

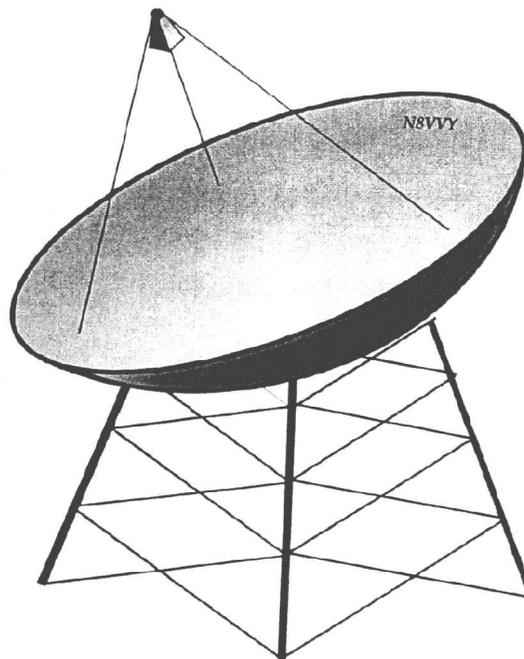
# ANOMALOUS PROPAGATION

Newsletter: *The Midwest VHF/UHF Society*

## Editors:

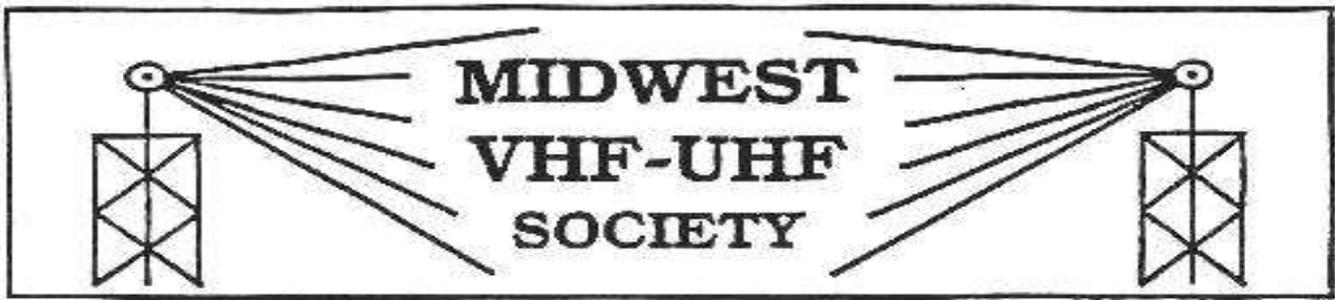
Gerd Schrick, WB8IFM  
4741 Harlou Drive  
Dayton, OH 454 32  
(937) 253-3993  
[WB8IFM@ARRL.net](mailto:WB8IFM@ARRL.net)

Steve Coy, K8UD  
3350 Maplewood Dr.  
Beavercreek, OH 45434  
(937) 426-6085  
K8UD@ARRL.NET



Material from this publication may be copied  
with due credit to the source

Annual Society membership is \$ 12.00. Please  
make checks payable to Gerd Schrick



Vol. 28 No. 4

[www.mvus.org](http://www.mvus.org)

Apr/May 2014

Beacons: 1296.079 **W8KSE** \*) EM79ur Dayton, OH---- 2W to Big Wheel at 800' AGL.

Listen for the **10GHz Beacon** at EM79qk, tower of **K9AYA**, 2W @ 10,368.000 Mhz

## Contents

De N8ZM.....	3
Hamvention Forum Schedule.....	3
This and That.....	4
New GPS.....	5
Radio Shack changes.....	6
Earth's Magnetic Field.....	7
Ultracaps solve Cranking Problems.....	7
Phase 4 Amateur Radio Transponders.....	8
Fast Fourier Transform Magic.....	8
Pattern Recognition.....	9
Modern VHF Amplifiers.....	10

**Hamvention 16/17/18 May, Dayton, Ohio**

**MVUS Booth as usual #332**

See also next page! >>>>

<p>Pres. Tom Holmes, N8ZM  Vice Pres. Bob Mathews, K8TKQ  Secretary, Steve Coy, K8UD  Treasurer, Gerd Schrick, WB8IFM</p>	<p>*) off the air, pwr-supply needs repair, stand by. Mike, W8RKO</p>
---	---

**Noise sources** available in two frequency ranges: 50 MHz to 3 GHz, and 3 GHz to 11 GHz. Fully assembled and tested with ENR data provided. The lower frequency version \$50 including shipping in the USA. The 11 GHz version is \$95, but delivery is about 8 weeks ARO.

Contact N8ZM at [n8zm@mvus.org](mailto:n8zm@mvus.org) for more details.

## De N8ZM

**OK, first the big news??** The meeting date for this month is the 25<sup>th</sup>, and since Joe (N8QOD) and I, and possibly Steve (K8UD), are going to the SE VHF conference in Atlanta, Gerd suggested that we cancel this month's meeting. That would leave VP Bob, and Treasurer Gerd to run the meeting. Sounds like a great opportunity for a coup to overthrow the current regime. Any takers? So I propose to have the meeting anyway.

Also, the May mtg will be Friday after Hamvention for those who have recovered. That's May 23<sup>rd</sup>. I could use a couple more people to do time in the MVUS booth. Send me an email if you are interested so I can arrange for your exhibitors badge. Sooner is much better than later for this, so please do it now while you are thinking about it.

I am always looking for things to display in the booth related to VHF and microwaves, but that isn't a hard and fast rule. Anything that will attract visitors and pique their curiosity or bring back memories is a good thing. Let me know what you have.

I am hoping to have a few noise sources ready for sale but it will be tight given the accumulation of tasks on my plate the next 4 weeks. We should be prepared to take orders to fill right after the show. If ordered at the show, we'll honor our usual \$5 discount.

There is the possibility that the little balloons will be launched on Saturday afternoon by a robot! The launch location has moved to the east end of Mendelson's tent. Don't miss it!

There will be 2m and 432 beacons on the roof at HARA again, so be listening as you drive in. We'd like to get signal reports from you to see how far away you could hear them. They will be turned on sometime Thursday and will remain on the air until mid-day Sunday, barring any QRM complaints or power failures, both of which have been known to happen.

In case you missed hearing this, there is no VHF Weak Signal Dinner on Friday night of Hamvention this year. Tony was unable to work out a suitable agreement with the venue for this year. Hopefully he will be able to make it all work out for 2015.

This edition of Anom Prop is for both April and May, so don't look for another one until June!  
de Tom, N8ZM.

## 2014 Hamvention VHF/UHF Forum Sched,

Moderator: Tom Holmes, N8ZM. Sat 17 May, afternoon

1. Rick Campbell, KK7B *VHF Maker-Technology Harvesting and Spin-off Designs*
2. Jeff Wadsworth, KI5WL Easy 10 GHz Transceiver without Unobtainium
3. Mike Kana, AA9IL Newbie Explorations at 24 and 47 GHz
4. Ed Krome, K9EK Homebrew VHF amplifier-modern style\
5. Zack Widup, W9SZ Building 47 GHz Transverters from Scratch\
6. Tony Emanuele, WA8RJF Assembling a 10 GHz Portable Station
7. Terry Price, W8ZN K8GP-VHF Contesting run Amuck!
8. Dave Sublette, K4TO (Alternate) A 5,760MHz Amplifier Project

## 4-This and That 4-14

**Remember the VCR?** Well, how about computers. Turns out, the good old VCR was only the tip of the iceberg. [Gerd, WB8IFM]

**Brain Extension.** “I don't like it, but my desk is cluttered. In a sense the studio becomes like an expanded head, with different fragments of ideas moving across it as you lie awake at 4 a.m., and there are 50 different anxieties that your brain jumps between. [William Kentridge]

**Still Valid.** This I picked up from pg 2 of the j1999 January issue of our newsletter: *Drive safely, don't speed, don't follow too close!* [Gerd, WB8IFM]

**Reading the Paper.** I have been reading the morning paper. I do it every morning--knowing well that I shall find in it the usual depravities and basenesses and hypocrisies and cruelties that make up civilization, and cause me to put in the rest of the day pleading for the damnation of the human race. I cannot seem to get my prayers answered, yet I do not despair. [Mark Twain- letter to W.D. Howells, 4-2-1899]

Necessities? *Civilization* is a limitless multiplication of unnecessary necessities. [Mark Twain]

**Actions.** Fear or stupidity has always been the basis of most human actions. [Albert Einstein]

**Food Wasted.** Nine out of 10 Americans throw away perfectly edible, unspoiled food purely because the “sell by” or “best before” date has expired. The average home throws away \$450 of edible food a year because of a misunderstanding of those labels. [Los Angeles Times]

**Good News...Bad News.** There is a good chance of AMSAT supplying an Amateur Transponder for an Arabian geostationary satellite to be launched in 2016.... The bad news: It will be positioned around

26 degrees East so that only Europe and Africa will have access. Asia and the Americas will be left out! (except a sliver of the north eastern part of SA). See also page 8! [AMSAT-DL]

**Are you kidding?** There is a Watts to milliwatts conversion calculator as well as a Watts to megawatts calculator on the web! And many other similar conversions. Have Fun, learn a little about the metric system. [RapidTables.com]

**Mai 1.** “I'm hereby proclaiming Thursday Mai 1, *Take Their Video Games Away for Good Day*. In my fantasy, millions of boys come home from school that day and find their video consoles are gone. Forever! To paraphrase Louis Armstrong, “What a wonderful world that would be!” [John Rosemond]

**Jerks.** What I do not understand is why anyone who took the time and effort to obtain an Amateur Radio license, and went to the expense of assembling an Amateur Radio station would intentionally act like a “jerk” and intentionally violate the simple and useful rules that guide operating on the ham bands. Some people must get their jollies from doing this, but it doesn't make sense to me. [Jim,K8JE/ well said, Ed]

## A New “GPS” *By Gerd, WB8IFM*

We had tried GPS at work before it became available to the general public and I was impressed. You could see on the trace which side of the road you were on! That gives you a better feel of what you can see than the number of feet accuracy.

So when they became available, I got a hand held unit, meant to be used for hiking and it was quite an expense (several hundred \$\$ I remember!) What I found at the time were two things: you had a problem with the signal, needing a clear spot and a few satellites in view AND the (Ni-cad) batteries better be fully charged. Or you could carry a bunch of alkaline s. Then, when they became available for the mass automobile market and the technology had been tweaked (better receivers, antennas, and satellites) I tried it again only to find that the “software’ had gotten so confusing, it turned me off. I tried for a while, but then gave the unit to my son-in-law, and he didn't get very far either.

Years have past and we just acquired a brand new GPS for a friend who is coming to the Hamvention and doesn't want to spend that extra charge fr the GPS in the rental car! Interestingly this past weekend the two brothers on radio and in the paper discussing car problems were ranting about how the car companies way overcharge you for the GPS and apparently the rental car companies do the same thing, although their system is not integral to the car just like yours and mine.

Steve, K8UD, helped me select and order a GPS; it cost less than \$40 and arrived after a few days. Steve fixed the unit with a suction cup to my windshield and I plugged the connector into the cigarette lighter. That was it. There was no instruction manual, however there is a website, where you might find some advice. This advice is usually of the kind: “We are from the government and are here to help you!” Might as well forget it. That was not so good! Now, of course, if the thing is build to some fundamental rules, all is needed some intuition and some common sense.

I pulled out of the alley behind Steve's business and the friendly voice told me to turn left, OK. Then, turn right! OK again. After a few feet it was “take a sharp left!”. This was getting me on a main street, that I normally avoid. But it makes no difference in distance, so I took this route. On the display I could see that my next turn would direct me unto a Freeway for just a very short drive. I never take this route! So I just turned on the surface street that runs parallel the freeway!

For sure, the “ you missed your turn! Recalculate... Do this do that. But there was none of this. Apparently the system figured I knew where I was going and left me alone. I came to the intersection where I would have exited from the freeway and again: I was not corrected . I few more turns, nicely announced and I was pulling into our drive way. I was impressed.

The unit, a 5” Tom Tom, has touchscreen and voice control. At this point the only thing I haven't figured out is how to turn it off when it is not in use. So I leave it on (to give it time to recharge, and then, after a while I go back to the car and pull the plug! \*

\*) Steve filled me in on this “problem”. The on/off button is in the back, where, after looking, I found it. I do not like the black fad! Everything is black, the box, the buttons; and the markings ares scratches or grooves. We knew an old lady who kept a flashlight and a magnifying glass handy to control the TV or Stereo. There is some “classy” equipment that has white writing.

# Troubling Headline

By Gregg Harris

I get emails all the time from customers waxing fondly about the days of old when Radio Shack was more than just a store, but a place where people who loved electronics would hang out. Those days are long gone and when I recently saw the headline "[Radio Shack's Losses More Than Double](#)" part of me was sad that this chapter in [electronics component](#) history appears to be quickly closing.



There was a time when the future of electronics was easy to predict. Components would keep getting smaller and harder for those of us with fat fingers to work with. Electronics as a hobby was quickly dying and many were predicting it would die out as the old hobbyists died off.

"Radio Shack was founded back in 1921 to service the ham radio market, but in the 1960s and 70s, with the help of Charles Tandy, Radio Shack emerged as everyone's neighborhood electronic components store. But at some point in the 1990s that all changed. The component section got smaller and smaller until it virtually disappeared. The emergence of consumer electronics began to dominate and squeeze out the folks who thought a [screwdriver](#) in their shirt pocket was a fashion statement.

Many people I've spoken to remember Radio Shack not as a store but as a destination where they could meet and discuss the hobby that they loved. Radio Shack was a community and that's why for many the evolution was so frustrating.

But something happened in the new millennium. I can't say anyone at Jameco was smart enough to predict the electronics hobbyist market would reverse course and start to grow, but when it did we certainly recognized the void left by Radio Shack. We did our best to support Radio Shack's old customers, and we even tried to create a bit of that old community with our newsletters, products and programs.

What's most surprising about the resurgence in electronics as a hobby is that it has been driven by young people. From middle schools to high schools and universities, we're seeing a new breed of electronics hobbyists with exciting new energy. It's also heart-warming to see grandfathers and grandsons finding that they have electronics as a hobby in common (plus a few grandmothers and granddaughters). It's curious that in many cases the love for electronics seems to have skipped a generation.

There is a lot of passion wrapped up in both electronics as a hobby as well in Radio Shack and its evolution. Jameco sees plenty of future growth to come in this area, and from our pricing strategies to our product offering to our new [Club Jameco](#) website, we're doing everything we can to fuel passion for electronics as a hobby.

Do you miss the good old Radio Shack days? Take a moment to drop me a note and tell me your favorite Radio Shack memory and, if we get some good ones, we'll publish the best stories in next month's newsletter. Send your submission to [MyStory@Jameco.com](mailto:MyStory@Jameco.com).

Gregg Harris Vice President, Marketing Jameco Electronics

## Earth's Magnetic Field

(BBC Launch of "Swarm" by Jonathan Amos 11-22-2013)

The major part of Earth's global magnetic field is generated by convection of molten iron within the planet's outer liquid core, but there are other components that contribute to the overall signal. These include the magnetism retained in rocks, and there is even an effect derived from the movement of salt water ocean currents.

**Swarm ( 3 satellites)** will attempt to tease apart these various factors, to get a clearer picture of the field's true origins and its changing behaviour.

Other uses of the Swarm data will embrace investigations of the electrical environment of the high atmosphere and the way this interacts with the solar wind - the continuous stream of charged particles billowing away from the Sun.

The main component of the global field is generated in the outer core

The solar wind carries its own magnetic field which clashes with Earth's, producing "storms" that can on occasion disrupt satellites, **radio communications** and even electricity grids at the planet's surface.

## Ultracaps Solve Diesel-Cranking Problems

Mar 15, 2014 [Don Tuite](#)

Putting big ultracaps to use can take some out-of-the-box thinking. Here's one that helps truckers who aren't allowed to leave their engines idling .

Large-capacitance ultracapacitors offer something of a design challenge. Providing tens or hundreds of Farads for potential power storage, they demand new ways of thinking about potential applications. They're not simply another kind of battery. As a rule, they have 10 times higher power density (W/kg) than batteries, while batteries have about 10 times higher energy density (Wh/kg).

Maxwell Technologies has taken advantage of that difference to create two products that solve a problem common to both long-haul freight-carrying companies and operators of local delivery fleets. Laws and regulations prevent these companies from keeping their diesel engines running when they're stopped for long periods.

That's complicated by the amount of power it takes to crank diesel engines, which operate at much higher cylinder compression levels than gasoline engines. Compression, not spark, is what it takes to ignite a diesel-air fuel mix.

With a conventional battery array, that's a problem for both long-haul and short-haul truckers. On mandated layovers, long-haul drivers use all kinds of appliances for light, entertainment, and climate in the cab, while the trailer can pull even more energy for refrigeration. That can leave scant power for engine cranking when it's time to move on.

The problem is a little different for short-haul companies. There, the challenge is the requirement to shut down the engine at every stop. That leads to more frequent cranking, which may not give the batteries time to recharge between stops.

To deal with both problems, Maxwell's ultracapacitor-based Engine Start Module (ESM) product line includes one version for class 3 through 6 medium-duty trucks and another version for class 7 and 8 heavy-duty diesel trucks. Each combines a charger/ultracap array and replaces one or more of the batteries in the truck's battery box, but is devoted exclusively to cranking the engine during starting.

The original ESM product for long-haul trucks provides 1800 cold-cranking Amperes (CCA) and recharges in 15 minutes. It functions from -40°F to 149°F and weighs 21 lb. The ULTRA 31/900 is essentially half the larger version in a smaller package, delivering 900 CCA. It weighs 16 lb and matches the industry-standard Group 31 battery form factor. It stays fully charged even when the truck's lead-acid battery is as low as 9.5 V.

On behalf of Peter Guelzow  
March 23, 2014  
To: AMSAT - Forum  
Es'HailSat-2 will carry

## two geostationary **"Phase 4"Amateur Radio Transponders**

As a result of a concept proposed by the Qatar Amateur Radio Society, Es' Hailsat, the Qatar Satellite Company, have announced that their new, geostationary, Es'HailSat-2 communications spacecraft will provide transponders for use by radio amateurs. The spacecraft is expected to be ready for launch by the end of 2016.

Es'HailSat-2 will provide a 250kHz linear transponder intended for conventional analogue operations in addition to another transponder which will have an 8MHz bandwidth. The latter transponder is intended for experimental digital modulation schemes and DVB amateur television.

Precise uplink and downlink frequencies remain to be finalized but the uplinks will be in the 2.40-2.45GHz and the downlinks in the 10.450-10.500GHz amateur satellite service allocations Both transponders will have broad beam antennas to provide full coverage over about 1/3rd of the earth's surface. Precise operational plans will be finalised over the coming months but it is anticipated that only quite simple ground equipment will be required to use this satellite.

A team of amateurs, led by Peter Guelzow DB2OS (President of AMSAT-DL) are providing technical support to this ground breaking project which is expected to provide an exciting new phase of activity for radio amateurs **for the 21st century.**

## **Fast Fourier Transform "FFT"** From Wikipedia

A fast Fourier transform (FFT) is an [algorithm](#) to compute the [Discrete Fourier Transform](#) (DFT) and its inverse. A [Fourier Transform](#) converts time (or space) to frequency and vice versa; an FFT rapidly computes such transformations. As a result, fast Fourier transforms are widely used for [many applications](#) in engineering, science, and mathematics. The basic ideas were popularized in 1965, but some FFTs had been previously known as early as 1805. Fast Fourier transforms have been described as "the most important [numerical algorithm](#)[s] of our lifetime".[\[1\]](#) [As an example: in Ham radio the FFT can be used to select and tune automatically a SSB signal.](#)

## [AF-FFT Scope in the FT DX 3000](#) from Yaesu

An AF-FFT (Audio Frequency Fast Fourier Transform) scope is built in. This AF-FFT function was first demonstrated in the FT DX 9000 series. With this Scope, the audio characteristics of the received signals; the effect of adjusting the RX IF filter performance; and utilizing the QRM rejection features, may be visually observed. It is also possible to observe the TX audio characteristics of your own signal while using the Monitor function. This is very effective for tuning the parametric equalizer for voice characteristics and the microphone audio.

# Pattern-recognition system for mobile devices blocks ‘shoulder surfers’

[Source: Kurzweil]

April 9, 2014

Georgia Tech’s LatentGesture system creates a “touch signature” on mobile devices to block “shoulder surfing” password-hacking (credit: iStock)

Cybersecurity researchers from the [Georgia Institute of Technology](#) have developed a new security-software system called LatentGesture that continuously monitors how a user taps and swipes a mobile device. If the movements don’t match the owner’s patterns, the system recognizes the differences and if programmed, can lock the device.

In a recent Georgia Tech lab study, the system was nearly 98 percent accurate on a smartphone and 97 percent on tablets. (The system can be combined with other security systems for higher accuracy.)

“The system learns a person’s ‘touch signature,’ then constantly compares it to how the current user is interacting with the device,” said Polo Chau, a Georgia Tech College of Computing assistant professor who led the study.

To test the system, Chau and his team set up an electronic form with a list of tasks for 20 participants. They were asked to tap buttons, check boxes and swipe slider bars on a phone and tablet to fill out the form. The system tracked their tendencies and created a profile for each person.

LatentGesture continuously monitors how a user taps and swipes a mobile device. If the movements don’t match the owner’s tendencies, the system recognizes the differences and can be programmed to lock the device. (Credit: Georgia Institute of Technology)

After profiles were stored, the researchers designated one person’s signature as the “owner” of the device and repeated the tests. LatentGesture successfully matched the owner and flagged everyone else as unauthorized users.

“Just like your fingerprint, everyone is unique when they use a touchscreen,” said Chau. “Some people slide the bar with one quick swipe. Others gradually move it across the screen. Everyone taps the screen with different pressures while checking boxes.”

The research team also programmed the system to store five touch signatures on the same device — one “owner” and four authorized users. When someone other than the owner used the tablet, the system identified each with 98 percent accuracy.

As security consultant Frédéric Fraces [notes](#) on *Information Security Buzz*, there is a danger of other people “shoulder surfing,” or looking at a mobile phone or tablet in an attempt to steal a password. The researchers also say the system is constantly running in the background, so the user doesn’t have to do anything different for added security and authentication.

The study will be presented in Toronto at ACM Chinese CHI 2014 from April 26 to 27.

This research was partially supported by the National Science Foundation.

## References:

- Premkumar Saravana, Samuel Clarke, Duen Horng Chau, Hongyuan Zha, LatentGesture: Active User Authentication Through Background Touch Analysis, presented at The Second International Symposium of Chinese CHI (Chinese CHI 2014), Toronto, Canada, 2014

# Modern, home-brewed VHF Amplifiers

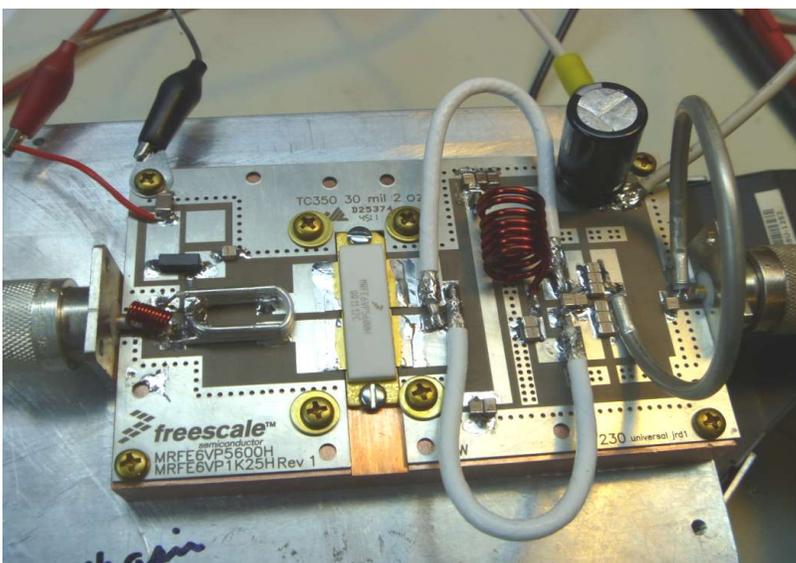
Ed Krome K9EK

EM69xd (Columbus, Indiana) May 2014

This year's Dayton Hamvention theme is Make! Makers are builders, tinkerers, repurposers; this is the tradition of Ham Radio. I've been licensed for 50 years; everybody used to try their hand at building RF amplifiers. In this high-tech era, it seems that many have lost the desire to build and tinker. In truth, modern devices and information available on the Internet make homebrewing easier and better than ever. First it was MMIC's, which redefined amplifiers. And modeling programs, that can tell you if your latest circuit might actually work, even before you build it. Now, there is a new line of transistors that should make amplifier builders out of all of us. This device is the Freescale MRFE6VP61K25H LDMOS Transistor. These are dual LDMOS devices, rated 1200-watts output, designed to operate any mode and up to 100% duty cycle from HF through 600 MHz

For about \$260. There is a 600-watt version, MRFE6VP5600H (about \$160), which I have used to build amplifiers on 6M, 2M and 432MHz. Circuit boards with kits of parts are available from two sources, RFHAM in France and W6PQL (who also has kits for sequencers and protection devices) in California. I have built kits from both. The most challenging part is that the small (.4" x 2") transistors must be mounted on copper heat spreaders, which are then mounted to heat sinks. Pre-machined copper spreaders are also available. Actual construction is not difficult; an evening or two. The 2M version (shown) is the easiest. And it worked, first time, without tweaking or tuning. Performance is amazing. Maximum input power is 1 watt for the 600-watt version; mine produced 560 watts power out. DC requirements are 48 Volts at less than 20 amps. This is a common voltage used for computer servers. The HP DPS-2500AB, rated at 51 VDC @ 39Amps, is readily available on eBay for ~\$40. Works fine.

All is not completely golden; these amplifiers produce prodigious quantities of harmonics. Low pass filters are always required.



The 6 Meter version was slightly more involved as the matching transformers (made from coax) are a bit more difficult to make. But it also worked without tweaking. 600 watts out from 1 watt in. The 432 MHz version was a bit lumpy; it took some tweaking. There are a variety of output tuning configurations being used. My version now produces 500 watts out from 4 watts in. An FT-817 drives it to full output.