GARS
Glenn Amateur Radio Society
KJ6HCG

Prez Says

The GARS Repeater

May 2024

Salutations from the lair of KF6OBI! – may the month of May bring many blessings to all. This last month has been full of many weather surprises. The total rain fall so far this rain year has the QTH at over 20 inches and over 15 inches up at the Saint John repeater site. We start the new rain year on 1 July 2024. The forecast is saying that we will have some wet weather the first weekend of May, which is in question as I write this. So what will the totals be come 30 June? We experienced a sudden flash storm that only lasted for about 15 minutes here at the QTH this past Friday, the 26th that delivered 0.06 inches of rain. This storm moved fast toward the southeast delivering some lightning, short power outages, and much rain in other areas. There was a dusting of snow at the repeater site.

We are getting close to doing the EMI testing of the DRT generator. The End Fed Half Wave antenna was re-flown again, for the third time, on 22 April, due to the RV snagging it, taking it out of service. Ground rods have been made up and are ready to be installed. Within the next couple of weeks the EMI testing will commence.

Update on the Byonics MicroFox-50 (MF-50) – I have received email notification that the Fox is back in stock. We are waiting notification of its shipment. The plan is to hold Fox hunts, or several, during the 2024 ARRL Field Day weekend. Who wants to take the lead on setting this event up? Let me know!

It is asked of each member to check out the GARS website at least once each week for any updates and or announcements that may not have been sent by direct email. The website is constantly being updated every several days.

During the month of May we are planning a couple of recon trips. One is to test the passage to the Saint John site. The other is to test the conditions at our planned summer ARRL Field Day site. Conditions at this time of both these areas, and the access roads to them, which are not conducive to travel. These areas are closed off. We will be watching the conditions and when all is good make those hasty recon trips. If you want to be involved let us know.

The 2024 ARRL summer field day plans are starting to come together. Band pass filters are being ordered to mitigate local interference issues while we are operating in close proximity to each other. Should you want to purchase a filter, donate monies, or get more information on this project, contact Tyler, N6TUV.

On 25 April Phil, KI6SMN, and Michael, KF6OBI participated in a Cybersecurity Drill here in Glenn County. Using Winlink Packet and VARA-FM we passed message traffic from Glenn Public Health to it's partners commercial email accounts. We also transmitted a Hospital Bed Report and took a message over VHF using hand-held radios on the Land Mobile Radio frequencies set aside for Glenn County Search and Rescue, SAR-TAC.

Then on the 27th there was a challenging POTA event at the Colusa-Sacramento River SRA, about 65 miles north of Sacramento near the town of Colusa on the west bank of the Sacramento River. Here is a short report from Jeramie, W6LAD; – "We had a very well attended POTA event at Colusa yesterday at park US-3243 with not so bright band conditions.

We had a most delicious lunch cooked by Tyler, N6UTV, and his XYL and others brought and provided items as well. The Colusa park is a very nice and shaded facility and with another group trip we could hold the record for QSO's from this park under the KJ6HCG Call. We also lack 2 QSO'S from being the park leader at park US-0205 Sacramento National Wildlife Refuge.

POTA wise we found the bands to be not in our favor although 3 members did make enough contacts to log a POTA activation.

Two Highlights were Smitty, WB1G, made a SSB Australia contact on 12M and Steve, KN6MGK, made a Japan SSB contact as well I believe that was also on 12M. Dennis, KN6SJJ, made a Virginia Contact as well yesterday. Chris, AE6Z, had a robust amount of CW Contacts I recall a NY station in there. Chris, AE6Z, Dennis KN6SJJ, and Steve, KN6MGK, had the

over 10 contacts to make an activation. Stats are as follows 15 Phone Contacts, 14 CW (AE6Z), 8 FT8 Contacts (KN6MGK), and Dennis, KN6SJJ, had 10 Phone Contacts. He really earned those as did Ryan, Steve, and Smitty. Without Chris doing CW and Steve doing FT8 we would not have had as good of a showing on the logs."

NOTICE – Due to interference issues on the W6RHC west machine, the GARS Monday night net will now start at 8 pm, 2000 hours. Starting 1 April 2024, instead of using the W6RHC west machine we will be using the K6LNK-36 Local repeater to conduct the net. Details are posted on the GARS website. Please continue to monitor the frequency pairs list that was sent out to the membership. Returning results at anytime will be greatly appreciated.

Up and coming events are: –See more notices are on the GARS Website <https://www.garshamradio.org/>

This months membership meeting will be on the second Friday, the 10th of May, at the Lutheran Fellowship Hall, 565 Main Street, Artois CA, at 7:00pm. Late arrivals and guests are always welcome. Also remember that one does not have to be a member of the club to participate in our membership meetings and activities. Be safe in all you do and may you all have many blessings in the days and months ahead!

Michael A. Ellithorpe, KF6OBI/WRHY416
President, GARS
kj6hcg@gmail.com
Glenn Amateur Radio Society, P.O. Box 212, Willows, CA 95988

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1 to 1 Guanella Current BALUN

By VK6YSF

Requiring a balun to feed a balanced feed line with an unbalanced T-Match tuner, a 1:1 Guanella Current balun design using a L15 ferrite toroid core was selected among others. A current balun may be for most situations the most suitable balun however due the extremely low and high impedance's often encounter with multi-band balanced antenna system a balun may be required to step up or down the feed impedance presented at the T-Match tuner, it is for this reason that I chose to not include the balun as an integral feature of the T-Match tuner, opting for the flexibility of an outboard balun and the ability to trial various baluns subject to the antenna system and impedance's presented.

The Guanella Current balun is a low loss, broadband balun that will ideally choke off common mode currents entering the radio room and importantly provide a transition from the unbalance output of the T-Match tuner to the balanced antenna system feed line.

While using the balun to choke off common mode currents is best achieved at the antenna end of the feed line, this is not a practical arrangement for a balanced feed line system.

The Guanella Current balun will have application on other antenna systems such as coaxial feed dipoles and sloper antenna to mitigate the problem of common mode currents on the feed line.

Construction

The double bifilar winding of 10 turns are wound evenly spaced around the L15 ferrite Toroid core with the two individual windings wound close together with a crossover half way through the winding so that balanced side terminates on the opposite side of the balun from the unbalanced termination. The toroidal core was rapped in an overlapping layer pink heavy duty Teflon plumbers tape to protect the enameled copper wire from insulation puncture from abrasion with the Toroid core.

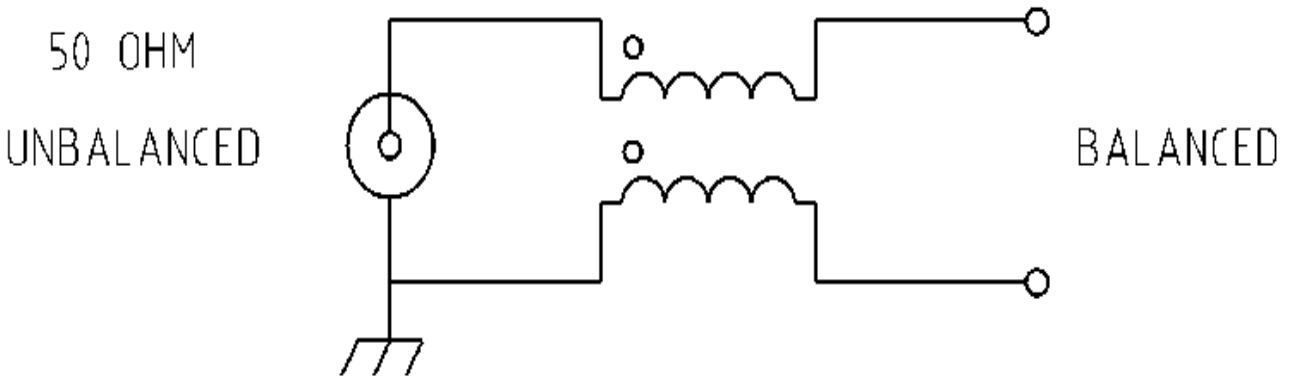

Figure 1 Schematic of the 1:1 Guanella Current balun

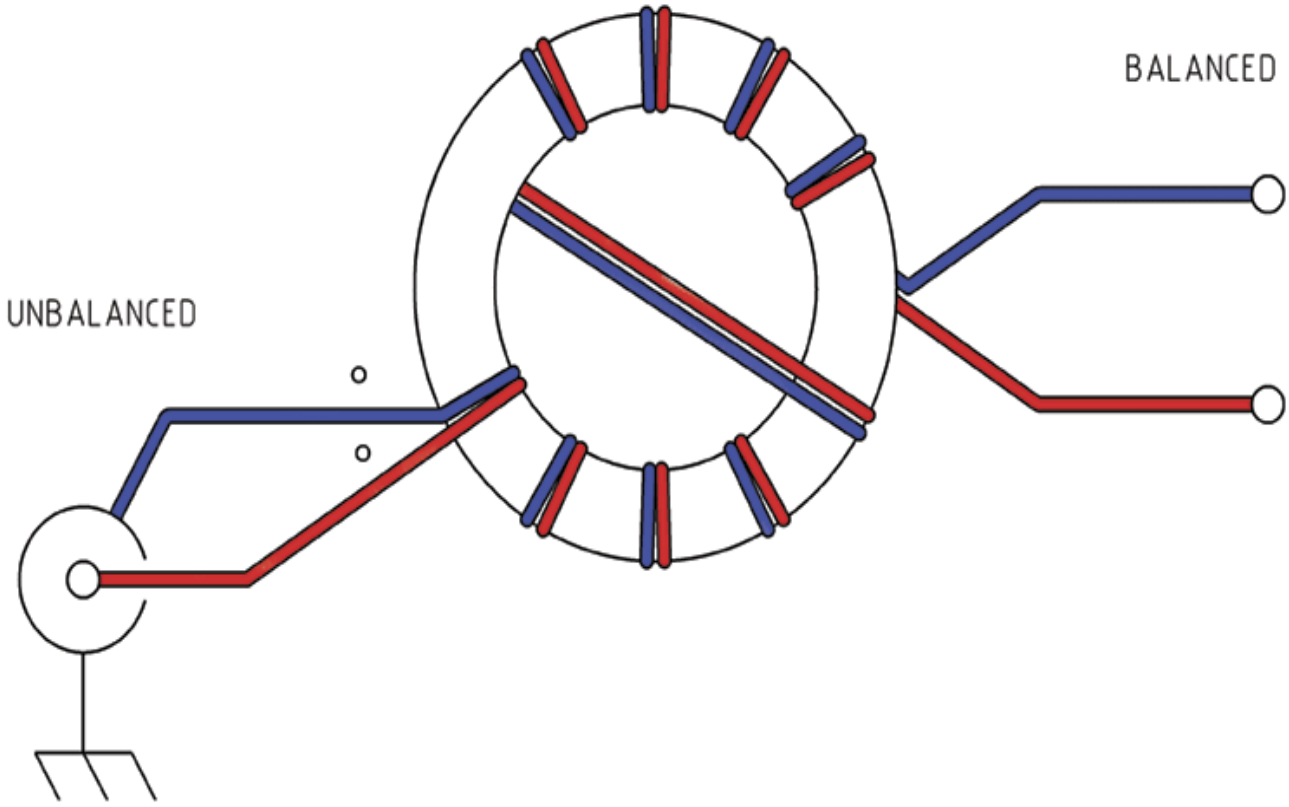

Figure 2 Wiring of the 1:1 Guanella Current balun.

Note this drawing shows winding connections only and not the number of turns required. See article for details.

Parts list.

- L15 ferrite toroid core. Jaycar Cat. No. LO-1238
- Pink heavy duty Teflon plumbers tape.
- About 2mm x 600mm of 1.25mm Enameled copper wire.

- Two Gold Banana Socket Binding Post – Black. Jaycar Cat. No. PT-0431
- SO-239 UHF chassis mount connector
- Sealed Poly-carbonate Enclosures 82mm x 80mm x 55mm from Jaycar Cat. No. HB-6230. See Fig 3 for details

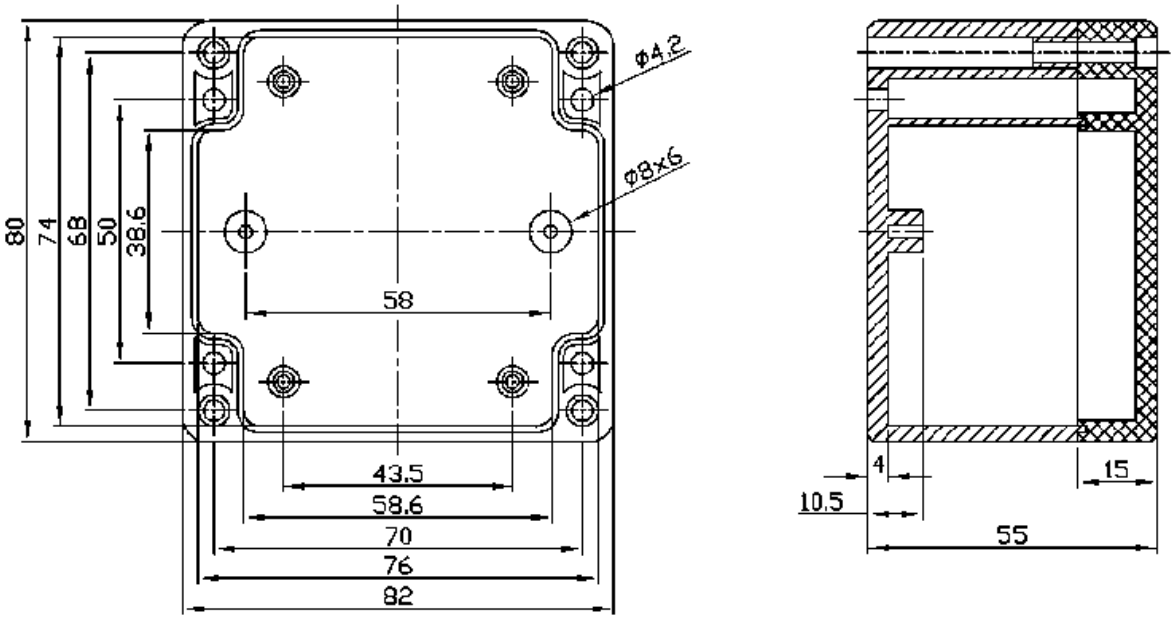

Figure 3 Sealed Poly-carbonate Enclosures 82mm x 80mm x 55mm details. Designed to IP65 of IEC 529 and NEMA 4

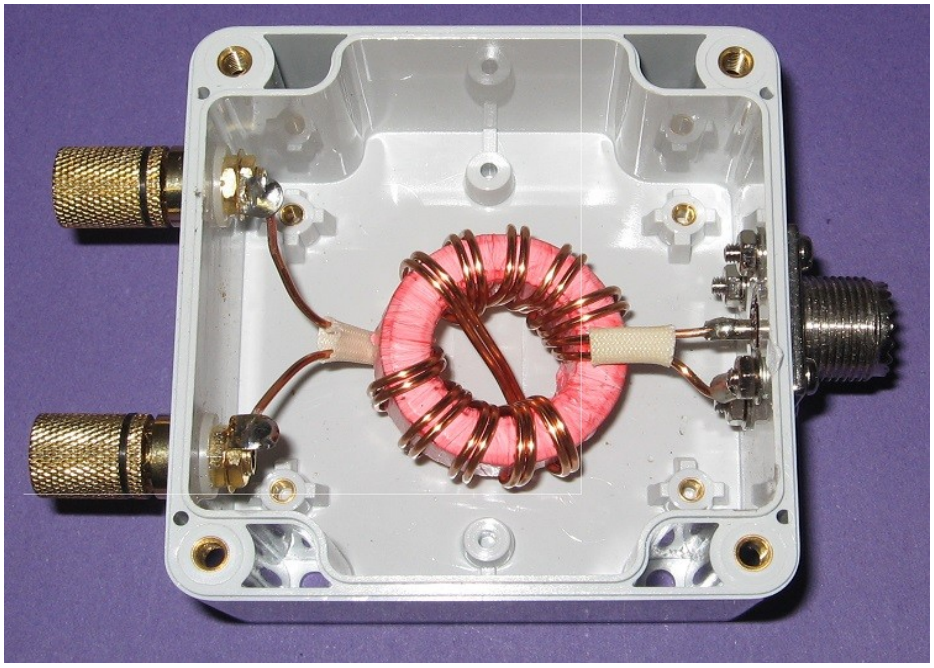

Photo 1 1:1 Guanella current balun assembled.

The evaluation of the efficiency of the balun over the desired bandwidth (1.8 – 30MHz) was carried out by testing the impedance that could be seen from unbalanced side to a resistive load applied to the balanced side using an antenna analyzer. The efficiency is shown to be relatively flat from below 1.8MHz to above 30MHz. The below antenna analyzer plot viewing a 50ohm resistive load attached to the balanced side of the balun and measured at a nominal impedance of 50ohms presented as anticipated an approximate 50ohm load to the analyzer and ideally produced about a 1:1 SWR. Despite not having carried out this test previously the results are more or less what was expected and demonstrates that the baluns 1:1 current transformation occurs efficiently from 1.8 to well above 30MHz

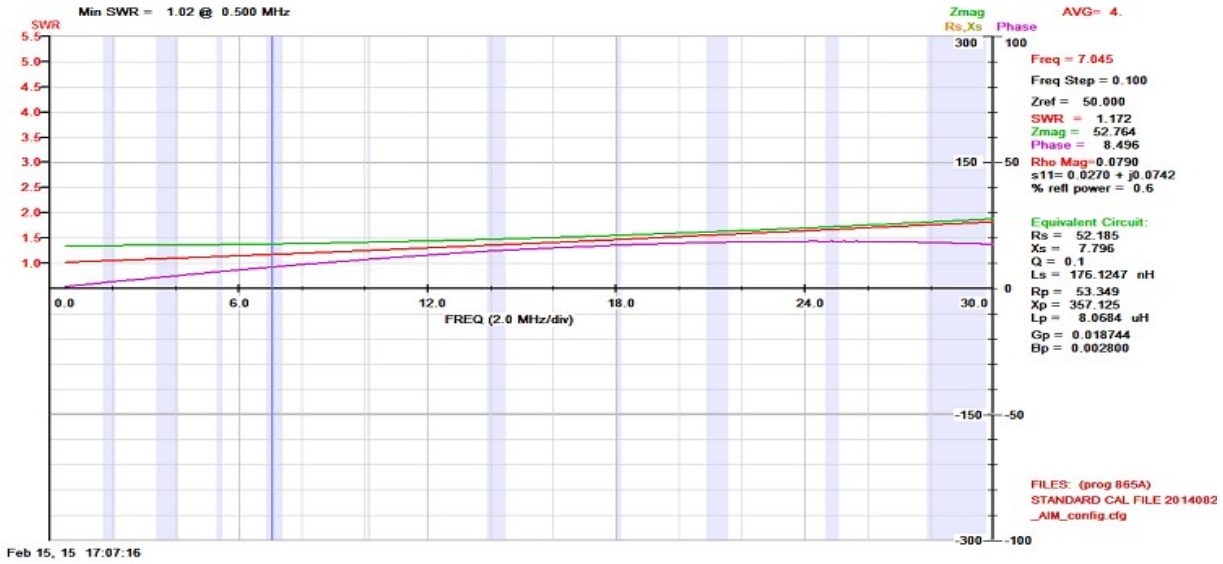

Figure 4 AIM 4170C antenna analyzer plot viewing a 50ohm resistive load through the Guanella current balun. Note the 50ohm resistor appears as 50ohms due to the 1:1 balun ratio resulting in an ideal SWR of 1:1.This plot shows an SWR of almost exactly 1:1 with no reactance at a frequency of 500kHz with consistent rise in SWR throughout the HF spectrum to an SWR of approximately 1.8:1 and some inductive reactance at 30MHz.

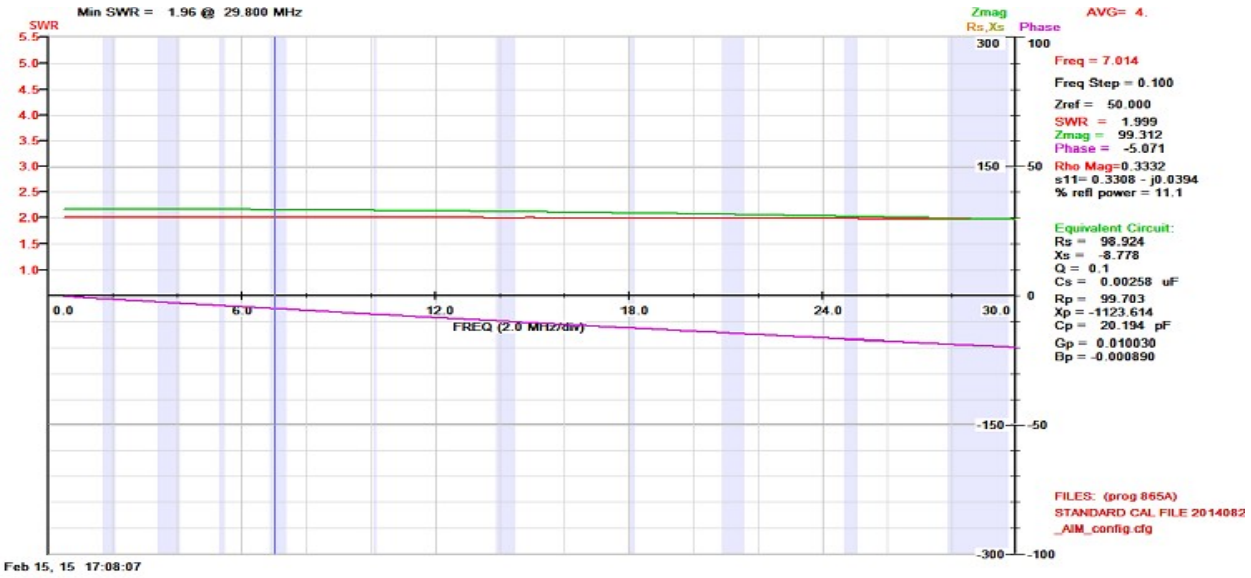

Figure 5 AIM 4170C antenna analyzer plot viewing a 100ohm resistive load through the Guanella current balun. Note the 100ohm resistor appears as 100ohms due to the 1:1 balun ratio resulting in an ideal SWR of 2:1. This

plot shows an SWR of approximately 2:1 from 500kHz through to 30MHz and with modest capacitive reactance towards the upper frequencies.

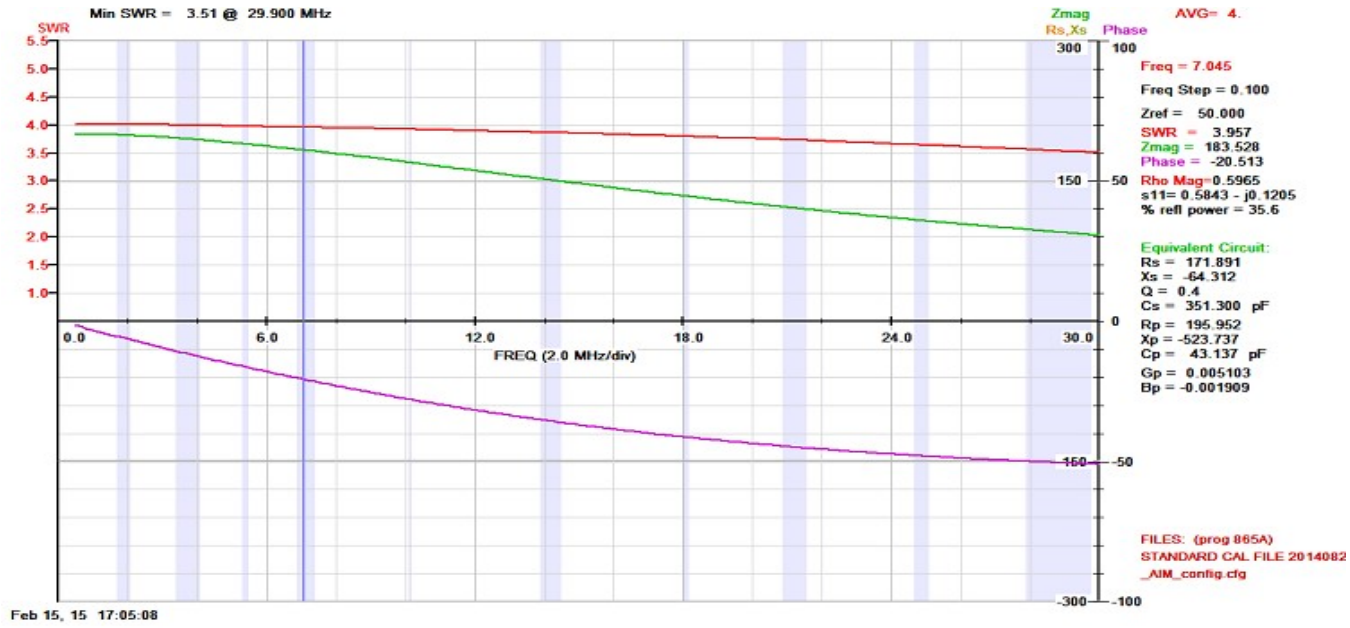

Figure 6 AIM 4170C antenna analyzer plot viewing a 200ohm resistive load through the Guanella current balun. Note the 200ohm resistor appears as 200ohms due to the 1:1 balun ratio resulting in an ideal SWR of 4:1.This plot shows an SWR of approximately 4:1 at 500kHz dropping to approximately 2:1 at 30MHz and with significant capacitive reactance towards the mid and upper frequencies.

AIM 4170C antenna analyzer explanation;

SWR	Standing Wave Ratio.
Zmag	Total Impedance.
Rs	Resistive component of the total impedance
Theta	Phase angle between voltage and current. + indicates inductive reactance while – indicates capacitive reactance.

Also see other baluns and ununs:

BALUN 1:1 CHOKE & 1:4 BALUN HF ladder feed-line to coaxial cable combination choke and 1:4 balun. (0.1MHz - 30MHz).

BALUN 1:1 CHOKING Choking balun for lower HF and MF bands. (200kHz - 10MHz).

CHOKING 1:1 BALUN - HF BANDS Reisert choking balun. (1.0MHz - 30MHz). FT240-43 Ferrite Toroid Core.

CHOKING 1:1 BALUN - HF BANDS Reisert choking balun (1.5MHz - 30MHz). FT140-43 Ferrite Toroid Core.

CHOKING 1:1 BALUN - LOW VHF BAND Choking balun. (10MHz - 60MHz). FT140-43 Ferrite Toroid Core.

BALUN 1:1 CURRENT 1:1 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).

BALUN 1:4 CURRENT 1:4 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).

BALUN 1:4 SINGLE CORE CURRENT 1:4 Guanella Current Balun, single FT240-43 ferrite toroid cores. (0.3MHz - 30MHz).

BALUN 1:1 VOLTAGE 1:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).

BALUN 4:1 VOLTAGE 4:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).

BALUN 6:1 VOLTAGE - VERSION 1 6:1 Voltage balun using a L15 ferrite toroid core (1.8 - 30MHz).

BALUN 6:1 VOLTAGE - VERSION 2 6:1 Voltage balun using a FT140-43 Ferrite Toroid Core (1.8 - 30MHz)

BALUN 9:1 VOLTAGE - VERSION 1 9:1 Voltage balun using a L15 ferrite toroid core (1.8 - 30MHz).

BALUN 9:1 VOLTAGE - VERSION 2 9:1 Voltage balun using a FT140-43 Ferrite Toroid Core (0.5 - 60MHz).

UNUN 9:1 VOLTAGE 9:1 voltage unun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).

UNUN 9:1 VOLTAGE VERSION 2 9:1 voltage unun using a L15 ferrite core (1.8 - 30MHz).

UNUN 9:1 VOLTAGE VERSION 3 9:1 voltage unun using a FT140-43 ferrite core (0.5 – 60MHz).

Page last revised 02 January 2022

GARS Officers: (Board of Directors)

President ..... Michael A. Ellithorp, KF6OBI
Vice President ..... Bob Wirth, KC6UIS
Secretary ..... Jeramie Finch, W6LAD
Treasurer ..... Phil Zabell, KI6SMN
Past President .....
Board ..... Ryan Elliott, AG6VA
Board ..... Mike "Smitty" Smith, WB1G
Training ..... Vacant
Publications ..... Vacant
Webmaster / Social Media — Mike "Smitty" Smith, WB1G
Radio Officer ..... Phil Zabell, KI6SMN
Emcomm Officer ..... Vacant

Board Meeting, 2nd Friday of each month, meetings starting at 6:30 PM
General Membership Meeting, 2nd Friday of each month, meetings starting at 7:00 PM

GARS Meeting locations: Main site is the Lutheran Fellowship Hall, 565 Main Street, Artois CA, our alternate meeting site is the Willows Seventh-Day Adventist Church, 543 1st Avenue, Willows, CA.

GARS Net: Mondays, 8:00 PM Primary until further notice; see the GARS website at https://www.garshamradio.org/ **Secondary:147.105 (N6YCK) (+)110.9 PL)**

GEARS Club Net: Tuesday, 7:30 PM 146.850 MHz-PL 110.9

Sacramento Valley Traffic Net: Nightly 9:00 PM 146.850 MHz-PL 110.9

ARES Nets:
Butte Mondays 20:00 146.850 MHz-PL 110.9
Yuba Sutter Thursdays 19:00 146.085+MHz PL 127.3

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Editor ……..…….. Michael A. Ellithorp, KF6OBI **Distribution—via email—monthly**