ATCO NEWSLETTER

VOLUME 10 NUMBER 3 **JULY 1993**

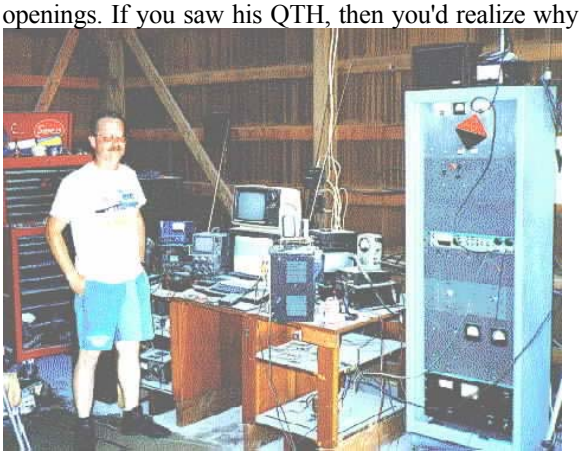
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO" and is published quarterly (January, April, July, and October)

AN ATV REPEATER FOR COLUMBUS IS *STILL* IN THE WORKS

The ATV repeater project is still progressing but not as fast as we had first hoped. It seemed that the task would take a few months to initially get on the air. Although that fact is technically true (Ken's transponder, I believe qualifies) a true repeater is still a way off. The basic stumbling block seems to be limited funds. If we had an unlimited amount of money, enough commercial gear exists to have put a good repeater on the air some time ago. However, that's no fun!!!!! Being a designer at heart, I like to design from scratch so a lower cost repeater is possible but at the expense of time. The time is not a bottleneck at this point because the repeater site has not been formally approved yet. Additionally, the summer months require outside home maintenance so repeater time slows down significantly. Read the following pages for more details.

ATCO HAM IN THE SPOTLIGHT

The randomly chosen ham the "roving cameraman" caught this time is Bill Heiden (WB8URI). Bill spends many hours listening to everyone else talk on the air while he fixes his 1937 Pontiac. Sometimes when he doesn't agree with someone's remarks, he joins in. Bill keeps an eagle eye open for that rare DX and is becoming our "mascot" to band openings. If you saw his QTH, then you'd realize why he hears Dayton and Cincinnati so good - He's about half way there. The next time I go out to see him, he's so far away I'll have to gas up the car and check into a motel before returning to Columbus! Space he's surely got!!!



⇐left

Here's Bill enjoying his favorite hobby. (the beer's behind him)

right⇒

Here's what his antenna looks like. No wonder his signal is so good.

The ATCO Repeater/Beacon So Far....

The Need That Needs Satisfied

A decade ago, Central Ohio had two ATV Repeaters! One in-band (439.25/426.25) and one cross band (439.25/1278.25). The in-band 70cm machine was spearheaded by Charlie, WB8LGA with WA8RMC and others assisting. The Cross Band machine efforts were provided by WB8CJW and WA8RUT. Both repeaters were single site, one (the in-band machine) located in North Westerville and the Cross Band machine located downtown Columbus. Both machines proved to be an experimenters delight; both had lots of problems to be solved! Both machines eventually went off the air because of the time pressures of the people involved.

The need that was satisfied in the early 1980's was a technical/learning need of the ATCO group at that time. What needs to be satisfied today is a public service and a test/application facility for the general Central Ohio ATV community. Given that the needs are very different, our approach is also different. The repeater of the early '80s was built from resistors, capacitors and transistors (and tubes!). The approach in the early 1990s is to build from proven commercially available modules (mostly-there is still quite a bit of boy engineer left in us!)

We got a new start on the current project when the Local National Weather Service approached our ATCO group with the possibility of putting their Weather Radar on the Amateur band. The Wx Service had been working with Hams for a long time via the Weather Spotters program on the 146.76 Machine. There are two needs that the Weather Service would like satisfied; 1. the ability for the Mobile Weather Spotters during severe storms to see the Wx RADAR while parked in their cars and 2. provide an opportunity for the general public to see the Wx RADAR. This later requirement caused us to select "Cable Ready Channel 58" (427.25Mhz) for our Repeater transmit frequency. What the Wx Service would bring to the party was access to the RADAR video and a very tall building in downtown Columbus to put our equipment and antennas. The second need was the general Central Ohio ATV community. We are blessed with many new ATV'ers (and the return of some old ones!) who need a signal source to test antennas, preamps, receivers, etc. In addition, we now have in our ranks ATV'ers who can not put up 60 foot towers with stacked arrays for ATV work. A repeater would extend their range. During our ATCO group meeting to discuss the project, 90% of the club voted to go forward. One of the descending voters has turned out to be a big supporter of the project! (thanks Bill!)

The System Design Strategy

We know that the top of buildings in downtown Columbus is a great place for transmitters, but a lousy place for receivers! There are billions and billions of microvolts flying around all over downtown! Since we needed to link the Wx RADAR from the Airport over to the downtown building anyway, we decided to go "split site" for our repeater. This design provided the opportunity to add multiple receive sites both in-band and cross band. Our final link frequency to downtown is likely to be 1255 Mhz FM, but we are going to give 910.25Mhz AM a shot first to maximize our flexibility in adding additional repeater outputs and inputs.

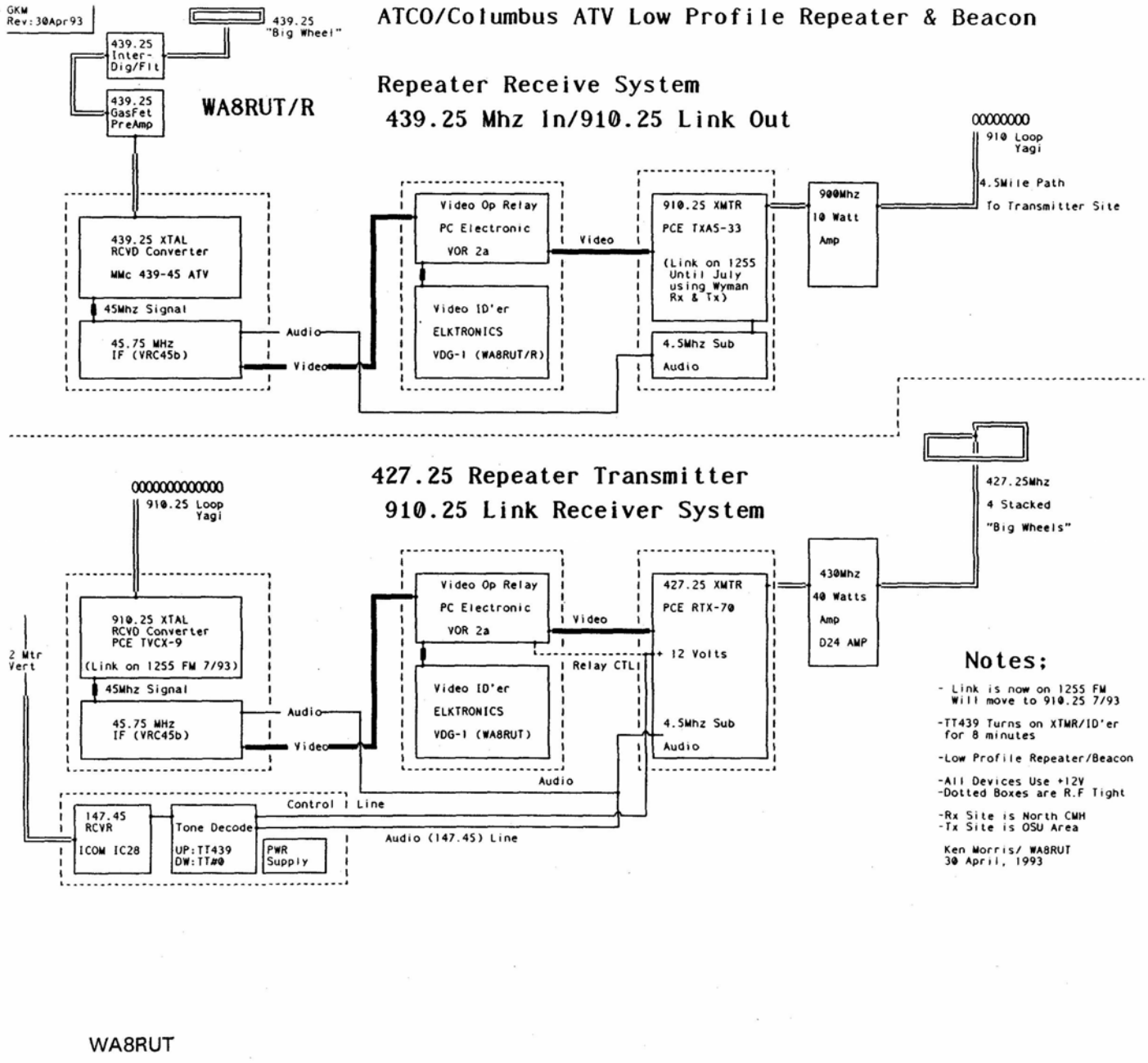
The Current System

The System that is on the air now is very similar to the figure on the following page. The only major difference is that the link frequency for the past 4 months has been 1255 Mhz FM. The 910.25 Link is now ready to install replacing the 1255Mhz link and should be in place in the coming weeks. The current system's intent is to get some experience linking video and work out the "bugs" before we install in a less accessible building downtown. It is also there to be used by anyone who cares to use it! Some facts about the current system;

a. Repeater/Beacon Output: 427.25 Mhz AM
b. Repeater Input; 439.25 Mhz AM
c. Beacon Mode: Touch Tone 439 on 147.45 brings ID up for 8 minutes; #0 takes it down immediately.
d. Transmitter is running about 40 Watts to 4 stacked mini-Wheels with only about 20 feet of 9913.
e. Transmitter is currently located near the WCMH-TV Tower on a 6 story building (780 feet MSL). This site is likely to be one of the receive sites when the transmitter gets moved downtown.
f. Receiver is located 4.5 Miles away at QTH of WA8RUT and linked to the transmitter on 1255 Mhz FM.
h. Receive antenna is currently a single Mini-Wheel 50 feet above ground with a GasFet preamp at the antenna. Antenna is side mounted on the tower, so it has a "shadow" in the coverage area to the south.

Next Steps

The next major event is to get the 910.25 Link installed and checked out. We expect to install the transmitter downtown sometime this summer. After the transmitter is installed, we then can link the Wx RADAR to the transmitter and begin the coverage tests fulfilling our first requirement of the system. After that, we can revert back to our "boy engineering" ways and dream-up all kinds of interesting links and added receiver/ transmitters including NASA Select. Stay tuned. Much more to come!



ATV REPEATER PROGRESS SUMMARY ..... from my workbench

Work has been progressing at a slow forward pace. However, because the summer months are upon us, many household tasks get in my way. Additionally, sometimes its better to enjoy the good weather than working hard in the basement doing design work. But this is the kind of weather that it takes to work on antennas so mine will get some attention. First, the entire tower will get painted. Next, the 31 element yagi antenna will be replaced by a 48 element broadside array to make ATV transmission easier with the increased bandwidth. Finally the 147 Mhz boomer sadly needs repair and tuning. Then back to the repeater work.

To date, the 439.25mhZ receiver and the 1258Mhz link transmitter are complete. I am now working on a 1258mhZ to 70Mhz converter which may prove to be rather time consuming. The 70mhZ to video/audio receiver is complete but everything else is somewhat in limbo. Left yet to do is create ID and switching generators to automatically identify the system. Anyone with some good ideas? My thought is to create a video generator that would have the callsign, link data and incoming signal "P" report mixed into the bottom line of the screen at all times. Then there would be no need to switch it on and off with timers. PC Electronics markets a device of this kind but, I feel, is very pricey for what it does. Does anyone know of some circuitry of this kind that I could use for design reference? If so, I'd like to hear from you!!

It seems at this time that an output frequency of 427.25mhZ will continue. I don't feel that it will interfere with the Dayton repeater operating on 426.25mhZ because of the distance but if time demonstrates that it does, we'll consider moving it. For the time being a vestigial sideband filter will probably be left off unless it interferes with someone else.

That's all from here. Now, where did I put that soldering iron? I know it's on the bench somewhere. Should I clean the bench **first?** Nah...that would take too much time...I'll just look around for a while.....

WA8RMC

GENEROUS REPEATER DONORS

I met Wilbur (K8AEH) at the Dayton hamfest and discussed the repeater with him. I must have left a very positive impression for he made a very generous monetary donation to the repeater and told me to go and buy the 1258mhZ exciter I talked with him about. As a result, the link transmitter was completed sooner than I thought. My many thanks to Wilbur for his help and understanding! If you need help with your tower, Wilbur, let me know.

In the meantime, I have learned from Fred (K8JGY) that Phil Morrison (WA8TTE), in addition to signing up as a new member, also made a monetary donation toward the repeater fund. Thanks, Phil.

Fred, do you think that if we teamed up, we'd make good vacuum cleaner salesmen?????

WA8RMC

PIZZA PARTY MINUTES

Fred Yost had suggested that we get together and have an eyeball with pizza (and beer), so we did. It was held at Donato's Pizza Sunday April the 18TH 1993. There was only one problem. It was such a nice day that the only ones that showed up were Fred K8JGY, Ken WA8RUT, Art WA8RMC, and Warren KA8GZQ. We had a tough time eating all of the pizza but Fred helped out a lot with the beer.

WA8RMC

Horizontally Polarized, OMNI with Gain Ya Say?

An ATV Antenna that is horizontally polarized, OMNI Directional and with gain. Sounds like an oxymoron, a contradiction in terms, or just not possible by mere mortal amateurs. Unfortunately (?), most of us live in the MID-West, land of flat terrain, tornados, 147.45Mhz and horizontally polarized antennas. We could avoid the whole topic except we decided to put on a ATV repeater. Because of the local choice of horizontal polarization, we have (and continue to!) experiment with Cross Dipoles (remember the "OCTOPOLE"?), Alford Slots, "ZIG-ZAGs" and Big Wheels scaled down to 440Mhz to meet our repeater antenna needs. Most of these antennas so far have resisted our every attempt to get significant gain out of them, but we Mid-Westerner ATV'ers are a hardy bunch (no matter how many years and dollars it takes!) and we are not about to give up to find the promised land of horizontally polarized, OMNI antennas with gain! Today, KA8ZNY and WA8RMC are waging war on the Alfort Slot, WB8CJW is making a frontal assault on the ZIG-ZAG antenna and WA8RUT has made a beach head on the "Mini-Wheel". This report is about our discoveries with the Mini Wheels.

When our ATCO Repeater/Beacon went on the air earlier this year, the antennas at both the receive and transmit sites where single "Big Wheel" antennas for 2 meters designed by W1FVY and W1IJD in the 1950s scaled down to 440mhz. Since the antenna is relatively broad banded, its not too difficult to get a good VSWR and a reasonable OMNI Pattern (±0.3db) out of one of them. We got what we expected when we put them on the air, horizontally polarized and OMNI Directional with around 0 DBd gain (best I could tell). Putting the Pre-Amp right at the receive antenna and keeping the coax very short (about 20 feet of 9913) and running 50 watts at the transmitter showed 'ok' results but clearly more gain was needed to do the job we needed.

During the Dayton Hamvention this year, I had a chance to talk to Dave Clingerman W6OAL, "Ole Antenna Lab" of Denver about stacking 4 of his Mini- Wheels and the expected gain. Dave told me he had made several for repeater groups around the country and he was achieving 5.9 Dbd gain from the array. It didn't dawn on me until later that this claimed gain was higher than the claims on the Alford slot and the ZIG-ZAG antennas. In May, I called W6OAL to talk some more about his antenna and claims. I came away from that call convinced that he had some thing worth pursuing. Within hours I mailed Dave a check for 4 stacked mini wheels plus two other single wheels (one for 440mhz and one for 1280 Mhz - more on these antennas in a later article). They arrived about a month later (Dave makes these antennas in his free time - he has a full time job as a Radio Frequency Manager/Engineer for the government.

Stacked Mini-Wheel Construction

To my surprise when I opened the shipping box from W6OAL, the antenna came in two sections (two antennas per section) joined by an "N" connector "T". I expected to see 75 ohm phasing lines (coax) but instead, Dave made the phasing lines out of copper tubing with a center conductor forming the coaxial phasing lines. What a neat idea! The mini-wheels are soldered directly on the ends of the copper tubing phasing lines, thereby eliminating connector losses, one wave length long (5/8 wave length physical spacing each section). One antenna is inverted from the other to achieve proper phasing. The top section with two antennas are tapped a 1/4 wave up from the lower of the top section antenna and the bottom section is tapped a 1/4 wave down from the top antenna on the bottom section. This "tap" section of each phasing line is 3/4 wave long terminating to a "N" connector. The two sections are joined with an "N" Connector "T". The antenna by itself does not self support and requires that it be fastened to a PVC pipe (about 8 feet long). The antenna will require some more work to help it withstand Ohio Tornados, but more importantly, our ice storms in the winter, especially, when it gets mounted 50 floors up!)

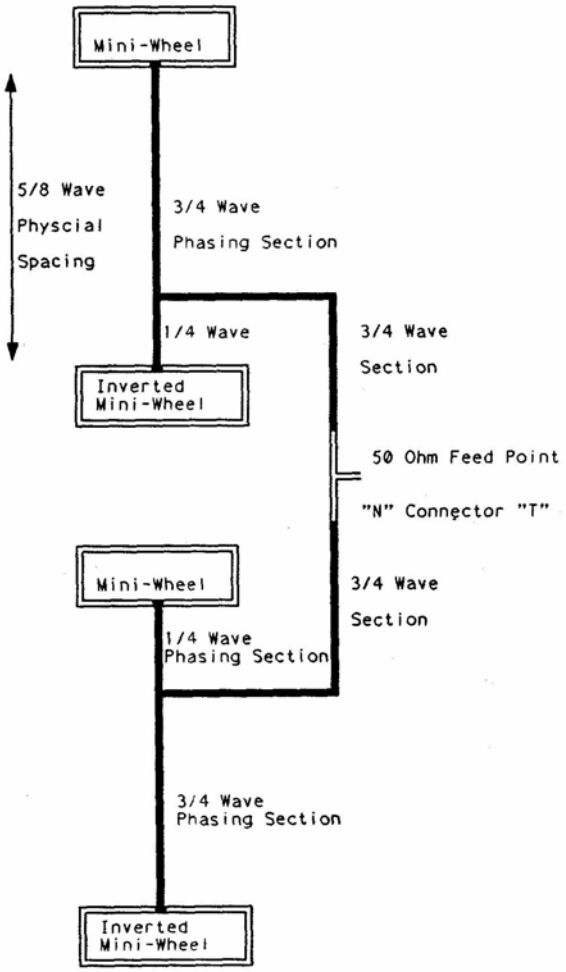
Checking it out

After an initial false start, careful strength measurements where made of the existing single mini wheel on the beacon from a line of sight distance of 4.5 miles away using a military DB attention box with 1 db steps. It took 26.5 db (averaged over 30 minutes) to put the beacon's signal below P0 - no signal detectable. The new stacked 4 mini wheels were installed within a two hour period. The same test was run with the attention box, but this time it took 33 db of attenuation (average) to achieve the same result. An apparent gain of 6.5 db over the single mini-wheel! Why 6.5 db instead of the theoretical 6.0 dbd? Maybe it was because the single mini wheel was positioned such that I was receiving its signal from one of the -0.3 db notches caused by the overlapping of the elements. Most likely however, it was because of the capability/accuracy of the "db Attenuation" box (after all, it was built for the military). I'm sure my statistical sampling methods were statistically valid! (?) Most of the "On-The Air" test also confirm about a 1 "P" unit improvement in the Repeater/Beacon's performance. Reports so far have been received by WB8CJW, KB8MDE, WB8URI, WA3DTO, WA8RMC, WA8TTE, KA8ZNY, KB8EWX, WB8LGA, W8DMR, N8LRG, K8JGY and others. Most stations reported about a one (1) "P" unit improvement except for WA8RMC and W8DMR. There are a couple of

theories on why those two stations were discriminated against, but that's another article!

An ATV antenna that horizontally polarized, OMNI Directional and has 6 dbd of gain? It looks like we may have found one! WB8CJW has completed his ZIG-ZAG antenna. I look forward to see how it compares with the Mini-Wheels.

4 Stacked Mini-Wheels
70cm ATV OMNI Antenna



Notes:

1. Phasing Lines are made of Copper Tubing with center Conductor Installed forming 75 Ohm Coax
2. Mini-Wheels are soldered Directly on the ends of the Phasing Lines
3. Array is supported/mounted on a 1inch PVC Tube.
4. Gain Appears to be 6 db over a single mini-wheel

WA8RUT

BALLOON LAUNCH UPDATES

If you have been paying attention, and checked in the net on 147.45 on Tuesdays you'd have seen at least two balloon launches since the last report. I've seen two of them and found it to be quite fascinating. I was surprised to see the strength of the video signals which was P5 most of the time. Both could be seen with crude receiving equipment and since the balloon achieves very significant heights, 400 mile distances can be seen easily.

The first launch occurred on Saturday June 6 at about noon by WA4GSS / KB8KMI from West Virginia. I picked up the signal when the balloon reached about 15,000 feet in height. From that time on the picture was about P5 until it again landed about 2 hours later. Since this was my first observation, I was amazed to find that it reached almost 120,000 feet before they released it to sail toward earth with it's parachute. At that altitude, the curvature of the earth could be seen quite easily by the onboard camera.

The second launch occurred on Saturday June 26 at about 10:00AM from Dayton Ohio by W8BI. This one, like the previous one, gave good views of the earth and horizon as it soared to 118,000 feet before being cut loose. On its decent a mirror gave assorted views of the earth before landing in a field near Marysville, Ohio. I received good P5 pictures until it got to within a few hundred feet from the ground but Bill (WB8URI) was close enough to it to get P1 pictures even after it had landed! Good work Bill. I'm sure that without your help the half hour it spent on the ground before being picked up would have been much longer.

I was very intrigued by this activity and highly recommend it as a diversion from ordinary ATV work. I wonder what we could do to support or enhance this activity? We'll try to keep you posted on future launches if the news of upcoming events is forwarded to me.

WA8RMC

439 Mhz ATV BAND OPENING

On Sunday July 11 at about 8:00 AM I worked KA3FZF in Monroeville, Pa., N8VGN in Weirton, West Virginia, and N8LMI in Wadsworth, Ohio with P5 pictures both directions. There were guys from Dayton who had similar success. WA8GUI from Dayton reported that the same guys were seeing the Dayton repeater P5 also. The band opening seemed to start about 10:00PM on Saturday nite and continued until about 5:00PM on Sunday evening. I wish there were more openings like that more often.

WB8URI

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 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 MEMBERSHIP APPLICATION

RENEWAL O NEW MEMBER O DATE _____
NAME _____ CALL _____
ADDRESS _____ HOME PHONE _____
CITY _____ STATE _____ ZIP _____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY_____
_____
_
COMMENTS
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ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK O CASH O
Make check payable to Martha Yost (for Fred Yost-ATCO treasurer) & mail to:

Fred Yost K8JGY
330 Dellfield Way
Gahanna,Ohio
43230

ATCO MEMBERS AS OF 01 JULY 1993

K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	Ohio	43068
W8AER	Dave Sears	1678 Kaiser Dr	Reynoldsburg	Ohio	43068
AH2AR	David Pelaez	4872 Trailside Court	Huber Heights	Ohio	45424
KB2ARL	Dave DiGiuseppe	391-3A Directory Dr	Columbus	Ohio	43213
WB8BIY	Robert Shaw	82 Troy Court	Westerville	Ohio	43081
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	Ohio	43065
N8CYV	Blaire Standley	721 West North St	Springfield	Ohio	45504
WA3DTO	Rick White	5314 Grosbeak Glen	Orient	Ohio	43146
W8EHW	Foster Warren	124 East Clark St	North Hampton	Ohio	45349
WD8EMS	Lee Coyle	7495 Lithopolis Road	Groveport	Ohio	43125
WA8EOY	Jonh Schlaechter	3199 Lewis Rd	Columbus	Ohio	43207
KA8ERS	Rick Shepherd	3296 Karl Road	Columbus	Ohio	43224
NK8F	Rich Budd	734 Hager Court	Gahanna	Ohio	43230
N8FFO	Edward Hauff	2716 Columbus Ave	Columbus	Ohio	43209
KB9FO	Henry Ruh	1545 Lee St Suite 73	Des Plaines	Illinois	60018
KB8GZO	Jason Pelaez	4872 Trailside Court	Huber Heights	Ohio	45424
KA8GZQ	Warren Duemmel	3488 Darbyshire Dr	Hilliard	Ohio	43026
K8HRR	Ira Bickham	260 Tiki Dr	Merritt Island	Florida	32953
N0IKJ	Ruth Budd	734 Hager Court	Gahanna	Ohio	43230
K8JGY	Fred Yost	330 Dellfield Way	Gahanna	Ohio	43230
N8KCB	Chris Morris	3181 Gerbert Rd	Columbus	Ohio	43224
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	Ohio	45331
WB8LGA	Chuck Beener	2548 State Route 61	Marengo	Ohio	43334
N8LRG	Phillip Humphries	1237 Summer Breeze Dr	Columbus	Ohio	43223
N8MCQ	John Unverzagt	159 Chapelfield Road	Gahanna	Ohio	43230
KB8MDE	Shaun Miller	3469 Oakcrest Rd	Columbus	Ohio	43232
N8OOY	Cheryl Taft	386 Cherry Street	Groveport	Ohio	43125
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Ohio	43204
WB8OTH	Perry Yantis	1850 Lisle Ave	Obetz	Ohio	43207
KE8PN	James Easley	1507 Michigan Ave	Columbus	Ohio	43201
KF8QU	Bob Tournoux	3569 Oarlock Ct	Hilliard	Ohio	43026
N8QLD	Rick Callebs	P.O. Box 266	Jackson	Ohio	45640
WA8RMC	Art Towslee	180 Fairdale Ave	Westerville	Ohio	43081
WA8RUT	Ken Morris	3181 Gerbert Rd	Columbus	Ohio	43224
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	Ohio	45334
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	Mich	48144
WA8TTE	Phil Morrison	154 Llewellyn Ave	Westerville	Ohio	43081
N8TUU	Maxine Duemmel	3488 Darbyshire Dr	Hilliard	Ohio	43206
W8TV	Bob Dye	6118 Sedgwick Rd	Columbus	Ohio	43235
KE8U	John Green	7585 Centeral College Rd	New Albany	Ohio	43054
WB8URI	William Heiden	4435 Kaufman Rd	Plain City	Ohio	43064
KA8WGX	Martha Yost	330 Dellfield Way	Gahanna	Ohio	43230
KA8ZNY	Tom Taft	386 Cherry Street	Groveport	Ohio	43125

ATCO FINANCIAL STATEMENT

CASH BALANCE (as of 04/01/93).....	$653.41
RECEIPTS (dues).....	$80.00
OTHER INCOME	$85.00
EXPENDITURES (postage).....	$-14.50
BALANCE (as of 07/01/93).....	$803.91

UPCOMING LOCAL HAMFESTS

On Sunday, August 22, 1993, the Union County Amateur Radio Club will sponsor their 17TH annual Marysville Hamfest/Computer Show at the Fairgrounds in Marysville, Ohio (near Columbus). Overnight camping with electric and water hook-ups will be available on a first come basis. 10' x 10' flea market spaces outside $5. Commercial vendors, please act fast to reserve space. Undercover areas and buildings for inside set-up are available.

Admission $4 advance, $5 at the gate.

Contact Don Sabins N8MGJ, 15704 Jolly Road Marysville, Ohio 43040 (513) 642-0475.

License exams will be available on a walk-in basis only.

On Sunday August 7TH the Columbus Hamfest will be held at the Aladdin Shrine Temple 3850 Stelzer Road in Columbus Ohio. For further information contact Jimmy KB8KME for a table.

LATE BREAKING NEWS FLASH!!!

WE HAVE NOW OFFICIALLY GOTTEN PRELIMINARY APPROVAL TO LOCATE OUR REPEATER ANTENNA ON THE STATE OFFICE TOWER IN DOWNTOWN COLUMBUS.

A few days ago I received word that the State has approved our request to locate our ATV transmitter on the top of the State Office Tower building in downtown Columbus. This is great news because the elevation 630 feet above a ground elevation of 760 feet. (40+ floors up). This benefits us in a number of ways not only to mention the advantage of the transmitter equipment up there also.(Based upon my measurements, 50 feet of feedline between transmitter and antenna will be required). We must meet with officials yet to iron out the formal details, but the picture has gotten considerably better. I hope that by the time you read the next newsletter, an operating system will be in place!!!! I'll report more details in the next newsletter.

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

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postage
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FIRST CLASS MAIL

HOPE YOU ARE ENJOYING YOUR SUMMER!!
WORK HARD IN THE YARD TO COMPLETE ALL HOUSEHOLD CHORES
SO CONCENTRATED ATV WORK CAN RESUME IN THE FALL!!!!!!!