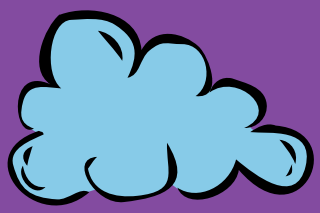
The Short Circuit

Newsletter of the Arctic Amateur Radio Club - kl7kc.com

Hamfest 8/4 10AM
Bentley Mall

2012
JUNE-JULY



KL7KC Field Day 2012

Radio fun in the sun, wind, and rain

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Fairbanks Hams Aid Tour de Cure

by Neal Brown W7USB

Perhaps the safest and best organized Tour de Cure in recent memory of the AARC members who supported it, began at the Dog Mushers hall on Farmers Loop Saturday 9 June at 8 AM. Everyone of the 153 riders had returned or were accounted for by 2 PM when the riding part of Tour de cure 2012 ended, and the post ride part at Dog Mushers was hitting full stride.

Riders could choose between 100K, 50K, 25K and 10K routes. All started by using the inherently safe Farmers Loop bicycle path. The 50K then looped out along Sheep Creek, Goldstream, and back along the Old Steese, all of which had little traffic. The 100K folks did that loop twice.

Helen Brown, KL0CM, and Dwight Morse, KL7EUY, and Neal Brown, W7USB, ran Net Control from Dog Mushers. Myles Thomas, KL1NU was at the Vallata, Linda, AD4BL and Bill Mullen, KE4ITP, at the intersection of Goldstream and Old Steese, John Slater, KL1AZ, at Old Steese and Farmers Loop, which Tour de cure volunteers also manned as aid stations with port-a-potties.. Jerry Curry, KL7EDK, put in more than 170 pleasant miles on his ham radio equipped motorcycle.

Tour de cure staff got bib number information to Net Control promptly as each group left on the hour. Helen's advance written organizational files were superb, and she and Dwight ran Net Control to near perfection, along with a few giggles and puzzled brows as some riders kept going through check points again and again.

Supplies and volunteers were at the aid stations of Vallata, Goldsteam and Old Steese and Old Steese and Farmers Loop in advance of the first riders. A post ride lunch at Dog Mushers started at 11 AM. Each of the AARC volunteers debriefed at Dog Mushers and enjoyed a lunch before heading for home.

In 1996 Helen Brown, KL0CM took over, from Ed Dennis, leading AARC's support of Tour de cure. No official record exists for prior support, but Helen figures AARC has supported Tour de cure for at least 20 years.

In 2011, nearly 56,000 riders around the country raised more than $18 million for the American Diabetes Association.

Hamfest August 4

AARC's 2012 hamfest will be held at the Bentley Mall from 10 AM to 5 PM on Saturday, August 4th. In addition to a FREE swap meet, a number of presentations will cover topics for the beginner or advanced amateur. There will also be a license exam session, so study up!

The hamfest is an imortant event for all club members. Your membership is due! Stop by and share some refreshments, tell tales of DX, make new friends, or learn some new skills.

If you need a table for the flea market or for more information, please call 488-5859.

ARRL Field Day Wrap-Up

This year's Field Day efforts focused on outreach and demonstrations of amateur radio. Club president Neal Brown W7USB stirred up interest by making several appearances on on local broadcasts even garnered some coverage in the Fairbanks Daily News-Miner. The Hutchinson Career Center parking lot served as KL7KC Field Day central for convenient public access.

The Field Day crew began to gather at 9 AM Saturday 23 June. They operated from 10 am 23 June until noon 24 June, with a break from about 10 pm Saturday night till 9 am Sunday morning.

Although Field Day competed for the public's attention with a number of solstice activities around town, turn-out was very good with a number of local politicians and emergency services represetatives visiting: State representatives Dave Guttenberg and Tammie Wilson; District 5 House candidate David Watts; FNSB assembly member Diane Hutchinson; and Ernie Misewicz, emergency coordinator for the Fairbanks Fire Department.

HF radio propagation conditions were typical; i.e., horrible throughout Field Day 2012. And when we could hear, we could not seem to get people to answer us.

Nevertheless, KL7KC successfully passed more than enough formal traffic messages (10 were needed) to gain Field Day bonus points and practice traffic handling. We received messages by 40 meter NVIS HF. Alaska Section Traffic Manager Ed Trump AL7N got them into the National Traffic System for relay and delivery.

John Antonuk AL7ID and Dave Pelzer KL7R both made contacts via their handheld satellite communication systems. John Antonuk communicated through AMSAT AO-50; FM mode, VHF uplink, UHF downlink. Dale communicated through FO-29.

Eric Nichols KL7AJ, Steve Estes KL7XO, Bill Brookins KC8MVW and Christine McCabe KL3HP were also among the prime operators. Neal Brown W7USB, Jerry Curry KL7EDK, and Myles Thomas KL1NU provided some vital support.

Field Day coincided with some of the warmest weather of the summer. Afternoon thunderstorms traversed the area and brought with them some excitement. High winds threated to blow everyone and everything away. Rain pelted the camp as well. Most retreated to Neal's RV, but KL7XO persevered by operating under a tarp.

Everyone had a great time, which is the primary objective for any event of this sort. Next year's plans are already in the works!

Power Sharing

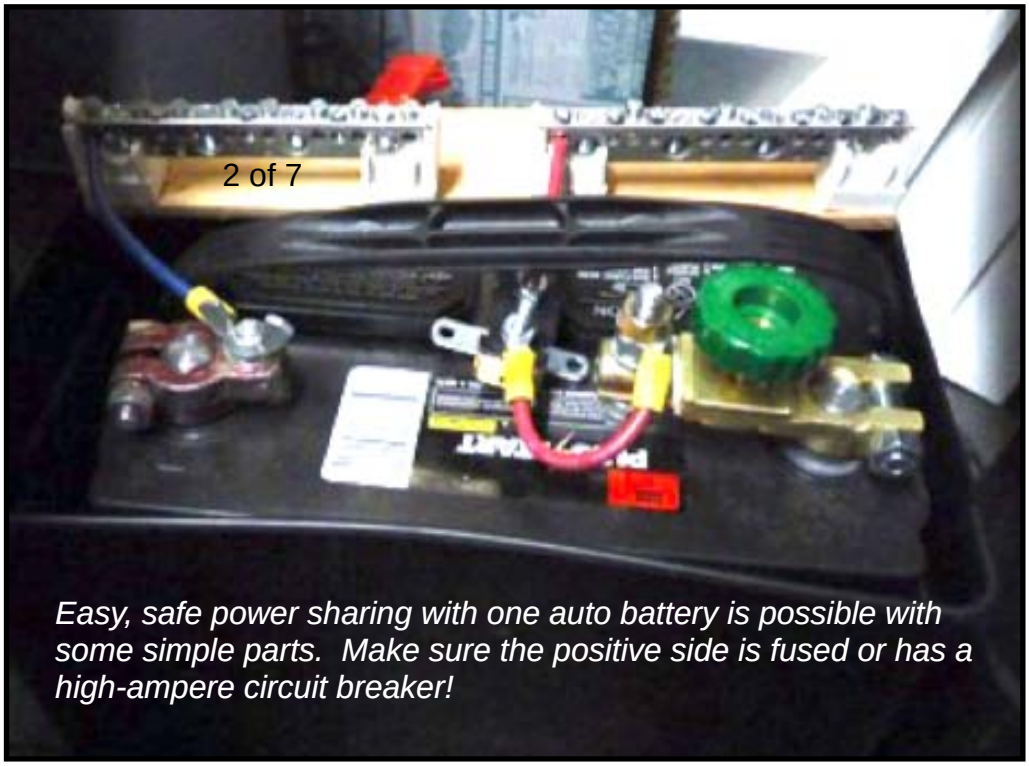
by Neal Brown, W7USB

Most ham radio rigs run off of 12 VDC, and their power leads often have been stripped of insulation and soldered.

I decided to adapt the 12 VDC car battery system I use at home for my own rig so others could easily connect up to it, and assumed that the maximum draw might be about 30 amperes.

By rotating the red knob assembly on top of the positive terminal of the battery power can be turned on, or off. At Jerry Curry's suggestion I put an automotive 50 ampere automatic resettable circuit breaker in the positive side of the circuit. I bought the negative and positive distribution blocks from ABS in Fairbanks and mounted them on a wooden board so they could never get together.

The system was easy to safely carry, set up and use. We could have easily run the HF unit the full 24 hours of Field Day on this system. We also had a demo APRS/GPS system connected to it.



Easy, safe power sharing with one auto battery is possible with some simple parts. Make sure the positive side is fused or has a high-ampere circuit breaker!

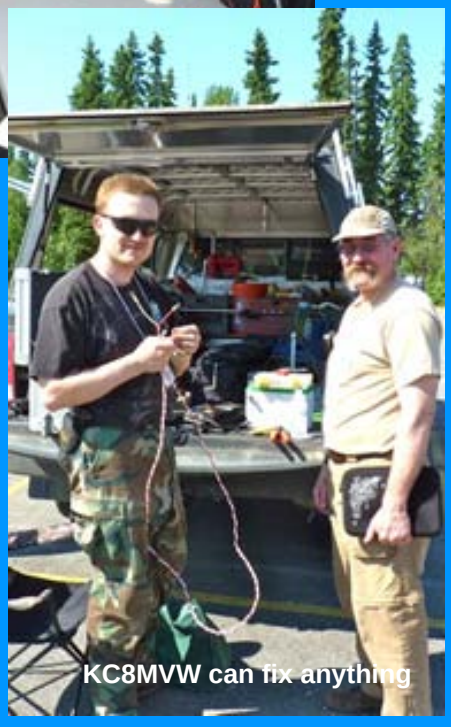
Around the Club in Photos

L-R: W7USB, KL0CM, KL7EUY


Jerry KL7EDK riding in style.


KL7R is double-fisted on CW


"CQ FIELD DAY!"


KC8MVW can fix anything


Storms ran AL7ID indoors

Summer is Time for Antenna Maintenance

by Larry Ledlow, Jr. N1TX

Now"s the time to put those skyhook dreams and plans from the colder months into play. Yes, I know fishing, boating, yard work, painting, construction, and a while lot more are higher on your priority list. But think about it: Wet, cooler weather will be here sooner rather than later, and that is simply not the time to do wiring, climbing, slinging, and soldering.

I'm one to talk. A few years back when we put up the first tribander at KL2R, I was literally racing winter weather. As soon as I stepped off the tower, freezing rain and snow started to fall, and that was the end of tower season for me.)

Of course, Interior hams know you can do antenna construction and maintenance in subzero weather, but things will be just so much more difficult as well as possibly more dangerous. Even simple tasks like checking coax for nicks and cuts can be nearly impossible when it's encrusted with snow. If you're pouring cement for that new tower base, you definitely need to plan some extra time for it to cure properly before freeze-up. Ever try to solder in the wind and rain? A royal pain, for sure.

Before adding any new antennas to your farm, I strongly recommend you make sure the existing installations are in top shape. That's because a new project can be a major distraction from essential maintenance, and time is limited.

Whether your antenna farm is simple or complex, start by checking the VSWR on each antenna. Do these checks every few months. Write this down in a notebook with the date, frequency, and reading and keep it handy. As wires oxidize, connectors loosen, and components age, VSWR can change. How much it changes can be a clue to the nature of any problems. Moisture can creep into places you could never imagine.

Visual inspections are crucial to identifying potential problems. Look for signs of strain or cracking on all wires, cables, and insulators. That includes your grounding and radial systems. Look for any corrosion in and around bare wire and other metal-metal connections. This is especially critical where two dissimilar metals (e.g., copper and aluminum) touch.

If you find some, remove the oxidized portion, clean the connection well with emory cloth or fine sandpaper, and reattach. You should consider applying an antioxidant paste such as Noalox, Penetrox, Ox-Gard, etc. Read carefully the instructions for the product you intend to use and make sure it is suitable for the intended purpose.

Coaxial cable requires special attention. Take the time to trace the coax and look at every inch for nicks and abrasions, which can lead to water invading the jacket. A wet coax is no coax at all. If you find a suspect area, I believe it's better to be conservative and replace the coax and plan to use smaller sections of it for jumpers and other projects.

Of course at $1.00 or more per foot for quality coaxial cable, this may be cost-prohibitive, and splicing is your only option. Since you really have no idea if or to what extent water has entered the coax, I suggest starting by removing at least one foot either side of the break in the jacket. If there is any discoloration or oxidation on the conductor and/or shield, whack off more until there are no more signs of corrosion. Make a jumper the appropriate length, solder on new PL-259s, and connect the ends with a PL-258 (UHF female-female) adapter. Make sure you wrap the splices well a sealant tape such as Coax Seal or a silicone connector tape. DO NOT USE SILICONE CAULKING. I prefer Coax Seal, because it holds up well in the cold.

No take a look at the antenna itself. Check for loose or cross-threaded bolts, screws, and rivets and any oxidation on the hardware. Galling is a bad sign, because it can reduce the thread size. Tighten or replace any part that is suspect. In then event you have a beam antenna with multi-section elements held together with screws or rivets, look for tiny cracks around the fasteners or an unusual amount of the oxidation at the joints. Cracks are a clue to impending failure of both electrical and mechanical integrity and will need repair. Also, consider adding some anti-oxidant paste to these joints even if you do not see any oxidation.

Even the smallest sign of arcing or burning on any portion of the antenna or its feedline is indicative of big problems, and more thorough troubleshooting is in order. This is especially true for antenna systems using an automatic tuner to get a good match. The tuner may make the transmitter happy with a poorly-matched antenna, but dangerously high voltages and currents can develop at the antenna end and damage the antenna feed and other components.

Check pullies, support lines, and guy wires for the right about of tension. If you own a guyed tower, invest in a Loos tension gauge. It's good insurance.

Maybe now you can see why I urge you to do this in warm dry weather. Depending on the size and/or the state of your antenna farm, it might just take the few weekends left before snowfall!

The (Really) Rough Guide to TNCs for APRS

by Larry Ledlow, Jr. N1TX

My involvement working on improvements to the Interior APRS infrastructure and the N1TX igate in particular has netted me quite a collection of terminal node controllers (TNCs). It started innocently enough. For years I have had several Kantronics products sitting on the shelf, so I pressed a KPC3+ into service at the igate running the UI-View32 client software.

I came to realize that since UI-View will never be upgraded, because the author, Roger Barker G4IDE SK, requested from his deathbed that the source code be destroyed. That was in 2004, and APRS continues to evolve. Many interesting and valuable features of APRS are only supported in newer clients (although UI-View is still a good program). In looking at other software packages, I decided to implement APRSISCE/32 written by KL4ERJ. And that's when I came to understand there were some key differences between TNCs. Advantages and disadvantages of each depend very much on the application.

There are a handful of basic situations in which you want to use a TNC on APRS: tracker (one-way position reporting); digipeater (relays); igate (like a digipeater, only a gatway between RF and the internet); weather and/or telemetry; and two-way messaging and/or mapping. Of course, a station can perform multiple functions.

TNCs operate in one of two modes. A standalone unit performs all functions internal to the TNC. In KISS mode, the TNC only performs the decoding and assembly of raw packets, which are then sent to a computer running an APRS client software package like UI-View, APRSISCE/32, or Xastir (for Linux and Mac users). The real brains of the operations are in the software, not the TNC firmware. The bottom line is you need to carefully consider how and where you will use the TNC before making a purchase.

Kantronics TNCs are nearly ubiquitous in packet and APRS applications. Of their product line, I can only speak from experience with the KPC3+ and KAM-XL. The KAM-XL is a strong contender for both HF and V/UHF applications. It's an expensive ($400+), very versatile (not just packet) TNC, and a comparison here would not be inappropriate, so I will only discuss its little brother.

The KPC3+ is half the price and an exceptional performer either as a standalone or as a KISS TNC. If you buy a used unit, ensure the KPC3+ has the latest firmware (9.1) or plan to buy a new ROM for about $40. The firmware adds some valuable features as a standalone digipeater and also addresses a serious duplicate packet issue when operating in KISS mode.

The KPC3+ I use for the N1TX-3 digi/weather station in Fox has been running reliably for several years. It is on a hilltop not always accessible by vehicle. One feature I like about it is the remote command capability, so I can reconfigure it from the comfort of my warm shack.

I do not recommend purchasing a new KPC3+ if your only intent is to use it as a tracker or solely in KISS mode. Less expensive tracker and KISS options are available. (Why lobotomize a $200 power house just to run KISS?) Of course, if you have a KPC3+ sitting on the shelf and want to use it for these applications, then it makes perfect sense.

Kantronics is no longer the only game in town, of course. Byonics manufactures both tracker-only (TinyTrak3+) and "smart" TNCs (TinyTrak4), the latter of which can operate in a wide variety of roles like the KPC3+. The TT3+ is an impressive unit for tracking applications and available in kit form ($33 with case) or pre-built ($42). It is about the size of two Zippo lighters. You can buy it in combination with a small GPS unit (Model GPS2) for $98 and $107, respectively. The TT3+ features SmartBeaconing, which adjusts how often the position reports are sent based on speed and course change. I have only just started playing with a TT3+ and GPS2 donated by Jerry KL7EDK, but I am very pleased so far.

The TinyTrak4 is far more powerful and can function as a tracker, standalone digi, or KISS TNC. It's about the size of a deck of cards. Again, you can purchase these as kits ($65) and pre-built ($75). Add a GPS2 for $65 more.

I have purchased several TT4s, one of which has been in service at KL1WE-1 in Anderson for about a year. It has proven to be extremely reliable, even surviving in an ice chest in an unheated garage throughout the winter. I have used the TT4 in KISS mode at the N1TX igate as well, when I had to take the KPC3+ out of service for some minor changes. Dan KL1JP has successfully built and deployed TT4 systems at very remote locations to provide digipeater/weather/telemetry services. Updating firmware or configuration settings is easy from a terminal program (Windows/Linux/Mac) or a configuration utility (Windows only).

There are two down sides to the Byonics units from my point of view. First, the cases are plastic or polycarbonate, which do not provide adequate shielding in high-RF environments. Although I have not experienced any interference issues, some users have. The cases seem fairly rugged, however. The second highly qualified negative is that remote control and configuration is not possible (yet). This feature has been promised on the TT4 for some time, but firmware development appears to have slowed to a crawl. Thus, I would hesitate to put the TT4 in a mountaintop digipeater for this reason.

An exciting product for KISS users is the TNC-X, which was developed by John Hansen W2FS. One very important feature is that it is one of two TNCs I know of to provide a USB interface. The RS-232 serial COM ports has the gone the way of dinosaurs on new PCs, and on the TNC-X, there is no fiddling with USB-serial converter cables and drivers. You still have to download a driver for the USB port to show up as a COM port on the PC, but the process is straightforward and guaranteed to work, unlike some generic USB-serial converters. If you use the USB port,

there is no need for a separate power connection to the TNC-X. That is a big plus.

The easy-to-assemble kit runs $88 with the USB option and metal enclosure, and a fully assembled TNC-X with USB is $123. I have purchased both types. The kit took me about 4 hours to solder and test.

For expanded capability, TNC-X also offers several other daughterboard options. If you prefer a Bluetooth interface to your PC or phone running an APRS app, the X-BT Bluetooth board is a nice add-on for $25. Two daughter board options to add digipeater functions to the TNC-X are available. The X-Digi is $20, and it does feature remote control and configuration. The uSmartDigi board costs $70, but it is very sophisticated in the configurable digipeater functions available. Finally, the X-Track daughter board ($17) turns the TNC-X into a tracker.

Unfortunately, you cannot have it all, because there is only one expansion header on the main board. So think carefully about your applications, or be prepared to buy different boards and swap them in and out as needed. I think it is a nice concept.

I only have some minor negative comments about the TNC-X. First, the instructions might seem a little muddy, so read, re-read, and read again. Also, I thought it would be a perfect solution to replace the KPC3+ on my igate. This turned out not to be the case, because the processing of the output packets was slower than the Kantronics. This is a highly technical gripe and should not discourage anyone from considering the TNC-X.

I have saved what I think is the best for last. Even though my testing with the little beauty is limited, my absolute favorite TNC (so far) is the OpenTracker3 (OT3m) from Argent Data Systems. For $95 you get a powerful, pocket-sized TNC in a hefty metal case suitable for just about any APRS or packet application. It shares many features with the Byonics products I admire so much and has improved upon some of them. Also, the OT3m was designed by people with a very practical bent, who have given attention to some little details that can make a world of difference for the APRS operator/installer.

As a tracker, the OT3m is fully capable of operating with a 5 or 12VDC GPS (configurable by jumper), Depending on the model or settings, GPS units communicate to the outside world using industry-standard NMEA "sentences" that begin with $GPRMC, $GPGGA, and $GPGLL. In addition, Garmin uses a proprietary binary format for communications. The OT3m will accept both types. The OT3m serial port allows connections of both a GPS and a another serial device simultaneously. For example, port A can accept NMEA data while port B can accept weather data.

The TNC will not transmit data without a valid position. You can, of course, enter a fixed position into the configuration file. A very nice GPS-related feature is that you can configure it to save a valid position after 30 seconds and then disconnect the GPS when you're finished with the installation. The OT3m can output waypoints to a mapping GPS receiver as well. For example, if you have something like a Garmin Nuvi or an Avmap, decoded APRS stations and objects will appear on the map. No external PC is required. You can set a range limit to eliminate creation of waypoints beyond a certain distance.

The OT3m accepts external power through a standard 2.1x5.5mm center-positive power connector. (This is not required is using the USB connector.) It can handle everything from 7 to 28 volts DC, which avoids many power supply problems in field installations where clean, stable DC may not be available. In addition, there is is no need to worry if you run the TNC from a car battery that may severely discharged. It only draws 50 mA, so a small battery will last seemingly forever.

On the front panel, you will see a green connector for accessory connections. This is a screw-block connector, which means no intricate soldering of DB9s for connecting input and outputs. The table below shows the pin-outs for this interface.

Accessory connector pin-outs:

Pin	Function
5V	Power output - 5V
1W	Dallas 1-Wire data bus
A1	Analog input 1
A2	Analog input 2
A3	Analog input 3
A4	Analog input 4
CT	Digital counter input
IO	Digital I/O
PS	Power switch output (7 amps max)
GND	Ground

I have not been able to find the maximum current allowable on the 5VDC output. A Dallas 1-Wire weather station can be connected directly to the 1W connector. Analog voltages from 0 to 20 VDC and the digital IO connection (5.2 VDC max) are very useful to monitor the state of other equipment at the installation site.

There is a power switch (PS) connection that actually allows the TNC to switch on and off a powered device drawing up to seven amps. This is plenty to turn on/off, say, an HT or even a mobile radio on lower power settings. This can be a very handy feature when used in conjunction with some other settings in the configuration profile. For example, to conserve battery power, you may want to only turn on the radio or other equipment just before a transmission and then turn it off again until just before the next transmission cycle.

The OT3m can be configured with two profiles for either different applications or different operating conditions. In addition, you can program the TNC to switch automatically between the profiles if certain conditions are met for things like altitude, speed, temperature, voltage, and several other parameters.

If you are careful in your logic, the OT3m can become virtually autonomous in responding to different operating environments. Let's say you install a solar-powered APRS station and want to transmit APRS beacons every 30 minutes when the battery is in a healthy state and the sun is shining. At night or when the battery reaches a defined level, you want the beacons to go out once every two hours. That would be no problem for the OT3m. I find the possibilities incredible and exciting.

And that pretty well sums up everything I know about TNCs! Drop a line to *n1tx@akradio.net* with your questions or to help me work on the APRS network in and around Fairbanks.

Part of N1TX's TNC collection

Inside the OpenTracker3

The OT3m features pin-outs silkscreened on the bottom - thoughtful in case you lose the manual.