AARCOVER

Keeping Austin Wireless
for Over 91 Years!

Bulletin of Austin Amateur Radio Clubs **ISSN 1067-0262**

October 2011 **Issue 10-2011**

BASE STATION EMERGENCY POWER USING STORAGE BATTERIES

Lewis Thompson, W5IFQ

Load Sizing:

Putting your base station on the air during a commercial power outage can require significant energy storage capacity. The following components of a high performance SSB/digital amateur station should be considered when computing the total energy storage requirements:

1. 100 Watt HF transceiver
2. HF Pactor modem
3. Computer
4. Auto-Tuner
5. Shack lighting
6. Printer and scanner

VHF transceiver

For storage battery sizing, the DC current at 12.6 VDC for each station component is added together. The DC current for the transceiver is assumed to be its receiver current plus 10% of the transmit current. The total number of amperes is multiplied by the total hours of expected operation to obtain the required ampere-hours (AH) of stored energy. For example:

1. 100 Watt Transceiver – ICOM IC-756ProIII	3A + 2.3A	=	5.3 A
2. HF Pactor Modem – SCS PTCIIPro	0.2 A	=	0.2 A
3. Computer, Dell ATG Laptop*	2.5 A	=	2.5 A

(Continued on page 4)

Periodic Events

Sun	7:30 p.m.	Travis ARES net	147.36 MHz + (131.8)
Sun	8:00 p.m.	Travis ARES Packet	145.73 MHz -
Sun	8:00 p.m.	Williamson ARES net	146.64 MHz - (162.2)
Sun	9:00 p.m.	ARO Swapnet	146.94 MHz -
Sun	(After Swapnet)	Newsline	146.94 MHz -
Mon.	7:30 p.m.	STX ARES Net	3.873 MHz
Tues.	7:30 p.m.	Hays ARES net	444.150 + (114.8)
Tues.	8:00 p.m.	Bastrop ARES Net	443.750 + (114.8)
Wed	11:30 a.m.	Ham Social Luncheon, Jim's	146.94 MHz -
Thu	9:00 p.m.	2m SSB Net	144.250 (USB)
Thu	11:00 a.m.	Lunch, Pokey Joe's 183&Great Hills	444.1 MHz+
Fri	8:00 p.m.	6m SSB Net	50.230(texasvhf.org/)
Sat	7:00 - 8:30a.m.	Breakfast @ Waterloo Ice House	444.1 MHz +
Sat	9:00 a.m.	Chapter 67 QCWA QSO Net.	3.920 MHz LSB
Daily	6:30 p.m.	Central Texas Traffic Net	147.14MHz+

In This Issue

Ham Radio Exams Results

The following are the results of the ARRL VE Test Session held on September 3rd at Bethany United Methodist Church :

Technician Class Licenses Processed

Rebekkah Adams KF5MPX
James R. Crocker KF5MPU
Robert J. Johnson KF5MPY
Chris W. Cottingham KF5MPW
Devon K. Humphrey KF5MPV
Brad A. Medford KF5MPT

General Class Licenses Processed

Earl K. Finch KF5MBR
Terry L. Standefer KF5MPZ
Clyde D. Lawson, Jr. KK4DZR

Examiners Participating in this Test Session

Milt Cram W8NUE
Larry Gunter WB5BEK
Joe Makeever W5HS
Mark Esslinger W5MAE
Bruce Harrell KJ5LW
Donald Sitze AF6VA

Next ARRL VE Test Sessions

October 8th - Bethany United Methodist Church, Disciple Bldg. Room 206
November 5th - Bethany United Methodist Church, Disciple Bldg. Room 206

TNX ES 73 DE W5HS
Joe

9-17-2011

The South Austin W5YI VE team heartily congratulates all of the following people who earned new or upgraded amateur radio licenses at our September 17th session:

Extra Class – (none)

General Class –

Bruce D. Usher –new-

Technician Class - (new)

Edward C. Fay
Jonathan D. Morris

Our administering volunteer examiners were:

Craig Bean, AC5KW
Jim Greenwood, AB5EK
Tony Lyon, KJ5XF
Wally Marusa, K5WLY
Gary Popp, AE5JR

Our next two amateur radio exam sessions will start at
2 PM on October 15th and November 19th in
room 118 of Fleck Hall on the campus of St. Edward's University.
All sessions are walk-in and the exam fee is $14.

For additional information regarding our amateur radio examination sessions,
please contact Jim, AB5EK at (512) 327-6184 or by e-mail to
hamradioexams@hotmail.com or visit our web page at
hamradioexams@hotmail.com or visit our web page at http://texashams.org/w5yi-austin/

Austin Amateur Radio Club, Inc., PO BOX 4739, AUSTIN TX 78765-4739, Web site: http://www.austinhams.org

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TC ARES PIO	Steven Polunsky	W5SMP		tcares-pio@ gmail.net

Please contact a club officer, attend a meeting, mail us to join the organization, you can also join or renew online.
The Austin Amateur Radio Club, Inc. (AARC) has annual membership dues of $20.00 per person or $30.00 per family. AARC maintains the following repeaters:

FREQUENCY	AUTOPATCH	USE
146.780	No	
146.880	Yes	General
146.940 107.2 PL Tone	No	Most popular, WX, Swapnet & Newsline
224.800	No	
444.100	No	
444.650 +5	No	70cm D-Star Repeater [W5KA]
146.480/+1.0	No	2m D-Star Repeater [W5KA C]
1293.200/-20	No	23cm D-Star Repeater[W5KA A]
1248.200	No	23cm D-Star DD (data, simplex/reversible) [W5KA A]

Persons using the repeaters are asked to join the club to help support these valuable resources. To use the autopatch, announce your call sign, press * and dial the phone number then release the PTT. When finished, press # to hang up the phone. Dial 911 (no * needed) for emergency services.

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For Changes in your ADDRESS, PHONE NUMBER or CALL SIGN:
See Jay Hoffman, KA5OST (512) 388-4404 ka5ost@arrl.net
Jay handles all changes for membership information .

Over the WWWaves…

A Collection of Various Websites sent in your friendly neighborhood hams…

TECHNIQUE OF HAND SENDING
http://www.archive.org/details/gov.dod.dimoc.23735
Scott W5ESE

Here is yet another ingenious idea that involves recycling what you likely already have, compliments of Make magazine. http://blog.makezine.com/archive/2011/06/bag-closure-power-strip-organization-hack.html
They use it for power strip identification, but it should work just as well, especially for the RG-58/8x/mini8 co-ax family. They also have posted an ingenious way to keep your cords from dropping off the back of the table when you unplug them.
http://blog.makezine.com/archive/2010/03/binder-clips-as-cable-organizers.html
Forwarded by Stuart Rohre, K5KVH

4. Auto-Tuner – SGC SG-235	0.7 A	=	0.7 A	
5. Coleman camp lantern 5327-750	0.5 A	=	0.5 A	
6. Printer Canon PIXMA 90* (standby current)	0.3 A	=	0.3 A	
7. VHF Transceiver ICOM IC-2720		1.2 A + 1.2A	=	2.4 A
		Total	=	11.9 A

Note: *Special mobile switching power supplies. Current measured with amp meter.

For 24 hours of total operation, the required AH is as follows:

24 hours x 11.9 Amperes = 285.6 Ampere-Hours

After generating your own ampere hour consumption table, it will become pretty obvious how to reduce power consumption by selectively turning off components when not in use.

Battery Storage:

Batteries do not store electrical energy. They use chemical processes to produce electricity. These chemical processes are either one shot, Primary, or Rechargeable. Further, these chemical processes are temperature, discharge current and cycle count dependent. Rechargeable batteries include Nickel Cadmium (NiCd), Nickel Metal Hydride (NiMH), Lithium-Ion (Li-Ion) and Lead-Acid. The energy density of these batteries and that of several liquid fuels is shown below:

Diesel fuel	-	12,700 Wh/Kg
Gasoline	-	12,200 Wh/Kg
Li-Ion	-	150 Wh/Kg
NiMH	-	100 Wh/Kg
NiCd	-	60 Wh/Kg
Lead-Acid	-	25 Wh/Kg

The Li-Ion, NiMH and NiCd batteries are typically too expensive for large amp-hour storage requirements, so this paper will discuss only the Lead-Acid battery. After seeing the difference in energy density between liquid fuels and batteries, it is pretty obvious why generators are such an effective electrical energy source!

Lead-Acid Batteries:

Types:

Lead-Acid batteries can be divided into two categories by discharge type as follows:

1. *SLI (Starter, Lighting and Ignition)* – This type of battery has high momentary current capability, but low continuous current and is limited to 20% of capacity discharge without permanent damage.

(Continued on page 5)

TECHNICAL TOPICS AND INFORMATION

By Pete Jordahl, K5GM

Jim W6RMK reminds us of the ubiquitous and inexpensive "grounding bar" used inside a circuit breaker box. Each bar has plenty of holes with clamp screws on each one. Used with an anti-oxidation compound, these make great grounding busses for radials and ground wires.

Tim K3LR also came up with a great way to bury coax - since the let-the-yard-grow-over-it technique doesn't work well with coax. He recommends using a pressure-washer to cut the trench. It does have a little tendency to splatter but neither will it cut buried cables like a ditch-digging machine. Don't ask him how he knows this.

And as far as laying those radials...why dig when your lawn will bury the radials for you? Cut your grass very short - then within hours lay the radials by hand, held down by galvanized landscape pins (a short piece of galvanized wire bent double works just fine) and with the end of each wire wrapped around a pin pushed deep. Set the mower a bit higher for the next few cuttings. Water to keep the sod growing at a fast rate - if needed. In four weeks or so all radials will self-bury and be gone under the sod. After five years the radials are down about 6 inches - all on their own. (Thanks, Tim K3LR)
Pete Jordahl, K5GM

Deep Cycle – This battery is able to withstand discharges to 50% (SLA) or 80% (flooded cell) of capacity but typically cannot deliver engine "cranking" current. The newer SLA batteries are modifying this characteristic.
Lead-Acid batteries are further divided by construction type as follows:

1. *Flooded-cell* - The plates of the battery are submerged in the liquid electrolyte.
2. *Sealed Lead-Acid (SLA) Batteries*:

a. *Gel-cell* - A sealed lead-acid battery with a gelled electrolyte.

Absorbed Glass Mat (AGM) – A sealed lead-acid battery with the electrolyte suspended in an absorbent glass mat next to the plates.

Specifications:

Cold Cranking Amps – The number of amperes the battery can deliver at 0ºF for 30 seconds and maintain a terminal voltage of 1.2 Volts per cell or 7.2 Volts for a 12 Volt battery. This is obviously an important specification for a SLI battery.
Reserve Capacity – The amount of time a battery at 80ºF can deliver 25 Amperes
until the terminal voltage reaches 1.75 Volts per cell or 10.5 Volts for a 12 Volt battery.
Ampere Hours (C) – The storage capacity of a battery when discharged at its 20 hour rate until a terminal voltage of 10.5 volts is reached under load. Note that this capacity is a function of actual load current and temperature. The 20 hour rate is the specified ampere hour rating of the battery divided by twenty. For example, a 100 AH battery can deliver 5 amperes for 20 hours at 77ºF. A battery will have less capacity at higher discharge currents and lower temperatures and more capacity at lower discharge rates and higher temperatures. See the appendix for specifications on a typical 100 AH SLA battery.

Charging Lead-Acid Batteries:

Lead-Acid batteries can be quickly destroyed by over charging or neglecting to promptly fully recharge after a deep discharge.
Overcharging: The SLA and Gel-cell batteries have very limited capacity to withstand an overcharge. During overcharging, the water portion of the electrolyte is converted (electrolyzed) to hydrogen and oxygen and vented out of the battery. Since the trapped water cannot be replaced as in a flooded cell battery, it is lost. Special design in the SLA battery allow a limited conversion of the electrolyzed hydrogen and oxygen back to water, but this process has limited capacity.
Undercharging: A lack of a complete recharge will allow the naturally formed sulfate crystals to harden on the lead plates, effectively killing that part of the battery.
Charging procedure:

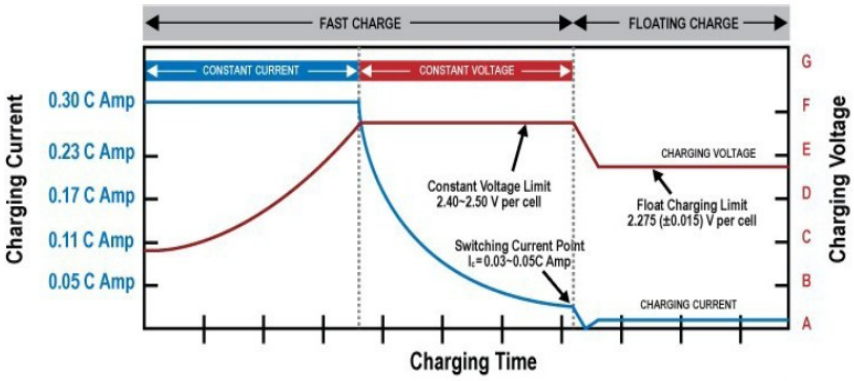
1. Initially charge at a current equal to less than C/10 unless the manufacturer recommends a higher initial rate. If the battery is fully discharged, the required recharging AH's will be about 12% more than the battery capacity. For example charge a 100 AH battery at 10 amps for 12 hours, i.e. 120 AH, or until the charge current drops to about 1 ampere.

Float the battery with a charge voltage of 13.2 to 13.65 Volts for at least 12 hours.

Best charging procedure is to use a dual rate charger that will accomplish the process automatically. Most dual-rate chargers can provide a continuous float charge on the battery after charging is complete. For example, Power Sonic™ has a family of dual rate chargers that can provide the charge profile shown below matched to the AH rating of the battery. Note that this complex charger design starts out constant-current and then switches to constant-voltage and then finally to a constant voltage float mode. The Appendix includes a recommended dual rate charger for the example Power Sonic™ 100 AH battery.

Discharge:

A 12 Volt Lead-Acid battery will have an output voltage that starts at 12.6 volts and drops as it discharges to 10.6 volts when fully discharged at the C/20 rate. To prevent damaged to a SLA battery, it should be discharged only to 50% of its capacity or to an approximate terminal voltage of 12 volts under load at the C/20 rate. For example the Power Sonic 100 AH battery will indicate its 50% capacity after 10 hours of discharge at a current of 5 amperes and will have a terminal voltage of 12.0 Volts. Note that this voltage is only true at a temperature of 68º F with a C/20 load. Most battery manufacturers can provide a "Discharge Characteristics" plot as shown on the second page of the Appendix.
The best care for a battery is to be aware of the discharge current and total time so as to not exceed the recommended 50% AH discharge. Then promptly recharge the battery fully and



CHARGING VOLTAGE AXIS			
CHARGING VOLTAGE AXIS	6V CHARGER	12V CHARGER	24V CHARGER
G	8.00	16.00	32.00
F	7.50	15.00	30.00
E	7.00	14.00	28.00
D	6.50	13.00	26.00
C	6.00	12.00	24.00
B	5.50	11.00	22.00
A	5.00	10.00	20.00

AARC Meeting Minutes: September 6, 2011

Meeting called to order: 7:01pm by President Mitch London, KD5HCV.

Meeting started with a welcome to all and a comical illustration.

We had 44 in attendance, one visitor, and one new member. One upgrade was reported.

Minutes: August's minutes approved as written in AARCOVER.

Past Events: Austin Summerfest was fun. The club gained 7 members and made ~$1000 from the ~$2000 of stuff sold for the Bixler Estate.
Upcoming Events/Announcements: SoTx SET (11/5) contact Glen Reid, K5FX. The Warrior Dash (11/19-20) will donate $1000 to the club if we provide 25 volunteers to staff one of 4 ~7hr shifts. This is not communications related, and is put on by a "for-profit" group. See their website for more info including volunteer activities. A sign-up sheet was passed around to see if there is enough interest to pursue this. Mamma Jamma Ride (10/1). Plano Balloon Fest (9/16). Belton (10/1). "Like" us on our Facebook page. Ham classes coming up and need volunteers. Wildfires are burning everywhere, so stay alert, monitor the repeaters, and see fires across the state at www.inciweb/org/maps. These items, other upcoming events, and scheduled presentations are listed in the AARC Swapnet newsletter, at www.austinhams.org, and on the Yahoo user group.

REPORTS
President/Vice-President: no reports (again).
Treasurer: highlighted last month's money in/money out and the totals for the club's & ARES's bank accounts. We are under budget for the upcoming repeater move.
Editor: It's been a long time but he loves being editor and is not giving it up. If you have anything related to the fires, please send them in.
Tech Committee: We are waiting now on the tower crew to give us directions. With the wildfires in mind, keep your important documents gathered together in a fire safe and cut back trees to help protect your property.
ARES: has not been activated due to fires, yet.
SIG/Other: The QRP group meets 2nd Saturdays. The QCWA group meets 3rd Saturdays. The editor has cleaned-up the website some and installed tracking software that can give feedback on who is looking at our website (from where and how long).
Space Wx: Recapped last month's events. The Solar Cycle is still rising and solar flux is up. There is a sunspot that could throw some flares straight at us. Sunspot detailed that produced an M-Flare today. Also, we recently had a proton event. Our geomagnetic field is relatively quiet now, but is going to get real active for a couple of days.

Old Business: none discussed this time.
New Business: Start thinking of running for an officer position. Elections are coming up in November for President, Vice-President, Secretary, and Treasurer.

Ham of the Month: Carolyn Canfield, KE5DTS.

Door Prizes: Lori Schmidt, KM5MQ – Popular Communications magazine subscription; Hugo Sanchez, N5JGX – Ear Light; Lisa Scheuplein, N1ICE – Slide Rule (GE Power Calculator).

Extra items: Stuart Rohre, K5KVH, talked about the scholarship. Joe Fisher, K5EJL, talked about the results for the LBJ Club's last competition against other school radio clubs.

Meeting Adjourned: 7:52pm.

Presentation: "Wood Carving" by Jim Roby, WA5CHF, Dottie Dunlap, & Johnny Dunlap. (All members of the Central Texas Woodcarvers Association)

maintain it on a float charge.

Battery Booster:
A typical amateur radio transceiver is designed to supply full RF transmit power with a DC supply voltage of 13.8 VDC. At 12 Volts, the output power will be approximately 87 watts. The actual output may be even lower due to voltage drops in the battery system wiring. Several manufacturers have developed switch regulators, called power boosters, that takes the variable battery voltage and boosts it to a constant 13.8 volts. These boosters can supply from 25 Amperes (MFJ-4416B) to as much as 40 amperes (N8XJK Super Booster) from a DC sources as low as 9 Volts. They can be set to lock out at an adjustable input voltage (battery protection) and have a RF detector feature that only boosts the voltage during transmit. Further both of these product lines claim 90% conversion efficiency.

Battery Testing:
The traditional way to test a Lead-Acid battery was with a Load Tester. This special purpose device placed a heavy load on the battery while measuring its terminal voltage, effectively measuring the "Cold Cranking Amps" defined above. This is not a cost effective tool for amateur radio operators unless they have a lot of rechargeable batteries.
The best test of your battery capacity is to actually run your station on the battery pack and observe the battery voltage and current under load with respect to time. Plot the time versus battery voltage and save for later reference when you repeat this test. A high tech measurement tool is now available from West Mountain Radio called the CBA III™ at http://www.westmountainradio.com/

CBA.htm and shown below:
This battery analyzer will test your battery at the 20 hour rate and provide a time versus output voltage plot. You can set an end of test voltage and the software will shut off the discharge so as to not excessive discharge your battery.

Safety:
No matter what kind of battery you are using they can be dangerous. All contain toxic materials and stored energy. Lead-Acid batteries demand the most respect. They are heavy, contain acid and can deliver very high currents that can start fires and produce serious burns. The old practice of removing your wedding ring when working around lead acid batteries is still a good rule. Documented stories tell of battery workers losing their ring finger when they accidentally got their wedding band across a Lead-Acid battery terminal pair.
A large fuse should be placed in the main current feed cable near the battery pack. The sports boating industry has a nice selection of both high current, DC, fuses and circuit breakers. For example see: http://www.westmarine.com/1/1/5369-anl-fuse-block-35-300a-loads.html and shown below:

Finally, all Lead-Acid batteries give off some gas during charging and have the potential to produce large quantities of both hydro-

gen and oxygen, so all charging should be done in a ventilated space away from open flames.

APPENDIX – SLA BATTERY EXAMPLE

POWER-SONIC®

PS-121000 12 Volt 100.0 AH

Rechargeable Sealed Lead Acid Battery
Designed for Cyclic, Standby, and Solar Applications

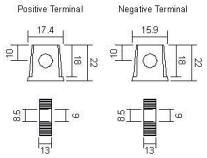
We've Got The Power.™

Features

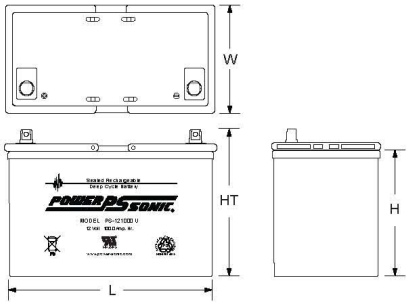
- Absorbent Glass Mat (AGM) technology for superior performance
- Valve regulated, spill proof construction allows safe operation in any position
- Power/volume ratio yielding unrivaled energy density
- Rugged impact resistant ABS case and cover (UL94-HB)
- Integrated ABS carrying handles for ease of movement
- Approved for transport by air. D.O.T., I.A.T.A., F.A.A. and C.A.B. certified
- U.L. recognized under file number MH 20845

Terminals (mm)

- U: Universal terminals: Heavy-duty posts with 'nut & bolt' fasteners



Physical Dimensions: in (mm)



L: 12.00 (305) **W:** 6.60 (168) **H:** 8.15 (207) **HT:** 8.98 (228)

Tolerances are +/- 0.04 in. (+/- 1mm) and +/- 0.08 in. (+/- 2mm) for height dimensions. All data subject to change without notice.

Performance Specifications

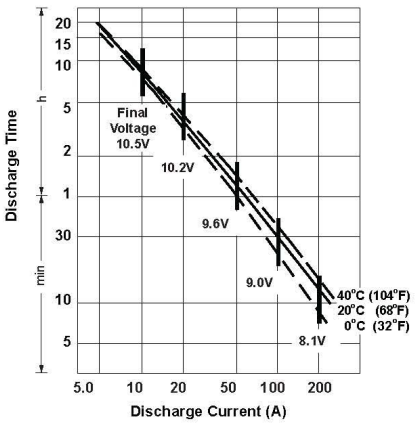
Nominal Voltage	12 volts (6 cells)
Nominal Capacity	
20-hr. (5A to 10.50 volts)	100.0 AH
10-hr. (9.2A to 10.50 volts)	92.0 AH
5-hr. (15.8A to 10.20 volts)	79.0 AH
1-hr. (55.2A to 9.00 volts)	55.2 AH
15-min. (175A to 9.00 volts)	43.8 AH
Approximate Weight	68.00 lbs. (30.84 kg)
Energy Density (20-hr. rate)	1.86 W-h/in3 (113.45 W-h/l)
Specific Energy (20-hr. rate)	17.65 W-h/lb (38.91 W-h/kg)
Internal Resistance (approx.)	5 milliohms
Max Discharge Current (7 Min.)	300.0 amperes
Max Short-Duration Discharge Current (10 Sec.)	750.0 amperes
Shelf Life (% of nominal capacity at 68°F (20°C))	
1 Month	97%
3 Months	91%
6 Months	83%
Operating Temperature Range	
Charge	-4°F (-20°C) to 122°F (50°C)
Discharge	-40°F (-40°C) to 140°F (60°C)
Case	ABS Plastic
Power-Sonic Chargers	PSC-1210000A-C

To ensure safe and efficient operation always refer to the latest edition of our Technical Manual, as published on our website.
All data subject to change without notice.

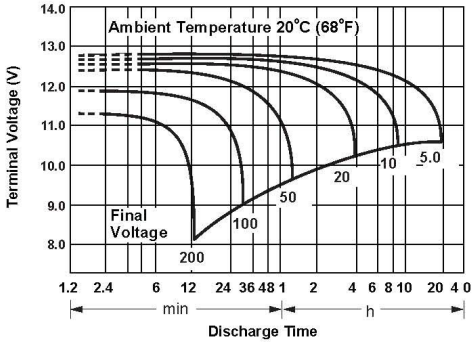
www.power-sonic.com

Constant Power Discharge Ratings								
MODEL	FINAL VOLTAGE	WATTS PER CELL @ 25° C						
		5 MIN	10 MIN	15 MIN	20 MIN	30 MIN	45 MIN	60 MIN
PS-121000	1.75	550	395	312	267	207	152	128
	1.70	586	413	324	277	212	155	129
	1.67	605	421	330	283	215	158	130

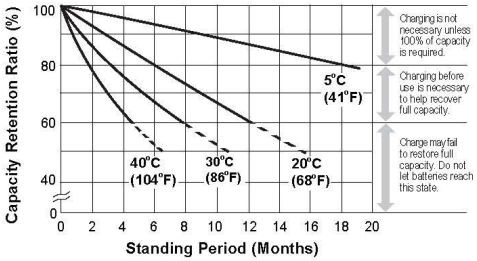
Discharge Time vs. Discharge Current



Discharge Characteristics



Shelf Life & Storage



Charging

Cycle Applications: Limit initial current to 20A. Charge until battery voltage (under charge) reaches 14.4 to 14.7 volts at 68°F (20°C). Hold at 14.4 to 14.7 volts until current drops to under 1A. Battery is fully charged under these conditions, and charger should be disconnected or switched to "float" voltage.

"Float" or "Stand-By" Service: Hold battery across constant voltage source of 13.5 to 13.8 volts continuously. When held at this voltage, the battery will seek its own current level and maintain itself in a fully charged condition.

Note: Due to the self-discharge characteristics of this type of battery, it is imperative that they be charged within 6 months of storage, otherwise permanent loss of capacity might occur as a result of sulfation.

Chargers

Power-Sonic offers a wide range of chargers suitable for batteries up to 100AH. Please refer to the Charger Selection Guide in our specification sheets for "C-Series Switch Mode Chargers" and "Transformer Type A and F Series". Please contact our Technical department for advice if you have difficulty in locating suitable models.

Further Information

Please refer to our website www.power-sonic.com for a complete range of useful downloads, such as product catalogs, material safety data sheets (MSDS), ISO certification, etc..

Contact Information www.power-sonic.com

DOMESTIC SALES	CUSTOMER SERVICE	TECHNICAL SUPPORT	INTERNATIONAL SALES
Tel: +1-619-661-2020	Tel: +1-619-661-2030	Tel: +1-619-661-2020	Tel: +1-650-364-5001
Fax: +1-619-661-3650	Fax: +1-619-661-3648	Fax: +1-619-661-3648	Fax: +1-650-366-3662
national-sales@power-sonic.com	customer-service@power-sonic.com	support@power-sonic.com	battery@power-sonic.com

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0309 1M

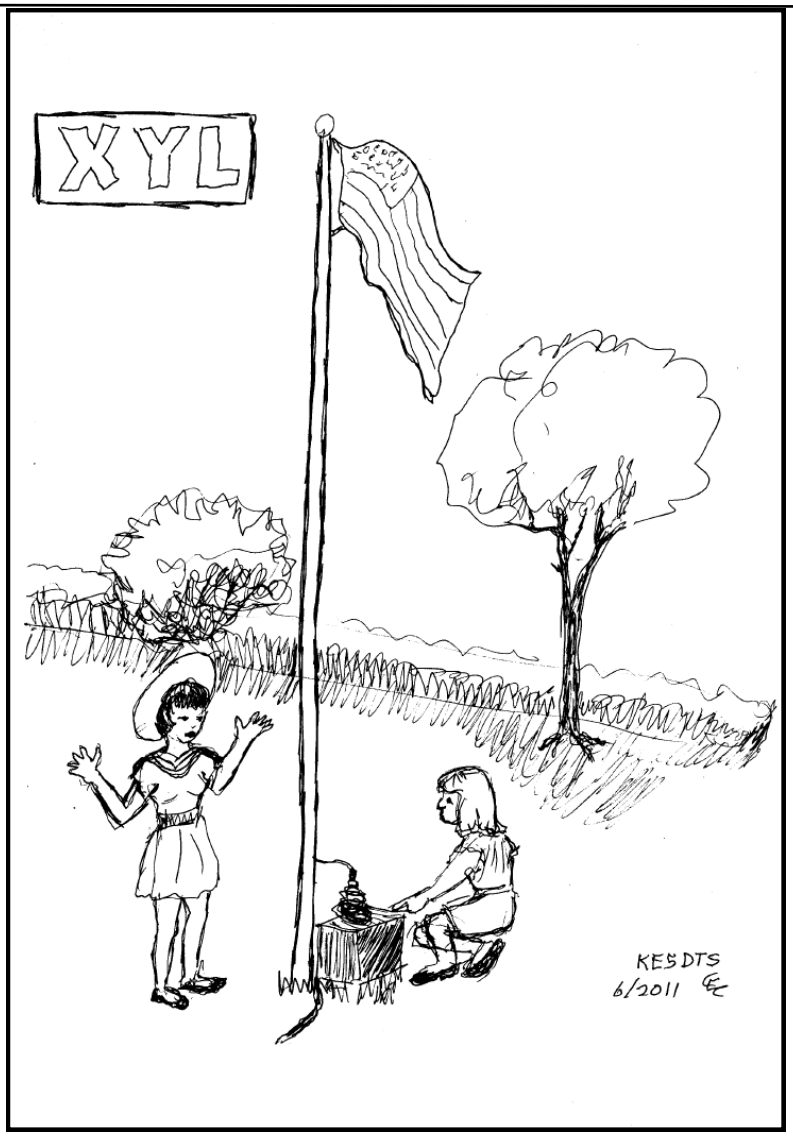
Recommended Dual-Rate Charger

Specifications

Model	Nominal Voltage	Output Voltage Float/Fast Charge	Output Current mA	Type Automatic	Dimensions: in. (mm)			Weight		Charger Design
					Length	Width	Height	lbs.	kgs.	
PSC-6300A-C	6	6.75 / 7.35	300	dual rate	2.05 (52)	1.57 (40)	2.64 (67)	0.21	0.10	Plug-in
PSC-6500A-C	6	6.75 / 7.35	500	dual rate	2.05 (52)	1.57 (40)	2.64 (67)	0.21	0.10	Plug-in
PSC-61000A-C	6	6.75 / 7.35	1000	dual rate	2.24 (57)	1.73 (44)	3.23 (82)	0.30	0.14	Plug-in
PSC-64000A-C	6	6.75 / 7.35	4000	dual rate	5.43 (138)	2.83 (72)	1.65 (42)	0.90	0.41	Desk Top
PSC-12300A-C	12	13.50 / 14.70	300	dual rate	2.05 (52)	1.57 (40)	2.64 (67)	0.21	0.10	Plug-in
PSC-12500A-C	12	13.50 / 14.70	500	dual rate	2.24 (57)	1.73 (44)	3.23 (82)	0.30	0.14	Plug-in
PSC-12800A-C	12	13.50 / 14.70	800	dual rate	2.24 (57)	1.73 (44)	3.23 (82)	0.30	0.14	Plug-in
PSC-122000A-C	12	13.50 / 14.70	1800	dual rate	5.43 (138)	2.83 (72)	1.65 (42)	0.90	0.41	Desk Top
PSC-124000A-C	12	13.50 / 14.70	4000	dual rate	5.43 (138)	2.83 (72)	1.65 (42)	0.90	0.41	Desk Top
PSC-1210000A-C*	12	13.50 / 14.70	10000	dual rate	8.80 (224)	5.17 (131)	3.33 (85)	4.30	1.95	Desk Top
PSC-241000A-C	24	27.00 / 29.40	1000	dual rate	5.43 (138)	2.83 (72)	1.65 (42)	0.90	0.41	Desk Top

XYL

By Carolyn Canfield, KE5DTS



I have no idea!
My husband says it makes the flagpole work better!

AARC Meeting Info.

Waterloo Icehouse

8600 Burnet Rd. South of 183

(Come early and have dinner!)

Business Meeting 7pm

October 4th—Zack Ferguson is working on a book about his grandfather and his QSL Card collection and he has questions we can help with. Also bring your QSL cards to show off.
ALSO: Nominees for officers!!

Officers Meeting 5:30 pm

October 18th - The officers at work!

2011 Upcoming Amateur Exams

ARRL VEC– October 8th & November 5th9a.m. at Bethany United Methodist Church. Contact Joe Makeever, W5HS (345-0800) or Joe Thiel, N5SMN (832-0450) for info. $15 fee.

W5YI VEC- Oct. 15th & November 19th 2p.m. in room 106, Fleck Hall, St. Edwards University. Contact Jim Greenwood, AB5EK arrl.net, (327-6184) for more info.
http://texasparadise.com/w5yi-austin

2011Calendar of Events

September 24—25
Texas QSO Party
Statewide QSO Contest. www.txqp.net

October 1
Belton Hamfest
Admission $5 (Includes a $2 Raffle Ticket)
Talk-in 146.82(-)PL 123.0
www.tarc.org/hamexpo/
www.beltonhamexpo.org/

October 15-16
Scouting Jamboree On The Air (JOTA) Frank Fickett Scout Training and Service Center- Tim Molepske tim.molepske@scouting.org

October 21
Texoma Hamarama - West Gulf Division Convention Ardmore, OK
www.texomahamarama.org

Upcoming Meetings...

Oct	Nov	Austin Meetings/Happenings	Time	Address
4	1	AARC Meeting Waterloo Ice House*	7:00 p.m.	8600 Burnet Rd.
8	12	Austin QRP, Alvin's Sandwich Shop	11:00 a.m.	12200 Research Blvd.
18	15	ATV Club Meeting Mangia's Pizza	7:00 p.m.	12001 Burnet Rd.
15	19	QCWA IHOP 183 Near Duval	1:30 p.m.	11654 Research Blvd.
26	23	Digital Wednesday at Red Cross	7:00 p.m.	2218 Pershing
24	28	Travis Co. REACT Jim's 183 & Burnet	7:30 p.m.	9091 Research Blvd.
25	22	Travis County A.R.E.S., ARL Auditorium	7:00 p.m.	10000 Burnet Rd.
27	24	CERT Meeting CTECC	6:30 p.m.	5010 Old Manor Rd.

AARC Business Meeting is at Waterloo Ice House Come early and grab dinner before the meeting.