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 WA8RUT REPEATER UPDATE

We finally got down to the repeater to make some enhancements. It ought to be obvious by checking the operation but if you'd like to read about it, check out the inside pages.

ATCO HAM IN THE SPOTLIGHT

This time I thought we'd look a little farther for a person to award the front page spotlight. I realize that he isn't quite "local" but nevertheless is most deserving to be recognized as a very ***Good*** and dedicated ham. (Sorry, Dick, for my attempt at humor.) He is none other than Dick Good, W8RVH, home based in New Carlisle, Ohio, a north eastern suburb of Dayton. Dick has been active in ATV for quite a while and active in our club almost since its inception. Hold down the fort in Dayton, Dick, and send us some of that rare DX. Dick can be heard on 144.34 almost every morning at about 7:30 AM talking to W9NTP in Indianapolis.

ACTIVITIES ... from my workbench

Well, here it is again time for another ATCO newsletter. This has been a particularly difficult newsletter to do in light of the many things that I've got going on around the house. The most important issue at hand is the major kitchen reconstruction project. Some walls come out, the floor gets ripped up, new appliances , new cabinets and counter tops are being installed. In the meantime, we have to eat, and restraunts get expensive quickly. So, as a result, my activities have been directed away from ATV temporarily. At this point, most things are starting to go rather smoothly , so some ATV activities are starting.

Dale (WB8CJW) and I went to the repeater the other day and, in my opinion, improved things quite a bit! Three major improvements were made.

1) We installed my dual 2 meter cavity that I talked about in previous newsletters. This removed the 146.76 MHz interference we were experiencing when trying to do touch-tone access on 147.45 MHz. It seems now that access can be made when the 146.76 MHz repeater is on the air at the same time.
2) We installed hard line for the 439.25 MHz and the 446.35 MHz link transmitter runs within the cabinet. This eliminated the desense we were getting when the link transmitter was on while receiving a weak ATV signal on 439.25 MHz.
3) We retuned the 439.25 MHz receiver. This was necessary quite by accident because while we were installing the cables, we apparently bumped the 439.25 MHz receiver and the oscillator quit. By the time we found the problem, we had essentially retuned the whole receiver. **It needed it too!** Initial signal thruput was barely visible bars (from my IFR signal generator with AM 1kHz modulation) was about 200 microvolts. Retuned, it produced the same quality signal with only 25 microvolts! We're going to have to check these things more often.

Much more needs to be done but if we fixed it all the first time, things tend to get boring later so we'll continue to stretch it out. (Did you buy that one???)

Our next major project is to improve the 1258 MHz output which will go down to 1250 MHz at that time. At the present it outputs about 15 watts into a single slot antenna. We just received a 60 watt unit and a dual slot antenna is on order. As soon as I finish the construction of a 13 volt 25 amp power supply to power the new amplifier, we'll take it to the repeater. That should improve things by at least 15 dB. (At 6 dB/P unit, that's about a 2.5 P unit improvement in picture quality!) It looks like we're headed toward 1250 MHz as our primary output over 439.25 MHz. Studies so far have shown that the FM signal and the fact that there are no FM repeaters on this band combine to produce a very interference free signal. Add to that the availability of surplus LNB satellite receivers, it turns out that it's just as easy to receive as 439.25. (***Side note***: KF8QU will find the small antenna required very attractive...he isn't allowed outside antennas in his neighborhood.)

Because the 1200 band is becoming more and more attractive as time goes on, we would like to promote projects with this band. N8KQN has been working on loop yagi antenna designs and I feel that he found one that is small, easy to build and has reasonably high gain given its size. The design will appear in the next issue (I just ran out of room this time). If anyone would like a head start, contact either Ted or me.

Oh, by the way, if any of you do your own construction and find it difficult to find an adequate power supply, don't overlook the possibility of using surplus computer power supplies. They are available at custom computer dealers and at hamfests for about 5 bucks each and have +5 volt @10 or more amps, -5 volts @ 500 ma, +12 volts @ 8 or more amps, -12 volts @ 500 ma and sometimes others. I'm using three 300 watt units with the 5 volt outputs (25 amps each) in series for the new 1280 amplifier. I needed to reduce the output of each to about 4.4 volts but this is easily done. So far I bought about 6 supplies and haven't found a bad one yet! It seems that the supply is labeled "bad" when the fan gets noisy. Most applications don't need the fan anyway so strip off the case and the ugly harnesses and mount the PCB directly inside your new project for a reliable and compact design. **CAUTION!!! These supplies operate directly off the AC line. The heat sinks have live 120VAC on them so be careful to insulate , ground and shield them properly to eliminate a potential shock hazard!!!**

One last item... last year a few people mentioned that we selected the Fall event too late to be able to plan around the family activities. Well, this year we've already booked the ABB shelter house for October 20 so mark your calendar now. Remember how cold it was on the first week in November last year? I do, and don't want to repeat it, so we moved it up 2 weeks this year!!!

Well, that's all for now. More next issue.
Art...WA8RMC

ATCO SPRING EVENT MINUTES

Our annual Spring Event was held on April 28,1996 at our usual place (ABB shelter house). The weather was warmer than the Fall Event last year but Mother Nature still wasn't cooperative for it rained before we could set up the antenna measuring equipment. There must be some sort of "hex" on our antenna measurement attempts because the last several tries resulted in failure of some kind. In any case, the food as well as the company was very acceptable. All seemed to have a good time. Discussions included repeater operation, Dale's rebuilt controller for the repeater, channel 10 radar situation, 1258 MHz repeater output power, and vertical Vs horizontal antennas. Later ballots were passed out to re-elect the officers...yes, I guess you're stuck with the same ones again this year! If you missed the event, a large number of door prizes were handed out which included some camera goodies from my attic and some books donated by Universal Radio. Participants in random order included WA3DTO, W8PGP, KA8WBK, W8RVH, W8EHW, N8OCQ, N8TBU, N8KQN, KB8UU, KF8QU, K8AOH, KB8UGH, KA8ZNY, N8OOY, WA8RMC, WB8CJW, KB8YMQ, WA8RUT and W8WAU. For a total of 19 people! Pretty good turnout but let's see some new faces at the Fall Event. (We have tentatively planned the Fall event for Sunday October 20 th.)

The following pictures are a few of the ones taken that day.

WA8RUT

KB8WBK W8RVH

KB8UU ????? W8WAU

RED, WHITE & BOOM!, Part Deaux

On July 3rd, our ATV club was again pressed into service for the second consecutive year by the Columbus Police to provide video surveillance of the 750,000 people who came to watch the Fireworks and participate in our Nations birthday celebration. Phil, N8LRG, Tom, KA8ZNY, Art, WA8RMC, Bob KF8QU, John, WB8INY and Yours Truly, WA8RUT, set up two monitors in the police **H**eadquarters' **E**mergency **O**peration Center (EOC) and two transmitting sites with 5 cameras to keep an "eye" on the massive crowd. Video quality provided to the EOC R,W & B Command Center were outstanding. Indeed the Columbus Police have their own fixed and mobile video surveillance system, but the quality from the ATVer's often surpassed even the CPD's helicopter mounted video surveillance (mostly because we know more about antennas and where to point them)! The highlight was when Channel 10, "10TV", interviewed Art and Bob about our operation and received some excellent "press" about ATV!

The Receive site, located in the EOC, comprised of two monitors with inputs on 2441.5 MHz FMATV, 910.25 MHz AMATV with back-up converters for both 1200 & 440 MHz (in case of unexpected interference on 900 or 2400 MHz). Antennas were an OMNI Vertical on 2400 MHz and the 910.25 antenna was a small Yagi mounted on a camera tripod. The monitors were positioned at the main CPD dispatch console, together with CPD's monitors for their fixed and 'chopper mounted' camera. It was interesting to note that the fixed cameras were closed circuit while the Chopper used a transmitter in the 2.1 to 2.6 GHz band. In fact, while setting up our own receive system, we could see the Chopper's transmitter with an indoor antenna better than the police receive system! The CPD system is transmitting FM Video and is also an INFRARED/ Heat detection camera of some sort (I did not get any details!) and if I were going to chase "bad guys" after dark with a helicopter, it's exactly the kind of camera that I would want! Both ATV monitors provided great pictures of the CPD places of interest. The 20" monitor with the 2441.5 MHz FMATV converter provided spectacular pictures when the Sony HI 8 camera was selected by the transmit site. The EOC receive site was manned by John, WB8INY and part time by WA8RUT. (I spent a lot of time on the roof!).

There were two Transmit sites, one nine (9) stories straight above the EOC on top of the Police HQ building on an observation deck (fantastic place to watch Fireworks!). KA8ZNY and N8LRG provided the operator skill to keep the transmitters on the air and to properly point the 5 cameras set-up at that location. The five cameras were fed to a video switch which was scanning each camera at about a 10 second rate while feeding video to two transmitters, one on 2441.5 and one on 1280 MHz FMATV. The 1280 MHz transmitter was used to up-link the pictures to the ATCO repeater so that those people at home who decided not to brave the huge crowd could watch the Fireworks. Dale WB8CJW reported great pictures through the repeater via the 1280 FMATV link.

About a half a mile away, on top of the Gas Company parking garage was our other transmitter site, operated by Art, WA8RMC and Bob, KF8QU. Art and Bob were transmitting on 910.25 MHz using a single camera into a Yagi pointed at the CPD HQ. Their 'neighbors' on top of the Gas Co. parking garage was "10TV" and about 500 other people who were awaiting the Fireworks. Pictures from the site were P4+ with good color from the 5 watt transmitter in the very difficult downtown area. Next year, I think we should give 920 FMATV a try from this site, as well as add some more cameras to be switched. As mentioned earlier, both Art and Bob were interviewed by 10TV and as a result ATV has now achieved fame and glory, at least on the 11 o'clock news!

The Fireworks were fantastic! It's not clear which transmit site had the best view, although being 10 stories above the ground makes the fireworks seem eye level! The Commanding Officer in the EOC was very complementary about our operation and promised that next year we would get our very own elevator key so we would not need a police escort to go back up to the roof! We traveled between the EOC and the roof frequently!

The operation was a total success with no major incidences requiring police action, with the exception of keeping two rival gangs apart. All ATVers report they had a great time providing this public service work and looked forward to doing it again next year!
Ken...WA8RUT

NEW MEMBER SECTION

Let's welcome the following new members to our group**!** If any of you know someone who might be interested, let one of us know so we can flood them with information.

KC8AGZ Dave Lukens , Pickerington Ohio
K8MZH Leland Hubbell , Johnstown Ohio

NEW WORLD RECORD ON 10 GHZ ATV. 360 Miles (591 KM)

On May 18, 1996, F1JSR and HB9AFO concluded an amateur television QSO of 360 miles/591 km between the Island of Corsica and Spain, which is a new world record on the band and in this mode of FM television.

Serge, F1JSR of near Lake Geneva in France was staying for one week on Corsica, in grid square JN42RQ, in the Serra di Pigno. His altitude was 3139 ft/960 meters above sea level. His equipment was a DRO synthesized transmitter on 10.450 GHz followed by a traveling wave tube amplifier delivering 20 Watts to an "Idea" parabolic antenna of 16 inches/40 cm in diameter. For reception, he had an offset feed antenna of 33.5 inches/85 cm, an unmodified Astra satellite TV Ku band LNB and a homemade direct detection ATV FM receiver.

For Michel, HB9AFO, in Spain, it was necessary to try several places starting in the region of Toulon, France and ending with Sierra de Montseny near Barcelona, Spain in grid square JN11ET at an altitude of 5395 ft/1650 meters above sea level. He used a DRO transmitter on 10.480 GHz followed by a 1 Watt transistorized power amplifier driving an "Idea" 16 inch/40 cm parabolic antenna. His receiver system consisted of a 39.5 inch/1 meter diameter parabolic antenna with high precision azimuth/elevation gearing, a modified Astra Ku band Sat TV LNB with a 0.7 dB noise factor demodulator in parallel with a 12 V operated TV satellite receiver.

The QSO was completely bi-directional (DUPLEX) with the signals varying between PO and P5 with full color. There were very rapid level variations due probably to the strong wind, the fog and the intermittent rain in Corsica.
Two days before, the same mode FM-ATV QSO was made with Michel, HB9AFO on the Pic de Nore, in the Department of Tran in France in grid square JN12FJ at a distance of 350 miles/574 km. In both cases, the QSOs lasted about two hours and the time was close to sunset.

A detailed report will be published in the French and Swiss ATV associations magazines, "P5+" published by the French association and in the "SWISS ATV".

A PAL VHS video cassette is now in production and obtainable from: Swiss ATV, PO Box 301, 1024 Ecublens, Switzerland.
Michel Vonlathen, HB9AFO, 21 May 1996

SILENT KEY

It is with extreme sadness that we report the passing of George Hoadley W8MTJ on 5/3/96. Although he was only active in ATV a short while, his presence was appreciated by many. George had some difficulty getting an ATV rig on the air so he was helped mainly by W8DMR and KB8WBK.

HAMFEST CALENDAR

This section is reserved for upcoming hamfests for as far in advance as we know about them. The listings will be limited to Ohio and vicinity and easily accessible in one day. I trust that anyone who is aware of an event that is not listed here or incorrectly listed will notify me so it can be corrected. The list will be amended as further information becomes available.

LOCATION	SPONSOR	DATE	TALK IN FREQ	COST	ARRL	EVENT?
Xenia, Ohio	----------	July 28	----------	$2 adv/$3 door		no
Columbus, Ohio	Voice Of Aladdin ARC	August 3147.24+	$5.00		no	
Marysville, Ohio	Union County ARC	August 18	----------	$4 adv/$5 door		?
Fort Wayne, Ind	Fort Wayne RC	September 7	146.160+	$4 adv/$5 door		yes
Findlay, Ohio	Findlay ARC	September 8	147.15+, 444.15			yes
Wheeling, W. Va.	Triple States ARC	September 15			?	
Cincinatti, Ohio	Greater Cincinatti ARC	September 22				yes
Berea, Ohio	Hamfest Assoc of Cleve.	September 29				?
Fort Wayne, Ind	Allen County ARC	November 16,17	146.180+	$5 door + $2 park	yes	

CHALLENGE YOUR STATION! ...Take Your ATV Station Higher Until Your *Giga - Hurts!*

No Pain-No Gain! ...Antenna Gain, Pre-amp Gain, Rx converter Gain, Power Amp Gain, etc., etc...The **pain?...**getting it all to work **successfully!....**and maybe a hit to your pocket book! Masochist Techno-Geeks (you know who we are!) have been pushing video across the state, county, city and the street for some years now on the 0.9, 1.3, 2.4 and 10 Gigahertz bands. The good news is that you no longer have to join the "Techno-Geek Club" to be successful on the Microwave ATV bands. If you are not receiving or transmitting ATV on bands higher than 70cm, the following discussion may be for you.

The 33cm Band (902-928 MHz)
In Columbus, both AM and FMATV is used. The antenna polarization is **vertical.**

The ATCO repeater has inputs on 910.25 MHz (A5) and 920 MHz FMATV. In addition the ATCO Bulletin Board (touch-tone 285, "BUL") Transmits on 910.25 MHz with 10 watts, to a 10 dbd gain OMNI-vertical antenna. The bulletin board is up-linked to the repeater, but since it is an OMNI antenna, it makes a great signal source to tune up your antenna and converters/pre-amps, etc. Several stations (including WA8RMC, KA8ZNY, WB8DZW, WB8CJW and WA8RUT) have transmit capability on 910.25. Most of the activity on the band is on 910.25 AMATV with 920 FMATV just getting started. If you would like a contact on 920 FMATV, give WA8RUT a call!

Common Receive converters/receivers used on the 33cm AMATV band include "Rabbit" (and similar 900 MHz video sender products) and the PC Electronics TVC-9 Converter ($59)/TVC9G , in a ready to go package ($99). FMATV Receivers/converters include LNB Satellite receivers which cover 900 MHz and can be found in Hamfest flea markets for $10 to $25 and HF Technologies makes high quality converters and 70 MHz IF for FMATV. The two units will cost just under $500. A less expensive (but lower performance) way to get a converter on FMATV is to use a converter like the TVC-9 (with a 70 MHz IF) to a LNA (70 MHz) Satellite receiver. This set-up will work better than a LNB receiver alone. Wyman Research (Waldon IN) makes the DL -1 which is a dual band 900 & 1200 FMATV Receiver for $275. The DL-1 is a Satellite PC Board repackaged into a small box. The DL-1 works better than most Flea market receivers, but still could use a good preamp, but you do get two bands in one small box!

Transmitters on 900 MHz include the PC Electronics TXA5-33 1 watt transmitter board for $139, plus if you want sub-carrier sound, you will need the FMA5-F sound board for $39. Packaging the transmitter and sound board is easy. I recommend that you mount the transmitter in the box such that the output connector can be soldered directly to the board. Pauldon associates (Tonawanda, NY) sells "Rabbits" (Transmitter and converter) with output and input connectors already installed for $69. Pauldon also sells power amps (8-10watts) for the Rabbit for $99 to $125 depending on kit or assembled. A high quality FMATV 1 watt transmitter is available from HF Technology for $380. Wyman sells 900 MHz FMATV transmitters with 5 watts out for $360 .

Antennas for 900 MHz include loop yagis, make or buy (Directive Systems or PC Electronics Model 3318LYARM- $95). Back issues of the ATCO newsletter contain plans to make a 900 MHz loop yagi. If you want an OMNI directional antenna, (as well as small yagis) antennas made for cellular service can be found in the flea markets for $10-$25. Gain from these antennas is typically 3-5dBd. Comet makes the FP-19 10 dBd antenna ($119) for 900 MHz. Be sure to use 9913 or better feedline!

The 23cm Band (1.240-1.300 GHz)

The output of the ATCO repeater is on 1258 MHz (soon to be 1250) FMATV and the input on 23 cm into the repeater is on 1280 MHz FMATV. The antennas are horizontal polarization. Most of the activity in Central Ohio is FMATV, although some A5ATV capability is still retained by some ATVers. This is a great band to watch your 439.25 or 910.25 signal into the repeater. WA3DTO, WB8URI and W8RVH are our "Big Guns" on 1.3GHz FMATV.

Receiver/Converters for 23cm. Many ATVers start with an LNB satellite receiver which can be found at many hamfests for $10-25. I have bought 10 or 12 of these receivers and about 70% work fine (The rest go in the junk box!). When shopping for a satellite receiver to use on 1250 MHz, make sure its an LNB receiver with an IF of 950-1450 MHz (not an LNA receiver with 70 MHz IF). With a good antenna and feedline, P5 pictures are likely from the repeater with just the LNB receiver. The LNB receivers are not very sensitive and you may wish to add a pre-amp if you live far from the repeater or want to watch other stations direct. The Down East Microwave 23LNAWPQ available from Down East and PC Electronics ($100) mounted at the antenna can not be beat! If you are going to use the same antenna to transmit, you can't mount the preamp at the antenna (it's not switched!). Pauldon Associates makes a switching type for $179. HF Technology Inc. makes high quality Receive converter (RX1300-$229) and a IF 70 MHz (IF70-$249).

Wyman makes a receiver base upon a satellite board that will receive both 33cm and 23cm and outputs video and sound to your monitor or VCR. I have used the Wyman receiver for several years now and it's become my standard to judge the performance of other receivers. It costs about $275 from Wyman.

FMATV Transmitters on 23cm are available from Wyman (5watts out $369) and HF Technology (TX1300) 1 watt for $360. The Wyman is a two crystal unit and the HFT unit is synthesized for the entire band with 3 channels selected from front panel. Pauldon just recently introduced a 50mw 23cm FMATV exciter for $219, but you will need a power amp to get into the repeater (such as a low power brick). Both Down East Microwave and Pauldon sell 18-20 watt power Amps for 23cm.

Antennas for 23 cm can be anything from a 1/4 wave in "Coffee Can", a dish with proper feed, yagis style antennas still work and loop yagis are a good choice. Antenna selection depends on what performance you need. Loop yagis are by far the most used antenna because of their broad band width capability and ease of mounting. Plans to make loop yagis appear in the ARRL antenna handbook. Some success has been obtained with building the "Quagis" for 1296 also in the ARRL Handbook The loop yagis are a much better choice. N8KQN has recently built a couple loops for 23cm. Ask Ted for help. Directive System sells several versions of 23cm loop yagis and PC Electronics sell the popular types. The 2424LYRM 16.2 dBd Loop yagis sells for about $95. In all cases, use 9913 or better feedline (the shorter the better!).

The 13cm Band (2.3-2.45 GHz)

In the works for 1996 is to add a 2.441 GHz FMATVoutput to the current ATCO repeater. The 2.4 GHz transmitter is currently connected to the ATCO bulletin board and is activated whenever the ATCO Bulletin Board is touch toned up. The 2.4 GHz transmitter is running 0.5 watts to a 15 dBd OMNI, vertically polarized and is located near WCMH Channel 4's old tower and studio (same as the 910.25 output). A 10 watt Power Amp is expected to be added in the next few months. On this band, LINE OF SIGHT is the basic rule! WA8RUT, W8DMR, WA8RMC, KA8ZNY maybe able to give you hand on this band.

Receiver/Converters for 13cm include converters made for (M)MDS (wireless cable) but tuned lower in the band. Some of these converters I have purchased at hamfests will tune directly to 2.4 GHz; others will not. Most of these output on channel 7 or 8 and will work for "slope detecting" the 2.441 FMATV transmitter. I did buy one of these MDS converters at a hamfest and its output was close enough to 70 MHz that I was able to connect it to a LNA receiver and have good quality FMATV video on 2.441 GHz.. The overall sensitivity of the receive system was nothing to write home about! But since I've never paid more that $15 dollars at a hamfest for an MDS converter and antenna, I figure I got what I paid for! On the other end of the cost spectrum is the HF Technology RX2500 with a HFT IF 70. The cost of the pair will run about $450 for a high quality 2.4GHz FMATV receive system that outputs video and sound. ATVQ carries an ad for a 2.4 GHz receiver/transmitter system for $180 that is similar to a 900 MHz "Rabbit". Damark, the mail order house advertised the same thing for a few dollars less so I ordered the "Wavecom" 2.4 GHz "Rabbit" like pair and I have been quite impressed with them. Our 2441.5 FMATV appears on channel 2 (the units are 4 channels) and the video was P5 with great color 500 feet away and not line of sight. I did not get a chance to see just how sensitive these units are, but they seem quite good.

Transmitters for 13cm FMATV are much more limited in availability. Other than the 2.4 GHz "rabbit" like pair mentioned above, the choice is the HFT TX 2500 FMATV transmitter. This is the same transmitter that is being used on the ATCO Bulletin Board and is planned to be moved to the down-town repeater site in 1996. The HFT TX2500 is a 0.5 Watt fully synthesized (2390-2450 MHz) with a 5.8 audio sub-carrier. The cost is about a $1 per millwatt!

Antennas for 2.4 GHz include a Dish, solid or wire mesh with a proper feed point. Many of the MDS converters will come with a small dish or a rod antenna. A source of wire and solid dish antennas (around $60) is Phillips Tech Electronics in Scottsdale AZ. They also sell MDS and MMDS converters. Their catalog is worth having. Directive Systems also sells (about $100) a 2.4GHz loop yagis with 18-20 dB gain and I recommend this antenna.

The 10 GigaHerts band

The ATCO Repeater does not do anything on 10 GHz ...yet! Activity on ATV on 10 GHz in the Columbus area is sparse. Much of the activity is via GUNNPLEXERS modulated with video. Surplus Gunnplexers can sometimes be found in flea markets for $20-$40. Advanced Receiver Research sells the M/A-COM 10 GHz 10mw transceivers units for $186/each. SSB Electronics and Down East Microwave also has some equipment that can help get on this band. WA8RUT & KA8ZNY can help get you started.

Does your Giga-Hurt yet?

The intent of this article was to provide the interested with a survey of ways to get video on the air by some other means than 70cm. The ideas and products & manufacturers mentioned here are by no means the only ones available nor do I recommend any one supplier over another! Most of the items/products discussed, I have some personal experience with -pro and con- that I am willing to share. I purposely did not discuss some of the less expensive (and more difficult!) ways to get on these bands because they do fall under the category of Techno-Geek applications! I am willing to share those approaches, but you will have to learn the techno-geek secret handshake! If you would like to discuss your experiences or if you would like to ask any questions, please give me a call or 147.45 or my phone numbers are listed in the ATCO newsletter or send me e-mail to wa8rut@aol.com.

Ken...WA8RUT

ATV BANDWIDTH

We hear all kinds of numbers thrown around for ATV bandwidth. Those looking for spectrum for other modes most often have a false impression if not defined correctly to them. No wonder they think we are band hogs. Most I have talked to think in terms of FM where the spectrum power density is quite high over the whole bandwidth - not so with ATV. Bandwidth really depends on what one is talking about, so here are some definitions.

Occupied Bandwidth: Per FCC Rules 97.3(a)(8) it is the width of a frequency band outside of which the mean power of the transmitted signal is at least 26 dB below the mean power of the transmitted signal within the band. ATV luminance video (the black and white part) is actually less than 2 MHz.

Carson's Rule for FM Occupied Bandwidth: 2 times the deviation plus 2 times the highest modulating frequency. i.e., 2 x 5 kHz deviation plus 2 x 3 kHz voice or digital equals 16 kHz.

ATV Transmitted Bandwidth: Down greater than 40 dBc +/- 1 MHz of the video carrier (Television Engineering Handbook - 1992 - Benson - Fig. 5-11) plus color subcarrier at 3.58 MHz. Down greater than 22 dBc (all red screen) and sound subcarrier 4.5 MHz greater than 15 dBc. Note this is true for both DSB and VSB. VSB has lower color and sound subcarriers attenuated additionally by the VSB filter response curve starting at -1.25 MHz below the video carrier.

Standard TV channel bandwidth: 6 MHz, video carrier 1.25 MHz up from lower edge.

While the transmitted video is many tens of dB below the peak envelope power (sync tip) and random (not unlike spread spectrum) the TV receiver IF and detector bandwidth must be almost flat across the whole 4.2 MHz to maintain the transmitted relative video to sync ratio. Normal instantaneous luminance video response bandwidth: 3 MHz.

Highest instantaneous video response bandwidth including color: 4.2 MHz.

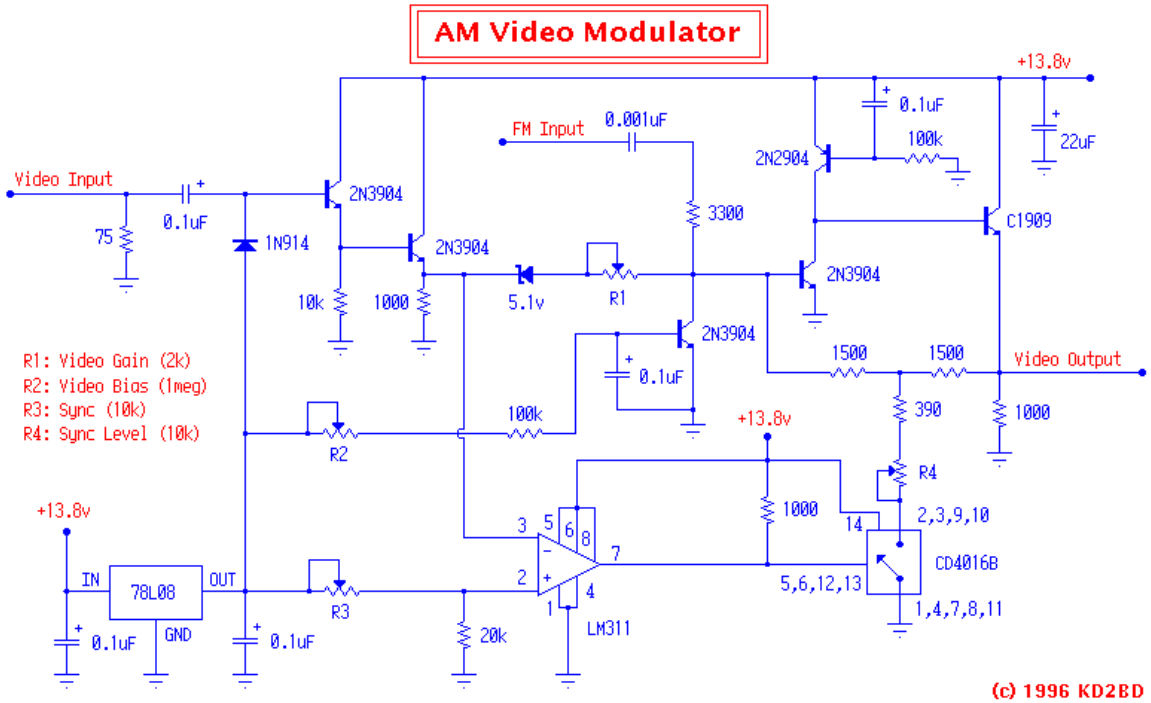
This is why most ATV stations receive more interference than transmit it. Most narrow band modes will never notice an ATV transmitter on the air if they are operating between 1 and 3.4 MHz or 3.8 and 4.3 MHz from a video carrier. The actual spectrum power density is about the same as license free FCC part 15 field strength with a 10 Watt ATV transmitter in these 2.4 and .5 MHz segments within the ATV channel. However, any narrow band transmissions greater than one microvolt within the 6 MHz channel can interfere with the picture.

Tom O'Hara... W6ORG

BROOKDALE ATV REPEATER VIDEO MODULATOR

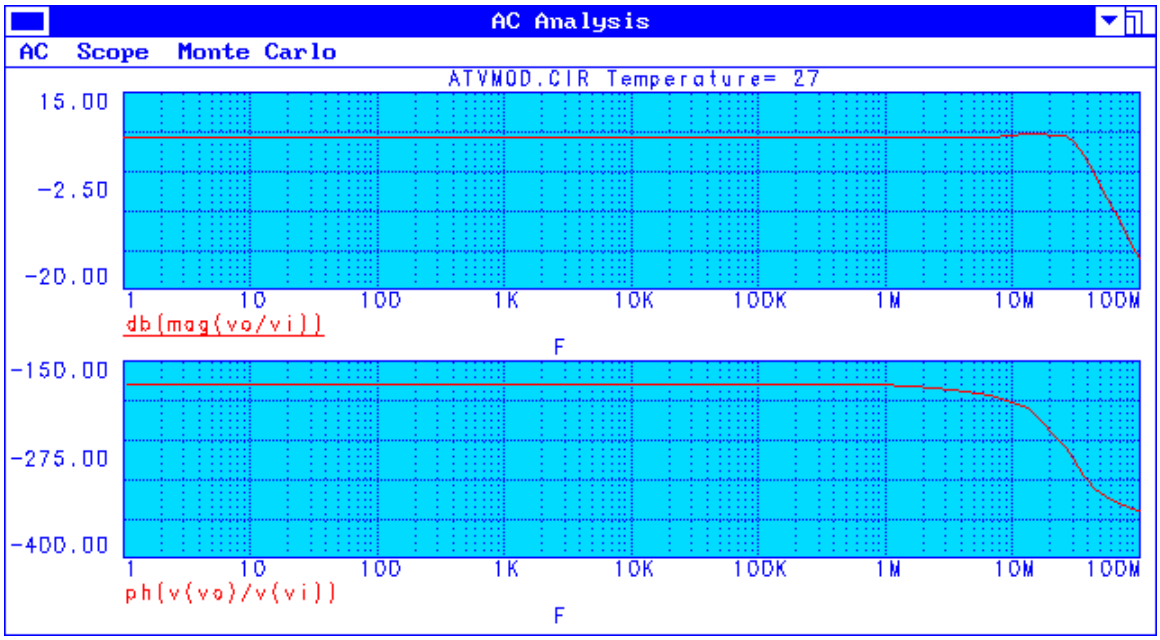
(ED note: I found this article on the Brookdale ATV internet homepage and thought it to be very interesting. I present it here in the hopes that someone will duplicate this circuit , try it and report on it. Any takers? If it looks good it may be worthwhile to incorporate into our repeater design...WA8RMC).

PC Electronics ATV transmitters suffer from poor linearity and intermodulation distortion. Tests have shown that these ailments are the result of the video modulator itself, not the modulated RF stages. While the linearity and distortion problems are not significant enough to be objectionable to the eye, they do seriously impact in-band repeater system performance.
In an effort to improve the performance of the Brookdale ATV Repeater System, the video modulator in the PC Electronics exciter was replaced with the one described here. The improvement in performance was *astounding* **.**



The first section of the video modulator performs a video level clamping function. The high input impedance Darlington amplifier and the small series coupling capacitor combine to achieve an excellent low-frequency response and a clamping function with very rapid response time. A three terminal voltage regulator sets the clamping level to 8 volts.
The clamped video is then level shifted through a second zener diode and applied to a single video amplifier stage. A PNP transistor in the collector circuit functions as a constant current source for the video amplifier. The result of using a constant current source rather than a collector load resistor is ***much*** higher voltage gain and better linearity. A 2N3904 in the base circuit sets the `Q' point of the amplifier. FM subcarrier audio at 4.5 MHz is also injected at this point through a 3300 ohm resistor and a DC blocking capacitor. A 5-watt RF power transistor serves as the last stage of the modulator.
Clamped video is also fed into an LM311 voltage comparator that serves as a video sync detector. Sync pulses detected by this circuit trigger a CD4016B silicon bilateral switch that lowers the negative feedback around the video amplifier and voltage follower to compensate for high power gain compression in any solid-state linear power amplifiers that may follow the video modulated stages. This method of sync expansion also compensates for audio subcarrier compression at sync time, resulting in a clean output signal with no sync buzz in the transmitted audio.
R1 is a video gain control. It is used to set the white power level. R2 is a video bias control. It is used to set the `Q' point for best linearity. R3 is a set-and-forget control. It is adjusted so that the LM311 delivers clean sync pulses to the CD4016B. R4 adjusts the level of the transmitted sync. Up to 9 dB of sync expansion is possible with this circuit.

Video Modulator Performance
The following graphs show the results of a computer simulation of the video modulator used in the Brookdale ATV Repeater System. This simulation was performed using MicroCAP IV software, an electronic circuit analysis program by Spectrum Software. The results shown here have been verified in practice using a Tektronix model 2245 100 MHz 4 channel oscilloscope.



The top graph shows the very wide and flat frequency response characteristics of the video modulator. The lower graph shows the phase response of the modulator. The response around the chrominance subcarrier falls well within the +/- 10 degree specification used by commercial broadcasters.
John...KD2BD

OHIO AREA ATV REPEATER LISTING

The following list is compiled from actual repeater sightings in the Columbus, Ohio area. We need to keep an up-to-date and accurate listing so the newer operators know what to look for when the band is open. Our repeater is obviously the best so I'll list it first.

LOCATION	CALL SIGN	INPUT FREQ	OUTPUT FREQ	BEAM HEADING	NOTES
Columbus, Ohio	WA8RUT	439.25	427.25	~	A signal on any listed input causes
		910.25	1258.25	~	an output on both listed frequencies
		1280		~	
Xenia, Ohio	KB8GRJ	443.25	421.25	240	*10 on 144.36 = tone up for 1 minute
Dayton, Ohio	W8BI	439.25	426.25	250	*10=ID, *71= bul board, on 147.45.
		1245	1287		
		1249.5	1291.5		
Lima, Ohio	WB8ULC	439.25	421.25	315	
Ashland, Ky.	WA4GSS	439.25	421.25	180	
Elizabethtown, Ky.	W4BEJ	439.25	421.25	210	
Bowling Green, Ky.	W4HTB	439.25	426.25	200	
			1280		
Wheeling, W.Va	WB8QHO	439.25	426.25	080	
Acme, Pa	W3PVH	439.25	421.25		
Pittsburgh, Pa	W3KWH	439.25	426.25	090	

INTERNET INFO

If you have access to the INTERNET, you may be interested to know of some of the HAM related information that is available. We've tried to start a list of interesting places to look in case you get in the "surfing" mood. If any of you find different places to look, I'd appreciate having the info passed on to me so I can include it in this list. The ATCO home page is updated periodically so be sure to check often for late breaking NEWS. The addresses listed below are case sensitive, so type exactly as shown below.
(If anyone has comments or would like additional listings contact me via EMAIL at towslee@ee.net.

ATV home pages:

http://psycho.psy.ohio-state.edu/atco	ATCO ATV home page. **
http://www.geocities.com/Hollywood/5842	East Tennessee ATV home page
http:/www.portal.com/~jpawluk/KB6MMF.html	California ATV home page
http://www.ladas.com/ATN	**A**mateur **T**elevision **N**etwork in Central / Southern California
http://www.mindspring.com/~rwf/aatn1.htm	Atlanta, Georgia ATV home page
http://www.stevens.com/HATS/home.html	Houston Texas ATV home page
http://uugate.aim.utah.edu/utah-atv/root.html	Utah ATV home page
http://www.hayden.edu/Guests/AATV	Phoenix Arizona Amateurs
http://citynight.com/atv	San Francisco California ATV
http://www.njln.net/~magliaco/atv.html	Brookdale ARC in Lincroft New Jersey
http://www.smart.net/~brats	Baltimore Radio Amateur Television Society (BRATS)
http://www.regio.rhein-ruhr.de/hamradio/atv	German ATV
http://www.ecn.net.au/~sbloxham	Australian ATV (exhaustive list of other ATV & ham radio sites)

** I have just contracted for my own URL which includes space for a home page. I will convert this in the near future. Stay tuned. My new address is towslee@ee.net but I'm still available on my work address towslee@mtwo.mt.com.

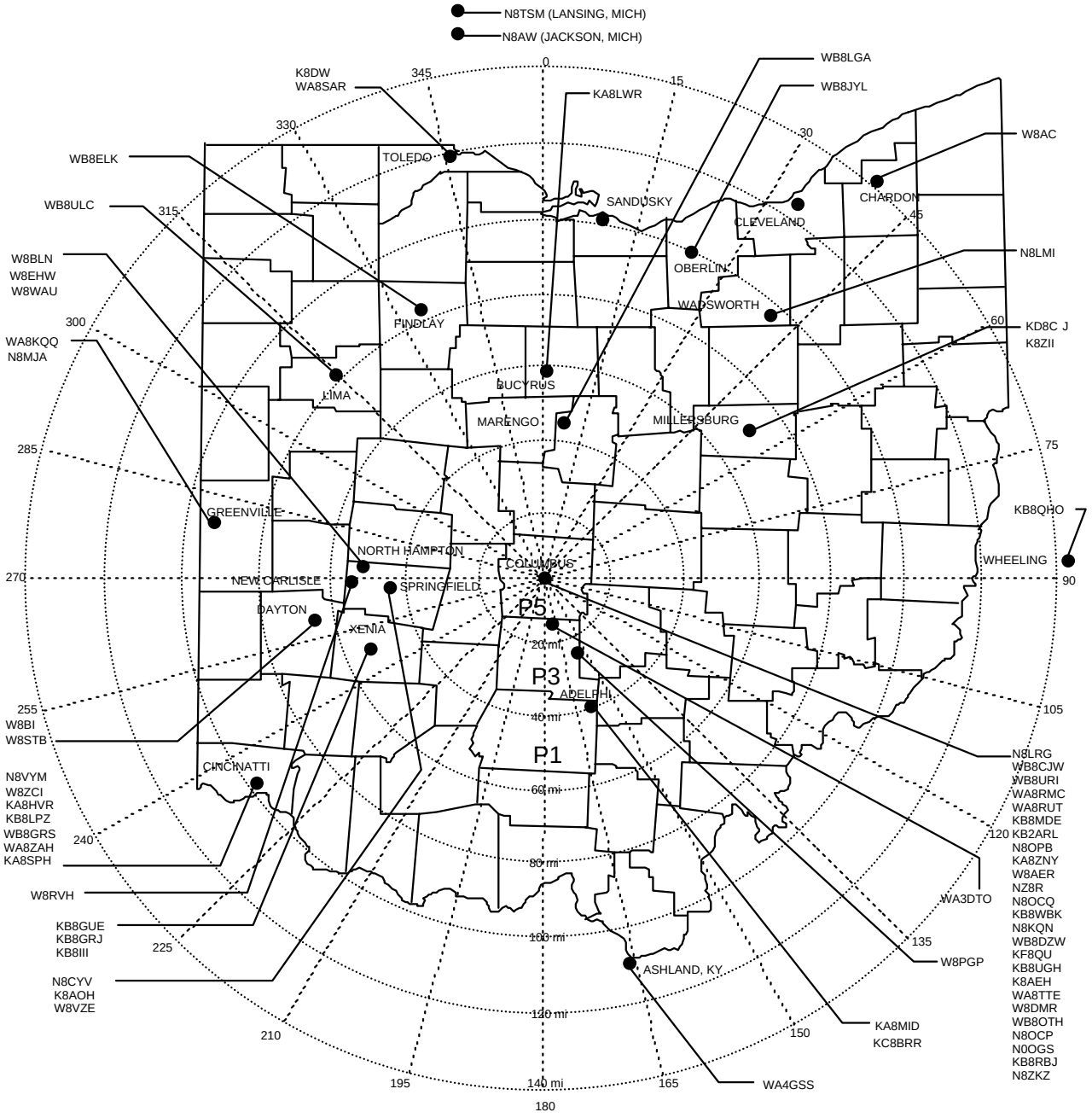
Note: If you don't already have a copy of 73 magazine July 1996, it might be worthwhile to get a copy and check out the article by Bill Brown WB8ELK about ATV INTERNET listings. We're in there as well as many others. Good PR for ATV. Congrats, Bill.

The following addresses are helpful in searching for many different Ham Radio topics on the INTERNET. I have found them be very powerful search engines for ham radio and television topics. At any point when logged onto the INTERNET, type the following:

http://www.yahoo.com/Entertainment/television/Amateur_television	listing of the available ATV home pages.
http://www.yahoo.com	table of contents pointer for a vast variety of topics.
http:/www.acs.ncsu.edu/HamRadio	General ham radio info- satelite track, call sign database etc.
http://www.wolfe.net/~daydream/html/ftpsites.html	Ham radio equipment mod. / problem listing directory.
http://www.arrl.org/hamfests.html	Current yearly hamfest directory.
http://amsat.org	AMSAT satellite directory/home page.
http://www.arrl.org	ARRL home page
http://asp1.sbs.ohio-state.edu	Local & global weather map information (good detailed info)
http://www.ualr.edu/doc/hamualr/callsign.html	Search by call sign or name.
http://psycho.psy.ohio-state.edu/w8lt	Ohio State University W8LT radio station.
http://www.acs.ohio-state.edu	Ohio State University home page. Lots of neat stuff.

ATV LOCATOR MAP

Below is an Ohio map complete with counties, main cities, beam heading (from Columbus) and all of the hams known to have had video on the air recently. Please report anyone that has had video on and seen recently. If video is not reported for a given individual in about a year, I will remove them from the map. Let's see if we can make Ohio near the top for ATV activity. It also contains mile circles & approximate P levels expected. Generally the signal drops by 1 P unit each time the distance is doubled if all other factors remain unchanged. The P numbers are typical reported values under average (non band open) conditions.



ATCO REPEATER TECHNICAL DATA SUMMARY

This space of each publication of the ATCO Newsletter will include the technical information of our repeater. Each time a new feature is brought on line it will be added here. Use this "table of information" as a quick reference for up/down access codes as well as some of the more important parameters of our system.

Main repeater:

Location: Downtown Columbus, Ohio

Coordinates: 82 degrees 59 minutes 53 seconds (longitude)
39 degrees 57 minutes 45 seconds (latitude)

Elevation: 630 feet above average street level
1460 feet above sea level

Transmitters: 427.25 MHz AM modulation and 1258.25 MHz FM modulation(soon to change to 1250 MHz)
interdigital filter in output line of 427.25 & 1258.25 transmitter
Power - 40 watts average 80 watts sync tip (427.25) 15 watts (1258.25)
Link transmitter - 1 watt NFM 2.5kHz audio (446.350 MHz)

Transmit antenna: 427.25 MHz - Dual slot horizontally polarized 7 dbd gain major lobe west
1258.25 MHz - Single slot horizontally polarized 3 dbd gain major lobe west

Receivers: 147.45 MHz for F1 audio input control of touch tones
439.25 MHz for A5 video input with FM subcarrier audio
910.25 MHz for A5 video link data from remote sites
1280 MHz for F5 video input

Receive antennas: 147.45 MHz - Vert. polar. Hi Gain "Comet" 12 dbd (also for 446 MHz output)
439.25 MHz - Horiz. polar. dual slot 8 dbd gain major lobe west
910.25/920.25 MHz - Vert. polar. dB Products 10 dbd gain
1280.25 MHz - Horiz. polar. single slot 3 dbd gain major lobe west.

				UP	DOWN
Input control:	Major Touch tones:	beacon (10 min)		*439	*22
		regional weather radar		697	#
		**Local radar(5 min)		264	#
		User repeat 1 minute		*45	*22
		Touch tone pad tester		#0	#5
		Manual mode	(ID)	#7790	*22
			(910 input)	#7791	*22
			(439 input)	#7792	*22
			(1280 input)	#7793	*22
			(future)	#7794	*22
		NASA Select		*70	*20
		5 second ID		#9	*22
		Bulletin board		285	#
		Reset to scan mode		D37 or #437	

** inactive at this time

Remote sites:	**Local radar	(910.25 MHz link output 8 watts)
	NASA select at KA8ZNY QTH	(910.25 MHz link output 10 watts)
	Aux link at WA8RUT QTH	(910.25 MHz link output 1 watt)
	Aux link at WB8CJW QTH	(910.25 MHz link output 1 watt)
	Aux link at WA8RMC QTH	(910.25 MHz link output 5 watts)

ATCO MEMBERSHIP INFORMATION

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

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

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

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V.President: Ken Morris WA8RUT
Treasurer: Bob Tournoux KF8QU
Secretary: Rick White WA3DTO
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris WA8RUT
Dale Elshoff WB8CJW
Statutory agent: Rick White WA3DTO
Newsletter editor: Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

RENEWAL O NEW MEMBER O DATE _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES O NO O HOME PHONE _____
NAME _____ CALL _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____

FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
_____

COMMENTS_____
_____
_____
_____

ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK O MONEY ORDER O
Make check payable to ATCO or Bob Tournoux & mail to:

Bob Tournoux KF8QU
3569 Oarlock Ct
Hilliard, Ohio 43026

ATCO TREASURER'S REPORT - de KF8QU

CASH BALANCE (4/10/96).....	$1093.18
RECEIPTS (dues).....	$ 100.00
OTHER INCOME (bank interest).....	$ 7.64
EXPENDITURES(postage) ($.32 x 70).....	$ (22.40)
(repeater expenses).....	$ (12.52)
(spring event food).....	$(153.58)
BALANCE (7/25/96).....	$1011.40

ATCO MEMBERS AS OF 25 JULY 1996

K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	Ohio	43068	866-1399
W8AER	Dave Sears	1678 Kaiser Dr	Reynoldsburg	Ohio	43068	861-0904
KC8AGZ	Dave Lukens	11780 Willowview Ct	Pickerington	Ohio	43147	
K8AOH	Charley Tucker	4546 Laredo Street	Springfield	Ohio	45503	513-390-0693
WB4BBF	Randall Hash	212 Long Street	Bluefield	Va.	24605	
W8BJN	Gene Kirby	13613 US 36	Marysville	Ohio	43040	513-644-0468
KC8BKD	John Miller	4419 Park Ave West	Mansfield	Ohio	44903	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	Ohio	43065	766-5823
N8CYV	Blaire Standley	721 West North St	Springfield	Ohio	45504	
K8DW,W8FB	Dave & Paul Wagner	2045 Maginnis Rd	Oregon	Ohio	42616	419-691-1625
WA3DTO	Rick White	5314 Grosbeak Glen	Orient	Ohio	43146	877-0652
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	Ohio	43026	876-6033
W8EHW	Foster Warren	124 East Clark St	No. Hampton	Ohio	45349	
WA8EOY	John Schlaechter	3199 Lewis Rd	Columbus	Ohio	43207	491-4470
KA8HAK	Jim Reese	1106 Tonawanda Ave	Akron	Ohio	44305	
N8KQN	Ted Post	1267 Richter Rd	Columbus	Ohio	43223	276-1820
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	Ohio	45331	513-548-2492
N8LMI,N8SIR,KB8UVK	Phil,Jim,Phil jr Buckholdt	153 East Bergey St	Wadsworth	Ohio	44281	
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	Ohio	43123-4100	871-0751
KA8MID	Bill Dean	PO Box 458	Adelphi	Ohio	43101	614-655-2454
KB8MDE/N8ZTL	Shaun Miller/Greg MacCartney	5061 County Rd 123	Mt Gilead	Ohio	43338	419-768-2588
K8MZH	Leland Hubbell	7706 Green Mill Road	Johnstown	Ohio	43031	967-8412
WD8OBT,KB8ESR,KA8ZPE	Tom Camm & sons	1634 Dundee Court	Columbus	Ohio	43227	860-9807
N8OCP	John O'Bryant	3139 ElPaso Drive	Columbus	Ohio	43227	274-5410
N8OCQ	Robert Hodge	3689 Hollowcrest	Columbus	Ohio	43223	875-7067
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Ohio	43204	
W6ORG	Tom O'Hara	2522 Paxson Lane	Arcadia	Cal	91007-8537	818-447-4565
WB8OTH	Perry Yantis	1850 Lisle Ave	Obetz	Ohio	43207	491-1498
KE8PN	James Easley	1507 Michigan Ave	Columbus	Ohio	43201	
W8PGP,WD8BGG	Richard, Roger Burggraf	5701 Winchester So. Rd	Stoutsville	Ohio	43154	614-474-3884
KF8QU	Bob Tournoux	3569 Oarlock Ct	Hilliard	Ohio	43026	876-2127
N8QLD	Rick Callebs	761 Standpipe Road	Jackson	Ohio	45640	
WA8RMC	Art Towslee	180 Fairdale Ave	Westerville	Ohio	43081	891-9273
WA8RUT,N8KCB	Ken & Chris Morris	3181 Gerbert Rd	Columbus	Ohio	43224	261-8583
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	Ohio	45334	513-964-1185
WD8RXX	John Perone	3477 Africa Road	Galina	Ohio	43021	
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	Mich	48144	
N8SFC	Larry Campbell	316 Eastcreek Dr	Galloway	Ohio	43119-8914	
KG8SN	Paul Ernst	67 Richards Road	Columbus	Ohio	43214	267-5758
W8STB	John Hey	894 Cherry Blossom Dr	West Carrolton	Ohio	45449	
N8TBU	Ed Latham	8399 Fairbrook Ave	Galloway	Ohio	43119	
KB8TRP	Tom Flanagan	1751 N. Eastfield Dr	Columbus	Ohio	43223	272-5784
WA8TTE	Phil Morrison	154 Llewellyn Ave	Westerville	Ohio	43081	
KB8UGH	Steve Caruso	39 South Garfield Ave	Columbus	Ohio	43205	461-5397
WB8URI	William Heiden	4435 Kaufman Rd	Plain City	Ohio	43064	614-873-4402
KB8UU	Bill Rose	2685 Kropp Road	Grove City	Ohio	43123	878-8964
WB8VJD	Rick Morris	203 Merton Street	Holland	Ohio	43528	
W8WAU	Jake Fuller	PO Box 117	No. Hampton	Ohio	45349	
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	Ohio	43062	927-3883
KB8YMN	Mark Griggs	2160 Autumn Place	Columbus	Ohio	43223	272-8266
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	Ohio	43064	
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	Ohio	43125	836-3519

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

FIRST CLASS MAIL

DON'T FORGET OUR NET AT 9:00 PM ON TUESDAY NIGHT ON 147.45 MHz