ATCO NEWSLETTER

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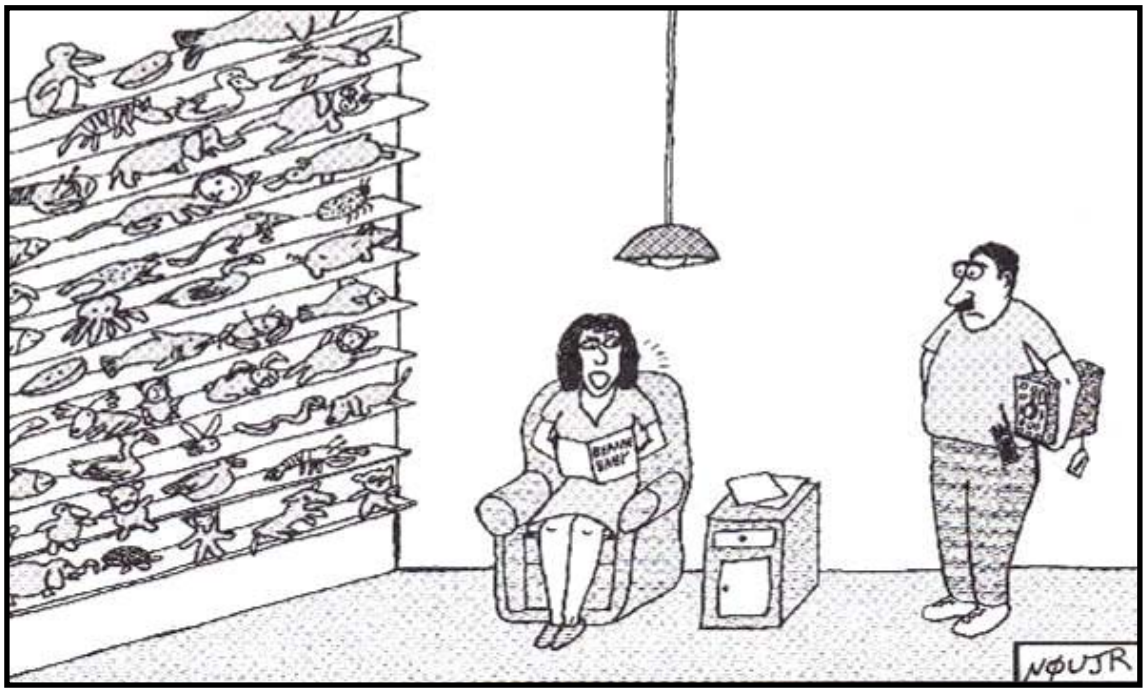
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" and is published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Thanks to Greg Trook N0UJR for allowing us to share his cartoons.



"Jay!!! What are you doing wasting more money on useless antique ATV equipment?"

ACTIVITIES ... from my "workbench"

Hello again fellow ATVers. It's now time to dust off that climbing belt and think about those antenna projects on the back burner since last fall. I know many of you have been talking about changing feed lines, putting up a new tower and adding various antennas. Well, the time is right. GO FOR IT!

Speaking of antenna projects, the repeater antennas need a good check this year. I know that the 2 meter receive/436.35 transmit omni antenna looked a little loose in the mount last fall so I want to check that antenna first. It hasn't been touched since 1994 when we originally installed it so its time is past due. Its position is kind of scary as it sort of hangs over the edge of the building with a good view of the street 650 feet below so I'm looking for volunteers to help. Are there any takers? (I guess I shouldn't have described it that vividly for now I've probably eliminated those considering giving me a hand).

Repeater wise, it's been a good year. A few things have cropped up but most were not serious. Most notably was the time Dale and I went there on a desense mission and wound up causing a filter failure. Read more on that one later in this Newsletter. The desense issue still remains. That is, a slight 1280 MHz input desense occurs when the 427 MHz transmitter is on. Yes, I know the 3rd harmonic of 427.25 is 1281.75 and well within the 1280 MHz input passband. That's the first thing I worked on. However, a low pass filter between the driver and final 427 amp or on the 427 amp output didn't change anything. But a dummy load right on the 427 amp output **does** eliminate it. Time didn't permit last time but upon a revisit, I'll put a dummy load on the receiver input and remove the 1280 preamp to see if changes to the receiver side helps. I also suspect that the 427 energy from the final amp might be getting into the receiver LO or IF chain somehow.

The next thing on the agenda is to install the digital DVB-S receiver. I've reworked it and it's ready for re-installation. I know most of you don't have DVB-S transmit capability but it will be installed and ready for use when needed. (Dale can use it to send the bulletin board information to the repeater for he has transmit capability now). For what it's worth, the DVB-S receiver had to be modified to work with the repeater. The repeater responds to a given input by detecting horizontal and vertical sync. The DVB-S receiver outputs composite sync at all times so if installed unmodified, the repeater would be locked onto it at all times. Dale designed a circuit to detect the presence of an RF input signal and gate on the output. Presently Dale has the capability to send a DVB-S signal to the repeater so maybe he'll use it to send the bulletin board information to it.

Next, I'm going to re-install the room camera that we once had. It was nice but was only black and white and "got in the way" when I was re-arranging things some time ago (sorry Dale). Now, Roger, WB8DZW, donated a good color camera with an auto iris and, believe this, a universal mounting bracket that will fit the support beam overhead, so how could I refuse. I will install it on my next trip there, hopefully within a week or two. The video enable input still exists so I think all that's needed is to simply plug it in. It needs a separate 12v power supply but everyone knows I have plenty of those!

Coming up shortly is an effort to fabricate an acceptable roof camera like the one we once had. I have the camera, lens and controller so all that's needed is to interface the existing weatherproof pan/tilt mechanism to the controller. A suitable weatherproof housing is needed as the one I have is too small to fit the large lens and camera into it. I think an appropriate length of 4" plastic sewer pipe with a cover and lens will suffice. I just need to sit down and fabricate one. When mounted, we will have a clear shot of the Huntington Park baseball field from the back of center field. The 250mm zoom lens is enough to be able to zoom in on just the back of the pitcher standing on the mound. Sound interesting?

That's just about it for now, folks. Remember the Spring Event is coming up on May 2nd. If you have some equipment or parts to donate for door prizes, think of us. I have some parts that I'll bring along. Also, let me know about future pizza parties and who will organize the next one. Finally, we'll have another antenna party but not at the Spring Event. It's too much to do in one day. Let me know when you'd like to do this.

73,
…WA8RMC

CQ COLUMNIST DAVE INGRAM, K4TWJ, SK

From the forums of QRZ.com

It is with great sadness that we report that our friend and longtime colleague, **Dave Ingram, K4TWJ**, became a Silent Key this morning (Jan. 20), as a result of complications from a massive heart attack he suffered on New Year's Eve.

Dave has been writing for CQ at least since 1981 and has been a CQ columnist since 1982, starting with an amateur television column called World of Video. That column eventually broadened its outlook and became World of Ideas, Dave's signature monthly column in CQ.

Regular topics included code keys, stealth antennas, building "new vintage" tube gear and mobiling. In addition, for the past decade, Dave has been CQ's QRP (low power) Editor and "How it Works" columnist. His enthusiasm for whatever caught his interest was contagious and spread widely through his informal yet educational writing style.

Funeral arrangements are not complete as of this writing. We will post additional information on the CQ website news page when it becomes available.

Condolence cards may be sent to Dave's wife, Sandy, WB4OEE, at their Callbook address.

73, ***Rich W2VU***

OHIO HOUSE BILL PRB-1 ABOUT HAM ANTENNAS

From Ohio section ARRL. memberlist@www.arrl.org

Hello Fellow Ohio Hams,

On Tuesday, January 19th, The Public Service and Homeland Security Committee of the Ohio House of Representatives held a second reading, and listened to proponent testimony for Ohio House Bill 212, better know as Ohio PRB-1.

Section Government Liaison Nick Pitner, K8NAP, has provided us with the follow up reports, published by both the Gongwer and Hannah Reports, which are reports that follow House Bill legislation at the State Capital. Here are the reports of testimony summary:

The Gongwer Report:

HB 212 AMATEUR RADIO ZONING (Stebelton, Okey) To codify federal restrictions on local zoning of amateur station antenna structures thereby preserving amateur radio service communications as a Homeland Security resource and to place the burden of proof for compliance on the zoning authority.

Amateur radio operators and organizers lined up to provide proponent testimony to preserve their radio service communications that would prohibit local zoning restrictions on the placement antenna structures. Frank Piper, section manager for the American Radio Relay League (ARRL), noted that 30,000 operators not only have devoted time and costs of equipment to enjoy their hobby but are also ready to serve the public in the event of failure of the existing communications structure. He added that in the event of such a communications breakdown, radio amateurs can and will take up those duties to ensure, emergency messages can be transmitted out of and into the affected disaster area as a wide variety of message handling modes ensures the ability send and receive communications regardless of the operating conditions.

Don Kovalchik, an electrical engineer and licensed amateur operator for nearly 40 years, explained that in order to communicate over a variety of distances, different frequencies and antennas are needed to cover all conditions. He said the laws of physics require effective antennas to engage in amateur radio communication and define many aspects of what those antennas must look like. As a proven method of communication during times of emergency, Mr. Kovalchik said it was his hope that the legislature would recognize, as did the Federal Communications Commission and 27 other states, that amateur radio communications should be protected in the public interest.

Richard Swain, president of the Galion City Council and holder of a ham radio licenses since 1961, said that despite the FCC requiring villages, cities, townships, counties and states to make accommodations for antenna installation, some localities continue to raise barriers. He said whether this is done out of ignorance or on purpose, most hams cannot afford to take expensive legal action to secure their rights. Mr. Swain said there are many examples of volunteer service where amateur radio operators have demonstrated their value to communities in the United States and around the world but without the proper equipment and the right to properly erect the necessary antennas, such support may not be available in the future.

Attorney Nick Pittner, who serves as an unpaid volunteer as state government liaison for the ARRL, asked that Ohio join with other states in the recognition of the valuable service provided by Ohio's radio amateurs and the preservation of that service as a resource for the benefit of all Ohioans in times of emergency.

The Hannah Report:

HB212 AMATEUR STATION ANTENNA STRUCTURES (Stebelton G) To codify federal restrictions on local zoning of amateur station antenna structures thereby preserving amateur radio service commutations as a Homeland Security resource.

Licensed amateur (ham) radio operators Frank Piper, Ohio section manager for the American Radio Relay League (ARRL); Steven Katz, of Granville; Richard Swain, president of the Galion City Council; Don Kovalchik, an electrical engineer; Robert Lewis, of Plain City; Nick Pittner, state government liaison for ARRL; Jeff Garvas, trustee with the Lake Erie Amateur Radio Association (LEARA) and past communications director with the Northeast Ohio Medical Reserve Corp (NEOMRC); and Bryan Torok, of Cleveland testified in support of HB212.

Katz said that for almost 100 years the federal government has assigned a large amount of radio spectrum to hams for public service. He attributed the effectiveness of the ham network to volunteers who train for emergencies.

Piper described the volunteer work of ARRL and the communications services provided by Amateur Radio Emergency Service (ARES) volunteers during a February 2007 severe snowstorm and a August 2008 flood in western and northwestern Ohio, respectively. He also described the National Traffic System (NTS) that maintains an amateur radio communications network in the event of a major communications breakdown.

Lewis described his ham experience relaying vital medical information between hams in New Orleans and New Jersey during the initial parts of the Hurricane Katrina emergency until their communications infrastructure could be restored.

Katz and Kovalchik said it is essential that amateur stations have the ability to erect and maintain efficient, high performance antenna systems to relay information to emergency service agencies from ham operators at the emergency site.

Kovalchik tried to explain the difference between longer wavelength, long range radio waves that bounce off the ionosphere, and shorter wavelength, higher frequency broadcasts used for "line of sight" communications. He said, "Efficient [long range] antenna sizes are generally about half a wavelength long, so antennas for these frequencies range from five meters to 80 meters in length (16 feet to 250 feet)." Short range antennas must still be placed high above the ground (35 to 75 feet or more) to extend their line of sight.

Lewis described his ham radio station which includes a 60-foot-high main antenna, as well as a shorter antenna attached to his chimney and a long ground antenna.

Pitner said federal law mandates that local authorities provide accommodation for antennas for amateur radio use by the Federal Communications Commission (FCC). However, he added that the ability of radio amateurs to carry out their mission has been compromised in many states by those charged with local land-use decisions, and challenging those decisions is beyond the means of most ham operators.

Pitner asked the committee to join 27 other states in importing the provisions of the federal regulations, known as PRB-1, into state law.

Garvas and Torok asked that HB212 also include language that exempts amateur radio operators from covenants, conditions and restrictions (CC&Rs) by residential developers that make it impossible to build structurally sound and safe ham radio towers on their property. Garvas noted that FCC rules already prohibit a CC&R or a homeowners' association from prohibiting the use of an antenna to receive broadcast television or a satellite dish.

---------- End of Reports ----------

I would like to take this time to Thank each one of our speakers, along with Terri Kovalchick N8TLK, who kept us all well organized for the day. It was great experience, and we were well received by the PS&HS Committee.

The next step for this Bill is to have a third reading, and hear any opponent testimony. After which we're hoping that this will be voted out of committee, and move onto the House Floor.

The Senate version of this Bill, SB 218, will be starting its first reading on February 2nd, with sponsor testimony. More will follow on these Bills as events happen.

….Frank Piper KI8GW Ohio Section Manager ki8gw@arrl.org

434MHZ ATV USED FOR EMERGENCY ROBOTS

A robotics company has applied for an FCC waiver to allow them to transmit remote controlled robotic video on 434MHz during emergency operations. Below is the partial FCC waiver along with some selected comments by hams. I suspect you'll be surprised by the overall responses. The last person sums it up very well in my opinion! Please read on…WA8RMC

Federal Communications Commission DA 10-291 Before the Federal Communications Commission Washington, D.C. 20554
In the Matter of RECONROBOTICS, INC. Request for Waiver of Part 90 of the Commission's Rules WP Docket No. 08-63
ORDER Adopted: February 22, 2010 Released: February 23.

I. INTRODUCTION

We have before us a request filed by ReconRobotics, Inc. (ReconRobotics) for waiver of Sections 90.101, 90.207, and 90.209 of the Commission's Rules to permit equipment authorization and customer licensing under Part 90 of the Commission's Rules for the Recon Scout, which is a remote controlled, maneuverable surveillance robot designed for use in areas that may be too hazardous for human entry. For the reasons set forth below, we grant the waiver request subject to the conditions specified herein. A waiver is required to permit the device to transmit surveillance data in 430-448 MHz segment of the 420-450 MHz band, which is allocated to the Federal Radiolocation service on a primary basis, & to amateur service & certain non-Federal radiolocation systems on a secondary basis.

II. BACKGROUND

ReconRobotics seeks a waiver to permit equipment certification for the Recon Scout, and its use by state and local law enforcement and firefighting agencies, and security personnel in critical infrastructure industries. The Recon Scout can be thrown, dropped, or launched into potentially hazardous areas and can provide real-time video to an operator located a safe distance away. Typical applications will include checking a building prior to forced entry; searching vehicle undercarriages for explosives; locating hostages, hostiles, officers, and bystanders before a rescue attempt; and searching for survivors in a building. The Recon Scout is used overseas by the U.S. armed forces, and is credited with saving lives. The Recon Scout transmits the analog video signal to the operator on one of three six megahertz channels: 430-436 MHz, 436-442 MHz, and 442-448 MHz. ReconRobotics states that multiple channels are necessary in order to avoid interference during incidents where multiple Recon Scouts are in use, but that such situations should be rare. It proposes that the first unit sold to a responding organization would operate on 442-448 MHz, with the 436-442 MHz version being sold only to entities that already own the 442-448 MHz version, and the 430-436 MHz version being sold only to entities that already own the 442-448 MHz and 436-442 MHz versions. ReconRobotics proposes to limit eligibility to state and local police and firefighters; and security personnel in critical infrastructure industries for use only in areas that are hazardous for entry by human personnel due to nuclear, chemical, or other environmental toxins. It also proposes other conditions on the waiver to minimize potential interference: use would be limited to actual emergencies involving threats to safety of life, and necessary training related to such operations; and the number of units to be sold would be limited to 2,000 during the first year following equipment approval, and 8,000 during the second year. It also suggests that the Commission, in collaboration with the National Telecommunications and Information Administration (NTIA), could deny license applications in particular areas as necessary to protect Federal radiolocation facilities. Over seventy comments were received in response to the public notice seeking comment on the waiver request. The commenters generally consist of public safety and law enforcement entities. ReconRobotics proposes to proceed in this sequence in order to provide maximum protection to amateur satellite downlinks in the 435-438 MHz segment. Any offer for sale or lease of the device would state these eligibility limits.

III. DISCUSSION

The Commission's Rules provides that we may grant a waiver if it is shown that (a) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and grant of the requested waiver would be in the public interest; or (b) in light of unique or unusual circumstances, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative. For the reasons set forth below, we conclude that ReconRobotics has met the first prong of the waiver standard, and that grant of the request is warranted, subject to certain conditions. With respect to whether the underlying purpose of the rules would not be served or would be frustrated by application to the instant case, we note that one purpose of allocating different spectrum bands to different services is to prevent harmful interference. ReconRobotics asserts that operation of the Recon Scout is unlikely to cause interference to the other services using the 430-448 MHz band, because the device operates with lower power (1 watt peak power, 0.25 watts average power) than radiolocation systems. With respect to amateur operations, ReconRobotics asserts that amateur satellite downlinks should not experience interference because earth station antennas are angled too high to detect a low-power device near ground level; and that terrestrial amateur operations are unlikely to experience interference due to the Recon Scout's low power and brief, itinerant operation, and amateur transmitters' much higher power. Moreover, ReconRobotics acknowledges that the Recon Scout would operate on a secondary basis to amateur services in the band, obligating its users to avoid causing interference. Amateur commenters state that because amateur satellite orbits are not geosynchronous, amateur earth station antennas often point toward the horizon to receive low-level signals. We agree with ReconRobotics, however, that interference to amateur satellite communications is unlikely. The Recon Scout will be used infrequently and will be limited in number, significantly reducing the possibility of interference. In addition, it is unlikely that Recon Scout would have a significant effect on the ability of even an amateur earth station operating near the horizon to receive a low-level satellite signal, given the variety of natural and man-made interference sources such as terrain, trees, buildings, and other obstacles and ground level interferers having a greater effect on reception. We conclude, therefore, that grant of a waiver to permit equipment authorization and customer licensing of the Recon Scout on 436-442

MHz clearly is appropriate, because the device is unlikely to cause interference to amateur satellite communications in the 435-438 MHz segment. Whether the Recon Scout can operate in the 430-436 MHz and 442-448 MHz segments without causing harmful interference is not as clear. Amateur radio commenters state that one watt is more than enough to activate a repeater, which could cause interference to an entire system of linked repeaters. In addition, the 432-433 MHz segment is used for long-range weak signal communications utilizing very sensitive receivers. We note, however, that deployment of the Recon Scout on multiple channels is expected to be rare.29 Therefore, we believe that interference to these amateur operations can largely be avoided by requiring deployment first in the 436-442 MHz segment, then in the 442-448 MHz segment, and in the 430-436 MHz segment only if the other two channels already are in use. With respect to whether grant of the requested waiver would be in the public interest, public safety representatives state that the Recon Scout would be of immense practical use to ensure officer safety in high-risk situations where there is a likelihood of death or serious harm. They also state that no alternative device has the same capabilities. Some amateur radio commenters argue that the remainder of the 436-442 MHz segment is used by amateurs for wideband amateur television (ATV) operations. We note that amateur stations transmitting a video signal to a repeater station typically use much higher power than the Recon Scout and may use high gain, directional antennas. We believe, therefore, that the signal of the amateur station can reasonably be expected to be much stronger than the signal of the Recon Scout at the repeater's receiving antenna, and that the stronger signal of the amateur station will capture the repeater, thereby minimizing any interference from a Recon Scout. Accordingly, we find no basis in the record before us to believe that operation of the Recon Scout on 436-442 MHz will create interference to ATV operations.We therefore grant the requested waiver to permit licensing and operation of the Recon Scout, subject to the following conditions:

· Eligibility limited to state & local police & firefighters eligible for licensing and security personnel in critical infrastructure industries.
· The Recon Scout used only during actual emergencies involving threats to safety of life, and for necessary related training operations.
· Training operations are not permitted within thirty kilometers of Federal radiolocation sites.
· The number of units to be sold is limited to 2,000 during the first year following equipment approval, and 8,000 during the second year.
· The Recon Scout will operate on a secondary basis to all Federal users and licensed non-Federal users.
· The operation of the Recon Scout may be impacted in the vicinity of radar and ionospheric research sites.

IV. CONCLUSION

We conclude that ReconRobotics has shown good cause for waiver of Part 90 of the Commission's Rules to permit equipment authorization and customer licensing under Part 90 for the Recon Scout. Therefore, we grant ReconRobotics a waiver to permit equipment authorization and customer licensing under Part 90 for the Recon Scout, subject to the conditions set forth above. Accordingly, IT IS ORDERED that the Request for Waiver filed by ReconRobotics, Inc. on January 11, 2008, IS GRANTED SUBJECT TO THE CONDITIONS set forth in paragraphs above.

NOW, SOME COMMENTS FROM A FEW ANOMYOUS HAMS.

1. We should do everything we can do cause interference to this product. *(Stop and think about what you're saying here!!!)*

2. From what I understand, this is a "Done Deal", and there is nothing at this time that can be done to stop anything. This being the situation, I am sure we can file petitions etc to have this ruling changed, but it will take quite a bit of effort. It may be best suited to wait a bit, until we can prove some interference to our use. It is said that we are a "Secondary User" to these UHF freqs. We are, but as I recall from what I read, they ARE NOT protected here at all, so they fall under us. If there is any interference noted, it should be reported to an OO, the ARRL, or even the FCC. As for intentionally interfering, that may be a reasonable first reaction, but realize the lives that may well be on the line with this gear. It is not so much the actual purchaser/user who is at fault, as it is the company, and FCC. Unfortunately, many of the agencies who will be buying and using this gear may not have anyone who is fully educated on the frequencies they operate on, and where those frequencies fall. I am a retired Texas Peace Officer, and Firefighter. My son is active, and many of our friends. I will do my best here to educate the agencies I can about the use of this equipment in the band where they operate, and the possible interference their personnel may have, and the likely outcome if they are looking for a "Crook", and The Armadillo guys decide to have their afternoon chat on their "Private" linked repeaters across Texas... I am afraid that at this time, we are stuck with the prospect. Now, as our Canadian Brother mentioned, they have lost their support. This is something WE MUST watch for here. I don't "Think" we are close to that, but again, it could easily happen here as well. Until such time, I will watch the actions, read news, and enjoy the Hobby/Service we now have.

3. In this case, I bet our secondary status will actually save us. We're secondary to the US government use of those frequencies so I doubt if the FCC or NTIA will ever allow another use due to their needs, not ours. But look at it this way... look at a spectrum analyzer between 50 MHz and 2 Gigs. See the big gaps with no signals? Those are the ham bands. While we think we're saving the world, the fact is we are under utilizing our FREE spectrum. Really want to help our cause? Throw a signal on the air. Add an ATV repeater with a test pattern or information on 24/7. Voice information system on 440. NASA TV or Audio... anything that is legal. Quite literally: Use it or lose it.

4. You make some good points. I am surprised we Hams have 30 MHz at UHF with all the commercial use just above us.
I would think the FCC would give more consideration over Hams to a security use like this is being done and we Hams would have little ammo to fight it. 440-450 has lots of use, but 420-440 are pretty much dead. If not for ATV and some sat use it would be totally dead. And we know how active Hams are in ATV and sat. I think one way to fight this is first to point out that the 1W security txs are going to

be swamped with Hams unknowing doing their thing and causing interference. I would think a robot with such a vital roll the manuf would want as much privacy as they can get and in a band used all over the US they really open themselves up for inference. I am sure this device will be used with monitoring in a helicopter and they will hear lots of other stations. I have found to solve such a problem is to do some homework and find a better solution, a better set of frequencies. I would think something in the GHz range would be better. I am sure the FCC chose 420-450 because already most of 400 MHz is used for something else and seen more important than Hams use and ATV is already there with the bandwidth.

5. The FCC is useless, just like the rest of our government there structure is flawed. If we cause interference or the other way around, do you think there going to care? Take a look at K1MAN, broadcasting on 14.275 around the clock, the license he has is expired and under investigation for years now. But he is still chugging along even after he was placed in jail for messing with a government establishment. The only thing I can say that is good about what he is doing now is they it cleaned up all the morons that occupied that freq. But lets take a look at this situation differently, he is not even suppose to be on the air, but the FCC has done nothing, His license is in "review" for years now, again nothing. He caused havoc for years and you guessed it, the FCC did nothing. So, we now are going to have a robot that will be on our freqs and will cause me and you interference, so we are secondary to only the government, it wont matter, we can complain, stomp our feet and turn red in the face, what is the FCC going to do? NOTHING as usual. Anyone here still living with BPL? The 440 band has so much crap in it that some day it will be useless to anyone more then 100ft away, radar systems, part 15 junk and whatever else they open the door too.

6. I would think the FCC would give more consideration over Hams to a security use like this is being done and we Hams would have little ammo to fight it. 440-450 has lots of use, but 420-440 are pretty much dead. If not for ATV and some sat use it would be totally dead. And we know how active Hams are in ATV and sat.

7. The second channel is 442-448 MHz with video carrier - probably - at 443.25 MHz and audio (if used) at 447.75 MHz. There go your FM voice repeater operations! The third channel is 430-436 MHz with video carrier - probably - at 431.25 MHz and audio (if used) at 435.75 MHz. NOTE: There is ALSO a control frequency and nowhere is IT listed.

8. The Recon Scouts use 6 MHz wide analog video. With the middle channel - and the first used - at 436-442 MHz that probably means vestigial lower sideband (like the former broadcast standards) with video carrier at 437.25 and audio at 441.75 (if audio is used). Every ATVer who operates at 439.25 WILL be impacted. Those of us at 434 will probably be impacted as well. The company's hand held "TV" receivers will PROBABLY lock up on the 439.25 MHz or 434 MHz video which will be a hell of a lot more powerful than the ReconRobotics 1/4 or 1 watt robot's signals. The public service agencies will be **** if they pick us up instead of the bad guys. Never mind the fact that the robots must accept interference FROM us.

FINALLY (AND WELL PUT, IN MY OPINION)

9. Good grief! Has anyone actually looked at this company's products? They make bomb-squad and SWAT team mini vehicles for police departments and military units. First, there aren't going to be enough of them around that any of us will be anywhere close to one. There's one police dept (out of 27) where I live that has one. Second, it would be a hoot to catch a transmission from one of those things, especially a SWATbot. Imagine the look on a criminal's face when the bot comes around the corner! Finally - and this is the most important - if you are somewhere that a bomb robot is in use that it interferes with your station - get the heck out of there! You are in actual danger!!!

OK, That's about it. What do you think? Let's talk about it on the Tuesday night net.
…WA8RMC

TV WOULD LOSE 120 MHZ IN NATIONAL BROADBAND PLAN

by Doug Lung, 03.18.2010

The partial article is shown below. To read the complete article, Control-click on "Doug Lung" above.

The FCC's National Broadband Plan (NBP) [PDF], delivered to Congress on Tuesday makes the case for an additional 500 MHz of spectrum needed for wireless broadband, and an additional 300 MHz of new spectrum for broadband within five years. As expected, much of this is expected to come from the UHF TV band.

In the plan, the FCC proposes several ways to clear this 120 MHz (20 television channels). The first is to create a new DTV Table of Allotments with different service areas and distance separations that would allow stations to operate on the same or adjacent channels with spacing that is currently prohibited, without increasing interference levels unacceptably.

One way they might do this would be to set the protected service area of a station at a higher signal level, perhaps by using the 48 dBµV/m community grade signal level instead of the current 41 dBµV/m signal level. Another way would be to allow greater amounts of interference between stations.

The NBP says this could clear 36 MHz of spectrum; however, clearing this spectrum will require some stations to change channels and replace their antennas, and possibly their entire transmission plants should they be relocated to a VHF channel. If this 36 MHz comes from the top end of the UHF TV band, as the NBP implies, it would mean that stations currently operating above Channel 45 would have to move.

With the 120 MHz reduction, the overall television band would be reduced to just 30 channels—only 2 through 31 would remain.

The FCC recommends the use of auctions and channel sharing to obtain the final 84 MHz of TV spectrum. To provide stations with an incentive for giving up spectrum, the commission proposes that Congress allow broadcasters to share part of the auction revenue, or to require the auction winner to pay incumbent licensees. Stations could give up all their spectrum and go silent, perhaps existing as cable-only operations, or they could join together and share a single 6 MHz channel.

While TV channels must be 6 MHz wide to comply with the ATSC standard for reception on current DTV sets, the 19.39 Mbps in that 6 MHz channel could be shared among multiple stations. In the NBP, the FCC points out that in some markets a single station transmits two networks on one channel, and some stations even run two HDTV programs on one channel. From what I've seen, while it's possible to run two simple HDTV signals (such as upconverted sitcoms and dramas, old movies, and some news) within 19.39 Mbps by using the latest generation encoders, it's not possible to run two high-quality, high-motion, complex content (such as sports programming) in less than 10 Mbps without noticeable and objectionable degradation.

The value of a channel would be based on the number of people it could cover if used for broadband purposes, not the value of the TV broadcasting business. This means a Class-A LPTV or small full power station running infomercials could be worth as much as a full-power network affiliate. As a result, the MHz–Pop price will probably end up at a level below that necessary to entice a major network affiliate to give up spectrum, but it could be very attractive to broadcasters with smaller revenue streams, especially if they could consolidate their SD programming on a channel with other broadcasters.

If the repacking, auctions, and channel-sharing don't provide the 20 channels needed for broadband, the NBP lists additional options, none of which are very attractive. These include: a transition to a cellular architecture on a voluntary or involuntary basis, an auction of overlay licenses—with wireless carriers being given secondary rights to the spectrum and having to negotiate with TV broadcasters to clear the channels, license modification requiring stations to share a single channel, and "other innovative solutions that may emerge."

As I mentioned earlier, elimination of TV channels above 31 would force many stations into the VHF band. The NBP recognizes this and adds as an additional measure to increase TV spectrum efficiency, the FCC would need to pursue "additional options" for dealing with VHF reception problems. These options might include power increases or "adoption of enhanced antenna and receiver standards."

Other options could include spectrum fees for full-power TV broadcasters, establishing a deadline for LPTV stations to convert to digital, more efficient LPTV channel allocations, and allowing LPTV stations to participate in incentive auctions. The FCC recognizes that reducing the UHF TV spectrum will also impact land-mobile radio systems that currently share television Channels 14-20 in some of the larger markets, along with wireless microphones and TV white space devices. The FCC proposes continuing to allow land-mobile users to operate under existing licenses, thus increasing the spectrum crunch on broadcasters in the major markets.

This is a critical time for free off-air broadcasting. The NBP makes the assumption that broadcast TV has declining value and serves only a small percentage of the population. However, antenna manufacturers are reporting record sales, and I've heard comments that the number of off-air viewers—including homes receiving only off-air television—may be starting to increase.

QUANTUM FILM THREATENS TO REPLACE CMOS IMAGE CHIPS

From EE Times Magazine. Control click on EE Times here to see the complete article.
R. Colin Johnson (03/22/2010 12:28 AM EDT)

Just as photographic film was mostly replaced by silicon image chips, now quantum film threats to replace the conventional CMOS image sensors in digital cameras. Made from materials similar to conventional film—a polymer with embedded particles—instead of silver grains like photographic film the embedded particles are quantum dots. Quantum films can image scenes with more pixel resolution, according to their inventors, InVisage Inc., offering four-times better sensitivity for ultra-high resolution sensors that are cheaper to manufacture.

"Many innovations are said to be revolutionary, but are really incremental changes. InVisage's quantum film, on the other hand, really is revolutionary," said Tom Hausken, director of photonics and compound semiconductors at Strategies Unlimited (Mountain View, Calif.) "Quantum dots have been a solution looking for a problem for several years. InVisage found a very significant problem they can solve."

According to Morry Marshall, vice president of strategic technologies at Semico Research Corp. (Phoenix), InVisage could have the next generation image sensor. "It gathers more light so you can either make a smaller image sensor for a less expensive cell phone camera, or you make a higher resolution sensor for high-end digital cameras," Marshall said. "It's a huge step forward and the market is also huge, so they will also need to overcome the problems facing any small company when trying to penetrate a large market."

The new semiconducting material was invented by Univeristy of Toronto professor Ted Sargent, who is now chief technology officer at InVisage. Sargent perfected a method of suspending lead-sulfide nanoparticles in a polymer matrix to form a new class of semiconducting polymer that Invisage has spent the last three years integrating into a standard CMOS process. Now it can paint quantum film atop a low-cost wafer that has the electrode array for super-dense high-pixel-count images, but without any of the expensive CMOS photodetectors that make up the bulk of conventional digital camera sensors.

"Our quantum film replaces the silicon used for image capture, but what we have really created here is a new semiconductor material," said Jess Lee, InVisage president and CEO. "Our quantum film even looks like photographic film—an opaque black material that we deposit right on the top layer of our image chip." Unlike tradition semiconductors, which have a fixed bandgap, the bandgap of Invisage's quantum film can be adjusted by changing the size of the embedded quantum dots. The film can also be painted-on at room temperature, obviating the need for expensive high-temperature fabrication techniques required by conventional sensors.

"We can paint our quantum-dot film onto any surface," said Lee. "Right now we are painting them on silicon wafers for our first product—an ultra low cost image sensor that obsoletes CMOS sensors." Traditional CMOS sensors require that light filter down past several microns of metallization to reach the photodetectors on a silicon wafer, but InVisage's quantum film is on the top layer for 100 percent exposure to incident light.

"Traditional CMOS sensors require light to travel down through four or five microns of metal before reaching the photodetector, whereas our quantum film captures all the incident light in a layer just 500 nanometers thick," said Michael Hepp, director of marketing at InVisage (Santa Clara, Calif.).

This process that was improved upon by OmniVision (where Lee was formerly the vice president of the mainstream business unit) with back-side illumination (BSI). According to Lee, BSI only converts about 80 percent of incident light because trenches are required between pixels to prevent cross talk in conventional sensors. Quantum film, on the other hand, exposes the entire top layer of the chip to light, allowing 100 percent pixel coverage and without the need for BSI. "Just by virtue of having our detector on the top surface, we get a 2X increase in sensitivity—the holy grail of the industry," said Lee. "Beyond that we have changed the materials too—our quantum film is twice as efficient at absorbing incident light for another 2X improvement, for a 4X improvement overall."

Physically, what happens is photons hit the quantum dots, but because of their small size quantum confinement converts the energy into an exciton—a bound electron-hole pair. The metal electrode then conducts the electron away thereby sensing the incident light. "We draw down those electrons and store them on a capacitor in a very standard-looking CMOS pixel—except we don't have to build a photodetector too so we can use much larger and less expensive geometries, since the quantum film has already done all the light capturing steps on the first layer," said Lee.

As a consequence, InVisage claims to be able to create image sensors that are four-times as sensitive (or four times smaller for the same sensitivity) using a low-cost 8-inch, 1.1-micron CMOS line at TSMC, compared to the CMOS image vendors today who have to use an expensive 12-inch, 65 nanometer process to achieve inferior results.

DATV RF BANDWIDTH FOR DVB-S

Below is a discussion by Ken and Hans about the bandwidth requirements of DVB-S ATV digital television. Much of it is technical in nature but if you read closely, I'm sure you'll get the general idea. So, try to absorb as much as you can and, if there are still questions, maybe I can help. After all, digital ATV is our future. Therefore, you'll see more of this as time goes on! The complete discussion can be seen on our ATCO website, www.atco.tv. Ed.

In an earlier discussion, Ken W6HHC explained how FEC and Symbol-rate affected the RF Bandwidth for DVB-S. It turns out that defining RF Bandwidth deserves some additional explanations in order provide a full understanding. Ken is pleased to be joined by Hans DC8UE for the creation of this article. Hans had earlier helped Ken to understand the design of the popular DBØDHL DATV Multimedia repeater in Hamburg Germany...and has technical experience as a satellite-communications-engineer in a commercial TV-uplink-station.

Confusion about the word "Bandwidth"

When Ken-W6HHC and Robbie-KB6CJZ were talking to hams in Europe about DATV repeater designs, they noticed that sometimes they were given unexpected bandwidths being used by the European repeaters. The Symbol-rates (S/R) being reported by the repeaters were always accurate (symbol-rate is always a setting in the transmitter, so it is well known), but the RF bandwidth reported sometimes had an unexpected relationship to Symbol-rate. A little searching on the internet (love Google and Bing search engines) showed that there are at least three popular ways methods of defining RF Bandwidth for DVB-S.

• "minus 3 dB" bandwidth method • "occupied" bandwidth method • "allocation" bandwidth method

So if you were to ask three different hams "what DATV bandwidth are you using?"...you may get three different answers when talking about the same DATV repeater!! Ken and Hans agree that the most important purpose of describing bandwidth for DATV hams...is to provide a value that can be used for band-plan spacing and frequency coordination to avoid adjacent interference. Now we will look at these three methods of describing RF Bandwidth for DVB-S (QPSK modulation).

"minus 3 dB" bandwidth method

With this method, the bandwidth is measured at the points that are down 3 dB. This is a typical method for measuring an analog filter bandwidth and represents the "half-power point" if you are looking at voltage on a spectrum-analyzer.

Mathematically, $\mathbf{BW_{-3dB} \approx S/R}$ for this definition.

While the **BW_{-3dB}** method is very familiar to analog engineers and analog ATVers, it is not very useful for DATV to define the bandwidth of a digital signal transmission link for two reasons. First, a modulation with a digital-(pulse) modulation signal produces a non-Gaussian signal-flank. Second, you would not want to space several DATV stations "shoulder-to-shoulder" on their 1/2–power points, since significant power would overlap neighboring frequencies. This approach to spacing of stations would create potential receiving interference. Especially, if several DATV repeaters are located together on the same hill-top or tower so that receiving antennas are pointing in the same direction toward adjacent DATV repeaters. As a note: The bandwidth of the DVB-S carrier at the minus 3.8 dB points is approx the same as the symbol rate (S/R).

"occupied" bandwidth method

As defined by the commercial satellite standard, 3GPP TS 34.121 section 5.8, the Occupied Band- Width (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency.

Mathematically for hams: $\mathbf{BW_{occupied} = 1.19 \times S/R}$

How is the occupied bandwidth measurement determined? During this measurement, a Gaussian filter with a bandwidth greater than 10MHz and a resolution bandwidth (RBW) of 30 kHz or less is used to measure the distribution of the power spectrum. First, the total power found in the measured frequency range is calculated. Then, starting at the lowest frequency in the range and moving upward, the power distributed in each frequency is summed until this sum is 0.5% of the total power. This gives the lower frequency value for measuring the bandwidth.

Next, starting at the highest frequency in the range and moving downward, the power distributed in each frequency is summed until 0.5% of the total power is reached. This gives the upper frequency value. The bandwidth between the 0.5% power frequency points is called the "occupied bandwidth". While the **"occupied" bandwidth** spacing of repeater frequencies is better at preventing adjacent interference than **"minus 3 dB" bandwidth** spacing, it still lacks one feature. The spacing should have a little guard-band to allow for unplanned obstacles ...like signal-path non-linearity, etc.

"allocation" bandwidth method

This method for describing bandwidth provides a little guard band between adjacent DATV signals. The allocation bandwidth for DVB-S is calculated as

(1 + Roll-off-Factor) x Symbol-rate
$BW_{allocation}$ = 1.35 x S/R

when using a 0.35 Roll-off-factor. The Roll-off-factor (shown in **Fig 1**) controls the grade of the slope of a DVB-S signal-edge.

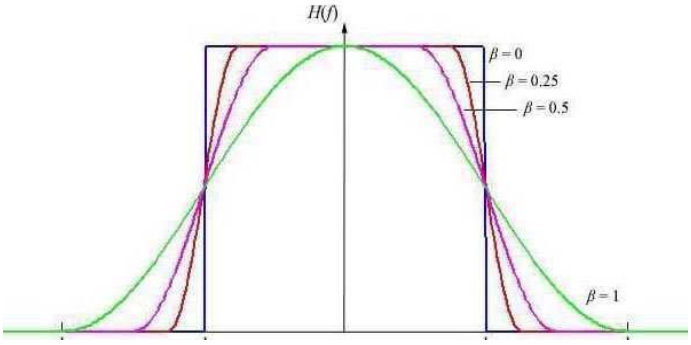


Figure 1
Different roll-off slopes for different Roll-off-factors

The "allocation bandwidth" is determined by the big satellite-providers (like inside the Intelsat Earth Station Standard 420: (IESS420e.pdf) as an area, inside that the power-level will be not be lower than –26dB. There will be a filtering necessary on the signal borders (mostly performed by software), which takes care, that the borders rolls out weakly. The grade (slope) of this roll off will be described by the Roll off factor. It shows the relationship between half of the roll off area to half of the wanted channel-bandwidth. DVB-S specifies the Roll-off-factor at 0.35. A raised cosine filtering at the edge region for the transmission path is required. The used filter generates in a first step only a root raised cosine shape. Only in combination with the same filtering inside the receiver you will get the wanted raised cosine form of the filter shape. After the transmitter, inside the "on the air"signal, you will find the larger signal shape (shown as the dotted line) in **Figure 2.**

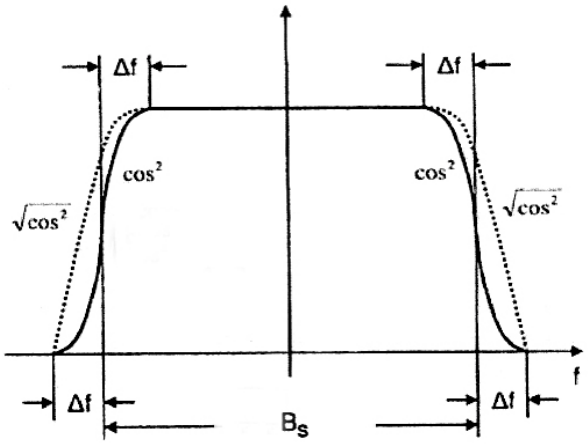


Figure 2
"On the Air" DVB-S signal has the shape shown as dotted lines

The DVB-S Standard uses a Roll-off-factor of 0.35 for video-transmissions and a Roll-off of 0.4 for data transmission equipment. You may find on newer professional hardware utilize a Roll-off-factor of 0.25. The new DVB-S2 standard (for high definition TV - HDTV) also utilizes a Roll-off-factor of 0.2. This means, the DVB-S2 used bandwidth is only 20% bigger than the symbol-rate. Hans DC8UE further explained that the DVB-S standard is now being used in Europe for transmissions from commercial broadcast studios and also from an OB-van (outside broadcasting) to the up-link transmission-center. **Figure 3** shows a D-ATV DVB-S QPSK signal using a 1.5 MSymbols/sec symbol-rate of (generated by a MiniMod). It shows clearly 2.025 MHz of used bandwidth. Below 35dB you can see the additional shoulders, generated by intermodulation on the non-linear characteristic curves of the equipment being used. A value of 42 dB for the shoulder seems to be normal for the single MiniMod exciter. But, if a power amplifier is driven too hard, then the following PA can increase the power levels of the shoulders to extremely poor values. The "allocation bandwidth" is in practice really very useful to describe the real used bandwidth for spacing DATV repeater frequencies. For ham radio, Ken W6HHC prefers to "adjust" the allocation formula to

BWallocation ~ = 1.33 x S/R

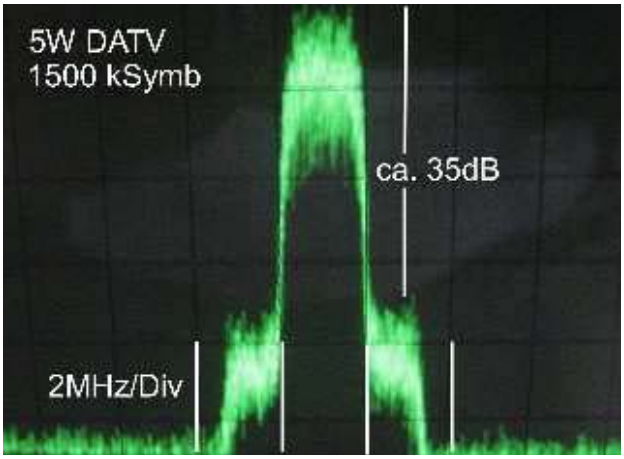


Fig 3
DATV QPSK signal at 1.5 M Sym/sec produces 2.025 MHz of bandwidth

Ken explains that this "adjusted value" is less than a 2% error and is much easier to calculate in his head. Both Hans DC8UE and Ken W6HHC agree that hams should only use the term **BWallocation** when they talk about DVB-S.

Non-Linearity effects on bandwidth

It is extremely important, to avoid compression in the power amplifier and to operate the signal path and PA in a linear mode. As mentioned earlier, the shoulders in **Fig 3** (don't you think they look like "shoulders on a human"...on each side of the head??) can continue to grow in strength through non-linearity, including compression. While **Fig 3** shows the shoulders down about 35 dB below the carrier, **Fig 4** shows that the shoulders on this PA output are only 20 dB below carrier. Hans DC8UE explains that when he made a transmission via a commercial satellite in the old (no longer used) analog FM-mode, they used the HPA (high power amplifier) in saturation (class-C). In the digital world with QPSK modulation, they have to lower the power for class-A linear mode. That reduces the possible output power down to a level 4 to 5 dB below saturation. This reduction is called output backoff (OBO). During a terrestrial transmission (DVB-T RF-link), we have to reduce the OBO to a level 6dB below saturation, in order to hold the shoulders down. One concept that DATV hams need to understand with DATV amplification is that the DATV signal has a very high Peak-to-Average-Ratio, as shown as PAR in **Fig 5**. So while the average power level may seem low, the peaks can be going into compression (or even flat topping in saturation), hence non-linearity, hence stronger shoulder power levels.

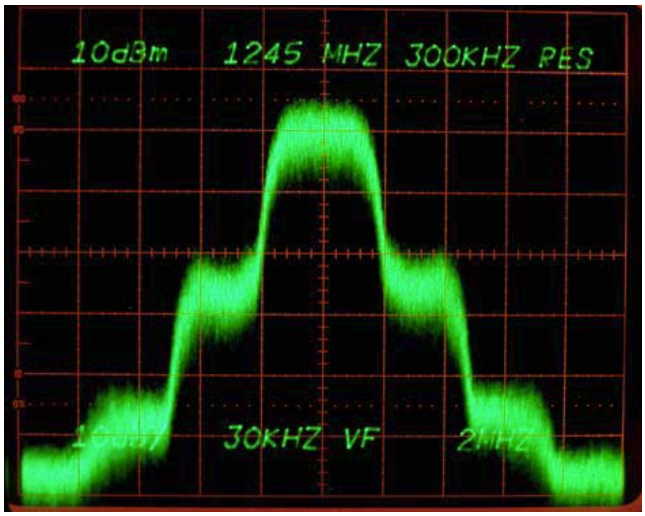


Fig 4
Spectral regrowth amplified by different PA with shoulders now only 20 dB below carrier (Photo courtesy of Art-WA8RMC)

Commercial satellite-uplink operators adjust their shoulders to be below -26 dB. Likewise it should be the duty of hams who operate DVB-S repeaters and transmitters to not allow the shoulders to get within 26 dB of their main carrier.

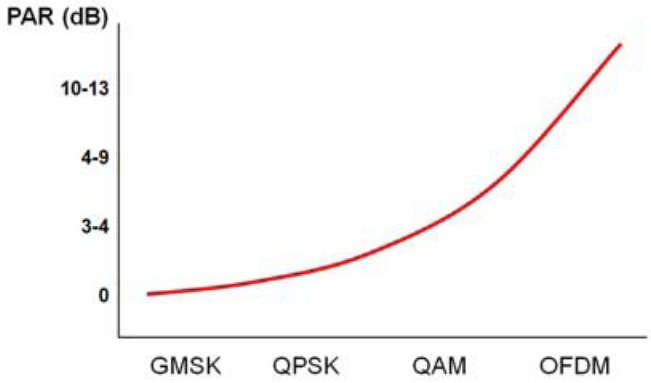


Fig 5
PAR for amplifier output power when processing signals with various digital modulation technologies
(Graph courtesy of Robert Green – Keithley Inst. Inc.)

Interesting DATV Links

- AGAF D-ATV components (Boards) – see **www.datv-agaf.de** and **www.AGAF.de**
- SR-Systems D-ATV components (Boards) – see **www.SR-systems.de** and **www.D-ATV.org**
- British ATV Club - Digital Forum – see **www.BATC.org.UK/forum/**
- British ATV Club – select from about 25 streaming repeaters – see **www.BATC.TV/**
- German ATV portal for streaming repeaters and forum – see **www.D-ATV.net/**
- Amateur Television of Central Ohio – see **www.ATCO.TV**
- Orange County ARC newsletter entire series of DATV articles – see **www.W6ZE.org/DATV/**
- TAPR Digital Communications Conference free proceedings papers – see **www.TAPR.org/pub_dcc.html**
- Darren-G7LWT site for "DATV Primer" – see **www.G7LWT.com/datv.html**
- Nick Sayer N6QQQ site for his future DATV repeater – see **www.N6QQQ.org**
- Rob-MØDTS D-ATV site including details of F4DAY-design – see **www.M0DTS.co.uk/datv.htm**
- Ultimate Resource for Digital Amateur Television – see **www.D-ATV.com**
- RF Bandwidth online calculator for DVB-S/DVB-S2 – see **www.satellite-calculations.com/Satellite/bitrates.htm**

…Ken Konechy W6HHC & Hans Hass DC8UE

DATV FOR THE INTERNATIONAL SPACE STATION

The following is from the AMSAT and AMS (AMSAT News Service). Update on the ISS Columbus Module Amateur Radio Station.

The Amateur Radio on the International Space Station (ARISS) international team met for the monthly teleconference on March 16. Two highlights of the meeting include the planned installation of VHF and UHF FM amateur radio equipment and possible digital amateur television from the Columbus module at the International Space Station.

The installation of the Ericsson radio used by ARISS in the Columbus module is scheduled to be done by astronaut Mike Fincke, KE5AIT on the STS-134 shuttle flight planned for late July 2010. ESA hopes to have a special contact to commemorate the first operation of amateur radio in the Columbus Module.

Gaston Bertels, ON4WF reported that the Amateur Radio - Columbus (ARCOL) Working Group is currently proposing the flight of a digital amateur television (DATV) system to downlink TV on S-band. ARISS US team members Mark Severance N5XWF; Mark Steiner K3MS; Lou McFadin W5DID; Kenneth Ransom N5VHO; Rosalie White K1STO; and Carol Jackson KB3LKI are assisting.

The Digital Television capability, under consideration for installation by the ESA in December, 2010 poses technical challenges. The biggest technical challenge is the obtaining of a suitable power supply. Gaston is working with ESA to resolve this.

While DATV from the Columbus module will open up an exciting new capability for education contacts, it will require a more capable ground station to receive the S-band DATV signals. This has implications for the existing telebridge stations, including how the DATV images would be routed to the event sites. Gaston will be establishing a working group to help tackle these two challenges (reception and passing to the event site), and is actively soliciting volunteers to help out.

The ARCOL (Amateur Radio – COLumbus) group has already accomplished the assembly and installation of the L- and S-band patch antennas mounted on the exterior of the Columbus Module.

Further overview of work being done in the ARCOL Group:

I would like to give you a little more insight as to what this activity is about. As some of you know, there's a program in place where the children of selected schools are given the opportunity to talk directly with astronauts. A given session lasts for only about 5-10 minutes during a given ISS pass. At that time the school children are allowed to ask the astronauts questions regarding their stay on the ISS. This program has been in place for a few years and has been quite successful promoting educational science.

Now there is a program underway to add television to the process where the children can not only talk to the astronauts but **see** them as well! Therefore, a group of knowledgeable people was assembled a few years ago to study this proposal. It has gone quite well and so far, has resulted in the installation of antennas on the outside of the European module of the International Space Station for this task. DVB-S digital television was selected as the preferred broadcast medium and S band (~2450MHz) as the downlink frequency.

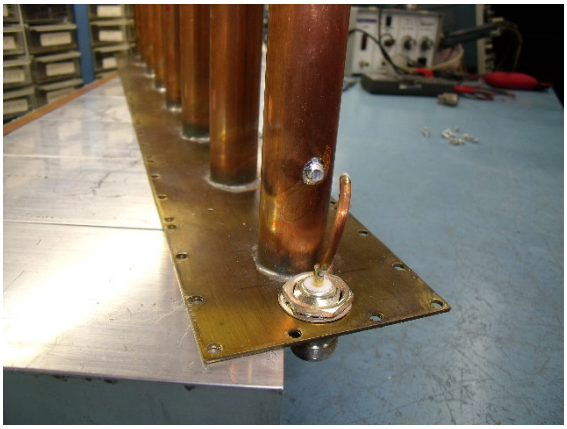
I have volunteered my services to help in any way that I can so I am now part of the Group. However, there is much to be done in a very short time frame so tasks must be split up among us. Experts at NASA in Houston along with the experts at ESA (European Space Agency) are now busy qualifying the components that go to the ISS. As you can imagine, exhaustive testing is involved to make the equipment space worthy as well as RFI testing to make sure that normal ISS communication is not disrupted. All ham equipment will operate from a single specified 120VAC 60 Hz power receptacle in the ISS.

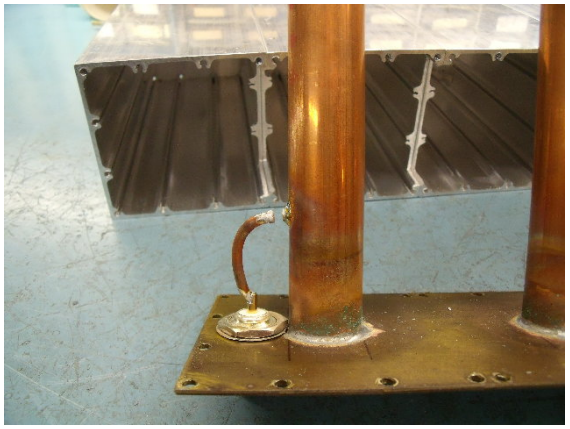
I am working on downconverter details, receiver specifications and antenna tracking arrangements as the requirements for the terrestrial tracking equipment will require some work. A typical pass will be in view for only 5 minutes or so therefore requiring some precise active tracking. In addition, the received signal will be only -65 to -85 dBm (I receive the ATCO 2433MHz repeater signal at -45 dBm) so the ISS signal will be 20 to 40 dB weaker (that's 100 to 10,000 times less). It works on paper but as you know…. We will probably need a stacked helix or a 4' dish antenna.

Now, don't get hopes set too high at this point. Many things need to go right in order to make this task a reality as the specification still needs NASA and ESA review. However, we are on track to be able to test the link possibly by the end of this year. We now have weekly teleconference meetings to coordinate our efforts so I'll try to keep the ATCO members informed of our progress as we move forward.

In addition, (this is the exciting part) we proposed providing a "beacon DATV signal" consisting of cabin video from the ISS continuously when the astronauts are not communicating in order to fine tune terrestrial tracking systems. That would be GREAT as it would be an incentive for the average Ham to become an ATVer and "GO DIGITAL". The format is within the capability of existing Free-to-Air receivers so ATCO Hams that can receive the DVB-S repeater signal have a head start! Also, think of the publicity we could get, a bonus for all ATV clubs. More later as the specification becomes finalized!
…WA8RMC

ATCO REPEATER FILTER PROBLEM



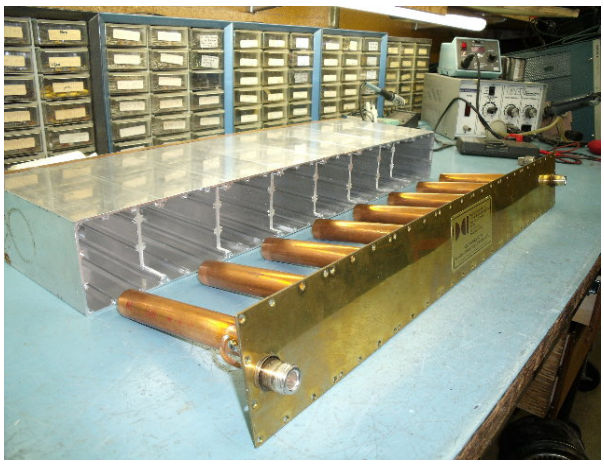


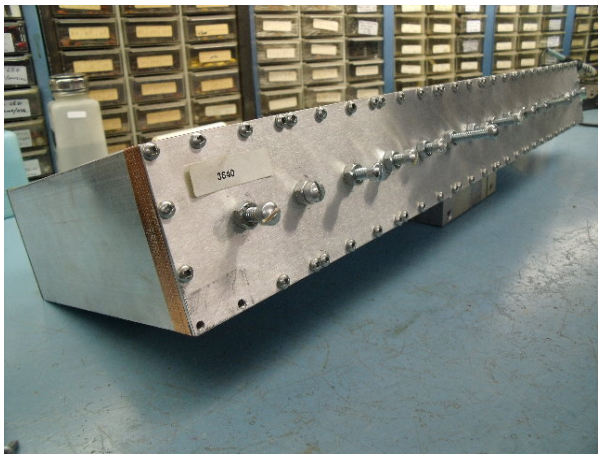
A short time ago, Dale, WB8CJW and I went to the repeater to install a timeout timer, investigate 1280MHz receiver desense and a couple of other issues. We rerouted a few cables and after a while, the desense "seemed to go away". Everything looked like it was in order so we left. The next day it was reported that the 427 MHz transmit signal was very weak. This prompted me to check it and, in fact, found it very weak at my QTH which launched a return trip that evening. After finding the SWR very high, I started checking all items in the line. When I removed the DCI (8) pole filter, things went back to normal, including the 1280MHz desense. We had (2) 8 pole filters in the 427MHz output line (needed with the old Mirage amplifier because it generated severe harmonics). I questioned the need for both filters so this was a good time to find out. After removing the bad DCI filter, the system operated normally. That's good news. Since the DCI filter is better and has lower losses than the remaining filter, I tucked it under my arm and brought it home for repair.

When I opened the DCI filter on my bench, the photos above show the problem. Apparently when Dale and I were moving cables, we inadvertently twisted the N connector on the filter rotating it and breaking the output coupling loop. In retrospect, it's a poor design to have a screw on N connector not soldered in place. Heliax cables are very stiff so some torque stress on these connectors should be expected. They should have either used a flange type or soldered the screw-in one in place. When I repaired the loop, I then soldered the nut and N connector body to the filter housing for both input and output fittings. A fine tune of the element adjustments produced an overall filter loss of about 0.8dB, not bad! Its loss is lower than the one in place now so the next time I go back to the repeater, I'll replace the existing one with the refurbished DCI filter.

The left photo shows the repaired output coupling loop. The connector is now soldered to the brass plate.

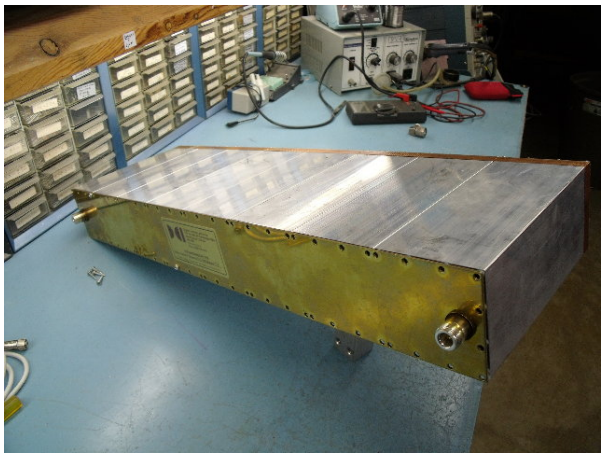
The right photo shows what the internal assembly looks like with the brass plate removed from the aluminum body.





These 2 photos show the front and rear views of the whole filter.

Notice there are two adjustments for each of the 8 sections, one for tuning and the other for coupling. They ALL interact with each other!



…WA8RMC

PC TO NTSC CONVERTER

I recently purchased this Sabrent Model TV-PC85 PC to NTSC converter from Micro Center. The cost was $39.00 plus tax. It worked so well that I thought I'd share it.

Main Chipset is;

VXIS VX1937 Digital Encoder
Integrates a digital NTSC/PAL encoder with 8-bits ADC and 10-bits DAC

Graphic Card Resolution supported;

640 X 480 , 800 X 600 and 1024 X 768

Hardware I/O;

D-Sub 15 Pin for VGA / Monitor Output
S-Video / Composite (RCA) output
3.5 mm jack audio input / output

Dimension / Weight; 105 x 65 x 21 mm, 92 g. about the size of a pack of cigarettes.
This is powered by a USB port on your computer, no need for a Wall Wart.
It comes with a VGA cable to connect your unit to your computer. Also included is a cable for power from a USB port to the unit.

Features;

Adjustments for brightness, Contrast, and Sharpness. These controls are located on the side of the unit.
Plug and play, no need for software drivers.

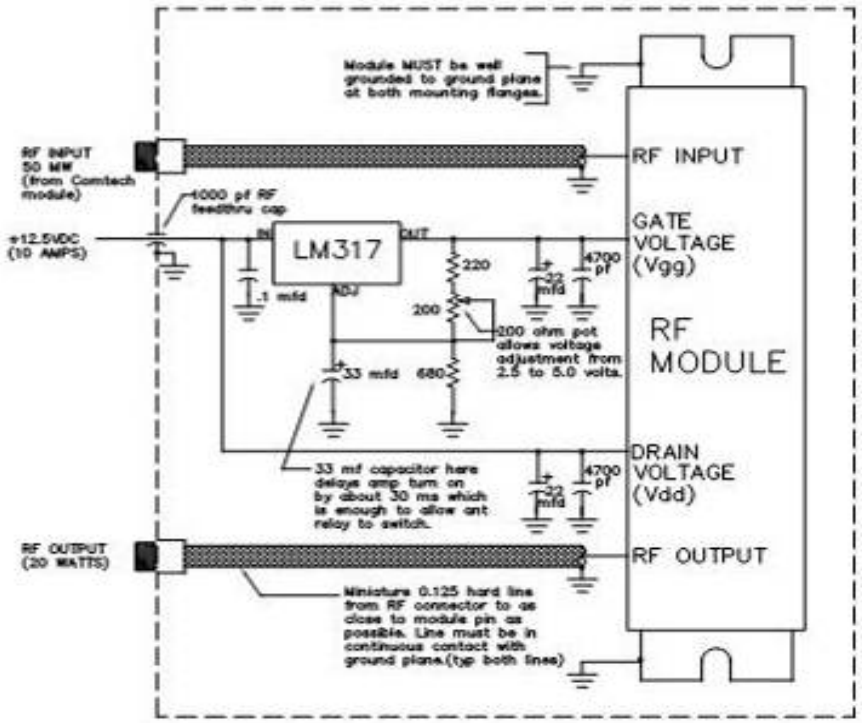
Below is a picture of the unit;

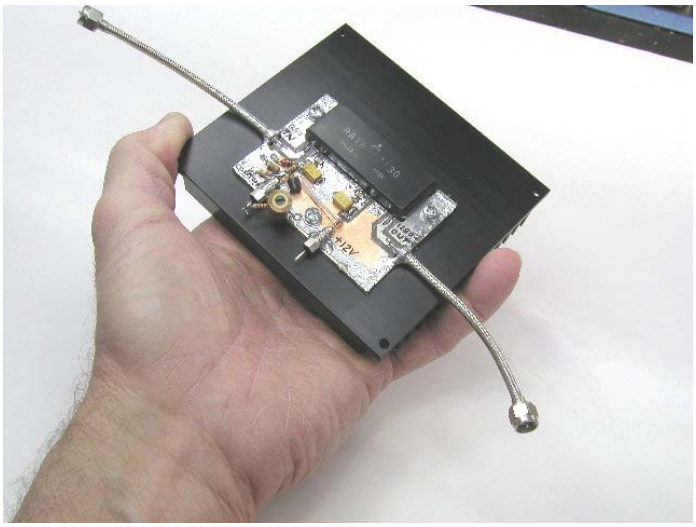
…Bob N8OCQ

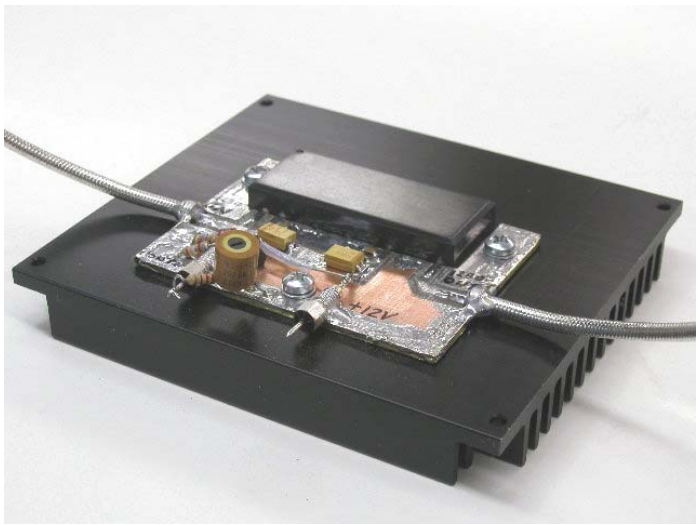
ANOTHER 1280MHZ BRICK AMPLIFIER

I've published this basic brick amplifier using the Mitsubishi RA18H1213 brick before so there is nothing new here. However, Bob Vieth, KD8ACU, asked me to build him one and I obliged. I used a blank piece of double sided circuit board and Xacto knife scribed traces in the copper to make the input and output lines. That wasn't totally necessary as one could just as easily run the rigid mini coax directly to the input and output pins eliminating those traces. In any case, below is the final result. The most important thing here and not totally visible is the brass shim stock pieces I wrapped around the board edges to connect the top and bottom sides. Also, it is very important to contact the brick flange mounting pieces DIRECTLY to the ground plane as shown. Other than that, go for it! A Comtech module 50mw output will drive this brick to about 20 watts. At 20 watts, about 10 amps @ 12vdc are needed. A fan not shown is required!

…WA8RMC



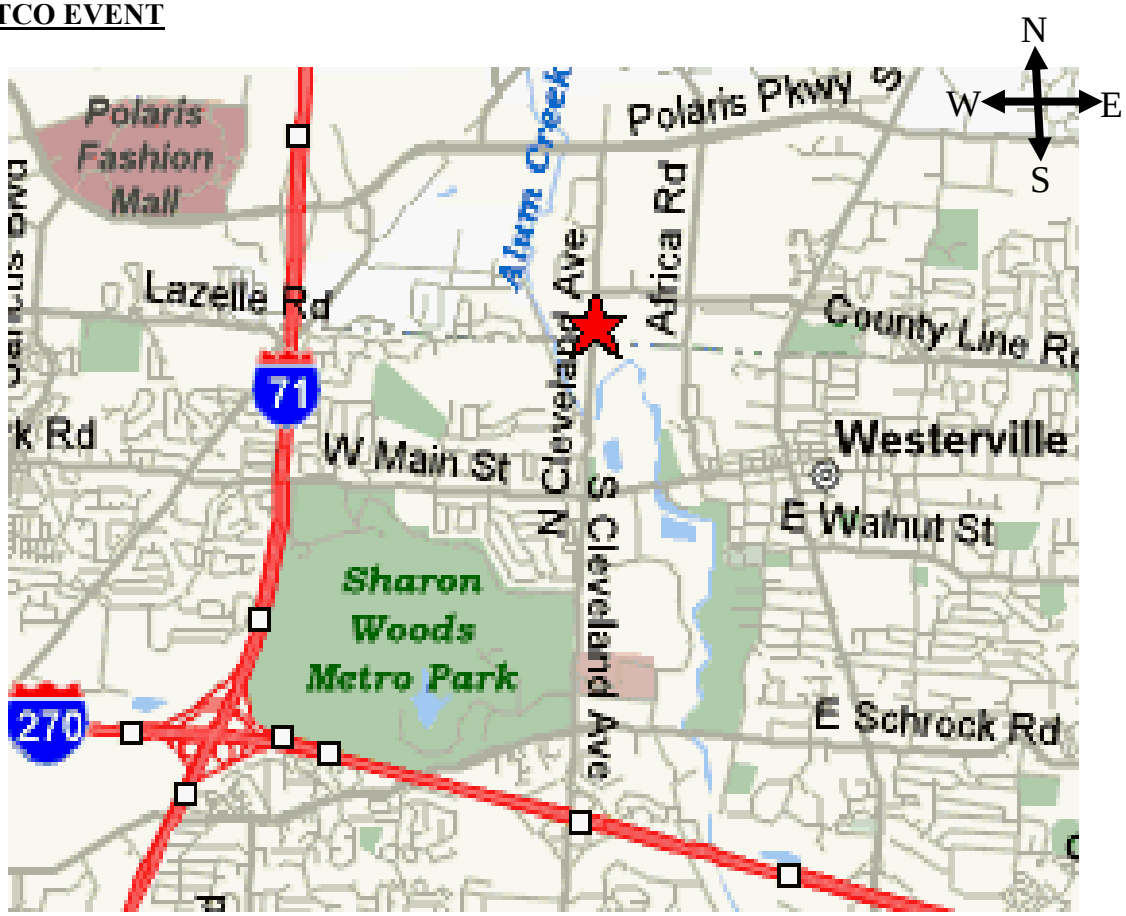




A T C O

2010 SPRING EVENT
12:30 PM – SUNDAY
MAY 2, 2009
ABB PROCESS AUTOMATION
CAFETERIA
579 EXECUTIVE CAMPUS DRIVE
FOR MORE DETAILS, CONTACT
ART – WA8RMC - 891-9273
LUNCH PROVIDED – DOOR PRIZES
BRING A FRIEND AND SEE OLD BUDDIES
MINI HAMFEST – SHOW AND TELL

DIRECTIONS TO THE ATCO EVENT



From I-70 WEST Bound:
Take I-270 Northbound around and turning to the west to Cleveland Ave. Exit north onto Cleveland Ave and travel north about 2 miles to Executive Campus drive. (It's the next street past Westar Crossing Street). Turn left (west) to the ABB building at the end of the street.

From I-70 EAST Bound:
Take I-270 Northbound around and turning to the east past SR 315 and past I-71. Get off on the Cleveland Ave second exit and travel north (to Westerville). Continue north on Cleveland past Schrock road and then past Main Street. Continue north about ½ mile past Main Street to Executive Campus Drive. (It's the next street past Westar Crossing Street) Turn left (west) to the ABB building at the end of the street

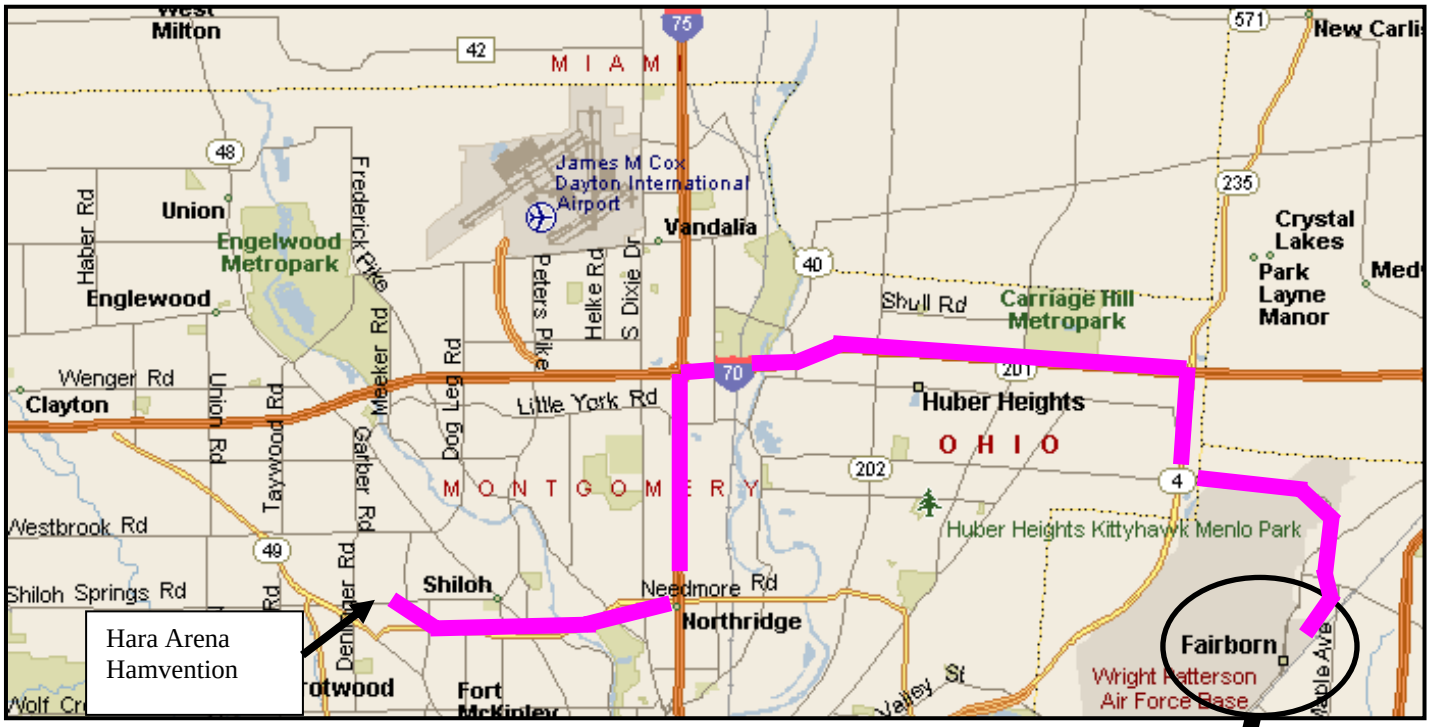
From I-71 NORTH bound toward Columbus:
Drive through Columbus on I-71 to I-270 on the north side. Take I-270 east to the first exit, Cleveland Ave. Get off the Cleveland Ave second exit and travel north (to Westerville). Continue north past Schrock road and then past Main street. Continue north about ½ mile past Main Street to Executive Campus Drive. (It's the next street past Westar Crossing Street) Turn left (west) to the ABB building at the end of the street.

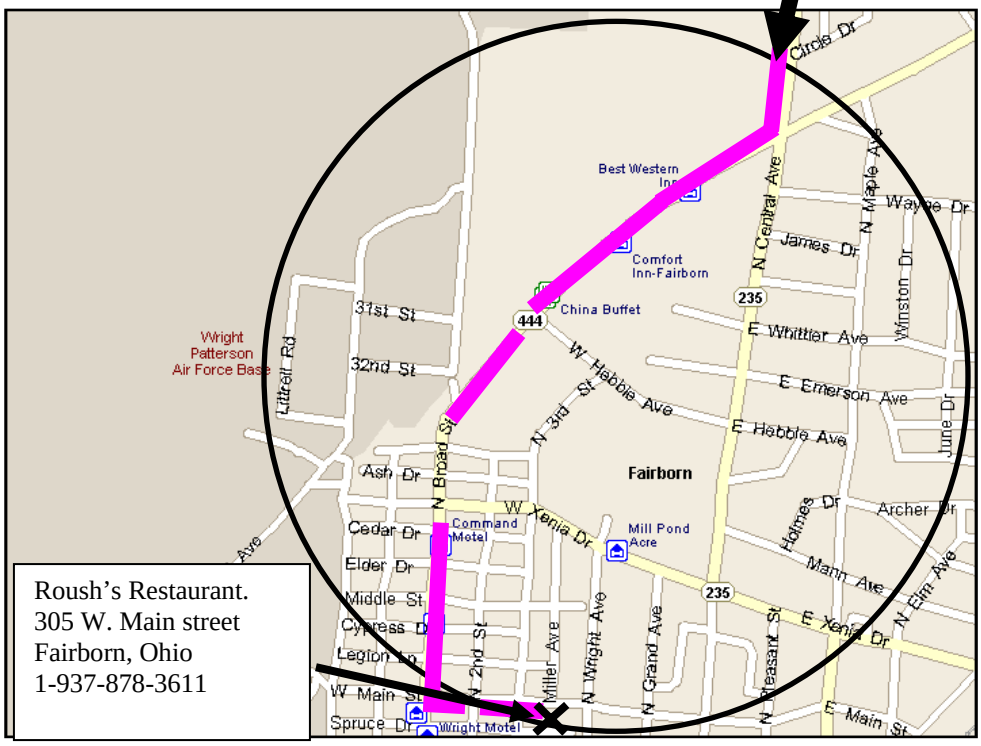
From I-71 traveling SOUTH bound toward Columbus (North of I-270):
Exit the Polaris Ave exit and travel East about 1 mile to Cleveland Ave. Turn right on Cleveland Ave to Executive Campus Drive. Turn right again on Executive Campus Drive. ABB is on the right side of the street about half way around the semi-circle.

HAMVENTION FRIDAY NIGHT DINNER 2010

The ATV Friday night dinner and discussion will be held on Hamvention Friday from 7 till 10PM at Roush's Restaurant 305 W Main St. in Fairborn, OH 45324 (at the north end of Wright Patterson airfield runway). The dinner menu is varied, moderately priced and ordered separately. We will enjoy a sit down dinner then have speakers talk about various ATV topics. We will also include door prizes for those present. The meeting terminates at about 10PM.

Directions: Take I-75 north then I-70 east. Exit SR 235/ SR4 south (Fairborn exit). South on 235 about 1 mile then left on Chambersburg Road (east & still SR235 past airport runway). Right on N. Broad Street for about 10 blocks. Turn left on W. Main Street for 3 blocks to Miller Ave. Roush's is on corner of W. Main and Miller. Parking in rear.





DAYTON HAMVENTION 2010 ATV FORUM

The following is the formal list of presenters and the time schedule. This year I am focusing on a sample of the ATV repeaters in the country. First up, however is Gordon West who always has something very entertaining to say. He'll keep the crowd awake for sure. Then we get a sample of the proceedings of some of the repeater groups. Last but not least is Ralph Taggart who will talk about a typical ATVers life and image communications. All-in-all, it will be very entertaining for all attendees. Please try to put it in your schedule if you can!

See you there.
…WA8RMC

1530-1700(3:30PM-5:00PM) SATURDAY ATV(FAST SCAN AMATEUR TELEVISION) FORUM

TIME	SPEAKER	CALL	PRESENTATION TOPIC
1530-1535	Art Towslee	WA8RMC	Introduction/"ATCO repeater update"
1537-1552	Gordon West	WB6NOA	"Dress up for live demos"
1554-1559	Ron Cohen	K3ZKO	"Philadelphia, PA repeater update"
1601-1611	Mike Collis	WA6SVT and Bill Brown WB8ELK,	"ATN California repeater update and ATVQ Magazine"
1613-1621	Ron Fredricks	K8DMR	"Grand Rapids, Mich repeater update"
1623-1628	Jess Nicely	KB8OFF	"Dayton, Ohio repeater update"
1630-1700	Ralph Taggart	WB8DQT	"An Amateur's Life in ATV/Image Communications"

CONSTRUCTION ARTICLE INDEX

The following list is an index of all construction related material that has appeared in the ATCO Newsletter since its inception in the early '80's. This is a handy reference for that particular construction article that you knew existed but didn't want to wade through each issue to find it. All Newsletters below are also listed in order in the ATCO homepage under "Newsletters". Once you locate the Newsletter section, the displayed list can then be re-sorted as needed by clicking on the "date" in the header.
…Bob N8OCQ

Issue	Page(s)	Article
Vol 1 II	5	439 Beam
Vol 2 I	4	439 Beam
Vol 2 II	8,9	439 Parabolic Ant
Vol 2 II	9	Video Modulator
Vol 2 III	7	1296 Ant 45 Ele loop yagi
Vol 2 III	10	RF Power Indicator (in-line) for 1296 MHZ
Vol 2 SE	2,3	Diode Multiplier for 23 CM
Vol 2 SE	4,5	1296 MHZ 10 Watt Solid State Linear Amp
Vol 4 I	3	RF/Video Line Sampler
Vol 4 II	3	P-Unit Meter
Vol 4 II	7,10,11	UHF Gated Noise Source
Vol 4 II	12	420 – 450 Broom Handle Rhombic Ant
Vol 4 III	4,8	25 Element 1.26 Loop Yagi
Vol 4 IIII	6	Video Modulator (Tube Type)
Vol 5 I	3	Video Modulator One Transistor
Vol 5 II	4,7	900 MHZ Yagi Ant
Vol 5 II	6	Video Modulator for 2C39 Final
Vol 5 III	3	440 MHZ Hidden Transmitter Finder
Vol 6 I	3	Video Line Amp
Vol 6 I	8	25 Ele 910 MHz Loop Yagi
Vol 6 II	4,6,7	Microwave Oven ATV Xmiter
Vol 6 II	5	Matching a Quad Driven Ele
Vol 6 II	8	Power Divider for 33CM
Vol 9 IIII	5,7	16 Ele Loop Yagi for 439.25 MHz
Vol 10		No Articles
Vol 11 II	4,5,6	439 48 Ele Collinear Ant
Vol 11 IIII	7	1280 MHZ Cavity Filter
Vol 12 I	6,7,8	439 & 1200 Horz Polarized Mobile Ant
Vol 12 II	5,6,7	ATV Line Sampler
Vol 12 II	10	439 & 1280 Interdigital Filter(s)
Vol 12 III	6,7,8	439 Cheap Attic Ant
Vol 13 I	9, 10	High Level Modulator for ATV
Vol 13 II	5	VGA to NTSC Converter for Computer
Vol 13 III	9, 10	AM Video Modulator
Vol 13 IIII	4	1200 MHZ Transistor Linear Amp
Vol 13 IIII	6	900 & 1200 MHz Loop Yagis
Vol 14 IIII	8	439 31 EleYagi
Vol 14 IIII	12, 13	1250 MHZ FM ATV 3 Watt Xmiter
Vol 15 I	16	427.25 Horz J-Pole Ant
Vol 15 II	14	2400 MHZ Loop Yagi
Vol 15 III	8	Wavecom Modification
Vol 15 III	12,13,14	2.4 Gig Antenna's
Vol 16 II	20	2.4 Gig Helix Ant
Vol 16 IIII	4	1280 MHZ Loop Yagi
Vol 17 I	14, 15	Video Amp (Multi Output)
Vol 18		No Articles
Vol 19 IIII	4	Pwr Supply for 28 Volt Ant Relay
Vol 20 III	9, 10	Video Sampler
Vol 21 II	4	RF Pwr Amp for 900/1200 MHZ
Vol 21 II	14	10-14 Volt Doubler for 28 Volt Ant Relays
Vol 21 III	5	S-Video To Composite Adaptor
Vol 21 IIII	3,4	Video Noise Rejection Amp
Vol 21 IIII	14,15,16 ,17	"S" Meter For Comtech Boards
Vol 22 I		No Articles
Vol 22 II	10	1260 MHZ Cavity Filter
Vol 22 III		No Articles
Vol 22 IIII		No Articles
Vol 23 I		No Articles
Vol 23 II	5,6	Linear 60 Watt For 70CM
Vol 23 II	8,9	Video Modulator Update
Vol 23 III		No Articles
Vol 23 IIII		No Articles
Vol 24 I	13	RF Sniffer For 2.4 GIG
Vol 24 II		No Articles
Vol 24 III	3	Quantum 1500 Rec Tuner Mod
Vol 24 IIII	9	Battery Recharge Ckt
Vol 25 I		No Articles
Vol 25 II	6,7	Comtech TX Module Improvement
Vol 25 III	11	Comtech TX Module Improvement Correction
Vol 26 I	6	Isolator (Circulator) Modification 850 To 1260 MHz
Vol 26 II	5,6	Comtech 1200 MHz receive module improvements
Vol 26 III		No Articles
Vol 26 IIII	9	Remote Touch Tone Decoder For Your Shack
Vol 27 I	10	ATV Low Pass Filter (427 Mhz)
Vol 27 II	15	PictureTel Camera Data Cable Wiring
Vol 27 III	10	ATV Low Pass Filter (427 Mhz)
Vol 27 IIII	15	PictureTel Camera Data Cable Wiring

This is the complete list for construction articles shown in past ATCO newsletters. The page numbers listed may not match the actual page in the newsletter. They are the number shown in the PDF file. Some issues are missing. Art did not have a copy of every year. This list is complete through Vol 26 IIII.
…Bob N8OCQ

LOCAL HAMFEST SCHEDULE

This section is reserved for upcoming Hamfests. 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. This list will be amended, as further information becomes available. …WA8RMC.

18 Apr 2010+ 56th Annual Hamfest, Electronics, and Computer Show Cuyahoga Falls Amateur Radio Club http://www.cfarc.org/hamfest2010.html Talk-In: 147.27 Contact: Ted Sarah, W8TTS 239 Bermont Avenue Munroe Falls, OH 44262 Phone: 330-688-2013 Email: w8tts@w8tts.com Cuyahoga Falls, OH Emidio & Sons Party Center 48 East Bath Road

25 Apr 2010+ Athens County Amateur Radio Association http://ac-ara.org/ Talk-In: 145.15 Contact: Drew McDaniel, W8MHV 61 Briarwood Drive Athens, OH 45701 Phone: 740-592-2106 Fax: 740-593-9184 Email: dmcdaniel1@ohio.edu Athens, OH Athens Community Center 701 East State Street

14-16 May 2010+ Dayton Hamvention Dayton ARA http://www.hamvention.org/ Talk-In: 146.94(-) or 146.64(-) Contact: PO Box 964 Dayton, OH 45401-0964 Phone: 937-276-6930 Email: info@hamvention.org Trotwood, OH Hara Arena 1001 Shiloh Springs Road

19 Jun 2010+ Milford Amateur Radio Club http://www.w8mrc.com Talk-In: 147.345+ (no tone) Contact: Jim Linn, WB8RRR 5110 Romohr Road Cincinnati, OH 45244-1023 Phone: 513-831-6255 Fax: 513-528-7270 Email: wb8rrr@arrl.net Milford, OH Eastside Christian Church 5874 Montclair Blvd

25 Jul 2010+ Portage Hamfair 10 Portage Amateur Radio Club, Inc. http://Hamfair.com Talk-In: 145.390 MHz Contact: Joanne Solak, KJ3O 9971 Diagonal Road Mantua, OH 44255 Phone: 330-274-8240 Fax: 330-274-8527 Email: kj3o@arrl.net Randolph, OH Portage County Fairgrounds 4215 Fairgrounds Road

22 Aug 2010+ CARA Hamfest and Computer Show Cambridge Amateur Radio Association http://www.w8vp.org Talk-In: 146.850 (PL 91.5) Contact: Mary Rhodes-Ellis, KD8EIR 5855 Sherrard Road Cambridge, OH 43725 Phone: 740-439-6610 Email: Radicalrhodes@yahoo.com Cambridge, OH Pritchard Laughlin Civic Center 7033 Glenn Hwy

NEW MEMBER(S)

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 our group's lifeblood. It's important that we actively recruit new faces aggressively.

N9KNV Edmund Janowski South Milwaukee, Wi.

…WA8RMC

INTERNET ATV HOME PAGES (list verified 10/08/09)

Domestic homepages

http://www.atco.tv	Ohio, Columbus, homepage (ATCO)
http://www.w8bi.org/atv/atvresources.html	Ohio, Dayton ATV group (DARA)
http://www.citynight.com/atv	California, San Francisco ATV
http://atn-tv.org/ATN.htm	California, Amateur Television Network in Central / Southern
http://members.tripod.com/silatvg	Illinois, Southern, Amateur Television group
http://www.ussc.com/~uarc/utah_atv/id_atv1.html	Idaho ATV
www.bratsatv.org.	Maryland, Baltimore Radio Amateur Television Soc. (BRATS)
www.qsl.net/k7atv/	Salem, Oregon Amateur Television Associations-Salem
http://www.qsl.net/kd2bd/atv.html	New Jersey, Brookdale ARC in Lincroft
http://www.ipass.net/~teara/menu3.html	North Carolina, Triangle Radio Club (TEARA)
http://www.oregonatv.org	Oregon, Portland OATVA Oregon Amateur TV Association
?	Pennsylvania, Pittsburg Amateur Television
http://members.bellatlantic.net/~theojkat/	Pennsylvania, Phila. Area ATV
?	Texas, Houston ATV (HATS)
http://www.hotarc.org/atv.html	Texas, WACO Amateur TV Society (WATS)
?	Utah ATV
www.qsl.net/ww7ats	Washington, Western Washington Television Soc. (WWATS)
http://www.shopstop.net/bats/	Wisconsin, Badgerland Amateur Television Society (BATS)

Foreign homepages

http://atv.hamradio.si	Slovenia ATV **(BEST OF FOREIGN ATV HOMEPAGES)**
http://www.batc.tv.	British ATV club (BATC)
http://www.cq-tv.com	British ATV Club and CQ-TV Magazine
http://oh3tr.ele.tut.fi/english/atvindex.html	Finland ATV, OH3TR repeater.
http://www.darc.de/distrikte/g/T_ATV/atv.htm	German ATV

Misc other ATV related sites

http://www.atv-tv.org	The Amateur Television Directory
http://www.atn-tv.org	Amateur Television Network
http://www.atvquarterly.com	Amateur Television Quarterly Magazine
http://gb3lo.camstreams.com	"GB3LO" Repeater Camstream westoft, UK
http://www.ham-radio.com/sbms	"SBMS" San Bernardino Microwave Society
http://www.qsl.net/kc6ccc/	“METS" Microwave Experimenters Television System

TUESDAY NITE NET ON 147.48 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 (01/20/10)…….$1902.01
RECEIPTS(dues)……. $ 120.00
Fall Event food (not reported last time)……$ (160.90)
Paypal expenses……$ (2.06)
CLOSING BALANCE (04/20/10)…….$ 1859.05

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)
TV Transmitters: 427.25 MHz AM mod, 1258 MHz FM mod, 1268 MHz QPSK digital, 2433 MHz FM mod, and 10.350 GHz FM mod. multipole filters in output line of all transmitters
Output Power - 427.25 MHz :50 watts average 100 watts sync tip
1258 MHz: 40 watts continuous (Analog ATV)
1268 MHz 10 watts continuous (DVB-S digital ATV - 2 channels)
2433 MHz: 15 watts continuous
10.350 GHz 1 watt continuous
Link transmitter - 446.350 MHz 5 watts NBFM 5 kHz audio
Identification: 427, 1258, 1268, 2433, 10.35 GHz transmitters video identify every 30 min. with ATCO & WR8ATV on 6 different screens
1268 MHz & 10.35 GHz - Continuous transmission of ATCO & WR8ATV with no input signal present
Transmit antennas: 427.25 MHz - Dual slot horizontally polarized "omni" 7 dBd gain major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni (Analog ATV)
1268 MHz - Diamond vertically polarized 12 dBd gain omni (Digital DVB-S ATV)
2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.350 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni
Receivers: 147.48 MHz - F1 audio input with touch tone control
439.25 MHz - A5 video input with FM subcarrier audio (lower sideband)
449.975 MHz - F1 audio input aux touch tone control
1280 MHz - F5 video input or DVB-S digital (digital input fed direct to 1268 MHz digital output channel 2)
2398 MHz - F5 video input
10.450 GHz - F5 video input (not installed yet)
Receive antennas: 147.48 MHz - Vert. polar. Hustler G6-270R 6dBd dual band (also used for 446.350 MHz output)
439.25 MHz - Horiz. polar. dual slot 7 dBd gain major lobe west
1280 MHz - Diamond vertically polarized 12 dBd gain omni
2398 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni (not installed yet)

Input control:

Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
00*	turn transmitters **on** (enter manual mode-keeps xmitters on till 00# sequence is pressed)
00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
264	Select Channel 4 Doppler radar. (Stays up for 5 minutes) Select # to shut down before timeout.
697	Select Time Warner radar. (Stays up till turned off). Select # to shut down.

Manual mode functions:

00* then 1 for Ch. 1	Select 439.25 receiver
00* then 2 for Ch. 2	Unused at this time
00* then 3 for Ch. 3	Select 1280 receiver
00* then 4 for Ch. 4	Select 2411 receiver
00* then 5 for Ch. 5	Select video ID (the 4 identification screens)
01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 (not in use at this time)
03* or 03#	Channel 3 1280 MHz scan enable
04* or 04#	Channel 4 2398 MHz scan enable
A1* or A1#	Manual mode select of 439.25 receiver audio
A2* or A2#	Unused channel at this time
A3* or A3#	Manual mode select of 1280 receiver audio
A4* or A4#	Manual mode select of 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	unused at this time
C2* or C2#	C2* to disable digital transmitter, C1# to enable it.

ATCO MEMBERS AS OF April 20, 2010

Call	Name	Address	City	St	Zip	Phone	URL
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511	rfvieth@yahoo.com
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703		kc3am@verizon.net
W8ARE	Larry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964		lcmeredith@prodigy.net
KC8ASD	Bud Nichols	3200 Walker Rd	Hilliard	OH	43026	614-876-6135	kc8asd2@netzero.com
KC8ASF	Tom Pallone	3437 Dresden St.	Columbus	OH	43224	614-268-4873	kc8asf@sbcglobal.net
KC8BTX	Dudley Field	357 N. Ridge Heights Dr	Howard	OH	43028		kc8btx@37.com
W6CDR	Wynn Rollert	1141 Pursell Ave	Dayton	OH	45420	937-256-1772	w6cdr@hotmail.com
WB8CJW	Dale & Sharon Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551	delshoff@columbus.rr.com
N8COO	C Mark Cring	3941 Three Rivers Lane	Groveport	OH	43125	614-836-2521	cmarkcring@gmail.com
N8CXI	Garry Cotter	2367 Northglen Drive	Columbus	OH	43224		gjcotter@aol.com
N9CX	Bill Erwin	231 Gateside Ct.	Gahanna	OH	43230		werwin@columbus.rr.com
WA2CZD	Jim Gilbert	1204 Aspen Pines Drive	Wilder	KY	41071-0404		jgilbert@fox19.com
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785		
N3DGE	Mike Trachtenberg	3777 Lankenau Avenue	Philadelphia,	PA	19131-2816		mikect@verizon.net
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198	jabusic@yahoo.com
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641		ron_fredricks@comcast.net
W8DMR	Bill Parker	2738 Florbunda Dr	Columbus	OH	43209		w8dmratv@copper.net
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	OH	42616	419-691-1625	
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-876-6033	MHZ52525@aol.com
KC8EVR	Lester Broadie	108 N Burgess	Columbus	OH	43204		kc8evr@beol.net
N8FRT	Tom Flanagan	1751 N Eastfield Dr.	Columbus	OH	43223		chuck78@wowway.com
WA8FLY	Rod Shaner	16012 London Rd.	Orient	OH	43146	740-279-3614	wa8fly@copper.net
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147		w8fz@arrl.net
KB8GHW	Mike Amirault	11354 Reussner Dr SW	Pataskala	OH	43062	740-927-5005	kb8ghw@ee.net
WA8HFK,KC8HIP	Frank, Pat Amore	3630 Dayspring Dr	Hilliard	OH	43026	614-777-4621	famore@wowway.com
W4HTB	Henry Cantrell	905 Wrenwood Dr.	Bowling Green	KY	42103	270-781-9624	w4htb@insightbb.com
WG8I	Chris Vojsak Sr,	3536 W Henderson Rd	Columbus	OH	43220-2232	614-203-6000	wg8i.ham@gmail.com
WB2IIR	Michael Anthony	370 Georgia Drive	Brick	NJ	08723		
N8IJ	Dick Knowles	1799 Homeward Ave	Lima	OH	45805		rgrant2001@yahoo.com
KD8JLO	David Nulter	510 Millag Drive	Sunbury	OH	43074	614-579-6425	davnul@wideopennetworks.com
K8KDR,KC8NKB	Matt & Nancy Gilbert	5167 Drumcliff Ct.	Columbus	OH	43221-5207	614-771-7259	k8kdr@arrl.net
N9KNV	Edmund Janowski	1721 Minnesota Ave	South Milwaukee	WI	53172		ejanowski@wi.rr.com
W8KHW	Kevin Walsh		Columbus	OH	43220	614-442-7748	kwalsh@datrix.com
WA8KQQ	Dale Waymire		Greenville	OH	45331	937-548-2492	walkingcross@bright.net
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	OH	43123	614-871-0751	phumphries@columbus.rr.com
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334		cbeener@columbus.rr.com
KA8LWR	Mel Alberty	1645 Olentangy Road	Bucyrus	OH	44820	419-468-2971	malberty@columbus.rr.com
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081		w8ma@arrl.net
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660		ka8mid@qsl.net
W0MNE	Mike Doty	4300WinchesterSouthern Rd	Circleville	OH	43113	740-420-9060	mcubed2@hughes.net
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127	n8nt@atco.tv
N0OBG	Jim Conley	33 Meadowbrook C C Est	Ballwin	MO	63011		jim@commo.com
WD8OBT	Tom Camm	63 Goings Lane	Reynoldsburg	OH	43068	740-964-6881	mitchellb25@netzero.com
WU8O	Tom Walter	15704 St Rt 161 West	Plain City	OH	43064	614-733-0722	wu8o@emec.us
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022		hodgerob@yahoo.com
KB8OFF	Jess Nicely	742 Carlisle Ave	Dayton	OH	45410		kb8off@sbcglobal.net
W6ORG,WB6YSS	Tom& Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565	w6org@ arrl.net
KC8OZV	George Biundo	3675 Inverary Drive	Columbus	OH	43228	614-274-7261	george@biundo.org
W8PU	Gary Poland	3347 State Route 28	Midland	OH	45148		gpoland1@cinci.rr.com
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201	614-421-1492	jeasley11@hotmail.com
W8PU	Gary Poland	3347 S.R. 28	Midland	OH	45148		gpoland1@cinci.rr.com
KC8QJR	Adam Burley	1796 Queensbridge Drive	Columbus	OH	43235	614-886-2326	adam@digitalcave.org
W3RCJ	Thomas Farrell	1912 Burnwood Road	Baltimore	MD	21239		w3rcj@operamail.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	jhull@wcmi.org
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021		gkenmorris@gmail.com
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	OH	45334	937-964-1185	w8rvh@ctcn.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
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904	614-276-1689	w8rwr@sbcglobal.net
W8RXX,KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021	740-548-7707	jper@insight.rr.com
W8SJQ	Rocky Eramo	795 Riverbend Ave	Powell	OH	43065	614-207-2740	rockyeramo@aol.com
W8SJV, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856	w8sjv@nexgenaccess.com
KB8SSH	Mike Cotts	3424 Homecroft Dr	Columbus	OH	43224	614-371-7380	mcotts@wideopenwest.com
W3SST	John Shaffer	6706 Gilette Dr	Reynoldsburg	OH	43068	614-751-0029	w3sst@juno.com
K8TPY, K8FRB	Jeff & Dianna Patton	3886 Agler Road	Columbus	OH	43219		cqcqk8tpy@yahoo.com
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-1392	s.crew@in-touch.net
KB8UGH	Steve Caruso	6463 Blacks Rd. SW	Pataskala	OH	43062-7756		dael4@columbus.rr.com
W8URI	William Heiden	5898 Township Rd #103	Mount Gilead	OH	43338	419-947-1121	wb8uri@earthlink.net
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101		kb8uwi@yahoo.com
WA8UZP	James R. Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328	wa8uzp@yahoo.com
N8WAC	Tony Everhardt	6512 Emch Road	Walbridge	OH	43465	419-666-5178	natewac@aol.com

Call	Name	Address	City	St	Zip	Phone	URL
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	OH	43062	740-927-3883	hiram@hiramhunter.com
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123		ohiomec@aol.com
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011		sdiggs1@insight.rr.com
N8XYJ	Dan Baughman	4269 Hanging Rock Ct.	Gahanna	OH	43230		danohio@wowway.com
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064		kb8ymq@aol.com
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224		----------
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771	n8yz@amsat.org
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371		tholmes@woh.rr.com
K3ZKO	Ron Cohen	915 Rowland Ave	Cheltenham	PA	19012	215-828-1263	k3zko@verizon.net
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	OH	43125	614-202-9042	ttaft@columbus.rr.com

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. As an option for those joining after mid July, they can elect to receive a complementary October issue with the membership commencing the following year Your support of ATCO is welcomed and encouraged.

NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received and shows due one year from that date. The actual expiration is on January of the following year so we can keep the dues clock consistent with the beginning of each year.

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT
Secretary: Frank Amore WA8HFK
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Dale Elshoff WB8CJW
Statutory agent: Frank Amore WA8HFK
Newsletter editor: Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
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 ○ MONEY ORDER ○

Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, pay dues via the Internet with your credit card. Go to www.atco.tv and fill out the “pay dues” section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. 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.

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

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE RIGHT CORNER OF THE MAILING LABEL
OR
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF EXPIRED.