MAY 2014

SCOPE

THE PALOMAR AMATEUR RADIO CLUB NEWSLETTER

City Workshop in Poway

Yes. It is that time again.

On Tuesday, May 6th., the Poway City Council will again host a City Workshop to decide the fate of amateur radio antenna heights in Poway .

This will be the DECISIVE meeting.

The city development planning staff was given the task of finalizing the draft antenna ordinance, based on the discussions held between the City Council members at the February 18th City Council workshop.

Poway hams remain cautiously optimistic that we will finally get a break from the very restrictive rules under which we live. Naturally, nothing is certain in the land of political decision making, especially when a hotly contested City Council election is about to begin!

We know our opposition is massing for an offensive at this meeting. For many years past, they have been instrumental in using their seemingly strong influence on the council to prevent us from enjoying our amateur radio rights. They hope to sway the Council by their presence (vote count) again.

Here in Poway we are grateful for the bodily presence support San Diego County hams gave us in February.

This time we need every bit we can muster of ham presence at the Council Meeting.

So on behalf of the Poway Amateur Radio Society, I ask you to spread the word about Poway's needs, and encourage your club members, your ham radio friends in San Diego County, and their families and significant others, to come out and support Poway hams by their presence at the Poway City Council meeting.

The meeting is scheduled Tuesday May 6th, at 7:00 PM, at the Poway City Hall , 13325 Civic Center Drive , Poway CA .
We ask that all attending arrive at 6:00 PM

Hot dogs and refreshments will be served to all hams who attend. All beef hotdogs. No brethren ham will be consumed!

At the gathering, all those attending will be given a PARS name sticker to wear into the Council meeting in order to demonstrate a large presence of support.

Please come, enjoy food and camaraderie, and help us win one for ham radio in Poway .

73 de NN3V
Charlie

Save the Date

Club Meeting	Board Meeting	Club Event?
7 May 2014	**14 May 2014**	**T-Hunt!**
Come hear all about recent updates to LOTW.	Palomar Amateur Radio Club board meeting at 7:00pm at W6GNI QTH.	See page 12 for details.

Advertisements are free for members

Have items that need to find a new home? Advertise here! Send your ads to scope@palomararc.org

A jumper cable walks into a bar. The bartender says, "I'll serve you. But, don't start anything."

FOR SALE

1) Weller EC1002 Solder Station, regular pencil: $75
2) Weller EC1002 Solder Station, thin pencil: $65
3) Fluke 83, probes, and case: $110

Contact kk7kx: assi@kiloxray.com

It is not too early to start thinking about who will serve as the President for the next year. Dennis will not be available due to health concerns expressed by his wife. (Longevity will be severely shortened if he continues.) Please consider who can serve.

Palomar Amateur Radio Club is looking for a Volunteer to serve as a Director for the Club. The Club thanks Rich Lippucci NI6H for his service to the membership. Any member who wishes to assist the Club through the posistion of Director should contact an Board member to let us know of your interest. It is through the volunteering of time (and service) that the Club continues to exist.

(special) THANKS to our sponsors

Please patronize our advertisers. Their support of the club is vital.

SWD Coming Up this Fall

2014 ARRL Southwestern Division Convention

September 12 - 14, 2014
Will be held at the
Sheraton Four Points Hotel
8110 Aero Drive, San Diego CA. 92123

IC-7100 Installation in a 2013 Honda Fit

Paul Williamson, KB5MU

After crashing my BMW Z4 in December and ordering a replacement sports car for eventual delivery in July, I found I needed a car to drive in the meantime. So, I bought a new 2013 Honda Fit, a cheap and cheerful subcompact hatchback with very basic equipment. Since I wasn't planning to keep it very long, I didn't really think about a ham radio for it. But then two things happened to change that. First, I found that the Fit is a surprisingly good car. I think I'll keep it. Second, I noticed Icom's latest mobile HF rig, the IC-7100. It has a unique control head design, with a large LCD touchscreen facing up at a nice angle. The control head includes the speaker and the microphone connector, so it makes for a very clean installation with only one cable to run from the main rig to the operating position. Smart design.

Finding a place to put a rig in a modern car can be a challenge. Even on a base model car, they spread the controls out to take up all the space on the dashboard. Much of the top of the dashboard is out of bounds because of the passenger airbag. There isn't any extra space around your legs. What that leaves is the center console. In the Fit, there's space in front of the stick shift for cupholders and a 4-inch square tray. Luckily, there are other cupholders on the dash, so these cupholders can be sacrificed. The thing is, this space is well below the driver's normal line of sight. Any display mounted down there would have to be large and easy to read, and facing up at a nice angle. Exactly like the IC-7100's display!

To make the control head hover in just the right place for easy operation, some kind of mounting bracket is needed. There are many, many commercially-made mounts for mobile electronics. The line of Lido mounts they're featuring at Ham Radio Outlet look very nice, but I went another way, for maximum flexibility. I picked up a 6-inch gooseneck designed for use on stage with a microphone stand, a mounting flange for installing a mic stand on a desktop, and a ball head designed to mount a small camera or audio recorder on top of a mic stand. In another example of smart design, Icom has provided a standard 1/4"-20 tripod thread on the bottom of the IC-7100's control head, so it threads right on without any special bracketry. The ball head lets me fine tune the display angle, and it's easy to take the control head off.

I envisioned mounting the gooseneck's flange on the bottom floor of one cupholder. The flexible part of the gooseneck would then be fairly straight and vertical, with the weight of the control head balanced on top. The cupholders are a separate piece that pops right out, so it'd be easy to bolt through. But I worried that it might pop out too easily with a tall stalk attached. To avoid that problem, I'd have to

attach to the floor of the square tray instead, which is part of the main console covering. It took only one screw and two plastic push-in fasteners to release the console cover, but I had to unscrew the shifter knob to remove it entirely.

Mounted on the tray floor, the gooseneck would have to bend out over the cupholders to reach the right position, placing some twisting stress on the rather flimsy plastic floor. If I just mounted the smallish flange to the tray floor, it might flex too much. A stiff 4-inch square plate would reinforce the floor of the tray against the leverage of the cantilevered control head. At the hardware store I found a steel lid for an electric junction box, very stiff and already the right size. I just had to drill it for the mic flange and bolt the combination onto the tray floor. Unfortunately, a curve in the plastic meant I couldn't hide the plate underneath, so I put the plate on top. I used standard fender washers underneath the flange, but they stuck out too much around the corner bolts, so I made a backing plate out of some scrap aluminum I had on hand. I chose nyloc nuts so they wouldn't shake loose.

With the control head mounted, the next question was where to put the main radio unit. It's not very large by HF radio standards, but the interior of the Fit doesn't offer many hiding places. It's a hatchback, so there is no trunk. The trick rear seats fold both forward (making the cargo area wider) and backward (opening up a taller floor-to-ceiling cargo area), so nothing can go beneath or behind the rear seats. The floor of the storage area under the hatch is just heavy cardboard covering up the spare tire. Something could be mounted to the side panels back there, but it'd impinge on the cargo space.

The best place would seem to be on the floor under the front seat. There is almost enough room, but only with the radio mounted sideways. With the seat all the way back, the unit is completely underneath, but my legs aren't that long. With the seat in driving position, the unit does stick out a little. The Honda floor mat normally covers this area. I considered trimming it, but if I just bend the mat up over the radio it hides the radio and protects it from feet, without blocking any of its vents. Best of all, with the seat all the way forward the radio is completely exposed, making it very easy to reach all the cables and the SD card socket.

One problem with this location is that the heating vent for the rear passenger blows directly at the radio. I'm just hoping this won't cause an overheated radio or a grumpy frozen passenger.

The next question was how to mount the radio unit there. It has vents on the top and bottom as well as at both ends, so it probably should not be placed directly on the carpet. The IC-7100 does not come with a mounting bracket for the main unit (boo, Icom), but the MB-62 bracket is available. What I've done in the past is cut two slits in the carpet for the vertical ears of the mounting bracket, so I

could bolt the bracket to the hard floor below the carpet. I didn't do that here for two reasons. First, it looks like there are some working car parts under the floor there, and I didn't want to mess around under the car to look for safe drill points. Second, the carpet in the Fit is not so much carpet as a single big fuzzy rigid floor pan. Getting up under it would mean removing all the seats and who knows what all else. I didn't want to do that, either. So, I needed to install the MB-62 on top of the carpet somehow.

What I came up with was a metal strip that mounts between the two rear bolts that anchor the front seat. One side of the MB-62 bolts to the strip. For the moment, the other side of the MB-62 is left floating on top of the carpet, held down only by the weight of the radio. Since the strip is made of lightweight (0.020) aluminum I had on hand, it can twist rather easily, so the radio is not held rigidly. It can't move around, but it can flop a little. I choose to think of this as shock mounting.

Power wiring for a 100W rig simply must come directly from the battery, which is in the traditional location in the engine compartment up front. The Fit's engine is tiny, but then so is the engine compartment. At first glance, it seemed like there was no access at all to the firewall without going under the car. I searched the internet for advice on ham radio installations in a Honda Fit, without finding anything specific.

Casting my net a little wider, I found another hobby that involves putting high-powered devices into cars: extreme stereo competition. These guys run multiple kilowatt amps and achieve ridiculous sound pressure levels (SPL). I found a guy hanging out on FitFreaks.com forums who goes by the handle Fit4Spl. He has put a huge competitive sound system into a Fit and documented every step of the process! He had pictures showing exactly where to find a convenient grommet with room for a big power cable. You have to disassemble the air box (two screws) to see it from the engine compartment. From inside, it's way up under the dash above the gas pedal, but reachable. I cut a slit in it with a Xacto knife and fished my power cable through with a wire coat hanger.

The power cable is 10 gauge red-black automotive zip cord I found at Willy's Electronics. Both sides are fused at the battery end with blade-type fuseholders, also from Willy's. The cable is secured in several places with nylon zipties. After passing through the firewall grommet, it's secured again to a handy bracket and routed toward the center of the car. There it passes along the center console, beneath the plastic cover, being careful to avoid the shifter and emergency brake mechanisms. It sneaks out between the cover and the carpet near the rear leg of the front seat, and passes in front of the leg and under the seat slide rail into the radio area.

I terminated the power cable near the radio with a standard Anderson Powerpole connector, and constructed a short jumper from Powerpole to the new-style Icom 4-pin power connector, which I found at QSRadio.com. With Powerpoles here I can easily add a RigRunner to provide power for accessories, or power the radio from a separate portable battery or AC power supply. The Fit's own battery is pretty tiny, so I won't be able to operate parked for very long without an auxiliary power source.

The single cable from the control head to the radio goes the same way as the power cable, down the center console. The provided control cable is much longer than needed in this installation. Rather than try to rebuild the control cable, I found a spot inside the center console where I could coil up the excess, out of the way and hidden.

That leaves antennas. The IC-7100 has two antenna connectors, one for 2m and 70cm, and the other for 6m and HF/MF. Most of my mobile time ends up being on the PARC 2m repeaters, so the VHF/UHF antenna needs to work well. It also needs to stay attached even when the car goes into my garage or any parking structure. The best way to do that is put a hole in the center of the roof, and that's what I did. This is actually the first car I've ever had where that's possible. I've had sunroofs and/or luggage racks, or convertibles. Step one is to drop the headliner enough to peek inside and make sure there's nothing but air below where you want to drill. On the Fit, that's pretty easy: two clips each to remove the left side front and rear grab handles, and pop off the interior trim pieces that capture the edge of the headliner: rear quarter trim and B pillar trim. There's nothing at all going on above the headliner in the Fit, I just had to miss the reinforcing braces.

Going first class, I bought the special 3/4" hole saw that's designed just for this purpose. It made short work of making a very nice hole in the roof. The instructions call for removing the

paint in a narrow ring around the hole. I did that with a little wire wheel attachment in a cordless Dremel tool. Then I dropped in and tightened up the Larson NMO mount, fishing the pre-attached coax out to the side of the headliner.

Here's a critical step that I almost missed. Just above the edge of headliner, there's a cryptic-looking thing that runs from the front of the front side window to the back of the rear side window. It consists of a black plastic L-channel with a tight roll of white fabric nestled in it, loosely tied every few inches with a flimsy-looking ribbon. As you have probably guessed, it's the side curtain airbag. If the coax runs between the airbag and the interior, it will interfere with airbag deployment. Luckily, the airbag is mounted on standoffs away from the body panels, so it's easy to route the coax over the top of the airbag. On my first stab at routing the coax, I missed this point, because I wasn't expecting to find an airbag up there. The Fit has airbags built into the front seats, and I assumed they were the only side airbags. Apparently not.

The rest of the VHF/UHF coax routing is simple: down behind the trim on the B pillar (that's the one between front and rear doors), being careful not to interfere with the driver's shoulder harness, which also runs inside that pillar. Then out under the edge of the plastic trim near the left rear foot of the front seat, and into the radio area. I left a short turn of slack to make it easy to manage the connector, and cut off the excess coax (along with the provided connector). I soldered on a PL-259 plug with the appropriate reducer. This reminded me for the umpteenth time just how horrible those connectors are, so at my next work break I ordered some quality crimp-on PL-259 connectors and the right crimp tool for them. For next time.

The choice of HF antenna is a little less straightforward. Mobile HF antennas are always compromises, of course. Each operator has to decide what tradeoffs to make. My operation is generally random and unplanned, so I wanted all-band coverage without stopping the car to change the antenna. There are basically two ways to do that: a screwdriver antenna (that is, a whip with a built-in motorized coil in the base to tune it) or a plain whip with a separate antenna tuner. The general consensus seems to be that the screwdriver design performs better. I have a screwdriver antenna on my Land Cruiser (well, sometimes I do). They are big and heavy and ugly, and even with a so-called automatic controller, they are a bit of a pain to operate. The auto controller guesses which direction to run the motor by detecting the RF frequency (either with a counter or, more recently, by interfacing with the radio's remote control port), and then looks for a dip in SWR. Which is the same way you'd tune a screwdriver manually,

more or less. It works, most of the time. But it takes a few seconds, or more than a few if you're changing to or from 80m or 40m, or a whole lot more if it runs the coil all the way to the stop without finding the SWR dip. I didn't want to deal with that.

With an automatic tuner that interfaces to the radio, the plain whip can be tuned on any frequency in just a second or two with a single button press. You hear a brief burst of relay chatter from the tuner, and you're ready to go. A much nicer experience. What's more, if you're parked you can easily clip additional wire to the top of the whip and make a superior antenna out of it, and the tuner will just automatically handle it. This appealed to me, so I decided to try out the plain whip solution.

The best place to put the HF whip is also on the center of the roof. That would probably have been feasible, but it just didn't seem like a good idea. The HF whip is going to be too big to go into any garage, so its base needs to be readily accessible so the whip can be removed at a moment's notice. I decided to mount the whip with a classic ball mount, halfway up the side of the car, just forward of the tail lights. This specific spot is handy because the inside of the exterior sheet metal is accessible there, through a little trim hatch that provides access for changing bulbs in the tail lamps. For better access, the rear quarter trim is pretty easy to remove.

The common Hustler ball mount is a terrible piece of cheap junk. Avoid at all costs. There's a little machine shop in North Carolina called Breedlove Mounts. Hank Breedlove specializes in antenna mounts carved out of solid chunks of brass and aluminum. As he says, "stronger than it needs to be." I chose his ball mount plate set with the smaller 3" plates, because of the limited amount of room in the side wall of the Fit. It's a beast. If I have to switch to a screwdriver antenna in the future, this ball will be plenty strong to hold up a small one. I was a little worried that the sheet metal would be too flimsy, but it seems quite solid enough.

The ball is electrically isolated, so you can feed it from inside the car and the ball itself becomes the base of the antenna. I think this isolation will be enough to handle 100 watts. If not, it'll arc over. In that case, the fallback is to mount a heftier insulator on top of the ball, and bring the feedline out through the body panel, bypassing the ball. Breedlove makes an insulator like that out of a hunk of Delrin. I ordered one, but I hope it stays in reserve.

A spring is a good idea between a rigid mount and a long whip that can hit things. Hustler's seems fine, so that's what I got. It supposedly has a braid inside to make sure the two end caps stay electrically connected.

The usual whip length is 8 feet, though longer ones are available. The base of the whip on my Fit is about 39 inches above the road, so an 8' whip tops out a few inches above 11 feet. This should clear just about anything you'll find on the road. Of course, it's still way too tall for parking garages. There are two ways to deal with that. Well, three, if you count simply avoiding all parking garages. You can remove the whip, or you can bend the whip over. If I remove the whip, I'm standing there with an 8-foot rod in my hand, and a subcompact car to put it into. It turns out the whip actually does fit into the car, with the rear seat folded down, diagonally from the hatch to the passenger's footwell, but that isn't going to be very convenient if the car isn't almost completely empty.

DX Engineering has a solution for this problem: an 8' whip that breaks apart into three pieces with a hex wrench. That's what I bought. I have a notion that I might end up leaving just the bottom section of the whip installed, most of the time. In that configuration, it should still tune up on the higher bands, and the shortened whip isn't high enough to cause any problems.

Bending the whip over looks like it will work, too, somewhat to my surprise. The whip is rigid enough to stay up (not straight, but up) at freeway speeds, but it's still supple enough to bend forward all the way to the rearview mirror without apparent stress. It even follows the curve of the car rather nicely. In the old days, one would install a special clip on the gutter to capture the tip of the bent-over whip. Cars don't have gutters anymore. I'm still pondering a nice way to capture the tip. Probably something involving a loop of string and a hook mounted somewhere.

The remaining element of the HF antenna system is the automatic tuner. I chose the Icom AH-4, which gets good reviews and is the officially supported tuner for the IC-7100. It's a white plastic weatherproof box, about 7×3×9 inches. Coax and a control cable come in one end from the rig. The other end has a ribbed insulator for an unbalanced single wire antenna. The antenna really starts inside the tuner, passes through the ribbed insulator, along whatever jumper wire you add, and out along whatever whip or wire it's connected to. It might seem like you could shift the effective start of the antenna by interposing some coax, but the math says that just adds losses.

Really, the tuner should be mounted outside, exactly where you want the base of the antenna to be. I've seen that done on pickup trucks, but it didn't seem like a reasonable installation on the side of my little car. I mounted the tuner inside. There's a four-inch jumper between the ribbed insulator and the back of the ball mount. That means about eight inches of my antenna is inside the car. That's not ideal, but it was the best I could figure out. To do even that well, the tuner had to be mounted at an awkward angle, halfway into the rear quarter trim panel and halfway hanging out into the cargo space. The trim panel and the bulb access hatch had to be modified to make room. I used a hot-knife tip on my Weller soldering gun for that task.

The coax and control cable for the tuner route through the rear quarter trim panel and under the rear door sill trim, and emerge in front of the left rear foot of the front seat. They pass under the slide rail and into the radio area. This coax, too, is cut to length except for a short service loop, as is the tuner control cable.

The ball mount, a handy tie point on the body, and the ground terminal on the tuner are all tied together with braid. That is, however, just the beginning of "bonding" the car together with braid. I need to go back and braid across all the door, hatch, and hood hinges, and braid up the exhaust system and engine, and anything else that looks likely. The experts agree that this is important for mobile HF performance.

Even before doing any bonding, though, the HF antenna tunes up like a dream. A press of the tuner button on the control panel, and in a second or two it's done. It even tunes successfully on 80 meters, though the AH-4 is not rated to do that with a whip that short.

As for how well it gets out, I can't say yet. I've barely tried using it yet.

One thing I do know. There's a serious problem with ignition noise, even on VHF. I'm hoping this will be much reduced when I'm done bonding the car together. If not, then I'll have to find a way to address the ignition noise specifically. Some of the old wisdom about how to do that no longer applies, though. Car ignition systems have changed dramatically. Or so I've read.

Above: video of taking down of a tree hazard at the repeater site work party. By Don WD6FWE.

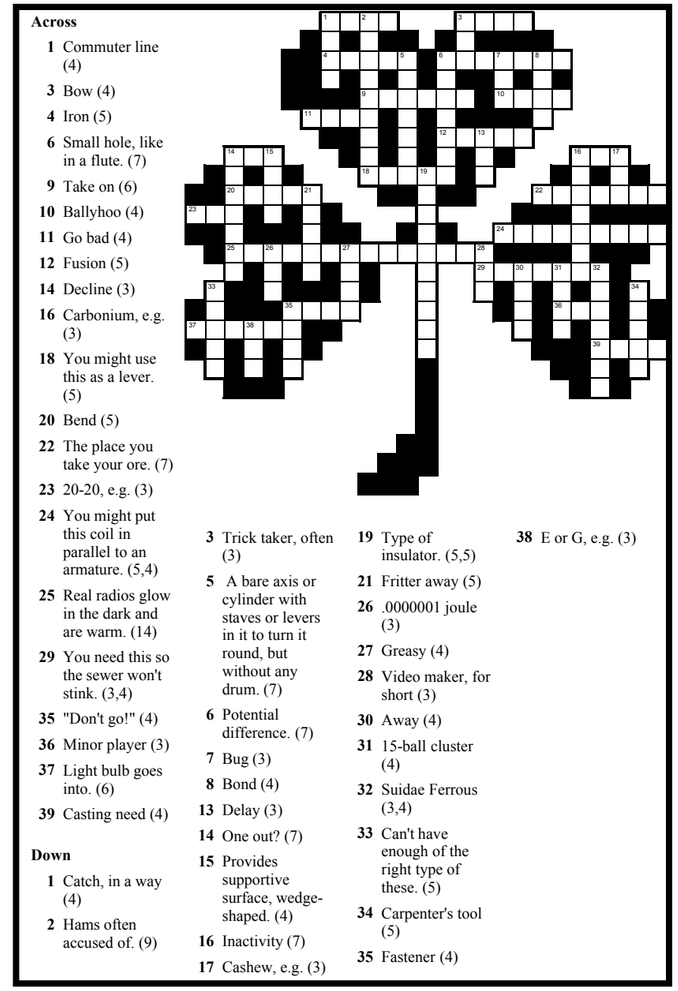
Repeater Site Work Party

by Dennis KD6TUJ

A small group went to the mountain on Wednesday April 9, 2014. Conrad KG6JEI picked up Dennis KD6TUJ , then went to Mike's K6MRP house to pick up some club equipment for storage. After picking up three tower sections, and additional parts we picked up some block and tackle from Mike. Mike offered to come up, an offer we could not refuse. Don WD6FWE and Gerry K6GAB met us at the site. Mike soon followed. As usual, the block building was opened up to air out the batteries so they may be checked. Dennis started to do the finish work on the conduit from 73 to 700. Conrad checked for correct fittings to terminate the coupled line and completed the terminations. (There is no such thing as enough line for a measured run!) Gerry had a chance to check out the site and see the repeaters. Don checked out the battery levels. Mike arrived and work was started to send a line through the tree to secure a pull rope. Only 1 1/2 inches thick by 200 feet. Don took a few tries, then Mike tried a few. A toss finally made it close enough. After trimming a few branches with a pole saw, the rope was close. Hey Conrad, bring your truck around. Tieing off to the hitch, Conrad and his truck pulled the line higher on the trunk to create a little pull for the drop. Mike fired up the chain saw easily. Since the fires there has been a large supply of wood that needed to be cleared, so he burns it in his fireplace to lessen the fire's leftovers. Choosing an angle, he cut the drop wedge out and proceeded to the fall cut. 2 1/2 minutes later the danger of the broken tree was removed along with the sister tree it was resting on. Gerry left to continue with his plans. Conrad finished the line connections. The 146.700 packet repeater is now coupled to the 146.730 antenna to be used for receive enhancement. We started talking about site mapping. Mike showed us the connections he has made to improve the site. We checked the old battery building and determined that there were no more low voltage connections. Checked out the "old" inverters. They are determined to be non-functional and will be removed at a later time. Mike then checked the battery charger for the string and noticed a RED light on. The supply had errored in some manner. Zero current was leaving the charger. The power/breaker switch was in full off position. The voltage meter read 48vdc. It should be reading 54vdc. Resetting the main switch brought life back. Output at 30+ amps. Slowly the voltage came up to 51 1/2 vdc after 45 minutes or more. Discussion was offered on how the switch was thrown. Seismic activity (tree falling)? SDGE line surge? Recent electrical storm activity? Bigger question - how long was the switch off before Mike noticed? Overall, the two major projects were completed. Dropping the tree hazard and coupling the packet repeater to a higher/more gain antenna. Don brought more distilled water for stock on hand to use in the batteries. PVC was brought for another trip to encapsulate the phone lines to prevent moisture from shorting them in the future. And a trim board is on the hill to replace the trim on the block building that has some critter work in progress.

One of the next trips needs to be on a weekend day to provide manpower to unload the tower sections from Mike so the trailer may be returned.

Dennis



Across

1 Commuter line (4)
3 Bow (4)
4 Iron (5)
6 Small hole, like in a flute. (7)
9 Take on (6)
10 Ballyhoo (4)
11 Go bad (4)
12 Fusion (5)
14 Decline (3)
16 Carbonium, e.g. (3)
18 You might use this as a lever. (5)
20 Bend (5)
22 The place you take your ore. (7)
23 20-20, e.g. (3)
24 You might put this coil in parallel to an armature. (5,4)
25 Real radios glow in the dark and are warm. (14)
29 You need this so the sewer won't stink. (3,4)
35 "Don't go!" (4)
36 Minor player (3)
37 Light bulb goes into. (6)
39 Casting need (4)

Down

1 Catch, in a way (4)
2 Hams often accused of. (9)
3 Trick taker, often (3)
5 A bare axis or cylinder with staves or levers in it to turn it round, but without any drum. (7)
6 Potential difference. (7)
7 Bug (3)
8 Bond (4)
13 Delay (3)
14 One out? (7)
15 Provides supportive surface, wedge-shaped. (4)
16 Inactivity (7)
17 Cashew, e.g. (3)
19 Type of insulator. (5,5)
21 Fritter away (5)
26 .0000001 joule (3)
27 Greasy (4)
28 Video maker, for short (3)
30 Away (4)
31 15-ball cluster (4)
32 Suidae Ferrous (3,4)
33 Can't have enough of the right type of these. (5)
34 Carpenter's tool (5)
35 Fastener (4)
38 E or G, e.g. (3)

April Scope puzzle solution

	V	O	L	T	A	G	E		O		A
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SAN DIEGO AREA ON-FOOT "INTERNATIONAL STYLE" T-HUNT

SATURDAY MAY 18TH. 2013

KIT CARSON PARK, ESCONDIDO, CA. 10:30 AM – 1:30 PM STARTS

SPONSORED BY THE SAN DIEGO T-HUNT GROUP & CQ MAGAZINE WORLD WIDE FOX HUNTING WEEKEND

Starting times will be 10:30 AM to 1:30 PM at 5 minute intervals. If you start at 1:30 you will have until 3:30 to complete the course. NO REGISTRATIONS FEES! This is not a TRUE International style Hunt other than using 2-M FM, having 5 T's and using the MOE-MOI-MOS-MOH-MO5 format. For information on International style hunts go to www.homingin.com/intlfox.html . Antennas may be any polarization but radiated power will be the same on all T's. We will be using punch card verification for the hidden T's. There will be orange & white flagging tape on each punch within 10 feet of the T's which will be concealed. We will have some equipment for loan to those that do not have small 2-M beams. There will be experienced Hams present to demonstrate techniques for those that want to experiment with Amateur Radio Direction Finding (ARDF) and a practice T before the start. You do not need a Ham License to participate! A Pot Luck BBQ is planned for 3:00 PM for those interested. Bring your own buns burgers/dogs and we will provide drinks, salad, beans, grill & condiments..... Contact Joe Corones, N6SZO @ H-858.484.3582, C-858.603.5545, jcorones@gmail.com OR Joe Laughlin, KE6PHB at H-619.461.7854, C-619.403.3149, KE6PHB@cox.net for information.

DIRECTIONS: In Escondido, at the junction of I-15 & Via Rancho Parkway, go east .75 miles past Beethoven and make the first left turn into Kit Carson Park. Follow park road .3 miles to tennis courts and park your vehicle. We will be in the "Ray Love Picnic Area" by the south end of Tennis Courts. GPS 33-04'-32.92"N & 117-03'-40.34" W. Call our cell phones if directions are required. Look for T-Hunt signs.

COME OUT AND EXPERIENCE A DIFFERENT ASPECT OF HAM RADIO!

Tower History

by Dennis KD6TUJ

The following and more can be found on the website shortly. There is a lot involved to operate our Club. An occasional reading of the past can bring a lot of respect to our past and current members.

Friday June 10, 1983 escrow closed on the Palomar Amateur Radio Club repeater site. Complete with 240 easy payments. No longer have to worry about being evicted over possible RFI to the landlord or rent increases.

August 1983 executive meeting discussed the erection of a tower on the repeater site, to permit the UHF antennas to be raised above the trees, and to establish in being a tower on the site in view of the moratorium on commercial towers in our area of Mount Palomar. Bob WA6QQQ told the committee of the possible availability of a 70' self-standing tower. Bob WA6QQQ also describes the engineering problems inherent in a large multiple repeater site. After hearing his discussion, the Committee was of the mind that the PARC site could handle 1-3 more repeaters. Stan, W9FQN, will look into obtaining a building permit for a tower.

September 1983 ...W9FQN reported that he would accompany Bob, NC6J, to the PARC repeater site to locate the corners of the Club's property, since Bob had managed to get a map resulting from a previous survey. Stan also informed the Committee that it is going to take a 12 cubic yard footing for the donated 70' tower. He estimates that it will cost the Club as much as $2K to move the tower to the mountain and erect it.

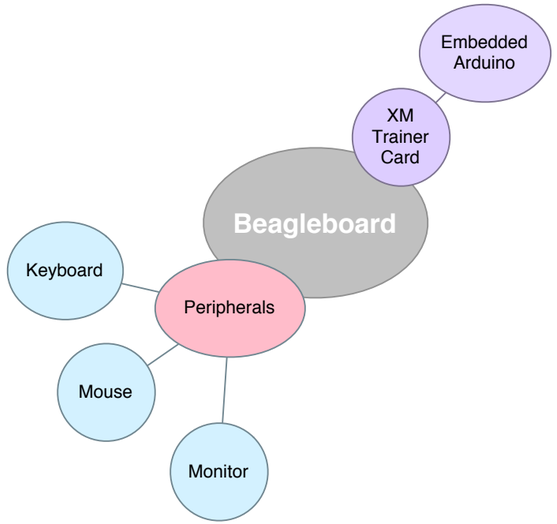
December 1983 TOWER DONATED BY RADIO STATION KOGO RECEIVED The PARC is finally the owner of a 70' free-standing tower which was very generously donated by radio station KOGO. Stan, W9FQN, assisted by N6AEF, N6GSS, N6GZI, K6HAV, KA6HZF, and WB6IQS loaded the four tower sections onto Stan's boat trailer on Saturday, 19 November, and removed the tower from KOGO's transmitter site to a storage space on Stna's property....The move, for which $50 was budgeted, cost nothing, thanks to Stan's loan of his boat trailer. The Club thanks radio station KOGO for this wonderful donation of a very high quality, hot-dip galvanized tower. It's a dandy! Thanks also to Bob Gonsett, WA6QQQ, who steered the Club to the tower and greased the skids in our direction.

January 1984 Plans are proceeding apace to come by the wherewithal necessary to buy the re-bar and concrete necessary to pour the base. ...

May 1984 Executive Committee Meeting The Committee voted to authorize Stan, W9FQN, to apply to the County for a building permit to erect our tower: and to spend up to $650 for the installation of the tower. ...

June 1984 Executive Committee Meeting Stan, W9FQN, told the Committee that the reinforcing rod is in the hole for the tower base...

July 1984 Executive Committee Meeting ... W9FQN reported that the concrete base for the tower could be poured by the end of July. Tower fund has topped $1000!...



Microcontroller Comparison

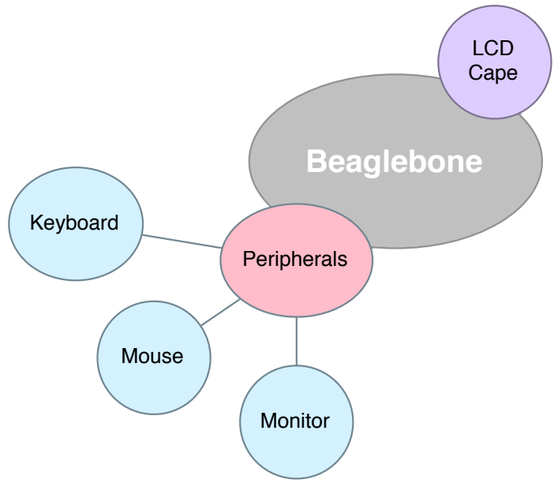
by Michelle W5NYV

The April 2014 QST had two excellent articles about microcontroller projects in amateur radio. As a microcontroller enthusiast, I was very happy to see the projects and resources featured.

This article is a summary of the microcontrollers I've worked with recently. I have four different types, for four different projects. They vary in how difficult they are to set up and use, and in how capable they are. Difficulty and capability are, as one might expect, related. The more capable the controller, in general the more difficult it is to configure and program. The evaluations are based on my impressions, and are scored relative to each other.

I refer to microcontrollers as "platforms". In general, a platform is a tool consisting of a set of hardware with dedicated software that can be used to solve a wide variety of problems. If a hardware/software system is intended to solve a narrowly defined set of problems, the system is usually referred to as "a solution".

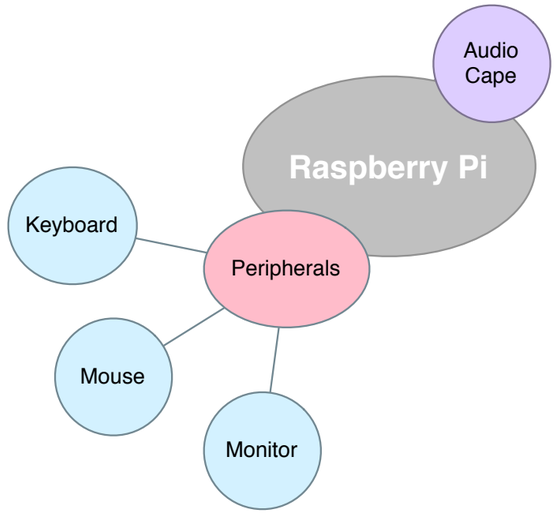
The first platform is the Beagleboard (see diagram above). It is a standalone single-board fanless computer based a 1GHz ARM processor. Peripherals can be directly connected to it. I have a keyboard, mouse, and monitor. The variant I have is called the Beagleboard XM. It has a daughter card (a dependent circuit that plugs into the main board) called the XM Trainer. This daughter card has a second processor called an Arduino on board. This project is intended to be a follow-bot. The Arduino is slated to



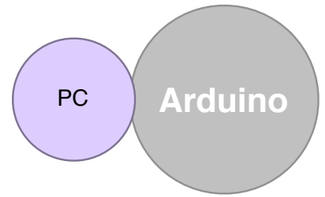
run the motors (code already works for this) and the ARM processor will run the obstacle detection and decision-making algorithms (work on this is in the very early stages). Setting up a Beagleboard can be a challenge, even for someone well-versed in operating a personal computer. The steps are many, and some of the commands border on arcane. The Beagleboard, Beaglebone, and the Raspberry Pi all use an SD card as a hard drive. The SD card must be prepared and the operating system loaded before it can be installed on the board.

Missing a step in preparation, or doing a step incorrectly, can result in damage to the SD card or the machine that the SD card is being prepared with. The boards do not come with documentation. It's expected that the proud new owner will go out to the web and find the instructions for preparing the SD card with the operating system they have chosen. In general, this means a version of Linux that has been specially written for the processors these boards are built with. Angstrom, Android, and Ubuntu are popular choices. If you design your own hardware to interface with these boards, you may need to write the drivers yourself. Working with these boards can be very DIY.

The second platform is the Beaglebone (above). It's a stripped-down version of the Beagleboard. It also accepts peripherals directly plugged in. Like the Beagleboard, I have a keyboard, mouse, and monitor plugged in. This board was intended as an audio recorder, but has been repurposed with an LCD daughter card for human-computer interface experiments. Daughter cards for these types of boards are often referred to as "capes". You can think of it as if the main card is wearing a superhero cape, which grants special super powers.



The third platform is a Raspberry Pi (above). It is also ARM-based, but wraps the ARM processor in a larger chip called the BCM2835, from Broadcom. Like the Beagle family, peripherals are directly plugged in. This device has a keyboard, mouse, and monitor. This platform became the audio recording project platform with the addition of an audio daughter card, or Audio Cape. The cape allows all sorts of audio to be distributed in and out of convenient connectors. This allows much simpler management of the audio compared to the bare platform. Setup of this platform was easier than the Beagleboard, on par with the Beaglebone, but not as easy as the Arduino.



The fourth platform is the Arduino (at right). The Arduino does not normally directly take peripherals. It connects to a personal computer through a USB connector. The host computer's keyboard, mouse, and monitor are relied upon during programming. The Arduino is less capable by comparison to the Beagles and the Raspberry Pi.

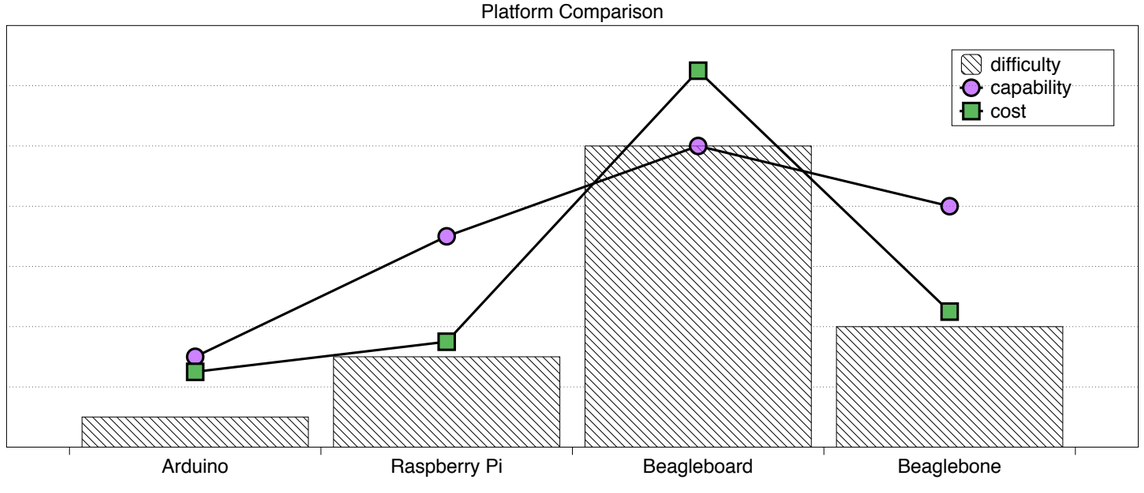
Like the other platforms, a wide variety of expansion cards are available. Unlike the other platforms, the Arduino has a software development environment that is very easy to use. There is no SD card. You program the Arduino using a varient of Processing, a language designed for non-programmers.

Arduinos are commonly and effectively used as the brains for LED projects, quadcopters, home automation, and other projects that don't require a large amount of complex signal processing. The ARM-based platforms can handle complex signal processing in addition to all the things that the Arduino can do. The final consideration is cost.

Cost

Arduino	$25
Raspberry Pi	$35
Beagleboard	$125
Beaglebone	$45

Below is a platform comparion chart of my impressions of how each platform stacks up against each other in terms of cost, difficulty, and capability.



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Featured Program:

At 7:30pm on 7 May 2014, Palomar Amateur Radio Club will present a program about Logbook of the World.

We look forward to seeing you at the Carlsbad Safety Center, 2560 Orion Way, Carlsbad, CA.

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