ATCO NEWSLETTER

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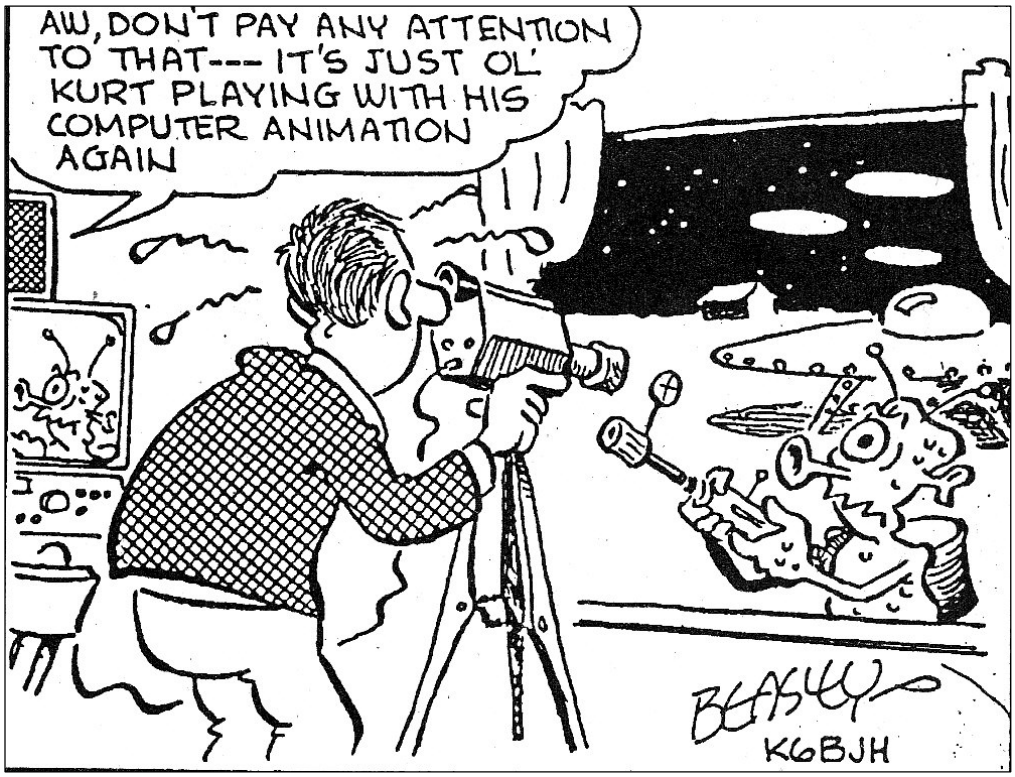
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" and is published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Thanks to Beasley, K6BJH (SK) and ATVQ Magazine for allowing us to share his cartoons. For the complete book on "The Best of Beasley" go to the ATVQ Magazine web site (http://atvquarterly.com/) available for purchase.



ACTIVITIES ... from my Workbench

Well, what shall I say this time? I'm sure you're tired of hearing me talk about the weather, lack of antenna work, unfinished home projects, yet-to-be-started projects or any other non-Ham related subject matter so let's go directly to relevant subject matter. One problem though,…there isn't a lot of Ham related material to talk about. Maybe it's just me but I'm getting the feeling ATV is becoming boring. If so, why is this? I hear some say that they're too busy with other things or the environment is becoming too complex to be able to focus on the "simple things" in life like ATV. If it's true, that's sad but if we just put down that I-phone/I-Pad for a little while and take a deep breath, things will automatically get better. I'm hoping that those of you that haven't checked into the Net recently will be feeling a little guilty by now. OK, now I feel a little better!

Honestly, I'm seeing less and less participation with our weekly Tuesday night nets. Is it me or are you guys just seeing the same old stuff and looking for something new? If it's for the want of something new, isn't the fact that ATV is changing to digital new enough? Oh yes, digital is "too complicated and expensive"! Well, it doesn't have to be either one of those. Digital reception is easy and inexpensive because you can find DVB-S receivers ready to go at Hamfests or on-line for $25 or less. The transmit part is a little harder but HiDes makes DVB-T transmit dongles for around $100 and DownEastMicrowave makes amplifiers for the dongle to get about 2 to 4 watts of signal on the air. That's plenty for local use. If you need help, just ask. There are a number of us that can assist, myself included.

Now to the "workbench" stuff. The repeater DVB-S receiver recently "sucked in some bad RF" it seems, prompting a trip there. Since the bulletin board quit working it was assumed that the entire 1258/1268 input was down (They're connected to a common antenna) so as usual, everyone envisioned the worst possible scenario that it had to be a bad antenna. (I'm NOT going to replace an antenna this time of year). A test showed the preamp and filters to be OK. Then I looked at the analog input which seemed OK too because Dale's digital signal produced a strong meter indication on it. (Whew, the antenna is OK). Next, I looked at the digital DVB-S receiver. It was "locked up" for an unknown reason. Simply selecting the channel up then down button restored normal operation. Well, I should have looked there first knowing similar problems with that receiver! That's the quirky thing about digital equipment. They are not designed robust enough!!!!!! Many times when they get a bad signal or one that contains noise, they lock up. Hopefully the situation will improve in the future. But, to their credit, we are using the Satellite receivers outside their intended design parameters. (How dare those receiver designers not think of the Ham uses!)

A simple switch change fixed the receiver problem this time but now I see a valid reset capability need for **all** of the installed repeater equipment. I'll see what I can do about that. I'll just use one of "Roger's power strips" to add a DTMF controlled relay to each of the 8 outlets. That way we will be able to toggle on or off the AC power to each device remotely. We already have that on the DVB-T transmitter and receiver but the rest should be controllable too. That project will be next in line.

Also on the agenda is the repair of both 70cm slot antennas. They've been in operation since about 1994 and really need a retrofit. The plastic radomes on both have totally come off now exposing the slots and feedpoints to the weather elements. I bring the subject up now but work cannot be done until warmer weather so I'm looking for volunteers to help. It is NOT a one man project. If left up to me alone, it will never get done so will someone that doesn't fear heights, please step forward and help out?

Last point. I see some people have not paid dues for 2015. Help the club, chip in to bolster our treasury and provide food for the Spring and Fall events. We need 2016 dues. Log onto the ATCO web page at WWW.ATCO.TV and update your profile. NOTE: I see what seems to be possible errors in the membership expiration date listings. This is a serious matter with me and want to make it right so please check it out and let me or Bob know if you suspect issues. If you haven't done that in a couple of years, you may have to log in as a new user. The username should be first name initial then last name. The default password is **NetNite.439**. For existing usernames the password may not be correct so if you can't figure it out, contact me or N8NT. Bob can reset your password. Then select PayPal to pay dues or send a check directly to Bob.
73,
WA8RMC

ATCO FALL EVENT

Well, it's Fall Event time again. I was pleasantly surprised with the turnout and group participation. Although the person count was not as high as hoped, it was better than Spring Event. Last time we had about 18 people and this time I counted 22. I truly believe it was due to W8DMR, Bill Parker's presentation. Bill always has something good to talk about and this was no exception. Bill diverted a bit from a normal ATV topic and discussed instead how LED flashlights/batteries actually work.

Quite noticeable to me was the fact that after we passed out the door prizes, most stayed around to rag chew instead of bolting to the exit door. Also, we took a group picture this time rather than independent photos.

Bill is doing what he does best by talking in group fashion surrounding himself with the audience.

Here he's passing out a demonstration LED flashlight to Joe, KC8YPD as a consolation prize.

Secretary notes from the ATCO 2015 Fall Event – November 1, 2015

Art, WA8RMC, started off around noon by welcoming everyone to the meeting and inviting all to eat lunch, which was thoughtfully picked up by Art and his wife. The food, as usual, was excellent. This event was marked by an excellent presentation by Bill Parker, W8DMR, who spoke about "gravity-less" batteries (atomic) – not using a chemical mixture to produce electricity, but storing it – in other words, a very large capacitor which is now finding practical use as well as produced in physically useful sizes. Bill also spoke about LEDs, which is a subject near and dear to his heart – and illustrated in a practical demonstration of electron "holes" and when an electron of an elevated energy level falls into the hole (a photon of light is given off). Bill also mentioned about how long it took to produce an LED that would give off white light: He described a common method nowadays that uses a UV LED and a phosphor coating to produce white light by scintillation.

Items donated by WB8FLY Were auctioned off by silent bid, all items proceeds going to the ATCO general fund. Thanks to WB8FLY for the donated items! A group picture was taken of the attendees. Thanks to Ken, W8RUT, for arranging use of the ABB facility. It's a perfect size for the ATCO group and easily accessed. Officer elections were brought up to retain present club officers. Roger, WB8DZW made the motion, and a voice vote of "ayes" confirmed with no dissentions.

1258 MHz FM analog transmit antenna downtown was repaired and works well now, even in the rain. Had a problem with the RCA connectors on the DVB-S equipment, to be replaced with BNCs. 439.25 MHz input at Jones Rd. site to be available again in the future. Transmitter is on 1288 MHz. to be turned on during future trip to site. 147.48 FM audio input (downtown) was made more sensitive. Short discussion on MESH net – see Ken W8RUT for further information as needed. Reduced 423 DVB-T transmit to 2 MHz BW with acceptable results. Charles WB8LGA confirmed this eliminated interference with Dayton. Charles further reports that Cincinnati has seen the Columbus DVB-T signal, but no reports yet of being seen in Dayton. Charles is working on a sync generator so even when a signal is received at a low level, it will present a good sync pulse even when signal is noisy.

Last, the raffle was held for donated items – everyone walked away with something. I walked away with a nice scanner which will be put to good use scanning amateur frequencies or other services while freeing up the other one I have for public safety monitoring.
…73, Mark Cring, N8COO

GET READY… A NEW TV FORMAT IS COMING!

Can you spot the difference between someone on TV and a person actually standing in front of you? Of course, but it's hard to put your finger on why. A screen wipes out the little details—the glint in an eye, the spring of a curl. TV's next leap takes it closer to real life. It's not 3-D, or more pixels. Instead, new screens can show the highs and lows that color reality: the reflection in an eye that's 500 times brighter than the pupil next to it, the countless gradations in a head of hair. Called high dynamic range, or HDR, this lust-worthy feature is available in the fall's best TVs from Samsung, LG and Sony. It may sound like some geeky perk, but unlike Ultra HD 4K TV sets, normal humans don't have to scoot the couch closer to notice HDR. From what I've seen, it's the best argument in years to upgrade.

HDR will become standard in the coming years. The price for getting it first is $2,000 and up. Way up. The term HDR may be familiar from a shooting mode on your smartphone camera. On a TV, HDR screens do a better job of reproducing the astonishingly wide range of colors our eyes take in. High-end cameras, the ones Hollywood already uses, capture much of this information. But to make video compatible with standard TV's narrow range of tones, a lot of this detail gets thrown out. What does HDR look like? You'll know it when you see it. Short of putting you in front of an HDR screen, nothing I could show you could quite reproduce it.

It helps to view it side-by-side with a standard video, as I've been doing with a few movies in my gadget vault for the past three weeks. A standard video might look brighter overall, but the HDR version is more heightened and detailed. Spider-Man's costume becomes a more intense red, even in darker scenes. "The Lego Movie" characters look like they're actually made of plastic. HDR video can get so bright that an on-screen explosion can actually be, momentarily, uncomfortable. My aha moment came watching the movie "Life of Pi." There's a scene where young Pi is attacked by flying fish. By the end, he looks like he's covered in beads of water. But when I watched it in HDR, I realized that wasn't water— those were fish scales, remnants of his battle. The HDR version could show enough of the tones in each scale for me to make it out.

In many of these sets, the extra colors are made possible by awesomely named quantum dots, which emit more colors on an LCD screen. LG produces HDR images using a more expensive technology called OLED, which can show even more colors. These TVs are also much brighter. To geek out for a moment, we need to pick nits—no, they're not lice, but units of measurement to gauge brightness. Back in the 1990s, when our current video standards were set, the assumption was that a TV could produce, at most, 100 nits. Flowers in the noonday sun are closer to 14,000 nits. A TV doesn't need to be that bright. Samsung's latest SUHD TVs can put out 1,000 nits. That's enough for a neon sign to look like it's glowing amid the inky dark pixels of night. There's just one problem, and it's familiar: TV makers are much further along than Hollywood in adopting the new technology. There's no HDR broadcast TV or live sports yet.

Can you imagine how awesome it would be to watch the Olympics in HDR? Here's what you can get today: Amazon streams HDR versions of a handful of movies, including "Amazing Spider-Man 2," and original shows to compatible smart TVs. Netflix plans to offer HDR, too, but it wasn't live on any sets I tested. Other sources don't exactly make it easy for early adopters. Online movie store M-Go sells HDR films, including "Life of Pi." You can play them on Samsung TVs—if you have a compatible external hard drive. The app is buggy, and it took me three days to download a file before I could watch my movie. To make matters worse, there are competing HDR formats. Samsung, Sony and LG are all behind HDR 10, which Amazon is using. But the entertainment wizards at Dolby Laboratories, largely responsible for jump-starting the idea of HDR, have their own system, Dolby Vision, which could lead to better images.

So far in the U.S., Dolby has only signed up Vizio, Netflix and Wal-Mart's movie service, Vudu, are early Dolby Vision content partners. Still, there's plenty of reason to be hopeful for HDR. Unlike Ultra HD 4K video, HDR doesn't require creators to use new cameras. Distributors don't really have to pick a side in the format war—they can offer both Dolby Vision and HDR 10 over the Internet. HDR doesn't take much more bandwidth to transmit to your home. 21st Century Fox has already committed to making all new movies available in HDR. And Samsung announced a Blu-ray disc player that supports 4K and HDR.

Before recommending my favorite HDR sets I want to warn you about shopping. Many retailers don't have HDR demos in stores it would be hard to spot genuine HDR content amid all the shock and awe. HDR isn't bright all the time. If money is no object, the year's best HDR-capable TV, hands down the best TV of 2015, is LG's 9500 OLED line. Its prices run $3,000 for a 55-inch model, and $5,000 for 65-inch. With max brightness of 400 nits, these OLEDs aren't as bright as competing LCD models, but because OLED can get as dark as the old plasma sets, both HDR and non-HDR video look more lifelike.

I can't recommend a TV without testing it first. The HDR TV with the most impressive color came from Sony, but the $3,800 65-inch X930C model I tested came in last in darker scenes. Sony says its 75-inch $8,000 X940C model doesn't have that problem thanks to a different backlight technology. If spending more than $3,000 on a TV might put you in divorce court, I can recommend Samsung's JS8500 ($2,500 for 65 inches) as a good compromise with the best lineup of HDR content.

After years of dubious upgrades— how many times did anyone actually watch "Avatar" in 3D?—there's finally a TV technology improvement that's instantly obvious to the naked eye. With HDR, the pieces are finally in place for TVs to compete on what mattered all along: the most realistic picture.

…GEOFFREY A. FOWLER, TV Technology Magazine

PROS AND CONS OF DVB-S vs. DVB-T

*Statements in **bold** and comments give a good Q&A about this important subject*

Jim says,
In your Mt. Diablo ATV group meeting I strongly encourage you to also consider using DVB-T rather than DVB-S. It works fantastically for terrestrial broadcast of digital TV and virtually eliminates issues with the ever present multi-path. Plus compared to DVB-S equipment which only supported standard definition (480i), you can do true high-definition up to 1080P with DVB-T. The costs for both ATV/DTV transmitters and receivers are very similar. For starters, I recommend you read my recent QST article from June, 2015, entitled "DVB-T: A Solution for ARES Television Operations". I can supply a .pdf copy upon request. I also have been giving talks this last summer and fall to ham clubs both in Colorado and here in Hawaii about DVB-T. I can also supply a .pdf copy of the power-point slides I used in my talks. I also have a lot (over 20+) application notes about ATV, both analog and digital available for free download in .pdf format from my web site.
... Jim Andrews, KH6HTV

Peter says,
I agree totally with Jim. In Australia, we use DVB-T for all repeater outputs. DVB-T is, of course, the Australian and European domestic standard. It is specifically designed to address multi-path problems in terrestrial environments. VK3RTV in Melbourne runs an output QAM16 DVB-T with a coverage of more than 80 Kilometres. The Brisbane DATV Repeater runs DVB-T QPSK with a reported increase in coverage after changing from QAM 16.
… Peter VK3BFG

Daniel Cussen <dan@post.com> **says,**
It works fantastically for terrestrial broadcast of digital TV and virtually eliminates issues with the ever present multi-path. Multipath does not seem to be much of an issue with DVB-S for amateur TV, at least in real world, near line of sight hill top repeaters. Most repeater outputs in Europe are above 1Ghz and relatively low bit rate with error correction. Most people have chosen narrow bandwidth and low bit rate to increase coverage. DVB-S is also useful for non repeater simplex use at below 1GHz, as in most countries 144MHz and 430MHz does not allow for DVB-T bandwidths, and there is opposition for modes that "jam" an entire band.

Plus as compared to the old DVB-S equipment which only supported standard definition (480i), you can do true high-definition up to 1080P with DVB-T. With DVB-S with MPEG4 (h.264) you can do high definition, especially with DVB-S2. Nearly every modern receiver supports it, although most repeaters are MPEG2. Some German repeaters have multiple transport stream channels. Upgrading to MPEG4 could in theory be done in software with no hardware changes, and indeed gets more bang for the buck.

The costs for both ATV/DTV transmitters and receivers are very similar. I agree. However on 1 GHz to 2 GHz receive a down converter is not needed for DVB-S receivers, greatly reducing cost. There are very simple/very low cost up-converters for 70cm from here: https://www.batc.org.uk/shop/hardware-and-kits SUP2400

While DVB-T receivers are common/standard in Europe and Australia/New Zealand, in Europe anyway a down converter is needed for repeater outputs as they are above 1Ghz. In Europe the default ATV standard is DVB-S, it has the ability for very narrow bandwidth (which will always be better than DVB-T), but also options for HD or multiple channels. The main downside of DVB-S is that terrestrial 70cm TVs cannot receive it directly, which in Australia or New Zealand, there is enough band width to allow this, and so it makes sense to use this mode, especially for repeater outputs. I am not really for or against any mode. The issues I see arising is simplex competition use, where people are using different transmitters, while others are set up only to receive & transmit the same mode & band as the local repeater output. If we assume in this case the local repeater output is DVB-S and the local repeater input is DVB-S, then locally using DVB-S makes perfect sense. Having nearby users with DVB-T transmitters would limit their use. Indeed for a long range line of sight link DVB-S will out perform DVB-T. With the space station we regularly have 1000KM+ DVB-S reception, with the record over 1400KM. This is using the less performing MPEG-2 and older wider bandwidths. It would be good though to try and aim for somewhat of at least a continent/region wide standards, to keep transmitters low cost, and allow simplex contacts. Hence my recommendation for seeing what is already in use in the area.

Joel - KD6W says,
As far as I know, DVB-T isn't limited by geographic location, or is it? The problem we have in larger markets is spectrum availability. You may have 8 MHz to devote to a repeater in Missouri, but in the San Francisco bay area, we have PAVE PAWS which darkened the entire 440 band and FAA radar in the 1.2GHz band. We are secondary on those bands so we loose those frequencies to operate wide band operation. We moved the ATV repeater to DATV output and specifically DVB-S so we could operate at 4MHz wide specifically to create a 2MHz input on other machines. DVB-S allows us to tailor the spectrum usage unlike terrestrial broadcast emission systems like QAM, 8VSB and DVB-T. Also, we don't operate HD (but could) since we don't care to see EVERYTHING in HD (there are some things that just shouldn't be seen and so lets just leave it at that), SD is good enough for our purposes. Besides, in the 4 MHz we operate 4 programs so we have 4 unique video services at the same time. How many do you have on your DVB-T?

DVB-S RECEIVER PURCHASE CONSIDERATIONS

I'm shopping for a dvb-s/dvb-s2 decoder to start off. Then I can work out how to Tx with a hack rf. Could you please provide current input and output frequency s and mode.

A friend nearby and I are both using unbranded DVB-S2 receivers from Ebay (several sellers have it) to receive W6CX, a model that works better than three others I have tried. It can be identified by its five V-shaped front panel buttons; here is one link to an example: http://www.ebay.com/itm/261851241128 I would recommend you source one proven to work with the repeater, normally via the repeater group/club. There are various standards/non standards in use. It is best if the receiver is tuned while a strong known exact signal is available, as it can be difficult to find and save a weak signal. Many receivers need a saved station before they will attempt to display anything. I use the Tutioune receiver, which is specially designed for HAMTV on DVB-S, but it is not really for beginners and the hardware is a kit and the software needs to run on a PC. It is ideal for those who want to progress from black box operation, or want to test transmitters and narrow bandwidth receive.

The link that Bob posted (the same one I did) is for the unbranded DVB-S2 receiver, not an X2-brand one. I did some research. That unbranded one has the best sensitivity (-85dB) of the ones I could find that publish specifications. At least one person has said one X2-brand model is even better. My X2 Premium (a model from 2013) is not as good as that unbranded one, but it is the second-best of the four I tried. The unbranded one recovers from the overload of my in-band transmitted signal quicker than my two-year-old X2 Premium.

That same unbranded receiver is available directly from sellers in China at even lower prices (in/to the USA), so it may be worthwhile to look for those sellers, since they are much closer to Australia. My search on Ebay was for "DVB receiver"; a search for "DVB-S2 receiver" did not always bring those ones up.
Chris W6ATV

Try out the geosat micro hd pro. It's $100, but supported in the USA. I've been using it in a broadcast setting for a couple months now.
Dan KE7TBB

I'm sure that everyone here realizes that in their primary application (satellite TV) sensitivity of these receivers (as defined as minimum input signal power required for satisfactory reception) is rarely all that important or particularly optimized. Mostly the C/Ku LNBs used with them have enough gain (60-65 db being typical) - so even with significant loss in cables, switches and splitters - the antenna noise power density coming from the dish seen at the receiver input is way greater than the effective noise of the tuner/tuner chip.

Much the more important "sensitivity" spec is how close to the theoretical Shannon limit they come in their BER versus C/N curves. This "sensitivity" determines how poor the input signal to noise ratio can be for a give FEC setting without significant numbers of data errors (and resulting audio and video breakup and macroblocking) and is very important when marginally sized and performing dishes are used – typical of most uses of these consumer set top boxes. And tuner chips and demod chips do vary somewhat in this weak signal performance (phase noise in LOs is a big one here).

If one is planning to use a TVRO type receiver with weak line of sight signals one should, of course, use a good LNA with enough gain to ensure its noise figure dominates over a receiver that may have a 10-15 db effective NF at its input (at best). And if there are strong carriers in the input spectrum other than the desired signal it may bem useful to have some RF preselection ahead of the TVRO receiver to knock them down a bit as satellite receiver tuner chips don't necessarily have all that huge a dynamic range between the power of a desired signal and overload by other strong off frequency signals on their input. That is almost never necessary in that most signals on satellite transponders are reasonably close in power density/Hz .... and early AGC from a PGA at the tuner chip input can ensure that the core of the chip sees everything in the satellite downlink spectrum at a fairly uniform power level.
Dave N1PRE/AE, die@dieconsulting.com

Thanks for the DVB receiver performance notes David. I had only noted the "sensitivity" number for that receiver (which is -81 dBm, not -85 as I had posted; several others I saw were rated -65 dBm) after experiencing its superior performance in the on-the-air tests here.
Chris W6ATV

My only point, of course, is that none of these boxes have what would be called a "hot" front end with low NF and high dynamic range... some may not even have enough gain between the L band input and the tuner chip output to the demod chip to see input thermal noise at the same amplitude as the signal constellation at the output of the tuner with the AGC wide open.

A hot front end would make no sense in their primary application provided they have enough traditional sensitivity to work with cabling and other components in the signal path between them and the LNBs.. given around 60-65 db gain LNBs. But adding a preamp LNA for L band use should handle this easily... and would generally be something one would do anyway... and of course for many apps they would be used on ham bands they do not natively tune anyway thus a LNB of some kind would be used and surely that should be designed to have enough gain to drive them at an adequate level through any cabling involved.
Dave Emery N1PRE/AE die@dieconsulting.com

ATV GEAR FOR SALE

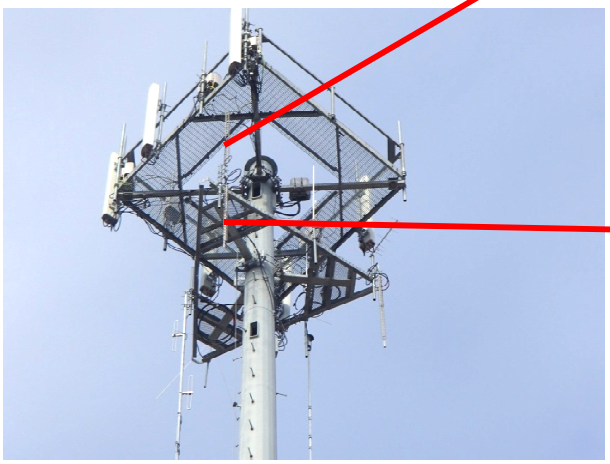
Rick has some ATV gear he would like to dispense with. Pictures are below. Give him a call to see if any are still available. He also has preamps for 900 MHz with paper work for everything and a lot of other ATV gear. He would like to trade it all or sale. Make offer if anyone is interested. 614-625-5073

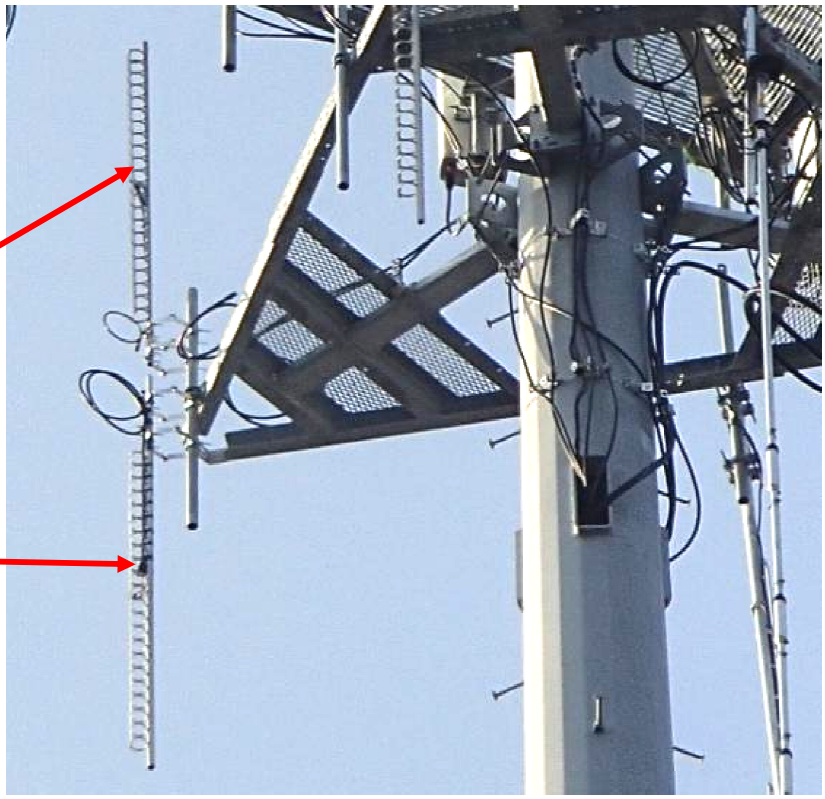
Ric K8YIO

GRAND RAPIDS, MICHIGAN GETS REPEATER IMPROVEMENT

Ron, K8DMR has been busy improving the antenna location at their repeater. I don't know how they were able to convince the Verizon cell tower owner to let them locate there but I'm glad they did. I believe it's at the 150 foot location and by the looks of it, it's got a clear view of the horizon. They have a rib cage antenna for transmit, another for receive with a third as a spare. He now says, "Now to get everything back on the air at the repeater site".

Ron
K8DMR





TIM PEAKE ISS SCHOOL CONTACTS

ARISS have announced details of the first of the school amateur radio contacts with UK astronaut Tim Peake KG5BVI. Tim will be using the special International Space Station (ISS) call sign GB1SS during his 6 month mission. Students will be able to put a number of questions directly to Tim using amateur radio equipment specially installed at the school for the occasion.

ARISS stand at the London Science Museum Tim Peake

The ARISS team of licensed UK Radio Amateurs is planning a world first by also receiving live video from the ISS during the contact. Using the HamTV transmitter, which has recently been commissioned on board the ISS, Tim will be the first astronaut to use this equipment during a two way school contact.

As well as building a vehicle based receive system, which will be installed at the school on the day of the contact, the team visited Goonhilly Earth Station in Cornwall to commission a dish to receive the 2.4 GHz HamTV transmissions from the ISS. During the contact at the schools the ARISS team will be providing information displays on the ISS position and have webcams showing both the local and Goonhilly dishes as they track the ISS. The hosting schools will be organising presentations and displays before and after the contact and the ARISS team will be providing a live web cast of all the day's events including the actual contact with Tim Peake. The live event webcast will be hosted by the British Amateur Television Club (BATC) on their web streaming service at *https://principia.ariss.org/live/*

The ARISS programme is designed to maximise the impact of the Principia Mission outreach activities. It will directly engage students with media and communication technologies with the goal of inspiring them to pursue careers in Science, Technology, Engineering and Math.

Tim Peake KG5BVI training on the amateur radio station equipment he will use on the ISS

ILLEGAL MARKETING OF ELECTRONIC LIGHTING BALLASTS

This is not directly ATV stuff but important toward maintaining a noise free atmosphere for ATV operation….Well, almost noise free. …Well, maybe not noise free at all but at least we'll know where it's coming from.

My experience comes from my outdoor Christmas lighting installation. I use the Radio Shack X-10 appliance modules that use the 120VAC line to superimpose the control commands. This year they all worked fine for a while. Then one evening I found that nothing worked. That seemed strange so I removed one module, brought it inside and plugged it into the AC socket the control unit was plugged into. Still no operation so I tried other outlets. No success so I tried another control module. That didn't work either. I decided to give up for the evening so I plugged each light string directly into their respective outlet, turned off my basement lights and went upstairs. Later, I tried them again and to my amazement, they all worked now. OK, I thought who's messing with me so I retraced my steps. Soon I realized that any time I had my workroom florescent lights on, the Christmas lights weren't controllable. I have the new electronic lamp ballasts in the lamps and found they transmit horrendous amounts of RF from below the broadcast band up through HF. A ferrite choke on each florescent lamp line would have cured it but I decided that during the Christmas season, keep the workroom lights ***OFF*** *when it's time to switch on or off the Christmas lights. Now you know* ***"the rest of the story".***
WA8RMC

From ARRL Newsletter 12/29/15 ARLB038 ARRL Again Complains to FCC about Illegal Marketing of Electronic Lighting Ballasts.

The ARRL has again complained to the FCC to allege illegal marketing of electronic RF lighting ballasts, operating under Part 18 of the Commission's rules, on the part of two major retailers. Letters went out this week to the FCC Enforcement Bureau and its Office of Engineering and Technology claiming Part 18 marketing regulations violations by Lowe's and by Walmart stores. At issue is the sale of non-consumer RF lighting ballasts to consumers who, in several instances, were told by store personnel that it was okay to install these in a residential setting. In addition, non-consumer and residential-class ballasts are intermixed in store displays with inadequate signage to direct consumers to the correct choice. Both letters asked the FCC to investigate and commence enforcement proceedings with respect to the two stores' marketing and retail sale of RF lighting devices in the US.

"ARRL purports to show that the retailer is...marketing and selling to consumers (by retail sale) non-consumer Part 18 RF lighting devices which are not intended for residential deployment, to consumers who have specifically noted their intention to deploy the devices in residential applications," ARRL Chief Counsel Chris Imlay, W3KD, said in similar complaint letters to the Commission on December 28 and December 29. Part 18 emissions limits for consumer devices are far lower than those allowed for non-consumer devices.

"ARRL has received numerous complaints from Amateur Radio operators of significant noise in the medium (MF) and high frequency (HF) bands between 1.8 MHz and 30 MHz from 'grow lights' and other Part 15 and part 18 RF lighting devices," Imlay continued. "These devices are easily capable of emitting RF noise sufficient to preclude Amateur Radio MF and HF communications (and, as well, AM broadcast station reception) throughout entire communities."

Supporting both complaints are extensive and detailed reports by ARRL Laboratory EMC Specialist Mike Gruber, W1MG. The reports recount incidents of actual purchases of Part 18 RF lighting devices intended for commercial use to consumers who made clear to store personnel that they intended to use the devices at home. Gruber's report includes multiple photographs that depict in-store displays of the products in question and showing signage that does not adequately explain which devices may be sold to whom.

The ARRL has asked that all non-consumer devices be removed from retail sale and marketing at the stores and to track and recall non-consumer devices already sold to consumers.

In his report, Gruber concluded that retailers should require purchasers of non-consumer Part 18 RF lighting devices to provide a valid contractor's number. He also advised that the stores improve display signage to make it clear that non-consumer Part 18 devices may not be used in residential settings.

Earlier this year, the ARRL sent similar complaint letters to the FCC regarding the marketing of Part 18 RF lighting devices by The Home Depot. The League also has complained about specific RF lighting "grow light" devices that it has alleged exceed Part 18 emission limits.

IMPROVEMENTS TO THE DARA ATV REPEATER

The exciter/amplifier cabinet for the 23cm FM ATV system has had a heart transplant. In the Plessey exciter's place is the Comtech 23cm transmitter board. This cabinet is now installed in the DARA ATV repeater rack and its working extremely well... Video looks excellent and everything is now stable. FM output is now 50 watts.

The first photo is a peek inside the cabinet before I removed the Plessey PCB. The second photo shows how much more room in the exciter chassis there is, with the Comtech PCB installed. Thought you would be interested in seeing the "new" equipment before it was placed back into operation.

I had to pad it down 14 dB so the Comtech board would not overdrive the intermediate amplifier.

Cheers,
Dave P
AH2AR

Amateur Radio Operators Convert to Digital Television – Part 1

Some now on-the-air in high definition. December 21, 2015
(Reprinted with permission from TV Technology Magazine)
http://www.tvtechnology.com/broadcast-engineering/0029/amateur-radio-operators-convert-to-digital-television--part-1/277663

By James O'Neal

ALEXANDRIA, VA.—Radio amateurs, or "hams," have been involved in one way or another with television practically ever since commercial entities began developmental work in the medium during the 1920s. And many TV engineers have held ham licenses and performed their own share of experimental work in their off-duty hours. Early on, at least one manufacturer offered camera pickup tubes at discounted prices to encourage experimentation by the radio amateur community.

Ham TV has evolved right along with the rest of the industry, moving from mechanical scanning to all-electronic operation, then color, and eventually to digital video and most recently, high-definition imaging. And while commercial television entities have routinely spent hundreds of thousands of dollars in retrofitting analog plants for digital broadcasting, hams—being an ingenious and creative lot—have managed to go digital on the cheap.

Art Towslee (amateur station call sign WA8RMC) is one of these DTV pioneers. He's now 74 and a retired Ohio electrical engineer who once specialized in the design of industrial weighing equipment. His interest in both ham radio and television date back to the mid-1960s.

Art Towslee

"A bunch of guys I knew were playing with some war surplus UHF radio gear and actually using it to transmit video," said Towslee. "I became very interested and got my ham license in 1965."

For the past 50 years, Towslee has continued to experiment with television transmission in the amateur radio spectrum—they are assigned chunks of RF real estate in the UHF and higher frequency bands for such work—and a few years ago, along with other members of his Columbus-area amateur radio club, transitioned to digital video, becoming the first such group in the U.S. to do so.

"Our club, ATCO [Amateur Television in Central Ohio], was formed in 1989," said Towslee. "We established a video-capable repeater [a "translator" with elevated receive and transmit antennas used to increase the range of amateur radio transmissions] in 1994 and used it to relay analog video transmissions between club members. Later on I had heard of some European amateurs who were experimenting with digital television and said 'wouldn't it be wonderful' if we could do that here."

Towslee, who is president of ATCO and publishes the club's newsletter, did some investigation and eventually located an engineer in the Netherlands who had designed a digital video encoder/decoder board set and was now marketing these. The price selling tag was in the $1,000 range and they were designed for the DVB-S (satellite) standard. Towslee and his group purchased the encoder in 2003 and installed it at their repeater site to provide a

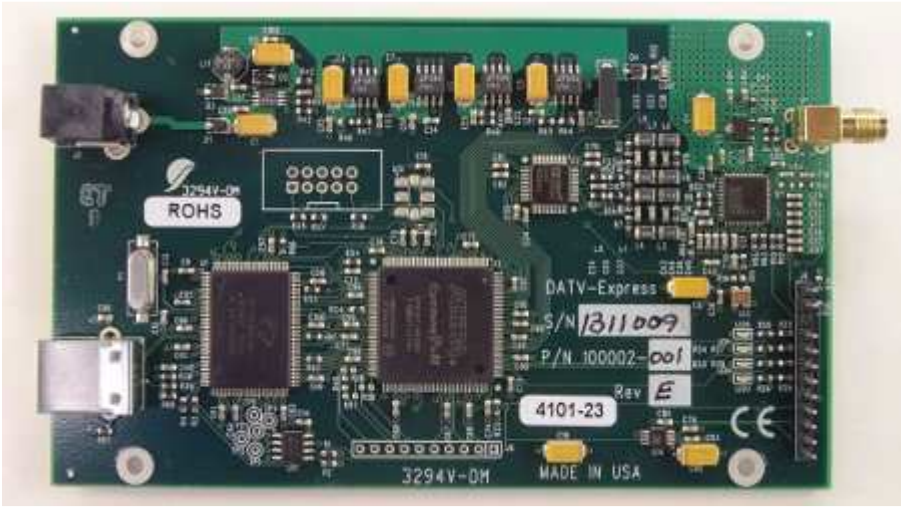
channel with digital video transmission capability.

FIRST ON THE BLOCK WITH AMATEUR DTV

"We were first in the U.S. to have digital amateur TV capability," said Towslee. "We claim bragging rights."

He explained that the card set (MPEG compression and DVB-S modulator) was fed incoming analog video and its RF output was coupled to an amplifier operating in the amateur service 23 centimeter band (1,240-1,300 MHz). The club made a group buy of "free-to-air" digital satellite receivers that decoded DVB-S and soon some 20 Ohio ham operators were exchanging digital television images.

"We added DVB-S receive capability to the repeater around 2010—DTV in/DTV/out," said Towslee. "This made us the first amateur radio group in the country with full digital repeater operation."



The $300 DATV Express digital television board developed by the ATCO amateur radio group

Towslee admits that interest in the digital video operation has dwindled a bit in the past five years ("you get bored seeing the same things over and over"), but says that some of the digital devotees are still at it.

"We now have two digital channels at our repeater," he said. "One in the 23-centimeter band at 1,268 MHz and another in the 70-centimeter band on 423 MHz. The 23-centimeter is set up to operate in 3.5 MHz of bandwidth and the 70-centimeter uses only 2 MHz."

In an effort to make DTV more accessible for amateur radio operators, Towslee, along with two others, has launched a small manufacturing operation that produces a digital encoder card—the DATV (Digital Amateur TV) Express board—that sells for $300. It operates in conjunction with a PC, as it's a software-defined device, and provides either a DVB-S or -T output.

"Our purpose was to get people in the U.S. interested in DTV," said Towslee. "So far we've sold 120 of the cards. However, I am a little disappointed as most of the sales have been to people in Japan and Europe."

When asked about the sort of experimentation hams are doing with their digital video gear, Towslee said that "dxing" or attempting to cover long distances with fairly low power is one of these.

"Using DVB-S we've achieved about 100 miles," he said. "With DVB-T and operating on 423 MHz one person in our group has done over 500 miles running about 400 Watts EIRP; of course this was over some pretty flat Ohio country."

When asked if any of his DTV group had attempted high-definition operations, Towslee stated that all operations were still being done in 480-line SD; however, he added that the DATV Express could be upgraded for HDTV operation.

"The board is absolutely HD-capable," said Towslee. "If there is a demand we will write code for HD operation."

While there may not be a big demand for high definition within the central Ohio ham community, this is not the case elsewhere. In other parts of the country, some amateurs have already made the HD conversion and are using this technology to assist others in the community. We will report on this in the next installment of "Amateur Radio Operators Convert to Digital Television."

This rack contains the workings of the Columbus, Ohio amateur radio television repeater system. The digital processing gear is in the box atop the rack.

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".CTRL Click on www.atco.tv. 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 I		(Missing Newsletter)
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 I	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
Vol 30 I		No articles
Vol 30 II		No articles
Vol 30 III		No articles
Vol 30 IIII		No articles
Vol 31 I		No articles
Vol 31 II		No articles
Vol 31 III		No articles
Vol 32 I	12	On screen display generator
Vol 32 II	7	DVB-T power amplifiers
Vol 32 III		No articles
Vol 32 IIII		No articles
Vol 33 I		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 33 I.

…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. 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.

01/24/2016 | Tusco ARC Hamfest
Location: Strasburg, OH
Type: ARRL Hamfest
Sponsor: Tusco Amateur Radio Club
Website: http://www.tuscoarc.org

02/21/2016 | Mansfield Mid Winter Hamfest
Location: Mansfield, OH
Type: ARRL Hamfest
Sponsor: InterCity Amateur Radio Club
Website: http://www.W8WE.org

03/06/2016 | NOARS Winter Hamfest
Location: Elyria, OH
Type: ARRL Hamfest
Sponsor: Northern Ohio Amateur Radio Society (NOARS)
Website: http://www.noars.net

03/20/2016 | TMRA Hamfest and Computer Fair
Location: Perrysburg, OH
Type: ARRL Hamfest
Sponsor: Toledo Mobile Radio Association
Website: http://www.tmrahamradio.org

03/26/2016 | MOVARC HAMFEST
Location: Gallipolis, OH
Type: ARRL Hamfest
Sponsor: Mid-Ohio Valley Amateur Radio Club
Website: http://www.facebook.com/KC8ZAB

04/09/2016 | Cuyahoga Falls ARC's 62nd Annual Hamfest
Location: Cuyahoga Falls, OH
Type: ARRL Hamfest
Sponsor: Cuyahoga Falls Amateur Radio Club
Website: http://www.cfarc.org/hamfest.php

04/24/2016 | Athens Hamfest
Location: Athens, OH
Type: ARRL Hamfest
Sponsor: Athens County Amateur Radio Association
Website: http://ac-ara.org/

06/05/2016 | Portage Hamfair
Location: Ravenna, OH
Type:
Sponsor:
Website: http://hamfair.com

07/17/2016 | Van Wert Hamfest
Location: Van Wert, OH
Type: ARRL Hamfest
Sponsor: Van Wert Amateur Radio Club
Website: http://w8fy.org

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 check-in requests or comments. We usually chat for about ½ hour so please join us locally or via internet at www.BATC.tv then ATV repeaters thenWR8ATV.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (10/15/15).....	$ 1880.17
RECEIPTS(dues).....	$ 80.00
Fall Event auction income.....	$ 141.00
PayPal fee.....	$ (0.59)
Fall Event food.....	$ 307.39
CLOSING BALANCE (01/16/16).....	$ 1793.19

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 the average street level (1460 feet above sea level)

TV Transmitters: 423.00 MHz DVB-T, 10 W cont, FEC=7/8, Guard=1/32, Const=QPSK, FFT=2K, BW=4MHz, PMT=4095, PCR=256, Video=256, audio=257
427.25 MHz Analog VSB AM, 50 watts average 100 watts sync tip (Analog TV on cable channel 58)
1258 MHz 40 watts FM analog
1268 MHz DVB-S QPSK 20W continuous. SR=3.125MS, FEC=3/4, PMT=32,Video=162,Teletext=304,PCR=133,Audio=88,Service =5004)
2395 MHz Mesh Net transceiver 600mw output.
10.350 GHz: 1 watt continuous analog FM

Link transmitter: 446.350 MHz: 5 watts NBFM 5 kHz audio This input is used for control signals.

Identification: 423, 427, 1258, 1268 MHz, 10.350Ghz transmitters video identify every 10 min. with active video and information bulletin board every 30 minutes.
423 MHz digital, 1268 MHz digital & 10.350 GHz analog - Continuous transmission of ATCO & WR8ATV with no input signal present.

Transmit antennas: 423.00 MHz – 8 element Lindsay horizontally polarized 6dBd gain "omni"
427.25 MHz - Dual slot horizontally polarized 7 dBd gain "omni" major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni
1268 MHz - Diamond vertically polarized 12 dBd gain omni
2395 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (Used for experimental Mesh Net operation)
10.350 GHz - Commercial 40 slot waveguide slot horizontally polarized 16 dBd gain omni

Receivers: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
438.000 MHz - DVB-T QPSK, 2K BW. Receiver will auto configure for FEC's and PID's. (Input here = output on all TV transmitters)
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).
1288.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1288.00 MHz - DVB-S QPSK digital SR=4.167Msps, FEC=7/8. PIDs: PMT=133, PCR=33, Video=33, Audio=49 (Input here feeds all TV transmitters and also goes directly to 1268 MHz DVB-S digital output channel 2.)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
10.450 GHz - F5 video analog NTSC. (Input here = output on all TV transmitters)

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (Shared with 446.350 MHz link output transmitter)
438.00/439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west (Shared with 438 & 439 receivers)
1288.00 MHz - Diamond vertically polarized 12 dBd gain omni (shared with analog and DVB-S receivers)
2395.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (Used for experimental Mesh Net operation)
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Auto mode 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 on for 5 minutes) Select # to shut down before timeout.
	004	Select 10.450 GHz receiver. **(Always exit by selecting 001)**
	003	Select room camera **(Always exit by selecting 001)**
	002	Select roof camera. Select room cam first then 002 for roof cam. (**Always exit by selecting 001**)
	001	Select 2398 MHz receiver then 00# for auto scan to continue

Manual mode Functions:		
	00* then 1 for Ch. 1	Select 439.25analog /438digital receiver (if video present on digital, it is selected. Otherwise analog)
	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 (17 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 1288 MHz digital receiver scan enable
	03* or 03#	Channel 3 1288 MHz analog receiver scan enable
	04* or 04#	Channel 4 2398 MHz scan enable
	A1* or A1#	Manual mode select for 439.25 receiver audio
	A2* or A2#	Manual mode select for 1288 digital receiver audio
	A3* or A3#	Manual mode select for 1288 analog receiver audio
	A4* or A4#	Manual mode select for 2398 receiver audio
	C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
	C1* or C1#	C1* to turn off 438 MHz DVB-T Tx, C1# to enable it (Must be in manual mode to enable this function).
	C2* or C2#	C2* to turn off 423 MHz DVB-T Rx, C2# to enable it (Must be in manual mode to enable this function).

Note: The DVB-T Tx and Rx units can lock up when they lose video or see bad video. When this happens, power must be cycled. To do this select C1* or C2* to turn off power. A few seconds later select C1# or C2# whichever appropriate to restore power to selected unit. Wait about 15 to 30 seconds to see restored operation. (Example: To reset the DVB-T receiver enter C2*,wait a few seconds then C2#)

ATCO MEMBERS as of January 2016

Call	Name	Address	City	St	Zip	Phone
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511
W8ARE	Larry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964	
NN8B	Don Kemp	6384 Camp Blvd.	Hanoverton	OH	44423	
N9BNN	Michael Glass	6836 N. Caldwell Rd	Lebanon	IN	46052	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551
N8COO	C Mark Cring	2844 Sussex Place Dr.	Grove City	OH	43123	614-836-2521
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785	301-772-7382
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641	
W8DMR	Bill Parker	2738 Florbunda Dr	Columbus	OH	43209	
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	OH	42616	419-691-1625
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-405-1710
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210	
KC8EVR	Lester Broadie	108 N Burgess	Columbus	OH	43204	
N8FRT	Tom Flanagan	6156 Jolliff St.	Galloway	OH	43119	
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147	
WA8HFK,KC8HIP	Frank & Pat Amore	P.O. Box 2252	Helendale	CA	92342	614-777-4621
WA8HNS	Mike Gray	5029 St Rt 41 NW	Washington Ct Hs	OH	43160-8740	740-335-5133
WB2IIR	Michael Anthony	370 Georgia Drive	Brick	NJ	08723	
K8KDR,KC8NKB	Matt & Nancy Gilbert	5167 Drumcliff Ct.	Columbus	OH	43221-5207	614-771-7259
W8KHP	Allan Vinegar	2043 Treetop Lane	Hebron	Ky	41048	
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	937-548-2492
N8LRG	Phillip Humphries	30856 Coshocton Road	Walhonding	OH	43843	614-3543744
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	
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856
N0OBG	Jim Conley	33 Meadowbrook C C Est	Ballwin	MO	63011	
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022	
KC8QJR	Adam Burley	931 West High Street	Mount Vernon	OH	43050	
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201	614-421-1492
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082	614-891-9273
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021	
KB8RVI	David Jenkins	1941 Red Forest Lane	Galloway	OH	43119	614-853-0679
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
WA6RZW	Ed Mersich	34401 Columbine Trl West	Elizabeth	CO	80107	
KB8SSH	Mike Cotts	3424 Homecroft Dr	Columbus	OH	43224	614-371-7380
KD8TIZ	Bob Holden	5161 Goose Lane Rd	Alexandria	OH	43001-9730	614-562-8441
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,KD8YYP	James & Anna Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123	
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064	
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224	
WB8YTZ	Joe Coffman	233 S. Hamilton Rd	Gahanna	OH	43230-3347	
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	OH	43125	614-202-9042
W8ZCF	Ferrel Winder	6686 Hitching Post Ln.	Cincinnati	OH	45230	
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371	

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.

No new members this time

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 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 to keep the dues clock consistent with the beginning of each year.

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 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 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.