ATCO NEWSLETTER

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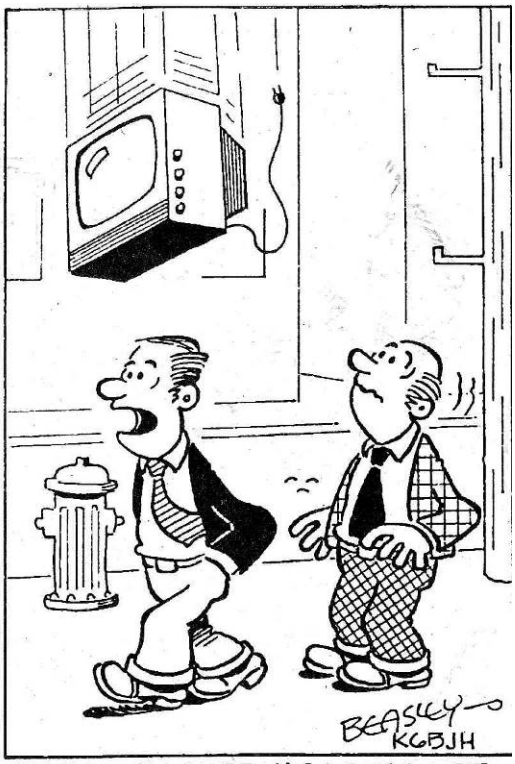
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" and is published quarterly (January, April, July, and October)

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.

I CAN LET YOU HAVE THIS TRIPOD FOR 1/3 OFF. IT'S ONLY MISSING ONE LEG



TELEVISION SURE HAS LOST A LOT OF ITS IMPACT IN RECENT YEARS

ACTIVITIES ... from my Workbench

Another summer has come and gone; goodbye to warm weather! Boy, I hope you guys completed all or most of your antenna projects because if not, perhaps it will have to wait till next year.

OK, onto the ATV items. There has been very little repeater activity up until now. The repeater seems to be working very well as the last trip to it was last Spring. However, now a new problem surfaced. About 4 weeks ago, we started receiving problems with the 1280MHz receive channel. Initially it was believed that the digital receiver had developed a problem which I thought to be defective. The received signal at the repeater was almost totally pixilated. I went to the site prepared to reset or replace the receiver. I did that and in the process I bumped the N connector on the analog receiver and broke it. An inspection revealed that the connector could not be repaired on site so I brought both the digital and analog receivers to Dale, WB8CJW, to inspect and repair. He found no issues with either receiver but with some fine tuning, was able to improve the analog receive sensitivity a little. I then returned the receivers to the repeater only to find the problem still existed so it is suspected that the preamp common to both receivers is defective. I took the preamp, signal splitter and related cables to Dale which he tested and found to be OK. The only thing left was the antenna so I returned to replace that with the same result.

In retrospect, I should have tested the incoming signal for external interference FIRST but since I did not do that, now was the time. Low and behold, we found a very strong pulsed signal coming from the west. It turned out to be a new FAA/Homeland security surveillance radar just installed in London, Ohio and operating right on 1280MHz! Upon further investigation I now find that we must vacate any Ham produced signal between 1275 and 1285MHz. If we don't, the FCC will convince us otherwise. When I tried to obtain more information about the new signal, I was told it is classified and no more details are available. So, we must find another repeater input frequency on this band. More details about this signal is contained in an inside article. At this time, I don't know where we can go as all potential frequencies are presently occupied. In fact, there is at least one other repeater that may have to move too. Kevin, W8KHW, operates a DSTAR repeater on 1285MHz which is within the "forbidden frequency" zone.

OK, if the above is not enough, I have been notified that our existing 1258MHz analog signal could again be interfering with the Russian GLONOS system used by the ODOT (Ohio Department of Transportation). Trimble, the manufacturer of the ODOT receivers, claims interference with their system. A representative Trimble RF engineer has contacted me about this. The possible good news here may be that the interference is not from us but with the newly installed FAA radar. Boy, I hope so! If that's true, it will be fun to stand on the sidelines and watch the battle between the FAA and Trimble. (I pretty much know who will win that one!). I'll keep you informed. However, please attend the Fall Event to discuss and see how this plays out. I should have more information by that time.

That's all for now guys. Remember, we really need more activity in our club. Some of the "regulars" have not announced their presence in a long time. Have they totally lost interest or are they waiting for more exciting news to develop? If the later is true, we may have something developing. We are presently working on a new digital repeater output that will be compatible with almost all digital TV's without modification. It will be a QAM digital signal the same used by cable companies for non-encrypted broadcasts. You will be able to tune your digital TV to cable channel 57 (422MHz) to see our signal. The antenna will be vertically polarized so simple stick antennas will work in most instances. The frequency of 422MHz is basically the same as Dayton's analog repeater output but we're anticipating that there will be no interference due to the distance and cross polarization between systems. If it turns out that there is, we will re-locate because they were there first. We'll see.

PS: I'm running out of material guys! Please help with article suggestions.
…73, WA8RMC

TIPS, TECHNIQUES AND IDEAS!

We need to hear from those that find their tips and techniques useful. I encourage those that have solved a problem in a unique way, ATV related or not, to share with the rest of us! Email me your idea or solution to towslee1@ee.net. Thanks WA8RMC

No ideas this time guys. Help out with some ideas.

BRIAN'S REPEATER IN JACKSON, MICHIGAN

The first is a view from the site looking north. Next 2 are the rx rib cage on top of a small tower and the adjacent 442.500 digital repeater/147.36 antenna. Some pics of the rack. The last pic is the atvr-4 receiver after the upgraded down converter.

Our new location is downtown Jackson,Michigan, on the Blake Building. Our antenna's are appx 230 ft above street level.

We still use 439.25 lvsb horizontal in and 923.250 out vertical. Running about 240 watts on sync tips. Using the Glenayre hi linearity amp on a 28vdc supply. Also incorporated is a time delay relay to switch the 110vac power supply off to the amp after appx. 3 minutes, to save juice and keep the heat down in the cabinet. The amp is drawing hi current all the time, whether in TX or not. So we figured we would cut the power after X amount of minutes of no activity. This has been a good setup in the past.

At this time, we are using a home made single rib cage slot for receive. After some extensive testing with a couple atvr-4 receivers, I did a upgrade to the receiver down converter board. This receiver used the older crystal controlled tvcx-70 board. Talked to Tom and bought a tvcs-4 downconverter board and had it programmed for lvsb and 45.75MHz IF, instead of the usual vhf ch 3. The quality and sensitivity has been impressive.

The receive feedline is about 35ft 1/2" Andrew Heliax. We have a 7 pole Paulden lvsb filter, plus 2 uhf cavities for additional isolation to get rid of an adjacent 442.500 moto turbo digital repeater, which is co-located at the site.

I have done extensive mobile testing, using 2 stacked PAR omni angles, a tc70-1, and a D1010 running 100 watts. The coverage has been impressive. Both getting into the machine and seeing it mobile on 900. I use a tvcs-9g down converter and 2-3db mag mount for 900 receive. Our area has very bad terrain with large hills and lots of wooded areas. On average, coverage is ok up to 10-15 miles.

Jason, n8urw, is a local wireless ISP in the area. We have high speed access about 4 feet from the ATV rack. We are testing a IP to Video server with OK results. It has trouble on weaker signals. About p2 and below. It is connected to the video output 2 on the ATVR-4 receiver. It only shows incoming video, no hang time or id's at this time.

We have it directed to www.kc8lmiatv.com, user name is atv,password,atv. The device is some

what picky. We find Google chrome is the best browser to use for viewing. Make sure everything on the pc is up to date or you will have trouble. H264 is the highest quality and works well on a good pc/connection. Note: There is no log out button. Just close browser window when done.

Here is a list of the repeater goodies: Upgraded 439.25 ATVR-4 with tvcs-4G down converter board on lvsb, 45.75MHz if, Pauldon 7 pole lvsb filter, 2 uhf cavities to minimize 442.500 interference, single rib cage slot antenna for receive, Intuitive Circuits ATVC-4 Plus controller, commercial DB products 12 foot tall 900 MHz 8dbd? Vertical, 40 feet 7/8 Heliax on 923.250 tx antenna, txa5-33, 923.250MHz 1.5 watt exciter attenuated to drive the big amp, 7 pole filter between exciter and amplifier input to help tighten up 923.250 side bands, Glenayre 500 watt amplifier, Motorola 28vdc power supply, Dayton time delay relay, 12 port rig runner, Motorola 13.8 vdc power supply, 2 meter control receiver, TrendNet TV-VS1 video server.

The repeater has been working well. Bryan, kd8kcf, Brian k8igu, and Ron K8dmr all are quite regular getting into the machine.
As with any project, this system again has been a lot of work, time, and money. But that's what the hobby is all about, right? We enjoy experimenting and playing on ATV.
73, Bryan kc8lmi

ATCO SATURDAY MORNING BREAKFAST

Ahhhhh, here we are enjoying a breakfast on Saturday. As most of you know, we rotate breakfast locations every Saturday to enjoy the food and company of fellow ATCO ATVers . This time it's at TJ's restaurant at Morse road and High street. We encourage others to join us. Pictured L to R around the table CW are Jay KB8YMQ; Roger, WB8DZW; Ken, W8RUT, (**restaurant manager who took the picture. Can you figure this one out?**); Stan, AA8XA; Bob, N8OCQ; me, WA8RMC and Bob, N8NT in the lower center.

ATV STANDARD SUMMARY

The following is from Wikipedia on the internet. http://en.wikipedia.org/wiki/Amateur_television. *Note the special comments made in the "other information" section.WA8RMC*

Amateur television (**ATV**) is the transmission of Broadcast quality video and audio over the wide range of frequencies of (radio waves) allocated for Radio amateur (Ham) use.[1] ATV is used for non-commercial experimentation, pleasure and public service events. Ham TV stations were on the air in many cities before commercial television stations came on the air.[2] Various transmission standards are used, these include the broadcast transmission standards of NTSC in North America and Japan, and PAL or SECAM elsewhere, utilising the full refresh rates of those standards. ATV includes the study of building of such transmitters and receivers, and the study of radio propagation of signals travelling between transmitting and receiving stations. ATV is an extension of amateur radio. It is also called HAM TV or Fast Scan TV (FSTV) (as opposed to slow-scan television (SSTV), which can be transmitted on shortwave ham bands due to its narrowband structure, but is not decodable by a commercially available television receiver).

North American context

In North America, amateur radio bands that are suitable for a television signal (wide enough to fit such a signal) are higher in frequency than VHF broadcast TV. The lowest frequency ham band suitable for television transmission is 70 centimeters, which is between broadcast channels 13 and 14. While outside of broadcast television channels, this frequency falls into CATV frequencies, on channels 57 to 61 (420-450 MHz). As such, ATV transmissions can be viewed by setting a television to cable input and attaching a terrestrial antenna. For more sensitive reception, some users may use a purposely-built ATV down-converter, which is a kind of set-top-box. Other bands are also used for ATV, most of them in the UHF region on frequencies higher than UHF broadcast TV. 33 centimeters and 23 centimeters are two other commonly used bands for ATV, but reception of these higher bands requires the use of a down-converter. Most ATV signals are transmitted in either Amplitude modulation (AM) or vestigial sideband (VSB) NTSC (North American analog TV broadcast modulation standard). AM and VSB signals are inherently compatible with each other, and most televisions can receive either. AM signals are wider than VSB signals, but VSB transmitters are more difficult and expensive to construct. For practical reasons, most individual ATV users transmit in AM, and VSB is transmitted by repeater stations. On the 33 cm and higher bands, Frequency modulation (FM) ATV may be used, and on the SHF and EHF ham bands, FM is more commonly used than VSB or AM. FM ATV is incompatible with AM/VSB ATV, and a separate demodulator is necessary to receive signals.

70 cm band

The 70 centimeters ham band is the most used band for ATV. Signals transmitted on this band usually propagate longer distances than on high frequency bands, for a given transmitter power and antenna gain. The 70 cm band channels (with carrier frequency for video and audio) are:

- 57: 420-426 MHz (421.25 video, 425.75 audio)[1,2]
- *58: 425-431 MHz (426.25 video, 430.75 audio)*[1,3]
- 58: 426-432 MHz (427.25 video, 431.75 audio)[1]
- *59: 432.75-438.75 MHz (434.00 video, 438.50 audio)*[3]
- 59: 432-438 MHz (433.25 video, 437.75 audio)
- 60: 438-444 MHz (439.25 video, 443.75 audio)
- 61: 444-450 MHz (445.25 video, 449.75 audio)[4]

33 cm band

The 33 centimeters ham band is next highest frequency band available for ATV in North America. This ham band is unique to ITU Region 2, and it is rarely available for amateur use in ITU Regions 1 or 3. This band is also shared with many users, including ISM devices and Part 15 users, so interference issues are more likely than on other bands. This is also the lowest frequency band on which FM ATV occurs. This band does fall within the CATV channel scheme; however, most current consumer equipment does not tune to channels above 125.

The 33 cm AM/VSB channels (with carrier frequency for video and audio) are:

- 143: 906-912 MHz (907.25 video, 911.75 audio)[1]
- N/A: 909-915 MHz (910.25 video, 914.75 audio)
- N/A: 910-916 MHz (911.25 video, 915.75 audio)
- 144: 912-918 MHz (913.25 video, 917.75 audio)
- 145: 918-924 MHz (919.25 video, 923.75 audio)
- N/A: 922-928 MHz (923.25 video, 927.75 audio)[2,3]

23 cm band

The 23 centimeters ham band is the third highest frequency band available for ATV. Due to the wider nature of this band over the lower ones, and the expense of VSB-filters, VSB is rarely used. Most ATV is either in AM or FM. Old TVRO receivers may be used to watch FM ATV when an antenna is connected to the LNB input. The IF of these receivers overlaps this ham band.

The 23 cm AM/VSB channels (with carrier frequency for video and audio) are:

- 1240-1246 MHz (1241.25 video, 1245.75 audio)[1]
- 1252-1258 MHz (1253.25 video, 1257.75 audio)
- 1264-1270 MHz (1265.25 video, 1269.75 audio)

- 1276-1282 MHz (1277.25 video, 1281.75 audio)
- 1288-1294 MHz (1289.25 video, 1293.75 audio)

Other amateur radio bands

In addition to the above, there are other ham bands which are less commonly used for ATV:

- On the 13 centimeter band:
  - 2417.5 MHz is used for ATV links.
  - 2441.5 MHz is the most used FM ATV frequency. Uses a 6.0 MHz audio sub-carrier and 4 MHz deviation.
- The 9 centimeter (3 GHz) and 5 centimeter (5 GHz) bands have links in some areas.
- On the 3 centimeter band, 10.4 GHz is a wideband FM channel and may be used as an ATV repeater input.

Other information

The distance record for ATV is between Hawaii and California on 434 MHz.http://www.hamtv.com/atvdxrecord.html

Experiments with digital modes have lagged somewhat behind those in Europe, but have taken on some new urgency given the transition of broadcast television. **WR8ATV currently has an output using DVB-S, which is believed to be the first, and currently only, D-ATV repeater in the US.**

Transmission characteristics

Typically frequency modulated TV is used on frequencies above 1240 MHz (1.24 GHz), where there is enough bandwidth for such wideband transmissions. This is often used as a repeater's input frequency, with output being standard VSB on the four channels listed above.

In a nutshell

- below 1.24 GHz: Vestigial Sideband
- above 1.24 GHz: FM, PSK etc...

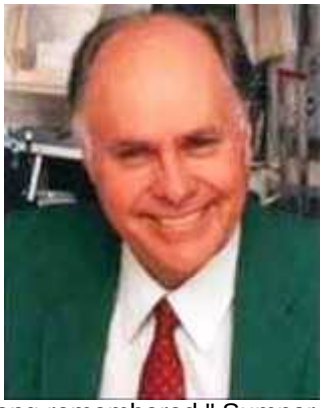
The quality of transmission is expressed as a "p-level"; "p" standing for "picture". P-levels range from zero to five, increasing as the picture becomes more viewable. P-0 signifies a state in which sync bars are visible, but the picture is too snowy to be seen; this occurs at a minimum signal strength of 3db. Each level represents an increase of 6db over the previous; P-5 is 30db above P-0 and represents a perfectly clear picture.

Range

As transmission frequency increases, atmospheric path losses become greater, particularly at frequencies above 10 GHz. Additionally, long-distance propagation by F-layer ionospheric skip over the horizon does not typically occur at higher frequencies, and terrain and man-made structures can affect propagation of signals, blocking or redirecting signals. Factors such as E-layer skip propagation, tropospheric enhancement, and knife-edge diffraction can extend the useful range of signals.

http://en.wikipedia.org/wiki/Amateur_television#23_cm_band
…Ken W8RUT

Silent Keys: Ham Radio Publications Pioneer, Visionary, Iconoclast Wayne Green, W2NSD, SK



Wayne S. Green II, W2NSD ("Never Say Die"), of Hancock, New Hampshire, died September 13. He was 91. A well-known and often outspoken figure during what some consider Amateur Radio's golden years in the 1950s and 1960s, Green helmed *CQ Magazine* for 5 years before becoming the self-proclaimed "El Supremo and Founder" in 1960 of *73* magazine, which he published until 2003.

"The purpose of [*73*] at that time was to get more hams building equipment," Green recounted in a radio interview several years ago. A hallmark of *73* was Green's iconic, rambling and wide-ranging "Never Say Die" editorials, in which he rarely missed an opportunity to tweak the ARRL and his magazine competitors for their perceived shortcomings. ARRL CEO David Sumner, K1ZZ, said Green maintained his membership in the ARRL despite being a persistent critic.

"Wayne will be remembered in many different ways by many different people, but he will be long remembered," Sumner added. "In the early days of packet radio he gave me some good advice as to how the ARRL should promote the new technology: 'Talk about it as if everybody's doing it, and eventually they will be.'"

Indeed, Green often was ahead of the curve in promoting such technologies as single-sideband phone, solid-state, FM, and the marriage of computers and ham radio, and he went on to found and publish *Byte* and other computer-oriented publications. "I live mostly in the future," Green was quoted as saying.

ARRL Publications Manager and *QST* Editor Steve Ford, WB8IMY, got his start writing for Green. "Wayne published my first article way back in 1975," he said. "I still have a photocopy of the check he sent."

Green maintained a larger-than-life presence, even in the years after he faded from the Amateur Radio spotlight, and he never did really retire. "Hey old buddy, I will miss you," radio talk show host Art Bell, W6OBB, posted to Wayne Green's blog. "NEVER SAY DIE is a phrase that will be with me till it's my time." Green was an occasional guest on Bell's "Coast to Coast AM" overnight talk program. There hardly was an issue that Green would not confront, and he expounded a variety of unconventional science, health, and medical theories -- from cold fusion and the moon landing to AIDS and cancer cures. He continued to write and speak frequently on these topics and others, as well as on public policy, even at hamfests where he was a guest.

The "final" in his blog sums up Green's overarching philosophy. "Wayne Green passed away September 13, 2013 in a peaceful, painless transition from this life on Earth. An eternal optimist, and one who loved to share his never-ending zest for life, he was a friend to many and will be missed greatly. Wayne was not afraid of dying and was very much ready to embark on his next great adventure to the afterlife."

A NEW REPEATER IN OUR NEIGHBORHOOD

Brian, KC8LMI, has just installed a new 439.25MHz input, 910MHz output repeater near Bowling Green, Ohio on an old 150 foot high cell tower. Good for you, Brian! Below is a description of the installation. WA8RMC

Brian describes, https://www.youtube.com/watch?v=LPVweoYaW4E

Video from top of tower during antenna installation.

The site was abandoned by Alltel. It is on Craig n8djb's property near Pemberville, Ohio approximately 150 feet high that they left on his property. The tower was put up in 1985. They left everything on the tower and the building. The rotor guy you probably know him or heard of cats rotors? The address of the site is 7398 S.R. 105 Pemberville, OH 43450. We're using 439.25 lvsb input horizontal omni and 923.25 output vertical. We got the amplifier in line Friday night. Testing at the site is so far so good. I am 80+ miles and can get in almost any time of the day even in the rain. It's not reliable but only takes a slight opening to be in solid. I was seeing it last night while the band was open and getting in mobile just south of Ann Arbor, Michigan on my way home.

The Rx is a single rib cage on the very top and the atvr-4 lvsb and the home made filter with a 1 watt exciter. Lots of attenuation and Glenayre amp. The site is approximately 4.5 miles east of Bowling Green and I-75. Good mobile coverage. The 900 interference is present but depends on where you are. We are testing the site out currently. There is no video server on it at this time.

We installed a meter on our rack to keep track of our power usage, as the power is being paid by Craig n8djb right now. I'm not sure how all that is going to work out but we will have to come to an agreement at some point. So far he seems to be ok with everything we have done.

The equipment is my dad's and mine. Bryan kd8kcf has a couple power supplies, and the metering-wiring involved, as we ran 220vac to run the 900mhz amplifier. The power supply is a 100 amp 28vdc switching. The system is made up of the following: horizontal omni home made single rib cage Rx antenna at appx. 150ft fed with 1"5/8 Heliax. The Tx is a 8db commercial stick also fed with 1"5/8. The receiver is an atvr-4 for lvsb and 439.25 am input. There is a home made 7 pole lvsb filter in line. The output is also am, 923.250, exciter is a txa5-33, 1 watt exciter attenuated to run the Glenayre amp to 475 watts sync tips.

The system has a control receiver and is in normal repeat mode most of the time unless Bryan has it disabled temporarily to look for our local machine up here near Jackson, which is on the same 923.25 output. I happen to have most of the gear sitting here between dads equipment and mine. We had talked to Craig at Findlay swap and he said we could test the site and so far so good! I'm 80+ miles and can get a pic in most of the time, even in the rain. I have seen it up to p3 so far at the home qth.

I'm not sure what the future holds but we are impressed so far with the performance of this site. The 900 interference is present but depends on your location. There are a lot of part 15 devices now so depending on where you are it's not bad. We went for a ride the night we put the amp in line last Friday night and the band was open but we worked it in my mobile setup I am using 2 omni angles D1010 and mag mount for 900 rx and saw it into Findlay mobile on I-75 and down to almost Lima south then turned around.

On the way home the next night I worked it into near Ann Arbor. Band has been pretty good lately but that site is clear and clean input which is prime. It is impressive. I hope we can make things work out and leave it there.

I will try to keep you updated. This was a quick decision to test at this location. We met him at Findlay and the following Saturday we did the antenna work and had it on the air.
…73 for now. Bryan

AUTOMOTIVE COMPUTERS — MORE INTERFERENCE?

The new features of automotive interiors come at a cost of multiple sets of wireless information and content being delivered transparently to the driver. In the past, this was at most two antennas - AM and FM for the entertainment system. Modern vehicles need a few more antennas, and the count is growing.

A typical high-end car today has AM, FM, Satellite Radio, TPM, Remote Entry, Remote Start, In-Vehicle TV, DAB, GPS, Bluetooth, Collision Avoidance Radar, Parking Assist Radar and Electronic Toll Collection. Next-gen vehicles will add GSM and LTE in addition to Wi-Fi, specialized Car-To-Car Communications and additional systems for automated drivers assist.

One of the challenges of these systems is directionality of the antenna and its ability to pick up the signal with the vehicle facing different directions. The nominal solution for this issue is the use of a diversity system that employs multiple antennas and then has circuitry to determine which one has the strongest signal, and then use that one.

However with the large number of antennas needed in the system - over 15 now and quickly approaching 20 - initial placement of these antennas in a non-interfering manner on the vehicle is a big challenge. This is even before the duplicating of the antennas to support the diversity requirements.
The antennas are still passive, but have migrated from Mast/Whip antennas, to glass-mount antennas to the new generation bee sting antenna designs and the shark fin modules. These are being used with a combination of the glass-mount antennas and new distributed antennas. As the frequency diversity increases more shapes of antennas are needed, as shown in the table below (courtesy of Intech):

Service	Typical Frequency	Tx*	Rx#	Direction of Radiation
AM Radio	Approximately 1 MHz		Yes	Horizontal
FM Radio	88 MHz to 108 MHz		Yes	Horizontal
In-vehicle TV	50 MHz to 400 MHz		Yes	Horizontal
Digital Audio Broadcasting (DAB)	100 MHz to 400 MHz		Yes	Horizontal
Remote Keyless Entry (RKE)	315 MHz/413 MHz/ 434 MHz		Yes	Horizontal
Tyre Pressure Monitoring System (TPMS)	315 MHz/413 MHz/ 434 MHz	Yes	Yes	Intra-vehicular
Cellular Phone (provision of Internet via HSPA)	850 MHz 900 MHz 1800 MHz 1900 MHz 2100 MHz	Yes	Yes	Horizontal
Satellite Navigation (GPS)	1.575 GHz		Yes	Satellite
Satellite Digital Audio Radio Service (SDARS)	2.3 GHz		Yes	Satellite
IEEE 802.11 b/g/n (Wi-Fi)	2.4 GHz	Yes	Yes	Horizontal
Bluetooth	2.4 GHz	Yes	Yes	Intra-vehicular
WiMAX	2.3 GHz/2.5 GHz/3.5 GHz	Yes	Yes	Horizontal
Electronic Toll Collection (ETC)	5.8 GHz (or 900 MHz)	Yes	Yes	Overhead
V2V+ and VII+	5.9 GHz	Yes	Yes	Horizontal
Collision Avoidance Radar	24 GHz and 77 GHz	Yes	Yes	Forward

* Transmit # Receive + These terms are acronyms for Vehicle-to-Vehicle communication and Vehicle-Infrastructure-Integration using IEEE 802.11p

… A9XW on 10/02/13.

DATV-EXPRESS DATV BOARD PROGRESS UPDATE

The project team performed a design review on the Rev E DATV-Express PCB layout package that Tom WB6P had prepared. The new etch layout looked great…some minor documentation clean-up was implemented and the "pre-production" design files of the board were released to Art.

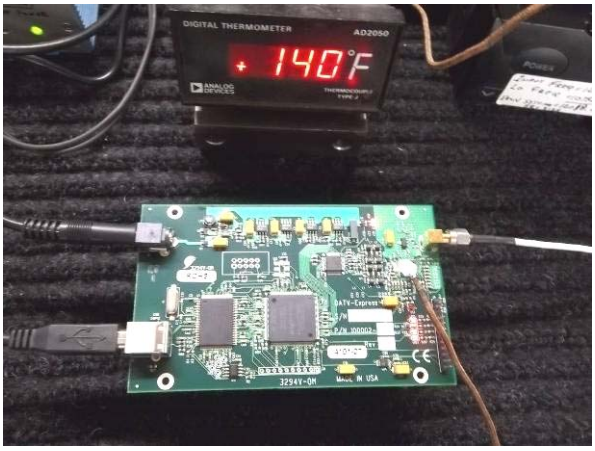
Art WA8RMC had an extremely busy month on the project. He ordered 100 blank PCB's from Sunstone for the pre-production run of boards. Art also placed the order for the solder-paste stencil/mask. This will allow the robots to later assemble the PCBA board without hand-soldering. But Art was having extreme frustration receiving video and audio at his QTH. Now Charles G4GUO has 6 different STB/receivers that all worked perfectly. Ken W6HHC has one STB that received video perfectly. At that point, using v1.04 DATV-Express software, the best that Art could report was "full QUALITY and blank screens" on three STBs…and an occasional flash of video and "raspy audio" on the fourth STB.

Charles G4GUO tapped into the experience the DigiLite team and Brian G4EWJ explained that one short-cut taken by DATV-Express software to NOT implement the PCR (Program Clock Ref) field in the Transport Stream (TS) would cause problems. The PCR field was implemented in v1.05….but the results on Art's STBs did not improve?!? Art has Tutioune software with a S2-1600 receiver card as developed by Jean Pierre F6DZP. Art's screen shots of Tutioune analysis tool revealed some irregularities. Charles sent a TS file to Jean Pierre F6DZP and to Rod G6TTD/KG6TTD (TSreader for MPEG-2) to get feedback utilizing their experience. Jean Pierre explained that the audio bitrate was not correct. Charles could now see that the audio bitrate was being calculated incorrectly, fixed the audio bitrate calcs and sent a new v1.06 of the software to Art. Now Art can receive video and audio on one of the four STBs. Charles is suspicious that the PID setting may not still correct between Art's DATV-Express board and the STBs that refuse to work correctly. (Oh the joys of testing prototype designs ….hi hi)

Charles G4GUO was able to compile the DATV-Express software onto Raspberry-Pi and transmit a 1 MSymb/sec DVB-S signal. Raspberry-Pi does not have a lot of computing power…so 1 MSymbol/sec is the maximum on the Raspberry-Pi until Charles ports more PC functionality into the board FPGA. Next Charles compiled DATV-Express software on a Sabre Lite board from Element14 (Freescale i.MX6 Quadcore) and could successfully transmit DVB-S signal at 4 MSymbols/sec FEC=7/8.

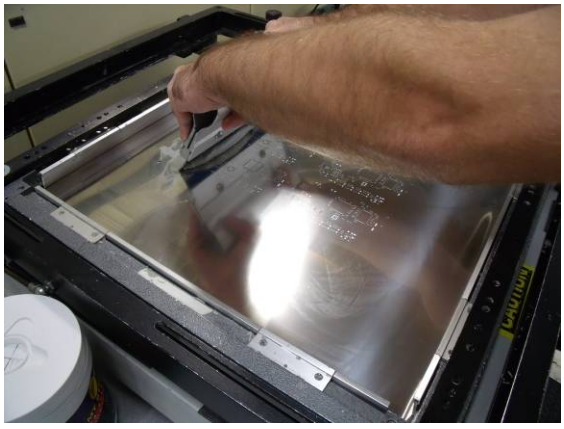
Ken W6HHC continued to test new software releases to make sure that nothing became broken at his testing lab. G4GUO had implemented a TS file recording switch into v1.05, so it was "cool" for Ken to be able to capture his TS stream and then play it back or send it off for someone else to view. Charles pointed the team to a useful (and free) TS analysis tool called DVBinspector. The DVBinspector provides lots of info about TS stream details...like measured data-bit rates, and PIDs being used, etc.

At the right is a picture of the pre-production board during a temperature test. The output modulator IC gets pretty warm as it dissipates about one watt. That's a lot for such a small package. It has a heat dissipation pad on the bottom of it which is intended to be soldered to the artwork for heat dissipation purposes. Earlier prototypes operated the IC too hot so added copper ground plane to the artwork was done hoping to eliminate the need for a separate heat sink. It looks like it is successful.



Below are pictures of the panel of boards during fabrication. On the left they are manually applying solder paste to the panel of 4 boards. To the right of that is the parts assembly robot in action. It is surprising to see how fast they are placed on the boards. It's almost to fast to see it work and definitely too fast to see individual parts being placed.

…WA8RMC



OUR 1280 ATV/DATV MAY BE DOOMED!!!!!

Here we go again! A newly launched CARSR radar system has started operation on 1280.0MHz in our area! It is a radar that originates from Dayton Ohio international airport seen and heard in the Columbus, Ohio area with great strength. In fact it has made 1280MHz analog ATV here very annoying and DATV almost impossible. The bulletin board DATV information sent by WB8CJW has been shut down and the analog signal is viewed with significant interference streaks across the picture. How can we combat this interference? Well, since it is a government activity and they have priority in this band, we can't complain to the FCC. We have to accept the interference. It looks like it will only get worse as the Columbus, Ohio airport will most likely also have CARSR radar in the near future.

It's really a shame as we have already vacated the 1240-1250MHz portion due to the GLONAS interference issue we had a few years ago. Now we won't be able to operate on 1278-1282MHz. For us, there isn't any more available spectrum so it looks like the 1240-1300MHz band may be doomed for amateur communications. We must re-group and see what's coming in the future and where, if anywhere, we can re-locate.

If the above is not enough, I have been informed that our repeater signal is again possibly interfering with the ODOT system. An RF engineer from Trimble, the company in California that manufactures the ODOT GPS surveying equipment, Emailed me about it the other day. I returned the Email with a phone conversation describing how we interfered 5 years ago and subsequently moved from 1250 to 1258MHz with no further complaints till now. After I described the new CARSR radar installation in London, Ohio and how it may be the source of their interference, he agreed that it may be the culprit. He will investigate further and let me know the result. I am excited to find that we are not their problem this time. If true, it will be interesting to see how they solve it now. I'm sure if it becomes a battle between them and the FAA/Homeland security, I know who will win. This will be interesting to watch from the sidelines!!!!!!!!!!

As a review, I've included below the details of this newly developed radar system for your information.

Amateurs Must Protect New Radars in 23 cm Band

TAGS: aeronautical radionavigation, aeronautical radionavigation service, amateur, amateur operation, amateur service allocation, amateur stations, arrl, cm band, fcc rules, frequency allocations, harmful interference, mhz range, new generation, secondary basis, Southern California

From the ARRL bulletin 04/12/2012

The Federal Aviation Administration (**FAA**) is deploying a new generation of Common Air Route Surveillance Radar (CARSR) that has some implications for the use of the 1240-1300 MHz (23 cm) band by amateurs. The Amateur Service allocation in this band is on a secondary basis, with aeronautical radionavigation and several other services primary in the United States Table of Frequency Allocations. The FCC rules require that amateur stations operating in the 23 cm band may not cause harmful interference to stations in the radionavigation-satellite service, the aeronautical radionavigation service, the Earth exploration-satellite service (active) or the space research service (active). One case of harmful interference in Southern California has been reported.

CARSRs are being installed in several dozen locations throughout the country and will use various frequencies in the 1240-1350 MHz range with an occupied bandwidth of about 3 MHz. In the vicinity of the radars, amateur operation may be precluded in a portion of the 23 cm band. The ARRL is in contact with FAA engineers. We anticipate that the constraints on amateur use of the band will be limited to those necessary to protect aviation safety, which of course cannot be compromised.

Spectrum Threat To FPV Flyers On 1200 MHz CARSR

The following information is from the sUAS News web page www.suasnews.com. RC airplanes are subject to this limitation.

Here's some of the acronyms used:

***FirstPersonView (FPV)** refers to the operation of a radio controlled (R/C) model aircraft using an onboard camera cockpit view to orient and control the aircraft.*

***Common air route surveillance radar (CARSR)** The Raytheon-built ARSR introduced in 1958 had maximum range of 200 nautical miles. As of June 2012, approximately 60 ARSR RADARS are still operating in the US, 13 replaced with modern Common ARSR systems. ARSR RADARS are still maintained at high rates of reliability by FAA technicians. All ARSRs are slated to be replaced by the completely solid state Common ARSR by the end of 2015 (CARSR). The Westinghouse-built ARSR-3 and 3D search radar was used by the FAA in the Joint Surveillance System (JSS). It operated in L-band at 1250-1350 MHz and detected targets beyond 210 nautical miles. The D model had height-finder capability.*

UAV – Unmanned Aerial Vehicle

There are many variations of the unabbreviated form of UAV, namely; Unmanned Aerial Vehicle, Unmanned Air Vehicle, Unmanned Airborne Vehicle, Unmanned Aerospace Vehicle, Uninhabited Air Vehicle, Unpiloted Aerial Vehicle, Unoccupied Air Vehicle as well

as many other names. In some cases this has even been expanded to Unmanned Aerial Vehicle Systems (UAVS). Officially, according to the United Nations and NATO, UAV is the abbreviated form of the term Unmanned Aerial Vehicle.

It is basically a reusable remotely piloted aircraft. UAVs are either controlled from a remote location or fly autonomously on a pre-programmed flight plan or a combination of both. They are used in a variety of roles including surveillance, reconnaissance, search and rescue, surveying and many more.

UAS – Unmanned Aircraft System. The United States' Federal Aviation Administration and Department of Defense have officially adopted the term Unmanned Aircraft Systems (UAS) for a UAV, this was adopted in order to reflect that UAVs are not only aircraft, but systems which include ground stations and other elements besides the actual aircraft. This term not widely used as yet but is spreading through both military and civilian industries because it is the correct term to describe a UAV.

GCS – Ground Control Station. A ground Control Station (GCS) is the ground based control element of an Unmanned Aircraft System (UAS). From this station the UAV can either be piloted by a human directly or the automated flight plan can be modified.

SUAS – Small Unmanned Aircraft System. A Small Unmanned Aircraft System (SUAS) is just a man portable UAS. It has no officially defined size specifications but in general it is small, easily transportable and usually only requiring 1 or 2 persons controlling the entire system.
Drone - A commonly used name for a UAV.

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 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
Vol 30 I		No articles
Vol 30 II		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 30 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.
No new members this time.
…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.

11/02/2013 | Grant ARC Hamfest

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

11/03/2013 | Massillon Hamfest and Auction

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

11/09/2013 | All Ohio ARES Conference

Location: Reynoldsburg, OH
Type: ARRL Convention
Sponsor: ARRL Ohio Section
Website: http://www.arrl-ohio.org/SEC/default.html

01/19/2014 | SCARF Hamfest

Location: Nelsonville, OH
Type: ARRL Hamfest
Sponsor: Sunday Creek Amateur Radio Federation
Website: http://www.scarfarc.com

02/02/2014 | WinterHamFest

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

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
http://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 has 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 if you can.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (07/18/13)…….$2102.25
RECEIPTS(dues)……..$ 60.00
CLOSING BALANCE (10/17/13)…….. $ 2162.25

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)
10.450 GHz - F5 video analog NTSC

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
10.450 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 up for 5 minutes) Select # to shut down before timeout.
697	Select Time Warner radar. (Stays up till turned off). Select # to shut down.
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 for auto scan to continue

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 2013

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
NN8B	Don Kemp	6384 Camp Blvd.	Hanoverton	OH	44423	
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	2844 Sussex Place Dr.	Grove City	OH	43123	614-836-2521
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	301-772-7382
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	614-405-1710
KC8EVR	Lester Broadie	108 N Burgess	Columbus	OH	43204	
WA8FLY	Rod Shaner	16012 London Rd.	Orient	OH	43146	740-279-3614
N8FRT	Tom Flanagan	6156 Jolliff St.	Galloway	OH	43119	
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	419-231-7277
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
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334	
KA8LWR	Mel Alberty	1645 Olentangy Road	Bucyrus	OH	44820	419-468-2971
KD8KDM	Mike Bowlus	127 W. Plum St. PO box 221	Saint Paris	OH	43072	
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
WU8O	Tom Walter	15704 St Rt 161 West	Plain City	OH	43064	614-733-0722
N0OBG	Jim Conley	33 Meadowbrook C C Est	Ballwin	MO	63011	
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022	
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	
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,W8WTB	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	9 Master Street Apt A	Springfield	OH	45504	937-478-6488
W8RQI	Ray Zeh	2263 Heysler Rd	Toledo	OH	43617	
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	
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
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325	
W8TIP	Gene Hawkins	1720 Liberty Street	Toledo	OH	43605	
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	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	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064	
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224	
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
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371	

Call	Name	Address	City	St	Zip	Phone
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 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.