An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

Formerly the RSGB Microwave Newsletter and now published by the UK Microwave Group

2005 OCTOBER

Pictured left:

Sam Jewell, G4DDK, the 2005 winner of the G3VVB Trophy for Home Construction

…. see page 15

In this issue ...

Latest News …

- **W3IY..respected Stateside microwaver now "silent key" (page 17)**
- **Dutch Microwave beacons in jeopardy (page 18)**
- **SSETI Express lift off**
- **scheduled for 27 October (page 20)**

MANY THANKS TO ALL OUR CONTRIBUTORS THIS MONTH ... WITHOUT YOU THERE WOULD BE NO SCATTERPOINT!

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From the Editor's Desk

You responded magnificently to last month's plea for input to Scatterpoint ... many thanks! We have more than enough material to fill this edition and much of it, particularly activity news, has been put in the file for the next month. However, we still need more technical articles ... keep them coming folks!

By the time you receive this edition, the Martlesham Microwave Round Table will almost be upon us. It promises to be even better than last year so I do hope many of you will be able to attend and meet fellow microwavers from not only the UK but from the USA and Western Europe.

As the winter draws near, thoughts turn to construction projects. This year, why not turn to 24GHz as your next band? Some exciting things have been happening up there recently as Martlesham attendees will find out. Failing that, the 3.4GHz band is also worthy of your attention. Numbers are steadily growing on that very interesting band .

Until next month, **73 from Peter, G3PHO**

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News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown lower left. **The closing date is the Friday at the end of the first full week of the month** if you want your material to be published in the next issue.

NEXT MONTH'S SCATTERPOINT

will be our usual issue spanning both November and December. The one after that will be the January 2006 edition.

Scatterpoint appears ten times a year, the bi-monthly issues being July/ August and November/ December

HAVE YOU RENEWED YOUR UKuG SUBSCRIPTION YET? YOU CAN ALWAYS CHECK THE RENEWAL DATE ON YOUR ENVELOPE ADDRESS LABEL IF YOU RECEIVE A PRINTED SCATTERPOINT. THE DATE IS ON THE LOWER RIGHT CORNER OF THE LABEL. IF YOU STILL DON'T KNOW YOUR RENEWAL DATE PLEASE EMAIL THE SECRETARY, G0CZD, AS SOON AS POSSIBLE!

SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO THE UKuG GROUP SECRETARY AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE

MARTLESHAM MICROWAVE ROUND TABLE

Sunday 13 November 2005

The programme of lectures and other activities for this event can now be found on the UK Microwave Group website : http://www.microwavers.org

There will be three talks on the Saturday afternoon and four on Sunday, plus a 24GHz antenna test range (please note—no 10GHz this time),a fleamarket, the usual test gear facilities and the UKuG AGM.

At the time of writing this there were still rooms available at the Marriott hotel for an overnight stay but if you can only come on Sunday you will still need to register for the Round Table meeting itself. You can do this online, following the link from the UKuG website (see above).

WANTED

A 23cm 100w cavity amp, complete if possible. Please email John Randall, M0ELS, at: **m0els@tiscali.co.uk**

Using Mitsubishi Power Amplifier modules

Due to problems beyond his control, **Grant, G8UBN**, has not been able to supply the second part of the article he first published in last month's Scatterpoint. It will appear in the near future ... so patience, please!

SOFTWARE REVIEW

(see last month's Scatterpoint) comes a note from the author of the software, John Randall, M0ELS **<JRandall@fermaxuk.com> :**

I am making copies of my software, which Peter so kindly reviewed, available free of charge to all UKMG members. I hope this will entice people to use it more and allow me to get any feedback regarding bugs, etc.

I will be improving the software from time to time and will post the latest versions on my website for downloading.

Peter mentioned the video capture function and that he did not know what to do with it. One possible use is to view the video of a camera, which is attached to a dish for EME. This would allow one to aim the dish using the camera.

Any suggestions on adding additional functions would be appreciated and please note that if the software is required on a CD, then I will ask for a small £1.75 fee to cover postage

TIRED OF GETTING CDs WITH JUNK MAIL?

Then here's a good idea from John, M0ELS

I recently purchased what I thought was a straight key RECORDABLE cw beacon/id'er kit, but found to my horror that it required an iambic key. Not wanting to spend a fortune on a perhaps, once off paddle, I decided to make my own.

Above is a photo of the completed paddle key, which consists of 6 Wanadoo CDs glued together, 4 plastic shelf supports and several nuts and bolts. I used a spring steel ruler for the paddle.

It doesn't look like much but it was a good fun building it and will eventually get a weighted bottom and anti slip feet.

I would like to challenge everyone to build one!

"The PICeuncer"

A processor - based relay sequencer for Amateur Radio antenna changeover control

.. by DR. John C. Worsnop PHD C Eng MIEE, G4BAO

Introduction

This article describes a flexible circuit for the control of antenna changeover relays. It is based around the inexpensive Microchip PIC 12F629 processor and a few external components. It features "Power down failsafe" that switches a latching relay to put the preamp out of circuit if the power fails. The particular arrangement described uses the relay's auxiliary contacts to ensure that the relay is switched before the PTT is applied to the transverter.

The specific arrangement described here was used to drive a 24/28volt TTL-logic level switched latching transfer relay, to protect a 23cm masthead preamp but the software and hardware can be easily adapted to suit a large number of possible combinations of relays and switching arrangement. It could be used for latching or non-latching relays with a wide range of supply voltages.

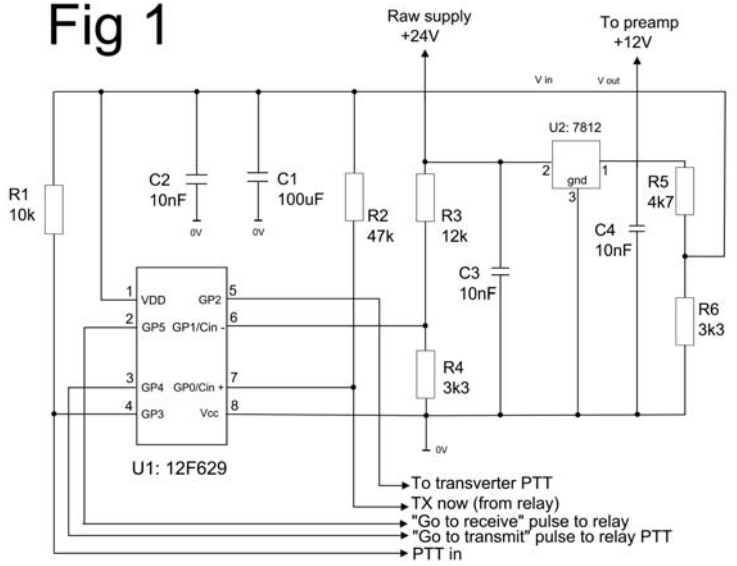
Processor and PSU circuit description

The 12F629 PIC controller is configured in the software to have four digital I/O ports and a comparator input.

- GP0 – digital input for the "transmit now" line, active low
- GP1 - comparator input that detects if the supply voltage has been removed.
- GP2 – digital output, active low that is used to key the transverter.
- GP3 – digital input, active low, from the PTT output of the transceiver.
- GP4 – digital output to provide a positive going TTL level pulse to switch the latching relay to the transmit position.
- GP5 – digital output to provide a positive going TTL level pulse to switch the latching relay to the receive position.

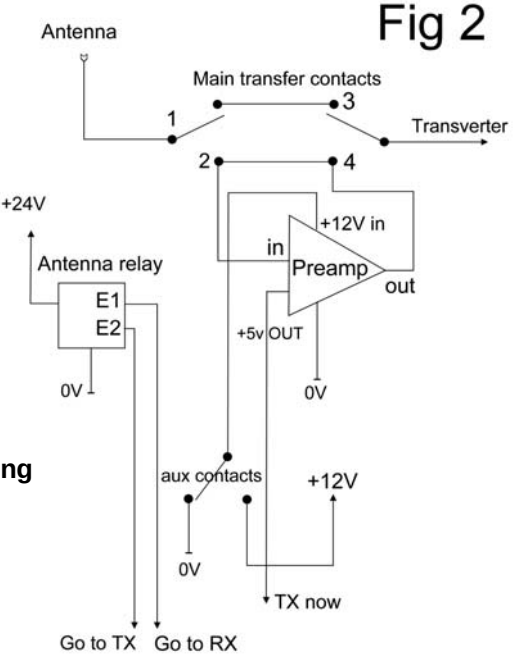
The PICuencer provides two supply rails from a raw 24V supply to power the changeover relay. A regulated 12V supply from U2 to supply the masthead preamp, and a 4.6V supply for the PIC is derived from a potential divider R5, R6 across the 12V rail. Potential divider R3 and R4 provide a voltage from the raw 24V supply. This supply has a large 100uF reservoir capacitor C1 to allow it to "hold up" long enough for the PIC to switch the relay to the "straight through" position on supply removal to always ensure that the preamp is switched out of circuit. As soon as this supply is removed, the comparator in the PIC detects this and forces the relay to switch the preamp out of circuit before the supply fails.

Fig 1



PICuencer: main circuit

Fig 2



PICuencer: relay switching circuit

Software description.

The main operation of the software is quite straightforward.

- At power up, configure the PIC, then make sure the preamp is in circuit by making sure the PTT to the transverter is high and pulsing the receive relay once.
- Start the main operating loop- wait for pin 7 of PIC (GP0) to go low, this is PTT on.
- PTT Low
- OK, latch the relay to the TX position. Wait until the auxiliary contacts have gone over, then go to transmit by pulling the PTT low to the transverter.
- We're transmitting now, so let's go and wait for the PTT, pin 7 of PIC (GP0), to go high again
- PTT high
- OK, turn off the drive by pulling the PTT to the transverter high again, wait, and then switch back to receive. We're receiving again, so let's go and wait for the PTT to go low again.

If at any time during operation, the voltage on the comparator input falls below 3.3V, we interrupt the processor which pulses the relay in to the receive position. We then wait to make sure the power really has gone. If the PIC is still running after 250ms, we go back in to the main loop of the program.

Software listing

```
;*****************************************************************************
*
;                                                 *
;   Filename:       PICwencer-2.asm                                 *
;   Date:         13th August  2005                       *
;   File Version:  2.00                             *
;                                                 *
;   Author: John Worsnop                                  *
;   (c) G4BAO 2005                                *
;                                                 *
;                                                 *
;*****************************************************************************
;                                                 *
;   Files required:                                   *
;   PC12F629.inc        -  processor specific variable definitions      *
;                                                 *
;                                                 *
;*****************************************************************************
;                                                 *
;  Notes:                                           *
; Version 2 with failsafe feature                         *
;*****************************************************************************

        list            p=PIC12F629             ; list directive to define processor
        #include        <P12F629.inc>           ; processor specific variable definitions
```

```
        __CONFIG    _MCLRE_OFF & _CP_OFF & _BODEN_ON & _PWRTE_ON & _WDT_OFF &
_INTRC_OSC_NOCLKOUT


;***** VARIABLE DEFINITIONS
w_temp          EQU             0x20            ; NOT USED variable used for context saving
status_temp     EQU             0x21            ; NOT USED variable used for context saving
delay_count     EQU             0x22            ;delay counter for timing loops
msd1            EQU             0x23
msd2            EQU             0x24
oscvalEQU               0x3FF
;**********************************************************
;       GPIO port bit definitions
;**********************************************************
txnow           EQU     0       ;TXnow input on GPIO
comparator      EQU     1       ;Comparator input
transverter     EQU     2       ;transverter PTT on GPIO (red led)
ptt                     EQU     3       ;PTT input on GPIO
relayTX         EQU     4       ;pulsed line to antenna relay (orange)
relayRX         EQU     5       ;pulsed line to antenna relay  (green)

;**********************************************************
        ORG             0x000   ; processor reset vector
        movlw   03h
        movwf   PCON    ; re-set BOR and POR flags in PCON
        goto    main    ; go to beginning of program

        ORG             0x004   ; interrupt service routine
;This ensures that at power off, the relay always switches the preamp out of circuit.
;It is called by the comparator detecting the supply volts dropping. Panic failsafe in the 20 or so ms
as the power dies down, it forces the relay in to the TX position then waits to 250ms to make sure
the PSU has really been removed.
        bsf     PIR1,CMIF               ;reset the comparator interrupt flag
looptodie
        bsf GPIO,relayTX        ; switch the preamp out of circuit
        call msdelay
        bcf     GPIO,relayTX
        call ms250delay         ; wait to makes sure the power really has gone
   goto main            ; if the PIC is still running after 250ms, restart the program
;*****************************************************************************
******
main
;calibrate the internal 4MHz oscillator
        bsf STATUS, RP0 ;*****************bank 1*******************
        call oscalval ;Get the cal value
        movwf OSCCAL ;Calibrate

;configure the IO ports
        movlw 0Bh               ;Set up GP0,1,3 as inputs. GP0 is PTT in, GP1 is C- GP3 is TXnow
                                ;Set up GP2,4,5 as outputs:
```

```
        movwf TRISIO  ;GP2 is Transverter PTT out
                                        ;GP4 is relayTX
                                        ;GP5 is relayRX
        movlw 09h
        movwf WPU               ;enable weak pull ups for GP0, GP3

;configure the comparator
        bcf             STATUS,RP0      ;*****************bank 0*******************
        clrf    GPIO    ;Init GPIO
        movlw   04h             ;Set GP1 to Comparator in, GP0,2  to digital IO
        movwf   CMCON
        clrf    PIR1

        bsf     STATUS,RP0      ;*****************bank 1*******************
        movlw   08Fh            ;Set Comparator reference to trip at 3.35 ( assuming 4.65V sup-
ply)
        movwf   VRCON

;enable global interrupt
        movlw   0C0h
        movwf   INTCON

;enable comparator interrupt
        movlw   08h
        movwf   PIE1

        bcf STATUS,RP0          ;*****************bank 0*******************;configure
the IO ports

;Power up - make sure we're in receive by making sure the PTT to the transverter is high
;and pulsing the receive relay
        bsf             GPIO,transverter
        call    pulseRX
;---------------------------------------------------------------------
;Start of main Operating loop- wait for pin 7 of PIC (GP0) to go low, this is PTT on
WaitforPTT low
        bsf             GPIO,transverter        ;Make absolutely sure the PTT to the transverter
is high
        btfss   GPIO,ptt                        ;skip the next instruction as long as the PTT is
high
        goto    PTTlow
        goto    wait for PTTlow

;latch the relay to the TX position ----------------------------------------------
PTTlow
        call pulseTX                    ; pulse the antenna relay to latch it in to the transmit
position
        call ms250delay                 ; wait 250ms to allow the relay to settle

; wait until the auxiliary contacts have gone over, then go to transmit.
Txnowwait
```

```
        btfsc   GPIO,txnow              ;waitfor TXnow low
        goto txnowwait
        bcf GPIO,transverter    ; pull the PTT low to the transverter

;we're transmitting, so lets go and wait for the PTT to go high
;Wait for pin 7 of PIC (GP0) to go high, this is PTToff
waitforPTThigh
        btfsc   GPIO,ptt
        goto    PTThigh
        goto    waitforPTThigh

;PTT is now high, so we need to turn off the drive, wait, then switch to receive
PTThigh
        bsf GPIO,transverter ; pull the PTT high to the transverter
        call ms250delay                 ; wait 250ms
        call pulseRX
        goto waitforPTTlow ;we're receiving again, so lets go and wait for the PTT to go low
again
;End of main operating loop

;Subroutine-------------------------------------------------------------------------
pulseTX
        bsf     GPIO,relayTX
        call msdelay
        bcf     GPIO,relayTX
        return

;Subroutine-------------------------------------------------------------------------
pulseRX
        bsf     GPIO,relayRX
        call msdelay
        bcf     GPIO,relayRX
        return

;Subroutines for doing the delays
;
;Subroutine-------------------------------------------------------------------------
;               50us delay
delay
        movlw 0x14
        movwf delay_count
delay_loop
        decfsz delay_count,1
        goto delay_loop
        return

;Subroutine-------------------------------------------------------------------------
;12.75ms delay
msdelay
   movlw 0xFF
   movwf msd1
```

```
msloop125
   call delay          ;50us delay
   decfsz msd1,1
   goto msloop125
   return

;Subroutine-------------------------------------------------------------------------
;250ms delay
ms250delay                    ; wait 250ms
        movlw 0x14
    movwf msd2
msloop250
    call msdelay          ;12.5ms delay
    decfsz msd2,1
    goto msloop250
        return


        END                   ; directive 'end of program'
```

Some further ideas

The big advantage of using a software based solution is that you can "adopt, adapt and improve" to suit your particular configuration. The source code and circuits shown will work with the relay configuration shown here, and is in use at the G4BAO masthead to switch a 23cm G3WDG pre-amp in and out of circuit. The transverter has its own separate TX/RX switching back in the shack.

For example, I made use of the auxiliary contacts to remove the supply to the preamp before transmitting, and to route the preamp's 5V supply to the PICuencer as a switching signal. For relays that do not have these contacts, simply remove the two lines after ***"txnowwait"*** but ensure that the previous delay is long enough for the relays to settle. I chose 250mS, but you can fiddle around with the timings to suit your relay switching times.

Similarly if you have a non – latching relay, change the "***pulseTX***" and "***pulseRX***" subroutines to energise and release the relay coil in the TX and RX condition.
If the relay does not have TTL level switching, one of the PIC I/O lines can be used to drive a FET or bipolar relay buffer.

I can make the source code available and if there's enough interest and (for a small charge) even supply programmed PICS.

Disclaimer and copyright notice

The author will take no responsibility for loss or damage to equipment, or injury to persons caused by the implementation of this hardware and/or software. It is supplied in the spirit of Amateur Radio, solely with the intention of stimulating ideas and to encourage people to learn to
program PIC controllers.

It may of course be adapted for individual Amateur Radio use, but the author asks that any changes or improvements be communicated to the author in the spirit of public domain software.

A Quiet Fan Controller

Speed varies with temperature

Paul Wade W1GHZ ©2005
w1ghz@arrl.net

Many modern radios and other electronic devices rely on muffin fans for cooling. These can be loud and annoying. Some run continuously, while others cycle on and off, either when needed or just on transmit. In some radios, the fan cycling results in a small frequency shift as the oscillator is heated and cooled.

Wouldn't it be preferable to have a fan with a variable speed, responding to cooling needs? I've thought so for a long time, but never got around to doing something about it. Recently, I decided it was time. I figured this was an obviously useful thing, so there would be lots of circuits available on the web. NOPE! The only things I could find were microprocessor circuits, many of them relying on fancy fans with internal tachometers – none of those in my junk box. Also, the microprocessor controls the speed by turning the fan on and off rapidly; some of the notes suggested that the results are audible.

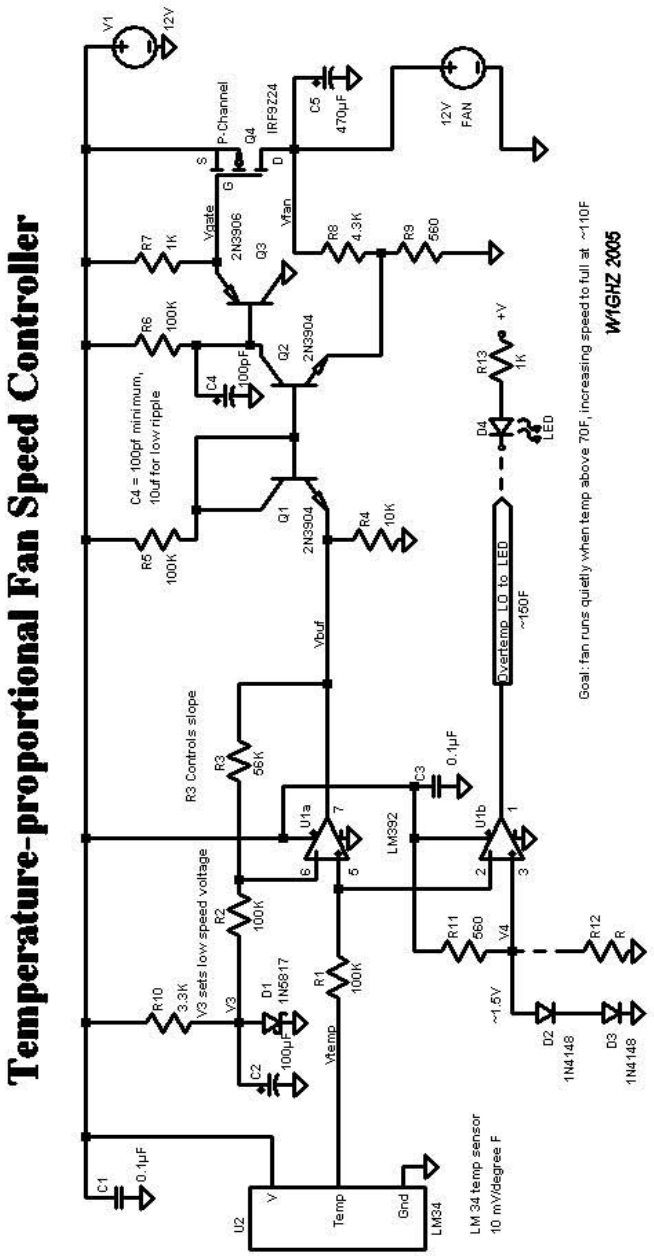
Most muffin fans use DC brushless motors, so the speed is easily controlled by varying the motor voltage. 12-volt fans are convenient and readily available. Also, there are a number of inexpensive temperature-sensing ICs available. What we need is a simple circuit to vary the fan voltage in proportion to temperature – basically, an amplifier. A couple of op amps should do the job.

I sketched out some circuits and simulated them with the free **SwitcherCAD III** software from http://**www.linear.com**. None of them worked satisfactorily, so I called the op amp guru, Byron, N1EKV. He agreed that it sounded simple and would look into it. He soon called back to say it wasn't as simple as it sounded because of some choices I had made: to keep one end of the temperature sensor and one end of the fan grounded, and to drive it with a power FET for minimum voltage drop at full speed. The result is that the sensor is referenced to ground, but the FET is referenced to the positive voltage. The final complication is that there is a huge gain in the circuit due to the transconductance of the FET, about 2.5 Siemens (in tube terms, this is 2,500,000 µmhos – a typical tube is 5000) or more. To make things worse, the FET is operating in a non-linear region, and having non-linear elements inside a feedback loop is never a good idea.

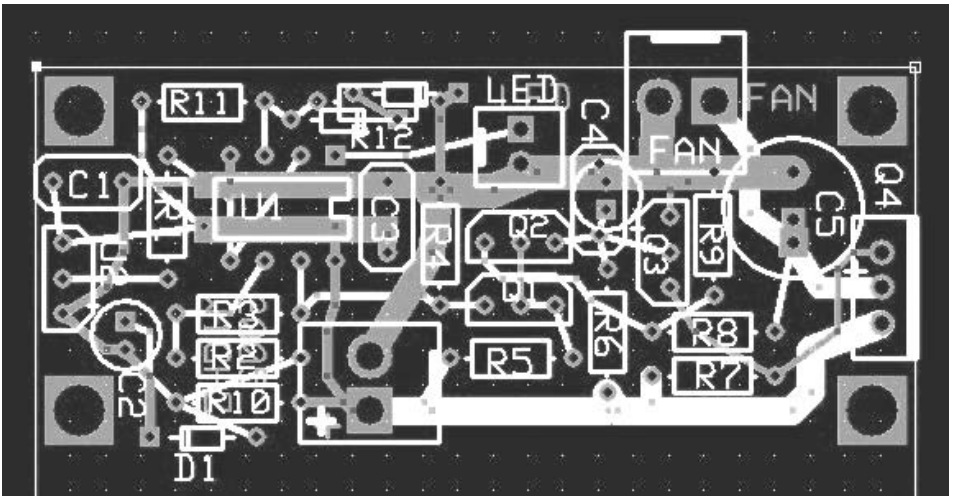
I went back to engineering basics: find a circuit to steal. One of the microprocessor fan controls[1] used an interesting circuit to drive a FET and shift the reference from ground to high side. The circuit, in the area of Q1 and Q2 in the schematic, looks like the Widlar current mirror used in many integrated circuits. I added this circuit plus the PNP emitter follower, Q3, and fiddled with the resistances to get it going. Then I consulted Byron again and added capacitors C4 and C5 to stabilize things.

Computer simulations are only as good as the models, and don't always fully model reality, so I built up a breadboard on a piece of perf board. It actually works – and it definitely oscillates without C4!

Now it felt safe to make a printed-circuit board, to make it reproducible and robust enough for portable equipment – perf board wonders seem to fall apart bouncing around in the back of the truck. Since op amps come in pairs and quads, I tried to think of something to do with the other half. The best use I could come up with is an over-temperature alert, but that really requires a comparator rather than an op amp. But there is one IC available with one of each, the LM392.


Temperature-proportional Fan Speed Controller
W1GHZ 2005
Goal: fan runs quietly when temp above 70F, increasing speed to full at ~110F
C4 = 100pf minimum, 10uf for low ripple
R3 Controls slope
V3 sets low speed voltage
LM 34 temp sensor 10 mV/degree F
Overtemp LO to LED ~150F
P-Channel
IRF9224
2N3906
2N3904
LM392
LM34
12V FAN
+V
LED

The comparator uses the output of the same temperature sensor to provide an alert at some higher temperature. The output goes low at the desired temperature to turn on whatever: an LED, a sound, a relay to shut down the amplifier, or a jolt to the operator's chair. The noise-maker from a defunct smoke alarm might be interesting, but a blinking LED seems adequate to remind me not to talk so much.

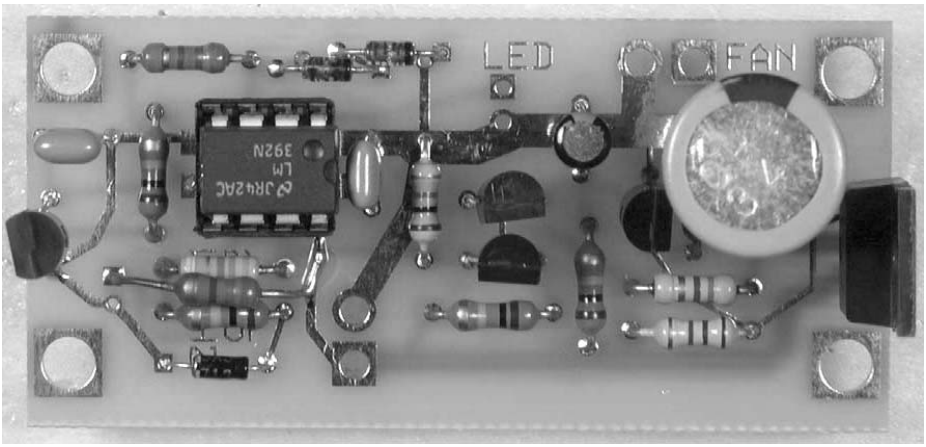


I used the free software from ExpressPCB (http://www.expresspcb.com) to layout the board shown in Figure 2 and placed a Miniboard order: three boards in four days for $59. Four days later, the boards arrived, I put one together and sparked it up. After I added one resistor that somehow was left out of the layout (Figure 2 includes the correction), it works fine. The fan purrs away at room temperature and speeds up as the temperature sensor is heated up. Figure 3 is a photo of the completed controller, with the LM34 temperature sensor at the left edge of the board, not yet attached to a heat source. It could also be soldered to the other side of the board, if the intent were to mount this board on the heat sink.

With the resistor values in the schematic, the fan gets about 9.5 volts at room temperature and gets up to full speed with full voltage at about 105°F. We will use Fahrenheit since the LM34 temperature sensor output is in Fahrenheit: 10mV per degree F, so the output at 70°F is 700 mV and at 105°F is 1.05 Volts. The slow speed is set by voltage V3, controlled by resistor R10; decreasing R10 increases the current through Schottky diode D1, which increases the voltage drop of the diode and increases V3. The temperature at which the fan reaches full speed is controlled by resistor R3; increasing R3 makes the fan reach full speed at a lower temperature. Note that we can monitor the temperature directly by measuring voltage Vtemp at the LM34 output, as 10mV per degree F.

The over-temperature setting for the comparator is similarly set by voltage V4, the voltage drop through silicon diodes D2 and D3. Decreasing resistor R11 increases the current through the diodes, increasing the voltage drop and thus raising the temperature setting. With the value shown for R11, V4 is about 1.50 volts, so the over-temperature alarm is at about 150°F. If a much different temperature setting is desired, R12 could be used instead of the diodes, but the temperature setting would vary with the supply voltage.

The temperature sensor U2, the LM34, should be in contact with the heat sink or surface being cooled by the fan. Either attach the flat side of U2 directly to the heat sink with Super Glue



(cyanoacrylate), or use a dab of heat sink compound and clamp it on. A heat sink takes some time to heat and cool, so the fan will not change speed instantaneously, but will speed up as the heat sink heats. More important, it will continue running at higher speed until it brings the heat sink temperature down, gracefully slowing down as things cool. U2 need not be mounted on the printed circuit board, but may be mounted remotely, on the heat sink; twist the wires together, and consider adding ferrite beads if there is a lot of RF floating around.

Of course, controlling fan speed won't do much good if there isn't adequate cooling with the fan running at full speed. If you are adding a fan, size, placement, and airflow are important. For cooling a heat sink, *impingement cooling*, with the air blasting directly into the fins (like a Pentium cooling fan), is much more effective than ordinary *convection cooling*, where the airflow is just passing through the fins. If you are just cooling a cabinet or enclosure, sucking may be more effective than blowing. But any airflow is better than none at all.

PCB boards are obtainable at http://www.w1ghz.org

1. ADM1028 data sheet, http://www.analog.com

Neat place

From:Kent Britain <wa5vjb@flash.net>

Neat Place with thousands of circuits:

http://www.discovercircuits.com/

NEW YAHOO MICROWAVE GROUP

I've created a Yahoo group dedicated to VUSHF & microwaves in Belgium (but members from abroad are also very welcome). The focus will be put on "weak signal" activity (DX) and technical experiments experience sharing.

Information :
Name: VUSHF_in_ON
Home page: http://fr.groups.yahoo.com/group/VUSHF_in_ON
E-mail: VUSHF_in_ON@yahoogroupes.fr
Looking forward to meet you there!

73, Gaëtan, ON4KHG

CRAWLEY MICROWAVE ROUND TABLE ~ A REPORT

The Crawley Microwave Round Table, held last month, was a undoubted success. As usual it attracted many of the microwavers from the South Eastern corner of the country but one or two folk from other parts came along as well. The Crawley meeting is sometimes known as the "Friendly One". The atmosphere is just that! It is a much smaller event than the other two big UK microwave meetings, RAL and Martlesham since it is held in the clubrooms of the Crawley Amateur Radio Club. Those who haven't been before should not compare it with Martlesham. There's none of the razzamataz of the big meetings, just a nice and very friendly get together of people with a common interest. There are always a couple of talks and some equipment demonstrations, plus the usual fleamarket/swap table session.


G8UBN judging the competition entries

Dave Powis, G4HUP, drove down and sent the following report:

A Construction Contest was run very successfully at Crawley, with approximately 10 entries - a wide variety of inputs from the very simple, eg preamps, to complete systems for 5.7GHz and 24GHz. The judging was by Julian, G3YGF, Grant, G8UBN and Allan, G8LSD. The overall **winner** was declared as **Sam, G4DDK**, for his 23cm Transverter. *(See front cover of this issue ...editor)* Note that the judges stressed that they based their criteria on construction and not on the complexity or electronic design of the entry.


G0FDZ talks on home Construction techniques

In recognition of his success, Sam will be awarded **the G3VVB trophy** at Martlesham on November 12th this year.

Overall it was a very good day, with some interesting items for sale in the flea market and some excellent talks - especially Chris, G0FDZ's talk on mechanical engineering - that brought out a lot of tips and discussion from the audience. Approximately 40 people attended the event.

Many thanks to Derek, G3GRO, and the Crawley club for staging it.

All photos courtesy of G4HUP


Flea market tables

Making Waveguide more Flexible 90 deg Twists

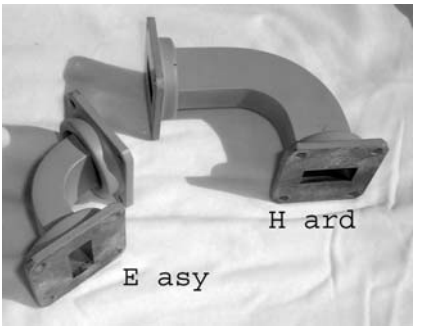
Kent Britain WA5VJB

Getting waveguide to go around a rotator, or even to be flexible going up a portable mast, can be fun. Waveguide has E and H planes. One way to remember which is which, is it to think of these planes as Hard and Easy to bend.

You could easily bend waveguide along the Easy Plane, but it's a lot Harder to bend it along the H bend. It's that Easy and Hard planes that make it fun to get even the 'Flex' guides to twist. They bend easy one way, but not the other.

When it come to E and H bends in waveguide, just look at it and think which would be easier to bend, that's the E bend.

Keep an eye out for 90 deg waveguide twists. Using two short sections of flexguide with a 90 deg twist in the middle makes the whole section much more flexible.



See ya on 10 Gigs de WA5VJB

CRYSTAL OSCILLATORS -- FEEDBACK ON LAST MONTH'S ARTICLE

From:André, F9HX <agit@wanadoo.fr>:
I read, with a great concern, papers about OCXOs in the last Scatterpoint issue.
I already made a lot of work about that subject and I published many articles in France and the UK.
You can find in the 2/2005 issue of VHF COMMUNICATIONS my article titled: " Solutions for stable and precise microwave frequency generation".

Two solutions are given. The first one is to use a professional 10 MHz OCXO with multiplication, division and addition to get a VHF output, for example 106.5 MHz.

In practice, we can get a 100Hz stability and frequency knowledge in the 10GHz band after less than half an hour after powering up.

The second solution, applying to VHF OCXOs like DF9LN, G8ACE and others, is to power them 24 hours a day to avoid the main problem: the retrace effect.

You can find all details about the 10 MHz solution on the site: **http://perso.wanadoo.fr/f5cau**
Up to now, seventeen "synthesisers" are already made or in progress in France and Switzerland.
PCB are available from F9HX.... **Email: agit@wanadoo.fr**
Best 73, André

BEACON MONITORING

- an interesting offer from G4JNT

Now that beacons and microwaves receivers are becoming more stable, would there be any widespread interest in computer controller beacon monitoring software? Using a PC soundcard as the Rx audio interface, software on the PC continuously measures Signal to Noise ratio and tracks drift, then logs reception reports continuously and can sound an alert when the signal peaks.

To track drift at either end, it would be necessary to have a computer controlled transceiver, but they're getting quite common now, too. Apart from the directional antenna issues, tracking multiple beacons wouldn't be difficult to include as an option, and if you have remotely switchable transverter interfaces, multi band beacon monitoring.

I've done quite a bit of this type of signal detection software in the past, both for work and for fun [they can occasionally be the same thing!] and automatically finding a signal that rises above the noise to trigger an alarm can quite straightforward, particularly if it is a carrier (see the 'Command' book - still some copies available from the RSGB bookshop.

It will be more of a challenge to reliably detect rainscatter and identify it positively as such, but since RS signals are usually quite strong, should be possible.

For this reason, I would also appeal to all beacon builders, to include at least 20 seconds of plain carrier into the keying sequence, and use on-off keying in preference to FSK.

If there is enough interest form people prepared to have a PC running continuously for extended periods, I could be tempted to put something together for the soundcard, solve the rainscatter issue and work out how to interface computer controlled tuning to a plethora of different types of Rx.

Andy G4JNT <actalbot@mail.dstl.gov.uk>

W3IY, Bill Seabreeze, SK

VHF and microwave enthusiasts lost a true friend and supporter on September 19, 2005 when Bill Seabreeze succumbed after a long struggle with cancer. He was only 54 years old.

Bill was first licensed as WN3EIY in 1965. He quickly found his lifelong passion of VHF and microwave radio. Virtually every VHF operator on the East coast of the USA knew Bill as a friend. Throughout his life he elmered up-and-coming VHF operators. His laboratory was always available to help solve our technical problems and to get our equipment working. His web site http//users.adelphia.net~w3iy/ was a treasure-trove of valuable vhf information, propagation data, and rover tips. He was a member of the Potomac Valley Radio Club. He was member of the Grid Pirates and an honorary life member of the Packrats.

Bill travelled far and wide as a speaker at local and not-so-local club meetings, hamfests, and educational sessions. He was always an advocate for VHF and microwaves, and for his special interest, roving. He was an author in QST and earned the QST cover award for his VHF contest write ups.

Bill's pride and joy was his rover, the official Intergalactic Roving Battle Jitney. He never missed a VHF contest until a week before his death, when he was confined to bed. He didn't enter for score but to give out rare grids to his friends. He developed a circuit starting in FM15 and FM25 on the outer banks of North Carolina, and continuing up through the eastern shore, taking advantage of coastal tropo to give these rare grids to stations as far up the coast as Maine. In recent years he was joined by his friend Christophe, ON4IY, who flew over from Belgium for each contest to rove with Bill. I will always remember Bill's whispering yet reliable 10-GHz signal from the outer banks. His perennial admonition, "don't forget to listen for the weak ones" is known to us all.

Bill was Vice President for Engineering of Microcube Corp. in Leesburg VA. He is survived by his wife Kathy, his son Billy, and his daughter Kristine.

Well, 73, Bill. I know from now on the propagation will be a bit more difficult but we will still be listening down in the noise for you, just like you taught us.

de W4RX

SCHIPOL MICROWAVE BEACONS TO BE TAKEN OFF THE AIR ...

All European microwavers will be both alarmed and saddened to hear that Hans, PA0EHG, has been instructed to remove the well-known Dutch microwave beacons located at Schipol airport, Amsterdam. The UK Microwave Group was alerted to this by John, G4EAT. As a result, a formal letter, expressing the Group's deep concern and outlining the immense value of these beacons to both amateur and non-amateur organisations, was sent to Hans for him to use in any subsequent negotiations with the authorities. At the time of writing this column the beacons were still operational but they could come down anytime now. We hope to hear some good news eventually but for now you can keep up to date by visiting Hans's webpages at:

http://home.planet.nl/~alphe078/history.htm

EME NEWS

From Brian, G4NNS (IO91FF)

Just an update on the 9cm and 6cm EME activity during August and early September.... The final score was 2 stations on 9cm, Al W5LUA on 3456MHz on 8th August and Willi LX1DB on 3400MHz on 9th August. After building the 5.7GHz system I worked Al W5LUA on 6cm on 31st August, followed by Willi LX1DB on 1st Sept, Philippe F2TU on 3rd Sept and Erich OE9ERC on 5th Sept. *(Come along and hear more about Brian's EME at Martlesham in November... editor)*

MILLIMETRE BANDS CUMULATIVE CONTEST ... 4th SEPTEMBER 2005

Due to a clash with the Telford Rally and a 144MHz contest, this event did not get the support it deserved. Nevertheles,s several operators in the Southern half of England went out portable and at least one operated from home.

From **Mike Parkin, G0JMI/P (Hackpen, IO91CL),** comes the following activity report:
On 24GHz I worked the following stations:
GW8KQW/P IO81LS 59 SSB both ways at 93km
GW3FYX/P IO81LS 55/58 (SSB) at 93km
I Also mananged a crossband QSO with GW8KQW/P on 47GHz (Rx) and myself on 2m (Tx). Ian was RST519 on CW over the 93km path. I was Running 1w to 18 inch dish on 24GHz, a homebrew Mixer on 47GHz to an 18 inch dish. Both Del, G1JRU/P, and I operated from Hackpen and we both made excellent contacts with Ian (KQW) and Roy (FYX).

Neil, G4LDR (IO91CL) reports:
Having worked everybody from home at the beginning of August, I decided to try a spot of portable operating. In the past I've always gone to Walbury but with the summit now closed off and to prevent criticism of everyone gathering on one spot instead of spreading out I decided to look for another site. With GW8KQW and GW3FYX operating from the Blorenge I wanted to find a site where I could work them as well as others I thought would be active in Dorset, Wiltshire, Hampshire and Berkshire. Its easier said than done to find a good site that has public access and the summit is clear of trees. In the end, I settled on Stoke Hill south of Devizes in Wiltshire. A pre-contest visit was made one evening a few days before the contest. The Bell Hill beacon was 599 plus 40 dB over an obstructed path due to the huge enhancements you get on 24 GHz signals most summer evenings after a hot day. On the contest day Bell Hill was 579 and stayed at that signal level whilst I operated. I did managed to work GW8KQW/P and GW3FKX/P on the Blorenge (89 km) at 59 signal strength. I also had contacts with G8ACE/P and G3PYB/P on Walbury and with G0MJW/P on Hackpen. These three were end stop signals so we used FM. G1JRU and G1JMI had also been on Hackpen earlier in the day but neither myself or the two on Walbury knew they were there. I tried with G1JRU over a short obstructed path but failed to make a contact, Dell did not have a compass with him which made pointing his dish accurately impossible. I also failed with G4MAP and didn't manage to contact G4EAT on two metres. I also failed to try with G8BKE as he was unable get onto his chosen site of Hardy's monument due to another event there. Despite the low level of activity it was an enjoyable day in the sunshine.

5.7 & 10GHz CUMULATIVE CONTEST ... 18th SEPTEMBER

Gordon, G0EWN/P (IO93FB44) reports his activities as follows: For the 5th Cumulative I decided to operate from Alport Height, IO93FB44. Last year, this site provided my best score with 19 contacts on 3cm. This time the weather was cold and overcast; activity seemed down on last year with fewer stations heard on 2metre talkback. I managed 10 stations on 3cm and 5 on 6cm as follows---3cm GW8AWM/P, G3PHO/P, M0EYT/P, G8OHM/P, G8KQW/P, G3FYX/P, M0FWZ/P, G8JVM,

G3LRP, M0GHZ. I failed with G4ZXO/P, G3UYM/P, G8AIM, G3YGF and G4NNS.
On 6cm G3ZME/P, G3PHO/P, G3LRP M0EYT/P (one way) and G8OHM/P

In general conditions seemed quite poor. Paths that had worked from this site in the past failed on the day. Please note access to Alport is now controlled by a height barrier set at 6'6"--for those with high vehicles.

From Paul Marsh, M0EYT/P <pjmarsh@compuserve.com>
For this contest, we were active from the 'next field along' from where we usually operate on Bell Hill, in **IO80UV**. This gave us the advantage of having a perfect takeoff from about 120 degrees, through North, round to about 190 degrees. Initially, we had set up the 2m talkback station, and my 2m op, Tony G3PFM commented that the band was dead, and asked if I had the correct date for the contest!

The first contact of the day on 5.7GHz was with Christophe, ON4IY, with SSB / CW being exchanged - my best ever DX on 5.7GHz at 491km. The 5.7GHz system performed well - it recently had a DEMI LNA added which seems to help a bit and doesn't suffer from overload from the local beacons. A total of 12 stations were worked on 5.7GHz. On 10GHz, initially the QSO rate seemed slow but picked up, resulting in 18 QSOs, best DX being G3LRP at 308km. We used 'spectran' on the laptop to process the audio, and with the de-noiser and FFT display, it helped a lot when copying weak CW.

QSOs were co-ordinated with KST and 2m talkback, with about an equal number being set up by each method.

Operations were halted around 16:45 BST, as there were reports that the local Bell Hill beacons had gone QRT - some investigation showed that the mains supply had dropped to 120V, so causing the controller to shut down the PA's to save battery power.

Peter, G3PHO/P, operated from Winter Hill, IO83RO94 for this contest and conditions couldn't have been much worse! One of his lowest ever tallies (Only13 on 10GHz and 6 worked on 5.7GHz) made him think hard about doing this kind of thing next year! Inter-G contacts were hard going yet F6DKW at 629km heard Peter's dots at RST539 and Peter heard F1PYR/P's dots for a few seconds on aircraft scatter! Weird indeed! Best two way QSOs were G4ZXO/P (IO90WV) at 341km and M0EYT/P on 5.7GHz at 304km.

MILLIMETRE BANDS CONTEST... 2 OCTOBER

This event was very well supported with some 14 operators active. It was great to hear G7MRF/P back on the bands after a long absence.

Mike G0JMI/P (IO91CL, Hackpen) sends the following report: I worked G8KQW/P on 24048MHz at RS59 ssb both ways over the 54km to IO81XW (Cleeve). G3FYX/P also on IO81XW, was also contacted on the same frequency and mode at RS55. We tried on 47GHz, but nothing was heard. I was running 1w to 18 inch dish on 24GHz, homebrew Mixer on 47GHz to 18 inch dish. I was going to stay and look for other stations but the cold, wind and Sunday over inquisitive trippers got the better of me!

Peter, G3PHO/P operated from both Alport (IO93FB) and Merryton Low Triangle (IO93AD) where he met up with G8VZT, G7MRF and G0EWN for a veritable gathering of the millimetre men! It was a good day out with 10 QSOs made on 24GHz and three on 47GHz, the best being the 24GHz contacts with both G8KQW/P and G3FYX/P (Cleeve, IO81XW) at 134km. **During the same afternoon GW3UKV/P IO83JF (Halyn Mt. N. Wales) worked the Cleeve stations at 167km on 24GHz**... excellent DX indeed.

Gordon, G0EWN/P also operated from Merryton as well as Bradfield (IO93FK)and worked 6 stations on 24GHz, the best being the two ladsson Cleeve at 134km from Merryton Low.

A cut down report from Ian, G8KQW/P says: I have only managed 3 of the cumulatives this year and I have managed the following QSO's over 75km on 24GHz

From Butser Hill IO90MX in August:
G8BKE/P – IO80WP – 90km
GW3UKV/P – IO80KW – 184km
GW8VZT/P – IO81KW – 184km

From Blorenge IO81LS in September;
G1JRU/P, G0JMI/P & G0MJW/P – IO91CL – 92km
G4LDR/P – IO81XG – 89km
G8BKE/P – IO80OU – 104km
G8ACE/P & G3PYB/P – IO91GI – 119km

From Cleeve Common IO81XV in October:
GW3UKV/P – IO83JF – 167km
G3PHO/P – IO93FB – 131km
G8VZT/P, G0EWN/P & G3PHO/P – IO93AD – 85km
G8IFT/P & G4MAP/P – IO82QL – 76km

Conditions and activity on both 24GHz and 47GHz this year have been most encouraging, so much so that a **SPECIAL MILLIMETRE BANDS REPORT** will be presented at Martlesham in November by G4EAT (JO01HR) who has had several contacts beyond the 200km benchmark this year. John operates from home by the way! A more detailed 24/47GHz report will also be published in next month's newsletter. 24GHz should be your next band if you are thinking of building something new this winter.

For now we haven't got the space to do justice to two excellent long term activity reports from DL4PLM and G3XDY. Our apologies go to them and any others .... we promise to publish them in next month!

73 from

Peter, G3PHO

SSETI Express - Update 3 Oct 2005

We have been advised that a new launch date has been agreed - **Thursday 27th October**, from the Plesetsk Cosmodrome - with 28th October as a back-up date. The launch time is still expected to remain at 06:52:26 UTC

Start GMT	End GMT	Description
14:20	14:45	Start of ESA TV Programme – welcome from ESA/ESRIN
14:45	15:15	Launch coverage from ESA/ESOC and Plesetsk Cosmodrome
15:02		Scheduled lift-off
15:15	16:30	Cryosat background information – live from ESA/ESRIN
16:30	16:45	Live coverage of satellite/launcher separation from ESA/ESOC
16:36		Scheduled orbital injection
17:00	17:30	Post-launch media briefing from ESA/ESRIN

It is planned that SSETI Express will downlink telemetry in AX25 format at 9k6 on 437.250MHz and at 38k4 on 2401.835MHz. It should also be available for Radio Amateurs to use as a single channel FM transponder. The 2.4 GHz transmitter was build by members of AMSAT-UK.

Free SSETI Express Handbook download:
http://www.uk.amsat.org/
SSETI Express Mission Operations:
http://sseti.gte.tuwien.ac.at/express/mop/
Download Page:
http://sseti.gte.tuwien.ac.at/WSW4/MOPWS/downloads.php

New French microwave beacon

A new beacon, **F1BOH**, has been built by the GHT group (Groupe hyper Toulousain)
Its located in: **JN14EB**
Its frequency is: 5760.952MHz
Power o/p: 2W
Antenna: 10db slot

This call sign will be used until we get the official one

May I remind you that at the same location there is already **F5ZTT** (previously F6CXO) on **10368.950MHz.**
A **24GHz** beacon will probably run in the future from there too.

73 Dom/F6DRO

Letter to the Editor

Date: Tue, 20 Sep 2005 19:03:05 +0200
From: "John RABSON" <john.rabson@wanadoo.fr>

23cm handheld equipment

As some readers may know, I have been involved with Raynet in a series of investigations of radio propagation in long tunnels, with a view to providing emergency communication for various utilities and emergency services. It has become evident that for many situations 70 centimetres is too great a wavelength to be useful at any feasible power level of, but 23 centimetres works well with a transmitter power of about 1W.

The principal problem we have still to solve is the availability of equipment. There do not seem to be any 23 centimetre portable or handheld radios in current production. For tests at Standedge tunnel near Manchester, ICOM very kindly lent me an IC910 and G7OCD was a great help by letting me borrow an ICT81E. Both equipments performed extremely well, but the IC910 is not intended for regular use in such an environment and both the owners wanted their radios back afterwards. Since then I have relied on scouring second-hand stalls at rallies and advertising in the back of radio magazines. There is of course a limited amount of equipment available this way, and a number of Raynet groups are looking to equip themselves for this band.

So what should we do? My main radio activity nowadays is on a rather lower frequency (87kHz) so I could do with some expert advice on what route to take on 23 centimetres (or possibly 13). The two thoughts which come to mind are (i) build complete transceivers (ii) build transverters to attach to ordinary VHF/UHF walkie-talkies.

Has anybody any suggestions, please?

John Rabson F/G3PAI/P*
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France
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*at present I am in Burgundy, but have not finished unpacking so am not yet on the air on any band.