitters would be affected if this becomes law. Several beacons for propagation research (Aurora, FAI, Meteor-Scatter) work with more power and do not make sense anymore with 15W ERP.

This is only one very bad item of the draft. Many other points worsen the future of amateur radio in DL either. One of them is the following. (DL8HCZ)

No general 6m allocation in DL

According to the above mentioned draft it is not planned anymore to release the 6m band to all German radio amateurs on a secondary base. In a previous draft from spring 2003 this was planned. The new draft suggests to keep the status quo with a few thousand special permits for 6m.

With almost all countries around DL giving free access to 6m und more and more also permitting 4m, I can only state "Poor Germany!" (DL8HCZ)

10 GHz for Novice Licences in DL

According to the above mentioned draft of new amateur radio regulations in DL it is planned to release the complete 10 GHz band to the Novice class (DO prefix) with max. 10 WEIRP. So far the DO's were allowed to work only on 2m and 70cm. At least one positive news in the draft.... Anyway it is not sure if and when this will be realized.

Moon Station

According to the lastest plans from U.S. president George W. Bush a manned station on the moon will be realized within the next 10 years or so. Unless this is not just propaganda for this years elections this will generate a good chance to erect beacons on all VHF/UHF/SHF frequencies on the moon. May be a group in the U.S. should be formed in order to realize this as a long term project? (DL8HCZ)

Echolink QRGs in DL

There is some pressure now in Germany on the DARC radio club to name frequencies or a frequency range for FM-Echolink stations. May be also duplex frequencies will be announced although this makes not much sense. Their input QRGs may be very close below 432.000 MHz. So this may cause some trouble for EME-Ops.

DD0VF comments on WSJT/Toplists:

Jürgen - DK3WG unterbreitete ja den Vorschlag, WSJT-"QSO" bei den Toplisten auszuschliessen und es wurde um Kommentare gebeten.

Ich kann Jürgens Meinung natürlich nur voll und ganz unterstützen. Es wäre schön, wenn wenigstens 1 Topliste ohne Maschinen-QSO übrig bleit. Für die, die es brauchen, kann ja eine "nur wsjt-toplist" ins Leben gerufen werden.

Sicher fühlen sich dann diejenigen auf den Schlips getreten, die ohne Spaß und zähneknirschend WSJT machen, damit sie noch paar neue Felder abbekommen....aber was soll's.

Es wird nicht mehr lange daueren, bis eine der nächsten Versionen ein "Single-Ping-QSO" in 500ms erledigt...was soll dann noch der Vergleich in einer Topliste?!

Auch wenn (offiziell) die Software keine automatischen QSO unterstützt, ist das sicherlich das kleinste Problem....

Es wird ja immer behauptet, das die neuen digi Betriebsarten Newcomer schafft...aber es gibt auch die andere Seite....mir hat das alles so ziemlich den Spaß am Amateurfunk genommen, so dass ich nur noch gelegentlich qrv bin - 1 x im Monat EME natürlich in CW ☺

73 de Steffen - DD0VF, JO61WB 4x7el 1.5wl 550W

(Ed.: This was the only comment in favour the exclusion of WSJT-QSOs from the toplist. Many others asked us to keep digital modes included. So the final decision is that there will be no exclusion of WSJT QSOs from our toplists)

Dates

Nordic VHF Meeting 2004

The Nordic VHF-meeting will be held on June 11-13th, 2004. The meeting will take place on Åland islands (OH0), on the island of Eckerö. Organizer is the RATS, Radio Amateur Technology Society in Finland.

Microwave Update 2004

Microwave Update 2004 will be hosted by the North Texas Microwave Society and will be held in Dallas near the DFW airport on October 14, 15, and 16. A formal announcement with all the details is on www.ntms.org and www.microwaveupdate.org (W5LAU/WA5VJB/WA5YWC)

G3WOS 6m BBQ in August 2004

G3WOS, Chris Gare, organizes a 6m BBQ on August 7th. For more info go to http://www.gare.co.uk/6m_bbq.htm.
Location is close to London.

VHF-Meeting Weinheim 2004

The next Weinheim VHF Meeting (UKW-Tagung) will take place now definitely on **August 28th/29th 2004**. Same location like in 2003. For more info check www.ukw-tagung.de

News

3.4 GHz band in 9A

On December 26th 2003 the 3.4 GHz band was released to Croatioan radio amateurs. Max. Output 10 Watts in the range 3400 to 3410 MHz.

Most Wanted Squares 2004: 2m + 6m

Like in the previous years DL8EBW, Guido, made together with the German magazine Funk-Telegramm the usual poll for the most wanted squares on **2m** in EU.
Here a preliminary result after 105 entries:

1.) KN38	**2.) KO67**	**3.) KO42**	
4.) KO41	5.) KO31	6.) KN20	
7.) KO40	8.) KO43	9.) KO44	10.) KO79

For **6m** IW0GPN made a similar poll. Here the preliminary result (21 participitiants):

1.) KO22	**2.) JO79**	**3.) JP30**	
4.) IM79	5.) JP21	6.) KN68	
7.) JM29	8.) JN96	9.) KN49	10.) IM78

MS-VHF-Database: Data request

Hallo dear VHF meteorscatter friends,
as you possible know, the VHF-DX-Group DL-West has built up a VHF-DATABASE, to spread infos about activities and locations of active DXers. A part of our big VHF-DATABASE is the METEORSCATTER-DATABASE
Therefor it is necessary to ask from time to time about your details and data-updates. We will try to spread around a new issue of these MS-DATABASE (version 2.05) in May 2004 and a total update of our VHF-DATABASE (version 2.10) in second half of the year 2003! For more details check:
http://www.dl8ebw.de/DATABASE-Project/DATABASE-project.html
Please fill in your details like in the sample further down in this info, or send info about call / locator of new active stations on VHF/UHF... Please be so kind to send it back to the editior of this DATABASE:
DL8EBW, Guido Juenkersfeld, c/o VHF-DX-Group DL-West
via PR-BBS-System: DB0LJ.#RPL.DEU.EU
via Cluster-System: DB0SUE-7 via e-mail: guy@dl8ebw.de
The MS-DATABASE will be given out as text file (zipped) and sorted file (zipped) for use with the WSJT programm from K1JT and will be free of charge to everybody!!!
BE CAREFULL!!! These MS-DATABASE files can NOT be used for using it into logging programms (VQ-Log) or into DX-Clusters (therefore you do need our VHF-DATABASE, check announcments before!)

A sample for a complete input to the MS-DATABASE:

Call:	Rufzeichen:	AB1CDE
OLD CALL:	Altes Call:	DE3EF
LOC-WW:	Lokator:	JO55AB
Activity:	Aktivitaet:	50-144-ms-FSK441-JT65-WWCOnvers...
RIG:	Equipment :	100Watt 11el MGF1302
NOF/CW:	CW-QRG:	144.155 3000lpm DTR
NOF/SSB:	SSB-QRG:	144.355
Update:	Update:	02/04

NOF CW/SSB is the normal-operating-frequency which is used as sked frequency at MS, EME, contest etc.!
For MS work you also can determine the max. speed and the way of decoding (eg. MSDSP, DTR ...) you will use!
73 de DL8EBW, Guy, c/o VHF-DX-Group DL-West

No more 6m in India

According to VU2ZAP all 6m licences in India are expired and there will be no new ones for the time beeing. The licences were given out in order to give a possibility to the VU amateurs to take part in the good conditions of the sunspot maximum which is over now.

220 MHz Band in Canada

Due to the high pressure from the industry the 220 to 222 MHz amateur radio band will probably taken away from the amateurs very soon. Instead the will probably a secondary allocation from 219 to 220 Mhz. The U.S. amateurs had this pleasure already in 1991.

10 GHz in Hong Kong

The VR2-amateurs get a new allocation for amateur radio from 10.450 to 10.500 GHz.

DF5AI Websites

Volker, DF5AI, has relaunched his websites. There are now two sites: One for propagation studies and another for his beamfinder program. For more info check www.df5ai.net

GHz Info- and Skedpage

There is a new page on the web where infos and skeds for activities on the GHz band may be posted, especially before contests. Check www.amram.de

W6PO Silent Key

On January 11th 2004 Bob Sutherland, W6PO beacame a Silent Key. Bob`s PA designs for the VHF bands with the 8877 tube is still famous all over the world. W6PO worked for Eimac for 48 years and was active on EME since the 70s. - -
Am 11.1.2004 verstarb Bob Sutherland, W6PO. Weltbekannt wurde W6PO durch seine PA`s mit der Röhre 8877 für die VHF-Bänder. Das „W6PO-Rack" wurde so zu einem festen Begriff. W6PO war seit 48 Jahren bei der Firma Eimac beschäftigt und er war seit den 70er Jahren via EME aktiv.

4m-Band-News

4m band released to all OZ hams

On February 1st 2004 severals segments in the 4m (70 MHz) range were released to Danish radio amateurs. Special licences are not longer issued anymore. Max. Output power is 25 Watts. The segments (secondary allocation) are:

QRG	Bandplan
70012,5 – 70062,5	CW + Beacons
70087,5 – 70112,5	SSB + CW
70312,5 – 70387,5	all Modes
70412,5 – 70487,5	FM

4m band in Croatia

In Croatia the 4m band was released to amateur radio on December 26th 2003. Max Output is 10 Watts in the range 70.000 to 70.450 MHz. Already QRV are 9A2EY, 9A3AB, 9A4EP and 9A4QV all from JN75.

4m beacon in Greenland

There are plans to built a 4m beacon for OX. QTH will be in HP15EO at the location from OX3SIX. The beacon may be operational in 2005 or 2006

4m band in Finland

There is coming information from Finland (OH) that there is a good chance for access to 4m in 2004.

Last

DUBUS Rating

On the websites from eham.net one of the most important portals for amateur radio wordwide I have found the following comments about DUBUS Magazine. Reading this was really great joy for me. What could be a better recommendation for DUBUS magazine? (DL8HCZ)

NE0P Rating: 5/5 Nov 9, 2003 02:35
Excellent VHF/UHF magazine Time owned: 3 to 6 months
This is an excellent VHF/UHF magazine, based on the last year of issues which is the only ones I have seen. It is written at a high level, much above QST, Worldradio, or CQ, but is still very understandable. Probably like a combination of QEX and NCJ for VHF. Contains excellent information on all frequencies above 50mhz, including the upper microwaves, and it is neat to see that people are actually playing up there.
It is also nice to read a European perspective to amateur radio. You quickly realize that the proportion of EU hams on VHF/UHF greatly outnumbers the proportion in the US. After reading an issue of DUBUS, I feel like selling all my HF gear and getting a 1296mhz radio.
If you are really curious about VHF/UHF propogation, equipment, and operating, this magazine is highly recommended.

NI6G Rating: 5/5 Jun 7, 2003 18:19
Time owned: more than 12 months
Out of all the amateur magazines that I subscribe to, I look forward to reading DUBUS the most. The technical articles are of the highest caliber and the activity reports are exciting. When I puruse this journal, I feel that I am vicariously living the life of a European weak signal operator. The interest level in VHF DXing seems to be much higher there than in the US. I've read many accounts that were exclusive to DUBUS and not found anywhere else including the internet.

Redaktionsschluss für DUBUS 2/2004
ist der 5. Juni 2004.
Deadline for DUBUS 2/2004 is June 5th 2004

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Reports (Technique, Operation Technique, Propagation, Software)

Parts and Products

News, Activity Reports, Contests etc.

DUBUS Beacon List 50 MHz and 70 MHz, March 2004, by DL8HCZ

QRG	Call	Locator	Pwr	Antenna	QTF	m asl	Mode	Status	Last Report	Remarks
50000	GB3BUX	IO93BF	25	2x turnstile	Omni	460	A1	TQRT	204	
50000	9A1CAL	JN86EL	1	7-ele	Vary	15	A1	24	0803	
50001.0	VE1SMU	FN84	25	3-el Yagi	90		A1	24	1203	
50001	IW1RCT	JN44FH	2	3 El Yagi	180			22-06z	0104	IW1RCT QRG 50007,5?
50001.4	BV2FG	PL05RA	3	5/8 GP	Omni		A1	24	0903	Probably QRT now
50001	BX2AB	PL05SA	10	GP	Omni		A1	?	0703	Probably QRT now
50001.3	IW3FZQ	JN55UW	8	¼ GP	Omni		A1	24	1003	
50001.5	IK1PLD/B	JN43CW	0.1	Vertical	Omni		A1	24	0503	IK1PLD
50002.5	7Q7SIX	KH75	5					24	0903	
50004.0	I0JX	JN61HV	10	5/8 Vert	Omni		F1	24	204	
50004.7	4N0SIX	KN04FU	1	Dipole	NNE/SSW	400	F1	24	104	
50005	ZS2SIX	KF25UX	25	Dipole			F1	24	0204	ZR2DX
50005	9M2TO	OJ05DJ	50	5/8 GP	Omni		A1	24	0104	
50006.2	PY0FF	HI36TD	30	Ringo Vert	Omni		A1	24	0203	
50007.8	DU1EV	PK04MP	10	½ GP	Omni		A1	24	104	
50008	XE2HWB	DL44UC	10	Vertical	Omni		A1	24	204	
50008.0	K0GUV	EN26	8				A1	24	1103	
50008	I5MXX	JN53JU	10	3/4 Vert	Omni	20	A1	24	0304	I5MXX
50009,5	P43L						A1	QRV?	1103	
50009.5	PY2SFY	GG77GA	4	5/8 GP	Omni		A1	24	1103	
50010.8	SV9SIX	KM25NH	30	Vert. Dip.	Omni		F1	24	0903	
50010	JA2IGY	PM84JK	10	5/8 GP	Omni		A1	24	0204	JA1VOK
50011	TG9RB/6	EK44SM	30	V-Ringo	Omni		A1	24	0104	TG9RB
50012	OX3SIX	HP15EO	100	Dipole	E-W	1500	F1	24	1103	
50012	HP1RCP	FJ09HD					A1	24	0303	
50013	CU3URA	HM68QM	5	5/8 V	Omni		A1	TQRT		
50013	LZ1JH	KN22TK	1	GP	Omni	520		24	0204	LZ1DP
50014	V73SIX	RJ39RJ	70	Pan Loop			A1	24	0204	
50014.5	9M6SMC	OJ85AX	2	Turnstile	Omni			24	0304	
50015	9Y4AT	FK90ER	25	3-el Yagi	N/NW		A1	24	1203	
50015.3	SR3SIX	JO92DF	5	¼ GP	Omni		A1	24	0902	
50015.5	LU9EHF	FF95	15	Inv. Vee			A1	24	1103	
50015.5	VA2MGL	FN47UQ	6	½ Vert	Omni		A1	24	0703	
50016	SV5SIX	KM46CF	0.2	dipole	Omni				0204	SV5BYR
50016	GB3SMG	IO91QP	25	V-dipole	Omni	195	A1		Proposal	
50017	JA6YBR	PM51RT	50	Turnstile	Omni		A1	24	0204	JA1VOK
50018	VE4ARM	EN09MW	50	3-el Yagi	NE		A1	24	104	
50019	IZ1EPM	JN34WR	15	5/8 Vert	Omni	400	A1	24	1103	
50019	CX1CCC	GF15	5	GP Omni				24	0304	Temp QRT
50020	GB3SIX	IO73SG							Proposal	
50020.7	IK5ZUL	JN52					24		104	
50021	S55ZRS	JN76MC	8	¼ GP	Omni	1219	A1	24	1103	
50021.3	OZ7IGY	JO55VO	30	Turnstile	Omni	92	A1	24	204	
50023	XE1KK	EK09QC	20	Ringo	Omni		A1	24	204	
50023	LX0SIX	JN39AV	10	Horiz Dipole	N/S		24		104	
50023.5	ZP5AA	GG14	5	Vertical			24		1203	
50023.0	JA1ZYK	QM05	10	Hentenna			24		1203	
50023	SR5SIX	KO02LL	2	Dipole	SW/NE	100	A1A	QRT	0104	soon qrv agn. SP5XMU
50024.7	UN1SIX	MN83KE	12	GP	Omni	3400		OP?	0402	
50025	9H1SIX	JM75FV	7	5/8 GP	Omni		F1	24	104	
50025	YV4AB	FK50	15	Ringo			A1	24	1203	
50025	VE4SPT	EO26PI	100	3 el yagi	N		A1	INT	0304	KG0VL
50025.4	OH1SIX	KP11QU	40	4 Turnstiles	Omni	157	A1	24	0104	
50026	VP9DUB	FM72OH	15	Horiz Loop	Omni		A1	24	0204	
50026	SR9FHA	KN09BW	4	GP	Omni		F1a	24	0803	
50027	CN8MC	IM63NX	20	J-Pole	Omni			24	0104	

50027	JE7YNQ	QM07	2	T'stiles	Omni		A1	24	0204	JA1VOK
50027.8	SR6SIX	JO81HH	7	GP	Omni		F1	24	0603	
50028	XE2ED	DM10	15	½ Vert.	Omni		A1	24	204	
50028.0	SR8SIX	KN19CN	10	Dipole			A1	?	0203	
50028	5T5SN/B	IK28AC	25		Omni				Proposal for summer 2004	
50029	P29BPL	QI30	25					24	NonOp	
50029	CT.....	IM59							2/04	Proposal CT1DDN
50031.0	ZD8VHF	II22TB	50	Dipole	Omni	723		24	2/04	
50031.5	CT0SIX	IM59	10E	Dipole	E/W		F1	24	2/04	
50032	JR0YEE	PM97	2	Loop			A1	24	0204	JA1VOK
50033	OH5RAC	KP30HV	26E	2dBD	200	145			Proposal for spring 2004	
50033	VE2RCS	FN25	5				A1	24?	1203	
50033	VE7FG	CO83SW	50	¼ GP	Omni	1051	A1	24	104	
50034	YU1EO	KN04ML	1	GP	Omni		A1	24?	1003	
50034	OX	GP47							Planned	
50035	ET3VSC	KJ99IA						24	0703	Call will change to ET3BN
50035	HC8GR	EI59	30	Halo			A1	24	1203	
50035	OY6SMC	IP62MB	15W	Vertical	Omni		F1	24	1203	
50036	VE4VHF	EN19LM	35	Vertical	Omni		A1	24	0104	
50036	OA4A/B	FH17	13	Vertical	Omni		A1	?	0204 hrd from LU	
50036.6	SR2SIX	JO93BC					A1	QRT	0702	
50037.5	ES0SIX	KO18CW	15	Horiz Dip.	E/W	35	A1	24	1203	
50038	VA2MGL	FN47UQ	5	Quad-Turn.	Omni		A1	24	0104	
50038	C21SIX	RI39LL	25	Dipole	E-W		F1	24	0104	
50039	VO1ZA	GN37	10	¼ Vert	Omni		F1	24	0803	
50039	FY7THF	GJ35	10	Vertical	Omni			24	0104	
50040	ZL3SIX	RE66	65	2xDipole	NW/NE		A1	24	0104	
50040	SV1SIX	KM17UX	25	Vert Dip	Omni		F1	24	0104	
50041	VE6EMU	DO33	35	4-el Yagi	NNE		A1	24	0104	
50041	ON0SIX	JO20EP	5	X-Dipole	N-S		A1	24	1103	
50042	YF1OO	OI33	15	GP				EXP	1103	
50042.5	GB3MCB	IO70OJ	40	Dipole E/W			F1	24	0104	
50043	VE6ARC	DO05	25	GP	Omni		A1	24	0104	
50043.3	ZL1VHF	RF73MB	20	1/2Vert@4m	Omni		A1	24	0204	
50044	ZS6TWB	KG46RD	15	5/8	Omni		A1	24	0204	ZR2DX
50044,5	LZ2CM	KN13NE	0.5	GP	Omni	1500	A1	24	0204	LZ1DP
50045	OX3VHF	GP60QQ	20	GP	Omni	20	F1	24	1203	
50045.6	JW5SIX	KQ26MM	10	Dipole	Omni		A1	24	0204	
50046.5	4N1ZNI	KN03WH	1	GP	Omni	200	F1	24	1203	
50046.5	VK8RAS	PG66	20	X-Dipoles	Omni	300	A1	24	0104	WIA
50047	JW7SIX	JQ68TB	10	3-el Yagi	S	10	A1	TQRT	0204	LA0BY
50048.2	VE8BY	FP53RS	25	Vert Dip	Omni		F1	24	0104	
50048.5	TR0A	JJ40	15	5-el	N		F1	24	0204	CT1HZE
50048.7	JW9SIX	JQ94LM	10	GP	Omni		A1	24	0204	
50049	VA3BCN	FN03	3	Horiz Dipole			A1	24	0701	
50050	LZ2CC	KN22GS	5	GP	Omni	1500		24	0204	LZ1DP
50050	VA2WW	FN46	5				A1	?	0603	
50050	FO5DR	BH52	50	Dipole				NonOP?		
50050	ZS6DN	KG44DE	100	5-el Yagi	SE			24	0204	ZR2DX
50051	PY1AA	DG87IC						24	0603	
50051	LA7SIX	JP99EC	30	4-el Yagi	190		A1	24	0104	
50052	SK2CP	KP07MU	10	5-el Yagi	NW	478	A1	24	TNonOp / Proposal	
50053.5	PI7SIX	JO22NC	12	Dipole	N/S	40	A1	24	0803	
50053.6	XE3RCM	EL50	1	Dipole			A1	24	0102	
50055	OZ6VHF	JO57EI	1	Vertical	Omni		A1	24	0204	
50055	V44KAI	K87QH	2	5/8 Vert	Omni		A1	24	1203	
50056.5	VA7SIX	CN89	10	Ringo	Omni		A1	OP	1203	
50057.0	VK8VF	PH57	100	Delta Loop	Omni		A1	TQRT	0104	WIA
50057	VK7RAE	QE38	25	X-Dipoles	Omni	220	A1	TQRT	0104	WIA location change

50057	TF3SIX	HP94BC	110	GP	Omni		A1	24	0104	
50058	K3DEL	FM28FN	5	SQLoop	Omni	33	A1	INT	1203	W3OR Intermittant
50057.5	VK4RGG	QG62	10	Turnstile	Omni		A1	24	0104	WIA
50058	HB9SIX	JN47QG	0.2	J-Pole	Omni		A1	24	1103	
50058	IQ4AD	JN54DT	8	GP	Omni		A1	24	1103	
50058	LZ2TU	KN13SF	5	Dipole					0803	Probably QRT now
50058	OE3XLB	JN87AT	10	5-el Yagi				24	0204	
50059.3	PY2AA	GG66	25	GP@60ft	Omni	850	A1	24	0802	Probably QRT now
50059.5	VE3UBL	FN03	10	Turnstile	Omni		A1	24	1003	
50059.5	K4TQR	EM63OM	4	Dipole	NW/SE		A1	24	1203	
50060	KE4WBO	EL96VV	10	Loop horiz	Omni	20	A1	24	0104	qrv when OP not on air
50060.0	KD4NMI	FM05RT	100	Vert.Dip.	Omni		A1	24	0204	
50060.0	GB3RMK	IO77UO	40	Dipole	N/S	270	F1	24	0104	
50060.0	W5VAS	EM50	100	SqualoOmni			A1	24	0204	
50060.0	WB0RMO	EN10	25	Squalo			A1	24	1103	
50060	K5AB	EM01					A1	24	0104	
50060.5	KD4AOZ	EM83					A1		1002	
50061	K9MU	EN44	7	Dipole	N/S		A1	24	0204	
50061	N7SCQ	CN98					A1	?	0903	
50061.7	KH6HME	BK29	20	Dipole			A1	24	0104	
50062	GB3NGI	IO65VB	10		Omni	518			02/04	Proposal
50062	K8UK	EN82JP	2	Omni			A1	24	0104	
50062	KB6BKN	CM88	30	3 Ele	E				0703	
50062	C6AFP	FL16	1	5/8 Ringo	Omni		A1	24	0204	
50062	T99YVZ	JN84UD							0603	
50062.5	W7HAH	DN28NB	25	Stack Halos	Omni		A1		0104	QRT
50062.5	WB4WOR	FM05BT	2	GP@3m	Omni		A1	24	0602	
50063	W9JN	EN54DN	1,10	Halo	Omni		A1	24	0104	
50063	LY0SIX	KO24PS	7	Dipole@5m					0901	QRT
50063	KF4ODI	EM56	10	Loop@40'			A1	24	0902	
50063	KE4SIX	EM83	5	GP	Omni		A1	24	0104	W4WTA
50063.5	NL7Z	BP51	20	Vert Dip	Omni		A1	24	1202	
50063.5	K7UV	DN31XM	40E	H. Loop	Omni		A1	24	0104	K7UV
50064.0	W3VD	FM19NE	7	Squalo	Omni		A1	24	0104	
50064	GB3LER	IP90JD	30	Horiz.Dip.	N/S	100	F1	24	0204	
50065	KL7/KG0VL	BP75XW	100	Horiz.	Omni		A1	24	0204	KG0VL
50065	HK3BZO	FJ24						?	0603	Probably QRT now
50065	GB3IOJ	IN89WE	10	Dipole	E/W	115	F1	24	1103	
50065	VQ9SIX	MI62	10	Vertical	Omni		A1	24	1103	
50065.0	W0IJR	DM79	20	2-ring halo	Omni		A1	24	0204	ex Call KA0CDN
50065.2	KH6HI	BL01	50	Halo	Omni		A1	24	0104	
50065.5	W0MTK	DM59	4	4 Vees	Omni		A1	24	0104	
50066	W5GPM	EM26							0703	
50066	VE9MS	FN65RR	0.25	Ringo	Omni		F1		QRT	
50066.0	VK6RPH	OF88	10	U Dipole	Omni	366	A1	24	0104	WIA
50066.2	W5SIX	DM54WA	1	5-el Yagi	060		A1	24	0104	
50066.5	KA5FYI	EM10	1				A1	INT	0702	
50066.6	WA1OJB	FN54	10	2-el Coll.	EU		A1	24	0803	
50066.7	KQ4E	EM86	10	halo	Omni		A1	24	0104	
50067	WZ8D	EM79	15	6-el@75'	S-Am		A1	seasonal	1003	
50067	OH9SIX	KP36OI	35	2x X-dipole	Omni	192	A1	24	0104	
50067	N7DB	CN85RM	5	halo	Omni		A1	Days	0203	
50067.5	W3HH	EN90	10	Horiz Loop			A1	24	0104	
50067.5	N8PUM	EN65BX	10	Dipole	Omni		A1	24	0204	
50067.7	K0EC	DM69	45	1/2V+1/2H	E-W		A1	24	0204	
50068	LZ0SIX	KN12QP	20	GP	Omni	670	A1	24	0204	LZ1DP
50068	N9UM	EN52WG	10	Loop@8m	Omni		A1	INT	0104	new Call KG9PF, soon 24h
50068.5	K2ZD	FN20	20	5/8 V	Omni		A1	24	1203	
50068.8	LU1DMA	GF05PH	1	5el Yagi				INT	0304	

50068.9	K6FV	CM87UL	100		varies	55/275	A1	24	0903	
50069	W9NFL	EN55	8	5 Ele			A1	24	QRT	proposed qrv in spring 04
50069	W7BAS	CN87TG	10	5-el	090		A1	24	1201*	
50069.5	N0UD	DN87	50	3-el@6m	N		A1	24	0104	
50070	W1RA	FN41	15	Vert. Dipole	Omni		A1	24	0703	
50070	EA3VHF	JN01EA						?	1203	
50070	WA7X	DM49HO	100	J-Pole	Omni		A1	24	1203	
50070	N3LEL	FN00	1	Dipole			A1	24	0104	N3LEL
50070	K4AR	EM76...					A1		0104	QRT for QTH+Call-change
50070	W4CLM	EM95					A1	24	1203	
50070	LU4DRM	GF05	15	6dbi Vert	Omni		A1		1002	QRT
50070	KG6JAI	?							0703	
50070,5	W5HN	EM13SJ	0.8	Halo	Omni		A1	24	0104	W5LUA
50070.6	K0ETC	EM27	10	Turnstile	Omni		A1	24	0104	
50071	W7WKR	CN98PI	25	X Dipole	Omni		A1	24	02/04	qrv agn from spring 04
50072	KB8GC							Test	0603	
50072.5	W4IO	EM81	1	Vertical	Omni		A1	24	0803	
50073	PP2SIX	GH53MP	7	GP	Omni		A1	24	1103	
50073	ES6RQ	KO28WA	10	6-el Yagi	240		A1	24	Intermittant	ES6RQ 1/04
50073	W7KMA	FM18GR	1	Dipole N	EU		A1	24	0203	
50073	NN7K	DM09	1	Squalo@15'	Omni		A1	24	0104	
50073	WR7V	CN87	10	Halo	Omni				0503	
50073	K0KP	EN36WT	100	Delta Loop	Omni		A1	24	1003	
50074	FG1JD	FK96ID	10	Dipole			A1	24	0204	FG1JD
50074	KD4HLG	EM73	3/30	AR6			A1	24	0204	
50074	W5RP	DM91							0204	
50074	N7LT	DN45	3	¼ GP	Omni		A1	24	0303	
50074	K8PLF	EN81							0204	
50074.8	YV5LIX	FK60NM	5	5el Yagi	045		A1	24	1102	
50075	VR2SIX	OL72BH	12/4/1.2/0.4	1/4GP	Omni	450		24	0903	
50075	N4RT	EM60	20	Vertical	Omni		A1	24	0104	N4RT
50075	KA7BGR	CN82	40	2x2el	SW/NE		A1	24	0204	
50075	YO3KWJ	KN34BJ	10	vertical	Omni			24?	0703	
50075	NL7XM/2	FN20WO	1	Squalo	Omni		A1	24	NonOp	
50075.0	KL7GLK/3	FM18SW	4	Turnstile	Omni		A1	24	0204	KL7GLK
50076	WR9L	EN61BD	10	Turnstile	Omni		A1	24	0104	
50076	OH5SIX	KP30HW	50	2x XDipole	Omni	130		TEST	0104	Temp. QRV -> .033
50077	W8MI	EN75						OP?	0602	
50077	K4AHO	EL98FR	7.5	Vert@30'	Omni		A1	24	0204	
50077	W9FZ	EN43					A1	24	1203	
50077.5	VK4BRG	QG48	3	Turnstile	Omni		A1	TQRT	0104	WIA – Attended keyer
50077.6	N0LL	EM09OW	14	2 halos	Omni		A1	24	0204	
50078	AC3A	EM28QV	10	Loop	Omni			24	0104	
50078.0	OD5SIX	KM74	8	¼ vert.	Omni			24	0903	
50078	PT7BCN	HI06RF	5	GP	Omni			TQRT	0902?	
50078.2	TI2NA	EJ79	50	Vertical	Omni		A1	24	0204	
50078	W8SCA	EM79UN	6	Halo	Omni		A1	EXP/24	1102	
50079	KK7CQ	DM33	10	Squalo			A1		Proposal	
50079	JX7SIX	IQ50RX	10	Slope dip	Omni	269	A1	24	0204	Temp. QRT
50079	W4CHA	EL88	30	Quadloop	Omni		A1	?	0104	
50079.5	XE2KIB	DL99					A1		1002	
50080	K0UO	EM07	10	Omni			A1	24	0204	
50080	ZS1SIX	JN96FB	10	Inv. V Dipole	Omni		F1	24	0204	ZR2DX
50080	FK8SIX	RG37FR	15	GP	Omni		F1	24	0204	
50080	WD8OST	EN76	10	6el@45'			A1	24	1003	
50080.0	UU5SIX	KN74AL	10	dipole		1300		24	0204	
50080.0	4X4SIX	KN72JB	3	dip@15m		50	A1	24	0903	
50080.0	W3CCX	FM29JW	4	halo@500'	Omni		A1	24	1103	
50080	PP1CZ	GG99UQ	3	5-el	N			24	0903	

50081	LZ2SIX	KN33							0503	Probably QRT now
50081.5	LU3EMK	GF05					A1	Not24	0302	
50082.5	LU8DCH		1.5	5/8	Omni		A1	24	1203	
50083.6	LU7YS	FF49IU	5	GP	Omni		A1	24	0903	
50084.0	UT5G	KN66LS	10	GP	Omni		A1	24	0204	
50084.5	K5NZ	EM20	10						0104	QRT
50087	VK4RTL	QH30	10	Vee	Omni	582		24	0104	WIA
50088	HC2FG	EI97	5	J-pole	Omni		?		1103	
50090	ZZ2LER	GG66	10	dipole	Omni		A1	24	0104	
50090,5	WP4F	FK68WL	5	GP	Omni		A1	24	0104	
50203	F6IKY	JN35AT	0.75	5 Ele.	360	700		IRR	0603	
50283	VK3RMH	QF22OH	10	Double Loop	Omni		A1	24	TNonOp	
50288	VK2RHV	QF57	25	Turnstile	Omni		A1	24	0104	
50293	VK3RMV	QF02	15	9-el@37m	N	305	A1	24	0104	WIA (ex VK3SIX)
50297	VK7RST	QE37	15	Dipole	E/W		F1	24	0204	WIA
50304	VK6RSX	OG89	50	Hor. dip.	Omni	50	A1	24	0204	WIA
50306	VK6RBU	OF76	25	3-el Yagi	80/260	10/100	A1	24	0104	WIA
50308	VK6RTW	OF84	10	Horiz			A1	24	0104	WIA
50315.0	FX4SIX	JN06CQ	25	2xHor.Dip	Omni		A1	24	0204	
50321	ZS5SIX	KG50	8	Halo			A1		0204	QRT ZR2DX
50386	F1GTU	JN05IF	5	Loop Omni			A1	?	0104	
50480	JH8ZND	QN02UW	10	5/8 GP	Omni		A1	24	0204	JA1VOK
50485	JH9YHP	PM86	2	13-el SE			A1		0204	JA1VOK
50490	JG1ZGW	PM95VP	10	7el Yagi	S		A1	24	0204	JA1VOK
50499.5	5B4CY	KM64PR	15	¼ GP	Omni		F1	24	1203	
50520.3	SZ2DF	KM25	1kw	4x16 el el.	30	330		EXP/SUMMER		
51030	ZL2MHB	RF80					RTTY	24?	0104	
52275	ZL2MHF	RE78NU	10	V ½ Dip	Omni		F1	24	1203	
52315	VK3RSX	QF13IR	10	Turnstile	Omni		A1	24	0104	WIA / VK3PA
52346.5	VK4ABP	QG26	10	¼ Vert.	Omni	480	A1	24	0104	WIA
52420	VK2RSY	QF56MH	25	Turnstile	Omni	240	A1	24	0104	WIA soon -> 50289
52450	VK5VF	PF95	30	Turnstile	Omni	680	A1	24	0104	WIA
52490	ZL2SIX	RE68	10				F1	24	0503	

70000	GB3BUX	IO93BF	20	2 x Turnstile	Omni	456	A1	24	07/03	
70007	GB3WSX	IO80QW	2,25	5 Ele	70	105	F1A	24	03/04	G3ZXX
700 . .	OX3 . . .	HP15EO								Proposal for 2005
70010	ZD8VHF	II22TB			N	723		24	03/04	Proposal DL8HCZ
70016	GB3SMG	IO91QP	20	Dipole		195			01/04	Proposal G0RDI
70020	GB3ANG	IO86MN	100	3 Ele Yagi	160	370	A1	24	09/03	
70021	OZ7IGY	JO65FR	25	3 Ele Yagi	225	40	A1	24	02/04	QTH will change to JO55
70025	GB3MCB	IO70OJ	40	4 Ele Yagi	45	320	A1	24	09/03	
70028,5	S55ZMB	JN76VK	5	4 Ele Yagi	310	250	A1	24	08/03	
70114	5B4CY	KM64PR	15	4 Ele Yagi	315	30	A1	24	08/03	
70312,5	SJV900	JO89								Proposal SM0TSC

There are NO 4m beacons from South Africa qrv anymore.

INT= Intermittent Operation TQRT = Temporary QRT EXP= experimental UC=Under Construction
The 6m list is based on G3USF`s list.

DUBUS 2m and 70cm beacon list, March 2004, by DL8HCZ

QRG	Call	Locator	m asl	Antenna	QTF	Pwr	Info/Keeper	Last Update	Remarks
144.060	LU1DMA	GF14		Yagi	N	7		02/04 LU1DMA	
144.141	EW6DS/B	KO45IG					EW6DS	11/03 UA3ARC	
144.146	LZ2CC	KN22GS	1480	GP	Omni	5	LZ2CC	02/04 LZ1DP	
144.170	KH6HME	BK29GO	2501	2x7 Ele.	to CA	1200e		07/03 .	
144.280	VE2FUT	FN35		Horiz.		10		10/03 .	
144.285+/-	VP9DUB	FM72OH		4 Ele	EU	40	DL8HCZ	02/04 .	Proposal
144.285	VE1CBC	FN63						10/03 .	
144.289	KL7GLK	FM18		turnstile	omni	5	KL7GLK	02/04 .	
144.289	KL7GLK	FM18		2 x 13 ele	EU	100	KL7GLK	02/04 .	Temporary QRV
144.300	ZD8VHF	II22TB		Yagi	EU	50	DL8HCZ	03/04 .	Proposal
144.302+/-	5T5SN/B	IK28AC		Yagi	EU	50	DL8HCZ	03/04 .	Proposal
144.341	UT5EC	KN78MM	180	4 x Yagi	Omni	10		01/04 .	
144.350	RN6MT	KN97LN	120	Ring Dipole	Omni	5	UR5LX	01/04 .	
144.362	UT5G	KN66LS	80	Dipole	N/S	5		01/04 .	
144.370,5	UR4YWW	KN28WG	280	Turnstile	Omni	4		01/04 .	
144.387,5	RA3IM	KO56UM	230	Discone	Omni	9		02/04 .	
144.400	VO1ZA	GN37JS	90	11 El Yagi	EU	250	VO1NA	10/03 .	
144.402	UA3IFI	KO76WF	160	¼ V	Omni	5		12/03 DK3WG	
144.402	OY6BEC	IP62OA	40	11 El Yagi				12/03 LA0BY	
144.403	EI2WRB	IO62IG	248	Vertical	Omni	100e	EI8JA	10/03 DL8HCZ	
144.405	EA1VHF	IN53RE	615	Halo	Omni	25	EA1DKV	02/04 CT1HZE	
144.405	F5XAR	IN87KW	165	9 eleYagi	290	400	F6ETI	01/04 F6HTJ	Temp. QRT
144.406	CT1ART	IM67AH	560	Halo	Omni	5	CT1EPS	03/04 CT1HZE	Dirty Signal
144.407	GB3SSS	IO70IA	50	8/8 slot Yagi	300	200	G3AGA	11/03 Transatlantic Beacon	
144.409	F5XSF	IN88GS	145	9 el Yagi	90	50	F6DBI	01/04 F6HTJ	
144.410	DB0SI	JO53QP	90	Big wheel	Omni	10 TX	DL1SUZ	01/04 DL8HCZ	
144.410	RB4NA	LP30VF		9 Ele Yagi	15	5		12/02 .	
144.411	IK1LBW/B	JN44VC	745	Turnstile	Omni	1	IK1LBW	01/04 DL8HCZ	
144.412	SK4MPI	JP70NJ	520	4 x 6 el Yagi	45/315	1500	SM4HFI	02/04 SM6CEN	
144.414	DB0JW	JO30DU	238	5 el Yagi	22	50	DL9KAS	01/04	
144.415	ZS2VHF	KF25UX			Omni	10	ZS2FM	02/04 ZR2DX	FSK
144.416	PI7CIS	JO22DC	40	Dipole	E/W	50	PA0CIS	02/04	
144.417	OH9VHF	KP36OI	310	10 dBd	200	200		02/04 actually on .415	
144.418	ON4VHF	JO20HP	180	Clover leaf	Omni	15	ON7ZV	09/03	
144.419	I2M	JN55AD	46	Big wheel	Omni	10	IK2THZ	01/04 DL8HCZ	
144.420	ZS1VHF	JF96						12/03 ZR1AEE QTH	
144.420	DB0RTL	JN48PL	480	Big wheel	Omni	15	DL8SDL	01/04 DL8HCZ	QRT!
144.421	OZ...	JO46/47		2 x Yagi	300	250	OZ7IS	Transatlantic Beacon	Proposal
144.422	DB0TAU	JO40HG	326	4x4 el Yagi	Omni	15	DL3DC	02/04	
144.423	PI7HVN	JO22WW	52	Halo	Omni	10	PA3FHY	12/03 PE2KP	ex PI7FHY
144.424	IN3A	JN56NB	225	GP	Omni	0.1	IN3IYD	01/04 DL8HCZ	
144.425	F5XAM	JO10EQ	99	Big wheel	Omni	14	F6BPB	02/04 F6HTJ	
144.426	EA6VHF	JM08SQ	150	Halo	Omni	25	EA6FB	11/03	
144.427	OK0EJ	JN99FN	1323	4 el Yagi	270	0.3	OK2UWF	12/03 DL8HCZ	
144.427	PI7PRO	JO22NA	10	Halo	Omni	10	PI4VRZ	02/04	
144.428	DB0JT	JN67JT	785	4 x Dipole	0	30	DJ8QP	03/99 Probably QRT	
144.429	IQ3MF/B	JN65RW	130	2xTurnstile	Omni	4	IV3HWT	01/04 DL8HCZ	ex IV3HWT/IV3A
144.430	GB3VHF	JO01DH	268	2x3el Yagi	315	40	G0FDZ	02/04	
144.431	9A0BVH	JN85JO	489	V Dipole	Omni	1		03/95 9A2MP	QRT
144.432	9H1A	JM75FV						02/04 9H1BN	QRT!
144.433	OH7VHF	KP52IJ	165	2xBigWheel	Omni	50		01/04 OH6DD	
144.433,5	HB9OK	JN45MW	1601	Halo	Omni	3,5	HB9DUR	02/04	
144.434	DB0LBV	JO61EH	232	2xDipole	Omni	0.4TX	DL1LWM	09/03	
144.435	HB9H	JN46KE	1600	2xDipole	Omni	0.3/3		06/98 HB9PQX	Probably QRT
144.435	SK2VHG	KP07MU	535	16 el Yagi	180	800e	SK2CP	02/04 SM6CEN	

144.437	LA1VHF	JO59MS	358	X300 (Vert)	Omni	20	LA4PE	01/04	LA0BY	Temp. QRT
144.438	OK0EO	JN89QQ	602	Ring dipole	Omni	0.05/0.12	OK2VLX	12/03	DL8HCZ	Planned
144.439	OZ3VHF	JO55				0.1		02/04		
144.440	DB0RG	JO51GO	730	V Dipole	Omni	1	DL4OAN	12/03	(D)	
144.440	ZS0VST			8 el Yagi	0	30	ZS4NS	03/00	ZS5JF	Planned
144.441	LA4VHF	JP20LG	30	2x8el Yagi	0	380	LA6LU	01/04	LA0BY	
144.441	CT0TWO	IM59OM		Vertical	Omni	0.25		02/04	CT1HZE	
144.442	I4A	JN54QK	300	4xDipole	Omni	1/10	IK4PNJ	01/04	DL8HCZ	QRT
144.443	OH2VHF	KP20BB	65	2xYagi	20/230	130	OH2LNM	01/04	OH6DD	
144.444	DB0KI	JO50WC	1025	Dipole	Omni	2.5	DC9NL	01/04		
144.444	IQ5LU/B	JN53GW	1000	Big wheel	Omni	6	IW5BHY	01/04	DL8HCZ	ex I5A
144.445	GB3LER	IP90JD	108					06/02	G3UUT	QRT
144.446	OK0EB	JN78DU	1084	Miniwheel	Omni	0.07/0.007	OK1APG	01/04		
144.447	SK1VHF	JO97CJ	65	2xCloverleaf	Omni	10e		02/04	SM6CEN	
144.448	HB9HB	JN37OE	1300	3 el Yagi	345	120	HB9AMH	03/04		
144.449	I0A	JN61		2 x Bigwheel	Omni	10	IW0BCF	01/04	I5WBE	QRT
144.450	DL0UB	JO62KK	120	4 x Dipole	Omni	10 TX	DL7ACG	01/04	DL8HCZ	
144.450	F5XAV	JN23GX	100	Big Wheel	Omni	20	F5IHN	01/04	F6HTJ	
144.450,7	RB3PA	KO84UF		8 Ele Yagi	360	1		10/03	.	
144.451	LA7VHF	JP99EC	320	10 el Yagi	190	20	LA5TFA	01/04	LA0BY	
144.452	OK0EC	JO60CF	778	3 el Yagi	90	0.7	OK1VOW	12/03	DL8HCZ	
144.453	GB3ANG	IO86MN	370	4 el Yagi	160	20	GM4ZUK	02/04		
144.453	I0G	JN63IB	1200	4 x dipole	Omni	10	IW0QIT	01/04	DL8HCZ	QRT
144.454	IW0UMP/B	JN40QW	350	Turnstile	Omni	1	IW0UGR	01/04	DL8HCZ	ex IS0A
144.455	OH5ADB	KP30NN	65	Dipole	135/315	0.1		01/04	OH6DD	
144.456	DB0GD	JO50AL	930	Dipole	0/180	1 TX	DG6ZX	03/99		QRV?
144.457	SK2VHF	JP94TF	300	2 x 10 el Yagi	0/225	100e		02/04	SM6CEN	
144.458	F1XAT	JN15AO	913	Big wheel	Omni	25	F1HSU	01/04	F6HTJ	
144.459	LA5VHF	JP77KI	260	2x6 el Quad	15/180	100	LA1UG	04/01	LA0BY	QRT
144.460	HG1BVA	JN86CW	370	2 x Big Wheel	Omni	5	HA1YA	02/04	HA1YA	
144.460	VK6RPH	OF88	337	Horizontal	Omni	10		0104	WIA	
144.460	TF3VVV	HP84							Proposal	
144.461	SK7VHF	JO65KJ	25	2xCloverleaf	Omni	10e		02/04	SM6CEN	
144.462	IQ0RI/B	JN62MH	1010	3 Ele Yagi	330	25e		08/03	.	
144.463	LA2VHF	JP53EG	710	12 el Yagi	15	500	LA1K	01/04	LA0BY	
144.464	I7A	JN81EC	685	Big wheel	Omni	8	I7FNW	01/04	DL8HCZ	
144.465	DF0ANN	JN59PL	630	V Dipole	Omni	0.3 TX	DL8ZX	01/04		
144.465	CN8MC	IM64		5 el Yagi	N	30TX	CN8LI	02/04	CT1HZE	QRT
144.466	OZ4UHF	JO75LD	130	Big wheel	Omni	10	OZ1HTB	01/04	OZ2TG	
144.467	HB9RR	JN47FI	904	4 x Dipole	Omni	0.0225		09/03	HB9RR	
144.467	I8A	JM78WD	1778	SqLo	Omni	8	I8GMP	01/04	DL8HCZ	QRT
144.467	OK0ED	JN99DO	290	2xDipole	Omni	0.1	OK2UWF	12/03	DL8HCZ	
144.468	F1XAW	JN26IX	561	Big wheel	Omni	10	F1RXC	01/04	F6HTJ	
144.468	LA6VHF	KP59AL	70	9 el Yagi	210	300	LA4OO	01/04	LA0BY	
144.469	GB3MCB	IO70OJ	320	3 el Yagi	45	40	G3YJX	02/04	G3YJX	
144.469	IT9A	IM67LX	825	2xBigwheel	Omni	10	IT9QPF	01/04	DL8HCZ	QRT
144.470	OH2VHH	KP20MH	75	Halo	Omni	2		01/04	OH6DD	
144.470	OK0EZ	JN79VV	350	Vertical	Omni	2/0.5	OK1DXF	12/03	DL8HCZ	
144.471	OZ7IGY	JO55VO	96	Big wheel	Omni	25	OZ7IS	01/04	OZ2TG	
144.473	OE3XAA	JN88BA	834	Halo	Omni	0,2	OE1BKW	09/99	OE1MCU	QRT
144.474	OK0EL	JO70SQ	900	Dipole	90/270	0.005	OK1AIY	12/03	DL8HCZ	
144.474,5	YU1VHF	KN04OO	200	2xQ	135/337	10	YU1AU	12/03	YT1MM	
144.475	DB0SGA	JN69KA	1024	4x4el Yagi	Omni	5 TX	DJ4YJ	01/04		ex DL0SG
144.475	LY2WN	KO25DB	95	Turnstile	Omni	5	LY2WN	01/04	LY2IC	actual QRG .473
144.476	F5XAL	JN12LL	1100	Big Wheel	Omni	10	F6HTJ	02/04	F6HTJ	
144.477	DB0ABG	JN59WI	522	Big Wheel	Omni	4 TX	DJ3TF	03/99	DJ3TF	QRT
144.477	SR2VHJ	JO93AD		10 Ele Yagi	270	6		02/04		
144.478	LA3VHF	JO38RA	30	9 el Yagi	180	120	LA3BAA	01/04	LA0BY	
144.478	OM0MVA	JN88NE	570	Dipole	90/270	0.11	OM3ID	12/03	DL8HCZ	

144.478	S55ZRS	JN76MC	1219	Dipole	Omni	1	S57C	02/04	S51KQ	
144.479	SR5VHF	KO02ON		Turnstile	Omni	0.75	SP5TAT	01/02	SP6LB	QRV?
144.479	IQ9BF/B	JM77NO	800	2xBigWheel	Omni	3	IW9AFI	01/04	DL8HCZ	QRT ex IT9S
144.480	LA8VHF	JO48XX	300	3x2 el Yagi	150	100	LA6LCA	01/04	LA0BY	
144.481	HG8BVA	KN06PW	85	5 Ele	270	5	HA8MV	02/04	HA1YA	
144.482	GB3NGI	IO65VB	518	2x4 el Yagi	45/120	25	GI6ATZ	02/04	GI6ATZ	
144.482	I8EMG/B	*JM89BJ	1400	Halo	Omni	3	I8EMG	02/04	I8EMG (D)	
144.484	UU9JJ	KN64RO						01/04	DL8HCZ	Proposal
144.484	EA8VHF	IL18BS		2 x agi	WNW+NNE	50	DL6FAW	03/04	DL8HCZ	Proposal
144.486	DL0PR	JO44JH	75	4x6el Yagi	0/180	200TX	DL8LD	02/04		
144.488	IW1DJS/B	JN45AB			Omni		IW1DJS	02/04	IW1DJS	
144.490	DB0FAI	JN58IC	590	16 el Yagi	305	30e	DL5MCG	02/04	DL5MCG	(temp. QRP !)
144.975	RA3FGV	KO92SO	140	V-Dipole		5		02/04	RW3BP	QRV!
145.250	RB9FA	LO88DA		Vertical	Omni	2	RV9FF	09/03		
432.128	S55ZNG	JN65UU	643	Horiz. Loop	Omni	0.1	S59DKS	02/04	S51KQ	QRT
432.280	UT5EC	KN78MM	180	4 x yagi	Omni					QRV?
432.361	UT5G	KN66LS	80	Dipole	N/S	5		01/04	UR5LX	
432.3...	UA9XEA	LO..						01/04	UR5LX	Proposal
432.400	UT3BW	KN29UA	365	crossdipole	Omni	2		01/04	UT3BW	QRT
432.400	OE3XMB	JN77TX	1154	11 Ele	337	5	OE3FFC	02/04	on .806	ex 432.800
432.400	GB3BSL	IO81QJ	252	4 x 3 el Yagi	90	250	GW8AWM	02/04		ex 432.934
432.401	SK2UHF	JP94WG	445	2 x20 el coll	0/225	300e	SK2AT	02/04	SM6CEN	ex 432.875
432.401	UU9JJ	KN64RO						01/04	DL8HCZ	Proposal
432,402	OY6BEC	IP62OA		7 dBD	135°	50e		01/04	LA0BY	
432.403	EI2WRB	IO62IJ	248	5 el Yagi	95	250	EI9GO			Proposal
432.404*	F1ZNI	JN23MM	114	BigWheel	Omni	10	F1AAM	01/04	F6HTJ	
432.405*	SK1UHF	JO97CJ	65	Slot	Omni	30	SM1IUX	01/04	SM1MUT	ex 432.950
432.405*	PI7QHN	JO22KH	20	3 dB Gain	Omni	2	PA0QHN	12/03		ex 432.905
432.406	OK0EO	JN89QQ	602	Ring Dipole	Omni	0.05/0.12	OK2VLX	12/03	Planned	ex 432.966
432.407	PI7YSS	JO32CD	60	Halo	Omni	2	PA0JAZ	07/03	PE2KP	ex 432.895
432.408	F5ZPH	IN87KW	165	4 Ele	135	20	F6ETI	01/04	F6HTJ	Temp QRT
432.410	DB0ZW	JN69EQ	825	Slot	Omni	1 TX	DC9RK	03/99	DJ3TF	ex 432.810
432.412	DB0JG	JO31GT	45	Clover Leaf	Omni	1 TX	DL3QP	08/03		ex 432.925
432.412	SK6UHF	JO67EH	175	Clover Leaf	Omni	10	SM6ESG	02/04	SM6CEN	Proposal
432.413*	F5XAG	IN93WC	550	2x10 el	N/NE	40	F5HPQ	01/04	F6HTJ	
432.414	DB0JW	JO30DU	238	2 x 11 el Yagi	45	50	DL9KAS	02/04	on 432.969	ex 432.975
432.415	DB0UBI	JO42GE	125	8el Coll	30	12	DD8QA			ex 432.920
432.416	PI7CIS	JO22DC	40		Omni	100	PA0CIS	02/04		ex 432.816
432.417	DB0LB	JN48NV	367	Cornerdipole	N/S	0.2TX	DK3PS			ex 432.945
432.417	DB0OS	JO40CW	745	Slot	270	0.1	DG6YW			ex 432.945
432.417	HG3BUA	JN96CC	585	Slot	Omni	1TX		02/04	HA5SHF	ex 432.946
432.417	OH9UHF	KP36OI	307	9 dBd gain	200	70		01/04	OH6DD	ex 432.945
432.418*	F1ZQT	IN95OX	80	Big Wheel	Omni	1	F1MMR	01/04	F6HTJ	
432.420*	F5XAS	JN12BL	2400	3 el	0	50	F6HTJ	02/04	F6HTJ	
432.420	DB0VC	JO54IF	300	4xDQ	Omni	10	DL8LAO	02/04		ex 432.990
432.423	PI7HVN	JO22WW	50	Horizontal	Omni	0.5	PE1HUE	07/03	PE2KP	ex 432.873
432.425	DB0YI	JO42XC	480	Big wheel	Omni	4 TX	DL4AS	08/03		ex 432.900
432.425	EA6UHF	JM08PV	470	Halo	Omni	10	EA6FB	temp. QRT		ex 432.918
432.425	LY2WN	KO25GC	96	2 x dipole	Omni	5	LY2WN	06/01	G3UUT	Planned
432.428	HG7BUA	JN97KR	700	Slot	Omni	1	HG5ED	Proposal		ex 432.930
432.429*	HB9OK	JN45MW	1601	Halo	Omni	3,5	HB9DUR	02/04		ex 432.938,5
432.430	GB3MLY	IO93EO	600	6 el Yagi	150	40	G3PYB	11/03		ex 432.910
432.431	9A0BUH	JN85JO	489	V dipole	Omni	1	9A2MP	03/95	QRT	ex 432.847
432.432*	HB9F	JN36XN	3581	Cornerrefl.	N/S	15	HB9MHS	02/04		ex 432.984
432.432	OH6UHF	KP13GM	55	3xBig Wheel	Omni	7	OH6UH	01/04	OH6DD	ex 432.840
432.434	DB0LBV	JO61EH	234	2xSlot	Omni	2TX	DL1LWM	08/03		ex 432.845
432.435*	OH5SHF	KP30HV	145	Turnstile	Omni	1		01/04	OH6DD	ex 432.935
432.436	F5XAZ	JN06KN	144	Big wheel	Omni	50	F5EAN	01/04	F6HTJ	ex 432.886

432.437	LA1UHF	JO59MS	380	X300 (Vert)	Omni	30	LA4PE	01/04	LA0BY	Temp QRT
432.438	HG6BUA	KN07AU	1015	Slot	Omni	1	HG5ED	02/04	HA5SHF	temp. QRT
432.440*	SK7MHH	JO86GP	45	Alford slot	Omni	100e		02/04	SM6CEN	ex 432.940
432.440	DB0RG	JO51GO	730	V-Dipole	Omni	1				ex 432.940
432.441	F5XBA	JN18KF	166	4xHB9CV	Omni	10	F2AI	01/04	F6HTJ	ex 432.830
432.441*	LA7UHF	JP20LG	30	4 el Yagi	0	200	LA6LU	02/04	LA0BY	ex 432.830
432.442	CT....						Proposed	06/04	CT1DDN	
432.443	OH2UHF	KP20BB	65	2x 10 dBi	20/225	60		01/04	OH6DD	ex 432.852
432.444	DB0KI	JO50WC	925	Dipole	Omni	10	DC9NL	01/04	on 432840.8	ex 432.840
432.445	GB3LER	IP90JD	104	12 el Yagi	165	675	GM4IPK	06/02	G3UUT	QRT
432.446	OK0EB	JN78DU	1084	Mini Wheel	Omni	0.03/0.01	OK1APG	01/04	on 432965,7	ex 432.970
432.447	S55ZRS	JN76MC	1219	Slot Dipole	Omni	1	S50M	02/04	S51KQ	ex 432.950
432.447	DB0IH	JN39ML	630	Big wheel	Omni	1	DC8DV	08/03		ex 432.950
432.448	S55ZCE	JN76OH	554	GP (V)	Omni	0.07	S51KQ	02/04	temp QRT	ex 432.980
432.449*	OZ1UHF	JO57FJ	150	Big wheel	Omni	10	OZ9NT	01/04	OZ2TG	
432.450	DL0UB	JO62KK	120	Malteser	Omni	10 TX	DL7ACG	02/04		ex 432.850
432.450*	I5WBE/B	JN53LK	300	2x7 el Yagi	15/260	6	I5WBE	01/04	DL8HCZ	ex 432.450
432.452	OK0EC	JO60CF	778	10 el Yagi	90	1	OK1VOW	12/03		ex 432.980
432.453	GB3ANG	IO86MN	370	9 el Yagi	170	100	GM4ZUK	08/03		ex 432.980
432.455	SK3UHF	JP82XO	175	4xD-quad	Omni	10	SM3AFT	02/04	SM6CEN	ex 432.855
432.456	DB0GD	JO50AL	926	Slot	N/S	1 TX	DG6ZX			ex 432.800
432.460*	SK4BX/B	JO79LH	270	4x10el log p	Omni	43	SM4RWI	02/04	ex SK4UHF	ex 432.905
432.463	LA2UHF	JP53EG	710	10 Ele Yagi	15	300e	LA1K	02/04	LA0BY	ex 432.870
432.465	DF0ANN	JN59PL	630	Big wheel	Omni	1 TX	DL8ZX			ex 432.965
432.466*	OZ4UHF	JO75KC	130	Clover leaf	Omni	10	OZ1HTB	01/04	OZ2TG	
432.467	ON4UHF	JO20ET	180	Clover leaf	Omni	0.5	ON4LC	08/03		ex 432.994
432.468	LA6UHF	KP59AL	70	15 el Yagi	210	40	LA4OO	02/04	LA0BY	ex 432.865
432.470	OK0EZ	JN79VV	350			1	OK1DXF	01/04		ex 432.871
432.470	GB3MCB	IO70OJ	320	4 e agi 45/	12		G3YJX	02/04	G3YJX	QRT
432.471	OZ7IGY	JO55VO	93	Omni+ 9el	Omni/45	30/300	OZ7IS	01/04	OZ7IS	ex 432.930
432.473	OE3XAA	JN88BA	834			0,2	OE1BKW	09/99	OE1MCU	QRT
432.475*	ES0UHF	KO18DN		Ring	Omni	12	ES2NJ	11/03		ex 432.835
432.475	DB0SGA	JN69KA	1024	4 x 9 Yagi	Omni	5TX	DJ4YJ			ex 432.975
432.475	HG1BUA	JN87FI	725	Slot	Omni	5	HA1YA	02/04	HA1YA	ex 432.975
432.477	DB0ABG	JN59WI	522	Big Wheel	Omni	1 TX	DJ3TF			QRT
432.478	LA3UHF	JO38RA	12	13 el Yagi	180	50	LA3BAA	02/04	LA0BY	ex 432.880
432.478	OM0MUA	JN88NE	570	Dipole	90/270	0.08	OM3ID			ex 432.888
432.479	SR5UHW	KO02OF	130	Turnstile	Omni	0.25	SP5TAT			ex 432.982
432.480	LA8UHF	JO59FB	30	8 el Yagi	90/180	50	LA6LCA	02/04	LA0BY	ex 432.820
432.482	OZ2ALS	JO45UB	28	4 x dipole	Omni	40	OZ9DT	01/04	OZ2TG QRT	ex 432.983
432.482	GB3NGI	IO65VB	518	12 el Yagi	125	250	GI6ATZ	02/04	GI6ATZ	Proposal
432.485*	LA4UHF	JO29PJ	75	10 el Yagi	200	50	LA9NQ	02/04	LA0BY	ex 432.890
432.488	DB0AD	JO40AQ	690	V-Dipole	Omni	1		08/03		ex 432.918
432.489	OK0EA	JO70UP	1355	2 x 15 el Yagi	S+W	3	OK1AIY	01/04	on 432936.6	
432.489*	SK7MHL	JO65OR	100	Alford slot	Omni	40	SM7ECM	02/04	SM7ECM	ex 432.970
432.490	OH7UHF	KP32TW	215	6 dBd	225	15/1.5/.15		01/04	OH6DD	ex 432.875
432.490	GB3SUT	IO92CO	270	2 x8 el Yagi	0/135	10	G8XGG	08/03		ex 432.885
432.831	IQ0RI/B	JN62MH	1010	3 Ele. Yagi	330	40e		QRV? New QRG?		
432.886,7	OK0EP	JO80OC	1505	2 x 4 el Yagi	W+SE	2x3	OK1VPZ	02/04	will stay on old QRG!	
432.908	HG8BUA	KN06PW	85	9 el Yagi	270	5	HA8MV	02/04	HA8MV	New QRG?

This list is based on the official IARU beacon list. Many additions, updates and corrections were made.
This is a list for European Beacons. Anyhow a few other "special" beacons from other continents were included.

* on 70cm means that the beacon is already qrv on the new QRG!

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