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The Tsunami Amplifier

The 4x4 slimtenna

Power Source

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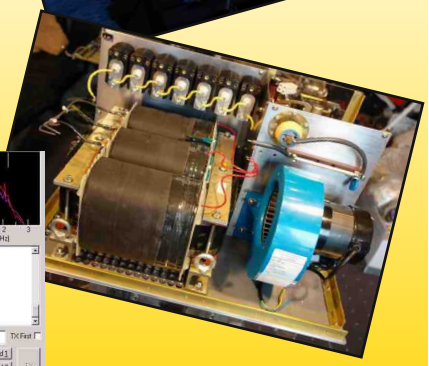

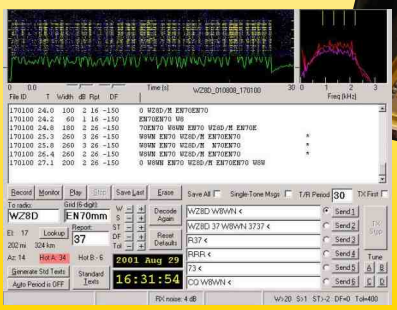

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The 4X4 Slimtenna
By Eli Kovo 4X4LH

A Reprint by Courtesy of antenneX Online Magazine issue Number: 119
http://www.antennex.com

Some of us prefer to spend a lot of money on towers, enormous in height and price, with lots of elements antennas and on top of it using the highest legal power. The rest of us, that have to deduct hard earned money from the family budget, have to make some delving in the intricacies of efficient transmitting, propagation problems and its many ingredients, if we want to still enjoy our hobby. It seems that today's Hi tech brought the hobby to a discouraging state - we don't build receivers and transmitters any more and on the operating side of it – an endless chasing of dx for a report and a QSL, which doesn't seem to be the highest goal of our hobby.

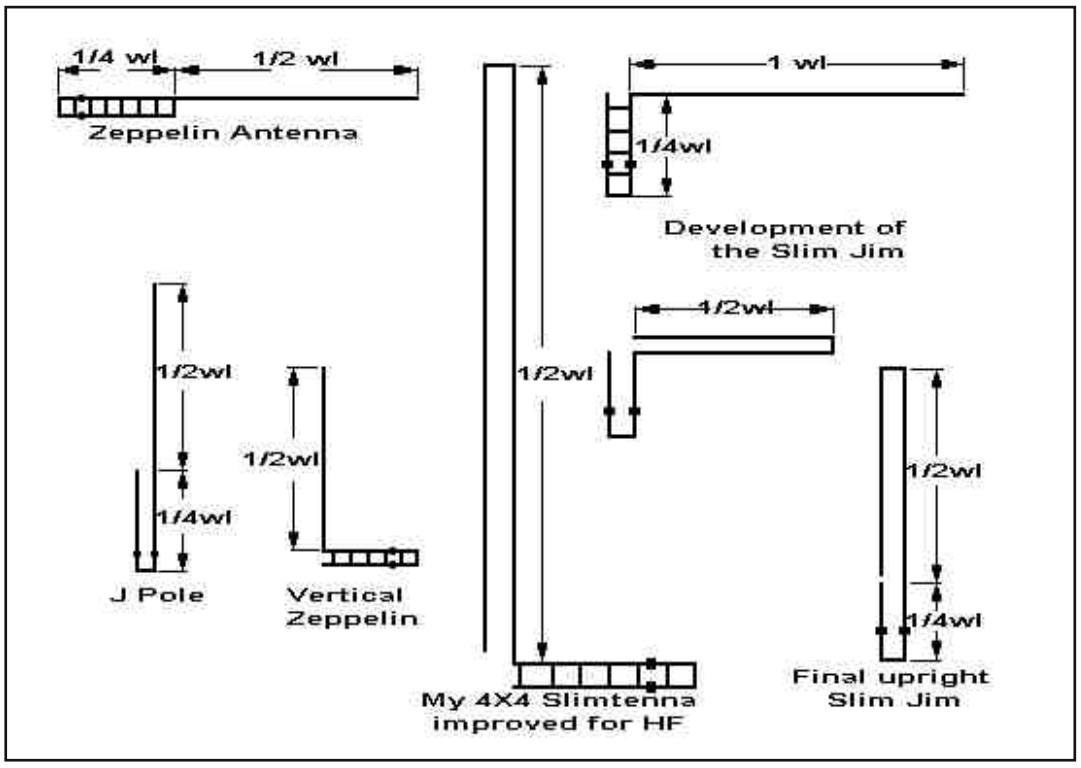
What is left to us is indeed, directing our efforts in better understanding the proper use of antennas, evaluating their radiation efficiency, getting to know the fouling behavior of the ionosphere, along with better differentiating between dBi, dBd, dB, etc. and even find out what Radiation resistance is.
After long years of thorough combing the literature, internet and other sources of information, along with building and using many different antennas, I came to the conclusion that one of the best ways to reach efficiently a distant station for a QSO of not less than 10-20 minutes, is the use of vertical antennas with no more than 150-200 watts.

In spite of some "great sages" saying that "a vertical antenna transmits equally bad to all directions", my present "antenna of the house" is a pile-up busting full wavelength wire Delta Loop, vertically polarized. I realized that the 1/4 wavelength ground plane antenna and the 5/8 wl antenna needing a good "mirror" underneath, are good choice on top of a car's metal roof, but will put you in jeopardy with your wife's garden and the lawn mower, if you try to bring them into your home station for HF.

I also realized that although a three or four elements Yagi beam concentrates its power in a narrow horizontal pattern, its vertical "take off " suffers from a high radiation angle of ~30°, loosing a lot of dB's in excessive number of hops to the ionosphere, while a good vertical monobander reaches the dx with less hops, with almost the same strength!

I further discovered that following the request of amateurs looking for a single knob (main's on/off) "no tuning" transceiver, made the manufacturers provide rather compact transceivers but without any way of antenna tuning and loading. Instead - promoting an external ATU to be added to the paraphernalia of the station with, of course, additional expenditure. It happens also because of the wish of amateurs and in many cases their necessity to use one single antenna for as many bands as possible no matter how bad the transmission is. Here lays one of the misunderstandings of many members of our fraternity. When feeding a dipole with its basic frequency it was built for, we get its basic well known clean pattern. Using the same dipole length on other frequencies with an ATU as a mediator, correcting wrong impedance, reactance and SWR for the tx to be happy, BUT:

1) The antenna will not provide the length the wave is looking for, according the rules of Physics.
2) The clean basic pattern of the dipole is distorted into many additional lobes on account of the main lobe.
3) The low take off angle desired for dx is elevated (to warm the clouds), causing more hops on its long way to the dx station.
4) The radiation efficiency becomes so low that out of our 150 watts only 15 poor watts get out on the air.
5) The ionosphere, acting as a mirror, absorbs some of our signal as a “payment for its services”, swallowing 8-10dB (for each hop) of our miserable signal, arriving at the dx station with less then 1 watt.
A correctly transmitting antenna is the best “amplifier” I know. A 3 dB gain doubles the power of your signal and a 6 dB quadruples it. Your 150 watts are sent out as 300 watts! Add the equivalent gain of low take off angle transmission (less hops) and you are better off than a kilowatt!!
I brought this long preface for my hobby fellows, pointing out some of the pitfalls. If we get aware of them we will benefit by better understanding of the how’s and why’s of antennas and enhance our station performance. This will hopefully encourage us to build and use simple, cheap and efficient, low take off angle monoband verticals.
Here comes my modification of the Slim Jim antenna which I call “The 4X4 Slimtenna”.



The esteemed Slim Jim antenna was invented by Fred Judd G2BCX on the basis of the J Pole antenna, which was based on the German Zepelin antenna. This one was an endfed dipole, fed by a 1/4 wavelength open wire ladder section, hanging out beneath the big airship. It was actually invented by an Austrian engineer in 1908 intended for use in balloons in a suspended mode. Niels Rudberg OZ8NJ found this astounding fact in an old textbook published quickly in the same year by Dr. J. Zenneck – Professor of Physics in Muenich (RadCom June 2006).
Pic1 The Zepp and J Pole, the development of the Slim Jim and its upgrade for HF-
“The 4X4 Slimtenna”

Both J Pole and the Slim Jim inventors kept its ¼ wavelength matching section in line with the ½ wavelength long antenna, e.g. a half wavelength plus another quarter wavelength. Beneath a balloon or a dirigible this was a fine and suitable arrangement as the antenna and the matching feeder were rolled out at lift off from a drum and rolled back when landing. It is certainly difficult for the ham to cope with these enormous lengths if he wants to use it as a vertical aerial on the HF bands. This is probably the reason why these fine antennas were confined mainly to VHF.

This type of feed can be in line with an endfed antenna or can be bent 90° to it. Both J Pole and Slim Jim can be put up vertically for HF - easier, if the feeding section lays near the ground or the roof. I will refrain discussing the J Pole as it doesn't offer more than an endfed halfwave dipole.

On the other hand, the Slim Jim is one of the very good antennas offering a good radiation efficiency - having:

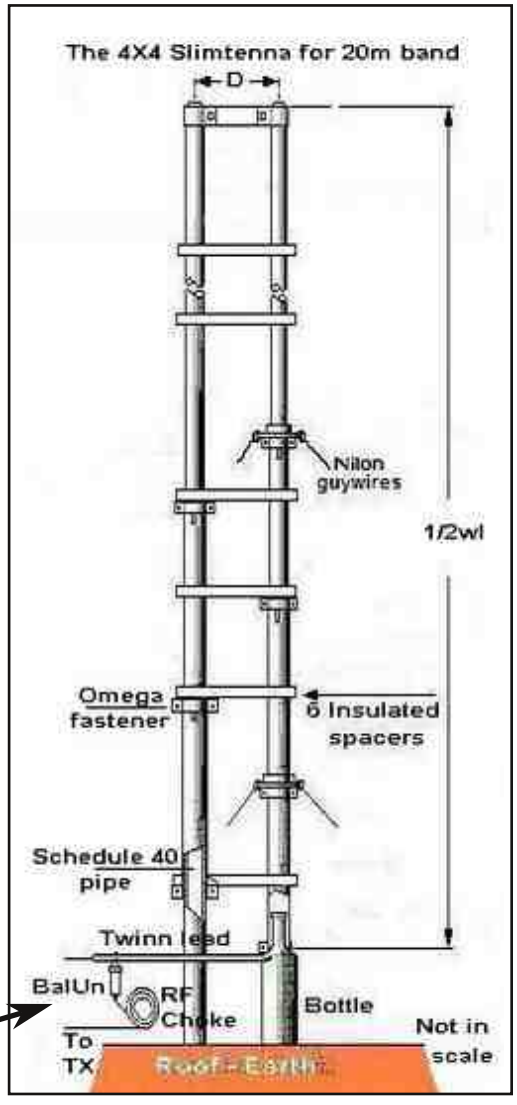
a) A driven element that combines the "efforts" of two halfwaves in phase, in a rather restricted space with about 3 dBd gain and an unbelievable 8° take off firing angle towards the horizon - almost parallel to ground!

b) Its overall height is no more than half wavelength.

c) No need at all for (repulsive quantity of) radials to substitute a missing length for our wave to ride on (unlike the ¼ wavelength ground plane searching underneath for its "lost" other 1/4 length, lifting its lobe up to Heaven for help… A pitiful scene).

Although building verticals for HF is easiest for 10 meter band, we will plunge into building it for 20 meters band and find out it isn't out of the reach of the ham both financially and mechanically. (See pic. 2)

Pic 3: The omega clamps and a flange at 4X4LH's roof



Pic.2: An overall and detailed view of the components included in the 4X4 Slimtenna

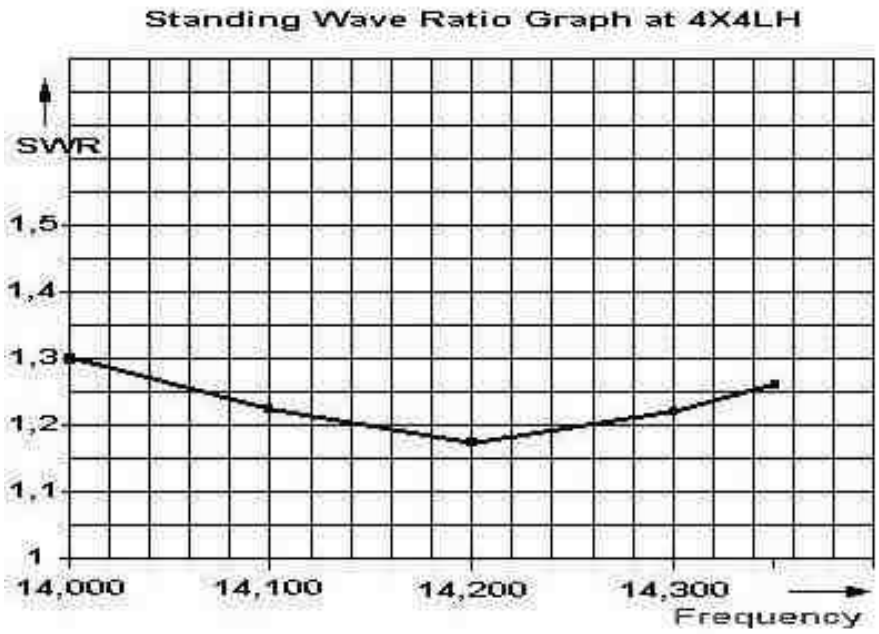
The height of the whole thing is 10.5 meters. Each leg is made out of 2, 3 or 4 pieces of aluminum pipes fitting in diameter. Starting with a bottom size of ~1.5", the upcoming pieces go into the lower one for at least 10 inches. If the pipes don't fit snugly, use a piece of aluminum beer can as a shim. I carried a magnet to the grocery shop to find the aluminum ones – the others will rust quickly. The steak I ate was happy with the beer and the pipes were happier with the shims inserted.
At the upper end of each section cut a double slot to clamp the next pipe. Fastening is done by using 2 omega clamps in each place. I don't rely on hose clamps to hold this weight and mechanical stress (See pic. 3).
Use all the way the same size of stainless steel ¼"(6mm) screws, washers and nuts. It pays back with time! Also, when doing the works you will have to carry one single size of wrenches.
The main fed element rests on a bottle, which is a very good insulator. The other leg is a bit shorter e.g. minus the distance D, and may stay on a proper size and length of Schedule 40 PVC pipe which is also a good insulator.
Prepare 6 Plexiglas (or other) spacers. I leave their design purposely to your ingenuity, as long as their size is in accordance with the table of widths below, (pic.4) and as long as they keep the two elements parallel. Place them at even distances along the antenna. Remember that the upper pipes get thinner but D stays the same. I don't go into details not wanting this article to look as if taken out of a cook book (hi).
Try to find in your plumber's shop 2 strong aluminum or plastic flanges with 3 or 4 holes and insert them at ~1/3 and ~2/3 heights from the bottom for the nylon guy wires. These flanges are supported underneath by the same type of a couple of omega clamps without drilling any holes in the pipes. (see pic.3)
The uppermost ends of the two elements are tied together (electrically) by a 1/2" wide aluminum strip, embracing both pipes and fastened tightly with above suggested type of screws. Don't forget to cap the pipe's ends against rain with anything convenient.

5,48 / Freq. in mHz	Distance in m	Cm ~
5,48 / 3,6	1,52 meter	152
5,48 / 7,1	0,72 m	72
5,48 / 14,2	0,386 m	38,6
5,48 / 18,1	0,302 m	30
5,48 / 21,2	0,258 m	26
5,48 / 24,9	0,220 m	22
5,48 / 28,5	0,192m	19,2
5,48 / 50,1	0,109m	11
5,48 / 145	0,03779m	3,8

Pic.4: A table for distance D between the two halfwaves in cm. and also for other bands

Use some help to lift the whole thing and tie it securely to all tie points you prepared in advance. I personally never tie more than one guywire to the same tie point, just to be on the safe side. If a tie point gets loose and out of its place, holding more than one guywire may cause the fall of the whole structure.
As with every good antenna, this one is also vulnerable to nearby objects like walls, metal structures, trees, etc. They shift the predesigned frequency, usually lowering it and distort the expected pattern, so try to be in the clear.

The right sequence for adjusting the antenna (any antenna) is to resonate it by achieving minimal SWR on the preferred frequency, first by taking care of its length, then with the feeding. Use your SWR meter while your TX is on AM and adjusted for minimum readable power output. By making a graph. like the one below, checking the SWR every 100kHz (See pic. 5), you will be able to decide whether the antenna is too long or too short. The adjustment is done usually on the shorter leg, where the gap was, but in some cases also on the main leg.



Pic.5: On a math textbook sheet, mark frequency and SWR coordinates

Feeding a high impedance vertical could be done by a coil and a tap for the coax, but such a coil has its own many requirements (Q, diameter, number of turns, rain cover etc.) and may radiate by itself. This is why an easier, preferred feeder of lossless open wires is used, where current in one wire is out of phase with the current on the other, ensuring no radiation from it. A ¼ wavelength section of 300Ω Twin lead solves nicely our problem. Its far end shorted, twisted and soldered. One conductor of the Twin lead connects to the bottom of the main element by a hose clamp, while the other wire is left not connected. Keep the Twin lead away of ground at the height of the bottle insulator. The necessary impedance of that specially designed for one single band ¼ wavelength matching section, is found out by a very simple formula for matching two (very) different impedances:

$$Zmatch = \sqrt{Zant \times Ztx}$$

The bottom end of the Slimtenna presents estimated impedance in the vicinity of ~1500Ω, which I could not actually measure. Adding it to our formula looks like this

$$= \sqrt{1500 \times 50} = \sqrt{75000} = 273.86\Omega$$

A good quality 300Ω Twin Lead will be near enough for that matching purpose of ours.
One more thing to be done is finding the real length of that ¼ wl section. We'll have to take into account the slowdown speed of our wave, caused by the plastic insulation

covering the conductors of the Twin lead. Enter Velocity factor. For Twin lead it is about 0.73, while, for instance, for coax cable it goes down to 0,66. We'll have to multiply the ¼ wl of our matching section by that Velocity factor (0.73) which means actually shortening the way our wave has to travel. To do that we have to decide what our working frequency is – say 14,200 mHz.:

Wavelength in meters = 300 / FmHz

300 / 14,200 = 21,12 meters, but we need only the ¼ of it, so

21,12 / 4 = 5,28 meters, now times "Velocity factor"

5,28 x 0,73 = 3.85 meters of Twin lead

This is the length of the Twin lead to be used to feed our Slimtenna. Not very difficult.

Pierce the insulation of the Twin lead at a distance of ~40 inches from the cold end and connect two alligator clips attached to the feeding coax end. You will probably need to do some more piercing until you find the points of lowest SWR. As it is clear that Twin lead is after all a balanced component, attaching it to an unbalanced coax cable necessitates the use of a 1:1 BalUn, connected to the points you found, with minor moving back and forth for fine tuning. If you happen to have only a 4:1 BalUn, you can use it instead, by looking for the right connection points (~200Ω) further on along the Twin lead, closer to the antenna leg.

Last but not least – from the upper end of the coax cable make a coil of 8 turns (close wound) with a diameter of about 8", without cutting it. You can wrap it on a ~8"plastic coil form ("borrow" a cake form from your wife) or have it air wound. Fasten it in such a way that it looks like a coil and remains like that. This device will prevent the outer side of the coax braid from joining the gang, turning into an antenna by itself, while the inside stream of current is unobstructed. This phenomenon is called "Common mode currents", meaning - currents flow on the external side of the coax braid during transmission. In common mode language it is simply an RF choke preventing your joyful SSB gurgles from appearing on your "lovely" neighbors TV, Hi Fidelity, computer, wireless phone etc. etc.

Make one last check for the lowest SWR –1.2:1 is very acceptable and you can now solder the BalUn wires to the Twin lead and cover all vulnerable joints with hot glue, RTV etc.

This 4X4 Slimtenna, if adjusted properly and operated correctly as a monoband vertical antenna, will turn out to be your "pileup-buster of the house"– try it!

My best wishes for a good luck with this fine project – 73 de Eli 4X4LH

Reference:

Y21BK - Karl Rothamel "Antenenbuch" Telekosmos Verlag 1984 / W4RNL – L.B.Cebik
W7EL - Roy Lewallen / The ARRL Antenna Compendium / Radio Rivista dell ARI
RadCom RSGB Magazine / RSGB – Radio Communication Handbook 5th Edition 1976

Eli Kovo 4X4LH has his license since 1958. At last, officially, he could switch on his long awaiting homebuilt tx (2 807's modulated by 2 807's). Ever since he is active on the bands, striving for better gear and antennas. He was a Technical Supervisor in the Israeli Radio and after a scholarship at Thomson college in Scotland, he became one of the founders of Israeli Television in 1968, raising to the post of Head of the Outside Broadcasts Dept. Now retired but still searching for better antennas for his amateur station and building them if possible.

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DB2TAM – Thorpe Abbotts Museum

The Chelmsford Amateur Radio Society (CARS) will be operating as GB2TAM from the Thorpe Abbotts 100th Bomb Group Memorial Museum, in Norfolk, on Saturday and Sunday 12/13th September.

Thorpe Abbotts was a Second World War air station, which was the home of the U.S.A.A.F 100th Bomb Group from 1943 to the end of the war in 1945. During that time, 753 aircrew made the supreme sacrifice and since then hundreds of veterans have returned to Thorpe Abbotts and continue to do so to this day. Although much of the air station has now gone, the control tower still stands and has been restored to its former glory by a group of dedicated volunteers over the last 25 years, most of who are still working for the museum.

GB2TAM has been organised to coincide with the weekend of the 100th Bomb Group reunion, which is held each year in Albuquerque, New Mexico. It is hoped that band conditions allowing, we will be able to make contact with the reunion and possibly speak to some of the dwindling number of veterans who will be attending.

The station will be operating on all HF bands using SSB as well as 2m FM and will be pleased to contact stations regardless of location. A GB2TAM QSL card will be available for all contacts which will show the control tower as it is today in a pristine restored condition.

100th Bomb Group
http://100thbg.com/
100th Bomb Group Thorpe Abbotts Museum
http://www.100bgmus.org.uk/

100th Bomb Group Memorial Museum
http://www.aeroflight.co.uk/mus/uk/1-b/100thmus.htm

The Chelmsford Amateur Radio Society run courses for the Foundation, Intermediate and Advanced exams To find out more contact the CARS training co-ordinator Clive Ward G1EUC on
Tel: 01245-224577
Mob: 07860-418835
E-mail: training2009@g0mwt.org.uk
Web: http://www.g0mwt.org.uk/training/

Credit: GB2TAM article by Mark Sanderson M0IEO
Attached Pictures:
Thorpe Abbotts Control Tower
by John Bowen G8DET

The DF5XV's Project Tsunami or 3 years of work due to a bet about a crate of Bitburger beer

Burkhard, DF5XV, www.classicbroadcast.de , owns a Monster-PA of R&S called VK20. The live weight of this PA amounts to 1.6 metric tons, it needs a big room on its own with a defined supply and exhaust air and its output reaches frightening 20 Kilowatts, even for RTTY. As a driving transmitter a R&S SK01 is required. Burkhard has an official permission of the BNA for 20 KW on shortwave for broadcast, although not for ham radio. Such enormous values of transmitting power challenge even the creativity of an experienced high frequency engineer. Well, three years ago, the author of this article placed a bet against Burkhard to build a power amplified with more than half the output power of the VK20 in SSB mode, yet would fit the trunk of a compact car as well as a manageable weight. Burkhard's answer: No way! So the race was on!

After three years have passed, the project with working title „Tsunami" is finally completed. Even the additional difficulty of a minimal required input power of only 100 Watts, achieved by every amateur transceiver, in order to attain the full SSB transmit power of approximately 15 Kilowatts was accomplished. A total amplification of about 21 dB is technically very ambitious as it was not the goal to build a power oscillator. The tube which satisfies the technical requirements of the project „Tsunami" for sure without reaching its limits is the 4CX10000D. According to the Eimac spec sheet for SSB linear amplification applications, this tetrode features a plate dissipation of 12 Kilowatts (Ua, max: 7500 V, Ia, max: 4 A) and provides a continuous output of 16 Kilowatts within the guaranteed values by Eimac. The plate input power results in 25 Kilowatts in this case. If the heating power of 563 Watts, the power of the screen and control grid as well as for the fan and other system requirements is added, a powerfull three-phase alternating current adapter is necessary. The fuse box of the single family house owned by the author provides a connection with 3 times 40 Amps at 400 Volts, hence a continuous power rating of 28 KVA. This is barely enough for a 16 Kilowatts continuous carrier – doing one's laundry in a washing machine at the same time should be avoided, though.

Fig.1: Size comparison: 4X150A, Pv = 250 W / 4CX1500B, Pv = 1500 W / 4CX10000D, Pv = 12000 W - The 322 holes in the 8 mm floor panel (underneath the transformer) are used as a cooling air intake.

Of course, in SSB mode this calculation is different. Without a voice compressor the average power in an OM-typical continuous QSO is only 20 to 25 percent of the peak power, with the use of a compressor the average power increases up to 30 percent. The plate high-voltage transformer of the Tsunami power amplifier is designed for 10 KVA, because for a SSB output power of 15 Kilowatts with an amplifier efficiency of 65 percent and an average voice power of excessive 33 percent (with dreadful contest modulation), the required transformer power amounts to 7.6 KVA. Thus, a 10 KVA transformer is more than sufficient to conduct comprehensive continuous QSOs in SSB. In case one listens to the dialog counterpart once in a while, the dimensions of the plate transformer is downright luxurious.

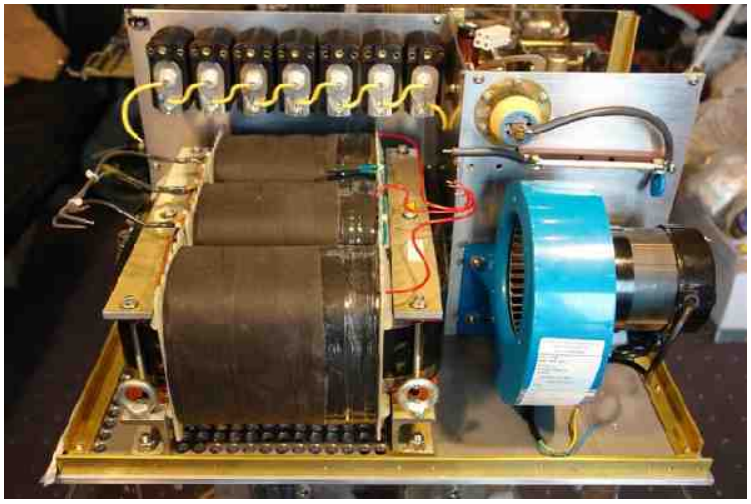


Fig. 2: 10 KVA three-phase alternating current tape wound hypersil plate transformer, weighs only 70Kilograms. Underneath the transformer one can see the 322 holes of 12 mm diameter, allowing for an especially quiet cooling air intake also cooling the transformer.

Additionally, the Tsunami power amplifier uses a 1.2 KVA toroidal core transformer for theremaining voltages. To power on the whole amplifier, a 1 VA transformer on the centralmotherboard is allotted. The turn-on procedure is designed to be very soft and after exactly 10seconds the amplifier is ready for full power.

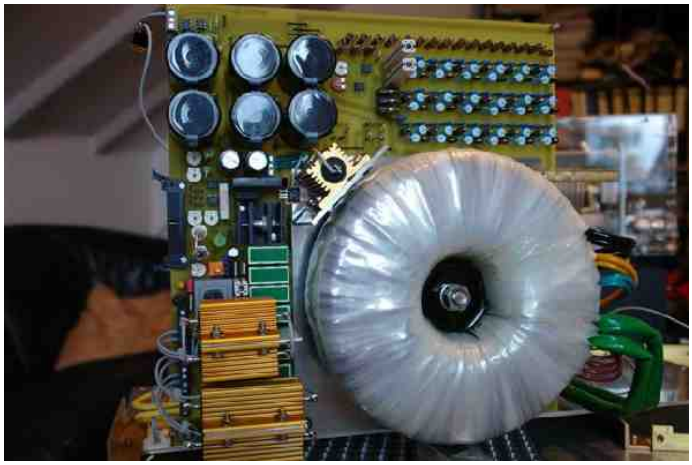


Fig. 3: Mainboard with 1200 VA toroidal core transformer (green connectors: 7.5 V - 75 A heating current), 1 VA transformer (center right, partly beneath golden resistor) for powering-on, 7800 V three-phase alternating current rectifier (top right), gold colored powering-on resistors (3 x 68 Ohms, 100 Watts, lower left), parts of the electronic controller of the control grid (center left)

After the dimensions of the main electronic components were determined, it was the constructor's ambition to build the world's only desktop output stage using a 4CX10000D which would fit on any reasonable station table. It is impossible to construct a smaller 15 KW SSB power amplifier: the total height of the "Tsunami" is only 31 cm. There is a voltage of 1000 V but only 8 mm of space between the bottom of the housing and the tube socket. Between the plate and the housing cover there is a voltage of 7000 V but only a gap of 22 mm. Although these distances are sufficient even at high humidity (e.g. after DX activity), smaller clearances are unfeasible. Also, the width of the amplifier is reduced due to the plate transformer and the roller inductor to an optimum of 57.5 cm. The same applies for its depth: 58.5 cm. A smaller 15 KW SSB power amplifier is definitely impossible! The air flow for cooling was optimized. Cold air is sucked in bellow the anode transformer, keeping it cool at the same time. The warm air is then taken out on the shortest path above the plate. Of course, the best and most quiet fan available is used and mounted to the housing with a rubber joint to minimize vibrations. Also, on reception, the fan speed is reduced to further minimize noise. Still, the radial fan is dimensioned to absolutely be on the safe side, so the air flow through the amplifier tube is increased when transmitting, which is not quite inaudible. But the amplifier stays cool even during non-stop operation.

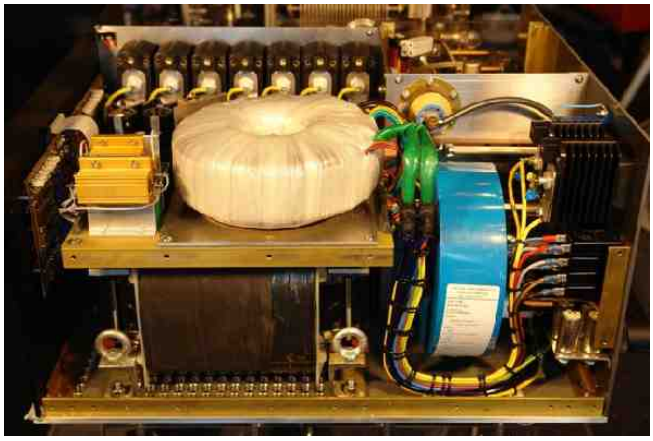
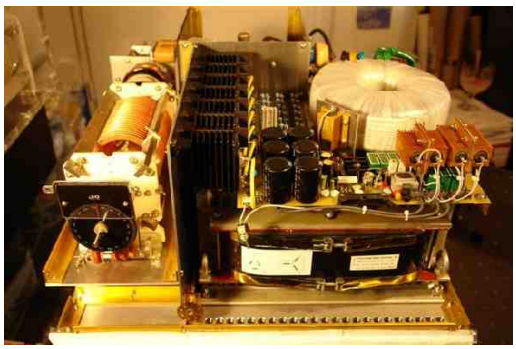


Fig. 4: On the bottom: three-phase alternating current hypersil plate transformer with 10 KVA, on top the central controller board with a toroidal transformer with 1200 VA (green connectors: 7.5V / 75 A heating current), fan (blue), 7 Zener diodes (50 W each) for the screen grid (behind the toroidal transformer). Two Zener diodes (50W each) as bias voltage of the precise electronic voltage control for the control grid are mounted to the rear panel. Plate fuse and feed through capacitor (top right), front panel with display board and digital control system for all switching operations (10 ms timing) of the amplifier as well as the control logic for the motors of two variable vacuum capacitors (left).

The configuration of the power amplifier without the front panel is depicted in Fig. 5. A ribbon cable connects the central main board with the display and control board on the back of the front panel. This display and control board also contains the complete processing logic of the amplifier as well as the Darlington transistors to directly control of all power relay. The power or RF relays will definitely not be triggered under load. Therefore, even the vacuum relays are working under optimal conditions. Fig. 6 shows the configuration of the front panel without pushbuttons and switches. By the way: the advantage of LED displays is their ability to display PEP values without indolence. In order to provide a stable operation of an power amplifier featuring an amplification of 21 dB, a transformation of the input voltage to the required driving voltage of the tube (approx. 245 V), an excellent RF insulation between tube input and output as well as additional neutralization of the tube is required. The insulation between tube input and output was achieved by galvanically grounding the screen grid and the installation of an additional mechanical perforated grid between screen grid and the plate of the tube at the same time. This mechanical effort depicted in Fig. 7 has never been reported before in public descriptions, so this might be a new idea. The screen grid was also grounded using 8 low capacitance connections. Fig. 7 also presents the RF plate choke of 112 uHy and the 8 KV feed through capacitor. The plate choke was supplied with an adjustable short circuit ring (silver wire with Teflon hull) in order to put two resonance points in the center between amateur bands.

Fig. 5: Front view without front panel, side plates and back board. Three-phase alternating current high voltage plate transformer (bottom right), central power supply board with toroidal transformer (above plate transformer), 7 x Zener diodes for the screen grid (center top), roller inductor (top left), cogwheel (bottom center) for switching the control grid transformer parts (compensating the input capacitance of the tube and neutralizing the tube itself, 11 switching positions for all amateur short wave bands)



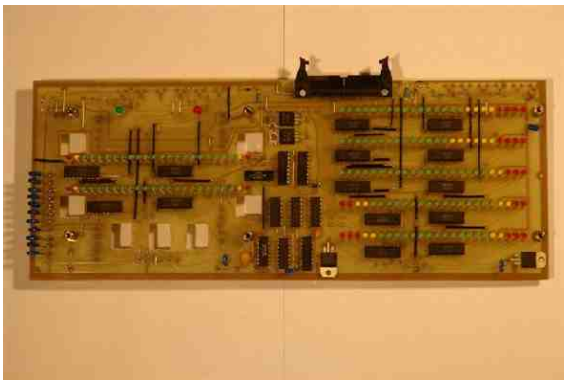
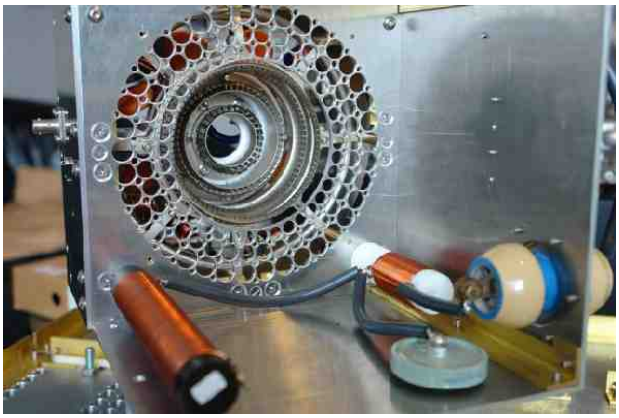


Fig. 6: Display and control board: the 8 ICs in the center control all PA functions with a 10 ms timing

Fig. 7: RF insulation of the grid area from the plate area by a perforated metal plate of 4 mm thickness. The eight low inductive ground connection of the screen grid are visible directly behind the perforated plate. Instead of the smaller second RF plate choke a 2 pF capacitor was later installed for neutralization



The modular tube package is depicted from the grid side in Fig. 8. The heating current (7,5 V / 75 A) is provided by the blue wires (2 x 16 mm²) whereas the orange ceramic capacitors (4,7nF / 6,3 KV) are the bypass capacitors which will RF technically ground the cathode on the shortest path. On the top right the input transformer is visible. This transformer with ratio 1:4 was replaced by another transformer with ratio 1:9 (tripling the voltage). The generously dimensioned RF input resistor has 450 Ohms at a 500 Watts input. The band switching is done by an 11-pole rotary switch. In the final version this switch was equipped with two layers, one for optimizing the input SWRs, and the other for neutralization. Also the coils for compensation of the different bands are partly visible. The modular and compact construction of the tube unit is very solid and easily accessible for service and optimization. The neutralization of the unit is carried out with heating and control grid voltage applied. Each and every band was optimized with respect to the input SWRs and neutralization with great precision, which was very tedious but the essential key for the success of the project. There is a distinct switch position for each band; the broad 10 m band however requires three positions. But of course the Tsunami power amplifier works stable even without neutralization, but the amplification is lower in this case and is slightly dependant on the frequency. So for perfect operation at an amplification of 21 dB all technical possibilities must be exploited.

But the results of superior RF production with unrestrained power compensate for the costly calibration work. With an input power of only 5 Watts an output of 750 Watts is achieved. With 30 Watts input the output power reaches 4400 Watts. Even with an SSB input power of 100 Watts the gain remains constant, i.e. the output power amounts to (40 m) 14.6 KW. The tube is not really challenged and demonstrates well-being and nonchalant performance. Only the terms of license are not really humored if the antenna shall be used as a load resistor. Unfortunately, a 5 KW dummy load by Bird was not really humored as well and quit its service with a loud bang after about 6 seconds of a 10 KW load (taking the picture for figure 14 took this long). All in all the construction was the sole goal of this project, besides the crate of Bitburger beer in case the bet should be won, of course …

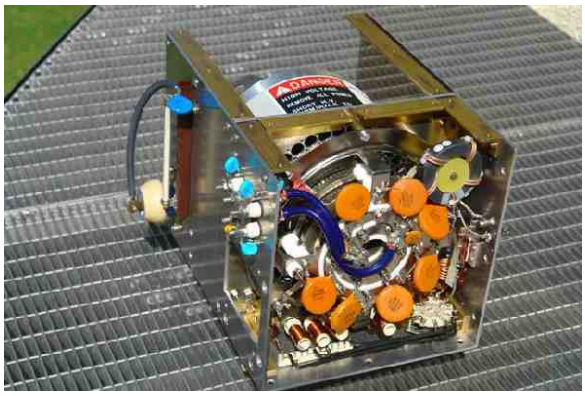


Fig. 8: Grid input: adjustable input inductors (bottom), HF input resistor (right of center), RF transformer (top right), 11 pole band switch (bottom right), other details: see text

The output transformer network (pi filter) can be seen in Fig. 9. Roller inductor and counter dail are on the right, the massive 10 m inductor at the top of the image. The 500 pF / 15 KV vacuum rotary capacitor in conjunction with the 2500 pF / 5 KV vacuum rotary capacitor determine the adjustment of the tube output impedance (about 3700 Ohms) to the 50 Ohms of the coaxial connector, based on the ratio of their capacitances. Of course, the 500 pF is primarily responsible for resonance adjustment. For a pi filter consisting of exactly these components, an operating frequency in the range of 1.8 – 29.7 MHz can be selected continuously. Furthermore, the Q of the pi filter can also be continuously adjusted according to specific needs. These are obvious advantages over pi filter with RF switches. The vacuum rotary capacitor can be turned while under full RF load without any problems; its variation range is about 1:100 compared to 1:10 for variable air capacitors. The only disadvantage of such a circuit is the high cost of its components in contrast to a switched network with air rotary capacitors. Aside from this, the usual components would quickly go up in smoke due to the available RF output power. A keyed signal (1 KHz, keyed at 20 Hz, on-off-ratio 1:2) is used for a quick and precise adjustment of the pi filter. The signal is looped into the microphone cord and hence provides perfect SSB adjustment: http://www.mydarc.de/dc9tm/ .
The author only has a 100 W transceiver available, which is the reason why the measurement of the output power ends at 14.6 KW SSB (40m). In case this is not enough, the Tsunami power amplifier can produce even more output power by increasing the input power. But it remains the operator's decision to observe the limitations, which is a question of character.

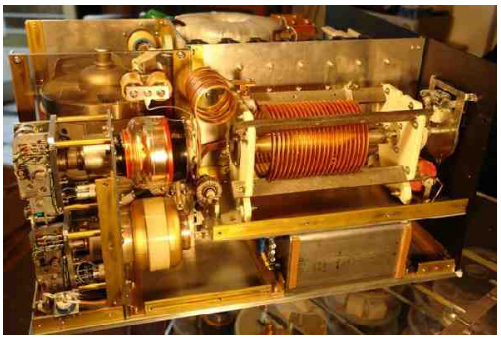


Fig. 9: Pi filter with roller inductor and counter dail (top right), 10 m coil (top center), two motor controlled vacuum rotary capacitors, 500 pF (15 KV) on top and 2.5nF (5 KV) below. Bottom right: two MP capacitors (32 uF / 6 KV each, so 16 uF / 12 KV combined) for the plate voltage

Fig. 10: Power amplifier without back board, the motors for the two vacuum

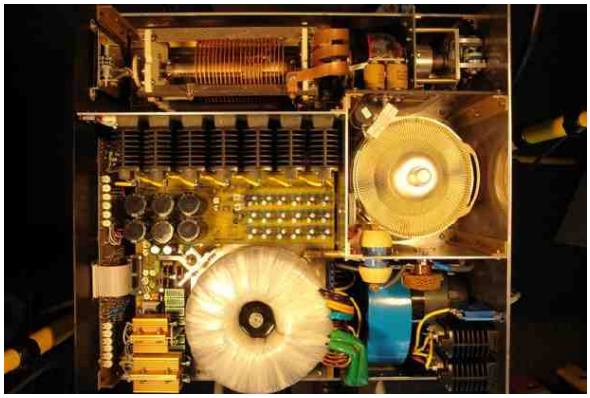


Fig. 11: Finished Tsunami power amplifier; top view, the brand new tube is shining happily!

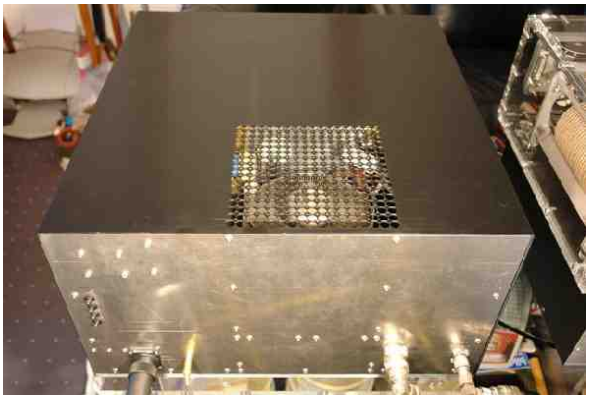


Fig. 12: Tsunami power amplifier; back view (left to right: 4 main fuses (circuit breaker), three-phase alternating current connection (5 x 32 A, 400 V), PTT (cinch), output (7/16), input (SO239))

Fig. 13: Finished Tsunami power amplifier on a sustainable acryl glass table, custom-made

Fig. 14: Finished Tsunami power amplifier: Does anybody know of a smaller 15 KW SSB output stage?

Fig. 15: Detailed view of the laser inscribed front panel

Data of Tsunami RF Linear Amplifier

RF linear amplifier covers all amateur bands from 1.8 MHz to 29.7 MHz

3 Power supply transformers	10000 VA , 1200 VA & 1 VA
Plate voltage at full output power	6500 V
Screen voltage, stabilized	1000 V
Grid voltage, regulated	- 245 V +/- 20 V
Filament	7.5 V / 75 A
Input SWR in the middle of band	
	160 m – 30 m 1 : 1.25
	20 m 1 : 1.35
	15 m 1 : 1.45
	12 m – 10 m 1 : 1.65
Gain (1.8 – 29.7 MHz)	20 - 21.6 dB
Neutralization	1.8 – 29.7 MHz:
Isolation between input and output	45 – 50 dB

Output with:

5 W Input:	0.75 KW	Input: SSB Signal:
10 W Input:	1.5 KW	33% of full 1 KHz Modulation
20 W Input:	2.9 KW	on / off Ratio 1:2, Interruptions: 20 Hz
30 W Input:	4.4 KW	
40 W Input:	5.8 KW	Equipment:
50 W Input:	7.3 KW	R&S 20 KW Dummy Load
60 W Input:	8.7 KW	Bird Power Meter
70 W Input:	10.1 KW	
80 W Input:	11.6 KW	Measurements
90 W Input:	13.1 KW	on 7.1 MHz
100 W Input:	14.6 KW	

Harmonic output	50 dB below rated output
Intermodulation distortion	35 dB or better
Tube Eimac	4CX10000D

Input network:

1:9 Transformation, 450 Ohm, 500 W HF Resistor, Tube Input Reactance Compensation & Neutralization for each band, 11 pol. bandswitch, two levels

Output network:

Roller inductor 20 uH & 2 motorized vacuum capacitors 500 pF / 15 KV and 2.5 nF / 5 KV

Metering: Display of all parameters – no switching

Computer control of all switching functions: No relays switching under power conditions

Soft start inrush, 10 sec delay time for full power

Turbine blower with 2 speeds

Well regulated screen and grid supply for +ve and –ve currents as well as current limiting to protect the tube and minimize the IMD. It´s impossible to override the screen and grid dissipation at any working conditions

The finish is of high quality black eloxial aluminia

Dimension	575w x 310h x 585d mm
Weight	132 Kg
Accessory (for Icom-Transceivers)	Module for optimized tuning (1 KHz; on / off: 1:2, 20 Hz)
Price:	Very low: About 1.7 €/W (1.7 €/W x 14.6 KW = 24.8 K€)

Some comments on the measurements

Measurements of the output power of the Tsunami power amplifier revealed a decreased output at higher frequencies. It turned out that this is mostly due to the ICOM transceiver (IC 7400) as its output is reduced when frequency is increased. Although it still pretended an output power of 100 W on its display, but the actual output at 10 m was only 74 W for example (with tuner). In general, the RF parts used in the Tsunami output stage are not small in terms of space due to their high performance. Hence, the signal paths and stray capacitances are inevitably larger as, for instance, in a 1 KW power amplifier. Still, the Tsunami features an impressive output power across the full frequency range from 160 m up to 10 m. The complex roller inductor allows for a continuous variation of the operating frequency across a broad frequency range, but the disadvantage is that the requirements of frequency variation, e.g. the skin effect, cannot be accounted for due to the constant turns of the coil. In switched pi filters, the respective inductor parameters like coil diameter, thickness of the conducting layer as well as the distance between the coils can be adjusted according to the desired frequency range, thereby a uniform output is achieved across the full frequency range. However, the Q of the output circuit predetermined by a fixed number of taps, whereas it can be continuously adjusted using a roller inductor.

For the Tsunami project, particular attention was devoted to resilience and reliability so the roller inductor that is used was chosen from a set of 8 different inductors according to these aspects. With a modification of its contact finger, the shortest possible contact path between roller inductor and the two vacuum rotary capacitors could be achieved. Also, motorized capacitors were a requirement for the best possible placement of the two pi filter capacitors. It is only due to these artifices that the frequency range of the Tsunami power amplifier completely covers short-wave, including the medium wave region of the 160 m band. The small variation in the amplification factor within the single bands can be easily compensated with a variation in input power. The performance of the fully assembled Tsunami is well beyond traditional amateur radio

means. Of course, one has to especially deal with the performance of antennas, antenna couplers, cable connections and so forth. A 165 m loop antenna, a reasonable open wire feeder and a well dimensioned antenna coupler permit for smooth operation on all bands discussed here, but excessively exceeding legal constraints should not be considered. As the author abides to the rules, the Tsunami is up for sale – but of course the bet has to be won first.
Of course, interfering factors also increase with increasing power. So one has to deal with complications like, e.g. for the author, RF destroying DSL modems. Therefore, a great deal of attention has to be paid to control strayed RF in the system. As soon as ferrite beads were attached to the 230 V and 400 V power cords as well as the PTT and HF control cables, everything was fine again.

So are destroyed DSL modems acceptable for fellow human beings? Of course not! As the German philosopher Max Weber says: Every human is responsible for his own bondage. This can be translated to: One should only create as much power as circumstances and fellow humans permit. ??!

Fig.16: Proof of output power: With an inputof only 70 W on 40 m the Tsunami poweramplifier provides an output of 10.1 KW.

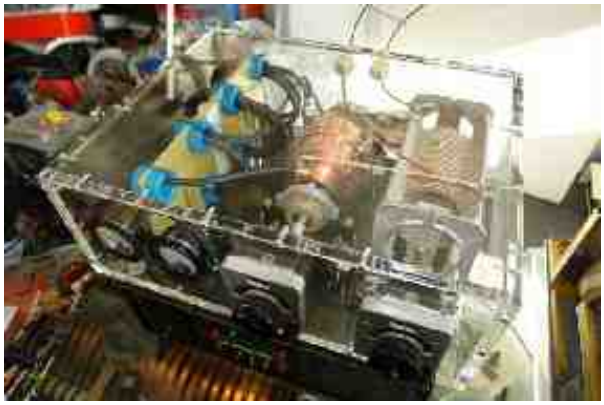


Fig. 17 – 19: The exclusive Tsunami capable antenna coupler in acryl glas, working up to 15 KW SSB output in a frequency range from 160m up to 10 m. The integrated power meter (original Bird) exactly indicates forward and reflected transmission power, allowing for quick and accurate adjustment of the antenna. The coupler sits ontop an amplifier with a 4CX1500B, which provides an output power of at least 2 KW SSB at a height of 16.5 cm.

Fig. 20: Ferrite bead for 3 x 400 V power cord, weighing about 4 Kg.

The author would like to thank his radio colleagues for the valuable support and assistance during the realization of the Tsunami project.

THE DX NEWS
From the Web (tnx opdx, 425 dx news, arrl...)

 3D2, FIJI

Operators Jacek/SP5EAQ and Jacek/SP5DRH will be active as 3D2MJ and 3D2KJ, respectively, from Viti Levu (OC-016), starting October 1st for four weeks. Activity will be on all bands, but with an emphasis on the lower bands. They plan to use two stations with small amps and vertical antennas. QSL via their home callsigns.

 4W, TIMOR-LESTE

Currently, two operators are active from here. Al, CT1GPQ, now active as 4W6AL, will be there until October 3rd. Remember, this is "NOT A DXpedition"! CT1GPQ is in Timor-Leste with a medical team and radio operations will take place only during his spare time. He was heard this past weekend on 20 meters CW at various times between 0800-1300z. QSL via Toze, CT1GFK. Online log is now available at: http://algarvedx.com

Second operator is Chris, VK4FR, now active as 4W6FR, will be there until mid-October. He is also on a work assignment. Chris was heard this past weekend mainly on 30 and 20 meters using PSK31. QSL 4W6FR via VK4FW.

 5B, CYPRUS (New IPA Op!)

Gab, HA3JB, will be active as 5B/HG3IPA between September 25th and October 2nd. This is a new IPA activation and is valid for HA-IPARC Award (Hungarian International Police Association). Find IPARC Award info at: http://www.ha3jb.com/award.html

Gab plans to be in the CQWW RTTY Contest (September 26-27th). Online log will be available on his Web page at: http://www.ha3jb.com

 9H, MALTA

Members of the Dutch Society of Radio Amateurs (VRZA) will once again be active using their special callsign 9H9PA from Qawra between September 5-28th. Activity will be on 80-6 meters using CW, SSB and the Digital modes. QSL via PB9ZR, by the Bureau or direct to: Ruben van der Zwet, Van Speykstraat 238, 2161 VT Lisse, The Netherlands. NO IRC coupons, they are not valid anymore in the Netherlands (2 USDs only).

PLEASE NOTE: Operators will also operate under their individual callsigns. The following callsigns were mentioned: 9H3AB (QSL via PA1SL), 9H3DZ (QSL via PA2AM), 9H3FD (QSL via PA3FHR), 9H3ON (QSL via PG9W), 9H3S (QSL via PA3HGP), 9H3X (QSL via PE1NGF), 9H3YM (QSL via PE1OFJ) and 9H3ZR (QSL via PB9ZR).

 9M6, EAST MALAYSIA

Operators Miki, JJ2CJB/AC2AI will be active as 9M6/JJ2CJB from "Langkah Syabas Beach Resort" located near the city of Kota Kinabalu on the Island of Borneo (OC-088) for the CQWW DX SSB Contest (October 24-25th). He plans to run 400 watts into a Force12 C4 beam. QSL via LoTW, e-QSL or the JA Bureau.

 AH0, MARIANA ISLANDS

Kuny/W1FPU (7L1FPU) and his nine-year son Yoshiki/ KH0UA (JF1UCV), Tomo/N2QP (JQ1OCR), his wife Yuri/KE7TWK, Hajime/AH0BR and Moto/W1NDE will be active from the Mariana Islands between September 4-7th. Activity will include a Multi/Multi entry in the All Asian DX SSB Contest (September 5-6th) as AH0BT. QSL via 7L1FPU, by the Bureau and direct.

 EA6, BALEARIC ISLANDS (EU-004)

Adrian, AA5UK, will be active as EA6/AA5UK from Ibiza (JM09tb), October 14-29th. Activity will be holiday style on 160-10 meters using mostly SSB and various Digital modes. Also, look for satellite activity on various birds. He will also be active during CQWW DX SSB Contest (October 24-25th). QSL via his home callsign, by the bureau, LoTW or eQSL.

 FT/G, GLORIOSO ISLAND (Update)

Didier, F5OGL, Glorioso 2009 team leader, announced this past week (on August 19th) that "the Glorioso 2009 team has in hand the flight tickets from Paris CdG to the St. Denis Reunion Island airport. The departure is scheduled on September 11th and the return on October 8th. The information about the French Forces Transall flight from Saint Denis to Grande Glorieuse will be published as soon as the FASZOI Hq will have confirmed them. (FASZOI = French Armed Forces for the South Indian Ocean Zone) The stay on Grand Glorieuse is considered having about three weeks length. All the gear has been picked up and is now ready packed on pallets to be sent to the Reunion island in the next few days. Thanks especially for that to the Provins ARC, F6KOP members Serge, F6AML and Frank, F4AJQ." For more details and updates, visit the FT5GA Web page at: http://glorieuses2008.free.fr

 HL9, SOUTH KOREA (Update/Attention PFX Hunters!)

Mike, KE7WRJ, will be here for over 2 months starting September 9th. He plans to be active as HL9QST, September 10th, but no later than 11th. This is a rare prefix only assigned to U.S. Service members assigned to Korea. His tentative schedule is to operate from 4 different locations in South Korea as follows: September 10-12th: Seoul - September 14-24th: Camp Casey - September 25th-October 18th: Camp Humphreys + October 19-29th: Camp Carroll - October 30th-November 13th: Seoul

Activity will be on 40-10 meters, depending on the propagation, using CW and SSB. Operations will be at least 8 hours a day during the week and longer over the weekends. Look for him to be in both the Extra and General portions of the bands. His equipment will consist of a 5000A by Flex Radio, a "3 element Yagi in a Bag" from Super Antennas. QSL via KE7WRJ, direct or LoTW.

 JD/O, OGASAWARA

Operators Makoto/JI5RPT (JD1BLY) and Taka/JO2JDJ (JD1BLP) will be active from Chichijima Island (IOTA AS-031) between September 19-22nd. Activity will be on 40-6 meters using the satellites, CW, SSB and Digi modes. QSL via their home callsigns. Log search for JD1BLY will be available on the following Web site: http://www.ji5rpt.com/jd1/

 LX, LUXEMBOURG

Operators Theo/PA1TK, Kees/PA5WT and Rob/PA3GVI will be active as LX/homecall between September 4-7th. Look for Kees and Rob to focus on the HF bands between 80-10 meters using CW and SSB. While Theo operates in the IARU VHF Contest on 144 MHz (2m). QSL via their home callsigns.

 P29, PAPUA NEW GUINEA

Allan, VK2GR, will be active as P29CW from the Western Province between September and December. Activity will be only during his spare time because he is there working with "Australian Doctors International" - ADI - http://www.adi.org.au

Due to the limited availability of power, Allan may not be active on the many field trips during his stay. QSL direct to Tommy, VK2IR, with 3 USDs or new IRCs. PLEASE NOTE: DO NOT send QSLs to the Papua New Guinea address.

SN120, POLAND (Special Event)

Look for special event station SN120OSP to be active between now and October 31st. Activity will be on all bands and modes. Operations are to celebrate the 120th anniversary of the auxiliary fire brigade of the Polish City "Gorowo Ilaweckie". QSL via SP4CUF.

SPECIAL EVENT

The ARRL announced that the Hiram Percy Maxim Birthday celebration is back! This year, the ARRL is honoring the 140th anniversary of the birth of the League's first president and co-founder. Hiram Percy Maxim, W1AW, was born September 2, 1869 and died February 17, 1936. The special event is open to all amateurs, and the goal is to work the stations adding /140 to their callsigns, and contact as many as possible during the event period, September 2-9th.

A special certificate is available for making at least 25 contacts with /140 stations, with endorsement increments of 25, and a maximum endorsement of 100. Who is eligible to sign /140? ARRL members who hold ARRL appointments, ARRL elected volunteers (such as ARRL Directors and Section Managers), ARRL Life Members, ARRL Head- quarters staff and VEs, AECs, QSL bureau workers and awards managers (who are ARRL members).

The complete list of eligible positions can be found on page 20 of the September 2009 issue of QST. For more details, read ARRL Letter (Aug. 21st, Vol. 28, No. 33) or go to the ARRL Web page at:

http://www.arrl.org/news/stories/2009/08/17/11025/?nc=1

T31, CENTRAL KIRIBATI

Craig, N3BQR, will be on a research trip to Phoenix Island (OC-043) and expects to be active as T31AA between September 10-25th. Part of his research will involve Craig trying to land on at least six of the eight islands in the chain, although this is subject to local sea state conditions. Activity is expected on 20 meters SSB using vertical and/or dipole. QSL route to be announced later.

TI5, COSTA RICA

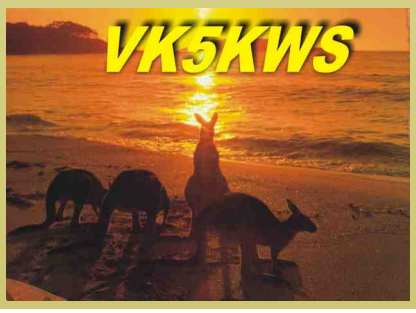
Operators Lewis/WW4LL and Andrei/EW1AR/NP3D will be active as TI5/homecall between September 23-28th. Activity will be on all bands using RTTY, SSB, and perhaps some CW. QSL via LoTW, also direct per (QRZ.com) address.

XW, LAOS

Bruce, XW1B, will be active during the CQWW DX CW Contest (November 28-29th) as a Single-Op/All-Band entry. QSL via E21EIC.

ZK2, NIUE

Koji, JM1CAX (ex-D2NX), will be active as ZK2NX between September 19-25th. Activity should be on all bands, especially 30/17/12 meters, mostly CW, but some SSB. QSL via JM1CAX, by the Bureau or direct.



DX-CALENDAR
By SM3CVM

The calendar is available at http://www.sk3bg.se/

- 7/9 WEST- EAST MALAYSIA and BRUNEI; 9M8QQ, 9M6QQ and V85QQ
from Sarawak (9M8QQ), Sabah (9M6QQ) and Brunei (V85QQ) by DF5UG. (QSL via home call.

- 30/9 CROZET I.; FT5WO AF-008
by F4DYW says he will be working at Alfred Faure Base on Ile de la Possesson. He plans to operate on 20, 15 and 40 metres SSB during his spare time, using 100 watts and dipoles. QSL via home call, direct or bureau. Look for updates on http://f4dyw.free.fr/index.php?langue=fr&contenu=ft5wo.html

- 31/9 MONGOLIA; JU85TTC
to celebrate the 85th anniversary of "Technique Technology College of Mongolia. Activity over the past weekend has been on 20 meters CW. QSL via JT1DN.

- ca 2/10 CHILE; CE73RG
The Radio Club Rancagua (CE4RG) was founded on July 22, 1936, and the 73rd anniversary will be celebrated with the special event station. Operation will take place in CW, SSB and PSK on 80/40/20/17/15/12/10m. QSL via CE4WJK.

- 3/10 TIMOR-LESTE; 4W6AL
from Timor Lorosae by CT1GPQ. Activity will be on 40/30/20/17 meters SSB, RTTY and preferably CW. His station setup will be an Icom IC-706 MK2g, a dipole for 40 and 30 meters and square loops for 20 and 17 meters. Pilot station and QSL Manager is Toze, CT1GFK. The pilot station will be in daily contact with CT1GPQ. Any questions or suggestions should be sent to star@algarvedx.com
Activity logs will be online (possibly daily) on http://algarvedx.com/
All information will be sent first via the Algarve STAR DX Team Mailing List. Subscriptions are available on team's WEB site. PLEASE NOTE: This is "NOT A DXpedition"! CT1GPQ will be in Timor-Leste with a Medical Team and radio operations will take place only during his spare time.

- 31/10 JAPAN; 8J6SL AS-077
from the Kumamoto Museum to celebrate the 100th anniversary of Hisatsu (Railroad) Line (Steam Locomotive) on the Island of Honshu (JIIA AS-077-001). Activity will be on all bands and modes. Possibly 5 stations will be on the air. QSL via the JARL Bureau.

- 1/11 ANTARCTICA; VKØBP AN-016
is currently working at Antarctic Davis Base Station, Gridsquare MC81xk. His activity is limited due to his workload, but he is expected to be on all HF bands. He seems to like 20 meters between 1500-1800z. Operations have been on SSB and PSK31, but he plans to operate on other modes later on during his stay at the Davis Station. QSL via VK2CA. PLEASE NOTE: There is also a possibility of activating other field huts in the area, and he will sign as VK0BP/P. Look for more details on his Web page at http://www.vk0bp.org/

- ca 16/11 LEBANON; OD/W5YFN
has received approval from the local authorities while in Lebanon, for one year starting on 16 November.

- 31/12 HONG KONG; VR2009EAG
special event to promote the Hong Kong 2009 East Asia Games. Operations will be primarily on the HF bands from 40-10 meters
and VHF on 6 meters. The modes used will be primarily SSB, RTTY, PSK31 and SSTV. QSL Manager VR2XMT: Charlie Ho, PO Box 900, Fanling Post Office, Hong Kong.

- 2009 WEST MALAYSIA; 9M2TI
by EA4ATI to work in Kuala Lumpur for the whole year 2009. He will work with 400 watts and a vertical in CW and SSB on 40m/20m/15m/10m. He also plans to take part in all major contests (if possible from stations better equipped). QSL via EA4ATI.

- May 2010 PHILIPPINES; DU9/DL5SDF OC-130
expects to be QRV from Mindanao Island. He operates CW only. QSL direct to Hans Bohnet, Purok 5, Lower Bon-Bon, Libertad, Butuan City 8600, Philippines or via the DARC bureau to DL5SDF (bureau card requests will have to wait until June 2010, when he will go back to Germany).

- 31/10 2010 CANADA; VA7PX NA-075
from Mayne Island. QSL via VE7AXU via bureau or direct.

- 2010 MARSHALL IS.; V73NS OC-028
from the Kwajalein atoll by WD8CRT, who will have to work here for two years starting on Jan 5, 2009. He will work mostly in CW on 160-6m. QSL via bureau or direct to Neil Schwanitz, PO Box 8341, APO, AP 96557, USA. His website is http://www.qsl.net/v73ns/

31/8 - 3/9 CANADA; VYØO NA-230
from the Ottawa Islands by VE3LYC. The islands are quite far from the mainland, and weather conditions can influence his schedule.

1/9 - 28/9 CANADA; K3GV/VY2 NA-029
from Prince Edward Island. Activity will be on 15 and 20 meters around the usual IOTA frequencies. QSL via home callsign, direct or by the Bureau.

4/9 - 16/9 AUSTRAL I.; FO/G3BJ OC-050 and OC-152
from Rurutu and Tubuai by G3BJ and G4JKS on vacation. Operations will be mostly CW on 80-10 meters (no 17/12m). They will use a K3 transceiver and a Butternut HF6.

6/9 - 7/9 FIJI; 3D2 OC-016
Requested call is 3D2G. This pacific dxpedition/tour by PG5M will be an ultra light solo DXpedition and CW only. He will use an Elecraft K3, and a 2x20m doublet plus vertical antennas. QSL via PG5M, by the Bureau or direct. For direct requests, please enclose a minimum of 2 USDs for return postage. More details and updates will be available on http://www.dx.to/

8/9 - 14/9 W. KIRIBATI; T3ØG OC-017
from Tarawa Island by PG5M on Pacific dxpedition/tour. This will be an ultra light solo DXpedition and CW only. He will use an Elecraft K3, and a 2x20m doublet plus vertical antennas. QSL via PG5M, by the Bureau or direct. For direct requests, please enclose a minimum of 2 USDs for return postage. More details and updates will be available on http://www.dx.to/

8/9 - 17/9 ARUBA; P41USA
by W3BTX (P49T) and W3TEF (P4/W3TEF) will once again activate P41USA this year over the anniversary date of the USA attacks on September 11th, 2001. Look for them to be active on all bands. Activity will include the September VHF Contest. All QSLs go to W3TEF.

15/9 - 16/9 FIJI; 3D2
Requested call is 3D2G. This pacific dxpedition/tour by PG5M will be an ultra light solo DXpedition and CW only. He will use an Elecraft K3, and a 2x20m doublet plus vertical antennas. QSL via PG5M, by the Bureau or direct. For direct requests, please enclose a minimum of 2 USDs for return postage. More details and updates will be available on http://www.dx.to/

17/9 - 23/9 TUVALU; T2G OC-015
Pacific dxpedition/tour by PG5M. This will be an ultra light solo DXpedition and CW only. He will use an Elecraft K3, and a 2x20m doublet plus vertical antennas. QSL via PG5M, by the Bureau or direct. For direct requests, please enclose a minimum of 2 USDs for return postage. More details and updates will be available on http://www.dx.to/

18/9 - 25/9 NIUE; ZK2BJ OC-040
by G3BJ and G4JKS on vacation. Operations will be mostly CW on 80-10 meters (no 17/12m). They will use a K3 transceiver and a Butternut HF6.

18/9 - 30/9 CHATHAM Is.; ZL7/N7OU
by N7OU making a lightweight, solo Dxpedition. Activity will be on 80-10 meters, CW only, using 100w into a vertical. QSL via N7OU.

22/9 - 21/10 MAYOTTE; TO7RJ AF-027
by DJ7RJ. He will be leaving the island on 25 October, so he will be active as FH/DJ7RJ during the last days. Expect CW and SSB on 160-10 metres and perhaps 6 metres. QSL via home call.

24/9 - 27/9 FIJI; 3D2
Requested call is 3D2G. This pacific dxpedition/tour by PG5M will be an ultra light solo DXpedition and CW only. This will be an ultra light solo DXpedition and CW only. He will use an Elecraft K3, and a 2x20m doublet plus vertical antennas. QSL via PG5M, by the Bureau or direct. For direct requests, please enclose a minimum of 2 USDs for return postage. More details and updates will be available on http://www.dx.to/

24/9 - 27/9 St. PIERRE & MIQUELON; FP/homecall NA-032
from Miquelon by MØTDG and G3ZAY. They will operate CW and SSB; low band operation will depend on equipment availability (and airline baggage limits). QSL via home calls. G3ZAY will also try to activate McNutt's Island (NA-126) on 29 September.

24/9 - 7/10 BONAIRE, CURACAO; PJ2/PA1FJ SA-006
from the Island of Curacao. QSL via his home callsign, direct, by the Bureau or eQSL.

26/9 - 1/10 ST. MAARTEN, SABA, ST. EUSTATIUS; PJ5/AH6HY NA-145
from Sint Eustatius. Activity will be holiday style with operations on 40-10 meters, mostly SSB with some CW. QSL via AH6HY, by the bureau or direct.

27/9 - 15/10 DOMINICA; J79ZG
by DL7AFS and DJ7ZG. Activity will be on 80-6 meters on the usual DX frequencies, mainly on CW, SSB, RTTY and PSK, as well as 6 meters. They will look especially for JA stations. QSL via DL7AFS. Their Web page for this operation is
http://www.qsl.net/dl7afs/Index_J7.html

29/9 - 12/10 AUSTRAL I.; TX5SPA (requested call) OC-152
from Tubuai by SP3DOI, SP3CYY, SP9PT, SP9-31029 and FO5QB. They will have three stations and will operate CW, SSB, RTTY and possibly PSK31 on 160-10 metres, with an emphasis on working Europe on the low bands. QSL via SP9PT. The web site for the expedition is at http://fo2009sp.pl/

30/9 - 3/10 TOKELAU IS.; ZK3
A multi-national team of 4 operators led by YT1AD. Details are expected in due course. Updates will be posted to the expedition's website at http://www.yt1ad.info/t31/index.html
1/10 - 10/10 CONWAY REEF; 3D2ØCR
Time depending on weather conditions. There will be 7 operators, and they will be able to run up to four stations simultaneously on 160-6 meters using CW, SSB and RTTY. QSL via DJ8NK, direct or bureau. A web page will be active soon at http://www.conwayreef2009.de/

5/10 - 10/10 CENTRAL KIRIBATI; T31
A multi-national team of 14 operators led YT1AD. Details are expected in due course. Updates will be posted to the expedition's website at http://www.yt1ad.info/t31/index.html

5/10 - 30/10 S. COOK Is; E51NOU OC-013
from Rarotonga Island by N7OU during his spare time. Activity will be on 80-10 meters, CW only, using 100w into a vertical. QSL via N7OU.

9/10 - 19/10 MIDWAY I.; K4M OC-030
After a seven-year hiatus, in late January 2009 the U.S. Fish &
Wildlife Service announced that they would once again allow amateur radio operations from Midway Atoll "on a trial basis". A multi national team will be active for ten days. They will have 5-6 stations active on 160-6 metres, with at least one station on 20m around the clock. Further information, including details on how contribute to this expensive expedition, can be found at http://www.midway2009.com/

10/10 - 27/10 BENIN; TY1MS
from Grand Popo by PA8AD, PA3AN, PA3AWW and PD0CAV including an entry in the CQ WW DX SSB Contest. Their goals are to activate this DXCC Entity on 160-10 metres, to provide onsite help and raise funds for the Mercy Ships Charity Project. QSL via PA3AWW, direct or bureau. Further information (including OQRS for direct QSLling) can be found at http://www.benin2009.com/

11/8 - 29/8 AZERBAIJAN; 4J/hc
by F2VX and F6FYD. They will operate SSB on the HF bands. QSL via home calls, direct or bureau.

12/10 - 14/10 WALLIS & FUTUNA IS.; FW
A multi-national team of 14 operators led by YT1AD. Details are expected in due course. Updates will be posted to the expedition's website at http://www.yt1ad.info/t31/index.html

12/10 - 25/10 MALDIVES; 8Q7AK AS-013
from Embudu Village, Embudu Island, WLOTA L-3911 by G7COD. Activity will be on 80-12 meters including 30/17/12m using CW
and SSB. Operating schedule (everyday) is as follows: 0730-0830z, 0900-1030z, 1300-1500z and 1730-1800z. Suggested frequencies are:
CW - 3503, 7003, 10103, 14003, 18073, 21003 and 24893 kHz
SSB - 3795, 7063, 14147, 18133, 21253 and 24953 kHz
QSL via his home callsign, direct or by the bureau. Look for complete details at QRZ.com under 8Q7AK.

16/10 - 22/10 MARQUESAS IS.; TX5SPM (requested call) OC-027
by SP3DOI, SP3CYY, SP9PT, SP9-31029 and FO5QB. They will have three stations and will operate CW, SSB, RTTY and possibly PSK31 on 160-10 metres, with an emphasis on working Europé on the low bands. QSL via SP9PT. The web site for the expedition is at http://fo2009sp.pl/

17/10 - 1/11 SENEGAL; 6V7Q
by F8IJV on his honeymoon. He plans to be active in the CQWW DX SSB Contest. He will try to operate before and after the contest on 160-6 meters, mainly on SSB and the Digital modes. He will be operating from Jean-Francois, 6W7RV, QTH in La Somone. QSL via F8IJV. More details will be forthcoming.

19/10 - 7/11 NIUE; ZK2DL OC-040
by DL2FAG. He plans to operate mainly RTTY, PSK and SSB on 10-80 metres, using a Triple leg multiband and dipoles. After Niue and before Samoa he will be visiting New Zealand's South Island (OC-134) and be active sporadically as ZL4/DL2FAG. QSL via home call. Log searches will be available at www.qsl.net/dl2fag/

19/10 - 17/11 AUSTRALIA; VK7ACG OC-006
from Tasmania by GØWFH. He will operate SSB on 160-10 metres, with a focus on the low bands. QSL via home call, direct or bureau.

19/10 - 26/10 SABLE I.; NØTG/CYØ, WA4DAN/CYØ and AA4VK/CYØ NA-063
They plan to have three complete HF stations, with three verticals, one "strategically placed" yagi and at least one wire antenna, and to operate CW and SSB on 160-10 metres, with an emphasis on Asia. Twenty metres are likely to provide most contacts, and they will try to have two stations (CW and SSB) on that band at the same time. The CY0 Team will provide a CY0 country multiplier to contesters during the CQWW DX SSB Contest weekend. The team plans to operate only one station in the contest and also continue to maintain CW and 30/17/12m operations for those DXers who are not in the contest. QSL for all callsigns via N0TG. The website for the expedition is at http://www.cy0dxpedition.com/

FINAL DRAFT.
Alternate Power Source for QRP radios
By KD9KC

This project began because my wife, Monika, N5NHC, shows dogs, and we often travel to distant places for the shows. The full dog show info is at
http://www.vonbonehenge.com

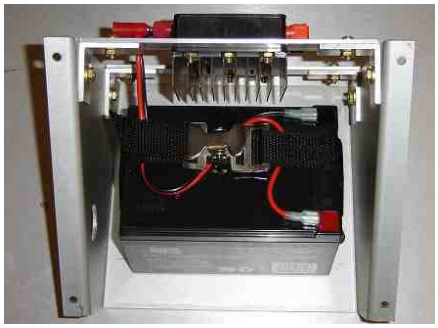
When the show is over, we get to go out exploring or hiking which is what I enjoy. But sometimes the dog show goes on all day long, and I get bored.
So in order to reduce my boredom, she bought me a Yaesu FT-817 QRP radio. I have a wonderful wife! In short order I had a complete portable stationin a brief case. Radio, mic and key, antenna and tuner, balun and feed line, charts and logbook all ready to go.

Very quickly I noticed that the internal battery in the Yaesu was only good for an hour or two of steady use so I started investigating alternate power sources. A tip from a friend led me to a local Alarm Companywhere they change out batteries on the alarm systems every year.
A “please” and a smile got me a box full of nice gel-cell batteries in assorted sizes, since they were happy to dispose of the old batteries.
This was better, and I began carrying a 12 V 5 Ah gel-cell along in the briefcase. It was a good battery for a day trip, but not big enough for a 4-day outing. And now I needed a charger too. Shortly thereafter, I got to thinking about Field Day. I would like a power source good enough to power a QRP station for Field Day.

My first step was to decide how much battery I would really need, and I wanted to err on the conservative side. The FT-817 uses about 380 mAh in receive, and about 1.9 Amps in full key-down transmit at 5 watts CW. Considering that CW is 50-% duty cycle, and assuming 40-% transmit and 60-% receive operation, this will average about 600 mA an hour. Using headphones will keep the volume down and save the battery even more.
This means a 7 Ah battery would last most of the night. So I checked the box of Gel-Cells from the Alarm Company, and there were a dozen or more 12 v 7 Ah batteriesin it. There were also a few 12 V 12 Ah gel-cells in there too. Perfect. A 12 Ah battery would certainly last all night. They all tested good, so I picked the best one and put it on the battery reconditioner.

Now I needed to see just how large a solar panel I would need. Solar panels are rated in watts. So, 13.8 x 0.380 = 5.25 watts for RX, and 13.8 x 1.9 = 26.2 watts for TX. Again figuring CW at 50-% duty cycle, and assuming 40-% transmit and 60-% receive operation.
I need at least 14 watt solar panel just to meet the drain on the battery. This would not recharge the battery, but only keep it from draining further. Friend who works for the local gas company has been changing out all the metering stations.
Some of the items being replaced were the batteries and the solar panels, andall the old stuff was getting scrapped. The batteries were 12 V 75 Ah batteries, very large and heavy. The solar panels were 25 watt panels. The panels were a perfect size, and I began assembling my Field Day Alternate Power Source.

This first photo shows a 12-Volt 12-Ah battery mounted inside the solar panel frame. The battery is strapped in using footman's loops and a nylon strap. Double-sided tape is placed on the bottom of the battery to keep it from slipping around. The 14 ga jumper from the battery goes to the charge regulator. The black box with the heat sink above is the solar charge regulator. The open-lead output of the panel is 18 volts. That would cook the battery, so the regulator is necessary.



The next photo is a look at the charge regulator. The solar panel connects to the terminals on the left, and the battery connects to the terminals on the upper-right. The load (radio) connects to the terminals on the lower-right. If you look carefully, you can just make out the green CHARGE LED is lit. The battery is visible tucked in behind and below the charge regulator. The wire from the panel to the regulator is 18 ga. The 15 foot output wire is 12 ga, but anything with banana plugs can be used. The battery weighs just under 8 pounds.

Here is a full-rear view. The 15 foot 12 ga wire to the radio is clearly visible.

This is the front view. The system is set up to float the battery at 13.8 Volts. The battery fully charged sets at about 13.4 Volts.
After a few minutes in the sunlight the Charge Regulator started pulsing on and off and the green CHARGE and the red OVERCHARGE LEDs were alternating on and off as it charged and bypassed. When I snapped the photo the voltage was at 13.54 Volts. It would jump between 13.8 and 13.4 on and off.

Thanks to friends and scrounging, I have only put about $30 into this project. The complete package weighs 24 pounds. Not backpack portable, but surely not too much for camping, field day, dog shows, etc etc.....
This is really a simple project, but I will be glad to answer any questions. E-mail me at my QRZ.com e-mail address.
Vy73. Mike - KD9KC.
El Paso, Texas. USA.

KEEP TRACK OF YOUR WSJT QSOs

Yes, I do have a computerized DX logg, it is a spreadsheet with all my QSOs. It workes fine for me , but an even faster way than checking for a callsign in this spreadsheet is to use the Call3.txt file within WSJT. And it is quite simple, I just add the band and the mode at the end of the row with the callsign. Of course, if the callsign is not in the file I must add it first. When I want to know if I have already met a certain callsign I either enter it in the To Radio box or doubleclick on it in the decoded text window and then place the cursor over the callsign. And there the information is!

Carl SM6NZV

C6APR - Again Pete,W2GJ; Ed, K3IXD; Dallas, W3PP; and Randy, K4QO will operate in the Multi-Operator, Two Transmitters (M/2) Class in the CQ WW SSB contest from the Crooked Island Lodge (Grid FL22), Crooked Island, The Bahamas. The team will be active from 22 October thru 26 October.
Before and after the contest look for C6AQO on HF CW and SSB, and C6AXD on HF RTTY. Both C6AQO and C6AXD will be on 160m thru 10m including the WARC bands.
All the QSOs are good for IOTA NA-113 and ARLHS light house BAH-005.
All QSLs via K3IXD.
73, Ed
K3IXD

Hi all ! I am happy to report that 220 mhz is comming back to ottawa here we now have about 30 hams on the band including myself ve3skp with a adi rig works great and a 4 el beam which get the same range as 2 meters i the thing that upsets me is the fact icom/yaesu/kenwood put next to few radios with 220 mhz on them. I think its about time they started to remake radios including 220 mhz on them such as the ts 2000 when you look at this rig it has all bands on it but not the 220 mhz so its not realy a all band radio is!
so if they did put 220 mhz in it would be all band i know i have the kenwood ts 200x model which you can rec 220 mhz so come on guys get on 220 mhz its a great band! if any of you out the have any thoughts on this?
73 from VE3SKP, steve in ottawa

Welcome to the

Mongolian DX Contest - 2009

The Mongolian Amateur Radio Society (MARS) promotes and organizes the “Mongolian DX Contest”. MARS has the honor to invite all Licensed Amateurs and SWLs throughout the World to participate the annual "Mongolian DX Contest.

Purpose of contest

• The objective of the contest is to establish as many contacts as possible between Radio Amateurs around the World and Radio Amateurs of Mongolia.

Contest period: Third weekend of the November (21/22) / Time: Saturday 00:00 UTC – Sunday 23:59 (24 hours)

Contest Mode: CW SSB RTTY

All participants must enter the contest only one of the category above. However, participants who entered by different mode shall submit separate log for each mode.

Bands: 160-10 meter (no WARC, no cross bands)

Categories: SOMB-CW-LP* - SOMB-SSB-LP - SOMB-RTTY-LP - SOMB-CW-HP* -SOMB-SSB-HP - SOMB-RTTY-HP - MOST-Mixed-HP - SWL-AB-Mixed

LP: Less than 100 W - HP: Must not exceed the power in the regulations Governing the Licence of the station.

Contest call: CQ JT TEST Number exchange: RST report plus CQ Zone

Work stations: Every station can be contacted once per band and mode.

Points: QSO with own country 1 point - QSO between JT stations 0 point - QSO with a different country on your continent 2 points - QSO with another continent 3 points - SWL One way QSO reception 1 point - Two way QSO receptions 3 points

Multipliers: A multiplier one for each different DXCC Country (Except JT) contacted on each band - A multiplier one for each different JT station contacted one each band

Final scores: The final score is the results of the total QSO points multiplied by the sum of DXCC countries and JT stations on all bands.

Awards: A special plaque will be issued for the winners of first, second and third places of each category.

Logs: Deadline is December 31, 2009

• Electronic logs should be submitted via email to jtdxcontest@gmail.com

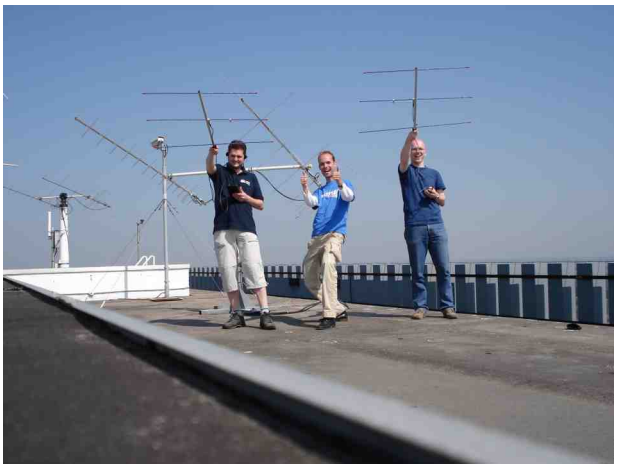
• Paper logs send to

Mongolian DX Contest
P.O. Box 830,
Ulaanbaatar-24,
Mongolia

COMIC'S HAM

Have some fun

SPECIAL HOLIDAYS



THE QSL OF THE MONTH