ATCO NEWSLETTER

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ATCO HAM IN THE SPOTLIGHT

This time we welcome Peter, K4PRS, and say goodbye at the same time. Pete was transferred here from the Tampa, Florida area by his company and has been quite active in ATV since then. Because he lives in an apartment, as you can imagine, his antenna situation is unique. The good news is that he lives on the second floor with crawl access to the attic. Imagine building an antenna then dis-assembling it to get it into the attic and re-assembling it up there. He did it and with multiple antennas too including 2.4 GHz ones!

Now all of that must come to an end for his company is transferring him back to Florida. He tells me that there is no ATV activity there at this time but plans to change all that and promises to keep us informed. Good luck at your new job and ATV challenge, Pete. Keep us informed but don’t remind us about the weather.

ACTIVITIES ... from my "workbench"

HAPPY NEW YEAR!

Hi guys! It's me again, your newsletter editor trying to think of some real juicy information to send your way so you'll keep coming back looking for more. Sorry, no magic bullet again this time. However, I do hope to bring you things that I have experienced and feel noteworthy and interesting. (No puns about the weather this time either as we both know how reliable that information would be!…Oops, that was a pun wasn't it?) I guess I'd better stick to the ATV stuff cause I really suck at being cute.

Well, last time I talked about the new 70cm ATV transmitter I was constructing. I still am and the work is incrediblly slow. It's no one's fault except mine as I can't find enough hours in the day to work on it as much as I like. Progress is being made but it seems to get interrupted by other projects that, at the time, seem more interesting. So far, I've proven that the new final amp will work at the 100 watt output level with about 10 watts of drive. The 10 watt driver is complete in the design phase and will output that level from a commercial modulator that I have. The assembly is now neatly housed in a 1 ½ inch high 19 inch rack panel box which now works OK. The attention should be turned toward packaging the final amp which needs proper cooling installed and power supply connections. The 28 volt switching power supply needed is all checked out and in working order but it needs to be mounted in the enclosure. I hope to work on this phase of the project in the next couple of months but in the meantime I've been working on the 2.4 GHz receiver and the 446.350/449.350 repeater portion.

The 2.4 GHz receiver was reported to be out of commission so the last time I visited the repeater looking for 1250 MHz transmitter trouble (I didn't find any) I tucked it under my arm and brought it home for analysis. Bench testing showed that the unit was operational but intermittient. Further testing revealed the combination, when subjected to RF from sources other than the antenna connector, was very susceptable to interference. After much shielding and machining, the receiver is now noise free and ready to go back downtown. I'm not sure if it will help but if the interference that we have been experiencing was coming from sources other than at the antenna, I've fixed it! For what it's worth, I have found that BNC connectors have absolutely no place in 2.4 GHz equipment. Also, N connectors that are dirty and not wrench tightened leak RF and pick up stray RF in hugh amounts! I've learned this before but sometimes a refresher course is required once and a while. The Downeast preamp was working well providing about 15 dB of gain but the gasket sealing the unit from water for outside installations was totally useless for shielding the unit from stray RF. When I replaced it with a conductive gasket, it was like night and day. Before a Wavecom on one end of the bench and receiver on a dummy load on the other, a P5+ signal was received. After the gasket change the signal dropped to about P1. Further work reduced it to P0 with the Wavecom 6" away. I stopped there.

Next on the list of fun things to do is complete the 446.350/449.350 repeater portion. As you may recall, I'm working the 446.350 transmitter to give it a little more power and improve the modulation. In conjunction with that, I'm adding a 449.350 receiver with the primary function to input touch toning for the roof cam. Since the combination must share a single antenna, a simple repeater with an input on 449.350 and output on 446.350 was born. The duplexer needed is easier said than done as the rejection and band pass characteristics needed are difficult for a 3 MHz spread from input to output. I think I may have it solved it now for the unit I picked up at Fort Wayne with an additional cavity section added looks like it will work. The receiver works great with a 0.2 uv sensitivity and the transmitter also is checked out. Ted, N8KQN, and Roger, WB8DZW, helped and got the units on the correct frequency and tuned up properly. Now all I have to do is package the combination so I can continue on the 70 cm transmitter. This portion must work before I pull the old 70 cm transmitter because the 446.350 transmitter is in the same box. Now, do you see the connection between the two projects?

In the midst of all the rebuild work is the report that the 1250 MHz signal is getting weak. A trip to the repeater showed that the power was down a little but not to the extent reported. An SWR check revealed almost 1:1 SWR. No problem there. I swapped antennas only to find it get worse. I shook the antenna during transmission to find no intermittents. A thorough check of connectors revealed no problem. Not finding any problem I left. The condition remained where a once P5 signal is now barely P1. More than one person reported this so I really scratched my head in wonder. After all the signal at my QTH has remained P5 all the time. Just lately I'm told that the signal is now back up to P5 without doing anything. It's a mystery to me but we'll continue to monitor it.

One more thing…I'm working on obtaining 3 flea market spaces in the name of ATCO at Dayton this year. This space, if obtained, will be for the use of all our members. Bring your things to sell here, space permitting. The only thing we ask in return is to help to staff it on a rotation basis. I also purchased 12 advance tickets available on a first come basis. These are vendor passes and entitle the holder to the parking lot at the east side of Hara Arena for a nominal charge. Also, Wilbur, K8AEH, agreed to put his RV in the flea market space for shelter, purchases and refreshments. How about that! My hope is that this space will become an ATV gathering area for all ATVers at Dayton. Maybe we also can arrange to have a portable ATV transmitter there and transmit 2 way video to PC Electronics inside. I plan to have a banner there to announce that ATCO ATV is at that site.

Well, that's about it for this time. No more news for now. Be sure to check in on our Tuesday night net on 147.45 for the latest details. The participation has been quite good with up to 18 check in's one night. Since Christmas it's dropped off a little but I'm sure as the new year wears on, more people will join in.

73,

Art

ATV DX VARIABLES

What kind of distance (DX) can I expect with AM ATV on 70cm or higher is the most asked question from new people coming into this facet of the hobby. There are a number of variables such as band, antenna gain, transmitter power, receiver noise figure, bandwidth and coax loss, and only when you define these variables and have line of sight between the two antennas can you come close to predicting the distance for a snow free picture.

Line of Sight - The most important variable of all is having line of sight between the two antennas. If you theoretically have any obstacle in the path that prevented you from looking through a high powered telescope placed on the boom of the antenna and seeing the antenna at the other end, you don't have line of sight conditions. Without line of sight, it is very difficult and beyond what most amateurs can practically determine and calculate. Most effort then should be spent on antenna height and placement to get line of sight. Just one tree or person blocking the path can give 20 or more dB of attenuation (20 dB is the same as going from 1 Watt to 100 Watts). If you do not have line of sight, or cant see that far, a rough approximation can be made by seeing if you can communicate from the exact same antenna location with 2 meter walkie talkies. If the signal is noisy or nonexistent try moving around looking for the magic spot; you never know where the signal might have a hole through the obstacle or get a reflection off a metal object that does have line of sight between both locations. However, non-line of sight paths are more subject to multipath ghosting from the reflected signals being significantly strong and/or out of phase with the direct signal. The bottom line is that it is much more significant to add antenna height or optimum tower placement in order to get line of sight than any added coax length and its little dB of loss difference. Line of sight over perfectly flat terrain for 10 miles takes an antenna at 50 feet above ground due to the curvature of the earth. The RF horizon miles is roughly two times the square root of the height in feet.

Band - Basically, the lower the frequency, the farther the distance all else being equal. What this means is that given the same transmitter power, coax loss, etc., due to antenna area, the signal strength arriving at the receiver input will be higher at lower frequencies. Since antenna capture area is two dimensional, the antenna size will decrease by 1/4 if the resonant frequency is doubled for the same antenna gain. The lowest amateur band with enough bandwidth to support ATV is at 420 MHz. Therefore, all other variables being equal, the 900 MHz band goes 1/2 the distance of 420 MHz band and the 1200 MHz band 1/3. To make up for the 6 dB for doubling or 9 dB difference for tripling the frequency, you can get some back by increasing antenna gain, antenna mounting a preamp, transmitter power or a combination. Coax loss increases with frequency as well as moisture effects.

Bandwidth, Noise Figure and Coax Loss - These somewhat all go together to determine the video to noise ratio seen on the screen. Most TV sets, VCRs, cameras, and camcorders themselves don't do better than 40 to 45 dB video to noise. So with ATV we define snow free as any video better than 40 dB S/N. The wider the bandwidth the higher the noise floor power from all those agitated electrons crashing around in a resistance. At standard temperature the noise floor is about -174 dBm (174 dB below 1 milliwatt into 50 Ohms) for 1 Hz bandwidth. The noise floor power goes up linearly at the rate of 10 dB every time the bandwidth is increased by 10 times. The nominal 3 dB bandwidth through a TV receivers IF and detector is 3 MHz which works out to be a noise floor of -109 dBm or .9 microvolts if there were no other factors. So a snow free picture as we have defined it and in this perfect receiver would have to have a signal strength of at least 40 dB higher than the noise floor or -69 dBm (80 microvolts). But we then have to add in the receiver system noise figure as determined mostly by the noise figure of the first preamp stage, its gain, losses of connectors, tuned circuits and mixer noise figures of the following stages. Bottom line is that the typical AM P5 picture will take between 100 and 200 microvolts at the ATV downconverter antenna input jack and even more with just a cable ready TV tuner. The coax loss from the antenna also reduces the signal strength. Below the snow free power level, the video will decrease one P unit for each 6 dB that is lost due to coax loss or first stage noise figure. Bottom line is use a downconverter with a low noise figure, minimize coax and connector loss by using the larger quality coax or hard line with N connectors and no adapters. You can also almost eliminate the coax loss with an antenna mounted low noise preamp. However, they are expensive if you also intend to switch the preamp out during transmit.

Antenna - Unless you know you don't need or ever use a lot of gain to make the path, most hams get the highest gain antenna they can afford and practically put up. It is a factor in both transmit and receive and to a point, a less costly increase in dB than adding a transmitter amplifier. The trade offs are gain vs. size and beamwidth with beams, but more important for ATV is bandwidth. The antenna needs to have a low reflected power as well as gain over the whole 6 MHz AM ATV channel that can be somewhat independent. It is best to stay with reputable antenna manufacturers that have proven gains at antenna measuring contests and data to support the advertised bandwidth. Whenever you put up a new antenna, it is a good idea to verify with a RF power meter that the reflected power at the ATV video carrier frequency is no more than 10%, even if you have to get with local hams to borrow the meter or come over and help you. Most of the time, when a new system is put up and one is not getting the expected results it is due to a problem with the coax, connectors or antenna construction or moisture getting in and ruining the coax. Don't be surprised if during periods when the antenna is wet that signal strength significantly decreases. It is not path attenuation from rain so much as it is moisture conduction on the antenna and changing its tuning and characteristics - a quick check with a power meter usually shows a drastic change in reflected power. Above 300 MHz, antenna polarity is not significant unless you are opposite of everyone else in the area which can cost you about 20 dB. Polarity is usually determined by who was first on ATV in the area, but technically, the polarity should be chosen to be opposite of the neighboring mode. For instance if using 439.25 for ATV, horizontal would give the most rejection from FM voice repeaters above

440 MHz since they are vertical. If using 434.0, your neighbors are the weak signal people at 432 MHz who are horizontal and therefore you should use vertical. Beams are preferred over omni directional antennas to minimize multipath ghosting for home station use. However, at repeater sites or at emergency operations centers, omni's may be more practical. Vertically polarized antennas are made more commercially and smaller in size than the same gain horizontal omni's, but most areas polarity has long since been determined before a repeater goes on the air. Make sure to check with local ATVers as to antenna polarity per band and frequency before putting up the antenna system.

Power and Path loss - OK, we are finally at transmitter output power. As the RF energy gets out more than 20 to 100 wave lengths from the antenna it spreads out linearly over an increasing area such that the amount that can reach a distant antenna decreases by a 1/4 as the distance doubles. Below is a table which shows the expected snow free line of sight DX on the 420 MHz band given transmitter power output levels in the order of 100 mW, 1.5 W, 20 W& 100 Watts p.e.p. and for antenna gains of a dipole, OAL 5L-70cm beam or antenna with 8 dBd gain, and 16 dB with a DSFO-ATV25 beam and the respective antenna at the receive end. The other assumed variables are a 2 dB system noise figure, 3 dB loss in coax at both ends and greater than 40 dB video to noise ratio.

	Xmit Antenna		
Receive Antenna	Dipole (0 dBd) Expected line	5L-70cm(8 dBd) Of sight distance	DSFO-ATV25(16 dBd) In miles
Dipole(0 dBd)	.24/.9/3.4/7.7	.6/2.3/8/19	1.5/6/21/48
5L-70cm(8 dBd)	.6/2.3/8/19	1.5/6/21/48	3.8/14/53/120
DSFO-25 16(dBd)	1.5/6/21/	48 3.8/14/53/120	9/37/133/300

Distance in *miles* on the 420-450 MHz band is shown in the order of **.1 / 1.5 / 20 / 100 watts** for the respective antennas and their gain in dB over a reference dipole. This assumes P5, line of sight, and the major lobes of the antennas are pointed at each other. P4 is twice the DX.

Bottom line is get line of sight and highest gain antenna you can. If you can put a 1 dB NF preamp at the antenna to eliminate the 3 dB coax loss in the figures above, you can multiply the distances by 1.4. For R/C you can double the distances shown since the coax in the vehicle is very short and if you use a 3 dBd ground plane to receive. A cable ready TV will probably be at least 6 dB noisier than the TVC-4G downconverter and 1/2 DX. If you want to know a different band you can scale the distance by multiplying the ratio of 434 MHz divided by the new frequency. If you have different variables you can multiply by 2 for every 6 dB power increase or less loss, and times 1.4 for every 3 dB. For a comparison of AM vs. FM ATV, see the ARRL Handbook.
… P. C. Electronics 2522 Paxson Lane Arcadia CA 91007-8537 USA ©2001
Tel: **1-626-447-4565** m-th 8am-5:30pm pst (UTC - 8) Tom (W6ORG) & Mary Ann (WB6YSS) O'Hara
24 hr FAX order line 1-626-447-0489 Email: tomsmb@aol.com Web site: http://www.hamtv.com

HAVE THE 2.4GHz PIRATES COME TO COLUMBUS?

Will something like this mess with our 2.4 Ghz video?? Has anyone heard anything to substantiate this?? It doesn't sound right to put 2.4 Ghz in the mobile units! WA8RMC

Just as the Columbus police department is finishing it's implementation of it's new computers Gahanna PD is preparing to replace its old and at best inadequate UHF system with a 2.4Ghz based system. The cruiser components will be a ruggedized laptop linked to a Cisco 2.4GHz ISM radio capable of 11Mbs data throughout. The short range of the radios will be compensated for by installing a large number of 2.4GHz base units through the city tied into the city's WAN. The new system will be able to carry high-speed data such as video. In fact there is plans to link the cruiser terminals with security video from the cities public schools. ADC Information Technology Services will be doing the radio configuration and setup and Metro Telecom will be doing the car and base radio installation. Monitoring this system will be very difficult (as difficult as I can make it since I am going to be the one configuring the radios. The data will be encrypted using a 128 bit encryption system called WEP that is secure against all but the most technically sophisticated attracts.
Information taken from http://radioscanning.wox.org/Scanner/last_second.htm
…Frank Amore WA8HFK

ATCO SECRETARY NEEDED

We need someone to step forward and accept a nomination for the ATCO club secretary position left vacant when Rick, WA3DTO, moved out of state. The duties are very minimal. They involve taking notes at the Spring and Fall events and any other club event that we have and put them into a presentable form for publication as minutes in this Newsletter. That's all. Do I have any takers? Even if you feel that you can't take good notes, you are still needed. I'll help to put the information in a good format if needed. So, what do you say, can anyone help? Let me know.
…WA8RMC

MAKERS OF TV TUNER CHIPS TURN TO SiGe (SiGe is silicon and germanium)

OK guys, here's a bit of the Engineering development processes going on that may affect the ATV community soon. I see it as cheaper and better TV front-end units that could possibly extend our reliable range. Even if not, it's certainly interesting to read about the advances in electronics that could affect our hobby. WA8RMC.

SAN MATEO, Calif. — The canned tuner, a fixture of TV broadcast receivers, may soon be rendered obsolete if a group of startups bearing silicon germanium expertise have their druthers. Microtune, SiGe Semiconductor and Zarlink Semiconductor are among the companies that plan to launch higher-performance, lower-power and lower-cost single-chip TV tuners leveraging the relatively new process technology.

Even some experienced TV tuner chip makers seek to redesign their current-generation bipolar or BiCMOS chips in SiGe to serve the cable industry's ever-changing system requirements and demanding performance parameters. Backers of the technology say they can get better power, higher linearity and better temperature range using SiGe.

"It's got better linearity across the entire tuning range of a modern cable TV system, which requires linear amplification in 6-MHz-wide 'steps' from Channel 2 [54 MHz] up to Channel 122 [850 MHz]," said Gerry Kaufhold, an analyst at Cahners In-Stat Group. "I think SiGe can achieve this linearity with a lower-voltage power supply, which gives you a performance improvement and less power dissipation than with BiCMOS or straight GaAs."

Many of the startups are using a silicon germanium process developed by IBM Microelectronics, which introduced the technology for its foundry customers several years back. "IBM is way out in front of everyone," said Fred Zieber, president of Pathfinder Research (San Jose, Calif.).

In high-speed communication products, SiGe has enabled 10-Gbit/second fiber connections. Now the cost of the process has dropped sufficiently to open up new consumer markets, Zieber observed. SiGe parts are used in such consumer products as cell phones, GPS transceivers and disk drive read channels.

SiGe is winning over new converts as its cost drops. Zarlink Semiconductor (formerly Mitel) has a good high-speed bipolar process technology, but it turned to IBM's SiGe process when it determined that the latter technology would provide the highest-quality components and a higher packing density for a given power budget, said Ted Aaron, product-line manager for RF tuners at Zarlink.

The company would not have reached the same conclusion about SiGe two years ago, Aaron said. "We would have said that it would be too expensive."

Microtune (Plano, Texas) has similarly switched from BiCMOS to IBM's SiGe process for the MT2100 family of silicon tuners, scheduled for announcement Monday (Nov. 5). The company made the shift to meet the RF blueprint requirements of the CableLabs OpenCable specification.

Although Microtune's own BiCMOS-based dual-conversion tuner — launched three years ago — could handle data in a cable modem or in a pure digital set-top, "it was not good enough to hit the performance level required" for tuning video in U.S. set-tops, which must support both analog and digital modes, said Jim Fontaine, chief strategy officer at Microtune.

Dual analog/digital conversion tuners demand more stringent performance parameters in linearity, distortion, dynamic range and noise compared with cable modem tuners, Fontaine said.

The MT211 tuner provides more headroom to meet those specifications. "We can handle signal spikes, and we can also handle higher frequencies, even if the cable industry decides in the future to expand its channel bandwidth to a gigahertz to offer more channels," Fontaine said.

Press for multiple tuners

SiGe's maturity as a process technology comes none too soon for the U.S. cable TV industry. In-Stat's Kaufhold said the industry is pressing set-top box makers for multiple tuners in each box to enable such features as picture-in-picture, two-way data, voice telephony and video-on-demand.

The current OpenCable specification requires at least three tuners, but if a personal video recorder function is added to a set-top, "you could, in the future, have up to six tuners in one very advanced set-top box," Kaufhold said.

When consumers demand a sleeker set-top box design, without fans and slits, it won't be easy for system vendors to fit four canned TV tuners — each dissipating 3 watts — in one box, according to Cormac O'Connell, vice president for broadband cable at SiGe Semiconductor (Ottawa).

SiGe Semiconductor claims its new StreamCharger silicon platform yields tuner ICs that consume 50 percent less power than other tuners on the market. The technology consumes 500 mW, operates off a single-supply voltage of 3.3 V and incorporates multiple programmable power-down modes.

The StreamCharger family is sampling now to selected customers and is scheduled for general sampling in the first quarter. The company, which was founded by renowned SiGe technology expert Derek Houghton, is working with a number of unspecified foundries.

Vendors of outdoor cable modem and cable telephony customer premises equipment (CPE) are also under pressure to cut tuner power, according to O'Connell. Cable operators must invest to power up the cable plant and build redundancies into headends and hubs in order to offer telephony service as a primary line. Regulatory guidelines require providers to keep the telephony service up and running 99.999 percent of the time, even during power failures.

By minimizing the power dissipation of tuners used in CPE, cable operators can minimize "the need to pump into power," said O'Connell.

Dissenting voices

But not everyone is sold on SiGe. Tim Lindenfelser, vice president and general manager of the broadband communications business unit at Broadcom Corp., insisted that CMOS is a better choice for reasons of cost and future integration with the rest of the set-top.

"SiGe is still not a common process yet, and it's expensive," Lindenfelser said.

SiGe's cost has also been an issue for Conexant Systems Inc. The company uses a bipolar process for TV tuner chips but is switching over to BiCMOS for a direct-conversion cable TV tuner for analog and digital TV tuning. The device is scheduled for launch in the first half.

"In the long run SiGe may become cost-effective, but our internal cost analysis shows that 0.25-micron BiCMOS technology can hit the sweet spot better" when positioned against today's tin-can cable tuner modules, said David Jones, director of marketing for Conexant's Digital Infotainment Division. The company, which has in-house capability for both BiCMOS and SiGe, claims that it has access to wafer characterization data that puts it a step ahead of its fabless competitors and optimizes its processes as it designs new chips.

Although growing numbers of independent device manufacturers are equipped with SiGe processes, "most of them don't provide foundry services, and their production capacities remain small," said Zieber of Pathfinder Research. Aside from IBM and Conexant, device manufacturers with in-house SiGe capability include Agere, Infineon, Intersil, Maxim, Motorola, Philips, STMicroelectronics and Texas Instruments. Foundries such as TSMC, UMC and Chartered say they're working on securing SiGe process capacity by licensing the process technology from others.

In the meantime, fabless chip companies, whose SiGe foundry options are limited, may encounter a problem differentiating their TV tuner products, particularly in terms of manufacturing cost, said SiGe Semiconductor's O'Connell.

But Nick Cowley, RF tuner specialist at Zarlink, argued that differentiation can be achieved by those with solid expertise in TV tuner system requirements, saying that RF design remains "an art." Zarlink, he claimed, tapped its 20 years of RF expertise and its experience in implementing high-dynamic-range analog functions when it filed for several patents associated with circuit implementation in SiGe.
… Junko Yoshida EE Times Newsletter 11/07/01, 10:18 a.m. EST.

BELL LABS TEAM CREATES TRANSISTOR USING ONE MOLECULE

OK, complain to me about letting you know about non-ATV items. However, as you already know, smaller and smaller things are being developed all the time and most certainly the developments described below will no doubt be used in some future ATV equipment. The R-C plane enthusiasts in particular will rejoice when the 1 or 2 ounce 10 watt transmitter is developed for their planes. (The cameras are already here)! Now, lets see if they can improve the Die Hard type batteries. WA8RMC

In October, the same Bell Labs team, physicist Hendrik Schon and chemists Zhenan Bao and Hong Meng , unveiled a transistor with a single-molecule channel length

Scientists from Lucent Bell Labs have fabricated an individually addressable transistor whose channel consists of just one molecule — a feat never previously accomplished. The channel — the space between its electrodes — is where the transistor's electronic switching and amplification take place.

The tiny transistors are so small, only a billionth of a meter each, that about 10 million of them would fit on the head of a pin. Made of an unconventional organic semiconductor material and using a novel fabrication technique, they may lead to smaller, faster and cheaper computer chips.

Last month, the same Bell Labs team introduced a transistor with a single-molecule channel length. But that device could only be fabricated as a matrix of a few thousand molecules that worked in tandem. Now, in a major advance, the team has succeeded in fabricating molecular-scale transistors that can be individually controlled.

The main challenges in making nanotransistors are fabricating electrodes that are separated by only a few molecules and attaching electrical contacts to the tiny devices. The Bell Labs researchers were able to overcome these hurdles by using a self-assembly technique and a clever design.

They carved a notch into a silicon wafer and deposited a layer of gold at the bottom to function as one of the transistor's three electrodes. Then they dipped the wafer into a solution that contained a mixture of thiol molecules and some inert organic molecules, and let it dry. The purpose of adding the inert molecules was to dilute the concentration of thiols. As the solution evaporated from the wafer, a film exactly one molecule thick was left behind on the gold electrode. By carefully adjusting the ratio of the thiol to the inert molecules, the scientists were able to statistically ensure that just one active molecule was present in the area on top of the gold electrode. They then deposited another gold electrode on top of this film, while they built the transistor's third electrode on one side of the silicon notch.

"It is virtually impossible to attach three electrodes to a microscopically small molecule," said Bao. "We overcame this problem by letting the molecule find these contacts and attach itself to them, a process called 'self-assembly.' "

The chemical self-assembly technique is relatively easy and inexpensive and, unlike silicon, it does not require clean-room technology.

"Our experiment shows that it is possible to realize transistor action in a single molecule without sophisticated fabrication procedures," said Schon.

Using two nanotransistors, the Bell Labs scientists built a voltage inverter, a standard electronic circuit module commonly used in computer chips that converts a "0" to a "1" or vice versa. Though just a prototype, the success of this simple circuit suggests that nanotransistors could soon be used in microprocessors and memory chips, squeezing thousands of times as many transistors onto each chip than is possible today.

Analysis: What a team. This trio has developed an advancement that will reverberate throughout the design world for years to come. It will be fun to watch where nanotransisotor technology goes from here.
…From RF Design Newsletter 11/15/01. http://www.rfdesign.com/

ATV HATCAM PROJECT…Lets see more creations like this!

I can't claim any originality for this project but I can claim to have improved upon it and given some folks a bloody good laugh at the same time. "What's an ATV HatCam?" you ask. Well, it's a camera on a hat that uses Amateur Television to send its pictures to a TV set. Amateur Television is part of Amateur Radio. Hams have been sending pictures to each other for over 50 years.

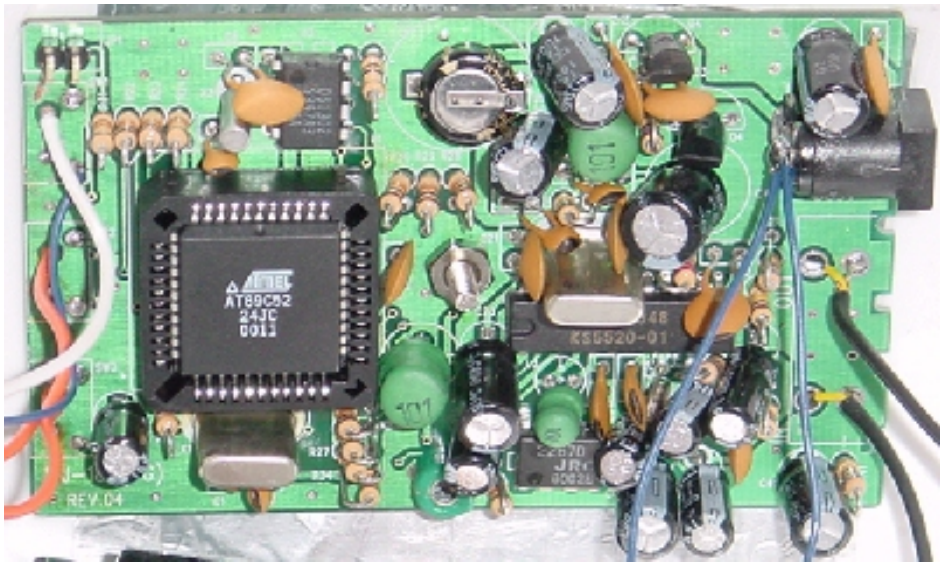
OK, lets get to it. Firstly take a look at this PDF document from PC Electronics. These guys probably didn't come up with this idea either but this is where I started. As you'll see from the document its quite a simple setup. BEWARE! Whilst its simple to make its not cheap. If you have to buy everything it'll set you back about $200. Mine cost $250.

So here it is. The KC2ENI variant ATV HatCam. As you can see it's just a construction hat with a camera and an antenna on top. I used the wide brim "Pith Helmet" type that you can get from most Do-It-Yourself stores like Home Depot (B&Q to us Brits).

Inside the hat is a Video-Lynx 100mW TV transmitter which you can also get at MFJ and some other places. It outputs the picture on 433.97MHz so it can be used the world over on 70CMs. This also works out to be cable TV channel 59.

Also included is a caption generator or "Down Stream Keyer" that puts my callsign and the time and date onto the picture. This is especially useful, as the law here in the States requires the picture to be visually identified. Normally one would do this by holding a card up with one's call letters in front of the camera at the appropriate time but I can never remember to do this. The transmitter has no audio facilities so Morse identification is out of the question.

This is the caption generator



So why does mine vary from the original document? For a start mine has the DSK added. But it also has some other abilities. The picture on the right shows the buttons, switches and sockets on the back of the HatCam.

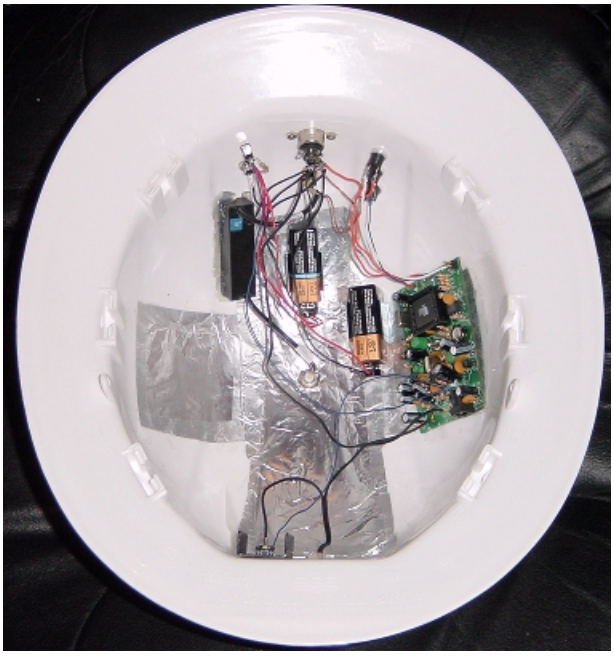
To the left is the power switch with its light. In the middle are a switch, a phono socket and a 5 pin DIN socket. The switch selects the picture source. This can be from the built-in camera or from the phono socket. It allows me to use a camcorder instead of the built-in camera. The 5 pin DIN plug allows me to supply external power for longer periods instead of using the internal batteries. It also allows me to charge the internal batteries too.

The buttons on the right allow me to program the DSK with the time and date plus whatever message I want to have on the screen. Mostly it'll display my callsign.

The camera is a CCTV camera that I got from Ebay. It needs a 5VDC power supply which is a problem as the rest of the HatCam runs at 9VDC. You'll notice a screw head on the right of the camera. This is holding down a 7805 regulator to convert the power from 9 to 5VDC.

Power is supplied by 2 PP3 type 9VDC batteries wired in parallel. The 2 batteries give me extra current which should sustain the operating life of the HatCam. I can get about 24 hours out of the HatCam on a fully charged set of batteries.

On the top of the hat I installed a BNC antrenna connector so that I could fit a Rubber Duckie antenna. In an effort to get the most out of the antenna I lined the inside of the hat with tin foil so as to create a "ground plane" for the antenna to work against. This can add as much as 3db to the signal level so it's worth the hassle.



I said earlier that it cost me about $250 to build. Why so much? Let's take a look. I had to buy everything from scratch apart from the switches and sockets etc.

- 100mW TV transmitter - PC Electronics - $99
- Color camera - Ebay - $49
- Caption generator - WuJu - $49
- Hard Hat - Amazon.com - $15
- Rubber Duckie antenna - $25
- Rechargable batteries - Ebay - $5

…Mark A Phillips, G7LTT 2000 http://www.g7ltt.com/ATV/atv_hatcam.htm

COMMENTS DUE FEBRUARY 12 IN "BAND THREAT" PROCEEDING

Comments are due February 12, 2002, in a FCC Notice of Proposed Rule Making and Order, ET Docket 01-278, that ARRL has targeted as a potential band threat. Reply comments are due on March 12, 2002. The proceeding deals in part with a potential threat to the popular 70-cm band from Part 15 RF identification devices proposed for deployment between 425 and 435 MHz.

SAVI Technology, which markets radiolocation and wireless inventory control products, told the FCC it needs the rules changes to satisfy customer demand for increased RFID system capabilities. The FCC has proposed to allow operation of RFIDs as unlicensed Part 15 devices in the 425-435 MHz band with transmissions of up to two minutes at field strengths now only permitted for extremely short-duration, intermittent control signals.

The ARRL has argued that under the Communications Act of 1934 the FCC lacks authority to permit unlicensed devices with substantial interference potential and that such devices must be licensed. The League also is looking into the interference potential posed to 20 meters by a proposal to increase the maximum emission levels permitted by Part 15 devices operating at 13.56 MHz, as well as the maximum level of out-of-band emissions.

Commenters are advised to read paragraphs 20-27 of the NPRM&O, available on the ARRL Web site <http://www.arrl.org/news/stories/2001/10/19/1/290a11.html>. Interested parties may file comments using the FCC's Electronic Comment Filing System, <http://www.fcc.gov/e-file/ecfs.html> (search using "01-278"). Commenters should include full name, US Postal Service mailing address, and applicable docket or rule making number--in this case ET 01-278.

It's also possible to e-mail comments via the ECFS. To obtain e-mail filing instructions, commenters should send an e-mail to ecfs@fcc.gov and include words "get form <your e-mail address>" in the body of the message. A sample form and directions will be sent by reply e-mail. …The ARRL Letter Vol. 20, No. 47 November 30, 2001

TAKE A NUMBER: FRN NOW MANDATORY

Anyone filing an Amateur Radio application now will be asked to supply a 10-digit FCC Registration Number (FRN) issued by the FCC's new Commission Registration System, or CORES. The requirement applies to FCC applications filed on-line or on paper. The FCC also has supplanted Universal Licensing System (ULS) registration with "CORES/Call Sign" registration, so applicants no longer need to register separately in both systems.

Most, if not all, hams that registered previously with the ULS already have an FRN, although they may not know it yet. The FCC just completed another cross-registration to include those already on the ULS books within the CORES "entity registration" database, and another is scheduled. Amateurs can learn their FRNs by doing a license search on the FCC's Universal Licensing System page <http://wireless.fcc.gov/uls/>. FRNs also are displayed via the ARRL call sign server on ARRLWeb <http://www.arrl.org>.

The FCC has updated its ULS page <http://wireless.fcc.gov/uls/> to reflect the new reality and to make the page a bit less confusing. Amateurs not yet registered in CORES who click "CORES/Call Sign" registration will be redirected to the CORES site to complete that process. Amateurs who click "Online Filing" are advised to proceed to CORES to register if they do not already have an FRN, then return to ULS for filing.

Those filing on-line applications now are asked to supply either an FRN or a Taxpayer Identification Number (TIN--a Social Security Number for an individual) plus a password, typically the same for both CORES and ULS.

The process is a bit more daunting for new club station applicants, who now will be asked to register in CORES as business entities. Such applicants also may file with a Club Station Call Sign Administrator using Form NCVEC 605 and simply leave the FRN field blank. ARRL VEC Manager Bart Jahnke, W9JJ, says that in those cases, the Club Station Call Sign Administrator (CSCSA), such as ARRL, will register the club station entity in CORES on the applicant's behalf.

The FCC also now only accept FCC Form 159 (Remittance Advice) dated February 2000 or later, which requires providing an FRN. A copy of the acceptable version is available on the FCC Web site <http://www.fcc.gov/fees>. At the left side of page, click on "Form 159".

For more info about the Commission Registration System or to obtain an FRN, contact CORES Help Desk, 877-480-3201, cores@fcc.gov. …The ARRL Letter Vol. 20, No. 48 December 7, 2001

ORGANIZATIONS TO MARK CENTENNIAL OF MARCONI'S TRANSMISSION

Here I go again publishing non-ATV-related topics. Well, I could say that if it hadn't been for Marconi, we might not have discovered television! That's stretching things a bit but…what the heck…lets learn a little bit about other wireless topics as well. Read on, as there will be a quiz at the Spring event! WA8RMC

On a windswept piece of Newfoundland 100 years ago this week, Guglielmo Marconi, bundled up against the cold and straining to hear into his receiver, became the grandfather of the cell phone.

Few business leaders in the 3G industry will likely take the time this week to note the centennial of the first wireless trans-Atlantic transmission, but celebrations are planned in Newfoundland and in Cornwall, United Kingdom, from where the first signals — the hissing dit-dit-dit of a Morse Code "S" — were transmitted. The signals were received Dec. 11, 1901, at Marconi's station on Signal Hill, St. John's, but the need to verify reception pushed the internationally recognized date of transmission to Dec. 12.

In the United States, the IEEE Communications Society kicked off its recognition of the event with a special retrospective of Marconi's life in a Nov. 28 seminar at the IEEE Globecom conference in San Antonio, Texas.

A day earlier, conference keynote speaker Steve Grady, vice president and regional marketing officer for Marconi USA, had stressed the relevance of Marconi's business career to entrepreneurial engineers.

Unlike Oxford University's Oliver Lodge — the scientist largely credited with proving the first radio transmission over a distance longer than 100 meters — Marconi was as much a businessman as an engineer. Indeed, Marconi distinguished himself from other followers of Heinrich Hertz by continuously scouting business applications for radio systems.

Grady told the IEEE audience that Marconi's ability to strike the right alliances with financiers, government officials and the media was as important as his research extensions to the work of Hertz and Lodge. "At the end of the day, applying the technology means finding a broad base of utility, first for government and military users and later for the public at large," he said.

Marconi was born in Bologna, Italy, on April 25, 1874, the second son of wealthy landowner Giuseppe Marconi and whiskey distillery heir Annie Jameson. In 1895, he surpassed the Lodge's original Oxford experiments, achieving 2-kilometer transmission, and asked his family to provide seed financing for promoting applications in England and France.

During two trips to England in 1896, Marconi met with radio researcher A.A. Campbell-Swindon, filed for his first British patent in wireless telegraphy and publicly demonstrated the technology even before incorporating a company.

When Wireless Telegraph and Signal Co. was incorporated in Great Britain in July 1897, Marconi bowed to the inevitable by presuming in advance that the British Post Office and Royal Navy would demand control over his critical patents. At the same time, he showed business acumen by retaining rights to wireless patents in Italy.

Marconi received a mix of government and private financing in Britain to establish coastal stations on the Isle of Wight and at Bournemouth in mid-1898. Late that year, as government leader William Ewart Gladstone lay dying in Bournemouth, a snowstorm took out the local wireline telegraph. Marconi demonstrated his media savvy by allowing journalists to transmit the news of Gladstone's illness via wireless. He also showed his commitment to moving to volume wireless production by establishing a radio system factory in Essex.

Marconi spent 1899 attempting to sell France and United States on the value of long-range wireless systems. A station was set up in France with the help of French financiers, and by midyear successful transmissions were made across the English Channel. In the United States, Marconi met with less success among his government contacts: Initial Navy experiments involving U.S. warships experienced self-jamming problems, and the government elected to stick with homing pigeons for intership communications.

But Marconi was undeterred. He incorporated Wireless Telegraph Co. USA, which later became RCA.

"We see an inventor 100 years ago realizing something many entrepreneurs don't understand today: You must pursue multiple regional markets, and multiple application bases, simultaneously," Grady said. "If you wait for one application to succeed or fail before examining another, you could lose your advantage."

By the spring of 1900, Marconi had solved the jamming problem through a new method of syntonic tuning, for which the inventor received his famous "Four Sevens" patent (No. 7777). The U.S. Navy expressed mild interest in conducting new experiments, but by this time, the government of Canada was even more anxious to invest in Marconi's experiments.The inventor already had shifted his focus from Cape Cod, Mass., to Newfoundland for trans-Atlantic experiments, since landfall of the transmitted radio waves would occur sooner there — and the Canadian government was only too happy to oblige.

At the turn of the century, physicists such as Lord John William Rayleigh were highly skeptical that radio waves could bend around the surface of the earth, since light showed no such propensity, and all electromagnetic radiation was believed to follow the same principles. It was not until decades after Marconi's experiment that Oliver Heaviside and Arthur Edwin Kennelly described the properties of the upper atmosphere that allowed the forward-scattering of radio waves that made transoceanic transmissions possible.

Indeed, Marconi in 1895 placed his transmitter near his house and a receiver three kilometers away, behind a hill, to prove that a signal could travel distances and overcome objects.

Through the summer of 1901, Marconi's team assembled an "elephant cage" suite of masts in Newfoundland and Cornwall, rapidly spending the bulk of the 50,000 pounds Marconi had cobbled together for initial financing. In Sept 1901, storms in Cornwall toppled the original array. Rather than postpone experiments, Marconi set up a series of temporary antennas, held aloft by balloons and kites, while permanent wooden towers were constructed as replacements.

Hence the controversy over whether signals were received. It seems safe to say the signals were received on Dec. 11, but a balloon holding up one aerial on Signal Hill in Newfoundland was blown down, so the experiment was not verified until Dec. 12, 1901. Approval for permanent stations in Cornwall, Cape Cod and Newfoundland's Glace Bay rapidly followed.

In its early days, the Marconi family of companies preserved its lead through a unique arrangement for shipboard communications under which Marconi personnel were required to run the wireless sets. The early years were crucial in assuring that Marconi's companies would be strong enough to withstand the later transfer of patents to U.K.-based Cable & Wireless.

Today, Marconi's name lives on through the rechristening of General Electric Co. plc (a unit of Marconi that became GEC in 1897) as Marconi plc in 1999. While Marconi may be struggling as desperately as other telecom OEM giants, the wireless experiments a century ago spawned a multibillion-dollar global industry.

Stations KPH and K6KPH will be on the air Dec. 12 to help celebrate the 100th anniversary of the first wireless signal to cross the Atlantic. Both stations will use the original transmitters, receivers and antennas of famous ex-RCA coast station KPH. More information can be found at www.alpcom.it/hamradio/100.htm. Additional information about wireless radio and the Marconi celebration can be found at www.alpcom.it/hamradio/ and www.falara.org/OpEvents/Marconi/links.html.
… By Loring Wirbel From EE Times Newsletter Wed, 12 Dec 2001

FOR SALE …FOR SALE…FOR SALE…FOR SALE…FOR SALE…FOR SALE

From: "Richard Wise" <kb8yio@hotmail.com>

I have a Dell Optiplex 150 slim line tower computer but extra tall tower. I am looking to trade this unit for an H.F. rig like Icom 706mk11g or similar. The CPU is only 3 months old and has cdr-w burner and reg cd rom 20 gig hard drive with loads of games and blank cds. It has 256 megs of ram and lots more but to numerous to list here. I will sell out right or trade for Rig like Icom 706mk11g or Alinco dx-70th or similar rigs plus one year of free internet service still available. I would also consider trade for rigs like Kenwood tm-742a and the such. Best to place a call for contact info as I travel a lot and my not see e-mail for a few weeks 614-291-6506. Other rig offers also considered.

NEW MEMBERS

Let’s welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood him or her with information. New members are the lifeblood of our group. It's important that we actively recruit new faces aggressively.

KC8HCE Adam Porr Pickerington, Ohio

…Art WA8RMC

FALL ATV PIZZA PARTY

We continue to have fun at our random pizza parties. Sometime in November we decided that it's been too long since our last one so we decided to have pizza again before Christmas. And that we did! On Friday December 14, we gathered at Donato's in Hilliard for an informal ATV gathering. We did well this time around for about 16 people were present to rag chew and absorb some good pizza.

The gathering lasted about two hours which afterward we were invited to tour Hilliard's new antique television museum. The owner opened the facility just for us and gave us a personal tour of the contents. We were all amazed by the quality of the surroundings, which displayed more than 50 television sets, both domestic and foreign, dating back to the 1930's. He even has a one-of-a-kind TV/jukebox combination, which was built in the 50's that is still in operating condition. We all had a great time. See pictures below.

Below are pictures of the group consuming the pizza and below that are a couple photos of the TV museum.

Directly below is the TV/Jukebox I mentioned above. Quite a piece of equipment. Below left is the building that is home to the equipment. To see more visit http://www.earlytelevision.org. The address is on the homepage if you'd like to visit or contact Roger, WB8DZW, for directions. It's just down the street from him. The museum owner is Steve McVoy and can be reached at 771-0510.

FALL EVENT DETAILS

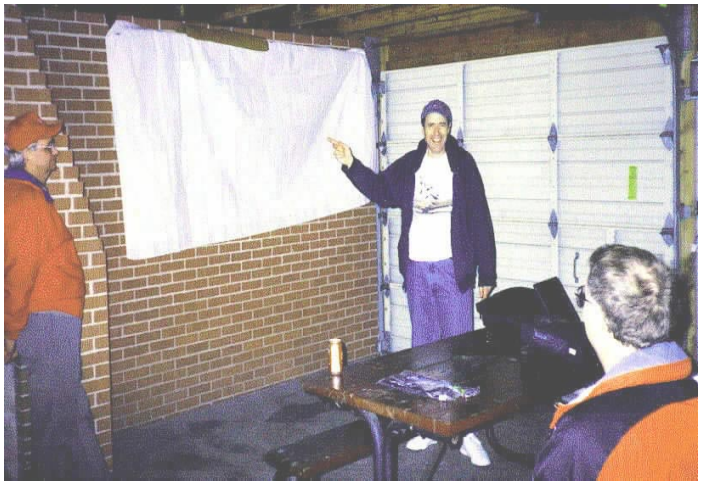
Another great Fall day…another great Fall Event! This one couldn't have been better weather wise and also was at the top of the list Fall Event wise. As usual, we had about 25 people attend the gathering. The food was good, and it seemed we ran out too soon. Either I underestimated the requirements or we had some really hungry people. We'll plan for a little more food next time although no one went home hungry.

Before and during lunch we enjoyed the luxury of a mini ATV hamfest where we lined up the cars and had a trunk sale swap party. I didn't buy or trade anything personally, but there were a number of interesting items to be had and a number of us went home with something new. Great! Lets make it bigger and better for the upcoming Spring Event. Check out the picture below for a glimpse of the car activity.

After lunch we had a business meeting where all present officers were re-elected. Yes, I guess you'll have to put up with us for another year. The only exception is the open secretary position left by Rick, WA3DTO, who has moved out of town. If anyone would like to volunteer, I sure could use some help. The only scheduled task would be to report the Spring and Fall event activities so I could publish them in the newsletter. I don't want to scare anyone away so I'll stop there.

Next we had a talk by Jim, WA8UZP, about computer programming which was very interesting even though I personally don't deal with software very well. I tend to be much more literate with the hardware aspects of this subject. Thanks, Jim for the great seminar!

Last, we held a door prize drawing where we drew prizewinners. They are great prizes and no one went home without something. Many thanks for the guys that donated the items. That's it for the year of 2001. We'll look forward to seeing all of you and more at the Spring Event to be held sometime around May first. We'll announce the date later. Stay tuned.
…WA8RMC



MESSY HAMSHACK CONTEST

Starting with this issue, I will accept nominations for the messiest Hamshack. This will be anonymous, as I'm sure that we do not want a self-confession of the worst kept hobby area, do we? Actually, the ones pictured here are not the messiest because I purposely have not shown my own shack…oops! But really, let's be honest. If it's messy, that's a good sign that we spend a significant time there. Besides, it's a hobby and supposed to be fun. Nominations will be accepted through next issue and I'll think of a great prize for the winner. (Now that I think about it, if the submitter wishes to be anonymous, how will I hand out the prize)? Let me think about that one for a while.

Entry number 1.

Entry number 2.

Entry Number 3

Entry number 4

Entry number 5

Entry number 6

OK, that's it for this time. I need more entries to make this interesting. It's best if you Email me the pictures (I promise not to disclose the source) or, if the internet is not available, just send it snail mail. Thanks!

…WA8RMC

ATV EQUIPMENT SUPPLIERS… Find your ATV stuff here!

Below is a list of manufacturers of ATV equipment that I have found. There is no endorsement of any of the manufacturers listed below so buyers beware. If I or anyone else that I know of has had any trouble with a manufacturer, it won't be listed. As I get more info, I'll add manufacturers. Likewise, if I hear of any trouble, it'll be removed. Good luck and keep me advised. List verified 6/1/00.
…Art WA8RMC

Downeast Microwave
Antennas, Power Amplifiers, Deluxe Downconverters, microwave parts.
954 Rt. 519 Frenchtown, NJ 08825
Phone: 908-996-3584
Fax: 908-996-3702

Hamtronics Inc
Ham receivers, transmitters
Antennas, Preamps
http://www.hamtronics.com

M²
Antennas
7560 N. Del Mar Ave.
Fresno, Ca 93711
Phone: 209-432-8873
http://www.m2inc.com

CCI Communications Concepts, Inc.
508 Millstone Drive
Beavercreek, OH 45434-5840
(937)426-8600 Voice
(937)429-3811 Fax
Email: cci.dayton@pobox.com
http::://www.communications-concepts.com ATV Equipment

ATV Quarterly (ATVQ)
ATV magazine publisher
5931 Alma Drive
Rockford, Il. 61108
Phone 815-398-2683
FAX 815-398-2688
Email: atvq@hampubs.com

PC Electronics
ATV Transmitters, Receivers
Manufacturer/Reseller
2522 Paxson Ln.
Arcadia, CA 91007-8537
Phone: 626-447-4565
Fax: 626-447-0489
tom@hamtv.com
www.hamtv.com

Black Box
1000 Park Drive
Lawrence, PA 15055-1018
(800)552-6816 Voice
(800)321-0746 Fax
Email: info@blackbox.com
http://www.blackbox.com
Electronic Connections

SHF Microwave Parts Company
10GHz Gunn oscillators and Antennas
7102 W. 500 S.
LA PORTE, INDIANA, 46350
Fax: 219-785-4552

Allied Electronics
7410 Pebble Drive
Fort Worth, TX 76118
(800)433-5700
http://www.allied.avnet.com
Electronic Parts House

GEKCO Inc
TV test signal circuit boards
PO Box 642
Issaquah, Wa 98027-0642
Phone: 425-392-0638
Email: sales@gekco.com
www.gekco.com

Cable X-Perts
416 Diens Drive
Wheeling, IL 60090
800-828-3340 Voice 847-520-3444 Fax
http://www.cablexperts.com
Wire and Cable

DCI Communications
Interdigital filters and cavities
Box 293, 29 Hummingbird Bay
White City, SK, Canada S0G5B0
Phone: 306-781-4451
http://www.dci.ca/

ATV Research Inc.
TV cameras & related parts
1301 Broadway PO Box 620
Dakota City, NE 68731-0620
Phone: 402-987-3771
Homepage: www.atvresearch.com
Email: atc@pionet.net

E. H. Yost & Company
2211-D Parview Road
Middleton, WI 53562
(608)831-3443 Voice
(608)831-1082 Fax
Email: ehyost@midplains.net
Battries

Phillips-Tech Electronics MMDS, ITFS downconverters and antenna systems
P.O. Box 8533
Scottsdale, AZ 85252
Phone: 602-947-7700
Fax: 602-947-7799

MCM Electronics
650 Congress Park Drive
Centerville, OH 45459
(800)543-4330 Voice
(800)765-6960 Fax
http://www.mcmelectronics.com

Jameco Electronic Components
1355 Shoreway Road
Belmont, CA 94002-4100
(800)831-4242 Voice
Email: infor@jameco.com
http://www.jameco.com
Electronic Parts

Fair Radio Sales
1016 E. Eureka P.O. Box 1105
Lima, OH 45802
(419)227-6573 Voice
(419)227-1313 Fax
Email: fairadio@wcoil.com
http://www.fairradio.com
Electronic Surplus Equipment

Directive Systems
RR#1 Box 282 Dixon Road
Lebanon, ME 04027
(207)658-7758 Voice
(207)658-4337 Fax
Antennas
http://www.directivesystems.com/

Mouser Electronics
958 North Main Street
Mansfield, TX 76063-4827
(800)346-6873 Voice
(817)483-0931 Fax
Email: sales@mouser.com
http://www.mouser.com
Electronics Parts House

Hosfelt Electronics Inc.
2700 Sunset Boulevard
Steubenville, OH 43952-1158
(800)524-6464 Voice
(800)524-5414 Fax

Pauldon Associates
210 Utica Street
Tonawanda, NY 14150
(716)692-5451 Voice
ATV Receivers and Transmitters

Universal Radio Inc
6830 Americana Parkway
Reynoldsburg, Ohio 43068
614-866-4267
http://www.universal-radio.com

Spectrum International
J-Beams, KVG, Micromodules,VSB
John Beanland
Phone:978-263-2145.
Email: Spectrum@ma.ultranet.com
filters

The Wireman, Inc.
261 Pittman Road
Landrum, SC 29356
(800)727-9473
(864)895-4195
Wire and Cable

Webster Communications, Inc.
115 Bellarmine
Rochester, MI 48309
(800)521-2333 Voice
(810)375-0121 Fax
Electronic Parts

INTERNET ATV HOME PAGES (list verified 01/18/02)

If you have access to the INTERNET, you may be interested to know of some of the HAM related information that is available. Most addresses listed below are case sensitive, so type exactly as shown. (For comments or additional listings contact me at towslee@ee.net).
Note: The listings below without URL's have disappeared! If any of you know otherwise, let me know.

Domestic homepages

http://psycho.psy.ohio-state.edu/atco	Ohio, Columbus, homepage (ATCO)
http://www.activedayton.com/community/groups/rmeeksjr/index.html	Ohio, Dayton ATV group (DARA)
http://users.erinet.com/38141/atv.htm	Ohio, Xenia KB8GRJ
	Alabama - Gulf Coast Amateur Television Society
http://www.hayden.edu/Guests/AATV	Arizona, Phoenix Amateurs (AATV) Carl Hayden High School
http://www.w7atv.com	Arizona, Pheonix Amateurs(AATV)
http://www.citynight.com/atv	California, San Francisco ATV
http://www.qsl.net/atn	California, Amateur Television Network in Central / Southern
http://www.qsl.net/scats/	Florida, Melborn Space Coast Amateur TV Society (SCATS)
http://www.bsrg.org/aatn/aatn1.html	Georgia, Atlanta ATV
http://members.tripod.com/silatvg	Illinois, Southern, Amateur Television group
http://www.ussc.com/~uarc/utah_atv/id_atv1.html	Idaho ATV
	Kentucky, Lexington Bluegrass ATV Society (BATS)
	Kansas, Kansas City Amateur TV Group (KCATVG)
http://www.bratsatv.org	Maryland, Baltimore Radio Amateur Television Soc. (BRATS)
http://www.icircuits.com/dats	Michigan, Detroit Amateur Television System (DATS)
http://come.to/amateurtv.mn	Minnesota Fast Scan Amateur Television (MNFAT)
	Missouri, St Louis Amateur Television
http://www.qsl.net/kd2bd/atv.html	New Jersey, Brookdale ARC in Lincroft
http://www.no3y.com/radio.html	New Mexico, Farmingham
http://www.ipass.net/~teara/menu3.html	North Carolina, Triangle Radio Club (TEARA)
http://www.jones-clan.com/amateur_radio/klamath_amateur_television.htm	Oregon, Southern Oregon ATV
http://www.nettekservices.com/ATV/	Pennsylvania, Pittsburg Amateur Television
http://members.bellatlantic.net/~theojkat	Pennsylvania, Phila. Area ATV
http://www.geocities.com/Hollywood/5842	Tennessee, East ATV
http://www.hats.stevens.com	Texas, Houston ATV (HATS)
	Texas, WACO Amateur TV Society (WATS)
http://www.hamtv.org/	Texas, North Texas ATV
http://www.ussc.com/~uarc/utah_atv/utah_atv.html	Utah ATV
	Washington, Western Washington Television Soc. (WWATS)
http://www.shopstop.net/bats/	Wisconsin, Badgerland Amateur Television Society (BATS)

Foreign homepages

http://lea.hamradio.si/~s51kq/	Slovenia ATV **(BEST OF FOREIGN ATV HOMEPAGES)**
http://www.batc.org.uk/index.htm	British ATV club (BATC)
http://www.sfn.saskatoon.sk.ca/recreation/hamburg/hamatv.html	Saskatoon, Canada ATV
http://www.gpfn.sk.ca/hobbies/rara/atv3.html	Regina, Canada ATV
http://www.inside.co.uk/scart.htm	UK, Great Britain ATV (SCART)
http://www.cmo.ch/swissatv	Swiss ATV
http://www.rhein-land.com/atv	German ATV in "Niederrhein" area
http://www.arcadeshop.demon.co.uk/atv/	UK, G8XEU ATV homepage
	British Columbia, Canada VE7RTV repeater
	Auckland, New Zealand ATV
http://www.cq-tv.com	British ATV Club and CQ-TV Magazine

INTERNET MISCELLANOUS HAM RELATED HOME PAGES

(list verified 01/18/02)

The following addresses are helpful in searching for many different Ham Radio items on the INTERNET.

http://www.hampubs.com/	ATVQ Magazine home page. ATV equipment & article references.
http://www.hamtv.com	PC Electronics Inc. Lots of proven ATV equipment for sale.
http://downeastmicrowave.com	Down East Microwave Inc. Lots of uhf/microwave parts & modules.
http://www.arrl.org/hamfests.html	Current yearly hamfest directory.
http://amsat.org	AMSAT satellite directory/home page.
http://www.arrl.org	ARRL home page
http://www.arrl.org/fcc/fcclook.php3	ARRL/FCC revised CALLSIGN database. Search call sign or name.
http://hamradio-online.com	Ham Radio Online "newsletter" Lot of Ham related info.
http://www.qsl.net/atna/	ATNA homepage
http://www.ham-links.org	Ham Radio collection database
http://fly.hiwaay.net/~bbrown/index.htm	Tennessee Valley Balloon launch info (Bill Brown WB8ELK)
http://www.ipass.net/~teara/atv4.html	Arizona ATV 2.4Ghz Wavecom page (Wavecom mod. info)
	Space Shuttle Launch Info Service & Ham TV System (LISATS)
http://www.svs.net/wyman/	Wyman Research Inc. W9NTP Don Miller ATV equipment
http://www.m2inc.com /	M2 Antenna Systems Inc.
http://www.dci.ca/amateur_radio.htm	DCI Digital Communications Inc. Bandpass filters
http://scott-inc.com/wb9neq.htm	Kentucky, Airborn ATV from WB9NEQ in Bowling Green
http://www.icircuits.com/	Intuitive Circuits Inc
http://www.qsl.net/kd4dla/ATV.html	KD4DLA ATV web page index
http://www.severe-weather.org	Columbus, Ohio severe weather net at Columbus airport
http://www.mods.dk	Ham radio modification lists.
http://gullfoss.fcc.gov:8080/cgi-bin/ws.exe/beta/genmen/frequency.hts	look up any frequency on the FCC data base.
http://www.fcc.gov/wtb/	Starting point from which all radio license holders can be found
http://www.labguysworld.com	Lab Guy Antique TV camera listing
http:\\www.earlytelevision.org	Antique television museum in Hilliard, Ohio
http://radioscanning.wox.org/Scanner/scanner.htm	Radio scanner info for all frequencies in Columbus, Ohio area.
http://www.labguysworld.com/	Television recorder history web page. Lots of tv info.

HAMFEST CALENDAR

This section is reserved for upcoming hamfests for as far in advance as we know about them. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here, notify me so it can be corrected. I maintain some fliers that compile this list so for additional info Email me at towslee@ee.net. This list will be amended, as further information becomes available.

20 Jan 2002+Sunday Creek AR Federation http://www.hfradio.org/kc8aav/ Contact: Russ Ellis, N8MWK 8051 Oregon Ridge Glouster, OH 45732 Phone: 740-767-2226 Email: n8mwk@arrl.net Nelsonville, OH
27 Jan 2002+Tusco ARC Contact: Gary Green, KB8WFN 32210 Norris Road Tippecanoe, OH 44699 Phone: 740-922-4454 Email: kb8wfn@tusco.net Dover, OH
3 Feb 2002xNorthern Ohio ARS Contact: John Schaaf, K8JWS PO Box 432 Elyria, OH 44036-0432 Phone: 216-696-5709 Email: noars@qsl.net Lorain, OH
10 Feb 2002+InterCity ARC & MASER http://www.maser.org Contact: Scott Yonally, N8SY 179 Malone Road Mansfield, OH 44907-2117 Phone: 419-522-9893 Email: n8sy@arrl.net Mansfield, OH
24 Feb 2002+Cuyahoga Falls ARC http://www.cfarc.org Contact: Ted Sarah, W8TTS239 Bermont Avenue Munroe Falls, OH 44262 Phone: 330-688-2013 Email: w8tts@arrl.net Cuyahoga Falls, OH
17 Mar 2002+Toledo Mobile Radio Association http://tmrahamradio.org Contact: Paul Hanslik, N8XDB 3241 Schneider Road Toledo, OH 43614-2432 Phone: 419-385-5056 or 419-535-6594 Email: kb8iup@arrl.net Maumee, OH
24 Mar 2002+Lake County ARA http://hamnet.org/lcara Contact: Roxanne, N8BC 7480 Fern Drive Mentor-on-the-Lake, OH 44060-3233 Phone: 440-209-8953 (9 AM to 9 PM) Email: lcarahamfest@hotmail.com Madison, OH
28 Apr 2002+Twenty Over Nine ARC Contact: Don Stoddard, N8LNE 55 South Whitney Avenue Youngstown, OH 44509 Phone: 330-793-7072 Email: n8lne@arrl.net Canfield, OH
17-19 May 2002xDayton Hamvention Dayton ARA http://www.hamvention.org/ Contact: Dayton, OH

ATCO REPEATER TECHNICAL DATA SUMMARY

Location:	Downtown Columbus, Ohio	
Coordinates:	82 degrees 59 minutes 53 seconds (longitude) 39 degrees 57 minutes 45 seconds (latitude)	
Elevation:	630 feet above average street level (1460 feet above sea level)	
Transmitters:	427.25 MHz AM modulation, 1250 MHz FM modulation and 2433 MHz FM modulation.	
	Interdigital filters in output line of 427.25, 1250 & 2433 transmitters	
	Output Power -	427.25 MHz:40 watts average 80 watts sync tip
		1250 MHz:50 watts continuous
		2433 MHz:15 watts continuous
	Link transmitter -	446.350 MHz 1 watt NBFM 5 kHz audio
Identification:	427, 1250 & 2433 xmtrs. Video identify every 30 minutes showing ATCO & W8RUT on four different screens	
Transmit antennas:	427.25 MHz - Dual slot horizontally polarized 7 dBd gain major lobe west	
	1250 MHz - Diamond vertically polarized 12 dBd gain omni	
	2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni	
Receivers:	147.45 MHz - F1 audio input control of touch tones	
	439.25 MHz - A5 video input with FM subcarrier audio (**lower sideband**)	
	915 MHz - F5 video link data from remote sites	
	1280 MHz - F5 video input	
	2398 MHz - F5 video input	
Receive antennas:	147.45 MHz - Vert. polar. Hi Gain 12 dBd dual band (also used for 446.350 MHz output)	
	439.25 MHz - Horiz. polar. dual slot 8 dBd gain major lobe west	
	915 MHz - DB Products vertically polarized 10 dBd gain omni	
	1280 MHz - Diamond vertically polarized 12 dBd gain omni	
	2398 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni	

Input control:	Touch Tone		Result (if third digit is * function turns ON, if it is # function turns OFF)
	00#		turn transmitters **off** (exit manual mode and return to auto scan mode)
	00*		turn transmitters **on** (enter manual mode -keeps transmitters on till 00# sequence is pressed)
Manual mode functions:	00* then 1	Ch. 1	Select 439.25 receiver - manual mode (hit 00* then 1 to view 439.25 signal only)
	00* then 2	Ch. 2	Select 915 receiver - manual mode
	00* then 3	Ch. 3	Select 1280 receiver - manual mode
	00* then 4	Ch. 4	Select 2411 receiver - manual mode
	00* then 5	Ch. 5	Select video ID - manual mode (the 4 identification screens)
	01* or 01#		Channel 1 439.25 MHz scan enable (hit 01* to scan this receive channel & 01# to disable it)
	02* or 01#		Channel 2 915 MHz scan enable
	03* or 01#		Channel 3 1280 MHz scan enable
	04* or 01#		Channel 4 2411 MHz & camera video scan enable
	A1* or A1#		Manual mode select of 439.25 receiver audio
	A2* or A2#		Manual mode select of 915 receiver audio
	A3* or A3#		Manual mode select of 1280 receiver audio
	A4* or A4#		Manual mode select of 2411 receiver audio
	C0* or C0#		Beacon mode – transmit ID for twenty seconds every ten minutes
	C1* or C1#		427.25 transmitter power output select (C1* = 40W output power or C1# = 1.5W output)
	C2* or C2#		2433 transmitter for on/off. (C2* enables transmitter and C2# disables it)

Auto scan mode functions:		
	001	2411 receiver (normal mode - returns to auto scan)
	002	Roof camera (select 001 when finished viewing camera so repeater will shut down)
	003	Equipt. room camera (select 001 when finished viewing camera so repeater will shut down**)**

FOCUS 1	**ZOOM** 2	**APERATURE** 3	**DISABLE** A A A **A**
FILTER 4 steps 4	**TILT** 5	**PAN** 6	**ENABLE** B B B **B**
IN/RT/DN 7	8	**INC SPEED**	**C**
OUT/LT/UP *	0	**DEC SPEED** **Pan/Tilt**	**D**

CAMERA CONTROLLER KEYPAD FUNCTIONS

002 = ENABLE CAMERA
001 = RETURN TO NORMAL

Note: sometimes enter 003 for room cam then 002 for roof cam is better.

OK, that's it folks. Play with it to your heart's content. Oh, one more thing. Use the camera in the repeater automatic mode only. If you access it in repeater manual mode, the first time you hit a function button, the controller thinks you want another input and shuts it down. In auto mode hit "002" to enable the roof camera and "001" when finished to return the controller to the 2400 MHz input. Since there will be no 2400 MHz signal, the repeater will shut down.
Use the keypad diagram at left as a function reference. Cut it out and paste it beside your keypad if you prefer. Thanks to Dale, WB8CJW, for the handy work.

ATCO MEMBERS AS OF 18 January 2002

Call	Name	Address	City	St	Zip	Phone	URL
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	Oh	43224-3011		sdiggs4590@aol.com
K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	Oh	43068	614-866-1399	wilbur.w@juno.com
KC3AM	David Stepnowski	735 Birchtree Lane	Claymont	De	19703-1604		kc3am@aol.com
KC8ASD	Bud Nichols	3200 Walker Rd	Hilliard	Oh	43026	614-876-6135	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	Oh	43065	614-210-0551	delshoff@columbus.rr.com
WA8DNI	John Busic	2700 Bixby Road	Groveport	Oh	43125	614-491-8198	jbusic@copper.net
W8DLB	Denny Beardmore	PO Box 313	Bethesda	Oh	43719-0313	740-484-4822	Dlb@1st.net
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	Oh	42616	419-691-1625	
WA3DTO	Rick White	5314 Grosbeak Glen	Orient	Oh	43146	614-877-0652	wa3dto@aol.com
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	Oh	43026	614-876-6033	wb8dzw@aol.com
W8EHW	Foster Warren	PO Box #32	No. Hampton	Oh	45349		
KC8FGH	Bob Rector	135 S. Algonquin Ave	Columbus	Oh	43204-1904	614-276-1689	Rrector677@aol.com
KS4GL	John Barnes	216 Hillsboro Ave	Lexington	Ky	40511	606-253-1178	jrbarnes@iglou.com
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	Oh	43147		
KA8HAK	Jim Reese	1106 Tonawanda Ave	Akron	Oh	44305		
KC8HCE	Adam Porr	6825 Ridgeway Ct.	Pickerington	Oh	43147	614-837-6489	Kc8hce@arrl.net
WA8HFK,KC8HIP	Frank, Pat Amore	3630 Dayspring Dr	Hilliard	Oh	43026	614-777-4621	
W3HMS	John Jaminet	912 Roberts St	Mechanicsburg	Pa	17055-3451		w3hms@aol.com
N8IJ (ex w8jnd)	Richard Knowles	2318 Britt Ave	Lima	Oh	45806		
WD8ITF	Larry Fields	953 W. Hopocan Ave	Barberton	Oh	44203-7007	330-825-7148	lfields@neo.rr.com
K8KDR,KC8NKB	Matt & Nancy Gilbert	5167 Drumcliff Ct.	Columbus	Oh	43221-5207	614-771-7259	mjgilbert@wcom.net
K4KLT, KD4ODQ	Bob & JoAnnSchmauss	P.O. Box 1547	Land O' Lakes	Fl	34639-1547	813-996-2744	schmauss@att.net
N8KQN	Ted Post	1267 Richter Rd	Columbus	Oh	43223	614-276-1820	n8kqn@juno.com
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	Oh	45331	513-548-2492	walkingcross@mail.bright.net
N3KYR	Harry DeVerter Jr	303 Shultz Road	Lancaster	Pa	17603-9563		deverterhf@dejazzo.con
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	Oh	43123	614-871-0751	phumphries@columbus.rr.com
WB2LTS	Manny Diaz	8 Pearl Ave	Holtsville	Ny	11742-1711		wb2lts@worldnet.att.net
KC8LZC	Tom Walter	15704 St Rt 161 West	Plain City	Oh	43064	614-733-0722	kc8lzc@go.com
W8MA(ex wa8tte)	Phil Morrison	154 Llewellyn Ave	Westerville	Oh	43081		
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	Oh	45660		ka8mid@qsl.net
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	Oh	43026	614-876-2127	rtournou@columbus.rr.com
WD8OBT,KB8ESR	Tom Camm & sons	1634 Dundee Court	Columbus	Oh	43227	614-860-9807	
N8OCQ	Robert Hodge	PO Box 23473	Columbus	Oh	43223	614-875-7067	
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Oh	43204	614-279-7577	
W6ORG,WB6YSS	Tom & Maryann O'Hara	2522 Paxson Lane	Arcadia	Ca	91007-8537	626-447-4565	tom@hamtv.com
W2OTA,WA2DTZ	Michael Chirillo	942 Bruce Drive	Wantagh	Ny	11793	516-785-8045	
KC8OZV	George Biundo	3675 Inverary Drive	Columbus	Oh	43228	614-274-7261	kilowatt@biundo.org
WB8PJZ	Dave Morris	2323 Allentown Road	Lima	Oh	45805	419-226-6997	dave@towercomminc.com
KE8PN	James Easley	1507 Michigan Ave	Columbus	Oh	43201	614-421-1492	jeasley11@hotmail.com
W8PGP,WD8BGG	Richard, Roger Burggraf	5701 Winchester So. Rd	Stoutsville	Oh	43154	614-474-3884	rgburggraf@juno.com
K4PRS	Peter R. Sinkowski	4532 W Kennedy Bl #114	Tampa	Fl	33609-2042		k4prs@yahoo.com
WA8RMC	Art Towslee	180 Fairdale Ave	Westerville	Oh	43081	614-891-9273	towslee1@ee.net
W8RRF	Paul Zangmeister	10365 Salem Church Rd	Canal Winchester	Oh	43110		w8rrf@copper.net
W8RRJ	John Hull	580 E. Walnut St.	Westerville	Oh	43081	614-882-6527	
W8RUT,N8KCB	Ken & Chris Morris	3181 Gerbert Rd	Columbus	Oh	43224	614-261-8583	wa8rut@aol.com
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	Oh	45334	937-964-1185	w8rvh@glasscity.net
W8RQI	Ray Zeh	2263 Heysler Rd	Toledo	Oh	43617		zehrw@glasscity.net
KB8RVI	David Jenkins	1941 Red Forest Lane	Galloway	Oh	43119	614-878-0575	kb8rvi@hotmail.com
W8RXX	John Perone	3477 Africa Road	Galena	Oh	43021	740-548-7707	
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	Mi	48144		
N8SFC	Larry Campbell	316 Eastcreek Dr	Galloway	Oh	43119		
W8SJV	John Beal & family	5001 State Rt. 37 East	Deleware	Oh	43015	740-369-5856	W8sjv@midohio.net
W3SST	John Shaffer	2596 Church Road	York	Pa	17404		w3sst@juno.com
K8STV	Jim Carpenter	823 Quailwood Dr	Mason	Oh	45040		
KB8TRP,KB8TCF	Tom, Ed Flanagan	1751 N. Eastfield Dr	Columbus	Oh	43223	614-272-5784	ed@fastpc1.com
W8TZ	Ross Hatfield	47 Wildflower Lane	Chillicothe	Oh	45601	740-774-2777	w8tz@qsl.net
KB8UGH	Steve Caruso	6463Blacks Rd SW	Pataskala	Oh	43062-7756	740-927-1196	mixter.1@osu.edu
WB8URI	William Heiden	5898 Township Rd #103	Mount Gilead	Oh	43338	419-947-1121	
KB8UU	Bill Rose	9250 Roberts Road	West Jefferson	Oh	43162	614-879-7482	
WA8UZP	James R. Reed	818 Northwest Blvd	Columbus	Oh	43212	614-297-1328	wa8uzp@qsl.net
WB8VJD	Rick Morris	203 Merton Street	Holland	Oh	43528		wb8vjd@glasscity.net
KB8VUQ	Jack Wolff	2682 Hiawatha Ave	Columbus	Oh	43212	614-263-4816	kb8vuq@arrl.net
W2WIA,KA2EVC	Ed & John Kuligowski	63 Connecticut Ave	Massapequa	Ny	11758	516-541-3172	w2wia@netscape.net
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	Oh	43062	740-927-3883	hiramhunter@aol.com
KB8YMN	Mark Griggs	2160 Autumn Place	Columbus	Oh	43223	614-272-8266	mmgriggs@aol.com
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	Oh	43064		
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	Oh	43229	614-882-0771	
KB8ZLB	Dave Kibler	243 Dwyer Rd	Greenfield	Oh	45123	937-981-4007	k154@bright.net
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	Oh	43125	614-836-3519	ka8zny@copper.net
N8ZTJ	Jeff Skinner	25956 Locust Grove Rd	New Holland	Oh	43145		

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are $10.00 per person payable on January 1 of each year. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this newsletter quarterly in January, April, July, and October. It is sent to each member without additional cost.

The membership period is from January 1ST to December 31ST. New Members will receive all ATCO newsletters published during the current year prior to the date they join ATCO. For example, a new member joining in June will receive the January and April issues in addition to the July and October issues. Your support of ATCO is welcomed and encouraged.

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT
Secretary: (open)
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Dale Elshoff WB8CJW
Statutory agent: (open)
Newsletter editor: Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

RENEWAL O NEW MEMBER O DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES O NO O
HOME PHONE _____
NAME_____
INTERNET Email ADDRESS_____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS_____
_____
_____
_____

ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK O MONEY ORDER O
Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, you may pay dues via the Internet with your credit card. Go to www.tournoux.com/~atco and fill out the form. Payment is made through "PayPal" but you DO NOT need to join PayPal to send your dues. Simply DO NOT fill out the password details and there will be no PayPal involvement.

TUESDAY NITE NET ON 147.45 MHz SIMPLEX

Every Tuesday night @ 9:00PM WA8RMC hosts a net for the purpose of ATV topic discussion. There is no need to belong to the club to participate, only a genuine interest in ATV. All are invited. For those who check in, the general rules are as follows: Out-of-town and video check-ins have priority. A list of available check-ins is taken first then a roundtable discussion is hosted by WA8RMC. After all participants have been heard, WA8RMC will give status and news if any. Then a second round follows with periodic checks for late check-ins. We rarely chat for more than an hour so please join us if you can.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (10/15/01)..... $1170.52
RECEIPTS (dues)..... $ 200.00
OTHER INCOME (bank interest)..... $ 7.21
October Newsletter postage..... $ (145.40)
Parts for repeater..... $ (22.50)
Pay Pal charges..... $ (1.18)
Fudge factor..... $ (3.37)
Check cashing charges..... $ (2.00)
CLOSING BALANCE (01/18/02)..... $ 1203.28

ATCO Newsletter
c/o Art Towslee-WA8RMC
180 Fairdale Ave
Westerville, Ohio 43081

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK MAILING LABEL FOR THE EXPIRATION DATE AND SEND N8NT A CHECK IF EXPIRED.