



# Linear Lines

Trident Amateur Radio Club (TARC) Newsletter  
May 2014

## TARC Nets:

Every Tuesday, 147.27 MHz PL 123.0

- 7:30 PM CW practice
- 8:00 PM Net

## Upcoming Events:

- May 19 Club Meeting  
May 21 License Exam session  
**Contact:** Robert AE4RJ  
May 22 Dinner Group  
**RSVP:** Ron K4TCP  
May 25 Fox Hunt!  
Jun 2 Board Meeting (all welcome)  
Jun 7-8 Museum Ships Weekend  
**Contact:** Tom AJ4UQ  
Jun 16 Club Meeting



*Is the radio gear just an excuse to hang around with friends? That's one of the mysteries of the ages. This scene from the recent TAILGATE event makes it pretty hard to tell. Plenty of friendly folk, and maaaybe a radio here or there. One thing for sure, the decision to hold out for better weather paid off!*

## Woody Ebersold AC2AQ (SK)

We mourn the passing of our member Woody Ebersold. Our thoughts and prayers go out to Woody and his family. May he rest in peace.

## ARTSAT1:INVADER Satellite Gets OSCAR Number

The ARTSAT1:INVADER satellite (call sign JQ1ZKK) has been designated CubeSat OSCAR-77 or CO-77, according to Bill Tynan, W3XO, AMSAT-NA OSCAR Number Administrator. **INVADER**, a 1U CubeSat launched February 27, is an "Art Satellite" developed by students at Japan's Tama Art University as a part of the "ARTSAT: Art and Satellite Project," which aims at practical uses of a satellite for art and design. It carries a CW beacon on 437.325 MHz, a 1200 bps FM AX.25 Packet Radio and FM Digitalker on 437.200 MHz and a low-resolution camera. -- Thanks to AMSAT, ARTSAT Project

## From The President

Well, the weather is getting warmer so lots of antenna work going on. If you want to build an antenna, either HF or VHF, let me know and we can set up a time to build it at the house. We have everything you need available at the **Builders Group** to build most antennas.

The next **club meeting** is Monday the 19th at 7:30 PM at the Red Cross headquarters in North Charleston. The next **dinner meeting** is Thursday the 22nd at 6:30 PM at the Cracker Barrel in Summerville. Then the **Fox Hunt** is on Sunday the 25th with a new Fox in Tommy AA4TB.

If you can, try checking into the **Tuesday CW net** at 7:30PM or the **Tuesday Voice net** at 8:00PM on the club repeaters.

So lots of activities to keep you radio active. All information on upcoming activities available at [tridenthams.org](http://tridenthams.org)

*Ham Radio is a contact sport so make one today.*  
Tom Lufkin, W4DAX

## From the VP shack

### Field Day 2014 is approaching fast!

Field Day is June 28-29, 2014, the last full weekend of June. The signup sheets will be published shortly for setup help and an operator schedule. Please check your calendars and volunteer to help with setup/tear and/or operate for one of the 1-hour time slots. We need to blow away last year's score. Let's try for #1 in the state for 2A! Stay tuned!  
73 Steve KE4THX

## Treasurer Speaks

The treasury is solvent for the club and our membership continues to grow. This is a sign of a healthy club. I was listening to stations in Rock Hill this weekend on the statewide repeater link up. They were conducting a foxhunt. It seems that we are not the only ones doing foxhunts. Speaking of foxhunting, our foxhunt is coming up on Sunday the 25th of May. As always, the start time is 1pm at the same location we have been using. I will be there to get your mileage. Complete details on our website. What is new is that we have a new Fox. Tommy Billings AA4TB has agreed to be the fox and promises us that he will be hard to find. As usual, we will have some hotdogs after the hunt.

This month we will also have another dinner get together. These have proved to be very popular with the club, and everyone has been looking forward to them. Date is the 22nd, time is 6:30pm at the Summerville Cracker Barrell. Ron K4TCP will be the host, **RSVP to him please**, at ron.davis@gmx.us. Thelma will be on vacation for two weeks visiting her Aunt in Texas, so your email from me will have to do for the meeting this month. I plan to be at all club activities this month and hope to see you there. Bob NG4R

## Pop Quiz !!

How long does it take charged particles from Coronal Mass Ejections to affect radio-wave propagation on the Earth?

- 4 to 8 minutes
- 20 to 40 hours
- 14 days
- 28 days
- Please, there are children present!

## VE Exams

Once again the Low Country VE Team had an eventful test session. Ten candidates attempted to gain new licenses or upgrade their current tickets. There were eight elements passed, five failed (Some testers attempted more than one element.) The grand result was seven new techs and a new general class.

Congratulations to our successful candidates. We are looking forward to catching you on the TARC Net on Tuesday evenings at 8:00 P.M.

VE exams are given each month at the Masonic Lodge on St James Ave. The next exams are on the 21<sup>st</sup> of May. For more information see tridenthams.org

## The Tale of the Gate

The 8<sup>th</sup> Annual **TARC Tailgate Party** was held on 26 April 2014 at the Goose Creek Masonic Lodge #401. Due to "very wet" weather the event was rescheduled from the original 19 April 2014 date. The weather was very kind this time, and a great time was had by all. The Goose Creek Masonic Lodge started off with a breakfast fundraiser at 0800 and the TARC Tailgate followed at 0900. We would like to have more sellers next year, and now that the Masonic Lodge is the new established location for this event, this should be obtainable. Much rag chewing was accomplished along with sales (Bob NG4R got rid of his beam antenna and even provided delivery). The ARRL gift certificates were given away with Tom W4DAX winning the grand prize, \$50 gift certificate, for the second time in a row! More pics can be found on the TARC website and Facebook page.

Thanks everyone for coming out!

Vaughn Duryea KJ4ZFY  
TARC Tailgate Party Chairman



**May Birthdays: Tom Lufkin and Michelle Mantooth – Happy Birthday!**

*Want to see something in Linear Lines?*

If there's something you want to see in Linear Lines, please send it to Robert KV4LV <kv4lv@arrl.net> by the second Monday of the month.

## Build this.....

### Breadboard Power Supply

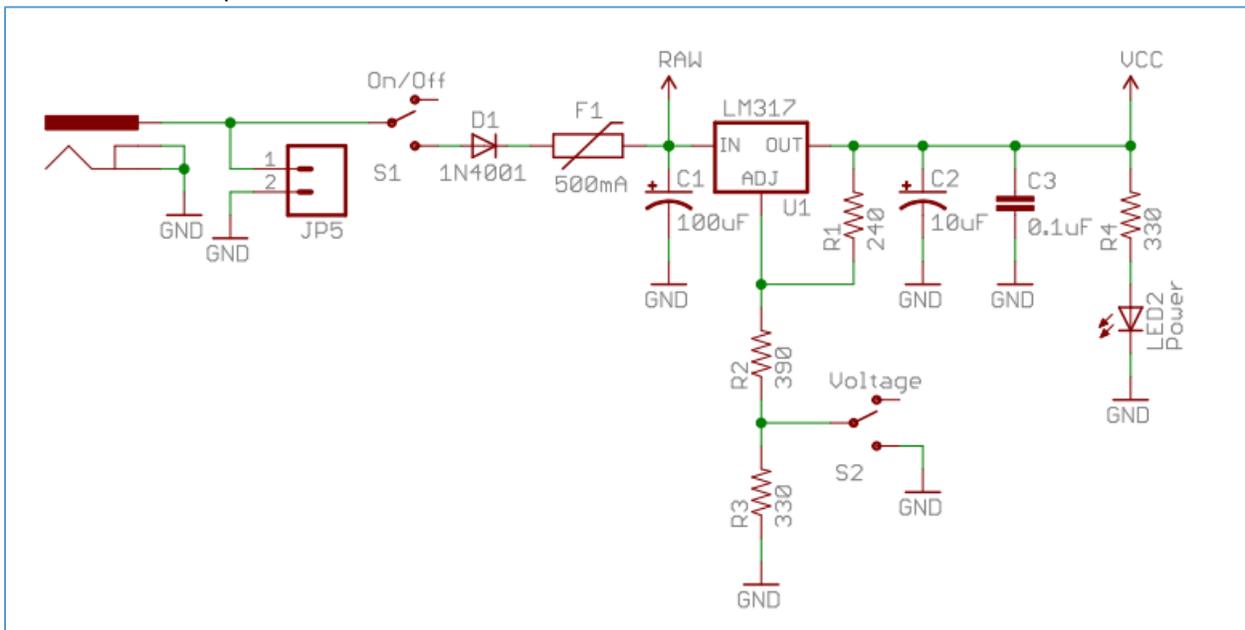
By Ron Davis – K4TCP  
5/10/2014

Here is an easy to build power supply that will plug into the power rails of your breadboard. Several on-line sources have these for sale but why not build one instead?

The power supply uses an LM317 variable voltage regulator to drop the voltage down to 5v or 3.3v. This is switch or jumper selectable depending on how you want to do it. Building your own puts you in charge to decide how the project will work!

The LM317 uses a resistor voltage divider to control the voltage regulator and determine the output voltage. If you have been following my articles, last month the Gell Cell battery charger used a similar circuit.

Here is the schematic and parts list:



- DC Barrel Connector (2.1mm)
- DC Wallwart powersupply 9v (center positive)
- TO-220 Voltage Regulator (LM317 1.5A max current)
- D1 1N4004 Reverse Protection Diode or equiv
- C1 100uF 25V Capacitor Electrolytic
- C2 10uF 25V Capacitor Electrolytic
- C3 0.1uF 50V Capacitor
- Red Power LED - High Brightness
- S1 and S2 - 2 x SPDT Slide Switch
- 4 x 0.1" Header Pins
- R3 and R4 - 2 x 330 Resistor 1/6W
- R2 390 Resistor 1/6W
- R1 240 Resistor 1/6W
- Protoboard
- F1 PTC resettable fuse

### ***How it works:***

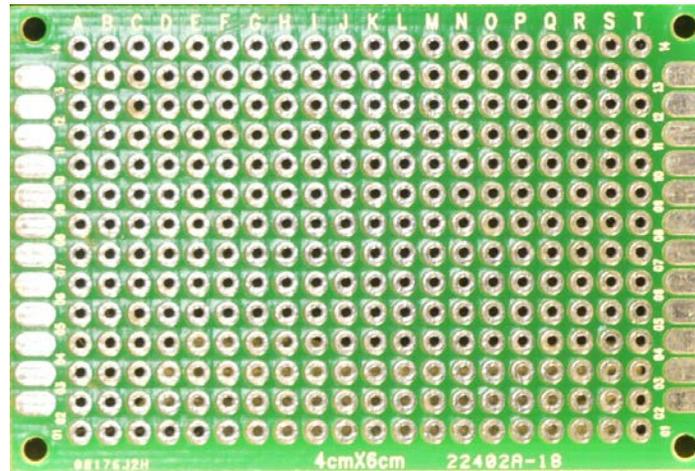
The LM317 voltage regulator will provide a constant and regulated 5v or 3.3v based on the resistor network (R1, R2 and R3). R3 is switched in or out of the circuit to provide either the 5v or 3.3v. D1 provides reverse polarity protection should you connect a wall wart that has the negative conductor on the center. The diode will not let current flow in the wrong direction. The capacitors C1, C2 and C3 provide filtering and decoupling. F1 is optional but recommended. JP5 is shown on the schematic and is there if you'd like to add or wire in a connector for a 9V battery. If you do this then do not plug in a wall wart. The connection labeled "raw" is a good test point to use with your DVM. You should read about 9v DC between here and ground. If you haven't figured it out already on a schematic like the one above you will see several points labeled GND. These are all tied together and are the ground for the circuit. In other schematics you will likely see similar connections for VCC and other signal lines, this just means they are tied together in the circuit but drawn this way to simplify the circuit diagram.

### ***Substitutions:***

**C1** and **C2** can be substituted for larger values as long as the voltage rating is 25v or higher. **D1** can be substituted with anything in the rectifier family 1N4001 to 1N4007 ([datasheet here](#)) as long as it is rated at handling 1A or higher. Feel free to substitute a jumper (0.1 headers with a shorting block) for the switches or eliminate the on-off switch. The LED can be anything you want, just be sure the resistor in series with it provides enough voltage drop. A 330 ohm or higher will usually work fine. ([see this link for a LED datasheet tutorial](#))

Note: **R1**, **R2** and **R3** provide the voltage divider network so their values are more critical. I would use these exact values.

The protoboard can be anything you have laying around. I would suggest a PTH (plated thru hole) board with solder pads on both sides about 2" by 1". This is the perfect width to fit across most breadboards. Here is a pic of the protoboard:



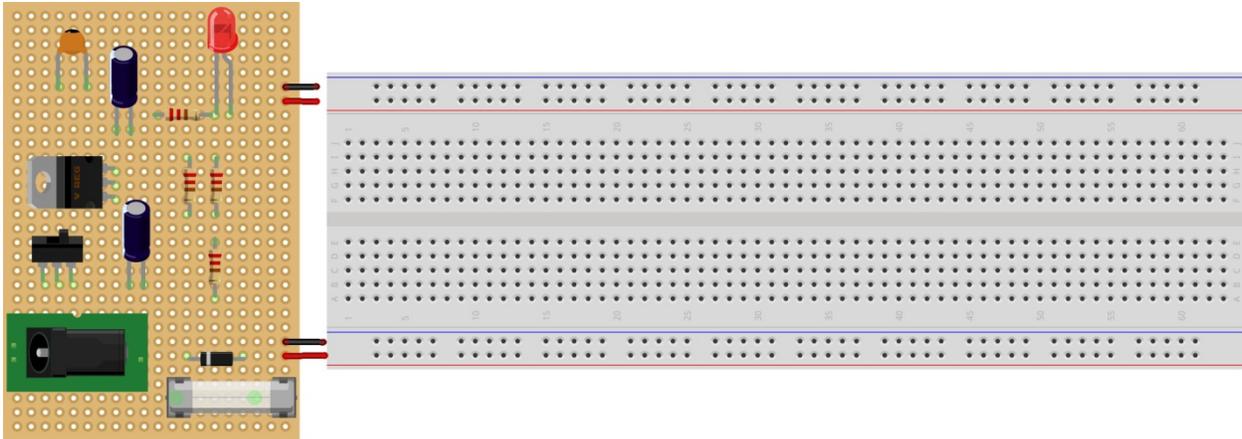
### ***Assembly:***

The components can be soldered into the protoboard and then wired together either with individual jumper wires or by bending the components leads and soldering them to the correct component to create the circuit connection. Use your imagination here. A technique I use is to print the schematic diagram and place it next to the protoboard. Insert the components into the board without soldering them. This is a dry run. Then adjust the location or placement of the leads (legs) of the components so that they align with the schematic and provide the least amount of soldering or wiring. This makes for an easier to follow parts placement and makes troubleshooting much easier.

The VCC line on the schematic will be your positive lead to the breadboard. The GND line on the schematic will be the ground for the breadboard.

Insert the 0.1 header pins into the protoboard so that they align with the power rails on the breadboard. Solder these to the protoboard and make a note of which is positive and negative by writing on the underside of the board with a sharpie. This will help when you have the board flipped over and are soldering in the other components. Another tip, use 2-4 pins for each rail connection, this gives the board better stability when it plugs into the breadboard.

Once everything is soldered in place double check your wiring against the schematic. Be sure your capacitors (C1 and C2), diode(D1) and LED are in the proper orientation. These devices are polarized meaning they must go in the circuit in a specific direction. Please see the datasheet for each device if there is any question. Use your DVM to verify the output voltages. Voltage between VCC and GND should be either 5v or 3.3v depending on S2 position. Your finished product will look similar to this:



fritzing

*Here are the datasheets for some of the components used above:*

LM317 [Datasheet](#)

<http://www.st.com/web/en/resource/technical/document/datasheet/CD00000455.pdf>

1N1004 – 1N1007 [Datasheet](#)

<http://www.diodes.com/datasheets/ds28002.pdf>

Great article from Adafruit on LED current limiting [Here](#)

<https://learn.adafruit.com/all-about-leds/forward-voltage-and-kvl>

For questions, comments or part sources feel free to contact me.

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