

Vol. 23 No. 3

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

Mar. 2009

**Meeting Fri 27 March**  
**at the Hometown Buffet near SR 725 and Yankee Rd.**  
**in Centerville**

**MVUS Sunday Net at 14:30 UT** (currently 10:30 AM local time, EDT).  
The net frequencies are primarily **144.280 Mc** and **28.960 Mc**.

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**Hamvention this Year: 15 / 16 / 17 May !!!**

We will have a booth which serves as a focal point. You can arrange to meet with your friends, may deposit small packages, just don't forget to pick them up later. There will be some demo's and literature and, of course, you can pay your dues and new members are welcome.

**Re Roster.** There will be **Errors**, please take your time now and check now, then let us know!  
**E-mail us or drop a postcard to the editor. Thanks.**

**Re Pictures and Graphs.** We have been posting most pictures and graphs in color on the Web. That makes it a whole lot nicer on your eyes. Of course, as a member of MVUS, you have full access to the Newsletter files.

## This and That 3-09

**Simplicity.** “An intelligent fool can invent further complications, but it takes a genius to retain, or recapture, simplicity.”  
[E.F. Schumacher]

**Gold Standard.** A local newspaper has been running a half-page color advertisement announcing to buy gold, silver and diamonds for at least a year. Sometimes there are several such ads (the same establishment) even full-page ones. So there must be money to be made that way. One of our members is panning for gold as a hobby. He even went so far as to obtaining a dredging machine.

[Gerd, WB8IFM]

**Signal to Noise.** The narrower the band of transmission, the better the so-called signal-to-noise ratio, just the same way, in technologist Gary Frost’s metaphor, that shorter books harbor fewer typographical errors.

[Harold Evans]

**Curse of Exact Time Measurements.** We now know that the earth slows down by 1 second every 500 days!

**Ignorance.** “It ain’t ignorance that causes all the trouble in the world. It’s the things people know that ain’t so.”

[Josh Billings]

**Tesla about Edison.** Tesla, who worked for Edison briefly, commented: “If Edison had to find a needle in a haystack, he would proceed at once with the diligence of a bee to examine straw after straw. I was a sorry witness of such doings, knowing that a little theory and calculation would have saved him 90% of his labor.”

**Clever Monkeys.** Female monkeys living in a 250-strong colony were observed by scientists teaching their young how to use strands of hair to clean between their teeth. The theory that primates are able to teach offspring how to use tools was confirmed by the discovery, according to Professor Nobuo Masataka of Kyoto University's Primate Research Institute, who conducted the study.  
[Danielle Demetriou in Tokyo]

**Laptop.** Came across the German term, used for a laptop: “Klapprechner” which translates verbally to flap calculator or flap pc.

[Gerd, WB8IFM]

**Testing...Testing.** NASA and U.S. Air Force test pilots have dropped a 50,000-pound "dummy" rocket booster on the Arizona desert (Feb 28-09) --and stopped it before it crashed. Its all part of NASA's plan to return to the moon.

[NASA]

**Anybody out there?** Is intelligence a rare accident in the evolutionary process, or such a self-destructive attribute that intelligent species don’t usually survive more than a couple of centuries after they industrialize? Are they all observing radio silence because there is something dreadful out there? Or have we just not figured out yet how mature galactic civilizations communicate?[Gwynne Dyer]

**For Once the Right Plant.** A local newspaper ad proclaims: “Find 5-Star Service Providers in our Local Directory” ...powered by KUDZU...

[Gerd, WB8IFM]

**Basket Ball Season.** If I watch more than two games a week, they all start to look the same, sort of like episodes of “Law and Order.”

[D.L. Stewart]

**VOM Sale.** Cent-Tech 7-Function Digital Multimeter \$ 1.99 , regular price \$ 4.99. [Harbor Freight Tools]

**Getting Our Fuel from Algae.** The UAS Dept. of Energy figures an algae-bearing area of 15,000 square miles would be needed to produce the amount of oil needed to take over the current US petroleum demands. That’s a few thousands square miles larger than Maryland, or about the size of 1.3 Belgiums.[Machine Design]

# LORAN-C

by John Ackermann,N8UR

Gerd asked me to write a few lines about LORAN-C, probably in light of the recent news blurb on [www.arrl.org](http://www.arrl.org) that the Coast Guard has announced that it is planning to discontinue operation of LORAN in 2010.

LORAN, which stands for LOnG Range Aid to Navigation, uses chains of stations transmitting precisely timed pulses. By comparing the delay between pulses arriving from three stations in one chain, a navigator can use a chart overlaid with TD (time delay) lines to determine position to an accuracy of 0.1 to 0.25 nautical mile. Modern receivers do away with the charts and calculate latitude and longitude directly.

While LORAN-C's accuracy is not as good as GPS, its repeatability is often less than 300 feet. That approaches GPS, and explains why fishermen liked to use LORAN to mark their favorite spots. It operates with frequencies around 100 kHz.

I'm interested in LORAN because, like GPS, it relies on precise timing. Each LORAN site is controlled by a set of Cesium atomic frequency standards, and their performance is monitored against the US Naval Observatory. As a result, LORAN can be used for frequency calibration, although the current system does not provide any way to directly tell the time. I run an NTP (Network Time Protocol) server that uses LORAN as its reference, and its performance is virtually the same as a GPS-based server.

This announcement about LORAN C discontinuation came out of the blue. There had been talk for years of dropping LORAN because it is supposedly rendered obsolete by GPS, but at the same time various groups lobbied to keep LORAN going as a backup system.

A few years ago, design was started on an "enhanced LORAN" or e-LORAN system, and as of early last year that development seemed to be moving ahead. Then, this announcement came out as part of the new federal budget.

Some of the more cynical folks I know have speculated that the announcement is really maneuvering to get increased funding for the Coast Guard by making LORAN expendable; the theory is that there will be an outcry which will cause Congress to provide additional funding. Whether that's really the case, I don't know, and I don't know whether the announced shutdown will actually occur.

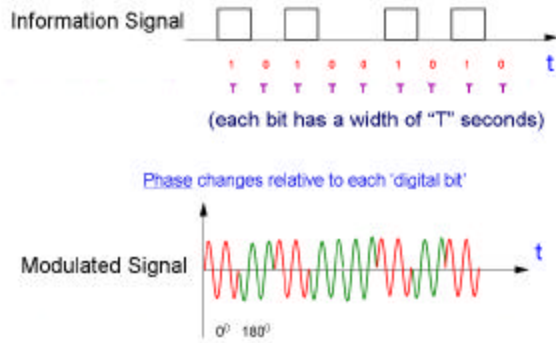
## Close Calls

Space Weather News for March 17, 2009 <http://spaceweather.com>

ASTEROID BUZZES EARTH: Newly-discovered asteroid 2009 FH is flying past Earth tonight only 85,000 km (0.00057 AU) away. That's a little more than twice the height of a geosynchronous communications satellite. Experienced amateur astronomers in North America can photograph the 20-meter-wide space rock racing through the constellation Gemini after sunset on March 17th. It should be about as bright as a 14th magnitude star.

This is the second time in March that an asteroid has flown so close to Earth. On March 2nd, 2009 DD45 passed by only 72,000 km away. Measuring some tens of meters in diameter, 2009 DD45 and 2009 FH are approximately Tunguska-class objects, meaning they pose no global threat but could cause local damage if they actually hit Earth. In years past, asteroids of this size often passed unnoticed, but recent improvements in asteroid surveys have resulted in growing numbers of space rocks caught in the act of near-Earth flybys.

## Phase Shift Keying (PSK)



If we look at the FSK signal in both time and frequency, you can see that there is bandwidth consumed. Here, the BW is mainly determined by the amount of frequency shift from a 0 to a 1.

## Vector Modulation

### Vector Modulation Characteristics

Modulation format	Number of bits per symbol	Constellation	Transmission bandwidth
BPSK	1		
QPSK	2		
16 QAM	4		

Symbol Rate = #symbols/sec. (Hz)

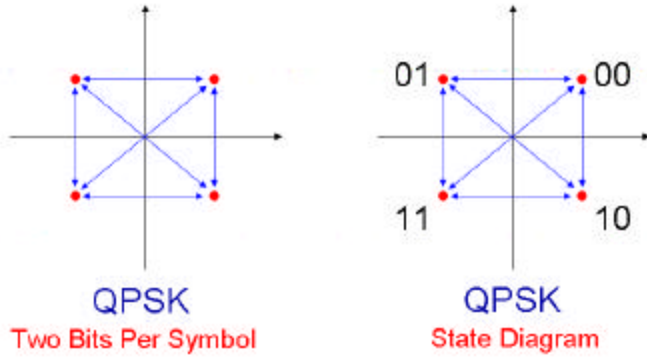
If I talk about the bit rate, you understand that it is the basic rate of data transfer in bits/second. In general, the RF bandwidth required to achieve a particular bit rate is equal to the bit rate. Megabit rates require MHz bandwidths. Spectrum is far too expensive for that! So, various schemes have been developed to get more bits moved using less spectrum. If we use Binary PSK for our reference BW, we can explore the benefits of some other modulation schemes.

Notice that as the scheme becomes more complex, the same bit rate can be achieved in less occupied bandwidth. This is a good thing, but comes at a cost: added circuit complexity and reduced immunity to noise.

Remember last month that I talked about using the combination of magnitude and phase to describe the carrier, and that this descriptor is called a vector. It is very easy to create a set of unique vectors that can represent one or more bits. For example, in BPSK, I have two vectors of magnitude one, and angle of either 0 or 180 degrees. These represent a bit value of either 1 or 0. If I have 4 vectors, at angles of 45, 135, 225, and 315 degrees, then my vectors point to the corners of a square. This gives me the ability to assign the four possible combinations of two bits, one combination to each corner. Each of these four combinations is a symbol for the bit combination it represents.

If I transmit my symbols at a rate of one per second, I am transmitting my bits at two per second. Therefore, the bit rate is related to the symbol rate by the number of bits a symbol represents.

## Bit Rate and Symbol Rate

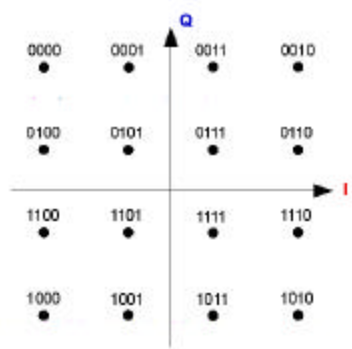


**BIT RATE** is the frequency of the system bit stream  
**SYMBOL RATE** is the bit rate divided by the number of bits that can be transmitted with each symbol



## Quadrature Amplitude Modulation (QAM)

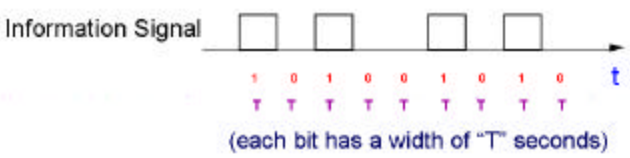
This is an example of a 16-QAM constellation. Each symbol represents 4 bits. Phase and amplitude changes occur for each symbol.



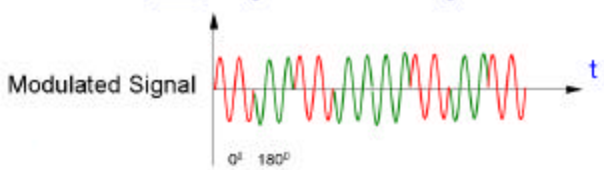
To carry three bits per symbol, I need to use eight phase values to accommodate all of the possible combinations of three bits. So now the phase angles step around the unit radius ( constant amplitude) circle in 45 degree increments, starting from zero. In these two cases, I need to break the incoming serial bit stream into chunks of two and three bits, respectively. This is very easy in hardware or software, but you can see that we have added a small amount of complexity. And on the receiving end, we also need the processing in place to translate the received symbols into the same bit sequence that was sent.

In the example on the left, 16-QAM provides four bits/symbol by using both amplitude and phase changes. Note that the bit combinations are not mapped to the symbol positions in order, but rather are assigned to assure that adjacent symbols represent only a one bit change along the horizontal and vertical axes, and no more than a two bit change along the diagonals. This is done to reduce bit errors.

## Phase Shift Keying (PSK)



Phase changes relative to each 'digital bit'



If we look at the FSK signal in both time and frequency, you can see that there is bandwidth consumed. Here, the BW is mainly determined by the amount of frequency shift from a 0 to a 1.



## MVUS Roster 2008

CALL	FNAME	LNAME	STREET	CITY	ST	ZIP	PHONE	DUES	News letter	Email
WD0B	David E.	Brandon	301 S. Hackett Rd.	Waterloo	IA	50701-1661	319-292-8724	5/1/2007	<input checked="" type="checkbox"/>	
W0EKZ	Robert	Maxton	1262 E.90th Ave N.	Belle Plaine	KS	67013	316-488-3801	12/1/2009	<input checked="" type="checkbox"/>	
AB0HP	Larry	Ballen	31993 Knollwood	Macon	MO	63552	660-395-4956	6/1/2009	<input type="checkbox"/>	
WB0SC	Jim	Brude	31 Quayl Brace Ct.	Amelia	OH	45102	513-753-5183	6/1/2008	<input type="checkbox"/>	wb0scd@amsat.org
N0UU	Lawrence	Stoskopf	4408 E Country Est.	Salina	KS	67401	785-823-9498	12/1/2009	<input checked="" type="checkbox"/>	
W0VZK	William G	Buckner	PO Box 721	Marshall	MO	65340	660-886-3408	6/1/2011	<input checked="" type="checkbox"/>	
K1DS	Rick	Rosen	206 Kimberton Dr.	Blue Bell	PA	19422	610-270-8884		<input type="checkbox"/>	rick1ds@hotmail.com
N1GX	Adam Mac	Donald	616 Gardenia Ct	Rosamond	CA	93560		12/1/2009	<input type="checkbox"/>	CalvinF15@SBCglobal.net
KB1SF	Keith	Baker	3560 Pine Grove Av	Port Huron	MI	48060	937-545-3292	12/1/2007	<input type="checkbox"/>	kb1sf@kcbassociates.com
N1UL	Ulrich	Rohde	52 Hillcrest Dr	Upper Saddle River	NJ	07458		12/1/2007	<input checked="" type="checkbox"/>	
K2EVW	Richard	Subin	427 DeHarts Store	Medows of Dan	VA	24120	540-593-2151	12/1/2007	<input type="checkbox"/>	rsubin@swva.net
W2RG	Rich	Griffiths	7924 Jolain Dr	Cincinnati	OH	45242	513-791-8023	12/1/2010	<input checked="" type="checkbox"/>	richgrif@one.net
K2VEE	Ed	Kulesa	2095 South Linda D	Bellbrook	OH	45305	937-848-2256	12/1/2010	<input type="checkbox"/>	k2vee@arrl.net
N3BYN	Gary	Johney	1885 Poplar Ridge	Pasadena	MD	21122	410-437-4285	12/1/2007	<input type="checkbox"/>	
VE3GY	David B	Toth	13233 Sarka Rd	Spencerville	OH	45887	419-235-6991	6/1/2010	<input type="checkbox"/>	
W3HMS	John A	Jaminet	912 Robert St.	Mechanicsburg	PA	17055-3451	717-697-3633	6/1/2010	<input checked="" type="checkbox"/>	w3hms@aol.com
W3HYM	David	Newman Jr	PO Box 459	Indian Head	MD	20640	301-743-6711	12/1/2009	<input checked="" type="checkbox"/>	
KP4AQI	Al	Torres	4850 Hollywreath Ct	Dayton	OH	45424	937-236-2534	2/1/2009	<input checked="" type="checkbox"/>	atorres@coax.net
AB4CR	Jack	Nyiri	909 Riverbend Rd	Nashville	TN	37221-4370	606-245-4162	12/1/2009	<input checked="" type="checkbox"/>	
K4EFD	Brad	Totten	10400 Broad Run R	Louisville	KY	40299-5416	502-239-6486	12/1/2004	<input checked="" type="checkbox"/>	btotten@juno.com
WB4GC	Jim	Sanford	10 Sugar Run Rd.	Eighty Four	PA	15330-2550		12/1/2011	<input checked="" type="checkbox"/>	WB4GCS@AMSAT.org
W4KUZ	Wendell	Booth	P.O.Box 216	Beattyville	KY	41311	606-464-3197	1/1/2004	<input checked="" type="checkbox"/>	
K4RF	Steve	Adams	P.O.Box 1255	Cornelia	GA	30531	404-869-0565	12/1/2008	<input checked="" type="checkbox"/>	
K4TG	Jerry	Shouse	1050 Hickory Hill Dr	Lawrenceburg	KY	40342	502-839-4041	12/1/2008	<input type="checkbox"/>	
K4TO	Dave	Sublette	3925 Ironworks Rd	Winchester	KY	40391		8/1/2007	<input checked="" type="checkbox"/>	
KA4VC	Michael	Spanos	116 Port South Lan	Alabaster	AL	35007	205-663-4457	12/1/2010	<input checked="" type="checkbox"/>	
WP4YJ	Robert	Sambolin	2151 Orchid Dr	W Lafayette	IN	47906	765-463-6360	12/1/2008	<input type="checkbox"/>	
WA5LB	Bill	Koch	307 Brookhaven Ln.	Pittsburg	PA	15241	412-257-3885	12/1/2009	<input checked="" type="checkbox"/>	
WA5VJ	NTMS Kent	Britain	1626 Vineyard Rd.	Grand Prairie	TX	75052			<input type="checkbox"/>	
KI6SZ	Don	Kessler	3872 Rexford Rd	Beavercreek	OH	45430	937-429-8857	8/1/2006	<input checked="" type="checkbox"/>	
AC7IT	Robert J	Super	2004 N Hodges Ln	Greenacres	WA	99016	509-928-1983	8/1/2009	<input checked="" type="checkbox"/>	AC7IT@Yahoo.com
W3/DJ7	Horst	Zodrow	530 Fairhill Dr.	Churchville	PA	18966-1457	215-355-2458	9/1/2009	<input checked="" type="checkbox"/>	
WR8A	Ed	Garner	3100 Oakmont	Kettering	OH	45429	937-293-2876	12/1/2009	<input checked="" type="checkbox"/>	edwr8a@cs.com
KA8AB	Michael P.	Murphy	8300 Schoolgate Dr	Dayton	OH	45424	937-235-1820	12/1/2008	<input checked="" type="checkbox"/>	murph@erinet.com
N8ASB	Daun	Yeagley II	1353 Gurneyville	Wilmington	OH	45177	937-382-8262	12/1/2007	<input type="checkbox"/>	daun@yeagley.net
W8ATH	Bob	Brubaker	3188 Barber Rd.	Norton	OH	44203	216-745-2218	2/1/2006	<input checked="" type="checkbox"/>	
WD8BF	Ed	Shaffer	268 Crocker St	Amherst	OH	44001-2008		12/1/2007	<input checked="" type="checkbox"/>	
KB8BK	Bill	Weaner	2305 Wrenside Ln.	Kettering	OH	45440	937-433-6174	6/1/2005	<input checked="" type="checkbox"/>	
KD8BU	Jason	Deines	150 Park Dr	Dayton	OH	45410	937-222-2256	6/1/2006	<input checked="" type="checkbox"/>	
KI8CA	Peter	Morris	11096 Congress Ru	Glouster	OH	45732-9711	740-767-3629	12/1/2009	<input checked="" type="checkbox"/>	
KC8CC	Steve G	Suess	721 W.Pekin Rd.	Lebanon	OH	45036		7/1/2004	<input checked="" type="checkbox"/>	kc8ccd@one.net

<i>CALL</i>	<i>FNAME</i>	<i>LNAME</i>	<i>STREET</i>	<i>CITY</i>	<i>ST</i>	<i>ZIP</i>	<i>PHONE</i>	<i>DUES</i>	<i>News letter</i>	<i>Email</i>
KD8CK	Robert	Taylor	3885 Brookshire Dr	Bellbrook	OH	45305		12/1/2007	<input type="checkbox"/>	
WB8DN	Joe	Hopster	3706 Glendale Milfo	Cincinnati	OH	45241	513-733-1590	12/1/2008	<input checked="" type="checkbox"/>	jhops25245@aol.com
WD8DP	Mark	Travaglini	52272 Nine Mile Rd.	Northville	MI	48167		12/1/2009	<input checked="" type="checkbox"/>	
KA8ED	Bruce	Lundy	1156 St.Rt.380	Xenia	OH	45385	937-376-5716	12/1/2008	<input checked="" type="checkbox"/>	belundy@earthlink.net
KC8EV		McCartney	3078 St.Rt. 212 NE	Mineral City	OH	44656	330-602-7633	6/1/2006	<input checked="" type="checkbox"/>	
WX8F	Jim	Nies	2227 Emerson Av.	Dayton	OH	45406	937-275-9614	1/1/2003	<input checked="" type="checkbox"/>	
WB8GZ	Mark	Sykes	9425 Adams Rd.	Huber Heights	OH	45424		12/1/2005	<input checked="" type="checkbox"/>	
K8HHP	Bob	Schank	35 Clarence St.	Belleville	MI	48111	734-697-7057	6/1/2009	<input checked="" type="checkbox"/>	
WA8HO	Fred	Steiner	1457 Granada Blvd	Ann Arbor	MI	48103	626-290-9857	1/6/2006	<input checked="" type="checkbox"/>	steinerfred@giga.net.tw
W8HU	Joe	Hausmann	1035 Firewood Dr.	Dayton	OH	45430	937-426-1303	12/1/2007	<input checked="" type="checkbox"/>	
KA8HU	Tom	Reed	743 Deer Run Tr.	Lebanon	OH	45036	513-933-0471	6/1/2007	<input checked="" type="checkbox"/>	reed@go-concepts.com
ND8I	Bruce N	Raymond	3494 Fairwood Dr.	Beavercreek	OH	45432	937-429-5362	4/1/2008	<input checked="" type="checkbox"/>	bruceraymond@ameritech.net
NE8I	Lloyd	Ellsworth	P.O.Box 0338	Birmingham	MI	48012-0338	313-292-5308	2/1/2009	<input checked="" type="checkbox"/>	ne8i@arrl.net
WB8IF	Gerd	Schrack EM79WS	4741 Harlou Dr.	Dayton	OH	45432	937-253-3993	12/1/2008	<input type="checkbox"/>	schrack@copper.net
W8ISZ	Jim	Frey	8816 Ridgewood Pl	Springboro	OH	45066	937-885-6587	6/1/2007	<input checked="" type="checkbox"/>	
W8JAQ	John	Schwall	163 Lee Dr.	Monroe	OH	45050	513-539-7675	12/1/2010	<input checked="" type="checkbox"/>	w8jaq@infinet.com
KC8KH	Larry	Weaver	1711 E.Third St.	Dayton	OH	45403-1824	937-219-8250	5/1/2009	<input checked="" type="checkbox"/>	
W8LLY	Fred	Stone	4170 Beechwood Dr	Bellbrook	OH	45305	937-848-4112	4/1/2004	<input checked="" type="checkbox"/>	w8lly@arrl.net
W8MM	Michael	Valentine	10280 Alliance Rd	Cincinnati	OH	45242	513-984-8900	4/1/2009	<input checked="" type="checkbox"/>	
W8NJR	Terry	Netzley	5920 Horseshoe Be	Ludlow Falls	OH	45339	937-698-6426		<input checked="" type="checkbox"/>	w8njr@aol.com
K8OCL	John	Champa	2304 Woodglen Dr	Richardson	TX	75082-4510	972-705-1531	6/1/2009	<input checked="" type="checkbox"/>	
WA8OG	Joseph	Burke	9168 Brehm Rd.	Cincinnati	OH	45252	513-385-4198	12/1/2009	<input checked="" type="checkbox"/>	burkej@one.net
N8OIF	Edward S	Raybould	1094 Fountain Ln A	Columbus	OH	43213-3211	614-868-5955	2/1/2009	<input checked="" type="checkbox"/>	
N8OU	John	Berker	Box 125/43 E.Front	New Holland	OH	43145	740-495-5200	5/1/2010	<input type="checkbox"/>	
W8PLZ	Jim	Schoettinger	5150 Worley Rd	Tipp City	OH	45371		12/1/2007	<input type="checkbox"/>	
AA8Q	Jack	Mitchell	4505 Daybreak Dr	Lebanon	OH	45036	937-845-3664	3/1/2007	<input checked="" type="checkbox"/>	aa8q@dnaco.net
N8QHV	Michael	Schulsinger	1002 Woodlawn Av.	Springfield	OH	45504	937-206-4240	12/1/2009	<input checked="" type="checkbox"/>	maschulsinger@yahoo.com
N8QOD	Joseph	Muchnij	1214 Cottingwood C	Bellbrook	OH	45305	937-848-8527	12/1/2008	<input type="checkbox"/>	muchnij@saic.com
WA8RJ	Anthony L	Emanuele	7156 Kory Court	Concord	OH	44077-2221	440-357-1356	6/1/2007	<input checked="" type="checkbox"/>	
W8RKO	Mike	Suhar	1108 E.Rahn Rd.	Dayton	OH	45429-6110	937-433-4332	12/1/2008	<input type="checkbox"/>	michael.suhar@lexis-nexis.com
KF8SB	Fred	Ralston	2316 Davue Cir.	Dayton	OH	45406	937-274-8915	5/1/2003	<input checked="" type="checkbox"/>	
KD8SI	Leo	Schaaf	2648 Aragon Av N.	Kettering	OH	45420	937-294-8425	6/1/2009	<input checked="" type="checkbox"/>	
KB8SR	Jon	Thuermer	1976 Burnham Ln.	Kettering	OH	45429	937-298-3199	10/1/2008	<input type="checkbox"/>	
K8TKQ	Bob	Mathews	73 Landrum Rd.	Bainbridge	OH	45612		12/1/2008	<input checked="" type="checkbox"/>	k8tkq@qsl.net
KE8TQ	Fred	Peerenboom	2015 Mill Run Ln	Bellbrook	OH	45305	937-416-5295	4/1/2007	<input checked="" type="checkbox"/>	peerenbf@dmapub.dma.org
KB8U	Russell	Dwarshuis	427 Barber Av	Ann Arbor	MI	48103-2721		8/1/2006	<input checked="" type="checkbox"/>	
K8UD	Steven S.	Coy	705 Watervliet Ave	Dayton	OH	45420	937-426-6085	2/1/2004	<input type="checkbox"/>	k8ud@arrl.net
W8ULC	Red	Dakin	4519 N Rt 123	Franklin	OH	45005	937-704-0835	12/1/2008	<input checked="" type="checkbox"/>	redw8ulc@siscom.net
N8UR	John	Ackerman	15 Grandon Rd	Oakwood	OH	45419	937-445-2966	6/1/2008	<input type="checkbox"/>	n8ur@tapr.org
N8UVM	Robert	Peoples Jr.	66460 Sam Russel	Dundas	OH	45634	740-596-2364	12/1/2008	<input checked="" type="checkbox"/>	rpeoples@globalcooling.com
KB8VA	Stephen M	Gocala Jr.	4232 Tippecanoe R	Youngstown	OH	44511	330-783-6390	5/1/2004	<input checked="" type="checkbox"/>	gocala@ix.netcom.com
KC8VE	Bruce	Lerner	734 Suntree Dr	Westerville	OH	43081	614-985-4818	1/6/2009	<input checked="" type="checkbox"/>	bd17431@sbcglobal.net
N8VES	Sam	Anderson	2143 Otello Ave	Dayton	OH	45414-4513	937-278-1029	12/1/2009	<input type="checkbox"/>	octopus@sigcom.net

<i>CALL</i>	<i>FNAME</i>	<i>LNAME</i>	<i>STREET</i>	<i>CITY</i>	<i>ST</i>	<i>ZIP</i>	<i>PHONE</i>	<i>DUES</i>	<i>News letter</i>	<i>Email</i>
WB8VS	James	Bacher	5849 Terrace Park	Dayton	OH	45429-6049	937-865-2020	6/1/2010	<input checked="" type="checkbox"/>	
N8VZW	John	Human	4080 Danern Dr.	Beavercreek	OH	45430	937-429-0234	6/1/2008	<input type="checkbox"/>	jbhuman@copper.net
WA8WZ	Tom	Whitted EN81OM	4641 Port Clinton E	Port Clinton	OH	43452-3805	419-732-2168	3/1/2008	<input checked="" type="checkbox"/>	wa8wzg@wa8wzg.com
N8XKZ	Michael F.	Radwick	7576 Kingsbridge	Canton	OH	48187	734-453-3066	5/1/2003	<input checked="" type="checkbox"/>	
K8YMI	Bob	Halley	114 Red Bird Lane	Terrace Park	OH	45174		8/1/2009	<input checked="" type="checkbox"/>	
WB8YO	Alan L	Smith	6303 King Arthur	Swartz Creek	MI	48473		6/1/2009	<input checked="" type="checkbox"/>	
N8YWG	Mark F	Feller	8471 Hartman Rd.	Wadsworth	OH	44281		5/1/2006	<input checked="" type="checkbox"/>	
N8ZM	Thomas	Holmes	1055 Wilderness Bl	Tipp City	OH	45371	937-667-5990	12/1/2011	<input type="checkbox"/>	tom_holmes@agilent.com
KB8ZR	Mark	Tessneer	2970 Indian Ripple	Beavercreek	OH	45440-3641	937-426-1355	3/1/2006	<input checked="" type="checkbox"/>	kb8zr@amsat.org
KA8ZSB	John	Hepner	9500 Huffman Rd.	Farmersville	OH	45325-9225	937-835-3149	12/1/2011	<input checked="" type="checkbox"/>	hepnerj@corecomm.net
K9ATR	Milton	Gibson	5707 S Bridgeton L	South Bend	IN	46614	574-291-0886	12/1/2011	<input checked="" type="checkbox"/>	
KB9AV	Paul	Van Dyke	13697 N 560 E	Syracuse	IN	46567-8296	574-457-5432	12/1/2003	<input checked="" type="checkbox"/>	kb9avo@imoskywarn.org
K9AYA	Bill	Eaton	1600 Boyle Rd.	Hamilton	OH	45013-1066	513-893-0933	8/1/2010	<input checked="" type="checkbox"/>	bill@rp-l.com
W9DF	David	Filmer	1419 Ravinia Rd.	West Lafayette	IN	47906	765-463-6618	5/1/2003	<input checked="" type="checkbox"/>	
K9EA	Dan	Michnay	9406 Notestine Rd	Ft wayne	IN	46835-9449		12/1/2009	<input type="checkbox"/>	dfmich@aol.com
K9EK	Edward	Krome	10891 W Grandview	Columbus	IN	47201	812-379-9433	12/1/2003	<input checked="" type="checkbox"/>	k9ek@amsat.org
WG9F	Rod	Owen	13809 Schwipps Rd	Milan	IN	47031	812-623-3072	12/1/2008	<input checked="" type="checkbox"/>	roderick.owen@ae.ge.com
W9FT	Ron	Henselman	1409 N.11th Ave	Melrose Park	IL	60160-3523	708-345-6981	12/1/2008	<input checked="" type="checkbox"/>	
W9IIX	Douglas	Johnson	4421 W 87 St	Hometown	IL	60456	708-337-8172	12/1/2007	<input checked="" type="checkbox"/>	
W9LCE	Merle	Rummel	P.O. Box 14	Boston	IN	47324	765-935-3891	12/1/2007	<input checked="" type="checkbox"/>	cliff@rtkonline.com
W9NBS	Tom	Stauffer	961 Silvercreek Dr.	Centerville	OH	45458	937-435-1870	12/1/2008	<input checked="" type="checkbox"/>	
W9OER	Frederick B	Haines	609 W5th St.	Vermont	IL	61484	309-784-2706	5/1/2003	<input checked="" type="checkbox"/>	
WB9SN	Jim	Mitzlaff	1727 N.Chestnut	Arlington Hgts	IL	60004-3703	847-506-0805	12/1/2009	<input checked="" type="checkbox"/>	wb9snr@att.net
W9XA	Kermit	Carlson	1150 McKee	Batavia	IL	60510	630-879-0983	6/1/2007	<input checked="" type="checkbox"/>	
N9XRO	Jack R	Huebschen	N51 W15819 Fair O	Menomonee Falls	WI	53051-6655	262-781-3631	6/1/2003	<input checked="" type="checkbox"/>	jackn9xro@aol.com
DB6NT	Michael	Kuhne	Birkenweg 15	D-95119 Naila/Hoell	GERMANY		---9288-8232	12/1/2011	<input checked="" type="checkbox"/>	kuhne.db6nt@t-online.de
7L3DNX	Takumi	Takeno	3-7-3-504-Simosinjo	Nakahara-ku	21	1-0042Japn	81-44-751-07	6/1/2009	<input checked="" type="checkbox"/>	naf01266@nifty.com