



The GroundWire

Rick's Rantings

ISSUE 2013-06



WEIRD RADIO USES

We all have seen radios used for various things in ham radio, rag-chewing, QRP, contesting, APRS, even CW! But I have seen things get a little weird when people (most of them NOT ham radio operators) put radios to strange purposes!

Wherever I work, the responsibility to care for and manage the radios for our organization typically falls on me. When I worked for IBM, I set out to replace our big, chunky Motorola radios with something a little lighter and easier to tote. I was still leaning towards Motorolas because, well, they're robust as dickens. My boss, on the other hand, who was always inclined to save a buck, was wanting me to go with something cheaper (I think {brand name excised to prevent lawsuits}). A few days later we were watching one of the technicians running some data cables and where he had to penetrate a wall, he needed to punch a hole. He whipped out a big Phillips screwdriver and then using his big Motorola brick for a hammer (he wasn't aware we were watching) he used the radio and screwdriver to pound a hole through the wall!! My boss muttered one word to me, "Motorolas" and walked away.

This one was a ham: Back when car alarms first appeared, there always would be someone down the block whose alarm was set way too sensitive and would go off all the time, usually at 2:00 am. My friend (name also excised to prevent future personal injury to me) had a neighbor with an offending car alarm and discovered that if he turned his 2 meter beam in the direction of the car and blasted it with max power, the alarm would go off. Yeah, you know what's coming: That night his neighbor's alarm kept going off. Over and over. It took a couple of nights of this but his neighbor finally disconnected the alarm (or at least set the sensitivity back) and problem solved!

I will confess to this one: I have used radio to pull pranks. In my pre-ham days in the USAF, I was stationed overseas and for lack of something better to do (a condition commonly referred to as boredom!) I positioned one of my police radios in a dead space in the kitchen cabinet of our dayroom/kitchen of the barracks. One of my cops could meow like a cat very convincingly and that even-

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ing we had everyone tearing through the kitchen looking for the cat stuck in the cabinets. Even after getting my license I have been known to place an HT in a jack-o-lantern on Halloween and use another HT to allow “jack” to talk to the kids.

But the strangest use for a radio (actually just the battery pack) goes again to my USAF days when we were security for the weapons storage area on base. This was obviously a NO SMOKING area! Once inside the fences of this vast area that stored all the munitions for the base (everything from bullets to the bombs that make mushroom clouds) everyone was supposed to surrender their cigarette lighters at the entry guard shack and to be caught with one in the area was a court martial offense. I was the security supervisor on duty and would cruise the area keeping the troops in line. And since I preferred to do that on foot rather than in a patrol vehicle, I found that I would come up on them without warning and see some of the darnedest things. So one night as I walked up I watched one of my guys whip out a cigarette and put it in his mouth. I stopped and wondered how he was going to light it having turned in his lighter. He then whipped out a paper clip and bent it into a U, took the battery off his portable radio, and used the paper clip to short the terminals of the battery until the clip glowed red, then lit his cigarette!! Ah, the ingenuity of the American GI!

73 de Rick / KJ5UY



**7255 West Camp Wisdom Road
Dallas, TX 75236**

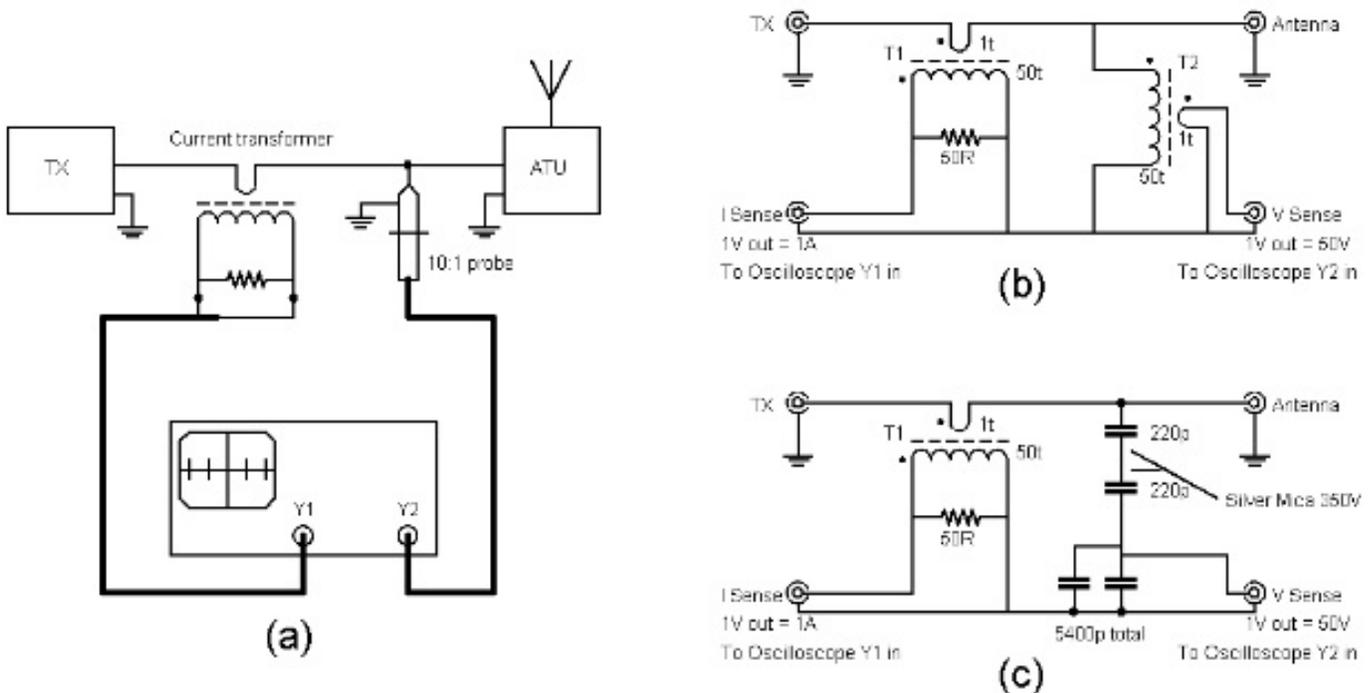
Want a little more info than an SWR meter alone can provide? Meet the ScopeMatch!



So this project came out of necessity at my station. I had lost the 4 detector diodes in my MFJ-259B and I was trying to decide if I wanted to replace them myself, which is difficult or send the unit back to MFJ and wait two months. Since the MFJ analyzer was a single point of failure in my 630-meter station's standard operating procedure for system tune up, I needed a quick fix.

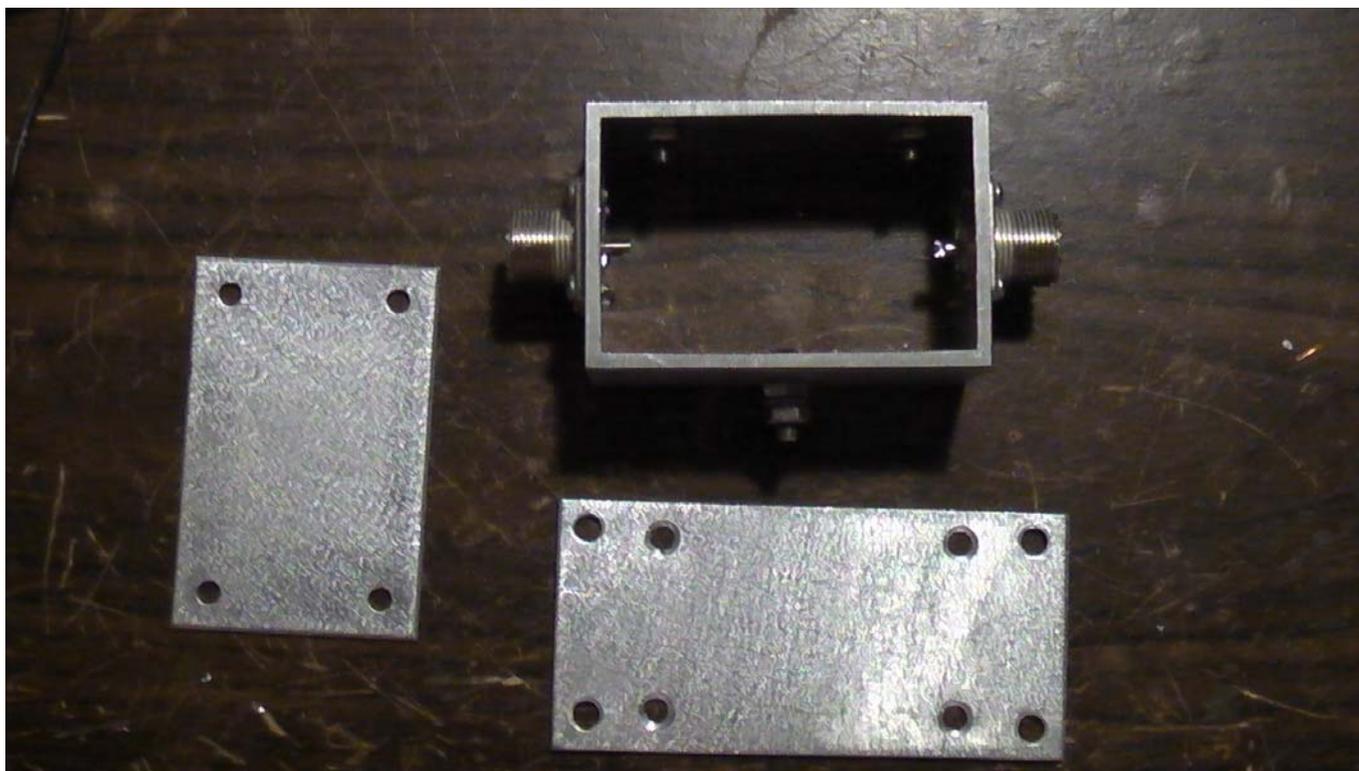
The ScopeMatch has been seen through the years in various forms. The version I will discuss today was developed by Jim Moritz, M0BMU (<http://myweb.tiscali.co.uk/wgtaylor/LFTA.pdf>) and was originally intended for use at MF and LF but there is really no reason that they could not work at higher frequencies.

The components are fairly straightforward, requiring only a two-channel oscilloscope, a hand-wound toroidal transformer, a resistor and some silver mica transmitting capacitors. Some connectors and an enclosure round out the system. The system works by sampling voltage and current of a signal on a coax and then displaying both simultaneously and in real time on the scope. At resonance, voltage and current are in phase and have equal absolute magnitudes (opposite signs on the magnitudes, in practice, however).



Picture (a) represents the basic simple layout. Many operators literally use this approach when trying to troubleshoot a problem. (b) is another options but the voltage sense transformer on the right side must be wound more carefully as it sees the full voltage on the transmission line. The windings must not breakdown and the transformer must provide enough choking inductance to keep RF from going directly to ground. I don't like (b), if you can tell. (c) is the best option for a permanent option. The capacitors in the voltage sense are silver mica transmitting types of 250-500v. In my opinion, higher voltage handling on these is better and both Tanners and Mouser stock them.

As I have mentioned in the past, I hate dealing with enclosures for projects. Some guys love the challenge of creating nice looking front-ends but I cringe at the thought of having to do the metal work and for that matter, enclosures are generally the most expensive part of any project if you are using “true”, professionally built enclosures. I was in luck, however. In an unused receive chain, I had an ICE broadcast band filter that I used ahead of a preamp on the main low band position in my station. As I am using band pass filters that are switchable, the broadcast band filter is not being used so I carefully opened the box up and clipped out the circuit, to be returned to an Altoids tin at some point, and used this really nice and well-designed box.

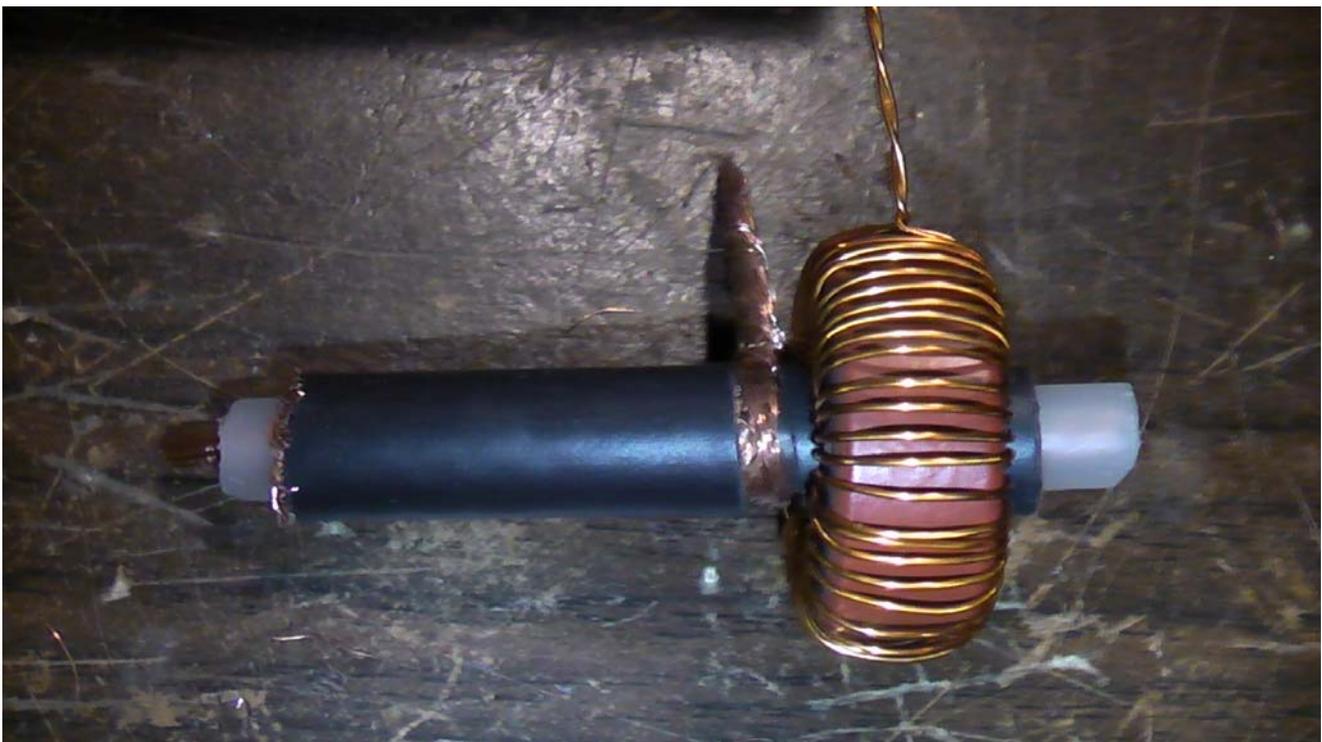


The next step is to wind the secondary of the transformer. I had number of cores that were unused and picked one that I thought would offer enough impedance in the region that I was operating. For HF, a Type 43 is probably fine. I am using this for MF and LF and I think this one is a Type 106. The core is wound with 50 turns of enameled wire, each pass through the center of the core equaling a turn.

Want a little more info than an SWR meter alone can provide? Meet the ScopeMatch! ...



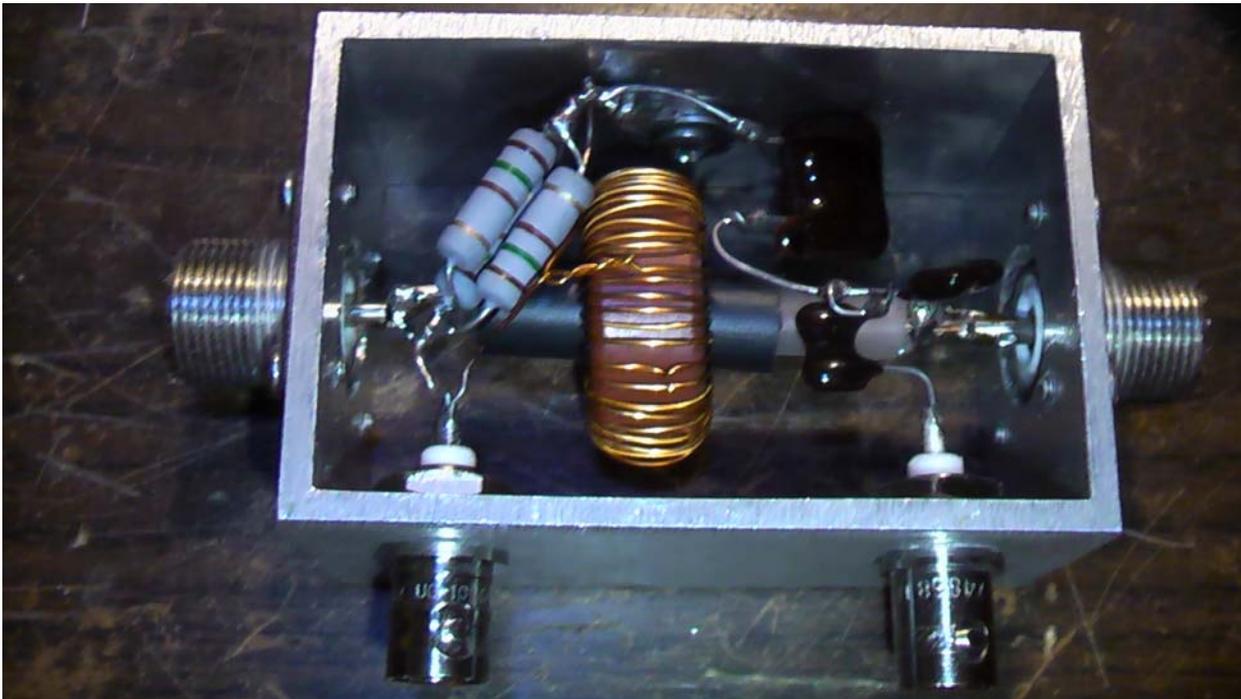
Next, the primary is prepared from a piece of coax. The coax literally bridges the SO-239 connectors at each end of the box. Remember that we are not modifying the signal; we are simply sampling it so there is very little loss incurred.



Want a little more info than an SWR meter alone can provide? Meet the ScopeMatch! ...

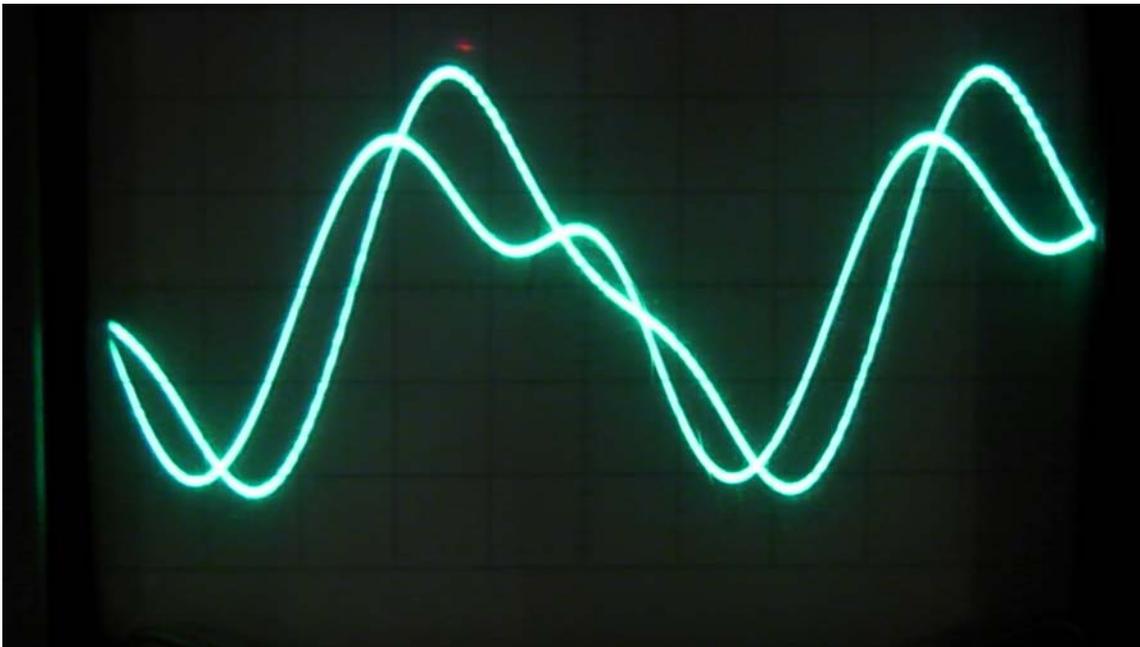


The core is placed over the coax and the ends are soldered onto the connectors in the box. The braid of the coax is connected to ground.

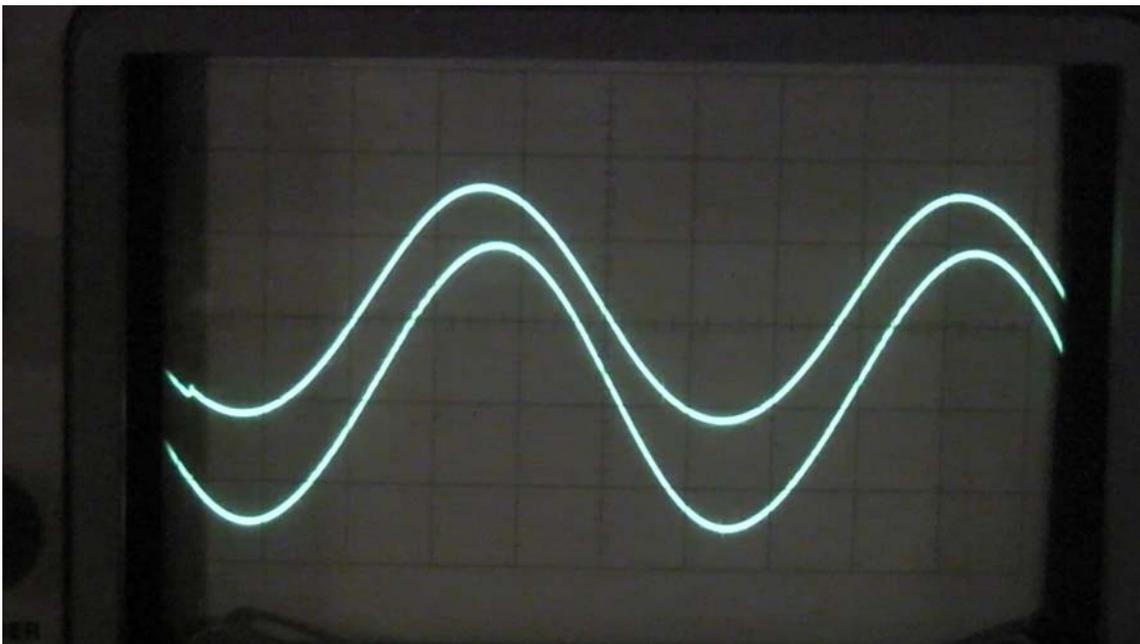


The resistive network on the secondary of the transformer causes a voltage drop. At 50 ohms (3-150 ohm 2-watt resistors in parallel), 1 volt generated equals 1 amp of RF current on the coax. I chose to use 6-watts worth of resistors for a lot of safety factor. In reality, there is probably only a fraction of a watt being dissipated in the resistors. Since resistance changes with temperature, I did not want to see variations in the waveform on the scope. The capacitors in the voltage network are similarly installed.

Want a little more info than an SWR meter alone can provide? Meet the ScopeMatch! ...



Plugging in to the scope channels, we see both waveforms here. Note that they are not pure sine waves as expected. This indicates a mismatch; in fact, the elbow on the smaller waveform is the result of an impedance mismatch. Adjusting the variometer for best tuning on 630 meters yields perfect waveforms where the current and voltage are in phase and of equal absolute magnitudes. Voltage is displayed on top and current is on bottom.





So why is this better than an SWR meter? SWR meters only show that there is a reflected voltage, it says nothing about impedance other than it is mismatched. The ScopeMatch does not directly indicate an absolute impedance like an analyzer would but it gives you a graphical display to tune up with while providing data that can be used in calculations to determine impedance, voltage on a coax, SWR, etc. Furthermore, simply getting both waveforms to look the same and in phase with each other is usually good enough to ensure that a sufficient match has been achieved.

Taking that last thought a little further, the in phase, equal magnitude waveforms indicate a 50 ohm, resistive load. If the waveform were still in phase but voltage were greater than current, it would indicate resonance with a resistance greater than 50 ohms. Looking at the reverse where current is slightly greater in magnitude than voltage, which is the case in my system, the resistance is slightly lower than 50 ohms. In fact, at the time these pics were taken, the SWR Analyzer indicates about 49 ohms.

Sometimes the phase is different which indicates a lack of resonance. When current leads voltage, we say that the system is capacitively reactive and when voltage leads current we say that the system is inductively reactive. REMEMBER – “ELI” the “ICE” man! Its very likely that you can have a combination of R and X to deal with when tuning the system.

So here is another tool for the shack if you own a scope and don't mind analyzing data to draw conclusions about you system. My ScopeMatch stays inline all the time and I use it to periodically monitor as well as during the checkout process. While it has not replaced the analyzer in my station's SOP, it does enhance the capabilities by allowing me to look at the signal on the coax which, along with information about antenna base current and PA voltage and current, I can draw some reasonable conclusions about the performance of my system at any given time.

By the way, I opted to order parts from MFJ to fix the analyzer. It was four high pitch surface mount schottky diodes that are impossible to get to with out taking the entire unit apart. It only cost me \$7 shipped and while it was a headache to do the repair for a number of reasons, it was worth it. If you find that your analyzer stops working for one reason or another and you have not directly transmitted into it, lets talk about how you might fix it. As bad as it is, it's worth it.

73 and look for me in the noise!

John KB5NJD/WG2XIQ

Financial Report ... May 2013



May-13	Income	Expense	Balance	Petty Cash
General Fund				
Beginning Balance 5/1/2013			\$2,739.11	
INCOME/EXPENSE				
Dues Income-2013	\$55.00			
ARRL Renewal Income-2013	\$86.00			
Transfer From Matl. Property				
Transfer Petty Cash income				
TOTAL INCOME	\$141.00			
EXPENSES				
ARRL Renewal CK 2026		\$82.00		
TOTAL EXPENSES		\$82.00		
TOTAL INCOME/EXPENSE	\$141.00	\$82.00		
Ending Balance 5/31/2013			\$2,798.11	
Special Events Fund				
Beginning Balance 5/1/2013			\$140.14	
INCOME/EXPENSE				
Trans from General Fund				
TOTAL INCOME	\$0.00			
EXPENSES				
TOTAL EXPENSES		\$0.00		
TOTAL INCOME/EXPENSE	\$0.00	\$0.00		
Ending Balance 5/31/2013			\$140.14	
Material Property Fund				
Beginning Balance 5/1/2013			\$1,922.52	
INCOME/EXPENSE				
Dues Income-2013	\$55.00			
Income from Donated Items	\$75.00			
Transfer from General Fund				
TOTAL INCOME	\$130.00			
EXPENSES				
Telephone 3 May via web		\$40.62		
R1CU statement fee		\$3.00		
Transfer to General Fund				
TOTAL EXPENSES		\$43.62		
TOTAL INCOME/EXPENSE	\$130.00	\$43.62		
Ending Balance 5/31/2013			\$2,008.90	
May Balance	\$271.00	\$125.62	\$4,947.15	

2013 Board Members

President

Mike Harang (K5MMH)

Vice-President

Bill Ellis (N5TXN)

Treasurer

Jerry Keltner (KB6OJE)

Secretary

Pat Roberson (KB5YPP)

Directors

Paul Dryer (KD5IVP)

Rick Ellis (KJ5UY)

Lester Wong (K5ITO)

Committee Positions

Repeater Trustee

Johnny Roberson (KJ5LB)

Repeater Committee Chair

Mike Harang (K5MMH)

Newsletter Editor

Bill Ellis (N5TXN)

Web Master

Bruce Holt (KG1BAH)

MN²

Monday Night Net

Net Time 8:00PM

147.060(+) Primary
444.500(+) Alternate

Minutes of Board Meeting ... May 7, 2013



The meeting was called to order by Mike (K5MMH) at 6:30 pm.

Invocation was given by Rick (KJ5UY).

Executive Board members present:

Officers

Mike Harang(K5MMH)

Bill Ellis (N5TXN)

Pat Roberson(K5YPP)

Jerry Keltner (KB6OJE)

Directors

Lester Wong (K5ITO) out of town

Paul Dryer (KD5IVP)

Rick Ellis (KJ5UY)

Guests: Ben (K5NEB), Floyd (KC5QBC), Johnny (KJ5LB), James (KF5RBN), Barry (KF5JPE), Jimmy (KB5WIO), Scott (KE5NLK), Bruce (KG1BAH).

Minutes: Motion to approve as printed in the Groundwire by Rick (KJ5UY); Motion 2nd by Bill (N5TXN). Motion approved.

Treasure Report: Motion to approve as printed in the Groundwire by Paul (KD5IVP); Motion 2nd by Rick (KJ5UY). Motion approved.

COMMITTEE REPORTS

Repeater: It was noted that the output was not good on the 2 meter, the 440 is ok; new batteries have been ordered and installed in the backup repeater; 2meter is being monitored 24 hrs. daily.

VE Session: None.

EOC: DeSoto has a new fire chief,

Membership: Two new applicants: Barry Fulfer (KF5JPE) general; Brandi Fulfer (KF5RTU) family. Motion to accept by Rick (KJ5UY), second by Paul (KD5IVP). Motion approved.

Net: Ben (K5NEB); 4 checked in, had to change to alternate frequency due to 2m repeater problems.

Web: Calendar events added. Have requested Bruce Holt to modify the "A Friend Remembered" page to be titled "Friends Remembered" and adjust the page so that other past members can be added. Access given to Russ Thompson (KX5G) so the Net Control schedule could be modified.

Groundwire: Front Page will be done by Rick (KJ5UY).

OLD BUSINESS

Head for the Hills Bike Rally – 11 May – Jerry (KB6OJE) has enough operators but needs alternate frequencies – Alternates: 145.410 Wax/Mid; 147.260 private; 146.565 simplex - will be used by the shadow; the club 440. APRS is 144.390. Net Control will meet at 6:00 am, Sags at 6:30. Russ (WX5G) and Floyd (KC5QBC) will monitor the weather.

Field Day is 22 June – Location this year is 7255 W. Camp Wisdom Rd. at the Pioneer Bible Translators site. A map will be provided. Les (K5ITO) will be the cook for hot dogs and hamburgers. Johnny and Mike will provide grills. The membership will provide sides, condiments, and desserts. There are new sections in Ontario, Canada. More information to come.

NEW BUSINESS

May Program – presented by J. Langridge. Topic will be current trends in the medium wave communications.

ADJOURN: Motion Paul (KD5IVP) at 7:05 pm.

General Membership Meeting ... May 21, 2013



The meeting was called to order by Mike (K5MMH) at 6:32 PM.

Invocation was given by Floyd (KB5QBC).

Executive Board members present:

Officers

Mike Harang (K5MMH)
Bill Ellis (N5TXN) Absent
Pat Roberson (KB5YPP)
Jerry Keltner (KB6OJE)

Directors

Lester Wong (K5ITO)
Paul Dryer (KD5IVP)
Rick Ellis (KJ5UY)

Guests: New Member Tim Skidmore (KF5TTQ), Mike Roberts (KI5CFS) requested membership form, Yvonne Schier.

Minutes: Motion: Rick (KJ5UY) 2nd : Jimmy (KB5WIO). Approved.

Treasure Report: Motion : Paul (KD5IVP) 2nd : Scott (KE5NLK). Approved.

COMMITTEE REPORTS

Repeater: 2 meter test plug has been built, running and testing.

VE Session: None tonight.

EOC: _DeSoto weather net was up on the 440 machine during the recent bad weather. The new Fire Chief had positive comments. Floyd will send an email to survey equipment owned by members that could be used in emergency situations.

Membership: Application given to Mike Roberts (KI5CFS).

Net: The net has been suspended pending resolution of 2m repeater problems.

Web: Still need "A Friend Remembered" and the Field Day location pages modified.

Groundwire: will be out soon.

OLD BUSINESS

1. Head For The Hills Bike Rally – May 11 –Recap by Jerry and Scott – Rotary appreciated all that the Ham Radio operators do. Send suggestions to Scott or Jerry for next year. This is the 7th year of the Rotary Bike Rally and participation by SWDCARC.
2. Ham-Com – June 07 and 08 – Bring your stuff to put on our club table to sell and take your turn at the table. Be sure to price the items you want to sell. Jerry will bring some change on Friday for the change box.
3. Financial Audit – In progress, will be completed in May. Scott will bring the paperwork to the June Board Meeting.
4. Field Day – Chairperson is Bill Ellis (N5TXN). Preparations are well under way. We will be operating as a 3AC station using call W5WB. We will actually be in "3 Alpha" designation. Location will be Pioneer Bible Translators, 7255 W. Camp Wisdom Rd. We may be able to do some set-up late Friday. Bill Fierbach (KD8AZT) is the last word on the use of the property. Sides, condiments, snacks and desserts are needed to go with the hot dogs and hamburgers that will be cooked on the grill on Saturday evening.

NEW BUSINESS

1. Mike is requesting that the Repeater Committee begin investigating and securing hardware to implement a permanent/portable location for a backup 2 meter repeater. Pro/Con discussions are need outside this meeting and at the board meeting.
2. Wayne Schier (KE4SGS) is the lucky and proud recipient of a new kidney!
3. Johnny (KJ5LB) will be having an outpatient surgical procedure tomorrow for bladder cancer.

ADJOURN: Motion Jimmy (KB5WIO) at 7:05 pm.

Program: Current Trends in MW Communications, presented by John Langridge (KB5NJD).