An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Hardly 'black box radio' these microwaves!

Here's a cardboard box portable transverter/IF system by UKuG member Doug Friend, VK4OE ... and yes, it works!

It's proof that you don't need sophisticated metal working skills to enjoy this aspect of our hobby!

(see page 14)

In this issue ...

Latest News ...

- **Atlantic 10GHz DX record attempts planned for summer 2010**
- **Norman Fitch G3FPK now Silent Key**

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

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From the Editor's Desk

The British weather has certainly taken its toll on UK amateur microwave activity! Robin has had very little input to his Activity News Column and in spite of a couple of cold High Pressure systems being over the country and the North Sea at various times, we haven't had the tropo lifts that years ago were something to look forward to each year.

During this very cold period you have all, of course, been building new gear for this year's contest season and GPS locking all your oscillators ... haven't you?

Still, Spring isn't all that far away and we can look forward to the first major event of 2010, the UKuG Microwave Roundtable meeting at the Rutherford Appleton Labs near Didcot. The website is now open for you to register for the event, which you can make into a weekend one buy signing up for the Saturday evening dinner and staying the night locally. Ready for a full Sunday at the Round Table.

Just as I am putting this edition of Scatterpoint together the news of the death of Norman Fitch, G3FPK, came through ia the Southgate ARC internet news service. Norman was a quiet person who always took his job as VHF Columnist in the RGSB's Radcom magazine. He had a keen interest in everything from 50MHz up.

73 from Peter, G3PHO
Editor

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown above. **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.

ALL MEMBERS PLEASE READ

The membership of the UKuG continues to increase but this means that, from time to time, problems arise with membership renewals. **PLEASE can you help the Treasurer and Membership Secretary by:**

- Include your **callsign** in ALL renewals.
- **If you pay by Paypal** add the details to the Paypal submission by using the 'E-mail to recipient' facility and enter your callsign in either the 'Subject' or 'message' field at the 'Review your payment and send' stage. Many people miss this as you need to scroll down the screen to find it!
- **If you pay by cheque** then please write your callsign on the back of the cheque.
- **If you pay by cash** then please include details of your callsign as a separate note with the money.

RAL 2010

REGISTRATION NOW OPEN

Registration for the next RAL Round Table on April 18th is now open at the same web site as last year. Thanks to Mike, G0MJW, and Brian, G4NNS, for their efforts in organisation.

http://www.microwave-events.org

For those who registered last year, the login you created should be used. If you have forgotten the username or password then the site has recovery features.

As a **last** resort please contact me.

Look forward to seeing you there!

73
Lehane
G8KMH

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The following subscription rates now apply. **Please make sure that you pay the stated amounts** when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

Your personal renewal date is shown at the foot of your address label if you receive Scatterpoint in paper format. If you are an email subscriber then you will have to make a quick check with the membership secretary if you have forgotten the renewal date. From now please try to renew in good time so that continuity of newsletter issues is maintained. Put a **renewal date reminder** somewhere prominent in your shack (the editor suggests having it tattooed on your forearm!).

Please also note the payment methods and be meticulous with Paypal and cheque details.

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Delivery to:	**UK £**	**US $**	**Eur €**
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*** Paypal to ukug@microwavers.org**

or

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UK	**£6.00**
US	**$12.00**
Europe	**€10.00**

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Reverse DDS

a versatile system for locking crystal oscillators

By Brian G4NNS and John G8ACE,
With an acknowledgement to Andy Talbot G4JNT

A note from the editor ...
This project was started to solve the stability problem of some of our wandering beacons but it also has other applications such as for stabilising local oscillator systems and as a versatile "precision" signal source for the shack, using a VFO instead of multiple crystals. Brian, G4NNS, says the article has rather grown "like Topsy" but has since been edited down to what is published here and in next month's Scatterpoint.

John G8ACE, who designed the PCB, and Brian G4NNS, who has written the article and developed Andy's original software, both think Scatterpoint is the appropriate publication medium so we at the editorial desk are most grateful for that kind thought !

John and Brian have built and tested "Alpha" and "Beta" prototypes and have 15 kits being prepared and distributed as this goes to press. Professional PCBs are due in late February. Once those have gone, Brian and John will make PCBs and possibly more kits available to UKuG members . So please 'hold fire' until another announcement is made!

Introduction:

Knowing your frequency with precision is a great advantage on the microwave bands. Whether it is maintaining a beacon on frequency or knowing where your receiver is tuned, the problem is the same and Paul Wade in his microwave update paper (Ref 1) concludes that knowing where to look on the dial, with precision, is worth 2dB when looking for a minimum discernible signal (MDS).

An obvious solution is to lock the oscillator to a high quality reference such as a 10MHz OCXO, TCXO, Rubidium, Caesium or GPS disciplined oscillator. These sometimes appear on the surplus market and even new ones such as the GPS disciplined oscillator from G3RUH are available within the amateur price range.

Many have already invested in OCXOs to give our cheap and cheerful crystals the best possible chance in their local oscillator or beacon, so a solution that can be retro-fitted is attractive.

For frequencies that are relatively "round numbers", as is the case for some local oscillators, e.g. 106.500MHz for 10368MHz with a 144MHz IF, the RefLoc design by Luis Cupido CT1DMK (See Web search), Andy Talbot G4JNTs Simple way of phase locking local oscillators (Ref 2) and Dave G4HUP's Direct Frequency Synthesis (see web search) provide a good solutions. But the rather "odd" or "irregular" frequencies e.g. 108.01020833MHz required for a beacon frequency of 10368.980MHz (when multiplied by 96) are not so easily achieved by this approach.

However, by using a DDS circuit in reverse, even these odd frequencies can be locked with sufficient precision for most applications. Even an LC VFO can be locked to a precision reference and although not recommended for on air use can provide a convenient precision frequency source in the shack.

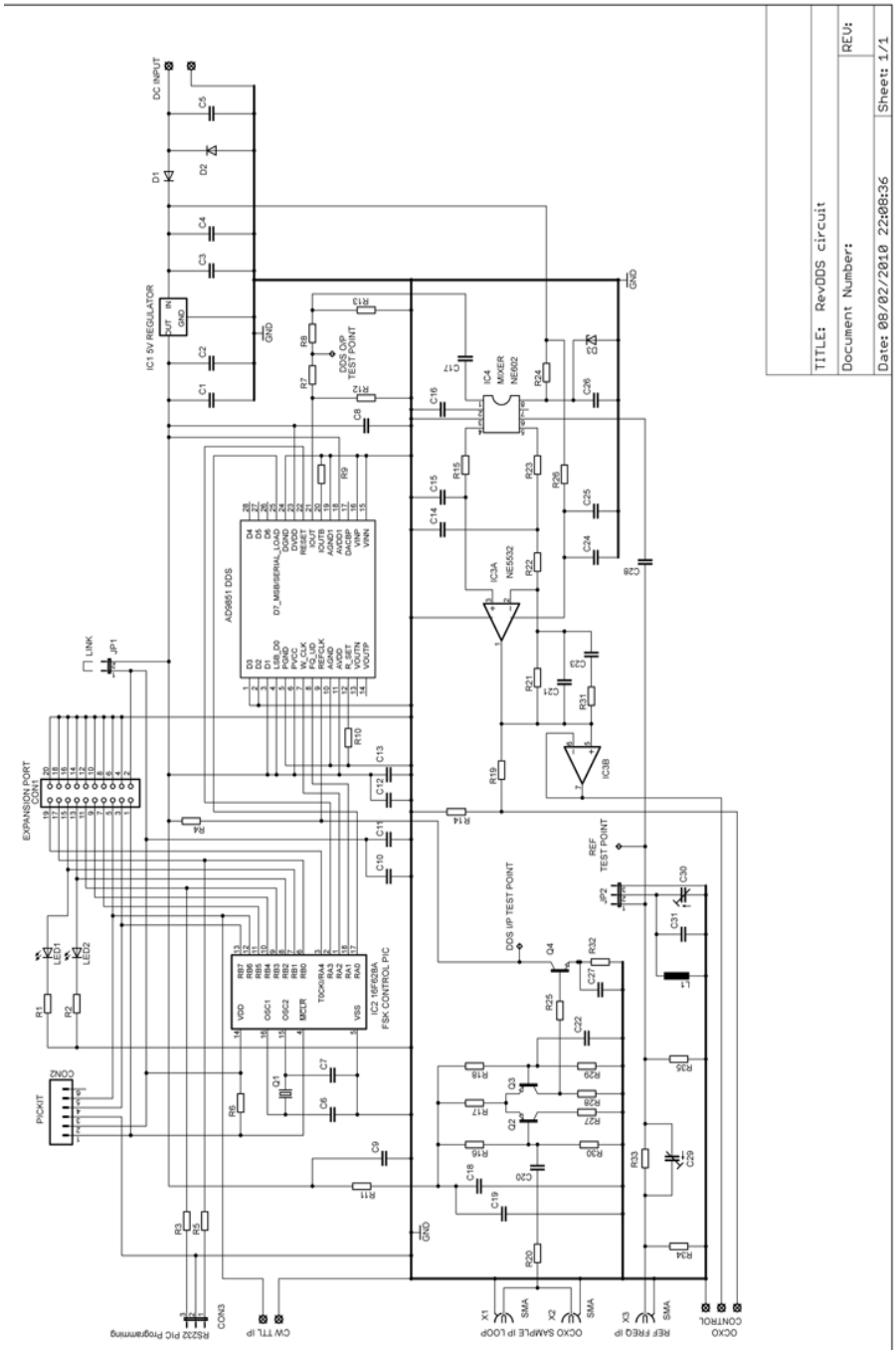
What do we mean by “reverse” in this context ? In normal operation these DDS circuits are clocked by a precision oscillator at, for example, 100.000MHz and this is divided down (perhaps processed might be a better description) to generate a lower, wanted, frequency. In the reverse mode, the wanted frequency, for example 108.01020833MHz from an OCXO is used to clock the DDS circuit which is set to produce an output at the reference frequency which can be more or less anywhere between 5 and 20MHz. This is then supplied to a phase comparator and the error signal used to vary the clock oscillator (the wanted frequency) until a lock is achieved. Many OCXOs, such as the G8ACE MkII OCXO have varicap fine tuning and this is where the error signal from the phase comparator is applied. Thus improved frequency accuracy and stability can be achieved by a simple retro-fit solution avoiding the need for substantial system changes.

Much work has been done on this approach by Andy Talbot, G4JNT (see websearch), Chris Towns G8BKE, John Hazell G8ACE and others seeking to improve the accuracy and stability of Microwave beacons. John has now produced a PCB containing the necessary circuit elements, and with sufficient flexibility to allow it to be used as a microwave beacon source or as a local oscillator system. The DDS is controlled by a PIC so the flexibility of the hardware along with the flexibility of the PIC code make this board an ideal platform for experimenting with DDS. No doubt users will develop new features and applications.

As a beacon master oscillator, the basic PIC code, available to download, includes the keyer for identification, using FSK. Other modulation schemes such as RTTY and JT modes are also expected to be possible although the latter will need some means of accessing time information (such as GPS or MSF). As a system for locking the station local oscillators, one Reverse DDS PCB can be switched to lock any of the common local oscillator frequencies with reasonable precision and it is a simple matter, using an RS232 terminal, such as a PC with Hyperterm, to customise those frequencies. PIC source code for a basic local oscillator locking system is also available to download. See websearch.

Circuit Description: (see next page for circuit diagram)

The circuit is based on one developed by G4JNT for use in the GB3SCC beacon but has been modified to be more versatile in its application. The wanted signal from the OCXO is passed through the PCB and a small sample is taken, buffered and amplified to clock the DDS. The heart of the system is the AD9851 DDS/DAC Synthesiser from Analogue Devices U$1. With a 32 bit Frequency Tuning Word and a 10 bit DAC this device is more than adequate for the task. This is controlled by a PIC16F628, IC1, which loads the frequency tuning word, serially, into the AD9851, and can provide identification keying in beacon applications. As much of the unused PIC I/O as possible has been made available to the user to give flexibility for example for switching between different local oscillator frequencies. A programming header compatible with the Microchip PICkit 3 development system has also been included to encourage the user to customise the system and develop other applications. The function of the AD9851 is to generate the reference frequency of between 5 and 20MHz for input to the phase comparator IC3. IC3 is a Mixer (NE602) used as a phase comparator for the signals from the reference and from the output of the DDS. IC2 amplifies and buffers the resulting error signal which is then output to tune the OCXO using it’s varicap, fine tune, feature. The level of the incoming reference signal is attenuated on board and it should be kept to a reasonably low level to minimise spurious “modulation” of the output from the OCXO. I found 0dBm at the input to the Rev DDS box was sufficient. Note that there are a number of components that are not needed for normal operation but which those experimenting with applications may wish to add. These include L1 C30, C31 and JP5 which were included to provide some additional shaping for the incoming reference signal. This was not found to be necessary. Even a very rough square wave was found to be OK. R14 provides the possibility of an attenuated control voltage output. Provision has been made for C29, R34 and R35 to provide an alternative option for adjusting the level of the 10MHz input to the mixer / phase comparator. With R33 at 10K and the reference input at 0dBm these components were not found to be necessary.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Date: 08/02/2010 22:08:36
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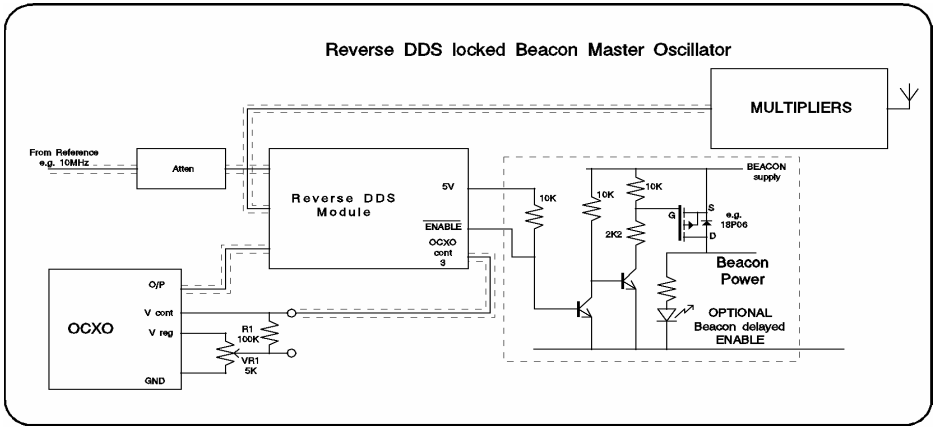
DC INPUT
IC1 5V REGULATOR
GND
LINK
JP1
EXPANSION PORT
CON1
PICKIT
CON2
LED1
LED2
AD9851 DDS
IC2 16F628A
FSK CONTROL PIC
DDS O/P
TEST POINT
IC4
MIXER
NE602
IC3A
NE5532
IC3B
DDS I/P TEST POINT
REF
TEST POINT
JP2
RS232 PIC Programming
CON3
CW TTL IP
OCXO SAMPLE IP LOOP
REF FREG IP
OCXO
CONTROL
SMA

Construction

The Reverse DDS is supplied as a kit and is intended for the experienced constructor as it uses surface mount components including the AD9851 which comes in a 28 lead SSOP package which features 0.65mm pin spacing. Full construction details are supplied with the kit. Where possible, the board has been laid out for the larger 1206 sized components to make construction easier but 0805 size components will also fit and may be supplied in the kit.

Typical Application and maintenance:

This shows a typical beacon application.



VR1 is adjusted with the OCXO not connected to the DDS to about half of Vreg (5.0V). After initial warm up and stabilisation time, the coarse , mechanical tuning of the OCXO is set so that it is nearly on the wanted frequency. The OCXO is then ready to connect to the DDS system and should lock quite quickly. The voltage at the V cont. input can be monitored and should be about half of V reg, Note that by adjusting VR1 so that the voltage across R1 is zero, with the DDS connected and locked, the OCXO will be more or less on frequency when the DDS is disconnected and the OCXO is running “free”. This can be a useful means of setting up OCXOs for “free” (un-locked) running. This procedure should also be adopted as part of beacon routine maintenance to ensure that the OCXO remains locked. The voltage across R1 indicating how far the crystal has “aged” since last adjusted. With new crystals, this voltage should be checked fairly frequently until the rapid frequency shift from ageing has stopped.

Set Up:

First you need a high quality reference and an OCXO with varicap fine tuning. Both need to have been running long enough to become stable.

Connect the OCXO and a properly terminated counter to the Reverse DDS Module. Set the OCXO fine tune pot VR1 to about half of V reg. Then adjust the OCXO coarse tuning usually a ceramic variable capacitor in the G8ACE OCXO until the OCXO is as near as you can get to the wanted frequency. With power applied to the reverse DDS module, the PIC will send the Frequency Tuning Word to the DDS and operation will commence.

With the wanted frequency selected by the PIC (see changing the Frequency Tuning Word) connect the control voltage from the Reverse DDS to the V cont input of the OCXO. The OCXO should now be locked to the reference.

Note that as set, the control voltage from the DDS system and that from the pot VR1 will be

equal, i.e. the voltage across R1 will be zero. As the crystal ages or conditions change, this voltage will change. As a part of routine maintenance, this voltage should be checked and the coarse tuning re-adjusted before the voltage becomes large and lock is lost. For new crystals that might age rapidly, this voltage should be checked frequently. For beacon operation it is in any case recommended that the OCXO is run for a minimum of a month before the installation becomes live. It is also recommended that the OCXO remains powered continuously until installed at a beacon site and that, if possible, a 'no break' supply is arranged for the OCXO (and perhaps the reference oscillator).

Trouble shooting:

With the OCXO and reference connected check the following:

TP 2 should have a signal, at the OCXO frequency, with an amplitude sufficient to drive the AD9851. As a guide, this should be about 2Vp-p as measured on a 100MHz oscilloscope with a 1M Ohm input impedance. Similarly, the reference frequency signal at TP3 should have a level of about 200mV p-p. With the PIC fitted and powered the correct frequency tuning word should be loaded and the AD9851 should have an output at TP1 with a frequency equal to the reference frequency and amplitude of about 2V p-p.

Resolution:

Resolution is limited by the range of the 32 bit frequency tuning word used in the DDS. At 24GHz with a multiplication of 192 this equates to steps of about 66Hz and at 10GHz with multiplication of 96 about 26Hz. This is good enough for most applications.

This article will be continued next month ....

JAPANESE EME DISH 8J1AXA

Noami Kurahara at 8J1AXA, sent this super photo of the 8J1AXA antenna, along with the email below, to Graham G3VZV, who kindly sent it along to Scatterpoint. She is a young friend from Surrey Space and UNITEC 1 is an interplanetary microsatellite that will be going to Venus quite soon (2011?) with a 5.840MHz beacon on it.

From: "Naomi Kurahara"

I'm at the Katsuura Ground Station, 8J1AXA, which has this 18m Dish. A Japanese EME team are now doing operations! It is the first time for me to hear moon echoes. It's really interesting. If there is a dish around you, try to hear signals from Japan.

The team operate till 24 Jan, 15:00(UT).
Info: http://www.8j1axa.jp/

See you,
Naomi

Editor's note ...

While that January date has passed, we are sure Scatterpoint readers will be interested in this fine antenna and maybe become alerted to future EME tests in the same way as many have listened to the tests from the Bochum, Germany, dish.

Phase Noise and MDS

Paul Wade W1GHZ 2009
w1ghz@arrl.net

There has been a lot of noise about phase noise recently but very little data. We know that older FM rigs with synthesizers sounded terrible on an SSB receiver but worked fine for FM. It is also generally understood that an LO with phase noise will add noise to signals in the presence of other very strong signals. But what really counts is the effect of phase noise on weak signals – and no one has worked this out mathematically.

The NEWS Group (www.newsvhf.com) does MDS (minimum discernable signal) testing on 10GHz at the annual July picnic. I thought this would be a good opportunity to do some direct comparisons but I wasn't getting my stuff together in time. Then Steve, N2CEI, called with an offer – he would send some equipment if I would test it. He sent a 10GHz converter (receive half of a transverter) with two external LO sources: the older MICRO-LO crystal-multiplier source and the new A-32 synthesized source, both at 1136MHz.

The two LO sources had less than 1dB difference in output power, so I hooked them up with a coax relay to allow quick switching. They were close to the same frequency, perhaps 15kHz apart, so that tuning was required when switching. A little tuning is ideal for MDS tests – if you can't find the signal, it is NOT discernable.

I had no idea what to expect, except that I've heard that some good operators are using a synthesized LO with good results. I certainly hoped that there would be no difference, so then I could change all my rigs to synthesized sources, lock all my LO sources to GPS and be right on frequency.

MDS Results

For the NEWS MDS testing, a transmitted signal is reduced in power by one dB at a time. Each listener indicates the level at which he can no longer hear the signal – the MDS is the previous level, 1dB higher. This is the weakest signal you can detect, probably several dB less than needed to copy CW.

The transmitter is several hundred feet from the receive locations – far enough that leakage from the equipment will not be heard. Attempts to do MDS testing with just attenuators are usually foiled by generator leakage. We also eliminate the possibility of IF leakage by using oddball LO and IF frequencies to generate 10.368GHz.

I connected the new 10GHz receiver, with a nominal 1.5dB NF, to a 24" offset dish. The IF rig was a Yaesu FT-817. At each power level, I switched back and forth between the two LO sources, detecting the signal by ear only, using decent headphones. I'm pretty good at finding very weak signals by ear – the nice waterfall displays are not easily transported to mountaintops, so I still dig them out with headphones. The MDS was comparable to similar systems, so performance was pretty good. The MDS with the crystal LO source was 2dB better than with the synthesized source.

One further note: at the start of the MDS run, with the signal perhaps 45dB out of the noise, the synthesized source had multiple responses several KHz apart on each side of the carrier, with level decreasing with distance from the carrier. The crystal source only had a pure CW note.

Further Tests

The following week, I discussed the results with Steve. He suggested that the internal oscillator he had provided in the A-32 source provided an inadequate drive level at 10MHz, resulting in higher phase noise. I looked at it with my spectrum analyzer, an old HP 141T, and saw close-in noise only about 28dB down. I then swapped out the internal oscillator for a good TCXO providing

+13dBm at 10MHz – the noise was reduced to about 50dB down. A second A-32 of an earlier vintage produced comparable results.

I then set up my own MDS range (since I provide the equipment anyway) and repeated the test. Results were the same: the crystal source was 2dB better than the synthesized source. The multiple responses to strong signals were still present with the synthesized source.

IF Transceiver

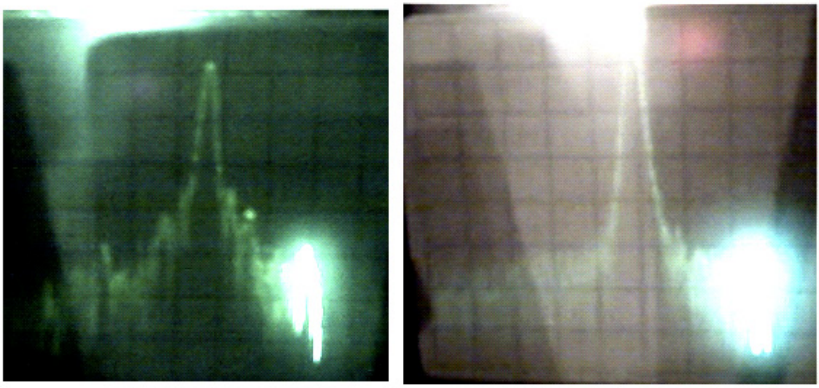
I also did experiments with the IF rig. Dale, AF1T, uses an IC-202 and he usually does better at MDS than most of us with more modern rigs. The IC-202 is known to have particularly good phase noise, since it uses a VCXO for tuning. So I dug out my old IC-202S for the second MDS test. The MDS using the IC-202s with either source was 2dB worse than the FT-817 with SSB filter.

Another experiment was IF bandwidth. My FT-817 has the optional CW filter, which seems to help when copying very weak CW signals, if they are stable enough. The MDS with the CW filter was about 1dB better than with the SSB filter.

Phase noise plots

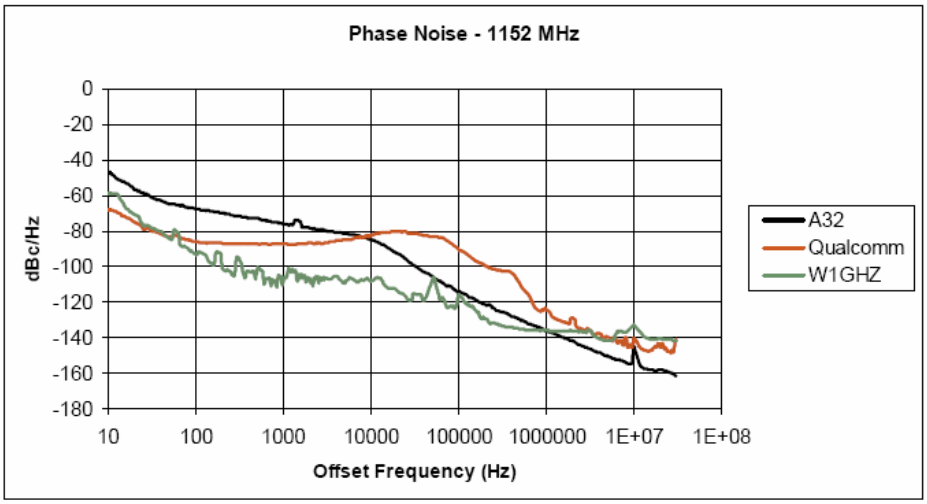
Actual phase noise data might help understand what is happening. Greg, WA1VUG, has been kind enough to bring nice Rohde & Schwarz (www.rohde-schwarz.com) test equipment to the Eastern VHF/UHF Conference, so I have some data. However, these are not the same local oscillators used for MDS testing and not at the same frequency, so we are probably comparing apples and oranges and maybe bananas. But they are included here for what they are worth. There are also phase noise plots of the A-32 on the Down East Microwave (www.downeastmicrowave.com) web site at both 1136 and 10224MHz.

First are the two spectrum analyzer plots of the A-32 source at 1136MHz in Figure 1, with the internal 10MHz oscillator at about +4 dBm, and with an external 10MHz TCXO at about +13 dBm. Vertical scale is 10dB/division and horizontal is 2kHz/division, with a 300Hz IF filter. The traces are faint because the storage function no longer works on my old HP 141T. Both of these violate my rule for oscillators: if you can see anything other than carrier on a spectrum analyzer, it's not good enough.



Internal Oscillator External Oscillator

The other plots are measured with an R&S FSUP phase noise tester and signal analyzer. Figure 2 below shows three different oscillators at 1152MHz: a different A-32 unit at 1152.022MHz, referenced to the 10MHz TCXO, a Qualcomm synthesizer board (rectangular version) at 1152MHz, and the 1152MHz LO board from my "Simple Multiband Rover Transverter," which multiplies up from an 64MHz computer oscillator.



Discussion

The MDS testing is somewhat subjective, but didn't know the answer beforehand, and I heard a consistent 2dB difference. I don't know whether this would make any difference in copying a very weak CW signal.

How important is 2dB? A final step in our NEWS MDS tests is to move the frequency slightly, less than 10kHz, then increase the level in 1dB steps to see when folks can actually find the signal. For most operators, this is 2 to 5dB higher than the MDS with decreasing levels on the starting frequency. In other words, knowing the frequency is typically worth 2 to 5dB. Therefore, if both stations are frequency-locked to GPS or rubidium standards so they are likely to be on the same frequency, the synthesized source is probably just as good as a crystal that is not right on frequency (i.e., all crystals).

The narrow IF filter also made a slight improvement, so frequency accuracy good enough to use the narrow filter would be an advantage. Note that the improvement was only 1dB even though the difference in bandwidth is roughly 7dB. Al, K2UYH, has been telling us for years that the human ear can be trained to be a very good filter. I guess my ears provide about 6dB of filtering. I'll bet some of the EME operators can do even better.

Are these sources good enough for mountaintop operation in New England? There may be strong-signal problems – signals from nearby sites are frequently more than 45dB above the noise, even with the dish pointed in another direction and are typically only separated by perhaps 20kHz. But I have seen good results with synthesized LO sources – W1FKF uses one and hears very well. Operating side-by-side, he often hears better than I do.

In other areas with no strong signals, knowing what frequency the weak ones might be on is a distinct advantage.

An alternative would be to use the synthesized source as a frequency reference marker and a crystal source for the LO. Some of us have been doing this with older, dirty synthesizers – the distinctive note differentiates the marker from a birdie.

At other frequencies, results may be different. We know that phase noise increases with multiplication – see the phase noise plots on the Down East Microwave website. What we don't know yet is whether the lower phase noise on lower bands will affect MDS or whether the effect will be worse at higher bands.

Summary

More testing is needed before we reach any conclusions. Synthesizers have been getting better, and I think more improvement is possible. Other choices, like the REFLOCK units, also need to be evaluated.

The MDS testing, while subjective, gives a realistic comparison so what most weak signal operators care about, hearing weak signals. It's not that hard to set up a test range, so give it a try when improving your equipment. At least you will be confident that it's an improvement.

Update – Phase Noise and MDS (Sept 2009)

I've been thinking about a new 10GHz transverter. After talking to Steve, N2CEI, again, I decided to try one with the A32 synthesizer for the local oscillator and see how it works in the field. Of course, I have my old transverter as backup, on a smaller dish with 24GHz and the dual-band feed.

Steve promised to have a transverter to me in time for the September weekend of the 10GHz contest – it arrived about 10 days before. I usually figure three weeks to put a system together properly. However, I ended up with some extra time. My 6 and 2 metre antennas were bent up by the ice storm last December, and we planned to finish the repairs on Saturday morning before the September VHF Contest started at 2 PM. But it rained all day Saturday, so I was off the air and worked on the transverter. The antenna repairs were completed Sunday so I was on the air about 4 PM.

My plan was to integrate the DEMI transverter with two of the eight-watt amplifiers in parallel for some decent power, and to use my new "Even More Fool-Resistant Sequencer" for switching. The amplifiers work fine in parallel, but the transverter doesn't provide enough drive for two, so the pair only put out about 11 watts – not enough to justify the extra 25 watts of DC (2 amps at 12 volts for each amplifier) in a portable station.

Anyway, metalwork takes time, and the sequencer took a little debugging, so I finished up the transverter Thursday night as I was loading the truck for the September weekend on Block Island. As a result, I didn't have time to get the GPS-locked oscillator included, just the 10MHz TCXO used for the MDS tests.

The TCXO was very stable during tests, but much less stable in the field. I had the worst of both worlds – synthesizer phase noise without accurate frequency control. A few contacts took longer or needed retries as a result, but I did pretty well anyway.

GOOD – I was hearing better than the other two guys on Block Island, one with an identical dish. Made several very weak contacts that they couldn't pull out.

BAD – definite phase noise, especially for each other, making spotting difficult. At times, AF1T, 80 km away, caused spurs near our frequency (we try to stay ~30kHz apart). Enough birdies to make tuning for stations an adventure.

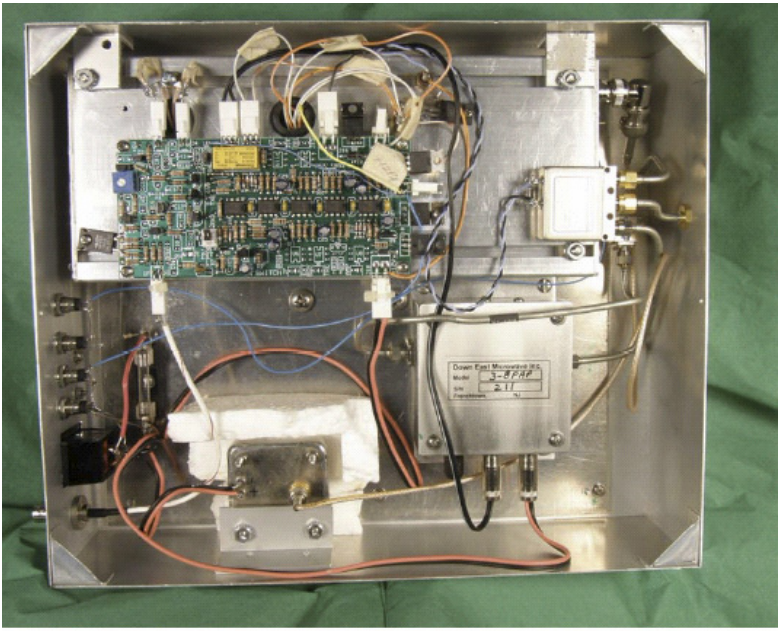
TBD – when we started out Saturday, my frequency seemed to be significantly off and drifting, slowly settling down. Sometime in the afternoon, I tripped over the power cord and dislodged it. When it came back up, my frequency was closer and drifting less.

Conclusion so far – with the GPS lock, it should make contacts much easier with stations that have good frequency control. The other half will still take lots of tuning.

P.S. – conditions got really good Sunday night, after all the roving stations had gone home. We worked a few DX home stations, then tore down. Early Monday morning, my phone rang –

K1MAP in North Carolina was hearing beacons near us. We quickly set up again and worked him twice, two new grids at 800km.

And the new “Even More Fool-resistant Sequencer” worked flawlessly for the whole contest. See **www.w1ghz.org** for sequencer description.



New 10 GHz Transverter with “Even More Fool-resistant Sequencer”

GREMLINS .... A note from Scott N0EDV

Scott N0EDV (acepilot@bloomer.net) wrote:

It looks like the idea for sending Yahoo calendar reminders of membership renewal dates may not work exactly as I stated (as printed on page 22 in the January 2010 Scatterpoint).

First, it wasn't a good idea for me to say to put it on the Scatterpoint Yahoo Group's calendar page as it might send reminders to ALL people on the list. I don't THINK this will happen since the Calendar Help link on the Scatterpoint group page states that "Note: If a user’s messages are moderated, then calendar reminders will not work for the events created by that user (even if they have set reminders when creating the event)."

So, how people should use this idea is to create their own Yahoo group (For example, create a Yahoo group called "G3PHO" (in YOUR case!!) and restrict membership to themselves only) and then use THEIR calendar on THEIR group page to add the event and send reminders.

Sorry about that! Thanks to Chris, G8BKE for the discovery and bringing it to my attention!!

IARU REGION 1 NEWS

This leader from OE1MCU VHF/Microwave Chairman in IARU-R1 VHF Newsletter-53 ahead of the Vienna meeting might be worth a read ...

"Contests still provide interesting opportunities to compare personal operating skills and equipment capabilities. The automatic IARU Contest Evaluation has been tested for one year now (iaru.oevsv.at). The software has already been improved in many ways. We now must discuss the automatic evaluation in real life and how to implement it under the contest rules. A number of very interesting proposals have been submitted to the Sub Working Group."

"I think it is important to allow each active operator to upload his log to the server, and that the log can be corrected electronically by the either the national VHF Manager or the Contest Manager. In addition to much faster processing, the new procedure will prevent any logs from getting lost in transit. In this way, the disappointment over a lost log after 24 sleepless hours can be avoided; all logs will be counted. On top of that, each participant will receive his score in .pdf format. I also think the time has come to consider a newcomer class in contesting to attract new contesters and thus avoid boredom."

Editor's note ... so the Eu VHF and up fraternitry finally join the 21st century! RSGB Contest logs at both VHF and HF have now been able to be uploaded direct to a "robot" website for some time now, allowing instant confirmation of entry and comparison of claimed scores with other entrants and even a chance to resubmit logs without penalties if a mistake is found after a submission, but before the deadline for final entries. After each of the RSGB 80m Club Contests, for example, I can get my logs into the robot within 10 minutes of the contest finishing. Often the final results table is published within a few days rather than the months it used to take with paper logs! Well done RSGB VHFCC and HFCC !

TRANSVERTER IN A CARDBOARD BOX

By Doug Friend VK4OE

(WITH REFERENCE TO THIS MONTH'S FRONT PAGE COVER PHOTOGRAPH)

Further to Bryan Harber's article in the January 2010 Scatterpoint, I thought that you'd be interested in seeing the "fast and furious" transverter for 3.4 GHz that I threw together for use in last week-end's Australian VHF/UHF Field Day event.

What will amuse some is the mounting (laying out!) of it in a cardboard fruit tray. This is not the first time I have mounted a microwave transverter that way!

The link to Bryan's article is the use of two of those Mini-Kits multiplier/amplifier modules, one as a receive front end(!), and one as a post-mixer amplifier/driver in the TX amplification chain. Yes, they work just fine either as multipliers or as amplifiers and both MMIC stages need not necessarily be used. (I did do an article on them in The Queensland VHF'er a year or two ago.)

It's amazing what you can 'scrape up from the junk box' when the pressure is on to get something quickly on the air! I did, however, have to also quickly populate and align an F6BVA multiplier board to do it, so it was not all of 'junk box' origin.

The reason I had to do this transverter quickly was that the N5AC PLL board in the 'main' 3.4 GHz portable transverter had decided to just not lock properly, the resolution of which is still 'work in progress'.... and, coincidentally, in that 'main' transverter I also use one of the Mini-Kits boards as a post-mixer filter. As Bryan suggests, it works real well in that service too!

Best 73,

Doug, VK4OE
Brisbane, Australia

70cm/23/13cm Beacon Updates from Belgium …

From:<pedro.wyns@telenet.be> Date: 11 Feb 2010

ON0VRT JO20CS 432.450MHz

Next week the new ON0VRT 70 cm beacon currently running in test at my home qth (JO21IC) will be placed on the final position JO20CS. The power details are: 10 watts output, 20 watts ERP, probably going up to 100 W soon'
Equipment is Ericsson RS9044 running PA4DEN firmware into two stacked halo's at 117m agl

Sponsored by ON7WP

A **13cm beacon** will follow very soon on**2300.900MHz**

On **23cm, 1296.950MHz** is active but still QRPp

Location is the tallest building in Belgium, the VRT broadcast tower in Sint-Pieters-Leeuw west of Brussels. (300m high)

CW text is ON0VRT-JO20CS 4 second interval using narrow FSK 400Hz split, carrier is zero beat at 432.45000MHz oven controlled. No GPS yet but ready for... It needs some more sponsoring !

73 from, Pedro ON7WP
ON0VRT station manager

(ONOVRT also houses several repeaters from 6 metres up to 6cm, and packet radio APRS stuff as well as winlink equipment)

Reports are welcome on the dx cluster

Pictures will follow....

USEFUL TOOLS

A useful 'tool' for finding the optimum reflection point for Aircraft Reflections can be found at:

http://sm0lcb.shacknet.nu/maps/qso_map/pathmap.htm

Other handy map tools are indexed at:

http://sm0lcb.shacknet.nu/maps/qso_map/index.htm

Many thanks to Jens, SM6AFV, for the information.

Norman Fitch G3FPK Silent Key

The Radcom VHF/UHF columnist Norman Fitch G3FPK was found dead at his home in Purley, Surrey on Friday January 29.

Norman was a keen operator on the VHF/UHF and Microwave bands and had been writing the RadCom VHF/UHF column for over 20 years.
In April 1989 he took over VHF/UHF from Ken Willis, G8VR, when it was part of the Spectrum Analysis.

The column then became VHF/UHF News and eventually, it became the VHF/UHF column of today.

He will be greatly missed.

SLOT ANTENNA CORRECTION

The correction to the waveguide slot antenna spreadsheet mentioned in the latest Scatterpoint is now available at :

http://www.w1ghz.org/antbook/slotantenna.xls

The difference is pretty smalll, so you'd probably only notice the error if you have CNC machinery.

73 from Paul W1GHZ

ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

By Robin Lucas, G8APZ

CONTEST and ACTIVITY REMINDER

February

16-Feb 2000 - 2230 1.3/2.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
28-Feb 0900 - 2000 All-band Activity Day
Non competitive (**Last Sunday in month)**

March

7-Mar 1000 - 1500 Low band 1.3/2.3/3.4GHz
First 4 hours coincide with IARU event
16-Mar 2000 - 2230 1.3/2.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
28-Mar 0900 - 2000 All-band Activity Day
Non competitive (**Last Sunday in month**)

April

11-Apr 0900 - 2000 Low band 1.3/2.3/3.4GHz
20-Apr 1900 - 2130 1.3/2.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
25-Apr 0900 - 2000 All-band Activity Day
Non competitive (**Last Sunday in month**)

FRENCH JOURNÉES d'ACTIVITÉ (JA)

27/28-Mar Activity weekend - 28th matches UKuG
24/25-Apr Activity weekend - 25th matches UKuG

GLOBAL WARMING? WHAT A JOKE!

The winter weather across Europe has been severe, with extremes of temperature and heavy snow in many places. Many OMs reported antennas damaged by ice and winds, rotators frozen, and in some cases, antennas failing to radiate due to the amount of ice on them.

As I write this, the USA is seeing the worst snow storms to have hit the eastern US for decades, where up to 28 inches (71cm) of snow has reportedly fallen in Washington, making it the heaviest snowfall there in almost 90 years.

10GHz DECEMBER ACTIVITY

From: Jeff Easdown, G4HIZ, Kent

The dark days leading up to Christmas were spent finishing off my homebrew dual band transverter, covering the **5.7GHz** and **10GHz** bands. The LNA/HPA are attached as required to choose the required band. A synthesizer based on the LMX2326 allows any 10MHz segment to be chosen in either band.

The IF is 430 to 440MHz, although other frequencies are possible. The transverter was based on modules taken from old equipment, apart from the PLL which was developed by me.

Shown in the picture, is the **10GHz** receive side being tested above Dover at Western Heights (JO01PC) on 28/12/09 receiving the French Beacon **F5ZTR** from Beauvais (JN09XJ) at 196km. Reception was good (seemed better than the **DB6NT**).

Construction work continues to house a **10GHz** HPA and look at possible options for **5.7GHz**.

Jeff Easdown, G4HIZ

COLD WX PROPAGATION OBSERVATIONS ON 24GHz

From: Chris Towns, G8BKE

With snow falling on the 6th January 2010, I decided to check the **24GHz GB3SCK** Bell Hill beacon 40km from my home QTH over a partially obstructed path.

Sure enough it was a good signal on snow scatter and a recording of it is now on my website. **http://myweb.tiscali.co.uk/g8bke/snow.wav**

Over the ensuing week while the weather remained very cold and the RH low, I continued to monitor the beacon on a daily basis. It remained a good signal just hovering a dB or two above the noise level until the cold spell ceased and it once again dropped below the noise level. **73 de Chris G8BKE**

GRANDE BLEUE ATLANTIQUE 10GHz DX RECORD ATTEMPTS

Last year, teams from France and Switzerland got a first taste of the microwave propagation possibilities between **CT**, **EA8**, and **D4** during June 2009 (reports in Scatterpoint Jul/Aug 2009, DUBUS 4/2009), and the groups have decided to do it again, from 3rd July to 17th July, 2010.

Latest propagation studies have shown that July is a much better month for Tropo ducting in this region than June (a report will appear in DUBUS 1/2010).

Once again, the main target for the teams is to make a new **10GHz** Tropo world record between **CT** and **D4** (about 2700km) or **CN** and **D4** (2100km). The chances of a QSO on the latter path is extremely high, and so far the plans include the following teams:

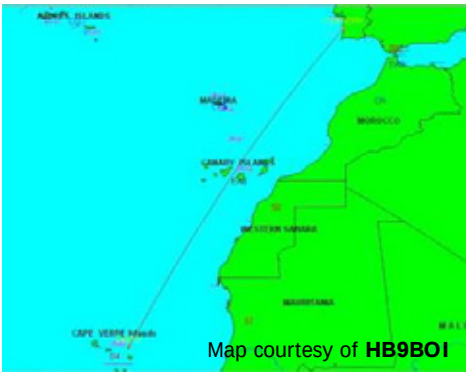
Portugal, Joachim, **CT1HZE** (IM57NH) and Philippe **CT/F6DPH** with his group (IM57OR).
Cape Verde Islands **HB9RXV** plus his team at **D44TD** (HK86NU).
Canary Islands **EA8BFK** (**DJ9PC**) in IL38, and Jean Claude **F5BUU** with David **F1URI** will be operational as **EA8/F5BUU** from IL28XQ (from July 2nd till July 15th). Jean Claude expects to be QRV on 6m, 2m, **23cm**, **6cm**, and **3cm** and may also operate ATV on **5.7Ghz** and **10GHz**.
Morocco Guy, **F2CT** will be operating with his team as **CN/F2CT** from IM52IH and maybe IM63 and IM61 too.

This event is a unique opportunity for other local operators or expedition groups to join the experiments and make QSOs on the microwave bands with the expedition stations.
The most promising and interesting other places would be (mostly for "first ever QSOs"):

South western Spain (**EA7**) IM66, 67, 76
Gibaltar (**ZB2**) IM76 Madeira (**CT3**) IM12
Azores (**CU1** or **CU2**, HM76 or 77)
Senegal (**6W**) Dakar IK14

Of course stations from **EI** and **G** (Cornwall area) should also try to be available in the first 2 weeks of July. The interest in 2009 was quite limited from there, unfortunately.

The path from CT to D4 via EA8



Map courtesy of **HB9BOI**

In **CT3** and **CU 23cm** and **3cm** are CEPT licence bands now, so anybody from Europe can operate there legally now without any special licence. Regardless of the 2010 results, it is most unlikely that such a coordinated Microwave activity will ever take place again in this region. If you want to join in, please let me know via e-mail (**DUBUS@web.de**).

73, Joe, **CT1HZE** (posted on MMMonVHF)

...AND FINALLY

On 31st January, Joel, **F6FHP**(IN94TR) asked Brian **G6HIE**(IO90ST) for a **23cm** test. The QSO went through quickly, and the signals were loud and clear with Brian, Joel reported 529 and deep QSB. Brian has just 10W and a single 35 ele but a good take off over the sea, and Joel has 500W and a 2m mesh dish. A good QSO at 676km in what seemed normal conditions!!

That's all until next time. **73, Robin, G8APZ**

Please send your activity news for this column to:

scatterpoint@microwavers.org

UKuG /BATC JOINT ACTIVITY EVENT 22 AUGUST 2010

In 2008, a group of microwave ATV enthusiasts went out portable in what was a day of terrible weather. The idea was to activate the western side of the UK on ATV and join up with UK Microwave members out in the cumulative contest that was taking place at the same time. Support from both groups was disappointing but this has not deterred us from trying again this year! Please try to support this event in any of the following ways:

- Come out portable or operated from home with microwave ATV gear
- Come on narrowband microwaves and try to work stations where there is also an ATV station close by
- Invite an ATV enthusiast to your station for that day, whether it be /P or at home and arrange for your participation in the day's microwave activity to be relayed to the BATC online video streamer.

The two Peters, G3PYB and G3PHO are hoping to attract as many stations as possible to take part by creating a series of high power, well-sited stations at key locations.

The key stations will, wherever possible, be capable of providing a link to a second key station or to a repeater input or to an individual home or portable station.

The event is to be held on an existing narrowband microwave contest with a view to providing contactS for ATV and narrowband microwave stations.

Support will be sought from groups interested in ATV and microwave activity who could provide a key station on a high location, with as many bands as possible.

An effort will be made to interlink the key stations to act as **relay stations.**

If possible, a **feed into a local repeater or directly in the BATC streamer** would be an advantage to create the widest coverage. Well-sighted locations to give maximum coverage.

Highest ERP consistent with the ability to act as a relay is needED for some.

The Upper microwave bands are to used to provide an opportunity for stations to use the bands for longer contacts.

The same equipment could also function as "Key" station relay equipment.

G3PHO and G3PYB plan to activate a high site in the Pennines (probably Merryton Low). Ideally **we are looking for "Key " stations on the NYM, Winter Hill, Wales, Midlands, Southern England and Eastern England**.

Any other sites are most welcome, but the aim is to create a core of key stations within reasonable link distances to maximize to activity.

Once we have as many offers for "Key " stations" the aim will be to publicize the event as widely as possible.

High ERP stations on the most popular bands such as (FM) 23 and 3cm are sought but we would like to **promote DATV** as much as possible, including 70cm. This should provide added incentive for stations to try new equipment for DATV and other bands such as 3.4 and 5.7GHz.

Ideas and suggestions for the event are most welcome to G3PHO and G3PYB via Scatterpoint.

If sufficient support is forthcoming, a contest scoring arrangement can be organised.

Provisional interest has already been received from:

G3PHO/P & G3PYB/P : Merryton Low Triangle
M0DTS/P: North York Moors
G3ZME/P: North Wales or Welsh border

We ask **all UK microwavers** to support this event as much as they can since both ATVers and microwavers stand to gain from the exposure on the BATC live video streamer and subseuqnt publicity in the various Amateur Radio magazines.

PLEASE EMAIL: editor@microwavers.org

SATELLITE NEWS FROM THE SOUTHGATE AMATEUR RADIO CLUB NEWS SERVICE

On May 20 Japan is planning to launch four "CubeSats". The largest of them, UNITEC-1, will carry a 15 watt Amateur Radio 5840.00 MHZ telemetry beacon and travel into deep space towards Venus

Three of the satellites will carry Amateur Radio payloads. On the AMSAT bulletin board, Mineo Wakita JE9PEL writes:

Four CubeSats in Japan are planned to launch at 20 May 2010 together with PLANET-C which belongs to JAXA by H-IIA rocket.
http://www.jaxa.jp/index_e.html

UNITEC-1, NPO UNISEC (University Space Engineering Consortium: 5.8GHz
http://www.unisec.jp/unitec-1/en/top.html

Negai, Soka University: 437.305MHz CW, Packet 1200bps FSK AX.25
http://kuro.t.soka.ac.jp/main.html

WASEDA-SAT2, Waseda University: 437.485 MHz CW(FM), PCM-FSK(FM) 9600bps
http://www.miyashita.mmech.waseda.ac.jp/Waseda-Sat2/index.htm

KSAT, Kagoshima Universit: Uplink: S-band(2GHz, 10kbps), Downlink: Ku-band (13.275GHz, 10kbps/1Mbps
http://www.sci.kagoshima-u.ac.jp/~nishio/download/Ukaren2008nishio.pdf

IARU Amateur Satellite Frequency Coordination information:
Unitec-1 **http://www.amsat.org.uk/iaru/finished_detail.asp?serial=141**

Negai **http://www.amsat.org.uk/iaru/finished_detail.asp?serial=90**
WASEDA-SAT2 **http://www.amsat.org.uk/iaru/finished_detail.asp?serial=123**

AMSAT Bulletin Board AMSAT-BB
http://www.amsat.org/amsat-new/tools/maillist/

AMSAT-UK publish a colour A4 newsletter, OSCAR News, that is full of Amateur Satellite information. Join online at **https://secure.amsat.org.uk/subs_form/**

73 Trevor M5AKA
Daily Amateur Radio News (Email/RSS): **http://www.southgatearc.org/**

Email Your News To: editor at www.southgatearc.org

Microwave Update 2010 Comes to Southern California

Microwave Update (MUD), the world's most popular, amateur radio-focused microwave and millimeter wave experimentation technical conference will be held at the **Sheraton Cerritos Hotel** from 21-24 October 2010.

Each year, the MUD attracts attendees from all over the world to discuss the latest technical developments and operating achievements in amateur experimentation on the 1,000MHz and up frequencies.

This year's event is hosted by the **San Bernardino Microwave Society (SBMS).** MUD is a technical conference and includes presentations by leading microwave radio experimenters and a banquet as well as a vendor area where exotic microwave RF components can be bought and sold. Several commercial equipment manufacturers are scheduled to appear, to demonstrate their latest offerings. In addition, noise figure and antenna gain test sessions for up to 47GHz are being planned.

Call for Papers and Speakers
The call for papers and guest speakers is being announced now. Deadline paper submissions is 1 September, 2010 in order to appear in the MUD Proceedings. Go to the MUD 2010 website for guidelines and submission information.

Pre-Register Now!
Participants are encouraged to register for the conference and reserve hotel rooms as early as possible. When making hotel reservations, make sure to mention the Microwave Update to qualify for your special rate.

The town of Cerritos offers a number of excellent activities for sight-seeing and the Southern California Fall weather is another bonus. Participants are encouraged to make this a family affair. We will have Ladies Activities in and around the hotel, and there are many local attractions such as Medieval Times, Knotts Berry Farm, Disneyland and the Queen Mary (W6RO) nearby.

More details, including a registration form, can be found on the Microwave Update website, at **www.microwaveupdate.org**

About the San Bernardino Microwave Society
The SBMS is a non-profit technical organization dedicated to the advancement of communications above 1000 MHz, and was founded in 1955. The club has a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond.

Visit the SBMS website, **www.ham-radio.com/sbms**

For more information, contact Wayne Yoshida, KH6WZ: kh6kine@earthlink.net
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