# ATCO NEWSLETTER

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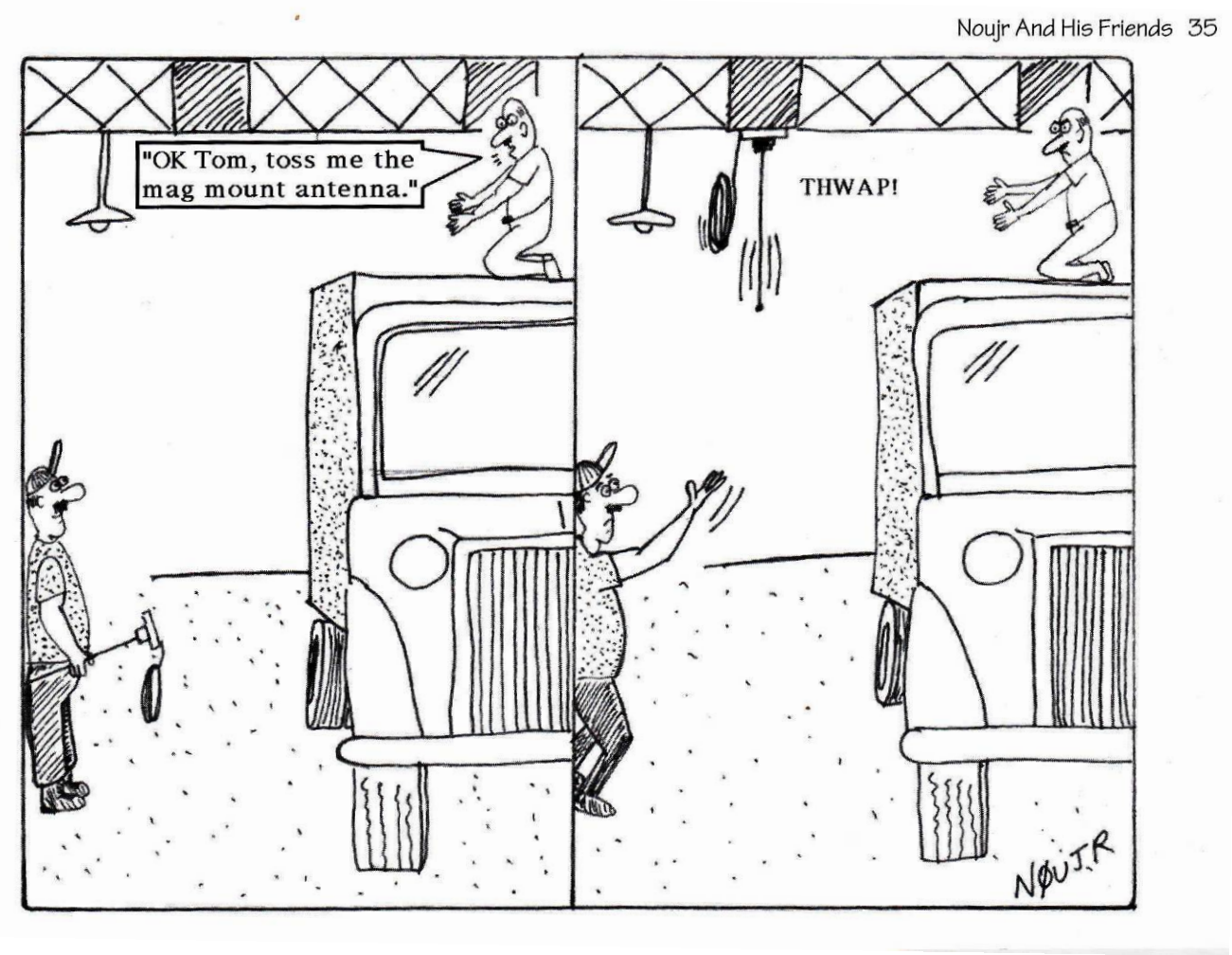
*The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc"* and is published quarterly (January, April, July, and October)


## ATCO SPOTLIGHT TOPIC

Thanks to Greg Trook N0UJR for allowing us to share one of his cartoons. See also http://incolor.inetnebr.com/n0ujr/.




# ACTIVITIES ... from my "*Crippled*" Workbench

WOW!!!!!!!!!! Is Fall here already? It seems like just yesterday I applied for my Ham tower permit. Well, it really hasn't been that long (since late August) but things haven't moved as quickly as I had hoped. The City of Westerville, in my opinion, puts overly strict conditions for a tower installation. They tell me, "It's simple. Just have a professional engineer with a structural Engineering PE certificate approve the design and stamp it with his state of Ohio seal". Sound simple? Well, YES, if I had an unlimited source of money. It seems that very few registered PE's in Ohio are interested in a residential tower application. Those that are, want thousands of dollars to approve it because they would need to do a complete structural analysis of both tower and house to which it will be fastened. In addition a ground sample analysis would be necessary as well as tower, wind and ice loading.

I finally found a PE willing to work on my application at a reasonable rate. He said if I get certification from the tower manufacturer that fully extended, it will survive a 90MPH wind, his analysis would take only 2-3 hours. The tower manufacturer complied. The PE completed his work and gave me his list of requirements. He wants my house braced from the inside with plywood on the attic side where the tower will be fastened and 3/8" rods through the outside bracket and into the house and through at least (3) of the main 2x10 roof beams. That's a lot of work but doable so I guess I have no choice if I want a tower. As I am writing this, the phone rang. It was Westerville telling me that my building permit for the tower was approved and waiting for me to pick it up. Therefore, my next Newsletter should contain the line, "HOORAY, IT'S UP AND WORKING". Then I'll be back with live video on the Tuesday Night NET!

The repeater needs some attention but nothing serious. The big item that was fixed is the 1280 MHz receive antenna. It failed a while back so I removed it for inspection and used the spare 1258 MHz antenna till the 1280 was repaired. Well, I found nothing wrong with the 1280 antenna and home tests showed it had a low SWR so I returned it to the repeater. Upon installation, I checked the cable at the antenna end and found it shorted. When I checked the line inside at the transmitter, it was OPEN. OK, I've never seen or heard about anything like that before. Charles, WB8LGA, was with me on that trip and confused him also. How could that be??? Was it a lightning strike or something like that??? It seems like it was impossible but sitting there talking about it wasn't getting the job done so we decided to remove and replace the entire 7/8" Heliax line. Besides, the connector at the antenna was the wrong sex and needed an adapter so this was an opportunity to fix that. When we pulled the line down to the roof, we traced it inside. That's when we discovered it was connected to the transmitter filter hence the SHORT measured from the antenna. The line we checked from inside was in fact the transmit antenna which is not a DC SHORT. Mystery solved!!!!!!!!!!!!! The lines were mismarked. I don't know who to blame for this so it's time to move on.

Later we took a final continuity check of the lines and found a high resistance center pin to outside on the 1280 receive line. When we took the connector apart at the transmitter, it was all corroded around the center pin. It seems that some time ago there was some water that came in and down the line from a roof seal that "wasn't". The water ran into the Heliax connector on the top of our cabinet and viola!... the source of the corrosion. I don't know how long it has been that way but I'm sure it's been years. In any case, the antennas work OK now and I was able to eliminate the adapter so we went home happy. This only took 4 hours but, hey, it was a beautiful day and we didn't have anything else planned anyhow (I thought). On the way home Charles informed me that it was his birthday. Now, I felt real bad forcing him to climb skyscrapers on his birthday! He said it was OK because his plans were not till later that day.

Next job, install the roof cam before the weather gets too cold. Are there any helpers out there? I have the 10 GHz transmit unit removed and at my house for an upgrade, to fix a video issue and add the 10GHz receiver but the main reason is to check it out with the roof camera. In operation, the roof cam plugs into the 10GHz unit so wiring goes into the repeater as one single cable. I hope to get it checked out and installed by Fall Event time.

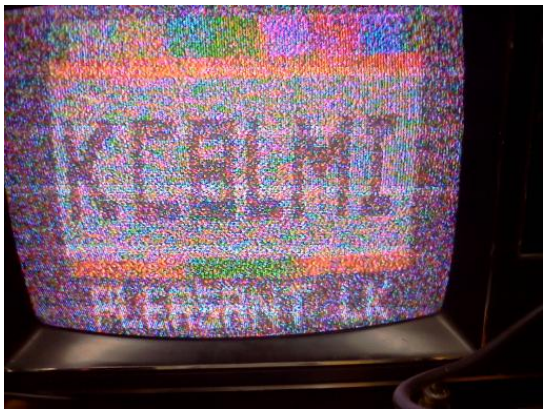
A short note about our $10 dues. I notice that there are a number of you that have not paid dues for 2012 yet. Please avoid me sending you a reminder in January instead of the Newsletter for 2012 dues. If in doubt, check your status in your personal section of the ATCO web page at www.ATCO.TV. Better yet, come to the Fall Event and surprise Bob, N8NT, with money.

That's all for now folks! Don't forget the Fall Event on Sunday October 28.

Oh, there are two more things: We needed a new Secretary and a Statutory Agent representative for our club because Frank Amore, WA8HFK, moved to California. Tom, KC8WRI said he'd be the Statutory Agent. Mark N8COO volunteered for the Secretary job. Thanks guys. All we need to do now is to officially vote them in at the Fall Event along with the other officers.
…73, WA8RMC

# ATV DX FROM W8URI

Below left is a picture of KC8LMI on 8/16/2012 from Pleasant Lake Michigan. I gave him a P3. Although the initial voice contact frequency was 3930, we were able to talk on 144.34. Again the time was around 8 A.M. on the ATV get together on 3930. Pictures were taken with my cell phone and sent to my email and then forwarded to you. Best 73. Bill W8URI

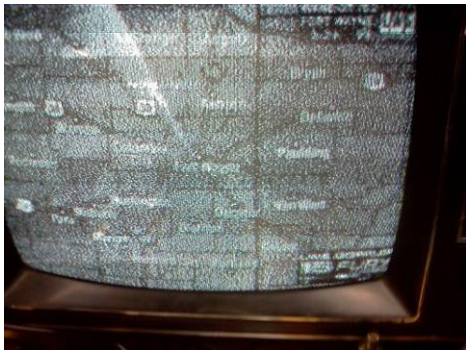


On the right is a picture of K8IGU from 8/16/2012. He got a P5 from me. This occurred at our morning net on 3930 MHz. Brian is located in Lucky Ohio just south of Toledo.


# MORE ATV DX FROM W8URI

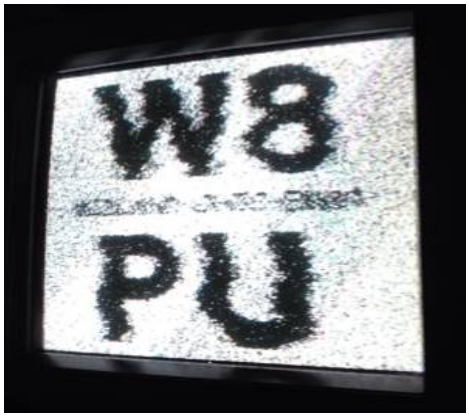

Above is a picture from W4HTB as received at my house in late June 2012. Pictures are taken by Hank Cantrell, W4HTB, on that day. What an opening! Not bad for 315 miles.
… Bill W8URI

Here is a pix of the W8FY repeater/beacon in Van Wert, Ohio. The Tx freq is 434.00 MHZ. They are vertical polarization. Pix seen late June 2012.



W8FY repeater/beacon. If you look closely you can see the Fort Wayne I D in the pix. Again, pix taken late June 2012.

# ATV DX FROM WB8LGA




216 miles from W8PU to W4HTB 08/19/2012

311 Miles from WB8LGA to W4HTB 09/19/2012

# QAM ATV SUCCESS IN COLORADO

Mon, 1 Oct, Boulder, Colorado
Aloha DTV Group
Here in Boulder, we have had success using QAM-64 for Ham TV. It is the same method as used by the CATV industry. Thus we are able to send true, 1080I hi-def, video and CD quality digital audio and receive it directly on our home analog/digital TV receivers. It is extremely easy to implement. I have recently posted it on my web site (kh6htv.com ) a new Application Note, AN-13, entitled "High Definition Digital TV Transmitter". It gives all the details on how to very easily roll your own hi-def QAM-64 DTV transmitter. Check it out.
…73 & good TV DX de Jim, KH6HTV

# ATV ACTIVITY IN PHILADELPHIA / WILMINGTON AREA.

Hey Art,
As far as newsletter subject matter there is not much of anything happening here in the area as far as activity. I have not heard from anyone in Baltimore in a year or so. Talked to Dick, WA3USG, from York, PA in the spring and he said there was no interest in his area. I have not heard from the guys in Harrisburg for a while either so I don't know what they are up to.

Here in Wilmington, DE I plan on changing from Horizontal to Vertical to hopefully stir up more interest. Since Vertical antennas are very common at home there will be little excuse not to try to receive the signal. I have an old 4 pole I will be installing shortly.

In Philadelphia, Ron K3ZKO, and myself will be testing for interference at a new site for the Philadelphia repeater. This will also be Vertical at a rather unusual site, the Battleship New Jersey which is a museum ship located in the Delaware River at Camden NJ. We have permission to place the repeater there but are concerned about interference on 439.250 from all the RF around Philadelphia. I would like to install the antenna before it gets too cold. I am planning on using a tri-band antenna (144, 440, and 1200) that Mike, WA6SVT, suggested and it will be about 140' ASL. Not a very high site but over water it should help some.
…from Dave KC3AM in Delaware, Md.

# SPACE STATION DEPLOYS FIVE CUBESATS

QST de W1AW
Space Bulletin 005  ARLS005 from ARRL Headquarters
Newington, CT  October 5, 2012
To all radio amateurs

ARLS005 Space Station Deploys Five CubeSats

Five research CubeSats - all with Amateur Radio communication systems - were successfully deployed from the International Space Station beginning around 1430 UTC today. The satellites were launched from the Kibo station module using a specially equipped Robotic arm.

The group includes:

TechEdSat, collaboration among NASA's Ames Research Center; San Jose State University; the Swedish National Space Board (SNSB) and the Japan Aerospace Exploration Agency (JAXA), will be sending AX.25 packet telemetry at 437.465 MHz. The TechEdSat team is asking for assistance from amateurs in decoding and relaying data. Follow the mission on their Twitter page at, http://twitter.com/TechEdSat. More information about decoding and submitting packet data is available on their website.

FITSAT-1, designed and built at the Fukuoka Institute of Technology, Japan, will test the feasibility of high-speed microwave data downlinks in low Earth orbit. It will transmit telemetry on 437.445 MHz and 5.84 GHz. They welcome signal reports from amateurs at their website at, http://turing.cs.fit.ac.jp/~fitsat/.

WE WISH, from the Meisei Electric Company Radio Club, Japan, will send CW telemetry and occasional SSTV images at 437.505 MHz.

RAIKO, designed and built by students at Wakayama University, Japan, will transmit high-speed data at 2.2 and 13 GHz.

F-1, built by students at FPT University in Hanoi, Vietnam will send telemetry at 145.980 and 437.485 MHz using 1200-baud packet and CW. Amateurs are asked to monitor and submit reports. More information can be found at, http://fspace.edu.vn/?page_id=27.

# BATC ATV CONVENTION HIGHLIGHTS

From G4GUO on 10/7/12

Reflections on the recent BATC 2012 Convention held on 10/7/12 near London, England. Below are highlights from the convention.

- The convention occurred over the weekend of the 6/7 October in the town of Basingstoke which is located just south of London.
- I was there for most of the two days and made a presentation on Saturday and demonstrated DATVexpress on both days.
- In the demonstration are there was a stand showing vintage TV equipment. A young student Phil M0DNY showing how to use a DVB-T USB dongle as an SDR.
- There was a demonstration of 3D TV which was located next to the Digilite stand so they could jointly show 3D TV being transmitted with DVB-S using a Digilite.
- Dave G8ADM had a stand showing how to improve yagi antennas for ATV use.
- Peter G3PYB was showing digital TV being transmitted over a 47 GHz link.
- Next to that was my stand where I was showing the transmission of DVB-S2 using the DATVexpress board. The equipment survived the train journey thankfully and worked perfectly for the entire weekend. That was a big relief.
- Next to me was Jean Piere F6DZP and Darren G7LWT showing the latest version of the Tutioune software. I now know that the name came from a French - Canadian friend of F6DZP.
- There were a number of trade stands selling noise sources, low noise preamps, digital power meters, SR systems equipment and BATC club items and memorabilia.
- The lecture stream was varied and interesting, even the lectures that I thought would not be too interesting turned out to be quite the opposite.
- I especially enjoyed the MPEG4 lecture using a chip by Jason G7OCD, a brief overview of all the available easy to program MPEG4 encoder chips. That should save me some leg work.
- I also enjoyed the lecture from Sam G4DDK on the use of lossless negative feedback to produce low noise pre-amplifiers. I now know where to put the RF absorbing foam inside my preamp. He also had some units to sell and told us about his latest yet to be released products.
- The BATC committee in the form of Chris G1FEF also let us know about upgrades to the streamer and how it has been successful beyond their wildest dreams.
- The lectures are available on the BATC website in the Archive section for anyone that wants to view them.
- All in all I felt is was well worth going to as I was able to find out what others are doing and to talk about some potential collaborative efforts, it seems as if a lot of us techies are working on very similar projects. Finally noticeable was a total lack of any mention of analog TV. With the inevitable loss of large amounts of Amateur spectrum it looks like digital TV will be the only way forward.
- There seemed to be two themes that stood out from the Convention, sub 1 MS/s DATV using MPEG4 / HVEC encoding and totally digital repeaters i.e. ones that don't convert to analogue in their chains.
- Finally I would like to thank Noel G8GTZ and all his little helpers for putting on such a great show.

… Charles G4GUO

# BATC 2012 CONVENTION - PRESENTATION ON DATVexpress

Topic: **DATV-Express – Recent Project Progress**

**Abstract:** The British Amateur Television Club (BATC) held a convention in October of 2012 where a presentation was given on the DATVexpress Project. The DATVexpress project was formed to create low-cost solution for Digital-ATV transmission. The open-source project was first announced and described at the TAPR Digital Communications Conference (DCC) in 2011.

This BATC 2012 PowerPoint presentation provides a report on recent project progress. The project's hardware board design appears to have the capability to go well beyond just DVB-S transmission; it should be able to transmit any waveform of up to 8 MHz bandwidth using SDR techniques. Charles G4GUO reports on recent progress to produce DVB-T and DVB-S2 on the hardware board using new software.

(Also, through the courtesy of BATC, below is a link to a BATC Streaming file of the actual presentation video and audio. This .FLV video file requires Adobe Flash Reader [free] to view. The file is quite large to download – 170 MB. Please download that video file if interested and then view it on your local computer). Control click on the below URL's to view or download the details of our ambitious project.
…Charles

***Editor note:*** *Feedback from the convention attendees for the lecture on DATVexpress at the BATC convention received the best average points. So it looks like they liked it. It received 4.19 where 1 is best and 11 the worst. The next closest lecture was Tutioune which scored 4.63, the worst scored 8.78. So, it is well worth viewing the DATVexpress presentation.*

BATC DATV-Express Slides (.PPT)  see DATV-Express Presentation Video (.FLV courtesey of BATC)

# THE SECOND ANNUAL VK3RTV DATV/ATV QSO PARTY

## by Ken Konechy W6HHC (credit to www.W6ZE.org )

Last year, Peter Cossins VK3BFG and the hams associated with the VK3RTV digital-ATV repeater organized the first world-wide DATV QSO Party in August 2011 to help celebrate the 100 Years of the Amateur Radio Victoria organization providing support for ham radio. This year, the Melbourne ATV Group organized a second QSO Party for DATV and ATV stations on August 24th and 25th GMT. The VK3RTV repeater is the second earliest DATV-repeater in Australia, and no longer has any analogue downlink. **Many Ways to Get Video to Australia VK3RTV** In south-eastern Australia, many hams had contact directly line-of-sight by radio frequencies with the VK3RTV DATV-repeater (near Melbourne). In other parts of Australia and the United States, hams relayed their video to Peter VK3BFG by SKYPE videoconnections… who then uplinked the video and audio to the VK3RTV digital repeater using the DVB-S protocol for DATV. Let me detail out the many ways that hams participated in the VK3RTV QSO Party this year:

1. Line of sight 1.2 GHz RF DATV or ATV transmission to VK3RTV repeater
2. SKYPE video connection directly via internet to VK3BFG, who uplinks the video to the VK3RTV repeater by 1.2 GHz DATV RF
3. USA ATVers connect to the ATN Analog-ATV Network by RF and the received RF signal from W6ATN repeater is then SKYPED by KE6BTX to VK3BFG, who then uplinks the video to the VK3RTV repeater by 1.2 GHz DATV RF.


**Figure 1 – W6HHC 1.2 GHz DATV Video can be seen being received on Set Top Box/Notebook Computer**

4. SKYPE video connection via internet directly to KE6BXT. Don will simultaneously send your video to the W6ATN ATV Repeater Network by RF and via SKYPE on the internet to VK3BFG, who then uplinks the video to VK3RTV repeater by 1.2 GHz DATV RF

**Getting W6HHC 1.2 GHz DATV Signal to Australia**
During the QSO Party, the W6HHC digital-ATV signal was transmitted on 1.2 GHz using DVB-S protocol for DATV. The signal was then received on a nearby satellite Set Top Box receiver that sent the video signal over by USB to a Dell notebook computer to be displayed. See **Fig 1** of the W6HHC DATV video being received in Orange, CA on the notebook computer screen.

The next step was to take the video display on the notebook computer and send it over the internet by SKYPE video-connection (called "shared-screen" mode or "shared-desktop") to Peter VK3BFG, the net control station.

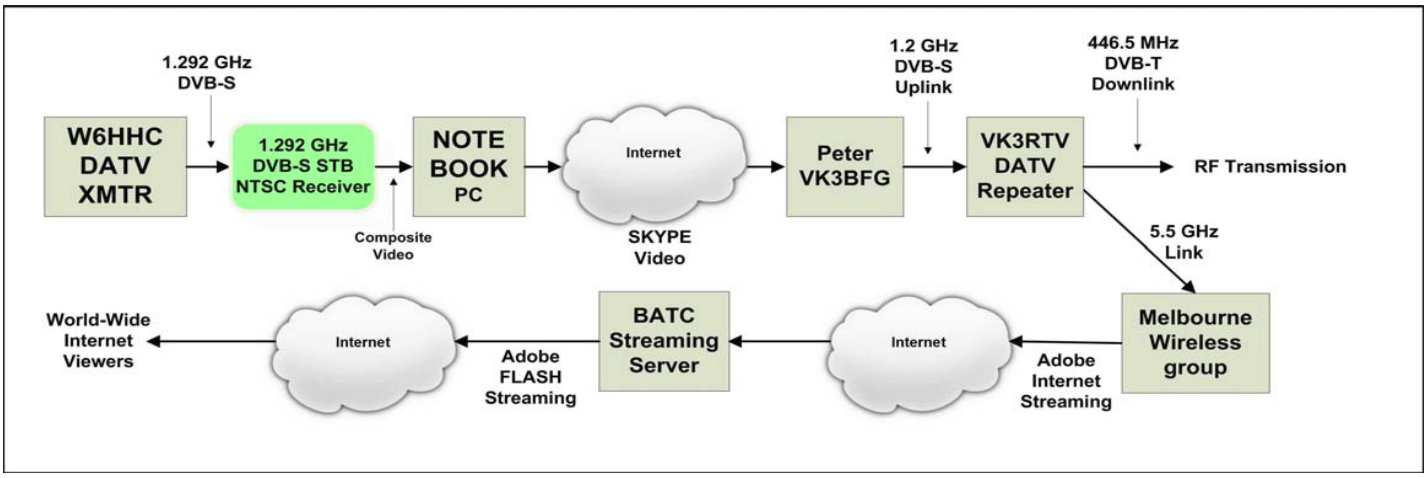



**Figure 2 – Block Diagram Showing W6HHC DATV QSO Straight to Australia VK3RTV**

W6HHC chose method-2 in the "many ways list" to SKYPE his received DATV video signal to VK3BFG via the internet. See **Fig 2** for a block diagram explaining the complete video signal path. Peter K3BFG then uplinked the received SKYPE video to the VK3RTV DATV repeater on 1.2 GHz using DVB-S protocol. The VK3RTV repeater in turn downlinked the W6HHC video on 446 MHz using the DVB-T protocol.

As shown in **Fig 2**, a nearby group called Melbourne Wireless also receive a 5 GHz link from VK3RTV and send the video over internet by streaming video to the BATC (British Amateur Television Club) server. Now the VK3RTV video could be seen all over the world through the www.BATC.TV internet URL. It was exciting to watch my DATV video come back from the VK3RTV digital-repeater via the BATC streaming server on the internet using my iPAD as a monitor! This was an interesting combination of ham radio and internet!

**Success and Fun for the VK3RTV QSO Party**

The following are some of the photos that I captured from the VK3RTV QSO Party. Peter VK3BFG reported that a total 16 ATVers on Friday night (Australian time) and 18 stations checked in on the Saturday's session. That included SKYPE DX check-ins from South Australia (VK5ADM), Tasmania (VK7OTC & VK7EM) and USA (KE6BXT & W6HHC). Don KE6BXT in Mission Viejo, CA reported that he had about another 10 different ATV stations check into ATN via RF and about five stations checked in via SKYPE.


**Fig 3 – Typical VK3RTV Repeater Test Pattern seen over the Internet**

**Figure 4 – Larger Picture is Peter VK3BFG testing with Don KE6BXT (smaller PIX in lower corner) (photo courtesy of KE6BXT)**


**Figure 5 – BATC Screen-Shot of QSO Party Announcement before the event.**


**Figure 6 – BATC Screen-Shot of John Fisher K3DQ and wife Jean VK3VIP. Jean is also president of ALARA (the Australian Ladies Amateur Radio Association)**

**Fig 7** shows a video screen-shot from the "traveling portable DATV station" VK3WWW that visited and set-up DATV at many of the iconic scenic spots around Melbourne during the QSO Party. I am a bit suspicious that that some sort of "green screen" may have been involved with their transmissions? But, I certainly enjoyed a personal tour of Melbourne. Well done!!


**Figure 7 – BATC Screen-Shot of the "traveling DATV portable station" K3WWW**


**Figure 8 – BATC Screen-Shot of Don VK5ADM checking in via SKYPE from South Australia**

ATN video in **Fig 9** could be seen simultaneously on the ATN television network by RF and on VK3RTV via SKYPE. I also checked directly into KE6BXT by SKYPE (method-4 on the "many-ways-list"). I discovered this year that I could no longer do a SKYPE connection "screen share" with KE6BXT. That meant I could send a "video call" with KE6BXT but NOT a "shared screen". And…that meant I could not send the W6HHC DATV video received on my screen to Don….but I could send my web camera video from my notebook computer to Don and on to the QSO Party using method-4. More will be discussed about this new "SKYPE issue" a little later in the article.


**Figure 9 – BATC Screen-Shot of Don Hill KE6BXT at his controls during the VK3RTV QSO Party**

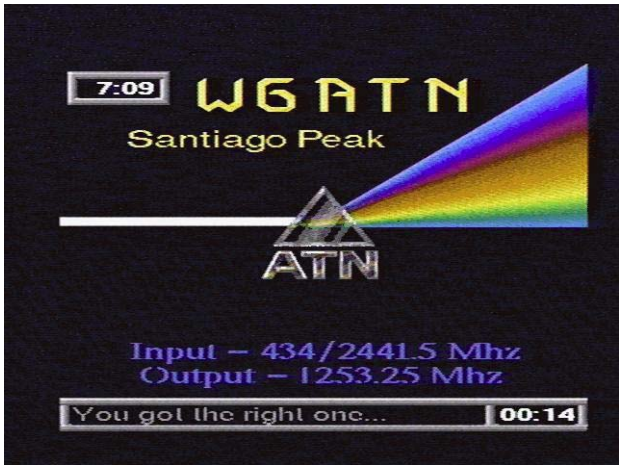



**Fig 10 – Typical W6ATN Repeater Test Pattern seen over the Internet**

**Solved some Problems – Found some Problems**
Last year I ran into some problems watching the BATC streaming that annoyed me.

**Problem-1 (solved)** I discovered last year that I could not use my iPAD to monitor the BATC streaming server. This is because BATC streaming uses ADOBE FLASH video and Apple will not allow FLASH video to be viewed on either the iPAD or the iPHONE because of security concerns. In the **TechTalk96** article, I reported that I had discovered an "APP" that is sold in the Apple iTunes Store that solves the BATC streaming problem on an iPAD. The "APP" product is called Photon Flash Web Browser This APP is a specialized web browser for an iPad or iPhone and sells for US$4.99 on the Apple iTunes Application Store. This APP can handle Flash streaming video, as well as interactive Flash games, as well as pre-recorded Flash video like often used on Facebook.

**Problem-2 (solved)** A second problem with the iPAD I had known about was the AUTOLOCK feature that was shutting the iPAD down every 15 minutes (or sooner). That is a terrible limitation for a streaming QSO party. A friend of mine had an AUTOLOCK setting available for "Never". But, the "Never" setting did not show up on my iPAD? A long search of the Apple Knowledge Database for iPAD did not yield any answers to the problem. Thank goodness for the "brick and mortar" Apple Stores!! The Apple "geniuses" at the nearby Apple Store sorted out that because my iPAD was used in a corporate environment using Microsoft Exchange Server…Exchange had invoked a security policy that had mandated a password be used for iPAD AUTOLOCK. By eliminating the Exchange set-up (temporarily for the QSO Party) on my iPAD, I could now remove the AUTOLOCK password and I now could see a "Never" timeout setting.

**Problem-3 (newly found and solved)** This year I discovered that Don KE6BXT had changed around his SKYPE set-up in his station to make some improvements. But, Don's new set-up (or updates by Skype) was preventing me from setting up my SKYPE in the "share screen mode". My "no cost SKYPE" was obtaining a message that I needed to upgrade in order to use the "share screen mode" with Don's SKYPE. That meant that I could only send my web-cam video to KE6BXT…not the video on my computer screen (such as received DATV video or a PowerPoint presentation). SKYPE does offer a SKYPE PREMIUM product that allows all parties to be sending shared-screen. The SKYPE PREMIUM is relatively cheap. You can use it for one day for US$5 or subscribe to it for one month for US$9. After the QSO Party I used a free trial offered by SKYPE PREMIUM and confirmed the upgrade provides a satisfactory solution with KE6BXT to this new problem. [NOTE – my SKYPE screen-sharing video always has worked well with VK3BFG.]

**Problem-4 (newly found)** During this QSO Party I discovered another new problem. My iPAD monitoring the BATC streaming using the Photon Flash Web Browser would drop out of FLASH streaming after about 6+ minutes. My "workaround" to prevent drop-out was to move the iPAD screen around a bit every 5 minutes to keep the "APP" in the FLASH mode. I suspect this is a Photon "APP" setting or a technical issue. I plan to get in touch with Photon technical support and see if I can find a better solution to the drop-out.

**Conclusion**
The second VK3RTV DATV QSO Party was great fun!! I got to meet (see) a lot of DATV and hams. Combining DATV and SKYPE and internet allows a widespread group of participants and watchers in a QSO party. I think this event was great promotion of DATV!! I think of the SKYPE function as an "amplifier", that is SKYPE and the internet allow RF video signals to go where they could not have reached before. Peter VK3BFG has a good philosophy to use "balance" during the VK3RTV QSO Parties. As Peter says "…The No 1 premise is to maximize the use of RF and amateur radio frequencies and minimize the use of the internet. We are amateur radio enthusiasts, using computers as tools when required." I want to thank both Peter Cossins VK3BFG and Don Hill KE6BXT for inviting me to participate and taking the time to allow me to test SKYPE before the QSO Party started. Also, a special thanks to all the folks at BATC who provide the BATC-streaming server.
… Ken Konechy W6HHC

**Interesting DATV Links**
- VK3RTV Digital Repeater WEB site – see **www.VK3RTV.com**
- W6ATN Amateur Television Network (ATN) – **see ATN-TV.org/**
- Amateur Radio Victoria organization – see **www.AmateurRadio.com.au/**
- British ATV Club - Digital Forum – see **www.BATC.org.UK/forum/**
- British ATV Club – select from about 35 streaming repeaters – see **www.BATC.TV/**
- German ATV portal for streaming repeaters and forum – see **www.D-ATV.net/**
- OCARC TechTalk95 article on first VK3RTV World-Wide QSO DATV/ATV Party in 2011 – see **www.W6ZE.org/DATV/**
- Orange County ARC newsletter entire series of DATV articles – see **www.W6ZE.org/DATV/**
- Yahoo Group for Digital ATV - see **groups.yahoo.com/group/DigitalATV/**

# EXPERIMENTS WITH HI-SPEED 420 MHZ WIRELESS NETWORKING

David Bern, W2LNX Montgomery College, Rockville, Maryland W2LNX @ arrl.net

*ED Note: This topic will be covered in depth by Dave at the Dayton Hamvention ATV forum next year.*

This paper reports on our testing the Doodle Labs DL435-30 and Xagyl Communications XC420M wireless networking miniPCI cards. They behave like IEEE 802.11 wireless networking cards but operate in the 420 MHz band. We have successfully tested these cards over 10 miles at about three Mbit/s data rate at a 5 MHz bandwidth in the 420 to 426 MHz ATV sub-band. Our test applications were a Webcam video streaming program and a file download server program that ran on inexpensive Netbook computers.

**Introduction**

At the 2011 Digital Communications Conference, Charles, G4GUO and Ken, W6HHC presented their DATVexpress project [Brain 2011] as a less expensive hardware and software solution for digital amateur television (DATV) in the 1.2 GHz band. It made me wonder: would it not be simpler to focus on creating a high-speed network and use a Webcam on a personal computer to stream video to another personal computer? Can a DATV system be assembled using only purchased commercial off the shelf components (COTS) and not have to design any custom hardware and software?

At the beginning of this year, I mentioned this problem to Chris, KB3CS, a fellow member of the Montgomery Amateur Radio Club (MARC), Rockville, Maryland, and he suggested that I take a look at the Doodle Labs 420 MHz high-speed data radios for amateur radio [Doodle]. Doing a Google search on "Doodle Labs", I found a blog entry by Steve, KB9MWR about these data cards [KB9MWR 1]. In it, he references a short video by Kyle, N0KEW where he demonstrated a speed test using these radio cards [N0KEW]. Then, I found a detailed description by Joseph, N9ZIA on how to use a DL435-30 in a Ubiquiti RouterStation Pro with its DD-WRT firmware [N9ZIA]. Clearly other hams were starting to experiment with the Doodle Labs cards and DD-WRT [DD-WRT] and this prompted me to order some cards from Singapore.

**Learning to use the Ubiquiti RouterStation Pro router boards**

While waiting for the DL435-30 cards to arrive, I ordered some Ubiquiti RouterStation Pro router boards [RS Pro], MMCX male to N female connector pigtails [pigtail] for the cards, and several Wistron CM9 Wi-Fi miniPCI cards from mini-box.com [Wistron] and from eBay. The RouterStation Pro boards were reflashed with their DD-WRT firmware using TFTP [reflash] and the Wistron Wi-Fi cards were temporarily installed with Wi-Fi antennas. Now, I was ready to learn DD-WRT. In theory, the DL435-30 and the XC420M cards are drop-in replacements for the Wistron 2.4 GHz Wi-Fi cards. As Daniel Lajeunesse of Xagyl Communications explained to me, these cards are designed with the Qualcomm Atheros AR5414A chipset followed by a transverter stage from 2.4 GHz to the 420 MHz band. My first exercise was configure a RouterStation Pro router as a Wi-Fi client in Client Wireless Mode [client] so it can access our household Wi-Fi access point. The second exercise was to configure another RouterStation Pro router as a Wi-Fi access point in AP Wireless Mode [AP] with its own SSID so it can be found and accessed by my laptop. That done, the client router was now able to connect to the access point router.

**Learning to use the Doodle Labs wireless networking cards**

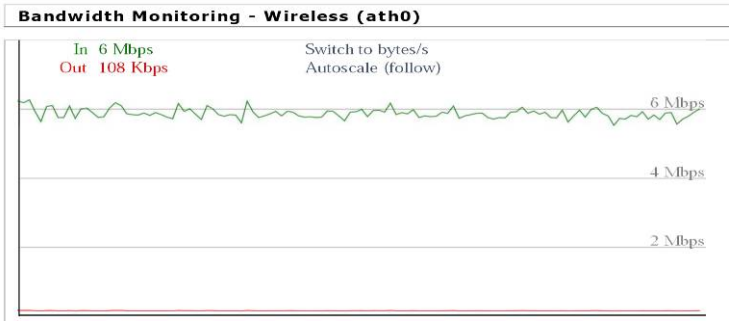
When the Doodle Labs DL435-30 cards arrived, I built two quarter wave antennas cut to 422.5 MHz; an antenna pigtail and a large tuna fish can was used as the ground plane and base. The SWR of the antennas were trimmed with my MFJ-269 antenna analyzer to be less than 1.5:1 [W2LNX]. Then, I replaced the Wistron cards with the Doodle Labs cards in both router boards and attached the MMCX antenna pigtails to them. On the access point router DD-WRT Wireless Physical Interface ath0 page, the Wireless Channel was set to 1 - 2412 MHz that actually set it to 422.5 MHz, the Channel Width was set to Quarter (5 MHz) and The Wireless Network Name (SSID) was set to BOARnet1. Also, Security Mode was set to Disabled on the Wireless Security ath0 page. On the bottom of the client router DD-WRT Wireless page under Access Point, the access point router board appeared. Both router boards needed to be set to the same SSID. Clicking on Site Survey button on the bottom popped up a Neighbor's Wireless Networks page showing the BOARnet SSID. Then, clicking on its Join button set the client router to have this SSID.

**Learning to use the Xagyl Communications wireless networking cards**

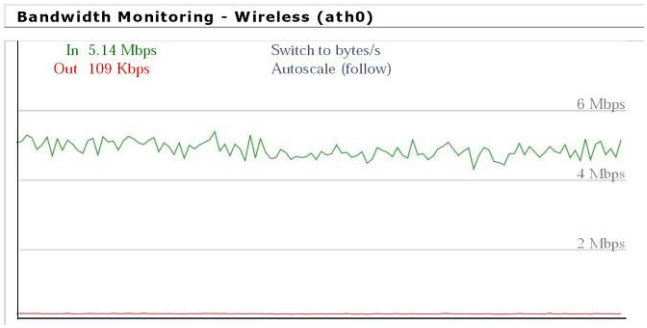
In March, I was alerted by Steve that Xagyl Communications was shipping their of 420 MHz XC420M miniPCI cards [KB9MWR 2]. In April, I replaced the Doodle Labs cards on the router boards with the Xagyl cards [Xagyl] when I received them. The only change required for the Xagyl cards was setting the frequency in the access point router to Wireless Channel 2 - 2417 MHz that set it to the same frequency of the Doodle Labs cards.

**Test applications**

The test applications were the hfs file download server [hfs] and the Yawcam Webcam program [Yawcam] that I learned about in a recent QST article [microscope]. Yawcam has a built-in Web server that streams video from a Webcam and I needed a video application since I am testing in the 420 to 426 MHz ATV sub-band [band plan]. For testing purposes, a built-in Webcam in a Netbook computer is sufficient. For better video quality, I purchased a pair of Logitech Webcams [Webcam] as mentioned in the QST article. A file download at 20 feet apart from one room to another ran at about 6 Mbit/s for the Doodle Labs cards – see screenshot 1 – and about 5 Mbit/s for the Xagyl cards – see screenshot 2.




screenshot 1: Doodle Labs XC420M cards 20 feet apart




screenshot 2: Xagyl Communications XC420M cards 20 feet apart

**Assembling the stations**

The access point and client router boards were each put into a lightweight metal cookie box [tin box] mounted with metal standoffs [standoff]. The plastic windows of the lids were replaced with aluminum window screening to provide shielding and ventilation. A female N connector pigtail [pigtail] and a ¾ inch PVC pipe adapter for passing through an Ethernet cable were mounted at each end of both boxes. The Ethernet cable, in addition to being connected to the WAN port, also provides power with a power-over-Ethernet power supply [POE 48]. For testing purposes, the quarter wave antennas were attached to the boxes – see photo 3.


photo 3: router with quarter wave antenna and stand

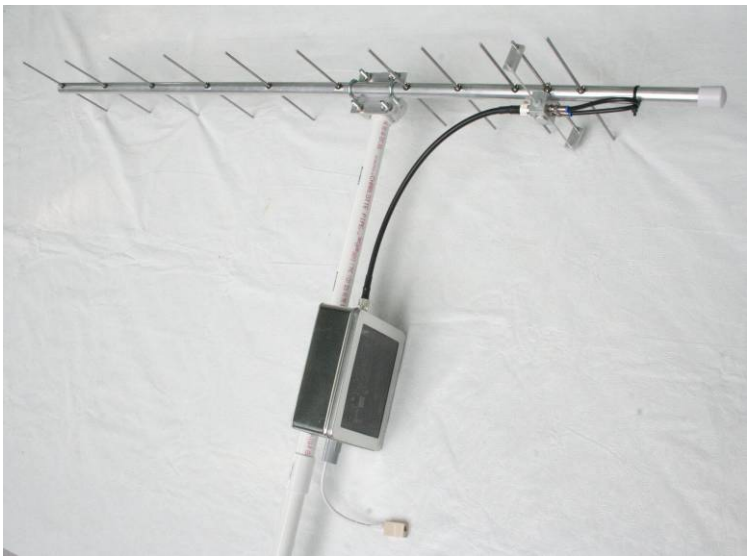


photo 4: $M^2$ 420 MHz Yagi antenna with router

Both routers were configured to allow remote Web page access to the routers via the WAN port. This allows LAN and WAN access over the same Ethernet port. Next, the router boxes were attached to two foot pieces of one inch PVC pipe with cable ties. Thick pieces of Styrofoam board on the back of the boxes prevented them from slipping on their pipes. 11 element 420 MHz M2 Yagi antennas [M2 Yagi] were attached to the PVC pipes with PVC pipe T joints. The routers and the antennas were connected with custom made 18 inch LMR-400 coax cables [The RFC]. The routers needed to be connected close to their antennas since the output power of their cards is about half a watt. These assemblies easily fitted on top of an eight foot painter's poles – see photo 4.

**Range testing in Shenandoah Valley**

The Doodle Labs and Xagyl Communications cards work well from one room to another room in my house and around the neighborhood within a mile of my house. But the real question remained: how well do these data radios work over long distances? The acceptance test I chose was to have at least one Mbit/s data rate over at least a 10 mile distance. I wanted to find two locations that have easy driving access, are within line of sight of each other and are a little more than 10 miles apart.

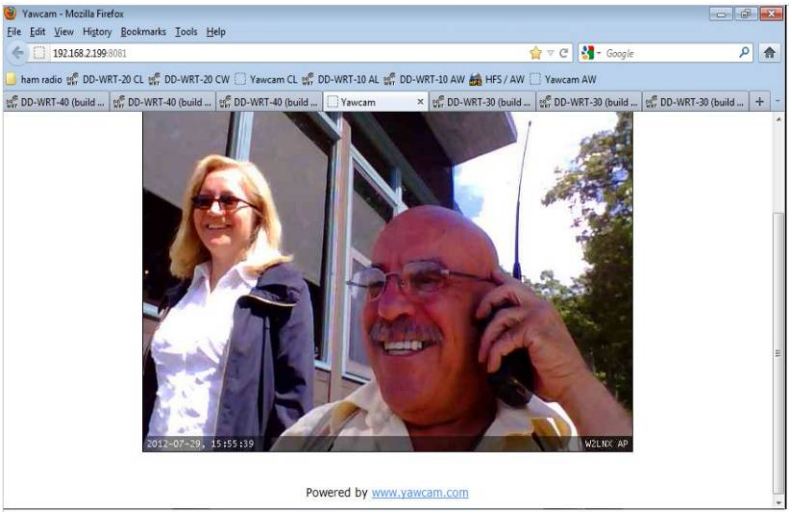
The July 2005 QST article by David, KD9LA [KD9LA] suggested that Shenandoah Valley is a good place to do a 10 mile range test. Using Google Earth [Earth], the first location I found was the patio next to the Skyland Resort Pollock restaurant in the Shenandoah National Park at an elevation of about 3,650 feet. The other location I found was the parking lot of Sonny's Place restaurant at an elevation of about 1500 feet on US Route 211 about 13 miles away on the other side of Luray, Virginia – see screenshot 5.

screenshot 5: Skyland to Sonny's Place and to the top of the ridge

In early July, Aleks, KB3YHT, and I drove to the Skyland location and we set the client router with a Xagyl card and the M2 Yagi antenna on top of an eight foot painter's pole secured with a heavy patio umbrella base. On the patio, the antenna was oriented in a northwest direction towards Sonny's Place. Similarly, at Sonny's Place parking lot I set up the access point router with a Xagyl card. As soon as my Web browser accessed the router Wireless page, I saw the client router immediately appear in the Clients list with a signal quality of about 35%. On the Bandwidth page, it showed a data rate of 2.5 Mbit/s from a file download running at about 300 Kbyte/s from hfs while Yawcam was also running at several frames per second.

At the end of July,  Aleks, KB3YHT, Vic, WB2U, William, W3QX and I went back to the Skyland patio to duplicate the previous test but with the Doodle Labs cards. While, Aleks and Vic were waiting on the patio – see photo 6, William and I drove to where US 211 crosses over the Massanutten Mountain at about 1800 feet which is a little further and higher than Sonny's Place – see screenshot 5. We obtained similar results of signal quality of about 35%, a data rate of 4.5 Mbit/s from a file download running at about 400 Kbyte/s from hfs while Yawcam also was running at several frames per second – see screenshot 7. Note that the Doodle Labs and Xagyl cards are not compatible since they cannot communicate with each other.


photo 6: Aleks and Vic on the Skyland patio



screenshot 7: Aleks and Vic on Yawcam

We are planning to duplicate the 2.4 GHz range tests originally done by Jason, N4DSL and his fellow hams [KD9LA] on 420 MHz from Reddish Knob in the George Washington National Forest to the Two Mile Overlook 34 miles away and the Hogsback Overlook 56 miles away both on the Skyline Drive in Shenandoah National Park. We expect to be successful with these tests with an array of a pair of 420 MHz Yagi antennas. Even though the array has less gain than a 2.4 GHz parabolic grill antenna, this loss of gain is offset by a smaller

path loss on 420 MHz [path loss]. We want to accomplish these tests in time to report our results to the 2012 Digital Communications Conference [DCC] in Atlanta, Georgia.

**Conclusions and recommendations**
We can confidently claim that the Doodle Labs DL435-30 and the Xagyl Communications XC420M wireless networking cards on 420 MHz work as advertised. They have comparable performance since they easily passed our acceptance test of one Mbit/s data rate over a 10 mile distance. The Doodle Labs cards appear to have a faster data rate, but in North America, the Xagyl cards are more conveniently available since they are shipped from a U. S. address or a Canadian address and they were 35 percent less expensive than the Doodle Labs cards at time of purchase.

We have demonstrated that it is possible to assemble a long distance high-speed data link on 420 MHz with only purchased available components. The only construction required was to make quarter wave antennas and to drill holes in lightweight metal boxes.

**Continuing work**
Much work still needs to be done on this project. In the short term we want to:

- Create a network of three routers. A router board would be configured as a wireless networking bridge with an omni-directional antenna or with two Yagi antennas pointing in opposite directions. It would allow us to extend the range of a link between an access point router and a client router.

- Evaluate the Avila GW2348-4 [Avila] and the ALIX alix2d13 [ALIX] router boards. These boards have been purchased since they can run DD-WRT and are currently being sold by their manufacturers. The Ubiquiti RouterStation Pro router boards can run DD-WRT but have been discontinued.

- Test the x86 version of DD-WRT on an Intel Atom motherboard using a PCI to miniPCI adapter to determine if an inexpensive low-power consuming motherboard running DD-WRT or a more generic Linux distribution can be an effective router.

- Internetwork with distant ordinary 2.4 GHz Wi-Fi wireless local area networks or distant ad-hoc 2.4 GHz mesh networks running mesh software such as HSMM-MESH™ [HSMM-MESH].

- Determine if bi-directional linear broadband amplifiers (BDA) for the 420 to 432 MHz range are needed.

A long term goal of this project is to improve our county's public safety backup communications. We are planning tests to determine the feasibility of a self-contained wide area high-speed wireless network for our county's existing data infrastructure.

The dream of creating a national ham radio high-speed data network is alive and, more importantly, this technology can enable building this network. We will continue to report the progress of this project in the TAPR PSR online magazine [PSR].

I would like to hear from others who are experimenting with high-speed wireless networking on 420 MHz. DD-WRT access point router and client router configuration files and information on how to configure a computer connected to its router are available. Please email requests, questions, ideas, suggestions and to W2LNX @ arrl.net.
…David Bern, W2LNX Potomac, Maryland, USA July 31, 2012

# A T C O

***2012 FALL EVENT***

12:30 PM Lunch/meeting

Sunday October 28, 2012

ABB PROCESS AUTOMATION

CAFETERIA

579 EXECUTIVE CAMPUS DRIVE

FOR MORE DETAILS, CONTACT

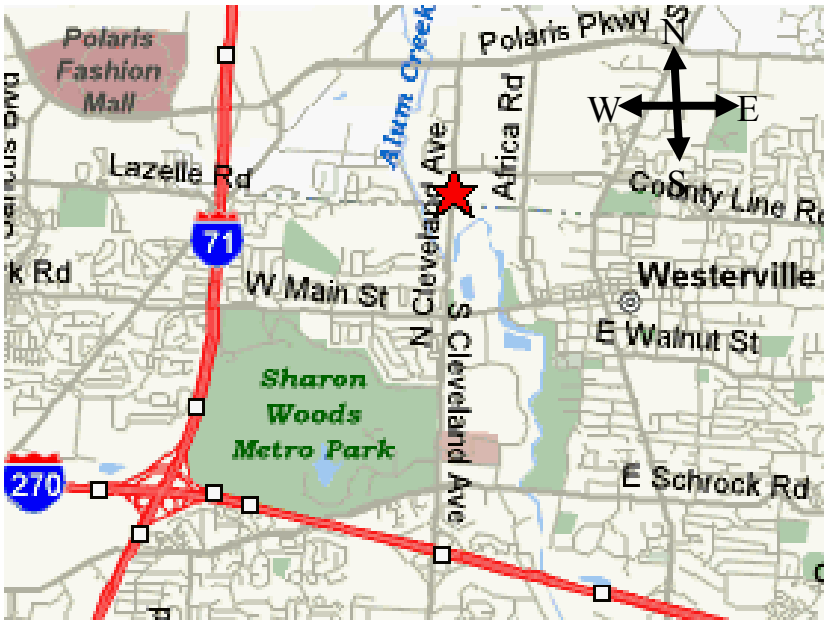
ART - WA8RMC 891-9273

LUNCH PROVIDED - DOOR PRIZES -

BRING A FRIEND AND SEE OLD BUDDIES

MINIHAMFEST - SHOW AND TELL

**DIRECTIONS TO THE ATCO FALL 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.

# 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) Mod. 850 To 1260 MHz |
| Vol 26 II | 5,6 | Comtech 1200 MHz rec. 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 II | 10 | ATV Low Pass Filter (427 Mhz) |
| Vol 27 II | 15 | PictureTel Camera Data Cable Wiring |
| Vol 27 III | | No articles |
| Vol 27 IIII | | No articles |
| Vol 28 I | 11 | Super 1280 MHz amplifier |
| Vol 28 II | | No articles |
| Vol 28 III | | No articles |
| Vol 28 IIII | | WB8LGA Antenna switching system |
| Vol 29 I | | No articles |
| Vol 29 II | | 1280 MHz Hi Gain Panel Antenna |
| Vol 29 III | | No articles |
| Vol 29 IIII | | No articles |
| | | |

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 numbers shown in the PDF file. Some early issues are missing. Art did not have a copy of every year. This list is complete through Volume 29 IIII.
…Bob N8OCQ

# 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 them with information. New members are our group's lifeblood so it's important we aggressively recruit new faces.

WB2IIR Mike Anthony Westerville, Ohio

…WA8RMC

# 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. To see additional details for each Hamfest, Control Click on the blue title and the magic of the Internet will give you the details complete with a map! To search the ARRL Hamfest database for more details, CTL click ARRLWeb: Hamfest and Convention Calendar .
…WA8RMC.

## 10/28/2012 | Massillon Hamfest

**Location:** Massillon, OH
**Type:** ARRL Hamfest
**Sponsor:** Massillon Amateur Radio Club
**Website:** http://www.w8np.org

## 11/17/2012 | Indiana State Convention (Fort Wayne Hamfest & Computer Expo)

**Location:** Fort Wayne, IN
**Type:** ARRL Convention
**Sponsor:** Allen County Amateur Radio Technical Society
**Website:** http://www.fortwaynehamfest.com

## 11/03/2012 | Grant ARC's Hamfest

**Location:** Georgetown, OH
**Type:** ARRL Hamfest
**Sponsor:** Grant Amateur Radio Club
**Website:** http://garcohio.net

## 01/20/2013 | SCARF's 17th Annual Hamfest

**Location:** Nelsonville , OH
**Type:** ARRL Hamfest
**Sponsor:** Sunday Creek Amateur Radio Federation

## 02/03/2013 | Winter Hamfest at NEW LOCATION!

**Location:** Elyria, OH
**Type:** ARRL Hamfest
**Sponsor:** Northern Ohio Amateur Radio Society
**Website:** http://www.NOARS.net

## 02/17/2013 | Mansfield Mid Winter Hamfest

**Location:** Mansfield, OH
**Type:** ARRL Hamfest
**Sponsor:** InterCity Amateur Radio Club
**Website:** http://www.w8we.org

# INTERNET ATV HOME PAGES (list verified 01/21/12)

**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 N2SMT/R repeater |
| http://www.ipass.net/~teara/menu3.html | North Carolina, Triangle Radio Club (TEARA) |
| http://www.oregonatv.org | Oregon, Portland OATVA ATV Association W7AMQ/R repeater |
| **htt**p://members.bellatlantic.net/~theojkat/ | Pennsylvania, Phila. Area ATV W3PHL repeater |
| http://www.hotarc.org/atv.html | Texas, WACO Amateur TV Society (WATS) |
| www.qsl.net/ww7ats | Washington, Western Washington Television Soc. (WWATS) |
| http://www.shopstop.net/bats/ | Wisconsin, Badgerland Amateur Television Society (BATS) |
| http://www.kcatvg.org | Kansas, Kansas City ATV Group WR0ATV repeater (KCATVG) |
| | |

**Foreign homepages**

| | |
|---|---|
| http://atv.hamradio.si | Slovenia ATV |
| http://www.batc.tv. | British ATV club (BATC) |
| http://www.**batc.org.uk/cq-tv** | British ATV Club and CQ-TV Magazine |
| | |

**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 |
| http://www.icircuits.com/store/index.html | Intuitive Circuits ATV products |
| http://www.atvresearch.com/ | ATV Research Co, cameras & related security products |
| http://www.downeastmicrowave.com/ | Down East Microwave, UHF/Microwave parts |
| http://www.directivesystems.com/ | Directive Systems, UHF/VHF/Microwave antennas |
| http://www.m2inc.com/ | M2 Antenna Systems |
| http://www.hamtv.com/ | PC Electronics, ATV equipment |
| | |

# 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 followed by late checkin requests or comments. We rarely chat for more than an hour so please join us if you can.

# ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (7/20/12)..... $ 2043.48
RECEIPTS(dues)..... $ 60.00
Paypal fee..... $ (2.05)
CLOSING BALANCE (10/20/12)..... $2101.43

# 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 VSB AM mod, 1258 MHz FM mod, 1268 MHz QPSK digital, 2433 MHz FM mod, and 10.350 GHz FM mod.
(multipole filters in output lines of all transmitters)
Output Power - 427.25 MHz: 50 watts average 100 watts sync tip
1258 MHz: 40 watts continuous (Analog ATV)
1268 MHz 20 watts continuous DVB-S (QPSK) DATV SR=3.125Msps, FEC=3/4 , 2 video channels.
(PMT PID:32, Video PID:162, Teletext PID:304, PCR PID:133, Audio PID:88, Service ID:5004)
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, 10.350 GHz transmitters video identify every 15 min. with ATCO & WR8ATV on 6 different screens.
1268 MHz digital & 10.350 GHz analog - 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: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
439.250 MHz - A5 NTSC video with FM subcarrier audio, lower sideband. (Input here = output on all TV transmitters)
449.975 MHz - F1 audio input aux touch tone control. 131.8 Hz PL tone. (Input here = output on 446.350).
1280.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1280.00 MHz - DVB-S (QPSK) digital SR=4.167Msps, FEC=7/8, PCR PID:33, Video PID:33, Audio PID:49
This input feeds all transmitters and also directly to 1268 MHz digital output channel 2. Therefore, 1280 DATV input and 439 or 2398 can be ON at the same time. (Input here = output on all TV transmitters)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
10.45 GHz - F5 video analog NTSC (not installed)

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (also used for 446.350 MHz link output)
439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west
1280.00 MHz - Diamond vertically polarized 12 dBd gain omni
2398.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.45 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni (not installed)

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 transmitters 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 Select 1280 digital receiver
00* then 3 for Ch. 3 Select 1280 analog receiver
00* then 4 for Ch. 4 Select 2398 receiver
00* then 5 for Ch. 5 Select video ID (6 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 1280 MHz digital receiver scan enable |
| 03* or 03# | Channel 3 1280 MHz analog receiver 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# | Manual mode select of 1280 digital receiver audio |
| A3* or A3# | Manual mode select of 1280 analog 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# | C1* to disable 427 MHz transmitter, C1# to enable it |
| C2* or C2# | C2* to disable 1268 MHz digital transmitter, C2# to enable it |

# ATCO MEMBERS as of October 2012

| Call | Name | Address | City | St | Zip | Phone |
|---|---|---|---|---|---|---|
| KD8ACU | Robert Vieth | 3180 North Star Rd | Upper Arlington | OH | 43221 | 614-457-9511 |
| KC3AM | Dave Stepnowski | 735 W Birchtree Ln | Claymont | DE | 19703 | |
| AH2AR | Dave Pelaez | 1348 Leaf Tree Lane | Vandalia | OH | 45377 | |
| W8ARE | Larry Meredith III | 6070 Langton Circle | Westerville | OH | 43082-8964 | |
| KC8ASF | Tom Pallone | 3437 Dresden St. | Columbus | OH | 43224 | 614-268-4873 |
| WB4ATV | Don Coy | 489 Crystal Lake Drive | Melbourn | FL | 32940 | |
| NN8B | Don Kemp | 6384 Camp Blvd. | Hanoverton | OH | 44423 | |
| KC8BTX | Dudley Field | 357 N. Ridge Heights Dr | Howard | OH | 43028 | |
| W6CDR | Wynn Rollert | 1141 Pursell Ave | Dayton | OH | 45420 | 937-256-1772 |
| WB8CJW | Dale Elshoff | 8904 Winoak Pl | Powell | OH | 43065 | 614-210-0551 |
| N8COO | C Mark Cring | 3941 Three Rivers Lane | Groveport | OH | 43125 | 614-836-2521 |
| N8CXI | Garry Cotter | 2367 Northglen Drive | Columbus | OH | 43224 | |
| N9CX | Bill Erwin | 231 Gateside Ct. | Gahanna | OH | 43230 | |
| WB8CXO | Mike Young | 289 Gayloard Dr | Munroe Falls | OH | 44262 | |
| N8CZO | Mike Flaharty | 1025 Josiah Morris Road | London | OH | 43140 | |
| N3DC | William Thompson | 6327 Kilmer St | Cheverly | MD | 20785 | |
| WA8DNI | John Busic | 2700 Bixby Road | Groveport | OH | 43125 | 614-491-8198 |
| K8DMR | Ron Fredricks | 8900 Stonepoint Ct | Jennison | MI | 49428-8641 | |
| K8DW | Dave Wagner | 2045 Maginnis Rd | Oregon | OH | 42616 | 419-691-1625 |
| WB8DZW | Roger McEldowney | 5420 Madison St | Hilliard | OH | 43026 | 614-876-6033 |
| KC8EVR | Lester Broadie | 108 N Burgess | Columbus | OH | 43204 | |
| WA8FLY | Rod Shaner | 16012 London Rd. | Orient | OH | 43146 | 740-279-3614 |
| N8FRT | Tom Flanagan | 1751 N Eastfield Dr. | Columbus | OH | 43223 | |
| W8FTX | George Biundo | 3675 Inverary Drive | Columbus | OH | 43228 | 614-274-7261 |
| WB2FVE | Craig Blaine | 1195 Hooverview Drive | Westerville | OH | 43082 | 614-891-5378 |
| W8FZ | Fred Stutske | 8737 Ashford Lane | Pickerington | OH | 43147 | |
| KB8GHW | Mike Amirault | 5560 Refugee Rd. | Baltimore | OH | 43105 | 614-859-7005 |
| WA8HFK,KC8HIP | Frank & Pat Amore | 3630 Dayspring Dr | Hilliard | OH | 43026 | 614-777-4621 |
| W4HTB | Henry Cantrell | 905 Wrenwood Dr. | Bowling Green | KY | 42103 | 270-781-9624 |
| WG8I | Chris Vojsak Sr, | 3536 W Henderson Rd | Columbus | OH | 43220-2232 | 614-203-6000 |
| WB2IIR | Michael Anthony | 370 Georgia Drive | Brick | NJ | 08723 | |
| N8IJ | Dick Knowles | 1799 Homeward Ave | Lima | OH | 45805 | |
| W8KHP | Allan Vinegar | 2043 Treetop Lane | Hebron | Ky | 41048 | |
| WA8KQQ | Dale Waymire | 225 Riffle Ave | Greenville | OH | 45331 | 937-548-2492 |
| N8LRG | Phillip Humphries | 3226 Deerpath Drive | Grove City | OH | 43123 | 614-871-0751 |
| WB8LGA | Charles Beener | 2540 State Route 61 | Marengo | OH | 43334 | |
| KA8LWR | Mel Alberty | 1645 Olentangy Road | Bucyrus | OH | 44820 | 419-468-2971 |
| W8MA | Phil Morrison | 154 Llewellyn Ave | Westerville | OH | 43081 | |
| KA8MFD | Ross McCoy | 227 S Boundary St PO Box 9 | Edison | OH | 43320 | |
| KA8MID | Bill Dean | 2630 Green Ridge Rd | Peebles | OH | 45660 | |
| W0MNE | Mike Doty | 4300 Winchester Southern Rd | Circleville | OH | 43113 | 740-420-9060 |
| N8NT | Bob Tournoux | 3569 Oarlock Ct | Hilliard | OH | 43026 | 614-876-2127 |
| WU8O | Tom Walter | 15704 St Rt 161 West | Plain City | OH | 43064 | 614-733-0722 |
| N8OCQ | Bob Hodge Sr. | 3750 Dort Place | Columbus | OH | 43227-2022 | |
| KB8OFF | Jess Nicely | 742 Carlisle Ave | Dayton | OH | 45410 | |
| W6ORG,WB6YSS | Tom, Maryann O'Hara | 2522 Paxson Lane | Arcadia | CA | 91007-8537 | 626-447-4565 |
| KE8PN | James Easley | 1507 Michigan Ave | Columbus | OH | 43201 | 614-421-1492 |
| W8PU | Gary Poland | 3347 S.R. 28 | Midland | OH | 45148 | |
| W3RCJ | Thomas Farrell | 1912 Burnwood Road | Baltimore | MD | 21239 | |
| WA6RCW | Ed Mersich | 34401 Columbine Trl W | Elizabeth | CO | 80107-7866 | |
| WA8RMC | Art Towslee | 438 Maplebrooke Dr W | Westerville | OH | 43082 | 614-891-9273 |
| W8RRF | Paul Zangmeister | 10365 Salem Church Rd | Canal Winchester | OH | 43110 | |
| W8RRJ | John Hull | 580 E. Walnut St. | Westerville | OH | 43081 | 614-882-6527 |
| W8RUT,N8KCB | Ken & Chris Morris | 2895 Sunbury Rd | Galina | OH | 43021 | |
| W8RVH | Richard Goode | 9391 Ballentine Rd | New Carlisle | OH | 45334 | 937-964-1185 |
| W8RQI | Ray Zeh | 2263 Heysler Rd | Toledo | OH | 43617 | |
| KB8RVI | David Jenkins | 1941 Red Forest Lane | Galloway | OH | 43119 | 614-878-0575 |
| W8RWR | Bob Rector | 135 S. Algonquin Ave | Columbus | OH | 43204-1904 | 614-276-1689 |
| W8RXX,KA8IWB | John & Laura Perone | 3477 Africa Road | Galena | OH | 43021 | 614-579-0522 |
| W8SJQ | Rocky Eramo | 795 Riverbend Ave | Powell | OH | 43065 | 614-207-2740 |
| W8SJV, KA8LTG | John & Linda Beal | 5001 State Rt. 37 East | Delaware | OH | 43015 | 740-369-5856 |
| KB8SSH | Mike Cotts | 3424 Homecroft Dr | Columbus | OH | 43224 | 614-371-7380 |
| W3SST | John Shaffer | 6706 Gilette Dr | Reynoldsburg | OH | 43068 | 614-751-0029 |
| W8TIP | Gene Hawkins | 1720 Liberty Street | Toledo | OH | 43605 | |
| K8TPY, K8FRB | Jeff & Dianna Patton | 3886 Agler Road | Columbus | OH | 43219 | |
| NR8TV | Dave Kibler | 243 Dwyer Rd | Greenfield | OH | 45123 | 937-981-1392 |
| W8URI | William Heiden | 5898 Township Rd #103 | Mount Gilead | OH | 43338 | 419-947-1121 |
| KB8UWI | Milton McFarland | 115 N. Walnut St. | New Castle | PA | 16101 | |
| WA8UZP | James R. Reed | 818 Northwest Blvd | Columbus | OH | 43212 | 614-297-1328 |
| KB8WBK | David Hunter | 45 Sheppard Dr | Pataskala | OH | 43062 | 740-927-3883 |
| KC8WRI | Tom Bloomer | PO Box 595 | Grove City | OH | 43123 | |
| AA8XA | Stan Diggs | 2825 Southridge Dr | Columbus | OH | 43224-3011 | |
| N8XYJ | Dan Baughman | 4269 Hanging Rock Ct. | Gahanna | OH | 43230 | |
| KB8YMQ | Jay Caldwell | 4740 Timmons Dr | Plain City | OH | 43064 | |
| KC8YPD | Joe Ebright | 3497 Ontario St | Columbus | OH | 43224 | |

| Call | Name | Address | City | St | Zip | Phone |
|---|---|---|---|---|---|---|
| N8YZ | DaveTkach | 2063 Torchwood Loop S | Columbus | OH | 43229 | 614-882-0771 |
| W8ZCF | Ferrel Winder | 6686 Hitching Post Ln. | Cincinnati | OH | 45230 | |
| K3ZKO | Ron Cohen | 915 Rowland Ave | Cheltenham | PA | 19012 | 215-828-1263 |
| KA8ZNY,N8OOY | Tom & Cheryl Taft | 386 Cherry Street | Groveport | OH | 43125 | 614-202-9042 |

# 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. All Newsletters are sent via Email unless the member does not have an internet connection.

The membership period is from January 1ST to December 31ST. New members joining before August 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. For those joining after August 1ST, they can elect to receive a complementary October issue with the membership commencing the following year or get the previous (3) Newsletters. Your support of ATCO is welcomed and encouraged.

Membership expiration notices will be sent out in January in lieu of Newsletters for those with an expired membership.

**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: Mark Cring N8COO
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Dale Elshoff WB8CJW
Statutory agent: Tom Bloomer KC8WRI
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 ATCO dues" section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. Credit card 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
438 Maplebrooke Dr. W
Westerville, Ohio 43082

**FIRST CLASS MAIL**

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