



# THE VALLEY HAM NEWS

"The Voice of Yuba Sutter Amateur Radio Club"

A California Non-Profit Organization

April 2012



## Local Hams Support Our Community

For many years, the Yuba Sutter Amateur Radio Club have supported several events in our local community by providing emergency communications.

Two of these events are the "MS Walk" and the "Bike Around The Buttes", (an event that supports the Yuba-Sutter Children's Type 1 Diabetes Support Group & Resource Center.)

Both of these events will take place on Saturday, April 21, 2012. The MS Walk, which generates funds for the MS Society for research to eradicate MS, will start at Sam Brannon Park on Gray Ave. in Yuba City at 9am. Lonnie, KI6ZYY, is the comm. organizer for this event. [Email](#) him if you would like to participate with communications. The event should only last a few hours.

The Bike Around The Buttes event starts in Sutter, CA at 7am. All radio volunteers are going to meet in front of Net Control (Russell's Big Silver Portable Ham Shack - the Airstream) at 6:45am for a pre-event briefing before

heading out to the volunteer areas. There are 3 bike ride routes - the 17 mile, the 40 mile 'classic', and the 100 mile course. The two volunteer groups are the Rest Stop volunteers and the "SAG" volunteers. Rest Stop volunteers stay at each of the rest stops and provide radio communications at a static location. The SAG's (Supply and Gear) rove a pre-determined area of the

course and supply a way to bring in broken down bikes and tired riders, etc. The event usually lasts until 4-5pm, so this event takes up

most of the day. Some of us have been volunteering for this event for over 20 years now. Also, they provide a great lunch for the volunteers! We still have a few positions open for volunteers. If you would like to help out, please [email Russell, KB6YAF](#), the club contact for this event. Be sure to check out the new [map](#) for the bike ride and all of the more detailed descriptions of the volunteer areas at [www.ysarc.org](http://www.ysarc.org)



### YSARC

PO Box 1169, Yuba City, CA 95992

#### President

Lonnie Moore, KI6ZYY

#### Vice President

Andy Boone, KJ6IYM

#### Secretary

Larry Witcher, KE6LAW

#### Treasurer

Clara Ansley, N6VRH

#### Board Members

Herb Puckett, W6HBU

Mike Eby, KM6EBY

Lee Sheffield, KC6MCI

Marsha Sylvester-Jose, KI6CSN

Allen Hill, W6WPF

Jeremiah De La Ossa, W6DLO

#### VHN Editor and

#### Webmaster

Russell Decker, KB6YAF

#### Repeater Trustee

Dave Gartner, WD6AXM

### MONTHLY ACTIVITIES

1st Wednesday: Club Meeting  
3rd Wednesday: Board Meeting

**(Check the minutes for details on the Club and Board Meetings)**

*All newsletter submissions are due on or before the 4th Wednesday of the month*

### UPCOMING EVENTS

Apr. 4th - Wed. @5:30pm - **YSARC Dinner & Meeting at The 2 Bits Café Yuba City, CA**

Apr. 18th - Wed. @7pm **YSARC Board Meeting - Herb's QTH**

Apr. 21st - Sat. **MS Walk - Yuba City, CA  
Bike Around The Buttes - Sutter, CA**

### CLUB ACTIVITIES

Monday Night Net - (7 PM) - Weekly net w/swap shop  
(146.085 + PL 127.3)

Monday Night Net - (8 PM) - Butte Co. ARES Net  
(146.850 - PL 110.0)

Tuesday Night Net - (7 PM) - YSARC ARES Net  
(146.085 + PL 127.3)

2nd Wednesday - (7 PM) - ARRL Sac Valley Net

## A “SHORT” QSO FROM LONNIE, KI6ZYY...

There are many ways we as hams can get involved in the community. Many of us help with the MS Walk and Bike Around The Buttes in April each year. Others help with the Veteran’s Parade in Marysville each November. We get to make an annual presentation to a local Boy Scout troop with the help of Bill Duncan WA6OHP. Several members have put on training programs in years past to help new people join our ranks as hams. On March 10<sup>th</sup>, we completed our first Ham Cram/Review, giving one more opportunity for us to come together as a club to provide a service to the community. The following is a report to Ron Murdock for inclusion in his monthly newsletter:



The Yuba Sutter Amateur Radio Club held it’s first Ham Cram/Review. President Lonnie Moore KI6ZYY prepared study materials for participants well in advance of the event and reviewed that material with 5 candidates March 10, 2012. Lee Sheffield KC6MCI and his VE team provided a test session after the candidate’s 4.25 hour review session. Three candidates came away with certificates of successful completion for element 2.

The club and it’s members provided protein rich snacks for the candidates as well as a nice hamburger luncheon for them and the VE team. Big thanks to Lee KC6MCI and his VE team for their patience. This was a first for most of us and a learning experience. Big thanks to Marilyn Meadows for bringing her projector and laptop as back up and for bringing a nice pasta salad and a cake for the lunch. We ended up using her projector and laptop for the duration. Big thanks to Allen Hill W6WPF for cooking the burgers. Big thanks to Ramona for making and preparing the snacks for the candidates. A box of donuts would have been easy, but we felt healthy protein rich brain friendly snacks would help the candidates succeed. Big thanks to Meg Burgin KI6TLS as well for suggesting these snacks.

This event proved to be a success in several ways. We got the three successful candidates on the air with Lonnie’s (KI6ZYY) mobile station at the conclusion of the VE session. Two of them live in the Yuba City area and have been heard on the WD6AXM repeater. They are moving forward in the hobby. 25 participants, including candidates, VE team, instructor and those helping prepare the luncheon enjoyed the food and each other’s company. More importantly, we came together as a group of hams to help others join our ranks and had a good time doing it.

Submitted by Lonnie KI6ZYY

# LARRY'S MINUTES



## YSARC Board of Directors - Meeting Minutes of March 21, 2012

A regular Board of Directors meeting of the Yuba Sutter Amateur Radio Club was held at the QTH of Herb Puckett (W6HBU). The meeting was called to order by President Lonnie Moore (KI6ZYY) at 1900-hours. President Lonnie Moore (KI6ZYY) led the Pledge of Allegiance.

Officers present were: President Lonnie Moore (KI6ZYY), Secretary Larry Witcher (KE6LAW) and Treasurer Clara Ansley (N6VRH). Vice President, Andy Boone (KJ6IYM) was absent.

Board Members present: Lee Sheffield (KC6MCI), Mike Eby (KM6EBY), Marsha Sylvester-Jose (KI6CSN). And Herb Puckett (W6HBU). Allen Hill (W6WPF), Jeremiah DeLaOssa (W6DLO) and Dave Gartner (WD6AXM) were absent.

Guests introduced were: Ramona Traub, Bob McClard (N6BOB) arrived late..

Officers Reports: Minutes of the previous meeting were approved as read by Secretary Larry Witcher (KE6LAW). The Treasurer's Report was approved as read by Clara Ansley (N6VRH). Treasurer Ansley submitted bills for payment, and it was approved for payment.

Under Old Business: The tax exempt status of the club was discussed, and Secretary Larry Witcher (KE6LAW) needs to arrange a meeting with Russell Decker (KB6YAF) to address this issue. Treasurer Clara Ansley (N6VRH) again reported that the treasurer's part is complete.

President Lonnie Moore (KI6ZYY) informed the Board and Officer's that the next Ham Cram is to be tabled for future discussion

Changing bank's was again tabled for further study.

The donation in memoriam of Barry Barnes to Glad Tidings Children's Church has been completed by Treasurer Clara Ansley (N6VRH)..

Under New Business: The Ham Cram that was held on March 10, 2012 was a huge success. Three out of the five that took the test passed. Appreciation and was given to Stan (KJ6LVN) and Marilyn Meadows for bringing their projector and 2 side dishes to the Ham Cram. The club fed 25 people for less than \$5.00 per person.

Treasurer Clara Ansley (N6VRH) will and Secretary Larry Witcher (KE6LAW) will contact Russell Decker (KB6YAF) so the paperwork can be completed on the reinstatement of the club's non-profit status.

The previous meeting's approval to get former Secretary Meg Burgin (KI6TLS) a Ham Radio and Antenna for her motor home was rescinded by the board in accordance with Meg's request. This subject is tabled until further research can be done to give proper accolades and acknowledgement for the great selflessness Meg has given the club.

The "Bike Around The Buttes" and the "MS Walk" will be held on the same day, April 21, 2012. We still need 5 to 6 Ham's from 08:00 until about 11:00 for the MS Walk event who can then join the BATB event. Mike Eby (KM6EBY) and Shari Goforth-Eby (K6AVW) will bring Shari's VolksWagon Van to use as a base station for the MS walk.

The disposition of a tower and radio's which were donated to the club was brought to the table by President Lonnie Moore (KI6ZYY). Due to the deteriorated state of the equipment, it was voted on and decided to scrap everything donated except the duplexer cans.

The VE fund was voted on and approved to give the VE fund back to VE Liaison, Lee Sheffield (KC6MCI).

Allen Hill's (W6WPF) pursuit of setting up a Scholarship fund has been tabled for future discussion.

Researching the history and content of the club bylaws in order to consolidate and update them was discussed. It was decided by the board to be temporarily tabled. It was also brought to the boards attention by Herb Puckett (W6HBU) that this might take up to a year or longer to complete.

President Lonnie Moore (KI6ZYY) brought forth the subject of a club call sign. Possibilities of a call was put forth for anyone to take a look at the vanity call's and make suggestions. It was decided to readdress the subject at the next board meeting.

President Lonnie Moore (KI6ZYY) reported that Leroy Smith (KJ6DKM) did not have a bulb for donation to the club for the club projector. It has already been approved that a bulb be purchased from the General fund.

Hamfest and Antenna Saturday in Linda is held over until the next board meeting. President Lonnie Moore will check with Paul Johnson (N6XVL) on acquiring a location at the VFW hall in Linda.

Treasurer Clara Ansley informed the club that the club trailer license has been renewed for the amount of \$10.00, and that the license is good for five years.

The April Club meeting will be held at the Two Bits café with a power point slide show to be prepared by President Lonnie Moore (KI6ZYY).

The board felt dinner meetings & potlucks should be continued while technical presentations can take place on a Saturday rather than during monthly club meetings.

The April Board meeting will be held on April 18, 2012 at the QTH of Herb Puckett (W6HBU). Additional future activities were held until the next board meeting.

It was approved by the Board to donate \$25.00 to Butchie's Pool for their annual Easter activities .

Lonnie brought up the thought of holding several fund raisers each year. Bake sales & rummage sales are two possibilities.

Ramona Traub served cake for refreshments. The meeting was adjourned at 21:16-hours.

Respectfully submitted by Larry A. Witcher – KE6LAW, YSARC Secretary

# CLARA'S CALCULATIONS



CHECKING BALANCE: 2-15-2012: \$4,032.17

## RECEIPTS DEPOSITED:

2/22:	DUES: Paul Johnson-Gary Clark:	\$ 40.00	
	Store Sales: Larry Witcher:	20.00	60.00
2/29:	DUES: Doug Mosen:	20.00	
3/5	DUES: Kevin Culbertson KJ6TXZ	20.00	
	Store Sales:	32.00	
	VE Session: 3 Tested:	45.00	97.00
3/9	Store Sales:	42.00	
	Prizes-meeting:	40.00	82.00
3/12	VE Session: 5 Tested:	75.00	
	VE Change Cash Back:	50.00	125.00

MONTH'S TOTAL: \$ 384.00

TOTAL RECEIPTS: \$4,416.17

## EXPENSES:

2/15	1274	Larry Witcher - Secretary Supplies	\$ 65.00
2/22	1275	Church of Glad Tidings-Children's Church-Memorial to Barry Barnes:	100.00
2/29	1276	Cash - Change for VE Session:	50.00
3/3	1277	ARRL-VEC:	27.00
3/3	ATM	EI Central Café - 6 lunches-VE Team:	57.95
3/7	ATM	Walmart: HamCram Lunch supplies:	105.81
3/10	Cash	Lonnie Moore-refreshment for HamCram:	6.47
3/10	1279	Stan Meadows: plates-cups-ice for HamCram:	11.23
3/10	1280	ARRL-VEC:	40.00
3/10	1281	Larry Witcher; prizes for meeting:	55.22

TOTAL EXPENSES: \$ 523.68

CHECKING BALANCE: \$3,892.49

## LESS SPECIAL ACCOUNTS:

Repeater Fund:	\$ 650.30
VE Fund:	173.68
Drawing Fund:	409.53
Memorial Fund:	165.10
Office Supply Fund:	135.00
Prize Fund:	54.62
Store Sales Fund:	131.51

TOTAL: \$1,719.74

CLUB BALANCE \$2,172.75

SUBMITTED BY: CLARA M. ANSLEY, N6VRH, TREASURER

# MPPT Solar Panel Controllers

( *from Northern Arizona Wind & Sun Company* )

This section covers the theory and operation of "Maximum Power Point Tracking" as used in solar electric charge controllers.

A MPPT, or maximum power point tracker is an electronic DC to DC converter that optimizes the match between the solar array (PV panels), and the battery bank or utility grid. To put it simply, they convert a higher voltage DC output from solar panels (and a few wind generators) down to the lower voltage needed to charge batteries.

(These are sometimes called "power point trackers" for short - not to be confused with PANEL trackers, which are a solar panel mount that follows, or tracks, the sun).

## So what do you mean by "optimize"?

Solar cells are neat things. Unfortunately, they are not very smart. Neither are batteries - in fact batteries are downright stupid. Most PV panels are built to put out a nominal 12 volts. The catch is "nominal". In actual fact, almost all "12 volt" solar panels are designed to put out from 16 to 18 volts. The problem is that a nominal 12 volt battery is pretty close to an actual 12 volts - 10.5 to 12.7 volts, depending on state of charge. Under charge, most batteries want from around 13.2 to 14.4 volts to fully charge - quite a bit different than what most panels are designed to put out.

OK, so now we have this neat 130 watt solar panel. Catch #1 is that it is rated at 130 watts at a particular voltage and current. The Kyocera KC-130 is rated at 7.39 amps at 17.6 volts. (7.39 amps times 17.6 volts = 130 watts).

## Now the Catch 22

### Why 130 Watts does NOT equal 130 watts ..... Where did my Watts go?

So what happens when you hook up this 130 watt panel to your battery through a regular charge controller?

**Unfortunately, what happens is not 130 watts.**

Your panel puts out 7.4 amps. Your battery is setting at 12 volts under charge: 7.4 amps times 12 volts = 88.8 watts. You lost over 41 watts - but you paid for 130. That 41 watts is not going anywhere, it just is not being produced because there is a poor match between the panel and the battery. With a very low battery, say 10.5 volts, it's even worse - you could be losing as much as 35% (11 volts x 7.4 amps = 81.4 watts. You lost about 48 watts.

One solution you might think of - why not just make panels so that they put out 14 volts or so to match the battery?

Catch #22a is that the panel is rated at 130 watts at full sunlight at a particular temperature (STC - or standard test conditions). If temperature of the solar panel is high, you don't get 17.4 volts. At the temperatures seen in many hot climate areas, you might get under 16 volts. If you started with a 15 volt panel (like some of the so-called "self regulating" panels), you are in trouble, as

## MPPT Controllers - *Continued*

you won't have enough voltage to put a charge into the battery. Solar panels have to have enough leeway built in to perform under the worst of conditions. The panel will just sit there looking dumb, and your batteries will get even stupider than usual.

Nobody likes a stupid battery.

## What is maximum power point tracking?

There is some confusion about the term "tracking":

Panel tracking - this is where the panels are on a mount that follows the sun. The most common are the Zomeworks and Wattsun. These optimize output by following the sun across the sky for maximum sunlight. These typically give you about a 15% increase in winter and up to a 35% increase in summer.

This is just the opposite of the seasonal variation for MPPT controllers. Since panel temperatures are much lower in winter, they put out more power. And winter is usually when you need the most power from your solar panels due to shorter days.

Maximum Power Point Tracking is electronic tracking - usually digital. The charge controller looks at the output of the panels, and compares it to the battery voltage. It then figures out what is the best power that the panel can put out to charge the battery. It takes this and converts it to best voltage to get maximum AMPS into the battery. (Remember, it is Amps into the battery that counts). Most modern MPPT's are around 93-97% efficient in the conversion. You typically get a 20 to 45% power gain in winter and 10-15% in summer. Actual gain can vary widely depending weather, temperature, battery state of charge, and other factors.

Grid tie systems are becoming more popular as the price of solar drops and electric rates go up. There are several brands of grid-tie only (that is, no battery) inverters available. All of these have built in MPPT. Efficiency is around 94% to 97% for the MPPT conversion on those.

## How Maximum Power Point Tracking works

Here is where the optimization, or maximum power point tracking comes in. Assume your battery is low, at 12 volts. A MPPT takes that 17.6 volts at 7.4 amps and converts it down, so that what the battery gets is now 10.8 amps at 12 volts. Now you still have almost 130 watts, and everyone is happy.

Ideally, for 100% power conversion you would get around 11.3 amps at 11.5 volts, but you have to feed the battery a higher voltage to force the amps in. And this is a simplified explanation - in actual fact the output of the MPPT charge controller might vary continually to adjust for getting the maximum amps into the battery.

A MPPT tracks the maximum power point, which is going to be different from the STC (Standard Test Conditions) rating under almost all situations. Under very cold conditions a 120 watt panel is actually capable of putting over 130+ watts because the power output goes up as

## MPPT Controllers - *Continued*

panel temperature goes down - but if you don't have some way of tracking that power point, you are going to lose it. On the other hand under very hot conditions, the power drops - you lose power as the temperature goes up. That is why you get less gain in summer.

MPPT's are most effective under these conditions:

Winter, and/or cloudy or hazy days - when the extra power is needed the most.

- Cold weather - solar panels work better at cold temperatures, but without a MPPT you are losing most of that. Cold weather is most likely in winter - the time when sun hours are low and you need the power to recharge batteries the most.
- Low battery charge - the lower the state of charge in your battery, the more current a MPPT puts into them - another time when the extra power is needed the most. You can have both of these conditions at the same time.
- Long wire runs - If you are charging a 12 volt battery, and your panels are 100 feet away, the voltage drop and power loss can be considerable unless you use very large wire. That can be very expensive. But if you have four 12 volt panels wired in series for 48 volts, the power loss is much less, and the controller will convert that high voltage to 12 volts at the battery. That also means that if you have a high voltage panel setup feeding the controller, you can use much smaller wire.

Ok, so now back to the original question - What is a MPPT?

## **How a Maximum Power Point Tracker Works:**

The Power point tracker is a high frequency DC to DC converter. They take the DC input from the solar panels, change it to high frequency AC, and convert it back down to a different DC voltage and current to exactly match the panels to the batteries. MPPT's operate at very high audio frequencies, usually in the 20-80 kHz range. The advantage of high frequency circuits is that they can be designed with very high efficiency transformers and small components. The design of high frequency circuits can be very tricky because the problems with portions of the circuit "broadcasting" just like a radio transmitter and causing radio and TV interference. Noise isolation and suppression becomes very important.

There are a few non-digital (that is, linear) MPPT's charge controls around. These are much easier and cheaper to build and design than the digital ones. They do improve efficiency somewhat, but overall the efficiency can vary a lot - and we have seen a few lose their "tracking point" and actually get worse. That can happen occasionally if a cloud passed over the panel - the linear circuit searches for the next best point, but then gets too far out on the deep end to find it again when the sun comes out. Thankfully, not many of these around any more.

The power point tracker (and all DC to DC converters) operates by taking the DC input current, changing it to AC, running through a transformer (usually a toroid, a doughnut looking transformer), and then rectifying it back to DC, followed by the output regulator. In most DC to DC converters, this is strictly an electronic process - no real smarts are involved except for some regulation of the output voltage. Charge controllers for solar panels need a lot more smarts as light and temperature conditions vary continuously all day long, and battery voltage changes.



## MPPT Controllers - *Continued*

### Smart power trackers

All recent models of digital MPPT controllers available are microprocessor controlled. They know when to adjust the output that it is being sent to the battery, and they actually shut down for a few microseconds and "look" at the solar panel and battery and make any needed adjustments. Although not really new (the Australian company AERL had some as early as 1985), it has been only recently that electronic microprocessors have become cheap enough to be cost effective in smaller systems (less than 1 KW of panel). MPPT charge controls are now manufactured by several companies, such as Outback Power, Xantrex XW-SCC, Blue Sky Energy, Apollo Solar, Midnite Solar, Morningstar and a few others.

Here are some photos of MPPT Controllers:

Blue Sky Energy



OutBackPower



MidNight



Xantrex



MorningStar "TriStar"

Solar controllers are used between your solar panels and your batteries. MPPT controllers are the very best and the most efficient controllers you can use, and therefore more expensive. They typically range from \$120 - \$1200 or more depending on the voltage and amperage ratings. PWM (*Pulse-Width Modulation*) controllers are much less expensive and much less efficient. Costs of PWM controllers vary between \$30 - \$200 depending on voltage and amperage ratings.

For more details, go to: [www.solar-electric.com](http://www.solar-electric.com)

Out and About in the world of Ham Radio..



## CLUB QSL CARDS

*The Valley Ham News would like to showcase some of our club member's QSL Cards. The VHN editor is asking the membership to scan a photo of your QSL card and email it. If you don't have the capability to scan, bring one to the next meeting.*

