



...wait for this...**29 years** and still going strong...Is this not a club that needs your aid and support?

## The Gavel– MAY 2014

Greetings MARC members and welcome to my first Gavel. I want to congratulate and thank Mike, VE3EMW, for stepping up as your new MARC Treasurer. Welcome aboard, Mike! I also want to welcome back Jim, VE3JIW, Secretary, Rick, VE3IMG, First VP and John, VA3XJL, Second VP. Thank you all for helping to take the reins for another club year. And thank you MARC members for supporting me as your new President.

It's the start of a new club year and after a long and hard winter that just didn't seem to end, spring finally arrived. Field Day is about a month away and then we'll be onto the lazy, hazy days of summer, when I'm sure we'll be longing for the cold of January before too long! I am looking forward to serving you as your President and the club has got some interesting things coming down the pipe – or feedline as it were.

Remote Station: A few years ago the idea of a club-sponsored remote HF station was conceived.

Some preliminary work was carried out and a proof of concept was achieved in which the club's Kenwood TS-480 could be successfully controlled and used through the Internet. Recently,

### Field Day 2014

Is coming.  
What are you doing for  
the biggest day of the  
HAM  
radio calendar?

**This edition is the new look new feel, with new exciting content for this, and up coming club years.**

**Don't forget to submit your ideas, columns picture's, or thoughts, we take them all.**

**The Table of Content is on page four, just to make sure you read the first 3 pages.**

**This is only the beginning of the possibilities available, pitch in, and not just the regulars,**

**“come on people, as members of this club this is your newsletter.”**



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VE3MIS/VE3RCX

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May 2014

Michael VE3TKI, Ed VA3TPV and Bob VE3CWU have continued work on the project by securing a new vertical antenna and making some design changes to the overall setup. While more work needs to be done it seems like it won't be too much longer before the remote station will live again. Many thanks to Michael, Ed and Bob, and others how have helped move this project forward.

Field Day: The club's traditional year-end event will be held again this year on June 28-29. David, VE3MDX, has worked his magic again and organized another solid group of ten stations. While a fairly significant curve ball was thrown our way with the loss of our traditional site, David worked closely with the City of Mississauga to secure our spot at a new location: Pinchin Farms located on Mississauga Road just north of the 403. This site should serve us well with its abundance of trees for antennas and its rustic feel. If you can

please stop by the MARC Field Day, say Hi to your fellow members and maybe get a few entries in the log! Many thanks goes to David and the rest of the Field Day crew for working hard at putting together this important club event.

Repeater Upgrades: Club members may have noticed recently that our flagship VHF repeater has not been firing on all cylinders. Jim, VE3JIW and his crew have made several trips to the repeater site over the past month and through their hard work and ingenuity have improved the repeater performance. They have also determined that some antenna work needs to be done and this is being planned over the coming months. But for now the melodious tones of "Romeo" can be heard again! A hearty thanks to Jim and his crew for their work at maintaining this invaluable club asset.

Ham-Ex 2014: Our annual hamfest and flea market was held just a couple of months ago under

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the close supervision of Rick, VE3IMG and his counterpart from Peel ARC. While the weather was challenging - and those of us on parking duty should have brought our hip waders - a good crowd turned up for the event. The MARC club table proved lucrative as always and the overall revenue generated by the event will go to support the many activities and services for club members. Planning for Ham-Ex 2015 is already underway. Awesome

job everyone and thanks to Rick and the volunteers for bringing it all together!

Well, there you have it. A quick recap of some of the events MARC has been and will be involved in for the new club year. I hope to see you at the next club meeting!

73,

Jeff VA3WXM



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**The Editors column:  
 from the keyboard of editor in chief  
 Valentine Stubbs  
 VE3VVS**

**MARC Members Yahoo Group**

The MARC Members Yahoo Group is the primary way to disseminate club information about upcoming events.

Join the MARC  
 Members Yahoo Group

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 To receive club related  
 communications  
 and to contact  
 other club members

[http://groups.yahoo.com/group/marc\\_members](http://groups.yahoo.com/group/marc_members)



**The Contents:**

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This edition is indeed a editors Software Defined Radio Project. dream plenty of interesting It looked like a lot of fun and all articles, and good pictures to those involved got the chance to supplement and enhance the the learn about modern electronic's reader's experience. construction methods

I suppose most of you are all So read on...

gearing up for Field Day, I myself still have not decided how or what I want to participate, I just hope that we have good weather.

Valentine Stubbs  
 Chief Editor - Communicator

The feature article this month is all regarding the club's SDR, or VE3VVS

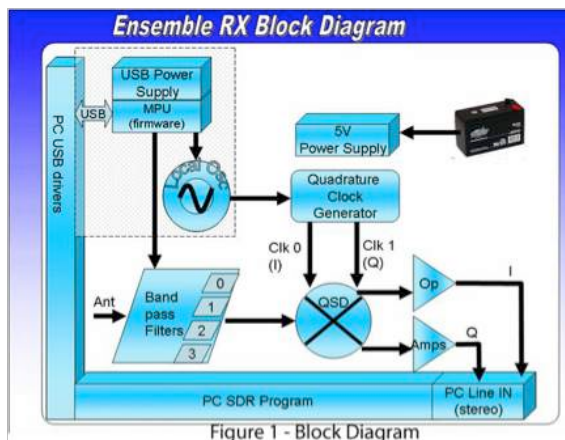
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**VE3MIS SDR Receiver Project**  
**Michael Brickell VE3TKI**

**Introduction:**

Late in 2013 a proposal was made for the club to build a software defined radio receiver. The idea was that we would learn about SDR technology and as a byproduct we would have an hf receiver located at the club station that could be accessed by anyone over the internet. A remote receiver could be made widely available via the internet so that it would be possible for those located elsewhere e.g., Europe, to transmit and listen for their signal here, to get an idea of propagation.

Thomas VE3ETG agreed to coordinate the purchase of several Softrock Ensemble II RX HF/LF receiver kits from Five-Dash Inc. We obtained 4 kits: one for the club VE3MIS, and one each for Bob VE3CWU, Brian VE3XBH, and John VA3XJL. I agreed to build VA3XJL's kit for him. After the kits had been ordered, I discovered to my chagrin that some of the components were SMT type, and that winding lots of small coils would also be required. I had no experience in SMT work (none of the other builders did either), but I was committed to the project. All was not lost however, as it turned out that Barry VE3LBL had done lots of SMT work, and to boot, was willing to demonstrate.



**Software Defined Radio:**

Figure 1 is a block diagram of the Ensemble II receiver we built (taken from the WB5RVZ construction notes, [http://www.wb5rvz.org/ensemble\\_rx\\_ii/index?projectId=16](http://www.wb5rvz.org/ensemble_rx_ii/index?projectId=16)). This particular receiver is a direct conversion type, and is controlled by an SDR program such as HDSDR running on a pc or a laptop. The rf signal from the antenna is supplied to a set of band pass filters, which are controlled by the program. The filtered rf is one input to a quadrature sampling detector (QSD) mixer circuit. A local oscillator, also under control of the program, generates two clock signals, separated in

phase by 90°, CLK0 and CLK1. These signals are the other inputs to the QSD mixer. The amplified output of the QSD mixer is provided to the computer sound card.

Isolation of the computer from the 5v dc supply to the receiver components is achieved in this case by putting the connections to the pc on an electrically isolated portion of the receiver board, with its own 3.3v dc supply.

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### Kit Construction:

By the end of four all day sessions on Saturdays in January and February (Figure 2) we had completed 3 of the kits. Barry VE3LBL demonstrated SMT techniques on one of these days. To work successfully with SMT components you need the proper tools: either a temperature controlled soldering station with a very fine tip on the soldering pen using fine gauge regular solder, or a "reflow station" with paste solder. As well, a pair of fine tweezers, a head visor with magnifying lenses, or a light with a magnifier, a flux pen, solder wick to remove the inevitable solder bridges, and miscellaneous other tools are needed.



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The reflow station (Figure 3) makes SMT work very simple. It consists of a variable speed fan which blows temperature controlled air through a nozzle. You apply a very small amount of paste solder, which comes in a small syringe, to each pad on the pc board. Then you place the component on the pads using tweezers, and apply heat with the reflow station blower. The solder paste, which is initially grey, changes to a silver colour and flows nicely onto the component terminals and the pads when it gets hot. If necessary, the solder wick can be used to remove excess solder.



Figure 3 - Reflow Station

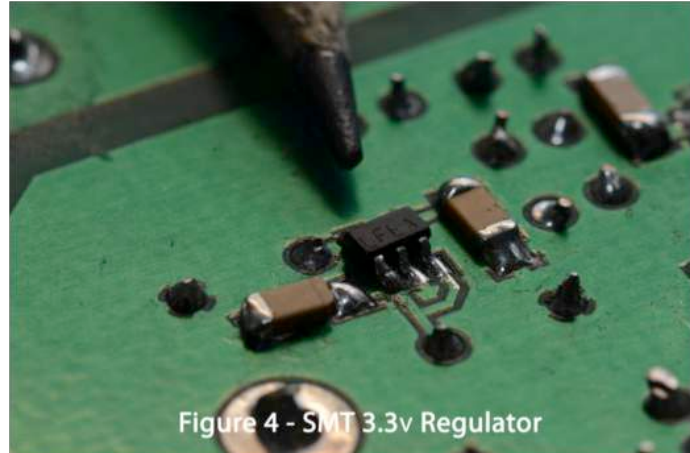


Figure 4 - SMT 3.3v Regulator

SMT components are extremely small. Figure 4 shows an SMT 3.3v regulator and several SMT capacitors, with a pencil point to show scale. Dropping one of these components or breathing too hard when locating it on the pc board can be a problem as you may never see it again!

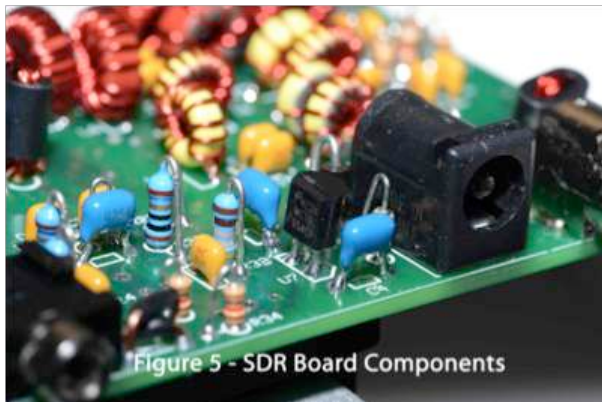


Figure 5 - SDR Board Components

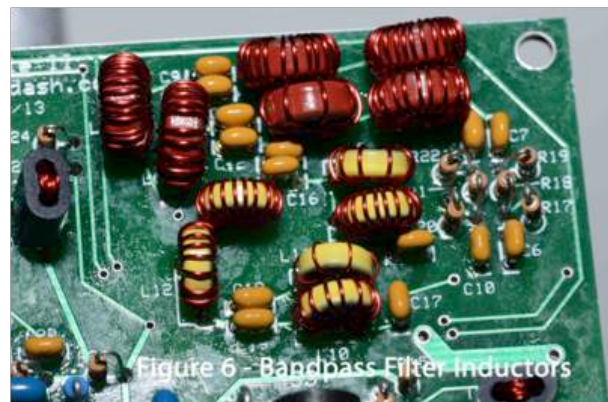


Figure 6 - Bandpass Filter Inductors

All but one of the ICs, and a large number of the capacitors in this kit are SMT type. Resistors are standard lead type but are vertically mounted in hairpin style on the board to save space (Figure 5). We had to wind 12 inductors as part of the filter section. These used very small ferrite cores wound with #27 gauge magnet wire (Figure 6).

Winding the inductors was actually not too difficult. We used a small vise to hold the cores while doing this. The instructions tell you how many turns go on each core, and we used an LC meter to check results. The kit uses three transformers. These are "binocular" types (Figure 7), which are wound with #30 gauge wire, a bit thinner than the #27 wire.

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**Circuit Details:**

*Local Oscillator and Bandpass Filter Control:*

Figure 8 shows the local oscillator and bandpass filter control portion of the circuit. The computer is connected to the Ensemble II pc board via a USB jack (J1). Signals from pins 2 and 3 of J1 are provided to the ATTTiny85 IC, U1, which in turn sets the oscillator frequency generated by the Si570 IC oscillator IC U3. The oscillator output, a square wave at the desired rf. frequency, is supplied to the primary winding of T1. The signal is passed through T1 to the quadrature clock generator divider circuit (Figure 9).

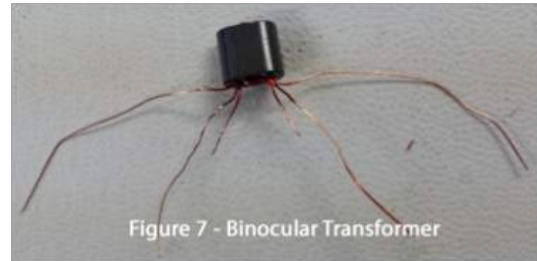


Figure 7 - Binocular Transformer

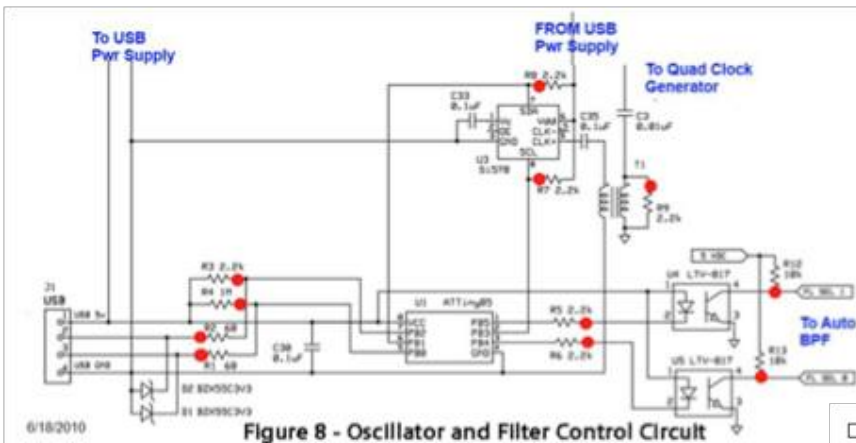


Figure 8 - Oscillator and Filter Control Circuit

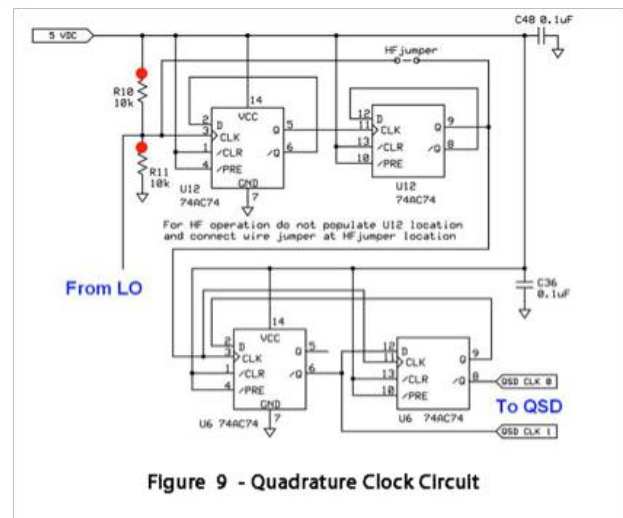


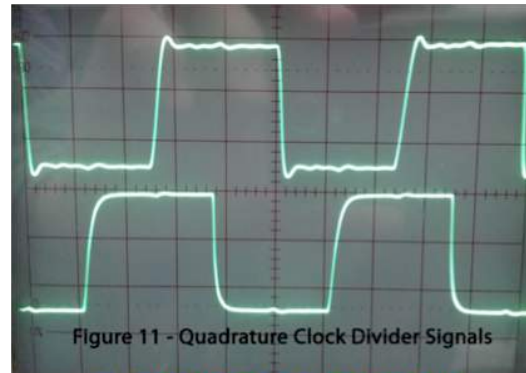
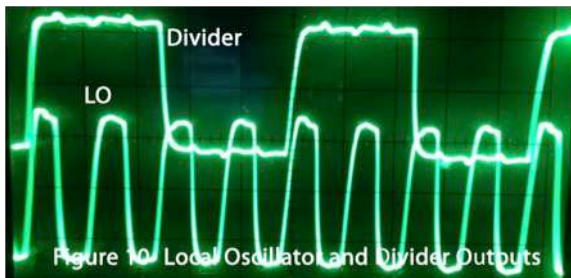
Figure 9 - Quadrature Clock Circuit

The clock generator consists of a divider IC, U6 (U12 is not installed in the HF version of the kit, and an HF jumper is installed instead) The IC takes the square wave output signal from the local oscillator and produces two output signals, also square waves, at 1/4 of the frequency. These output signals, CLK 0, and CLK 1, which are separated in phase by 90°, are provided to the quadrature sample detector (QSD) circuit.



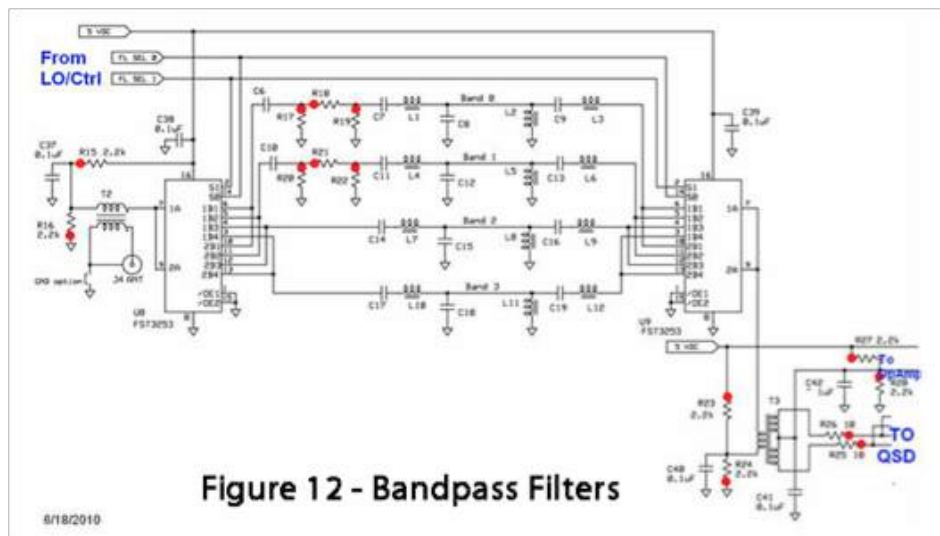
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Figure 10 shows the local oscillator square wave output and one of the clock signals, and Figure 11 shows the two clock signals, one shifted from the other by 90°.



**Bandpass Filter:**

The rf from the antenna is passed through the band pass filter module shown in Figure 12 before being input to the QSD. The module consists of four individually switched filter sections each of which passes a particular range of frequencies. The two ICs on each side of the module (U8 and U9) determine which filter is in line, depending on the control signals (FL1 and FL0) which are applied to the S1 and S0 pins of each IC.



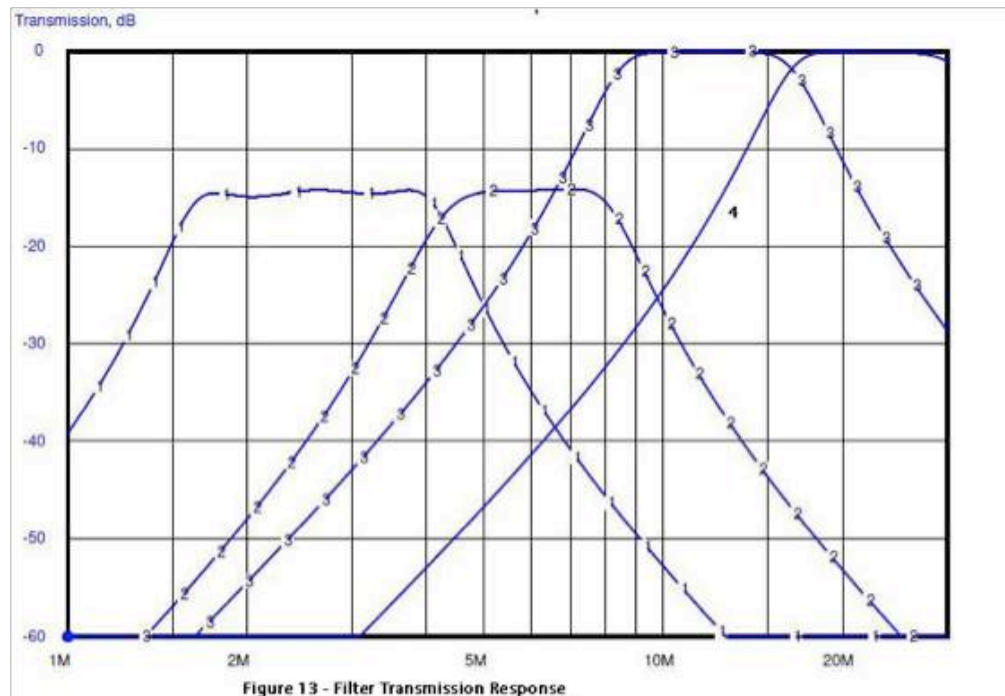
**Figure 12 - Bandpass Filters**

Each IC has two stages connected in parallel, to minimize the through impedance presented to the rf signal.

The control signals FL1 and FL0 are the outputs from two optoisolators U4 and U5 (bottom right of Figure 8). Signals from IC U1 (which is controlled by the SDR program) turn on either or both U4 or U5 (by forward biasing the internal diodes connected between pins 1 and 2), thus changing the output voltage at pin 3 (the filter control voltage FL1 or FL0) from 5v to 0v. There are 4 possible states for FL1 and FL0, (0v, 0v), (5v, 0v), (0v, 5v) and (5v,5v).

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The 4 individual filter transmission characteristics are shown in Figure 13. Curves 1 and 2, for the two lower frequency ranges 1-4 MHz and 4-8 MHz show a 15db transmission loss compared to curves 3 (8 - 16 MHz) and 4 (16-30 MHz) for the higher ranges (which have no loss). This is because of the resistor networks in these filter sections. We asked the designer why this was done and he told us that the QSD is prone to distortion at high signal levels at low frequencies and thus the attenuation provided by the resistor networks was needed.



*QSD Circuit:*

The rf signal from the bandpass filter is applied to the primary winding of T3, as shown in Figure 12 (right hand lower portion). T3 has two secondary windings, connected so that the outputs are 180° out of phase. These two signals and the two clock signals CLK 0 and CLK 1 are input to the quadrature sampling detector QSD.

The detector output is two audio frequency signals, also separated in phase by 90°. These are provided to two operational amplifiers. The op amp outputs are two audio frequency signals, denoted I and Q in the figure, which are input into the computer sound card. Subsequent signal processing within the program creates a waterfall display and audio to the computer speakers.

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A typical HSDR waterfall display is shown as Figure 14. In this figure the vertical axis of the display above the frequency readout is time, with the current time at the bottom of the display. The horizontal axis is frequency. The left most three yellow bands are a station transmitting on the frequency the receiver is tuned to. The two rightmost bands are another station responding to the on frequency station calls (this is split operation).

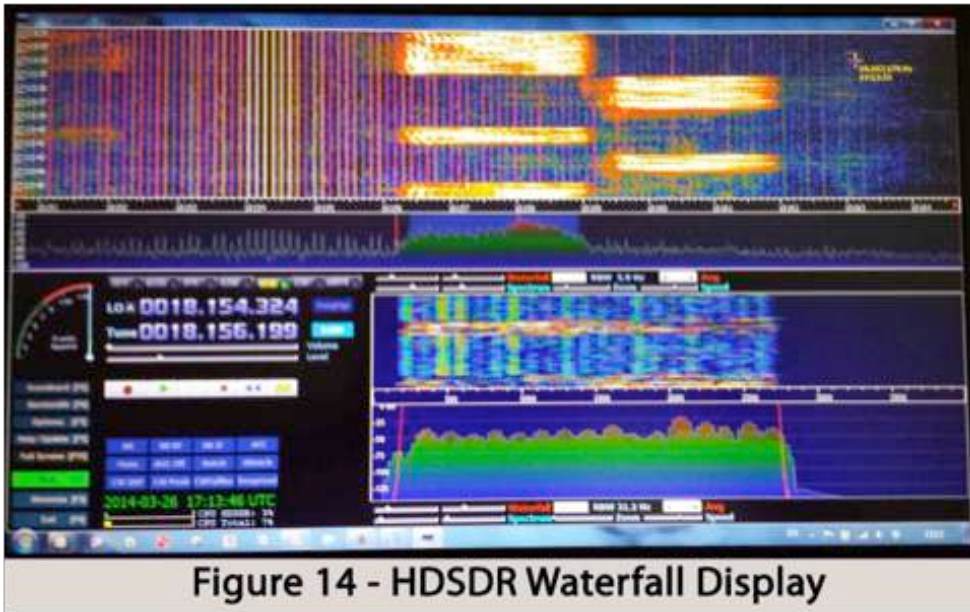


Figure 14 - HSDR Waterfall Display

**Summary:**

We now have three completed kits, all operating correctly. Figure 15 shows one of the completed kits in its enclosure. Building the SDR receivers proved to be a very interesting and educational exercise, although things did not go completely smoothly, requiring some troubleshooting when several of the kits did not work to begin with. We were able to develop our SMT soldering skills, and through various troubleshooting activities, learned a lot about SDR technology.



Figure 15 - Completed Ensemble II Receiver

The next step will be to set up the club receiver so that others can access it via the internet.



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VE3MIS/VE3RCX

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## QRZ Announces Secondary Call sign and LoTW Support

It's that time of year and we're very pleased to announce some very significant new features for our QRZ users.

We have major new developments in our call sign database, and our online logbook.

The big announcement for our call sign database is that we now fully support secondary call signs. A secondary call sign is one which includes a slash plus a modifier as either a prefix or a suffix to the primary call. This feature is available to all QRZ users and can be accessed by simply editing your call sign, or by using the **My Account** choice from the main QRZ menu, located under your call sign at the top right of the page.

With secondary call signs, you can now create a special page for your QRP operations, for example, or a special page for your repeater, or other unique operation. This means that calls like **AA7BQ/QRP**, **AA7BQ/R**, **AA7BQ/MM** are now fully supported and each gets its own QRZ page. These calls are grafted onto your primary call in such a manner that your subscriber status follows with the secondary call sign. In addition, on the Detail tab of each page, there is a "See Also" listing that shows which other call signs are related to the same primary call.

Basically, if you've enjoyed your QRZ page and would like to create a second specialty page for yourself, you can do it right now. These pages offer the same, full functionality as our regular call sign pages.

In addition, we also support DX prefixes and suffixes such as **AA7BQ/VP2** or **YU3/AA7BQ**. Any combination will work, and, the server is capable of finding your slashed call, even if the prefix/suffix is reversed! Also, unlike primary calls, secondary call signs may be deleted by their owners at any time.

Direct linking to these new QRZ pages is easy too. For example, to link to AA7BQ/QRP you can use the link:

<http://www.qrz.com/db/aa7bq/qrp>

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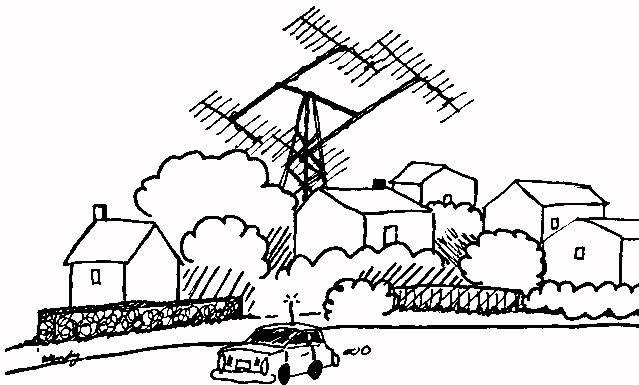
Our next big announcement concerns our online logbook. Many, many folks have asked us for LoTW integration and we're pleased to announce that this is now available to all Logbook subscribers. This means that if you're an LoTW user, you can push your QRZ logs directly to LoTW with just a couple of clicks of the mouse. The logbook offers options to send individual QSO's, lists of QSO's, or even your entire logbook directly to LoTW. We have created a configuration page which allows you to import your LoTW certificate into QRZ so that we can sign and send the logs on your behalf.

Once uploaded, your QSO's in the QRZ logbook will be shaded with a green background, indicating that they have been sent.

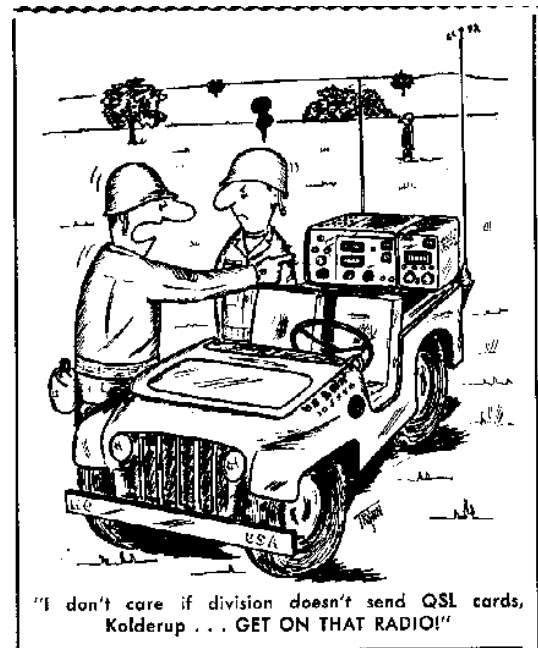
We also have a Quick Start Guide for QRZ LoTW operations available at:

[http://files.qrz.com/static/qrz/lotw\\_cert\\_guide.pdf](http://files.qrz.com/static/qrz/lotw_cert_guide.pdf)

Fred Lloyd, AA7BQ  
Publisher, QRZ.COM  
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OK, FRED. I'M ON MAPLE STREET. NOW, WHICH ONE IS YOUR HOUSE?



"I don't care if division doesn't send QSL cards, Kolderup . . . GET ON THAT RADIO!"

## *The MARC DX Award Update*

*By Ed Spingola, VA3TPV*



Photo 1: Mike Christmas, VA3FS, receiving his MARC DX Award from Ed Spingola, VA3TPV

The MARC DX Award is being offered to MARC members who submit a log to the MARC Awards Manager, VA3TPV, during the 2013 – 2014 club year. The MARC DX award is being offered in the categories of Mixed, SSB, CW, PSK, RTTY, and Digital modes in the increments of 10, 25, 50, 75, and 100 DXCC entities.

In this issue of The Communicator, we give an update on the status of this years MARC DX Award recipients. The Latest to receive their MARC DX Award certificate is Mike Christmas, VA3FS, who submitted a mixed CW and SSB log. Mike receives MARC DX Award SSB certificate # 2013-009. Mike will be continuing his quest for a Digital award and intends to submit another log before the club year ends.



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The following Table gives an update of the MARC DX Awards which have been earned to date.

Certificate Number	Category	Name	Call sign	Level
2013-001	SSB	Robert Emerson	VE3RHE	75
2013-002	Mixed	Michael Brickell	VE3TKI	100
2013-003	SSB	Lorne Jackson	VE3CXT	50
2013-004	Mixed	George Gorsline	VE3YV	100
2013-005	Mixed	Robert Hudson	VE3CWU	100
2013-006	SSB	John Coones	VE3JOC	50
2013-007	CW	Robert Hudson	VE3CWU	100
2013-008	SSB	Robert Hudson	VE3CWU	100

There are many opportunities throughout the year within which you can make DX contacts. Just follow the regular DX openings on the bands.

Contesting provides a good opportunity to make QSO's. Try one of the digital modes and you may snag that rare location that you cannot achieve with SSB. So get DXing and submit to me your logs. See the MARC web site under Club Events/MARC Awards for the MARC DX Award rules and entry forms. See the MARC web site under Club Events/MARC Awards for the MARC DX Award rules and entry forms.

[http://www.marc.on.ca/marc/events/events\\_awards.asp](http://www.marc.on.ca/marc/events/events_awards.asp)

or the this issue of The Communicator for details.

I will accept either a paper log or an ADIF log file if you need some assistance in determining your DXCC entities count.

So get on the air and enjoy this hobby of ours, make some contacts, and submit your log.

73 and Good DX.

Ed, VA3TPV

Attend all the  
regular club meetings,  
all times and events are posted on the club website:

[WWW.MARC.ON.CA](http://WWW.MARC.ON.CA)

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## Ontario



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Full - Blind \$25.00 + \$3.25 (tax) = \$28.25  
Full - Maple Leaf Operator \$100.00 + \$13.00 (tax) = \$113.00  
Full - Limited \$38.00 + \$4.94 (tax) = \$42.94  
Full - Regular - e-TCA Only \$48.00 + \$6.24 (tax) = \$54.24

Associate - Regular - paper TCA \$56.00 + \$7.28 (tax) = \$63.28  
Associate - Family \$25.00 + \$3.25 (tax) = \$28.25  
Associate - Blind \$25.00 + \$3.25 (tax) = \$28.25  
Associate - Regular - e-TCA Only \$48.00 + \$6.24 (tax) = \$54.24  
Associate - Corporate \$150.00 + \$19.50 (tax) = \$169.50

Note that the family membership fee applies to each family member who joins in addition to the principle member.

I wish to join for 1 yr

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If were previously a member please give your membership number or the callsign you held when you were previously a member \_\_\_\_\_

Name \_\_\_\_\_ Callsign \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Province \_\_\_\_\_ Postal Code \_\_\_\_\_

Phone \_\_\_\_\_ E-mail \_\_\_\_\_

Family Members \_\_\_\_\_

For blind membership please provide your CNIB number \_\_\_\_\_