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# HAM-MAG

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# Radio operator in WW2 by Chuck Blaney


Making a 28MHz rubber duck for the FT817

A CW QRP Transceiver for 20 m band


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# JUNE 2009

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# A CW QRP Transceiver for 20 m band
# By IK3OIL

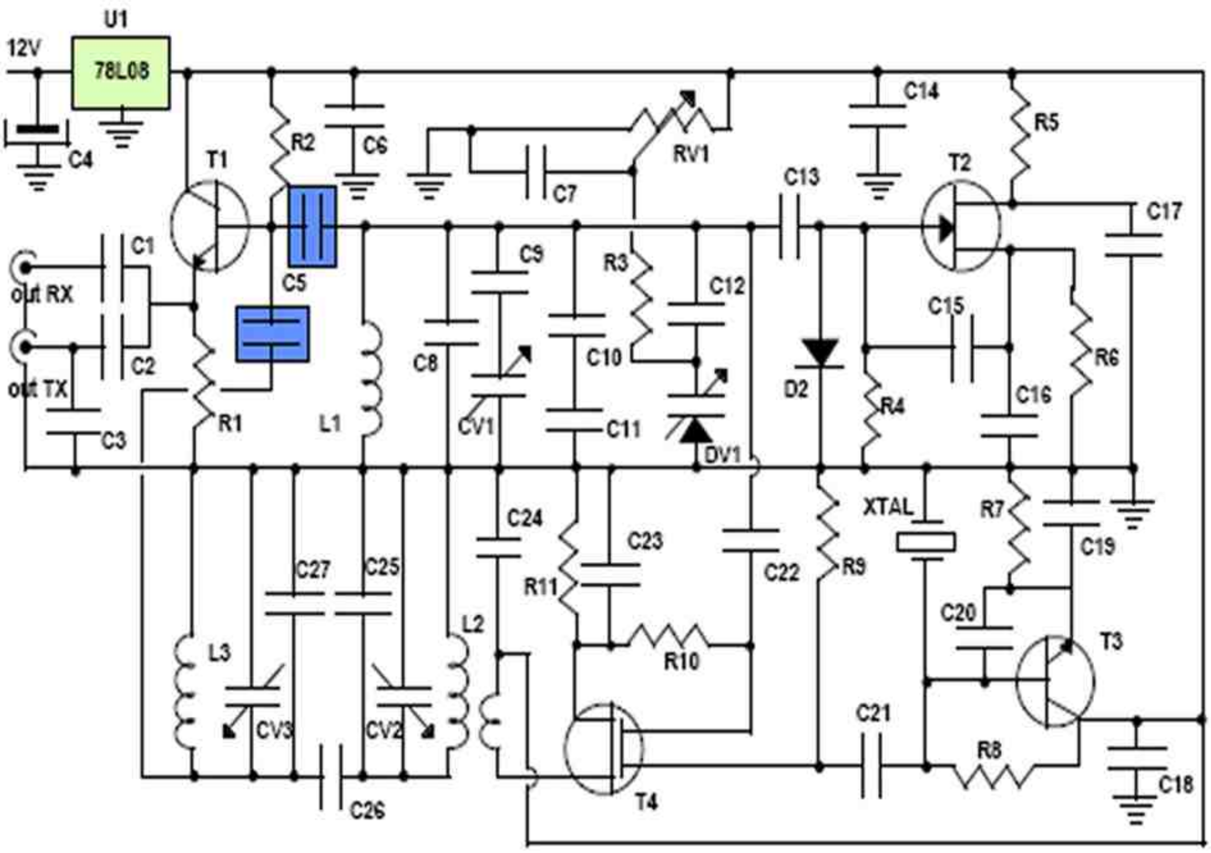
The little QRP presented in this article may be built in a gradual manner, in fact it is divided in two main modules (plus VFO), you may also complete only a single part (RX or TX module). Also the VFO module may be built with two complexity levels, as a conversion VFO or as a free oscillator, obtaining slightly different performances.
In other words the project looks completely modular, the tuning requires at least a frequency meter, a signal generator and an RF probe, if you have at your disposal an oscilloscope, this could make the job simpler.

***How it is made***

The transceiver is composed by three single sided printed boards 100x70 mm, theese may be stacked so as to reduce the overall size of the metal cabinet. I suggest to employ small size components (1/4 W resistors, 2,5 mm capacitors, …) wich should fit better on the PCB boards. On the front panel you may place the tuning pot with its reductor gear, the gain and volume controls, the Key and earphone jacks. The power and antenna connectors may be housed on the back panel.

***How it works***

I'll describe individually the three boards and the relative tuning devices.
a) The VFO circuit



| | | | | |
|---|---|---|---|---|
| R1 : 470 Ω - 1/4 W | C1 : 68 pF | C12 : 56 pF NPO | C23 : 1.2 nF | T4 : BF960 mosfet |
| R2 : 180 KΩ | C2 : 12 pF | C13 : 150 pf N150 | C24 : 33 nF | DV1 : BB204 |
| R3 : 56 KΩ | C3 : 82 pF | C14 : 33 nF | C25 : 47 pF | D2 : 1N4148 |
| R4 : 270 KΩ | C4 : 47 µF | C15 : 120 pF NPO | C26 : 2.2 pF | XTAL : 16 MHz |
| R5 : 100 Ω | C5 : 6.8 pF | C16 : 470 pF | C27 : 47 pF | U1 : 78L08 |
| R6 : 390 Ω | C6 : 10 nF | C17 : 10 nF | CV1 : 35 pF trimmer | RV1 : 10 KΩ lin. |
| R7 : 330 Ω | C7 : 33 nF | C18 : 33 nF | CV2 : 60 pF trimmer | L1 : see text |
| R8 : 220 KΩ | C8 : 120 pF NPO | C19 : 82 pF | CV3 : 60 pF trimmer | L2 : see text |
| R9 : 270 KΩ | C9 : 27 pF NPO | C20 : 33 pF | T1 : 2N2222 | L3 : see text |
| R10 : 270 KΩ | C10 : 150 pF N150 | C21 : 150 pF | T2 : BF245 | |
| R11 : 390 Ω | C11 : 120 pF NPO | C22 : 6.8 pF | T3 : 2N2222 | |

The basic version makes use of a Colpitts fet oscillator and a buffer (2N2222) driving the RX and TX circuits. It works very well up to 7 or 8 Mhz, above this limit the stability may be impaired, therefore if you want to adapt this transceiver for a high-bands use (this is the case of 14 MHz band), it will be better to choose the conversion VFO version, wich makes use of the whole PCB board. You may shift from a version to the other simply by changing the connection of the C5 capacitor. The basic circuit version doesn't use the conversion components (located in the lower part of the schematic)

Where specified, the capacitors must be NPO type. The tuning coil must be wound very carefully.

A multi-turn pot may be employed for the tune control, but this will make the building of a frequency reading scale more difficult.

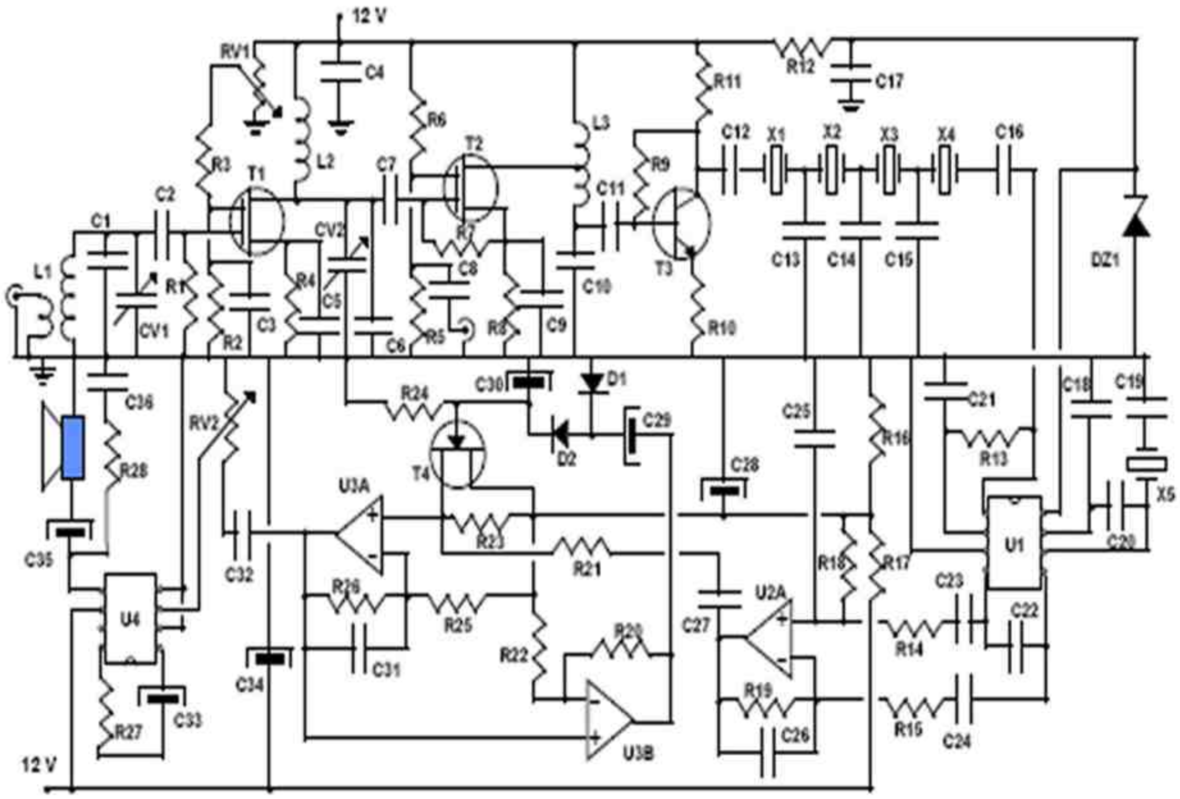
The L1 coil for the 14 Mhz band is made by 50 turns of enameled 0.40 mm wire wrapped on a 13mm plexiglass core. The specified component values allow a frequency span of about 70 KHz (from 2,433 to 2,510 Mhz) and the output level will be 4V pp. The two varactor diodes contained in the BB204 must be parallel connected.

The L2 and L3 coils for the 14 Mhz band are obtained wrapping 12 turns of 0.50 mm enameled wire on a toroidal core T44-2. The link on L2 is made by 3 turns of plastic insulated wire.

*To tune this module you may follow these instructions :*

- remove the 16 MHz crystal so as the oscillator goes off
- remove the connection between C21 and the gate 1 of the mosfet
- input a 18.4 Mhz signal to the gate 1 of the mosfet
- tune CV2 and CV3 capacitors for the maximum output at 18.4 MHz frequency, using an RF probe (or better an oscilloscope)
- insert the crystal and C21 capacitor
- turn RV1 at the minimum value and tune CV1 so as to obtain a 18,433 Mhz (14 + 4,433) frequency

b) The Receiver circuit



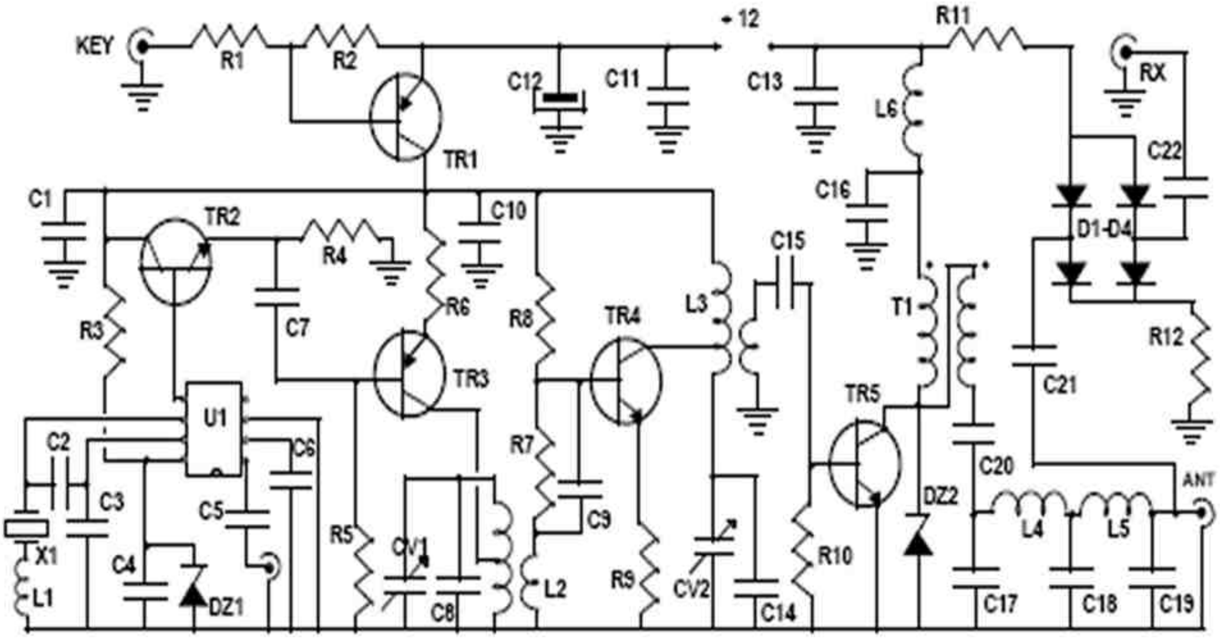

| | | | | |
|---|---|---|---|---|
| R1 : 220 KΩ - 1/4 W | R21 : 82 KΩ | C13 : 150 pF | C33 : 10 µF | L2 : see text |
| R2 : 33 KΩ | R22 : 4.7 KΩ | C14 : 150 pF | C34 : 47 µF | L3 : see text |
| R3 : 82 KΩ | R23 : 82 KΩ | C15 : 150 pF | C35 : 220 µF | |
| R4 : 180 Ω | R24 : 560 KΩ | C16 : 150 pF | C36 : 220 nF | |
| R5 : 56 KΩ | R25 : 82 KΩ | C17 : 33 nF | CV1 : 30 pF trim. | |
| R6 : 150 KΩ | R26 : 820 KΩ | C18 : 47 pF | CV2 : 30 pF trim. | |
| R7 : 270 KΩ | R27 : 1.2 KΩ | C19 : 150 pF | RV1 : 47 KΩ lin. | |
| R8 : 330 Ω | R28 : 10 Ω | C20 : 47 pF | RV2 : 22 KΩ log | |
| R9 : 180 KΩ | C1 : 68 pF | C21 : 33 nF | T1 : BF960 | |
| R10 : 470 Ω | C2 : 1.5 pF | C22 : 33 nF | T2 : BF960 | |
| R11 : 560 Ω | C3 : 10 nF | C23 : 100 nF | T3 : 2N2222 | |
| R12 : 560 Ω | C4 : 33 nF | C24 : 100 nF | T4 : BF244 | |
| R13 : 470 Ω | C5 : 10 nF | C25 : 1.2 nF | U1 : NE602 | |
| R14 : 4,7 KΩ | C6 : 68 pF | C26 : 1.2 nF | U2 : TL082 | |
| R15 : 4,7 KΩ | C7 : 6.8 pF | C27 : 100 nF | U3 : TL082 | |
| R16 : 3.9 KΩ | C8 : 470 pF | C28 : 10 µF | U4 : LM386 | |
| R17 : 3.9 KΩ | C9 : 10 nF | C29 : 1 µF | X1-X5 : 4.433 MHz | |
| R18 : 56 KΩ | C10 : 220 pF | C30 : 10 µF | D1-D2 : 1N4148 | |
| R19 : 56 KΩ | C11 : 10 pF | C31 : 150 pF | DZ1 : 6.8 V - 1W | |
| R20 : 82 KΩ | C12 : 150 pF | C32 : 1 µF | L1 : see text | |

It uses a classic superetherodyne design, employing mosfets in the front end and in the mixer stage, so as to obtain a good immunity towards overloadig signals and a few dB of RF gain.
The XTAL ladder filter makes use of 4 crystals, it exhibits about 600 Hz of bandpass and a good out-of-band rejection. You may employ any set of crystals, provided that their frequency is near 4 MHz. An NE602 IC is used as a product detector, producing also the beat frequency by another (same frequency) crystal. A capacitor, series connected to the crystal, raises slightly the beat frequency, so producing the required shift to demodulate the CW.
The BF circuit makes use of a first pre-amplifier and filtering stage followed by an AGC circuit. This BF automatic gain control partially compensates for the lack of a true IF section and the relative RF derived AGC. Please notice that the RX circuitry is working also in TX mode, so the trasmitted CW, whose amplitude is reduced by the diodes bridge and the AGC control, can be heard from the loudspeaker while keying (full break-in and monitor functions).
An LM386 IC works as a power amplifier delivering about 1 W into an 8   loudspeaker. Be careful while connecting this IC on the PCB board, an effective ground bypass is needed for the Vcc supply line, I suggest to insert two 47 µF capacitors immediately near the IC pins (see C34 in the assembly schematic), also the connections to volume control must be shielded.
The L3 coil is made by 30 turns of enameled 0.30 mm wire wrapped on a 5 mm plastic support with ferrite core, the tap is obtained at the 6th wire from the Vcc (cold side).
The L1 and L2 coils, for the 14 Mhz band, are obtained wrapping 16 turns of enameled 0.40 mm wire on a T44-2 toroid. The link on L1 is made by 3 turns of plastic insulated wire.
To tune this module please follow these instructions :
- tune the mixer stage injecting a 4,433 Mhz signal into the VFO input and adjusting the L3 core so as to obtain the maximum output from the T3 collector
- connect the VFO and input a 14 Mhz singnal to the receiver, then alternate the tuning of CV1 and CV2 so as to obtain the maximum output from the XTAL filter
- connect the antenna and adjust slightly CV1 and CV2 so as to obtain the best reception of a week signal
- you may change the CAG decay time by modifying the R24 value (the higher the value, the longer the decay time)
If any instability is observed in the front-end stage, you may try to solve the drawback by parallel connecting a 470   to the RX input, and/or loading the L2 coil with a 15-22 K  parallel connected resistor.

c) The Transmitter circuit

See on the next page...

***Some QRP rigs...***




| | | | | |
|---|---|---|---|---|
| R1 : 3.9 KΩ - 1/4 W | R12 : 1 KΩ | C11 : 47 nF | C22 : 10 nF | CV2 : 30 pF trim. |
| R2 : 33 KΩ | C1 : 47 nF | C12 : 47 µF | TR1 : 2N2907 | L1 : induct. 22 µH |
| R3 : 1 KΩ | C2 : 47 pF | C13 : 47 nF | TR2 : 2N2222 | L2 : see text |
| R4 : 1 KΩ | C3 : 150 pF | C14 : 68 pF | TR3 : BF324 | L3 : see text |
| R5 : 47 KΩ | C4 : 10 nF | C15 : 47 nF | TR4 : BFR36 | L4 : see text |
| R6 : 47 Ω | C5 : 470 pF | C16 : 47 nF | TR5 : see text | L5 : see text |
| R7 : 100 Ω | C6 : 10 nF | C17 : 150 pF | X1 : 4.433 MHz | L6 : VK200 |
| R8 : 1.2 KΩ | C7 : 1 nF | C18 : 330 pF | DZ1 : 6.8 V - 1W | T1 : see text |
| R9 : 5.6 Ω | C8 : 82 pF | C19 : 150 pF | DZ2 : 33 V - 1W | D1-D4 : 1N4148 |
| R10 : 47 Ω | C9 : 390 pF | C20 : 47 nF | U1 : NE602 | |
| R11 : 1 KΩ | C10 : 47 nF | C21 : 10 nF | CV1 : 30 pF trim. | |

It employs a frequency conversion design, so you can operate the TX and RX using a single VFO.

An NE602 mixer converts the VFO frequency up to the 14 MHz band using a crystal similar to those used in the RX, the little series connected inductance lowers the crystal oscillating frequency so as to produce the necessary shift. The power broadband stage is equipped with a transitor suited for the CB band (2SC2092, 2SC1969, MRF475, 2SC2166). The driver and final transistors must be adequately cooled. The T1 transformer has a 1:4 ratio and is made bifilar winding 6 paired turns of enameled 0.5 mm wire on a ferrite TV balun (12x12 mm). A double Pi filter cleans the signal before sending it to the antenna, while a diode bridge works as an electronic switch and implements the full break-in function. The power supply to the driver stages is inhibited while receiving, by means of TR1.

The 14 MHz coils must be made in the following manner :

L2 and L3 : 16 turns of enameled 0.40 mm wire on a T44-2 toroid, tap at the 5th wire, link made by 2 turns of plastic insulated wire

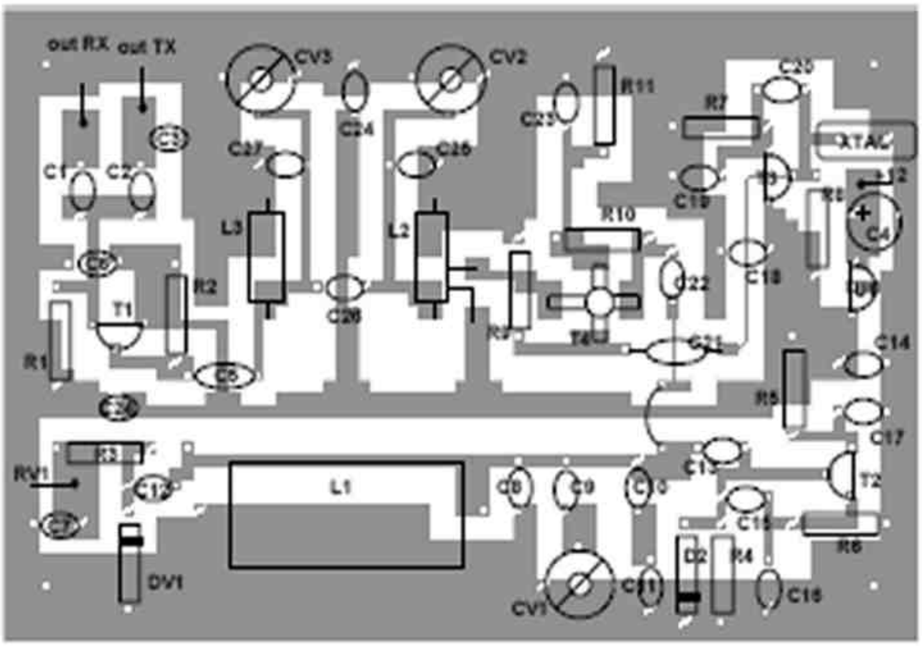
L4 and L5 : 12 turns of enameled 0.50 mm wire on a T50-6 toroid

To tune this module connect the VFO, then alternate the tuning of CV1 e CV2 so as to obtain the max imum output (4 - 5 W) on a dummy load (you may build it by parallel connecting 9 resistors 470 - 1W).

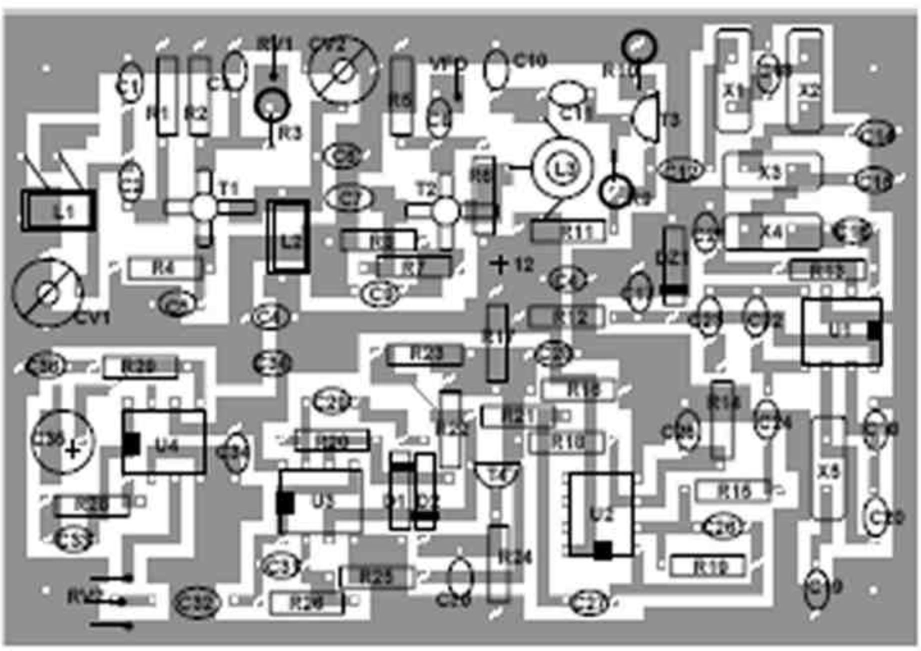
The full power current required will be about 1 A. If any instability is observed, you may try to solve the problem by inserting a low value (0.5 ) resistor series connected to the emitterof TR5, and/or by raising the R6 value to 100 or more.

d) The PCB boards

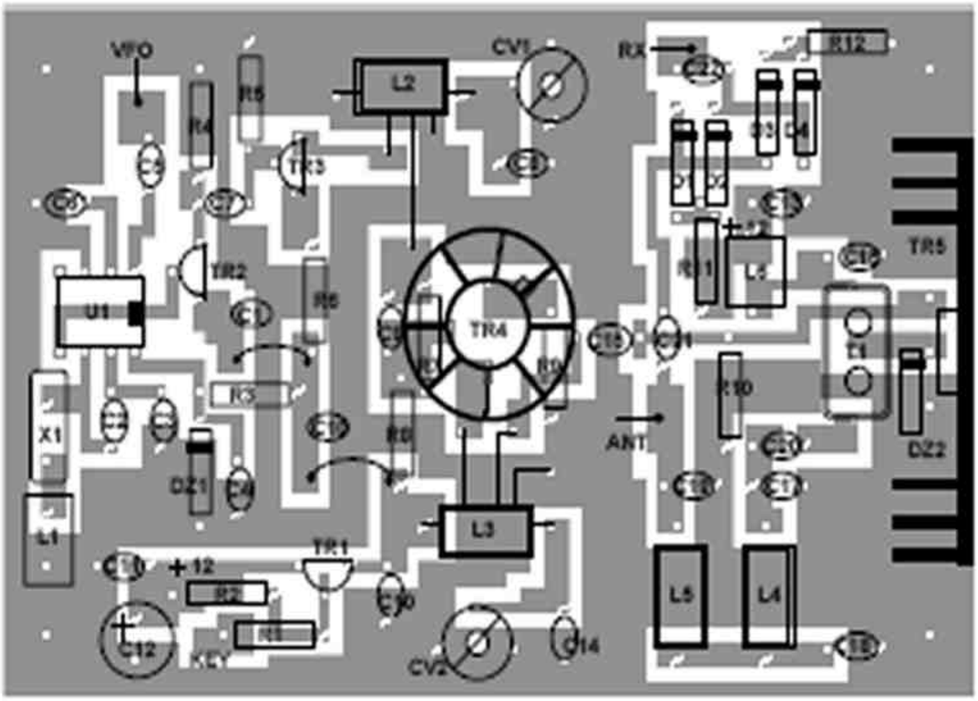
VFO




RECEIVER



## TRANSMITTER




e) some final notes
The assembly is not particularly critical, however some care must be dedicated to the VFO and RX input stage, wich must be aligned carefully. The overall sensititivity and selectivity are very good, and so also the capability to handle strong overloading signals, in short the mixer and XTAL filter stages make well their job. Also the BF CAG system proved to be very effective, and the listening quality recalls a good IF system. Especially the CW envelope is very good, showing a very short attack and decay time.

***73's and have fun on QRP !***
***IK3OIL, Francesco***

If you are interested in further informations, or to get the PCB masters, please contact me at my Email box.
info@ik3oil.it
http://www.ik3oil.it/

***HB9BQB's QRP rigs***

# Compact Bug-out comm trailer
# By Ralph Fellows, W5FTV

The devastation of Hurricane Katrina and the catastrophe of the greater-Houston mass evacuation for Hurricane Rita retaught me the necessity of advance, thorough disaster preparation. After considering mobility options such as a new diesel powered extended cab 4WD truck, a small travel trailer, pop-up camper and more I settled on keeping my current 4WD Ford Explorer and adding a small cargo trailer. It seemed a reasonable cost choice which would enable me to move my small family and essential supplies on a moment's notice.

I decided that one primary requirement for the trailer was that it must fit inside my attached two car garage. That would eliminate recurring off-site storage fees and ensure that the trailer would be protected from weather and instantly accessible no matter what the local conditions might be. To that end I purchased a new five foot by eight foot box cargo trailer with a single rear door. It fit inside my garage door only after I let some air out of the tires!

At first, I envisioned simply keeping non-perishable supplies preloaded, and at the final moment, loading perishable and irreplacible items in the trailer. It didn't take long before I realized that the trailer had much greater potential. After a few brain-storming sessions it was decided to not only use the trailer for survival necessities but to add a few creature comforts and Field Day and real-world emergency amateur radio features.

Outfitting was begun by removing the original ceiling, front and wall panels. A single layer of aluminum foil-backed foam insulation was installed in the front and two side walls while the ceiling was doubled insulated with the same material to increase protection against the oft-blistering hurricane-season Texas sun. Expanding foam was used to fill remaining in-wall spaces and the original panels were then reinstalled.
RV type rubber-based paint was applied to the roof. A rust inhibiting and moisture barrier oil based paint was used on the frame and bottom side of the trailer floor.
Conventional water based white paint was used to brighten the interior. Steel gray
deck and porch paint was chosen for the interior trim. Carpet donated by a friend was put down after the floor was coated with the deck and porch paint.
Additional brake, running and turn lights plus reflectors and reflective tape were placed on the outside of the trailer to increase on-the-road visibility. A largish ABC fire extinguisher, major first aid kit, floor jack, jackstands, spare tire, lug wrench, chocks, emergency triangles, assorted flashlights, ultra-high-intensity chemical light sticks, tire repair kit, pressure gauge, canned-air tire inflator/sealer and 12 VDC air compressor augment safety. Keyed-alike high quality padlocks with spare keys were obtained for the door, battery box, interior bench seat and spare tire.

To increase storage capacity it was decided to fabricate side-opening cabinets extending almost the entire length of both the left and right sides at the ceiling line. A rear-opening door was included at the back of the right cabinet to facilitate storage of antennas and a telescoping fiberglass mast kept in capped PVC tubes. A shelf was placed above the PVC tubes. An RV pull-handle was installed on the right-rear of the left cabinet to aid in climbing into the trailer.

A cushioned, moveable bench seat/cabinet, to be normally stowed flush to the interior front wall, was also built. The cabinet interior was divided into two compartments. One for electronics with safety items and another for generator storage. Heavy duty handles were fastened to the cabinet ends to aid in moving the hefty assembly. A durable stained and polyurethane coated oak fold-down table was installed to the left wall to accommodate meals, radios and such. Brackets were affixed to the right wall to stowe solar panels and two higher-quality folding chairs. Care was exercised to not permanently fasten any fixtures to the floor so it could be used for sleeping with a queen size inflatable air mattress or sleeping bags.

Color-coded containers for gasoline and water stores were acquired along with energy bars and military style meals complete with chemical heater, entree, condiments, dessert, disposable utensils and drink mix. Gasoline is chemical-stabilizer treated and rotated at intervals. Water is also storage treated and rotated. A back-up sub-micron water filtration kit and iodine purification ensure an adequate supply of safe drinking water.

A hassock style toilet and extra chemicals were procured at a local camping store.

A 5,000 BTU air conditioner was purchased from a "big-box" hardware store. Two AC/internal-battery/external 12 VDC powered fans were bought for their power-source flexibility.

Provisions were made to employ power from external AC mains through a heavy gauge extension cord, a one KW gasoline powered generator, an on-board marine battery, six solar panels and DC-to-AC inverters. A metal enclosure was welded for the marine battery and positioned just aft of the trailer hitch. Because the enclosure top was partially blocked by the spare tire two stainless piano hinges were installed. The front hinge allows full-time access to storage in front of the battery while the rear hinge allows full-box access when the spare tire is dismounted.

Two combination AC/DC/RF panels were fashioned from aluminum diamond-plate for exterior-to-interior connections. An RV-type weather resistant AC receptacle was installed on the exterior panel with a corresponding home-type AC jack on the interior panel. A ten-guage circuit was run from the panels to the interior of the left overhead cabinet to power the air conditioner and a multi-outlet strip on the wall above the fold-down table. Six inch UHF series "barrels" handle RF signals while Anderson powerpoles make the DC connections.

Three conventional medium screw-base light-socket fixtures were fastened to the underside of the left overhead cabinet for above-the-table lighting. Power-miser twelve volt multi-LED lamps from Backwoods Solar were installed in the fixtures. A seven amp-hour gel-electrolyte battery in the left overhead cabinet provides more-than-ample power for the lighting.

Double-and-triple-pair parallel-connected Anderson powerpoles were employed for all 12 VDC load and source cables. This configuration makes it possible to contiuously chain devices to the safety limit of fuses and wires. A four gauge black/red cable pair is used to connect the marine battery to the external AC/DC/RF panel and pass DC to the trailer interior. Ring terminals and stainless hardware permanently affix the cable to the battery. A short ten-gauge cable for connection to devices outside the trailer, such as the solar panels, is likewise affixed to the battery. Both cables' positive and negatives leads are protected by low resistance type AGU inline fuses located close to the battery terminals.

The ham radio equipment includes a Yaesu FT-817 "station in a backpack" and a Yaesu FT-897. Both have interal batteries and can be powered by external DC. An Alinco DR-620 provides the primary VHF/UHF capability. The first-line antennas are a 75/40 meter inverted V supported by a 30 foot fiberglass telescoping mast and a quater wave 75/40 meter NVIS wire. Band switching is accomplished by connecting or disconnecting double Anderson powerpoles to change radiating element lengths.

The inverted V can be set up quickly by placing the base of the fiberglass mast in one of two steel pipe sections welded vertically near the battery box. A Comet GP-8 VHF/UHF vertical on three five foot TV mast sections can be similarly erected in the second of the two steel pipes near the battery box.

Alternate antennas include a full set of Lakeview Hamsticks with matching coil/ incremental length whips and a Maldol HVU-8 compact vertical for 80 meters to 70 cm. An MFJ-904H tuner and MFJ-831 artificial ground are employed during HF operation. The artificial ground is connected to the trailer frame and aluminum skin through a pair of green Anderson powerpoles on the interior AC/DC/RF panel and a length of one-half inch braided low-Z wire. Quarter wave counterpoise wires can be connected to the trailer frame to enhance "ground tuning" for 75 and 40 meters. MFJ-259B and AEA VIA analyzers are on hand to test antennas. An MFJ-4416 battery booster is available to extend and improve performance when equipment is poweredby the marine battery. A 30 amp switching power supply is kept for opportunities when AC main power is available. A hand-held GPS, band/frequency charts, owner's manuals, quick references from niftyaccessories.com, a repeater directory, road atlases and additional hard-copy aids are on hand. A digital multimeter, replacement connectors, interseries RF adapters, extra coaxial cable, tools, spare fuses, common small batteries, Dacron rope, "Gorilla" tape, wrist rocket wire launcher and other items round out the inventory.

I'd like to extend my most sincere thanks to Bill Stevenson, K5CSB (carpentry) and his friend Larry Anderson (metal fabrication) for their generous and invaluable assistance with this project. Their pragmatic skills gave gave practical form to many a concept.

***73's W5TFV, Ralph***

# Making a 28MHz rubber duck for the FT817
## By Andy GØFTD

The main component in this design is the supporting rod, which the wire is wound upon.

I was given two flexible rods by a friend. They are sold as garden rods, used to support flowers and plants. They also glow in the dark - luminous! They are about 9mm in diameter. Unfortunately, I have not found a local supplier.

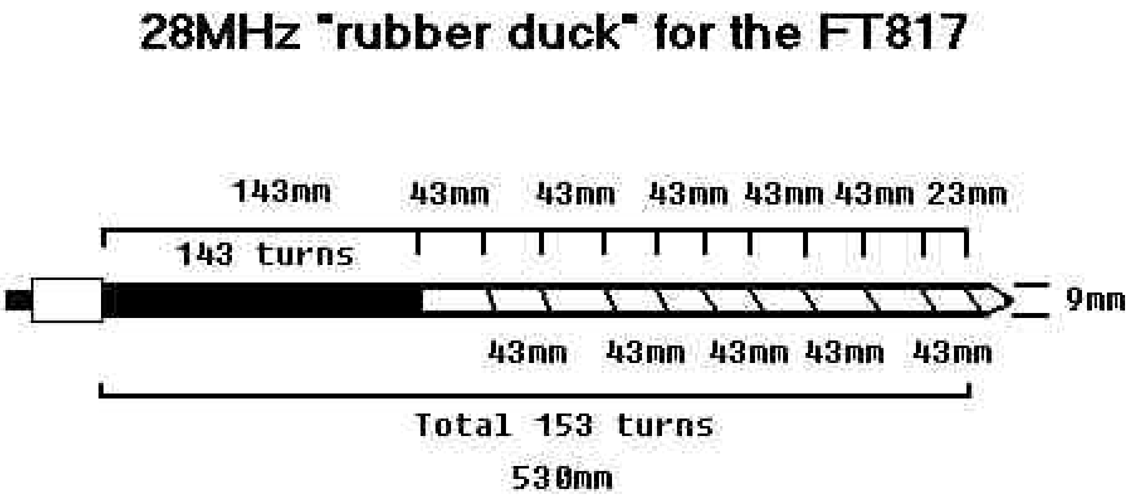
The rod needs to be 530mm for the antenna, plus about 15mm, which is inserted into a PL259 for RG8 style coaxial cable.

***CONSTRUCTION***

• Solder a suitable length of wire (7/02 guage, 1mm diameter PVC coating) into the centre of the PL259.

• Insert flexible rod into the PL259 (it easily fits ok).

• Now wind the correct amount of turns on to the 9mm rod, as shown in the diagram.




• Then use PVC insulation tape as shown here

• Add the PL259 <> bnc adapter.

***SWR and Tuning***

Firstly you must decide how you use your FT817.

Either you hold it with your hand (like FIG ) or it is to be free standing. This is because the human body is part of the antenna, and must be considered.

Check the SWR using the internal FT817 SWR meter.

Trim the antenna wire by 5mm each time.

WARNING - the 5mm steps are critical, 5mm makes a large difference !

You will also obtain different results when tuning indoors or outdoors - you must decide.

FT817 internal chassis

***RESULTS***

During the summer of 2006 I made some QSO's with it. Best DX was from G<>EA8, and ES/UA/IK/EA with ease. My QTH was by the seaside in Whitstable.

I also discovered that the SWR is OK, if I sit down and hold the FT817 between my knee's. It is not a good idea to use the FT817 at the side of the body when using the carrying strap. There is too much attenuation by the human body.

***WARNING!***

It is easy to damage the FT817 with ANY antenna which is connected to the BNC socket.

Always be careful with any antenna connected to the front BNC, or damage of the FT817 internal chassis could result.
I have included a photograph of an FT817 internal chassis, which is made of alloy / aluminium.
It is not very strong. Be careful!

***Have fun Andy G0FTD***

# THE DX NEWS

## From the Web (tnx opdx, 425 dx news, arrl...)

### 7P8, LESOTHO

Ivan, UR9IDX, is expected to be (or is) in Lesotho and has received the callsign 7P8R. His length of stay is unknown, as well as his plans for operations (bands/modes) as this was being written. QSL direct only to: Ivan Borzenko, P.O. Box 85, Mari, Mariupol-31, 87531, UKRAINE.

### 8Q, MALDIVES

Just a reminder that Nobby, G0VJG, will be active as 8Q7CQ between June 1-15th. This will be a limited operation because Nobby will be on his honeymoon (and he thanks his wife for putting up with him and the QRM). Activity will be from Kuredu Island (AS-013) mainly HF SSB but some 6 meters. QSL via Owen, G4DFI. Visit his Web page at:  http://g0vjg.piczo.com/?cr=5

### 8Q, MALDIVES

Tom, PF4T, will be active as 8Q7TB from the Island of Embudu between June 8-24th. Activity will be on 40 and 20 meters using SSB with a FT-897 and G5RV antenna. QSL direct to PF4T or by the Bureau via PA0LEY. For more details on QSL info, see (QRZ.com). Also, visit his Web page at:  http://8q7tb.pf4t.nl

### CY0, SABLE ISLAND (Attention Topbanders)

Randy, N0TG, informs OPDX that the CY0 Sable Island Dxpedition team will incorporate the famous "Battle Creek Special" antenna for 160 meters as well as 80/40m. This was made possible by the generous loan program coordinated through George, W8UVZ. The team thanks this special group for their support for not only for their CY0 operation, but for the many DXpeditions down through the years. The dates of the DXpedition are October 19-26th. operators are Randy/N0TG, Ron/AA4VK and Murray/WA4DAN. Visit their Web page at:
http://www.cy0dxpedition.com

### E51, SOUTH COOK ISLANDS

Nigel, G4KIU, is now active as E51SC from the Island of Rarotonga (OC-013). He has moved to the South Cook Islands and is expected to be on 80-10 meters mainly on SSB, RTTY, PSK31 and with some CW. He was heard this past week on 20 meters PSK31 between 0330-0630z.  Direct QSLs are to be sent to: Nigel Peacock, P.O. Box 880, Rarotonga, Cook Islands (via New Zealand). Please send a SAE, plus 2 USDs or 2 new style IRCs. Any direct cards received without the above items will be returned via the Bureau. Bureau QSLs go to: E51SC via G4KIU/RSGB. **IMPORTANT** There is no QSL Bureau in the Cook Islands. Cards without G4KIU on them will NOT be received. Please "DO NOT" send direct cards to any G4KIU address in England - they will NOT arrive. All E51SC contacts will be loaded to LoTW about once a week. He does not use e.QSL at all.

### EI09, IRELAND (Special Event)

Members of the Galway Radio Experimenters Club are now active using the special event callsign EI09VOR until June 6th. Activity is to celebrate the Volvo Ocean Yacht Race which takes place in Galway, Ireland. Look for both CW and SSB operations. Over the past week activity has been on 30/20/17 meters. Operators will be operating from Mutton Island Lighthouse. QSL via EI8DD. For more info, visit their Web page at:
http://www.galwayradio.com

HF70/SN70/SO70, POLAND (Special Event)

Look for members of the Polish Radio Amateur Associated (PZK) to activate the following special event stations during the 70th anniversary of the beginning of World War II.
The "NO MORE WAR" stations will be on the air during various times between September 1st and October 6th. The following stations are:
HF70NMW (by SP6ZDA) - SN70N (by SP2CA) - SO70R (by SP4NDU) - SN70NMW (by SP4JCP/SN4L) - SN70O (by SP8NFZ) - SO70E (by SP4JAE) - SO70NMW (by SP3ZIR/SN3B/SQJPV) - SN70M (by SP9KN) - SO70W (by SP5PPK/SQ5NAE) - SN70R (by SP2YRY/SP2UUU) - HF70N (by SP5KDK/SQ7HNT) - SN70E (by SP1MWF) - SO70A (by SP9YGD) -HF70O (by SP2LQP) - SN70W (by SP2LNW) - HF70M (by SP8MI) SN70A (by SP2KMH/SQ2MMS) - HF70R (by SP4ICP) - HF70E (by SP5X) - SO70N (by SP2AYC) - HF70W (by SP2KDS/SQ2BXI) - SO70O (by SP9KAJ/SP9CLU) - HF70A (by SP5PSL/SP5JXK) - SO70M (by SQ9JKD)

MUSEUM SHIPS WEEKEND EVENT

The "2009 Museum Ship Weekend Event" is sponsored by the "Battleship New Jersey Amateur Radio Station" and will be held next weekend, between 0000z June 6th, and 2359z June 7th. As this was been typed, some 76 museum ships are participating. For an up-to-date listing of participating museum ships, frequencies and details on a certificate which is available, please visit:
http://www.nj2bb.org/museum/index.html
Activity will be on all HF bands, 80-10 meters, using CW, SSB and PSK31. Some ships will also use Amplitude Modulation (AM) with either their ships original equipment or modern equipment.

NEW AWARD AVAILABLE

Francis, F6FQK, informs OPDX that a new TP2CE Radio Club diploma is now available called: "Council of Europe Radio Amateur Club Award". Complete rules and photos are available on: http://ewwa.free.fr

OH0, ALAND ISLAND (Possibly OJ0)

Manuel, CT1BWW (SWL CT0783), will be active as OH0/CT1BWW between July 26th and August 7th. Activity will be on 80-10 meters using CW, SSB and RTTY. QSL via CT1BWW, direct or by the Bureau. Manuel may be active as OJ0/CT1BWW from Market Reef on August 1st. For more info, visit Manuel's interesting Web page at:
http://www.geocities.com/oh0ct1bww

PA6, NETHERLANDS (Special Event)

To celebrate the reopening of a 800 year old church tower (after its renovation) in Noordwijk, look for PA6JEROEN to be active between June 4-14th on HF and VHF. The old church is called "Oude of St Jeroenskerk" (in English: Church of St. George). Actual operations from the church tower will take place on two Fridays, June 5th and 12th. Pictures of this tower can be viewed on:
http://picasaweb.google.nl/jaap.pa7da/OudeOfStJeroenskerkTorenbezoekNoordwijk#
Please QSL only via the Bureau to PA7DA.
ADDED NOTE: Jeroen (St. George) was a Monk from Scotland and arrived at the Noordwijk (Nortgho) in 847. In 857, he built a Chapel on the place of this Church and did bring Christianity to the people in the western part of Holland and West Friesland. Later he had been killed by the Normans!

## PZ, SURINAME

Mike, AJ9C, will be active from between October 22-29th. His callsign will be announced when it is assigned. He is expected to be active on 160-6 meters using CW, SSB and RTTY, as well as an entry in the CQWW DX SSB Contest (October 24-25th). QSL to his home callsign with SASE/USD(s) for return postage.

## TK9, CORSICA (EU-014)

Members of the DXCiting Team will be active as TK9X between July 25th and August 1st. Activity will be on 160-6 meters using CW, SSB, RTTY and FM. Operators mentioned are: YL Silvia/EA1AP, Alberto/EA1SA, John/EA3GHZ, Raul/EA5KA, Paco/EA5RU and Alicia/EA5EWM. QSL via EA4URE, direct or by the Bureau. Visit their Web page at:
http://www.dxciting.com/tk9

## U.K. TRIP

Bruce, ZL1AAO, informs OPDX that he is going on a "DXing and nostalgia trip to the UK for ex-GM1KNP". He wants to advise DXers and friends that he will be touring in the UK during July and August. Bruce will be using the UK country prefixes followed by his New Zealnd callsign (e.g. MM/ZL1AAO when in Scotland). He expects to be in Scotland, England and Wales (as he holidays around) and hope to include some activity from the Orkney Islands. Activity will be limited to mobile/portable operations using a FT857D, multi-band vertical or a tuner with long-wire. Mode will be SSB only. He will produce a special QSL celebrating his activity. Check (QRZ.com) for some more details and updates when he has more specific plans. QSL via his home callsign.

## VP9, BERMUDA

Alex, W5YDX, will be active as VP9/W5YDX between June 10-24th. Activity will be holiday style (during his spare time) mainly on 20 and 17 meters (suggested freqs. between 14140-14265 kHz) using 100 watts into a dipole. QSL via W5YDX.

## ZD8, ASCENSION ISLAND

Dean, KJ4GNB, is now active as ZD8DC. His length of stay was not known as this was being typed. Activity so far has been on 20 meters SSB. QSL ZD8DC via KJ4GNB.

## ZK2V NIUE OPERATION UPDATE

Chris, ZL1CT/GM3WOJ, provided OPDX with the following operation update: "A quick update from ZK2V - made 6100 QSOs in 9 days, which is a bit disappointing - conditions poor, especially last weekend. Made only 1 QSO on 160m and 2 QSOs on 80m, so concentrating on the higher bands. Openings to Europe are often short with weak signals, which is lowering the QSO rate, but signals from JA and the USA have been strong. Will be on RTTY tomorrow (28th May) for about 30 mins sometime between 0600 and 0800 UTC (14082 approx QSX up 8) - will do more RTTY if things work well.

For the first time from Niue, I have a special permit to operate on 60m - from 0000 Niue time (= 1100 UTC) on 1st June 2009 until 0000 Niue time (=1100 UTC) on 8th June. I can transmit *only* on 5403.5 kHz (USB for USA, but CW for rest of world), but will listen on 5371.5 or another channel. The website www.zk2v.com is updated nearly every day - there is an online logsearch and all QSOs are uploaded to LoTW every few days. ZK2V is QRV for 25 more days and hoping for better propagation. QSL direct or via the bureau to N3SL (not ZL1CT)."

# DX-CALENDAR
# By SM3CVM
# http://www.sk3bg.se/

- 30/5 TOGO; 5V7PM
by DL9MBI. Activity over the past weekend was on 20 meters, SSB, RTTY and PSK. QSL via his home callsign by the bureau. For direct cards, please send QSL cards to: Werner Peter Mueller, Plattenberg 2 1/2, D-84508 Burgkirchen, GERMANY (w/SAE and two green stamps. Otherwise the answer will be via bureau).

- 30/5 DOMINICAN REPUBLIC; HI7/OT4R
from Punta Cana. Activity will be on 20/15/10 meters SSB. Suggested frequency for 20 meters maybe 14300 kHz. QSL via OT4R.

- 30/5 ALASKA; N6IC/KL7 NA-041
from Douglas Island during a family visit. QSL via home call.

- 31/5 UGANDA; 5X4X
from Arua by DL8SBQ. He runs 100 watts into a spiderbeam for 20, 17, 15, 12 and 10 metres and a Zepp antenna for 40 metres. He has been pirated on 160, 80 and 40 metres - if you worked him during the evening hours, please note that Peter cannot operate after 20 UTC, because the power is off in Arua. QSL via DF5GQ.

- 31/5 CANADA; XL, XN, XM,and XO
Celebrating the 50th anniversary of the opening of the St. Lawrence Seaway, Canadian amateurs are allowed to use the following prefixes: XL (VA stations), XN (VO stations), XM (VE stations), XO (VY stations).

- 31/5 CANADA; XOØICE/2
by VE2TKH will be active from Quebec City to celebrate the 50th anniversary of the entry in service of the St. Lawrence Seaway. QSL via LoTW only (paper QSLs will not be available).

- 2/6 TANZANIA; 5H1HP and 5H1MS AF-032
from Zanzibar by DL2NUD and DL9MS. Activity will be on the HF bands and 6 meters, but an emphasis will be on VHF (EME/MS). Grid squares to be activated are: KI93RU and KI94RA.

- 3/6 NEW CALEDONIA; FK/G4JVG OC-032
from Noumea by 9M6DXX (G4JVG), holiday style while celebrating his 25th wedding anniversary with 9M6EVA. Activity will be SSB only, using 100 watts to 'fishing rod' verticals on 40, 20, 17 and perhaps 15 metres. QSL both operations via MØURX, direct or bureau. The logs will be uploaded to LoTW.

- 15/6 JAPAN; 8N5I AS-076
from Shikoku Island during the 2009 Shikoku Info Telecom Month. QSL via JARL bureau.

- 20/6 BANGLADESH; S21XR
with new call (earlier S21UGZ) from Dhaka by DU1UGZ. He operates in his spare time using a low band dipole. For the time being, he will focus on 40 and 80 metres SSB and RTTY, but in May he should get a beam for 10, 12, 15, 17 and 20 metres and hopefully a linear amplifier as well. QSL via home call.

- 20/6 NIUE; ZK2V OC-040
by ZL1CT. His 5-week expedition aims to give as many stations as possibile their first QSO with ZK2. Resources are limited, and he will operate mainly on 80, 40, 20 and 15 metres CW and SSB, with some activity on 30, 17 and 12 metres and some RTTY. QSL via N3SL. A log-search will be available at http://www.gm7v.com/zk2v.htm, and he plans to update it as often as possible.

- 1/7 CHAD; TT8CF
by F4BQO. He plans to operate CW and SSB on the HF bands. QSL direct to F4BQO.

- 20/7 JAPAN; 8J
Ten special event stations (8JØ4ØM-8J94ØM) from each callsign district of Japan will be active between 16 May and 20 July to celebrate the expansion of the 7 MHz band in Japan. QSL all stations via the JARL bureau.

- 24/7 NIGERIA; 5NØOCH
by DL3OCH. He plans to operate EME and on the HF bands (160-10 metres). Hopefully he will also go and operate from IOTA group AF-076. QSL via DL3OCH.

- 31/8 HONG KONG; VR2/F4BKV AS-006
mainly on PSK31 with some SSB during good propagation openings. His web site is at http://www.f4bkv.net/

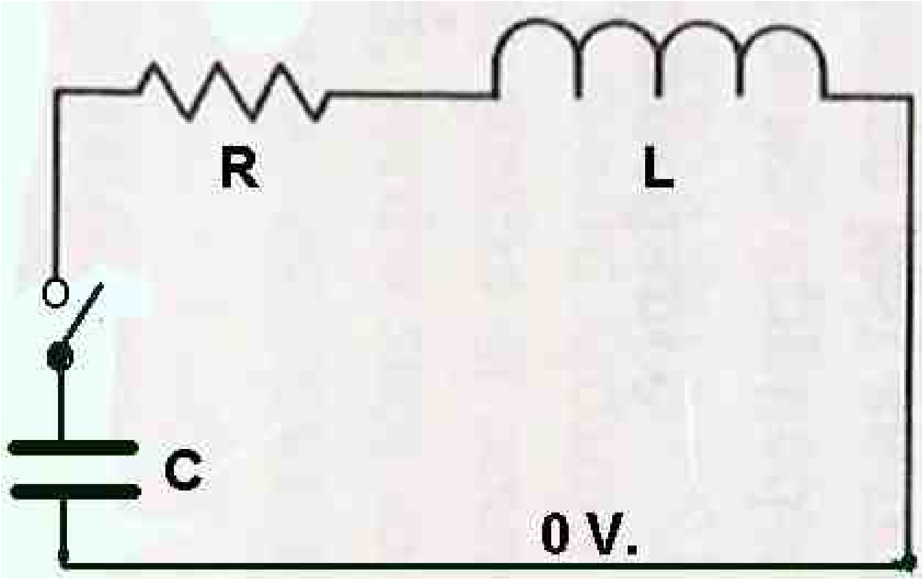
- 30/9 CROZET I.; FT5WO AF-008
by F4DYW says he will be working at Alfred Faure Base on Ile de la Possesson. He plans to operate on 20, 15 and 40 metres SSB during his spare time, using 100 watts and dipoles. QSL via home call, direct or bureau. Look for updates on http://f4dyw.free.fr/index.php?langue=fr&contenu=ft5wo.html

- 31/10 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.

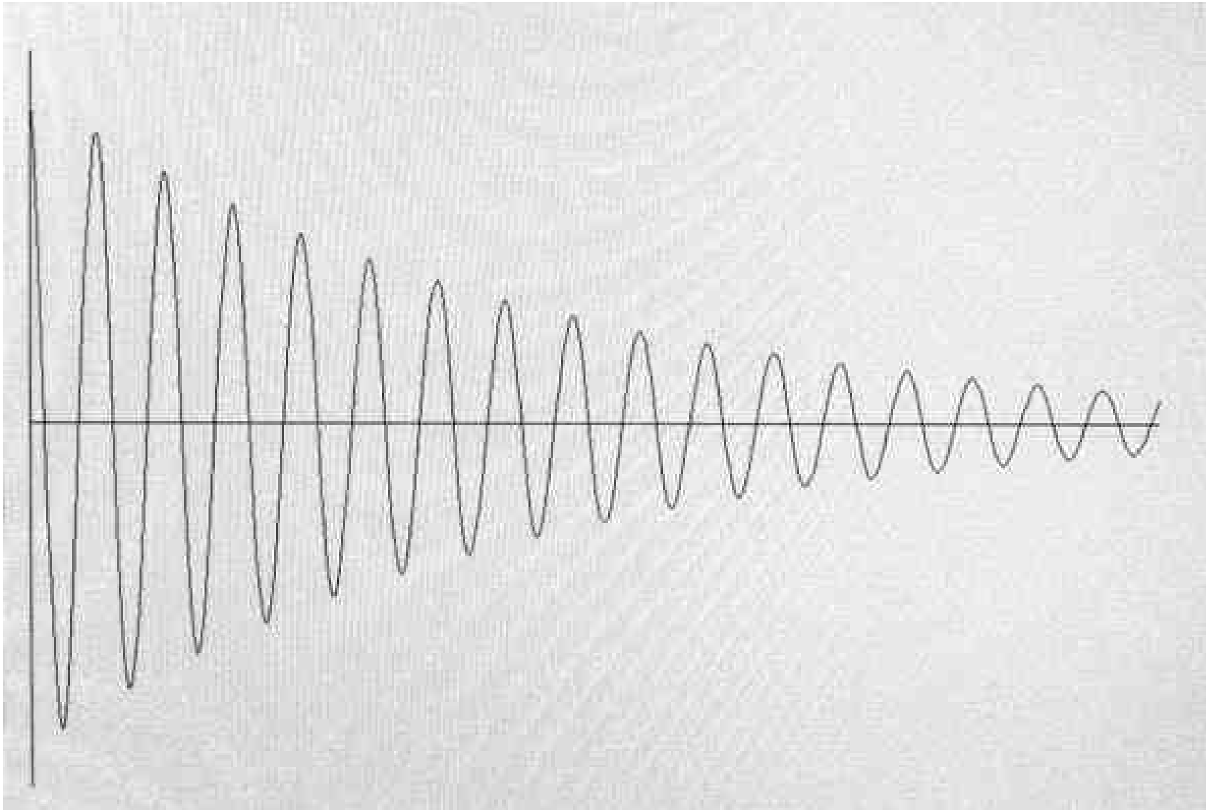
- 1/11 ANTARCTICA; VKØBP AN-016
is currently working at Antarctic Davis Base Station, Gridsquare MC81xk. His activity is limited due to his workload, but he is expected to be on all HF bands. He seems to like 20 meters between 1500-1800z. Operations have been on SSB and PSK31, but he plans to operate 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/

# OSCILLATING DAMPED WAVES By
Prof. Arthur BLAVE Ir, ON4BX
E-mail: on4bx@tvcablenet.be

*R L C CIRCUIT*

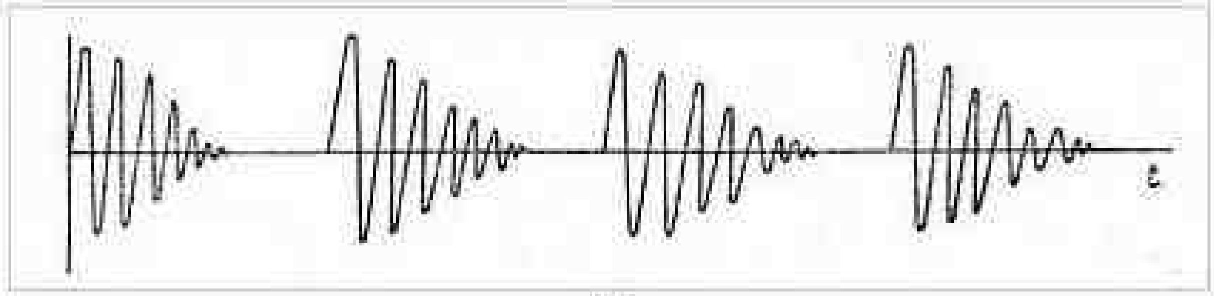



***Vc***



## *1.- History.*

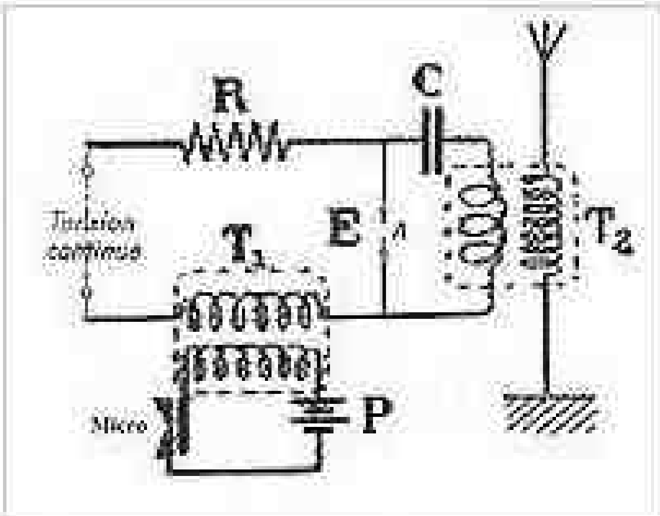
The waveform of the discharge of a capacitor into an inductive load has been well known for years.



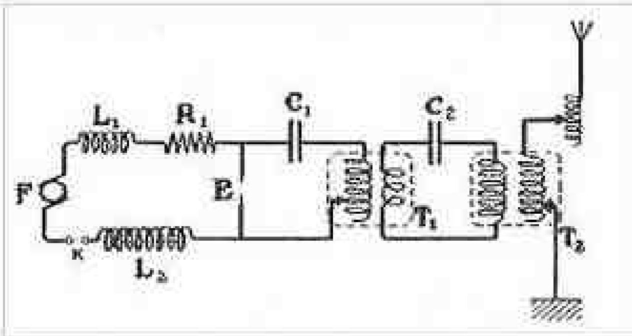
Trains of damped radio telegraphic waves made by a damped waves transceiver

In the past, radio transmitters were using such technique to generate bursts of waves, then modulated by cw and later by microphone. Before the discovery of the first electronic tube, that was the only way to communicate by rf!

A high voltage driving a spark could so generate bursts of damped waves into a coil, coupled to the antenna circuit..




***Example of a radioelectric arc transceiver***




***Example of a radioelectric & radiotelephonic arc transceiver***

TheTitanic ship was using such circuits to generate radio waves of 600m of wave-lenght for its radio-communications.

This is just the opportunity to invite the reader to consult the historic pages called « ondes amorties » into the well-known  encyclopedia « WIKIPEDIA »
http://fr.wikipedia.org/wiki/accueil

Of course, the discovery of the triode has conducted to the construction of radio-transmitters of high-power and spark waves generators are now museum pieces…

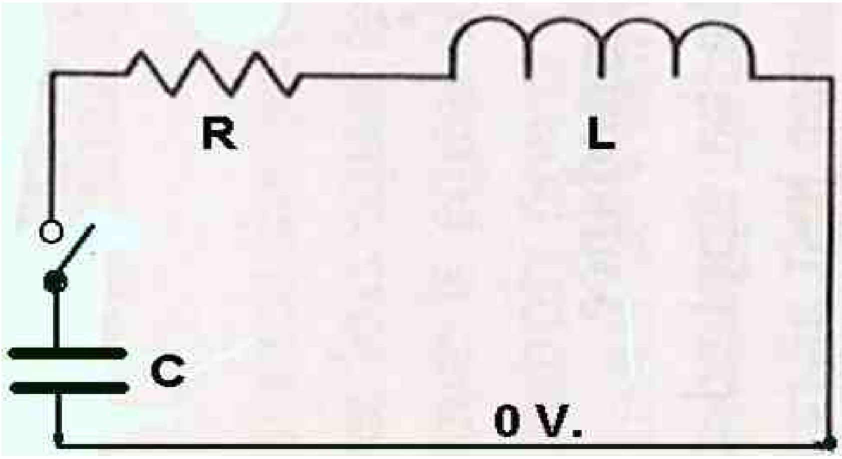
## *2.- CALCULATIONS*

Actually, damped oscillating waves into a circuitry means usually problems of spurious, even or damage to the semi-conductors. We must say that at the present time, damped waves are usually not welcome.
But how to reduce their effect, more what can we do ? How can we interact with the elements of the circuit ?
Usually, if we have a physical idea of the processus, the exact calculation is not well known.
That is why I have written the full mathematical way to calculate a damped wave and where to interact to reduce
it's level. So we will be able to select the best choice of components, wiring, and how to dispose them in the chassis…

2.1.- First of all… A damped circuit may never been calculated via the conventional filters RLC theory.
Those calculations are correct only if the circuit is on stationary state. That means that you can then make all tests via generators, meters etc… Your results are independant of the time.

A damped wave is never in a stationary state ! Voltages and currents are always varying with the time. More, we are always sure that after an amount of time, the initial charge will be zero! the damped wave is over!

That is why we must calculate all using mathematicals fonctions like derivation, complex formulations including complex exponentiations. They will also use some complex trigonometrics equations




The capacitor has been charged via an external supply, removed when C is fully charged, into a stationary state. When we close the switch (at t=0), that voltage is applied into the inductance, associated with it's resistance.
A damped wave will start (probably!) as shown on the oscillogram.
We will study the waveform of the voltage capacitor during it's discharge into R.
Of course, the initial charge of the capacitor will decrease, will never stay into a same state and after some time, will be fully discharged. That is the end of the damped wave.
We will see later that depending of the value of the components, the waveform may be different… Even not present !

***2.2.- DEFINITIONS*** :

Mathematicals fonctions around derivation will be used.
The symbol of the derivative of V is d(V) / d(t) for first order and d2 (V) / d(t2) is the second order.

Q is the initial charge of the capacitor.
We know that Q= C.Vc
***i*** is the instantaneous value of the current into the loop and is linked to the variation of the charge still present into the capacitor. So we may write:

$$i = \frac{d(Q)}{d(t)} = \frac{C\ d(Vc)}{d(t)}$$

$$VL = -\frac{L\ .\ d(i)}{d(t)} = -\frac{L.C.\ d2(Vc)}{d(t)^2}$$

$$Vr = R\ .\ i = \frac{R.\ d(Q)}{d(t)} = \frac{R\ .\ C\ d(Vc)}{d(t)}$$

and $Vc + Vr - VL = 0$

*Note : the value of R is here the sum of the wiring resistance, the internal wire resistance of the inductance and also including the equivalent value of the charge coupled to the inductance (if any) and the magnetic losses. Also, the value of the inductance is the inductance itself added by wiring inductances*…..

2.3.- RESOLUTION :

After replacement, equation is now:

$$Vc + Vr - VL = Vc + \frac{RC\ d(Vc)}{d(t)} + \frac{L.C.d^2(Vc)}{d(t)^2} = 0$$

We divide all by LC, we may do that because LC is never zero !. Now we write in correct order:

$$\frac{d2\ (Vc)}{d(t)^2} + \frac{R\ .\ d(Vc)}{L\ .\ d(t)} + \frac{1\ .\ Vc}{L.C} = 0$$

For easier calculations, we define alpha and omega as :

$R/L = -2.\alpha$ and $1/L.C = (\omega 0)^2$

Equation is now :
$d2\,(Vc)/\,d(t)^2 - 2.\ \alpha\ .\ d(Vc)/\,d(t) + (\omega 0)^2.Vc = 0$

The resolution of that equation will give the value of Vc in function of the time t.
It's content is now only Vc Alpha and Omega. More, $\alpha$ and $\omega$ are only depending of R L and C.

$Vc = A.e^{-x1.t} + B\ .e^{-x^2.t}$ where x1 et x2 are the solutions of the second order equation where the coefficients of X2 X1 X0 are the correspondents of the coefficient of the same level in the equation d2(Vc) / d(t)2 ………..

Values here are :

$x2 - 2\alpha .x + \omega 0^2 = 0$ second order equation where solutions are

$\frac{-b \pm \sqrt{(b2 - 4ac)}}{2a}$ values of x1 and x2.

$x1,x2 = \alpha \pm \sqrt{(\ 2 -\ 02)}$

The value of the two constants A and B must be fixed and are depending of the initial or final state values or the circuit. This will be done later….

Already, we may expect that should be linked to the loss of the initial charge because it contents a dissipative component R.

But the content of 0 is only L and C and should be probably linked to an oscillation form, of course if the study shows that there are one! At this level of the demonstration, nothing permit us to say that the damped wave, if any, will be exactly at 0 !!

Again we have to forget our usual rules of calculation of RL in a stationary state independent of the time!

***2.3.- RESOLUTION*** :

After replacement, equation is now:

$$Vc + Vr - VL = Vc + \frac{RC\ d(Vc)}{d(t)} + \frac{L.C.d^2(Vc)}{d(t)^2} = 0$$

We divide all by LC, we may do that because LC is never zero !. Now we write in correct order:

$$\frac{d^2(Vc)}{d(t)^2} + \frac{R \,.\, d(Vc)}{L \,.\, d(t)} + \frac{1 \,.\, Vc}{L.C} = 0$$

For easier calculations, we define alpha and omega as :

R/L= -2.$\alpha$ and 1/L.C=($\omega$ 0)²

Equation is now :

d2 (Vc )/ d(t)² - 2. $\alpha$. d(Vc )/ d(t)+( $\omega$0)².Vc=0

The resolution of that equation will give the value of Vc in function of the time t.
It's content is now only Vc Alpha and Omega. More, and are only depending of R L and C.

The application of « de Moivre » equation is easy.
Abraham de Moivre calculated the fonction and told us that solution of Vc is : (see Wikipedia Encyclopedia)

$$Vc = A.e^{-x1.t} + B.e^{-x2.t}$$

Where x1 et x2 are the solutions of the second order equation where the coefficients of X2 X1 X0 are the correspondents of the coefficient of the same level in the equation d²(Vc) / d(t)²

Values here are : $x^2 - 2\,\alpha .x + \omega_0^{\,2} = 0$

second order equation where solutions are $\frac{-b +- \sqrt{(b^2 - 4ac)}}{2a}$ values of x1 and x2.

$$x1,x2 = \alpha +- \sqrt{(\alpha^2 - \omega_0^{\,2})}$$

The value of the two constants A and B must be fixed and are depending of the initial or final state values or the circuit. This will be done later….
Already, we may expect that $\omega$ should be linked to the loss of the initial charge because it contents a dissipative component R.
But the content of $\omega$ 0 is only L and C and should be probably linked to an oscillation form, of course if the study shows that there are one! At this level of the demonstration, nothing permit us to say that the damped wave, if any, will be exactly at $\omega$0 !!
Again we have to forget our usual rules of calculation of RL in a stationary state independent of the time!

Now, we have three possibilities depending of the value of the term under the square root

$$\sqrt{(\alpha^2 - \omega_0^2)}$$

1. $(\alpha^2 - \omega_0^2) = 0$ equal to zero
2. $(\alpha^2 - \omega_0^2) > 0$ is positive
3. $(\alpha^2 - \omega_0^2) < 0$ is negative

$\alpha$ $\omega_0$ are depending only of the selected values of R L and C. There are no restricted value for them so the three possibilities may be present.

2.3.1.- first possibility : . $(\alpha^2 - \omega_0^2) = 0$

Then x1 and x2 have the same value $\alpha$

$$V_c = (A+B).e^{-\alpha T}$$ is a pure decreasing exponential.

$A + B = V$ initial voltage of C

Of course the initial value A+B is the initial voltage of C (when t=0).NO DAMPING WAVE AT ALL;

2.3.2.- second possibility : $(\alpha^2 - \omega_0^2) > 0$
X1 is different of X2 but both are real numbers.
Vc is now the sum of two decreasing exponentials, each with their own time constant. Same as 2.3.1 : NO DAMPING WAVE AT ALL;

2.3.3.- third possibility : . $(\alpha^2 - \omega_0^2) < 0$
Square root of a negative number is more difficult !
We must calculate with complex numbers j where

$$j = \sqrt{(-1)} \quad \text{and} \quad j^2 = 1$$

$$\text{then } x1,x2 = \alpha +- j\sqrt{(\omega_0^2 - \alpha^2)}$$

Calculation of the exponentials is now very difficult when the R L C are fully independants..
To be able to go further, we will now accept that our circuit is of good quality. That means that the total resistance R in the circuit is quite low and that the inductance L is of good quality, with low losses.

Then if $(\alpha^2 << \omega_0^2)$

$x1,x2 = \alpha +- j\omega_0$ and $V_c =$

$$Vc = A.e^{(-\alpha - j.\omega).t} + B.\ e^{(-\alpha + j.\omega).t}$$

$$Vc = A.e^{(-\alpha t)}\ .e^{(-j.\omega.t)} + B.e^{(-\alpha t)}\ .e^{(+j.\omega.t)}$$

Or, we know that $e^{(+-j.\varphi)} = \cos(\varphi) +- j.\sin(\varphi)$

Then $$Vc = A.e^{(-\alpha t)}\ .(\cos(\omega t) - j.\sin(\omega t)) + B.e^{(-\alpha t)}\ .(\cos(\omega t) + j.\sin(\omega t))$$

We have now to fix the values of the constants A and B. A and B are constant so we may try to fix their value at any instant of the damped wave. The value t = 0 is specially interesting.
We know that in our physical circuit are inductance components. Even if the value of the coil is 0 (L=0!!) there are wires between the elements so even very small, there is always a positive value present under L. So at t=0, the current is still 0. The voltage has not yet started to decrease so d(V) / d(t) must be 0. We will calculate it and apply the values to 0

$$d(Vc)/dt = A.e^{(-\alpha t)}\ .(-\sin(\omega t) - j.\cos(\omega t)) + B.e^{(-\alpha t)}\ .(-\sin(\omega t) + j.\cos(\omega t))$$

**At t = 0 we obtain:**

$$0 = A.1.(1-(0.j)) + B.1.(-1+0) = A - B$$

**Conclusion: A = B**

**If we replace B by A into the equation of Vc:**

$$Vc = A.e^{(-\alpha t)}.\cos(\omega t) - j.A.e^{(-\alpha t)}.\sin(\omega t)) + A.e^{(-\alpha t)}\ .(\cos(\omega t) + j.\ A.e^{(-\alpha t)}\sin(\omega t))$$

$$Vc = 2.A.e^{(-\alpha t)}\ .\cos(\omega t)$$

**At instant 0, Vc is the initial voltage $V_0$ of the capacitor.**

## FINAL FORMULA :

$$Vc = V_0 \cdot e^{(-\alpha t)} \cdot \cos(\omega t)$$

-----------------------------------

$V_0$ is the initial charged voltage of C

$\cos(\omega t)$ is the cosinus form of the damped wave

$\omega = 2.\pi.f$ (f=pseudo-fréquency oscillation)

$e^{(-\alpha t)}$ is the exponential decrease of the amplitude

That is the exact description of the damped wave display

We have now just to replace $\alpha$ and $\omega$ by their value defined before $R/L = -2.\alpha$ et $1/L.C = (\omega_0)^2$

Now we know how to calculate the damped wave, what value to change if needed…..

***COMMENTS :***

1.- This calculation is only correct if we assume that we are close to a good circuit ! ( 2<< 02) !!
Then the pseudo-frequency of the damped wave is exactly as calculate by values of LC.
If not, pseudo-frequency will be different and more and more far way than the value of the simple LC calculation. It will also move if the circuit is more complex, with non-linear components : drift is then possible….

2.- Usually, damped waves are present when a sharp step of voltage appears into the circuit. For example, within switching power supply at high power, fast speed commutation of voltages in tx, pulse generators..…. Most of the time, that is a perturbation non wished !

3.- At very high frequencies, wires between the elements are also affected by an amount of self-inductance with a value even very low, but able to generate damping waves during commutations voltages… So you have to study the circuit to minimise those wiring inductances

4.- Note also that at the first half-period of the cosin wave, the voltage change of polarity and is usually close to the initial voltage of C but reverse ! If semi-conductors are somewhere in the circuit, they will have to support usually a high reverse voltage… .

that means a immediate breakdown! You must install a protection circuit around your semi-conductors to protect them of those reverse voltages. Damping waves in high power system is frequently causing lots of trouble, moreover when attention has not been paid for them!

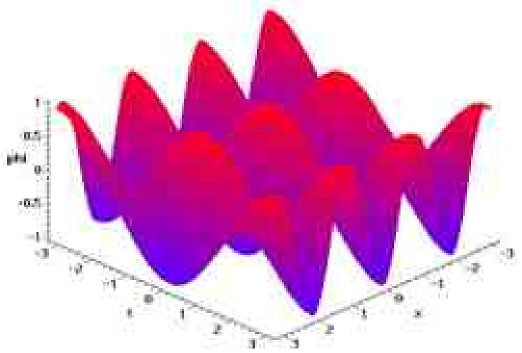
5.-May I suggest the reader to try some experiments and generates such damped waves?
The capacitor may not be polarised. (voltage oscillating over and under zero volt).
It can be charged via an auxiliary DC power supply with a serial resistor to permit the charge ,but high enough to avoid any perturbation during the generation of the damping wave.

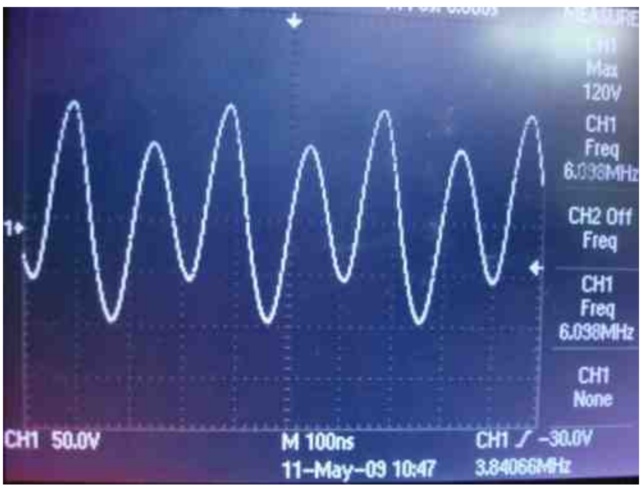
Usual low voltage can be used as charging voltage.
To display the wave, a memory scope can be connected at the capacitor. It will be selected as single trace, triggered by the capacitor voltage itself.
A non-memory conventional scope can also be connected but you will probably design your circuit for slow damping waves, or with a long persistence scope if any….

If you do those tests, you may have some problem with the shorting switch!! Conventional switches have a usually a bounce of the mobile contact during the mechanical commutation. So there are a few interruptions before the contact is really fully fixed. If the duration of that bounce is close to the pseudo-period of the damping wave, you may see something like stroboscopic effects! The display may be fully distorded!
The only correct way is to use a small mercury-wetted relay. Due to the capillarity, there is a mercury bridge between the moving and fixed electrodes during the mechanical commutation of the reed switch. There is no bouncing at all and the switching is perfect.

6.- Note: For more complex calculations, see also into the book
*“Reference data for radio engineers”*
(published by Howard W. Sams & CO.,inc ITT)

***73's from ON4BX***





# Chuck Blaney
# WW2 radio operator & prisoner of war

A WINDOW IN TIME.... is the story of a B-24 bomber crew that formed up at Mountain Home Air Base, Idaho, in 1944; shipped over to England where they were stationed at Seething Air Base; flew the first combat mission to Eurskirchen, Germany on Christmas Eve 1944; got shot down exactly three months later while bombing a target near Hamburg; were held prisoners and repatriated at war's end and reunited at a 50th anniversary reunion celebration set up by a German who saw the bomber crash while he was serving in the Hitler youth Corps.

This was an episode in the life of Charles W. "Chuck" Blaney. He was the Radio Operator/Top Turret Gunner aboard the B-24 bomber named "Do Bunny" shot down 25 March 1945. Chuck Blaney was born in Chicago in 1925. His father worked for Pullman Co. converted from making railroad cars to making Assault Landing Craft during the war years. His mother--get this--was a "Rosy the Riveter" in a Chicago Ford Plant converted from autos to assembling B-24 Liberator bombers. Chuck enlisted in July 1943 and volunteered for the Army Air Corps. He completed his Radio Operator/Mechanics Training Course at Sioux Falls, South Dakota, and Gunnery School at Yuma, Arizona. Following crew formation at Lincoln, Nebraska, they went to Combat Crew Training at Mountain Home Air Base, Idaho. They were then sent to Topeka Air Base, Kansas for combat assignment and were selected to become part of the 448th Bomb Group, Eighth Air Force in England. In November 1944 the crew left Fort Dix. New Jersey and embarked on a sea voyage to Liverpool, England and moved to Seething Air Base as part of the 713th Bomb Squadron.

Following the war, Chuck earned his BSEE at American University in Chicago and spent the next 30 years with several aerospace companies in various defense related engineering positions. Chuck ended his career as Manager of Product Marketing for Northrop/Grumman Aircraft Corp. after 23 years of service. Chuck is an Associate Member of the Colorado Springs Chapter of the Daidalians. He is also a life member of the American Ex-Prisoners of War and the American Disabled Veterans.

Here is Chuck's story:

# *A WINDOW IN TIME*

By Chuck Blaney

***The Crew***

The date was the 25th of March 1945 and the target was the underground oil facilities at Buchen, Germany (about 6 miles east of Hamburg). The 448th could have easily stood down this day. Yesterday's costly mission took a toll of eight B--24's that were lost to ground fire when we dropped supplies to 40,000 British paratroopers that had just crossed the Rhine River at Wesel, Germany. This was a specially designed mission that took us over the battlefield at 100 feet for a parachute drop of medical, food, ammunition and a Howitzer Cannon that was stowed in the cavity where the ball-turret had been removed. Admittedly, this was not a great mission for the high flying B-24. So much for low level missions using the heavy bomber. After 2 hours of forming we departed Seething Air base at 0600 as a 28 plane formation. We were on our 23rd combat mission with only 7 more to go before being rotated back to the states. Severe weather over the North Sea resulted in one squadron becoming detached from the rest of the 448th Bomb Group. However, the remaining 20 bomber formation proceeded to the designated target. As expected, flak was experienced over the Dutch coast and again around the target area. The bomb-run at 20,000 feet was successful and the target was destroyed with precision.

At bombs-away the formation was attacked by a swarm of ME-262 jet fighters. Coming out of the sun, the world’s first jet aircraft concentrated on our below strength bomber group. This would prove to be a costly day for the 448th. Four bombers would be shot down over Germany and two would manage to make it home only to be written off as salvage.

ME-262 fighters attacked Lt. Steffan’s B-24 and the bomber blew up in midair. Only the Navigator, Lt. Gottlieb, was blown free from the nose and managed to open his chute. He was the sole survivor of this nine-man crew. He was captured and taken POW. On the next fighter pass Lt. Stallard’s B-24, our lead bomber with the radar bombing equipment, was strafed across the flight deck. The attack killed or seriously wounded several of this twelve-man crew, including both pilots. Within seconds the plane went into a tight spiral to the ground. The right wing and then the other wing broke away from the fuselage. The plane then exploded and eventually crashed into a shoe factory in the town of Schneverdingen. Only three of the crew managed to bail out and survive as POW’s. They were Lt, Whitson, Pilotage navigator, Lt. McHugh, Bombardier, and S/Sgt Glass, the Radio Operator. Lt. Todd’s bomber was mortally hit and did a right turn north for Sweden. The plane managed to get to the Swedish coastline and ditched in the Baltic Sea. Seven crewmen, all but the pilot and co-pilot, survived. They were interned in neutral Sweden for the duration of the war.

Our B-24, Do Bunny, piloted by Lt. Paul Jones, immediately took extensive damage including the loss of one engine on fire. The engine was subsequently feathered and the fire extinguished. We maintained formation until a second ME-262 pass on the squadron. This time we responded with all four gun turrets blazing 50 caliber bullets. However, we took several more 20 MM cannon hits, including the loss of a second engine that proved be fatal. Time seemed to stand still. The flight engineer was knocked out of his top turret and he dropped to the flight deck. The Plexiglas in the rear turret shattered in the tail-gunner's face. Fuel and hydraulic fluid from pierced pipe lines were pouring and swirling out of the still open bomb bay which we were never able to close.  Do Bunny was in real trouble.

After the second fighter pass we were forced to drop out of formation. We began a gradual decent to lower altitude. Jones ordered all crewmen to prepare for bailout. He also instructed the crew to lighten the aircraft. We threw out everything that was not nailed down -- flak suits, oxygen bottles, ammunition, the waist guns, and even the radio equipment.

Our navigator, Lt. Herman Engel, could see the heavy clouds of smoke caused by our heavy bombing in the Hamburg area. He was able to set a coarse towards Wesel on the Rhine where the British Paratroopers had landed just the day before. I guess that we never really expected to make the Rhine but we did not have many options to consider. We were 220 air miles from friendly territory and we had flown about 50 miles in our crippled condition. Then a third engine over heated and had to be feathered. It was now evident that Do Bunny was not going to make it back.

On our sixth mission we had experienced an emergency landing with our skipper at the controls. We had been on a typical bombing mission to Worms, Germany when we lost a single engine to flak over the target and a second engine became marginal. Jones maintained formation until we were over friendly territory. Rather than risk the 120 mile run to England over the icy North Sea, he elected to make an emergency landing. We landed on the only runway we could find, which was a PSP mesh fighter strip on the outskirts of Brussels, Belgium. Needless to say, we ran out of this short runway in a hurry and settled in the Belgium countryside. Our B-24, Pregnant Lady, was written off as salvage as two engines were completely burned-out during landing. The successful emergency landing was a great confidence builder for the crew and especially for our pilot. We were indeed grateful for his judgment and piloting skills. The crew had all discussed how difficult our chances of survival might be should we have to bail out over enemy territory. In those days, late in the war when the conflict was going badly for the Germans, the civilians and certain military personnel like the SS and Gestapo were reported to be killing downed Allied airmen. This fact came straight from our Air Force Intelligence at mission briefings. The best chance, if possible, was for the crew to stay together as a group with the hope that the Luftwaffe or the regular German Army would take prisoners of war. This previous emergency landing had a great deal to do with the decision to ride out any subsequent crash landing in enemy territory. Another primary factor in our current situation was the extreme low altitude reached after we lost the third engine. It appeared doubtful that we could survive a bailout under all of these conditions.

Lt. Jim Mucha, our copilot, selected a suitable flat area directly along our flight path to set down our crippled B-24. We landed wheels-up in a field only 500 yards from downtown Soltau, Germany. Jones struggled with the controls just to keep the wings level. The crew had assumed its ditching positions. All went well until a wing dipped into the ground as we lost speed and then all hell broke loose. When that happened the plane just broke apart.


The three crew members in the waist, the tail gunner, the waist gunner and the ball turret gunner were able to jump out of the plane onto the ground. The cockpit was split wide open so the pilot and copilot were able to crawl out of the wreckage. All five were immediately confronted by angry town folk with pitchforks. Then two SS Officers appeared on the scene and the five were run into town and up against the wall of the Mehr Hotel. They were eventually taken control of by a German Officer in the Wehrmacht Army who was in charge of the Soltau Riding Academy. He had his soldiers and the manpower to take control over the civilians and the SS. He took the crew to the Riding Academy and locked them in the stables.

The remaining four of the crew, the Navigator, Flight Engineer, Nose Gunner and I, the Radio Operator, were trapped on the flight deck and still in the wreckage. We were pinned there when the top turret broke away from the airframe and lodged in the flight deck well. The Navigator and the Flight Engineer were unharmed and finally got out after German soldiers axed their way into the fuselage. The Nose Gunner and myself were not so lucky. The top turret had pinned our legs which were broken. The soldiers, including the town Burgomaster, spent considerable time and effort to hacksaw and pry the top turret enough to set us free. They put us on a horse drawn cart and took us to the town hospital where our legs were set and put in soft casts. We then rejoined the other crew members that were now locked up at the Riding Academy. The next morning troops from the German Luftwaffe arrived from a nearby ME--262 air base took over. Lt. Grauenhorst, the Riding Academy Officer, was relieved because he had been worried about the SS Officers and his confrontation with them the day before. We stayed at the air base one night and were then transported to Penneberg, an interrogation center for captured airmen. After four days in single solitary cells (the kind of stuff you see in movies) we were taken to Hamburg and shipped in railway boxcars, with other recently captured airmen, to Stalag Luft I Prison Camp in Barth, Germany. To this day, my copilot, Jim Mucha complains about having to carry me on his back through Hamburg but I counter by reminding him that I took all of the rocks thrown as we were paraded through the streets.

In late May 1945, the Russians liberated our prison camp. Just before the Russians overran the area the Prison Commandant ordered an evacuation and forced march of all prisoners. Colonel Zemke, our senior camp officer, refused to give the order to march. The next day revealed that the German guards had fled during the night and left us to our own device. Colonel Zemke, along with Lt/Col. Gabreski, went out to meet the Russians to make sure that they didn't mistake our camp for a German area and shoot up everything in sight. These Russian troops were the advanced units with a search and destroy mission. Our senior officers made arrangements with the Russians to contact the Eight Air Force and advise them of our situation. It was then just a matter of time before the 8th Air Force flew into the airfield in Barth to get us the hell out of there. All 7,717 American Airmen from Stalag Luft I were flown to tent cities in France to join 90,000 other liberated Americans to await transport back home. Some prisoners had been incarcerated for nearly four years during the US Army Air Corps 1,000 day War over Germany.

A young 12 year old German boy, who was a member of the Hitler Youth Corps, watched our crash landing. Gerhard Bracke was that boy's name.

Today Mr. Bracke is a University Professor and a part time WW II aircraft historian. It was during this past year that he made it his goal to find out what happened to the crew in the bomber that he watched as it crash landed. Many of the details, that we never knew from the German viewpoint, were revealed by Brache's research. He was instrumental in locating the survivors of that crash still living today, and brought us together for a 50th anniversary reunion in Dayton, Ohio during the fall of 1995. Gerhard Bracke flew in from Germany to join us for the celebration. The German Officer in charge of the Soltau Riding Academy was a Lt. Joachim Grauenhorst. He watched our B-24 pass directly over the academy and thought it would explode any minute. But there was no explosion nor any sound of any crash so he assembled several soldiers and took off to find where the bomber had gone down. In locating the wreckage, he directed all his attention to freeing the trapped crewmen inside. He then went into the town square where the others were herded. An SS Officer was inciting the angry German civilians and Lt. Grauenhorst initiated an argument with the SS Officers as to who had the authority to take the prisoners. It was probably only because Grauenhorst had several soldiers with him under his command that he was able to take those crew members back to the Soltau Riding Academy stables. He probably saved all of our lives.

Lt. Joachim Grauenhorst, a Wehrmacht officer assigned to the Riding Academy at Soltau

The reunion in Dayton was a huge success. Gerhard Bracke arrival from Germany was a complete surprise. Of the nine original crewmen, five are still alive. Four of us made it to the reunion; Paul Jones, the pilot; Jim Mucha, the copilot; Herman Engel, the navigator; and me--the radio operator. Mr. Bracke brought additional information he had gathered on our crew such as the official missing crew reports from other bombers that had seen the four bombers of the 448th Bomb Group go down that day. Bracke also had the biography of the German pilot, a Lt. Rudolf Rademacher, who shot us down. Rademacher had 118 victories in the ME-109 and 8 more in Luftwaffe's hottest jet, the ME-262 ( At least we were not shot down by an amateur). Lt. Rademacher survived the war only to die in a glider crash in 1953 about 10 miles from where we crash landed. Poetic justice.

Bracke also brought a personal letter from Lt. Grauenhorst who still lives in Soltau and a letter from the Mayor of Soltau inviting our crew to a City Of Soltau reunion in 1996. A highlight of Bracke's research was his uncovering of five photos of our crashed bomber that laid in the archives of the Soltau newspaper since 1945. What a treasure to acquire after all these years.

Lt. Rudolf Rademacher the German pilot that downed our plane on March 25, 1945.

So, that is my story. Four planes shot out of the sky in minutes and only our crew survived intact. With hundreds of holes in our B-24, no one was seriously wounded or killed. Why didn't the plane burn or explode in flight or upon crash landing. Was it just luck or was God the "tenth man" man in our crew that day. --- I would like to think that he was.

*The Crew:*

*Paul Jones Pilot Owensboro, KY - James Mucha Co-pilot McDonald, PA - Herman Engel Navigator Brooklyn, NY - Charles Blaney Radio Operator / Top Turret Gunner Chicago, IL - Leonard Dailey Flight Engineer / Top Turret Gunner Beaumont, TX - Albert Bentley Ball Turret Gunner Atlanta, GA - Edward Danicki Tail Gunner Milwaukee, WI - Alvin Stout Waist Gunner Arvada, CO - William Wilson Nose Gunner Willamston, SC*

More informations here : http://www.merkki.com/

# COMIC'S HAM

Have some fun


Yes, there is an antenna on this photo !


## THE QSL OF THE MONTH