ATCO NEWSLETTER

VOLUME 14 NUMBER 4 **OCTOBER 1997**

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

The repeater seems to be serving us well but improvements are still needed. The 439.25 input sensitivity suffers somewhat but all other aspects o the system are working well. We had and rectified our first significant breakdown since its inception. To find out what went wrong and what it took to fix it, don't stop here. Turn the page and read on.

ATCO

HAM IN THE SPOTLIGHT

This time we visit the home of Steve Caruso, KB8UGH. Steve has an ideal location to work the repeater for he lives near downtown Columbus within eyesight of the repeater antenna. He operates very well with just a whip antenna inside the house. Obviously he doesn't have KF8QU's problem where no outside antennas are allowed. Steve's hamshack has a much more simplistic look because he hasn't had years to collect "stuff". I predict that in about a year, he'll start taking over the living room with ATV gear.

ACTIVITIES ... from my "workbench"

Well, it's time to report on what's happening at *my* place the last few months. The "honeydo" list has taken on a totally new look...at last. Now, you might think by that lead-in that they all got done! WRONG! What really happened is as soon as the old ones finally were done they quickly were replaced with new ones. Same list, same volume, only subjects changed. Oh well, lets talk ATV.

To start off, as you may recall, an intermittent condition with the repeater surfaced, I believe, early this spring where the power output went way down. It appeared just after a significant storm so I assumed that the antenna was at fault. Just as suddenly as it appeared, it went away and the output was normal for a few more months. (I'm sure you know all about those problems that "fix themselves.") Sure enough, it came back in early July. This time we went down to the site fully expecting to do antenna work and found the transmitter output to be about 2 watts. Since I couldn't find anything wrong on site, I decided to shut the repeater down and take the transmitter home to work on it. When I got it home, I found the driver module to be intermittent. When I pressed it one way the output is normal. Press it another way and output goes to milliwatts. After an hour of probing, I finally found the problem which was a solder connection that became stress fatigued. That's a real bummer here for I was ready to blame PC Electronics for a bad solder connection before I discovered that I made the connection. ("No one else to blame here, Art, so solder it and go on with life!") Oh well, it had 3 wonderful years up to this point. After that, I checked out the rest of the circuitry to find it in good working order. However, even though it works OK, the Mirage D1010 amplifier was in sad need of a good screw tightening procedure. Two of the output connector mounting nuts had fallen completely off and one of the PCB mounting screws were loose. There is a fan that runs continuously on this amp so I'm not too surprised! A word of caution though, anyone with an amp like this with a 100% duty cycle blower better check the hardware frequently. I put the unit back together and re-installed it 3 days later and has been working OK ever since.

The next problem that we tackled was the 1250 transmitter amplifier that, as I reported last newsletter, went down to 15 watts from 50. When it was returned repaired from Down East Microwave, they said one of the four bricks failed. No reason other than it was probably caused by a power transient and was a non-warranty condition. Anyway, it's now fixed and performing above expectations.

The 1280 antenna at the repeater is still a horizontally polarized slot unit. A vertical antenna is on site waiting to go up if we feel that the vertical transmit antenna test was a success. I personally feel that vertical polarization is beneficial mainly for mobile operation but isn't any worse than horizontal polarization so let's go for it. The best is to wait till the fall event to discuss but will the weather hold out that long? We'll have to wait and see. If it looks like it may get cold soon, we may have to change it before then.

Now on to my favorite topic, the rooftop camera I'm working on. This turned out to be a much larger project than I first expected. I love to work on things like this but when one is designing the mechanical and electrical parts of this beast from scratch, in my "spare" time, it can be somewhat overwhelming. I'll eventually get it done but we need it soon as the 1998 spring storm season will be here too soon. I've got most of the mechanical gearing complete and the electrical parameters present much less of a challenge so that portion should go much quicker. I'll bring the portion completed so far to the Fall Event so we can have a "show-and-tell" session.

The last item on my agenda for this year (Ham related) is a NASA select link to the repeater constructed with a microwave dish Ken donated, LNA I found at Dayton, surplus 4.5ghz broadcast downconverter, 1/2" Heliax found at Dayton and miscellaneous other parts. You see, this project multiplexes well with the camera project for when I get bored on one, the other becomes exciting. Right now, I'm working on the NASA Select system mainly because the results seem to be more immediate. I'll let you know how it works out. Details at the Fall Event.

I've got an upcoming item that needs investigation and work. I'd like to be able to automatically log onto the Internet, say every 1/2 hour, connect to a program that has weather satellite picture, capture it and store it on my hard drive, put each event into a "slide show" program and be able to "play" it back on demand on the repeater as an animated progression of an advancing weather pattern. I know that it's possible to do this and there are possibly existing programs that could be used. Is there anyone out there that knows of such programs or can suggest of an easy way to create one? Suggestions are needed before I launch into this one.

That's all for now. More progress in the January newsletter.

...Art WA8RMC

Don't forget about the Fall Event on October 19th.

TECH TALK...Let's learn something technical

This is a new section I decided to add last issue dedicated toward broadening our technical knowledge about ATV instead of the "Plug & Play" situations many of us are in. I'm not the expert on most ATV subjects (but I'm good on opinions, so watch out!). I'll try to *pry* valuable information from those of you who DO speak with authority. Questions are also solicited because that's how we derive the answers. WA8RMC.

RF exposure update… **From ARRL Headquarters**

The FCC has revised the power level thresholds to trigger a routine Amateur Radio station RF exposure evaluation, and the changes will be welcome news for most hams. When the FCC first decreed a year ago that ham radio stations would have to comply with RF exposure guidelines, it set a 50-W threshold level. The updated guidelines, announced August 25, increase that threshold level on all HF bands except 10 meters, where it remains at 50 W. The new RF safety guidelines are scheduled to become effective January 1, 1998 for all Amateur Radio stations so stud this carefully.

The FCC went along in part with a request by the ARRL to establish a sliding scale for threshold levels, depending upon frequency. The revised thresholds are 500 W for 160 through 40 meters, 425 W on 30 meters (where the maximum permissible power is 200 W), 225 W on 20 meters, 125 W on 17 meters, 100 W on 15 meters, 75 W on 12 meters and 50 W on 10 meters. The threshold is 50W for all VHF bands but for UHF the threshold level is 70 W on 70 cm, 150 W on 33 cm, 200 W on 23 cm, and 250 W on 13 cm and above. Stations operating at or below these respective power levels are categorically excluded from having to perform a routine RF radiation evaluation. However, all stations, regardless of power level, still must comply with the RF exposure limits.

Along with its August 25 Second Memorandum Opinion and Order announcing the changes, the FCC released the "core" text of its long-awaited Office of Engineering and Technology (OET) Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields. The bulletin contains generic equations that can be used to analyze fields due to almost all antennas, although the FCC warns that "the resulting estimates for power density may be overly conservative in some cases." Hams leery of formulas might opt to wait for the easier-to-use Supplement B to OET Bulletin 65, which will include information designed specifically for evaluating Amateur Radio installations. The supplement promises to detail how hams can determine more simply if their individual stations comply with the new regulations. The FCC says the supplement will contain "information on projected minimum exclusion distances from typical amateur antenna installations."

The FCC said it would issue Supplement B "as soon as a review of the current draft is complete." When it's ready, Supplement B will be available to download from the FCC's Web site, http://www.fcc.gov/oet/rfsafety. The FCC directed inquiries as to the availability of the supplement and other RF-related questions to its RF Safety Program, 202-418-2464; e-mail rfsafety@fcc.gov.

Last year, the FCC established time-averaged max. permissible exposure (MPE) limits for RF fields in two tiers--for **controlled environments** (ie, a ham's immediate household, including visitors) and **uncontrolled environments** (ie, neighbors, the general public). If a routine evaluation of a har station indicates that human exposure to RF fields could be in excess of the FCC's MPE limits, the licensee must act to correct problem and ensure compliance. This could include changing operating patterns, relocating antennas, restricting access, changing frequency, output power, emissio type or any combination of these and other remedies.

The FCC says that ham radio facilities "represent a special case for determining exposure, since there are many possible antenna types that could be designed & used for amateur stations." The revised regulations categorically exclude most mobile installations, including those in the Amateur Radio Service, from having to comply with the RF-exposure or station evaluation guidelines. Since the FCC issued its guidelines, additional questions on RF safety have been added to the Amateur Radio examination question pool.

OET Bulletin 65 and the FCC Second Memorandum Opinion and Order are available at http://www.fcc.gov/oet/dockets/et93-62/. More details on the FCC's latest announcement on RF safety will appear in the October issue of QST.
...Ken Bird, WB8SMK

Most of us may feel that the above verbiage seems like a lot of hype from the FCC but if you don't try to read too far into it, it makes sense. There has been lots of talk about RF exposure hazards lately and I don't think that anyone truly knows how much RF is TOO much. As you digest the above numbers, remember they are talking about e***ffective radiated power*** and not just the output power from your transmitter. For that reason, the antenna type is very important. Now, for those of us that are ***really*** interested, there is a web site on the Internet that will calculate the RF exposure level and tell you if you're within limits. It only takes a moment to do so why not check it out. It's located at http://www.cs.utexas.edu/users/kharker/rfsafety.
...Art, WA8RMC

The quest to understand vsb (vestigial sideband) filters continue.

Neil makes a good point here. Granted, most of you are not going to run out and build an ATV repeater just to knowledgeably apply the followin VSB filter discussion, but maybe you have another point of view or just perhaps you have a filter laying around that can be put to good use to get that last bit of power from your final amp. In any case, it's **technical** so read on ...WA8RMC.

I understand that many times the question of using a VSB filter before or after the amplifier for ATV use has been discussed. I would like to offer a better solution.

First let's quickly review the need to have the VSB filter after the AMP. The main reason is to maintain the desired filter effect that VSB calls for. To achieve a -40dB to -60dB filter effect, you must filter AFTER THE AMP! (*Amplifiers are not perfect devices and all have some non-linearity. All non-linear devices generate spurious emissions, so the REAL task is to filter them to a recommended level. That's where the -40 to -60 dB comes in. Also, for those transmitting on 421.25 MHz it's needed to stay legal.* Ed).
The reason behind placing a VSB filter **prior** to the amp, is that you would narrow the input signal bandwidth, thus letting the amp produce more power over a smaller bandwidth. This also works well. However this technique only does not produce -40dB minimum VSB waveforms after the amp.

The solution then is simply USE TWO VSB FILTERS! Use one between the exciter and the amp to narrow the bandwidth. This lets the amp produce more output power. The 1 dB insertion loss is easily overcome by slightly more exciter power. Thus 1 watt into the amp prior to the VSB filter is still 1 watt into the amp after the addition of a VSB filter if you bump the exciter output power to 1.26 watts BUT IT IS NOW 1 WATT VSB Since any amp will produce more power over a smaller bandwidth, the next question is: Does the amp fed with a VSB input produce enough additional gain to make up for the second VSB filter loss after the AMP? Based on some experiments conducted at two 'rf' commercial companies which where done totally independent from each other, both engineers agreed that this technique resulted in about 25% more output power as compared to the same setup without the VSB filter between the exciter and amp. (The exciter in both cases was set for one watt output, as measured at the input to the amp.)
...Neil, WA2WIM wa2wim@ismi.net http://www.ismi.net/~wa2wim

OHIO AREA ATV REPEATER LISTING

This list is compiled from actual repeater sightings in the Columbus, Ohio area. We need to keep up-to-date listings so newer operators know what to look for when the band's open. H&V in freq. list = antenna polarization. Our repeater is obviously the best so I'll list it first.

LOCATION	CALL	INPUT	OUTPUT	BEAM	CALL FREQ	NOTES
Columbus, Ohio	WA8RUT	439.25 H	427.25 H	~	147.45	A signal on any listed input causes
		910.25 V	1250 V			an output on both listed frequencies
	1280 V	~				
Xenia, Ohio	KB8GRJ	434.25 H	421.25 H	240	144.36	*10= tone up for 1 minute
Dayton, Ohio	W8BI	439.25 H	426.25 H	250	147.45	*10=ID, *71= bul board
		1245	1287			
		1249.5	1291.5			
Lima, Ohio	WB8ULC	439.25 H	421.25 H	315		
Ashland, Ky.	WA4GSS	439.25 H	421.25 H	180		
Elizabethtown, Ky.	W4BEJ	439.25 H	421.25 H	210	146.98-	
Bowling Green, Ky.	W4HTB	439.25 H	426.25 H	200		
			1280			
Wheeling, W.Va	KB8QHO	439.25 H	426.25 H	080		
Acme, Pa	W3NBN	434 H	421.25 H			
			910.25 H			
Carnigie, Pa (Pittsburgh)	W3KWH		439.25 H	421.25 H	090	

FREQUENCY COORDINATION...ARRL moves to support Band Plans

ruxpin@netcom.com wrote:

I am looking forward to seeing the Petition for Rule Making. Noting the erosion in the level of compliance with the various band plans, the Board voted to petition the FCC to amend the amateur rules to state that hams ''should be familiar with, and should abide by'' voluntary banc plans that apply to the frequencies they use. This is a bad idea. It moves towards 'making legally binding' band plans often invented by biasea and out-of-touch groups which leave no space for advanced, special interest or research activities.

It may be sold as useful to ATV, but I suspect it would be used for the opposite effect. More useful would be a rule requiring space to be allocated for modes, especially considering the usefulness of the mode on that band. 70cm is prime TV space, not to be squandered on yet another 2m voice repeater link.
VE7AII/W6/TV

N5GAR responds:

I agree with the concern. Since you have a VE7 call, and this may mean you have not been tested on the Amateur Rules in the US, let me take a moment to comment. You are correct about the "biased and out-of-touch groups which leave no space for advanced, special interest or research activities." They have been caught trying to "coordinate" auxiliary transmissions on top of ATV repeaters, and trying to use the "coordination" process to create interference rather than resolve it. The reason they have difficulty with their plans, and that the rest of us are protected, is because of 4 sections of the FCC Rules. 97.3(a)(21) defines a frequency coordinator. 97.201(c) provides for coordination of auxiliary stations (such as links between repeaters - including links of FM and ATV modes). 97.205(c) provides for coordination of repeater stations (this includes ATV repeaters, not just narrow band FM repeaters). 97.305(c) prescribes the modes that each FCC licensee is authorized to use on each band (this includes ATV repeaters on the 70 cm. band, for example).When the FCC did its last re-write of the rules, it reduced the number of total words, but, in some ways, made some of the concepts a little more difficult to diges

The authority of the 'frequency coordination process' is rather narrow. Where the transmissions of a repeater cause harmful interference to another repeater, the two station licensees are equally "and fully" responsible for resolving the interference "unless the operation of one station is recommended by a frequency coordinator and the operation of the other station is not. In that case, the licensee of the non-coordinated repeater has primary responsibility to resolve the interference." With this, the possibility of certain interference situations from one REPEATER to another REPEATER are anticipated and addressed by the Rules.

There is a similar rule about auxiliaries (such as links between repeaters). With this, the possibility of certain interference situations from one AUXILIARY to another AUXILIARY are anticipated and addressed by the Rules. Interference between an AUXILIARY and a REPEATER (such as an ATV repeater with output on 421.250) is not rule compliant, and is not specially addressed. There is no "primary responsibility" to cure this kind of interference, if one of the signals is 'coordinated' and the other is not. It is presumed that 'coordinators' will use band plans that are FCC compatible; i.e. compatible with 97.305(c) and related sections. To do this, it is necessary to establish a band plan that accommodates all the modes that individuals are licensed to use on a band.

This is where the FCC's definition of a "frequency coordinator" is important. A "frequency coordinator" is an entity, recognized in a local or regional area by amateur operators... that recommends transmit/receive channels (and "associated operating and technical parameters") for such stations IN ORDER TO AVOID OR MINIMIZE POTENTIAL INTERFERENCE. It seems if the 'coordinator' sent out a 'certificate' purporting to designate 'coordination' of an auxiliary on top of an ATV repeater, the requirements of that definition wouldn't be met. It seems if a person receives papers indicating a 'coordination' that would obviously result in interference within ATV system (or any other mode of repeater - for that matter), the only right thing to do is to send the papers back - and not order crystals for the frequency. It also seems that if a person claiming to be a 'coordinator' sent out paperwork that would directly cause interference, rather than "avoid or minimize" it, other amateurs would not "recognize" him.

Here in Dallas, Texas, we have a "coordinated" ATV system listed in the ARRL Repeater Directory with output on 421.250. (It has been recently used to provide NASA's feeds of the Mars landing, among other interesting, worthwhile uses.) Yet there are "auxiliary" signals that directly interfere with it. These signals appear to be directional, and some of them appear to use high power. (The interference received, therefore, depends on the location of a particular receiver, related to the link transmitter.) No one should ever have been led to believe that such "auxiliaries" on top of the ATV signal could be "coordinated." Those transmitters could have been set up somewhere else. It should come as no surprise that not all the members (or even the life members) of the frequency coordination organization in Texas recognize the person who reportedly signed those papers as a "coordinator."

There has been an additional frustration with this as some of the interfering "auxiliaries" have not transmitted any identification. Some of them d not appear to be "two-way" communications, or follow 97.111, and instead transmit one way communications not allowed under 97.111(b). So, fo the ARRL to move to support Band Plans, the plans must be FCC compatible, and include all the modes - per 97.305(c) and related Rules.

Using "coordination" to try to eliminate a mode from a band, licensed by the FCC to individuals, simply would not work. That would purport to revoke rights and privileges granted to every amateur by the FCC, through the issuance of licenses. I know there is a minority of amateurs with special personal interests who want that, but this is not the position of most ARRL members, or other amateurs. See the quotes on my web page, at the URL below. ATV, and all the other modes, are here to stay.
...TOM BLACKWELL, N5GAR tom.blackwell@why.net http://www.why.net/home/tom.blackwell/

TOWER ACCIDENT...DON'T LET THIS HAPPEN TO YOU!

The following description was reported to have been seen on an accident report form as an explanation of multiple injuries an ATV'er sustained while working on his tower. I heard that he was an unhappy with P0 to P1 signal reports and was making improvements. The source is unknown...probably a good thing!

"I am an amateur television operator. On the day of the accident, I was working alone on the top section of my 80-foot tower completing the installation of my new antenna. When I had completed the work, I discovered I had, over the course of several trips up and down the tower, brought up about 300 lbs of tools and spare hardware. Rather than carry the unneeded tools and material down by hand, I decided to lower the items in a small barrel using a pulley which, fortunately, was attached to the top of the tower.

Securing the rope at ground level, I went to the top of the tower and loaded the tools and materials into the barrel. Then I went back to the ground and untied the rope, holding it tightly to ensure a slow descent of the 300 lbs. of tools. Please note that I weigh 165 lbs. Surprised at being suddenly yanked off the ground, I lost my presence of mind and forgot to let go of the rope. I proceeded at a rather rapid rate up the side o the tower. In the vicinity of the 40-foot level, I met the barrel coming down. This is the cause of my fractured skull and broken collarbone. Slowec only slightly, I continued my rapid ascent, not stopping until the fingers of my right hand were two knuckles deep into the pulley.

Fortunately, by this time I had regained my presence of mind and was able to hold tightly to the rope in spite of my pain. At the same time, however, the barrel hit the ground and the bottom fell out of it. Without the tools, the barrel now weighed about 20 lbs.

As you might imagine, I began an abrupt decent down the side of the tower. Around the 40-foot level, I again met the barrel coming up. This explains the two fractured ankles and the lacerations of my legs and lower body. The encounter with the barrel, however, slowed me enough to lessen my injuries when I fell onto the pile of tools and fortunately only three vertebrae were cracked. But now as I laid there on the tools in pain unable to stand, and watching the empty barrel 80 ft. above me, I again lost my presence of mind and let go of the rope."

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.

WA8DNI - John Busic Groveport, Ohio
KA8VUQ - Jack Wolff Columbus, Ohio

SILENT KEY

It is with great sadness that I must report the passing of W8EOY John Schechlecter. He was a long time ATV'er that dates back quite a few years John had been quite active in ATV until a couple of years ago. Recently, he has spent his time in a rest home and reportedly kept up to date by reading the ATCO newsletter. We'll miss you John!

ATV EQUIPMENT SUPPLIERS

Below is a list of manufacturers of ATV equipment that I have found. There is no endorsement of any of the manufacturers listed below so buyer beware. However, I WILL say that if I or anyone else that I know of, has had any trouble with a manufacturer, it won't be listed. As I get more info, I'll add manufacturers. Likewise, if I hear of any trouble, it'll be removed. Good luck and keep me advised. WA8RMC

Downconverters!

Michael Kohlstadt, KD6UJS, has a limited supply of used but working Pacific Monolithics 2.4ghz downconverters and power supplies which will work fine for viewing the repeater.
408-926-0430.

Down East Microwave
Antennas, Power Amplifiers, Deluxe Downconverters, microwave parts.
954 Rt. 519 Frenchtown, NJ 08825
Phone: 908-996-3584
Fax: 908-996-3702

HF Technologies Inc.
FMTV Transmitters, Receivers
457 Santa Fe Trail
Cary, IL 60013
708-639-4336

PC Electronics:
ATV Transmitters, Receivers Manufacturer/Reseller
2522 Paxson Ln.
Arcadia, CA 91009-8537
Phone: 626-447-4565
Fax: 626-447-0489

Phillips-Tech Electronics
MMDS, ITFS downconverters and antenna systems
P.O. Box 8533
Scottsdale, AZ 85252
Phone: 602-947-7700
Fax: 602-947-7799

R. Myers Communications
Good, single unit, source for 2.4GHz dishes
P.O. Box 17108
Fountain Hills, AZ 85269-7108
Phone: 602-837-6492
Fax: 602-837-6872

SHF Microwave Parts Company
10GHz Gunn oscillators and Antennas
7102 W. 500 S.
LA PORTE, INDIANA, 46350
Fax: 219-785-4552

Wyman Research Inc.
FMTV Transmitters, Receivers
Box 95, RR 1
Waldron, IN 46162
Phone: 317-525-6452

Publications!

ATV Quarterly (ATVQ)
3 N. Court St.
Crown Point IN 46307
Phone: 219-662-6396
FAX: 219-622-6991

BUILD THIS YAGI ANTENNA FOR 439 MHz ATV!

Ed Post N8KQN has most generously donated his time and effort to come up with this “monster” of an antenna. I’m sure that the repeater will look like channel 4 with this one. All kidding aside, you might want to play around with something like this when the Dayton repeater gets back on line (soon). The Gamma match details were omitted here for simplicity. It is nothing special and well represented in the Radio Amateur’s handbook and other publications. If you want to tackle this, enlist Ted or myself for some help. ...WA8RMC / N8KQN.

SPECIFICATIONS

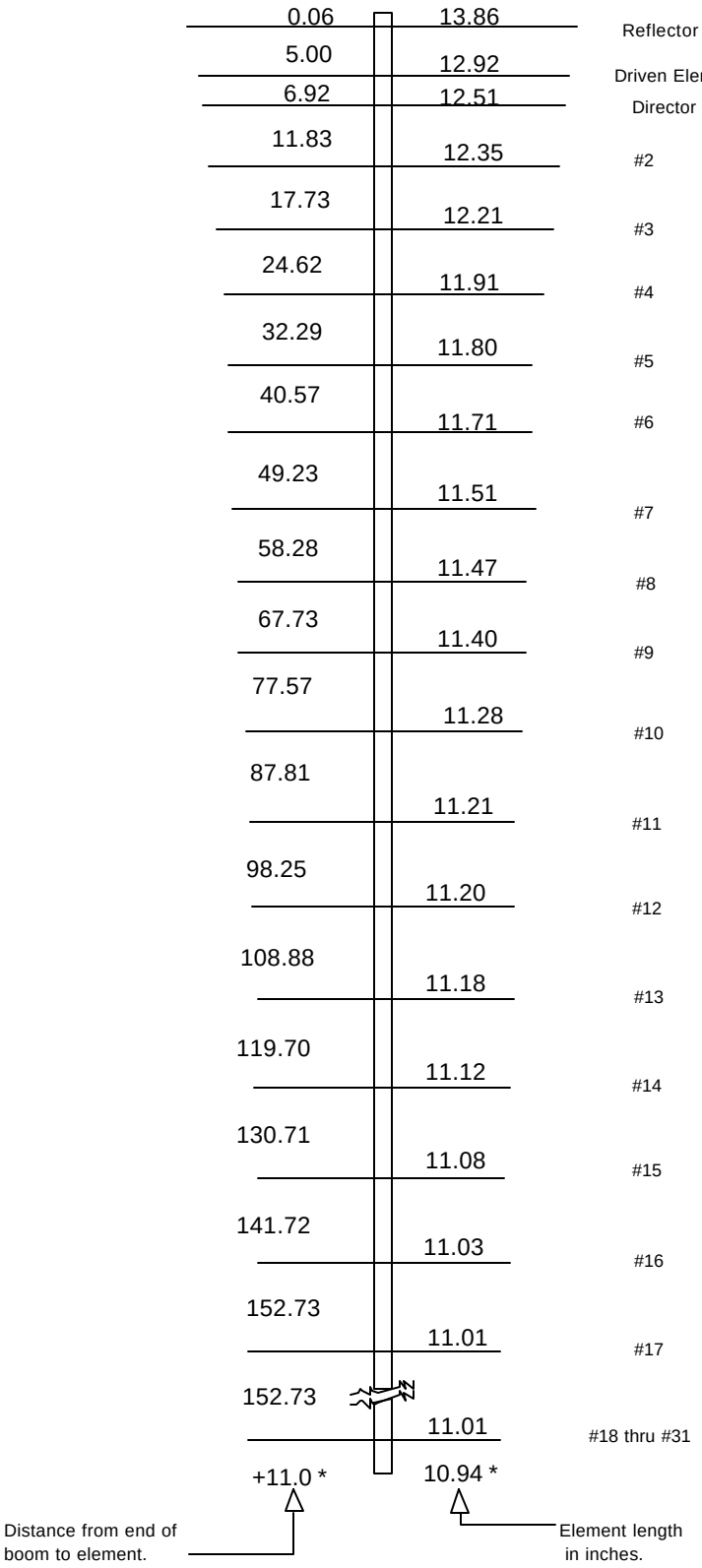
Frequency - 432 to 440 MHz
Elements - 31
Gain - 17 dB.
Front to back ratio - 30 dB.
SWR@ resonance - 1.4 to 1 maximum.

NOTES:

Driven element is 3/8 or 1/2" OD.
All other elements are 3/16" solid aluminum rod.
The driven element is fed with a gamma match arangement.
Gamma rod = 3/8" OD x 2.75" long.
Center for Gamma is 2.75" long made from RG8 coax center.
Spacing from center of Gamma to driven element is 1 1/2".

Boom should be 1 1/4" OD

* Elements 18 thru 29 are all spaced 11" apart. The length of each is 1/16" shorter than the previous one with element 18 starting at 1/16' shorter than element 17 and so on.



THE DAYTON REPEATER...competition for our system?...here's an overview!

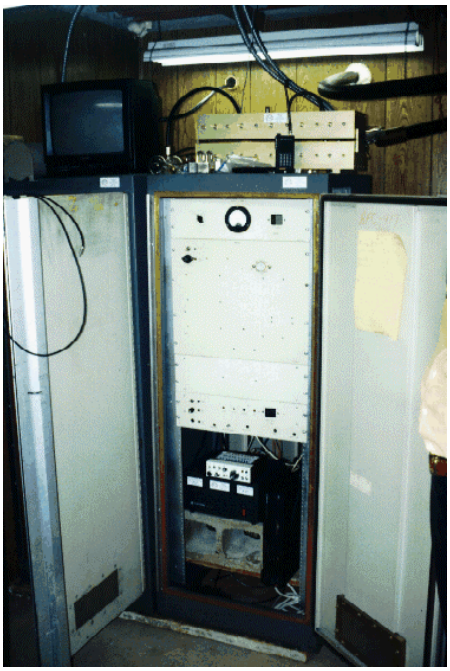
Well, after about 2 years of near silence, the Dayton repeater is starting to come to life! Headed by K6GUC, Reuben, and expert knowledge from WA8ZAH, N8STB and W8RVH, it seems inevitable that it'll be a first class system. Reuben has taken over the rebuild responsibilities and has been given the green light from the DARA club. The ownership will remain with DARA (and the funding) but "Reuben and the boys" will provide the expertise.

The whole system had been practically gutted by previous personnel so Reuben will essentially rebuild from the ground up exclusive of the antenna and feedline. The Lindsay antenna (there is only one now - there used to be two) seems to be in good shape and will remain on the tower as is. It is fed with about 200 feet of 1 5/8" Andrews hardline which also seems to be in good shape.

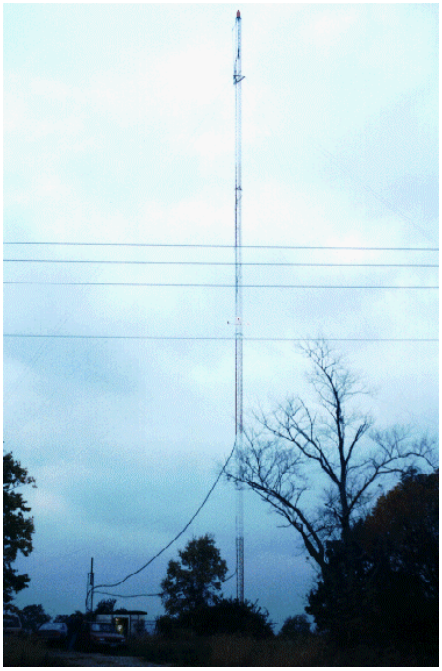
The site is near ideal for it is located on a small hill towering above the rest of the countryside by about 200 feet. There is very good observation visibility for at least 20 miles to the east. The north is bad, however, for about 3oo yards away is a giant water tower. It could be a good opportunity for a passive reflector, however. The tower is only 180 feet tall but the terrain more than makes up for it.

The building they have will remain and is not used by anyone else so the task is easier than if other commercial installations were present. However I noticed that some field mice now occupy the facility so eviction proceedings are in order here! The building and tower belong to DARA so they can do what they please to refurbish it. That's all for now. Reuben will let us know when the system is back to normal. It has been operational intermittently for the last week or so, so look to the west often for a pleasant surprise! Below are some pictures I took during my trip there last week.

Reuben adjusting modules in recvr. encl.



An open view of transmitter enclosure.



Tower shot with transmitter house below.

Left to right: W8STB, WA8ZAH, W8RVH, K6GUC

"Ye Ole transmitter house held up by W8STB"

HAMFEST CALENDAR

This section is reserved for upcoming hamfests for as far in advance as we know about them. 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. I maintain some fliers that compile this list so for additional info Email me at towslee@ee.net. This list will be amended as further information becomes available.

October 26	Marion, Ohio hamfest. 8:00AM to 3:00PM @ Marion County Fairgrounds. 147.30+ for talk-ins.
November 15,16	Fort Wayne, Indiana hamfest @ Allen County War Memorial Coliseum & expo Center.146.28+ talk in.
November 2	Massillon ARC, Canton, OH, 2925 26th St. SE, Canton, OH 44707-2029 330-484-5536
November 22	Grant ARC, Georgetown, OH Harold Pryor 324 Marshall Ave., Georgetown, OH 45121 513-378-2824
January 18	Sunday Creek AR Federation, Nelsonville, OH, 8051 Oregon Ridge, Glouster, OH 45732 614-767-2226 January 25 Tusco ARC, Dover, OH 6288 Echo Lake Rd. NE, New Philadelphia, OH 44663 330-364-5258
February 21-22	Great Lakes Division Convention, Cincinnati, OH, OH 45211 513-661-1805
February 22	Cuyahoga Falls ARC, Cuyahoga Falls, OH Box 2222, Stow, OH 44224 330-923-9045

PUBLIC SERVICE ATV ACTIVITIES IN COLUMBUS

"RED - WHITE - BOOM"

We again provided video surveillance coverage of our annual fireworks show for the Columbus police department. The crowd again this year topped the 500,000 mark and presented a great threat to crowd control. We only hope that our presence helped deter crime and assisted the law enforcement personnel to make their job a little easier.

This year, as was done in the past, we had a camera on top of the Gas Company parking garage manned by myself and multiple cameras on top of the police headquarters manned by Ken WA8RUT and Phil N8LRG. The switched video was sent down 15 stories to the police command center via a 2.4 Ghz link. There the police watched the video to get an idea where the largest crowd concentrations were. With that information they could dispatch the proper number of officers to keep order. Job well done guys!

RICKENBACKER AIR SHOW

This year we provided surveillance video (similar to "Red/White/Boom") for the air show at Rickenbacker Air Force Base. This was not quite as large of a crowd mainly because of the threatening weather, but never-the-less produced about 100,000 observers who mainly came out to see the Thunderbirds perform. Our task was to provide the surveillance video for the security personnel. Tom KA8ZNY manned the command center on Saturday while I took his place on Sunday. A much more exciting location was manned by Tom KB8TRP in the control tower. He actually got to watch the show. Also on hand were Ken WA8RUT and Phil N8LRG. Phil coordinated the effort mainly because of his job as communications supervisor with the Air Force at Rickenbacker AFB.

AIRPORT DISASTER DRILL

This activity at Port Columbus Airport is required at least every 4 years to prepare airport personnel for any possible airplane disaster. The drill was quite successful and we were glad to be a part. Our direction was to video tape and provide video coverage of the proceedings for the official observers so they could spot any mistakes in participants...and there were many I am told.

Our personnel consisted of Ken WA8RUT and Phil N8LRG who manned cameras at an airport command center room. I provided "field" coverage of the "victims" being bandaged and transported with my portable battery operated 1280 Mhz transmitter and omnidirectional antenna and Tom KA8ZNY (he got the really good job) had a camera and 910 MHz transmitter in a police helicopter hovering and circling above the proceedings. All equipment worked perfectly and excellent pictures resulted.

I need to report on an error of airport personnel that I observed and found to be quite amusing. Thank goodness it wasn't a **REAL** disaster but it's things like this that we need to learn from. It went like this: The fire and rescue vehicles were lined up outside the airport property. At the signal that a "airplane crash" had taken place, the normal sequence of events were to take place which includes alert the rescue squads and fire apparatus. At that point an airport police officer came racing around in his car to open the locked gates to the runways. So far so good. He squealed to a stop in front of the gate, jumped out of the car and ran over to the gate. At that point I noticed him fumbling at the lock. Guess what? He didn't have the right key to open the gate. After about 4 or 5 minutes of trying to open it a second car raced up and unlocked the gate so the "show could start". In my opinion, he should have called to the first waiting fire truck to come over and put their bolt cutters to action. Oh well, maybe next time! We all had fun.
Art...WA8RMC

NATIONAL ATV ORGANIZATION STARTS TO TAKE SHAPE

There is a new National ATV organization brewing. “So what”, you say. “What does that mean to me”. Well it could mean a lot or very little. It depends upon your location and or your ATV activity status. In a nutshell, there is a group of us trying to organize the ATV community to among other things represent a much stronger force when other commercial and (or) other amateur groups try to take some (or all) of our precious allocated RF spectrum away from us. We really need a good band plan!

It is well known that the largest and loudest lobby groups most often get their way. This was illustrated well not too long ago when a commercial group petitioned the FCC to allow a “business band” unlicensed segment of 450 MHz given to them to make low cost unlicensed portable communication radios. No one saw the petition so no one objected and the FCC said OK. Now we see these radios in Radio Shack stores. It was the commercial venture that started it.

So, if we’re organized, we help all of us unite and be heard. John Jaminet started the “action” about a year ago and now has successfully located 9 subjects (volunteers) to help the effort of which I am a part. In the coming months you probably will hear more from us as we proceed through the organization process so please be kind, understanding and most of all HELPFUL in our efforts.

The people on the organization committee are as follows:

Fred Juch N5JXO Houston, Texas (with the HATS ATV group)
Art Towslee WA8RMC Columbus, Ohio
Jim Tury KA4CKI Alexandria, Virginia (with Metrovision ATV group)
John Jaminet W3HMS Mechanicsburg, Pa (CAATN ATV club V.P.)
Ron Cohen KEZKO Philadelphia, Pa
John Shaffer W3SST York, Pa
Bill Brown WB8ELK Madison, Alabama
John Hays K7VE Washington state
John Hey W8STB Dayton, Ohio (with ATCO and DARA groups)
Vacant position. Anyone interested? Let me know!

We are presently trying to put together organizational details including officers, constitution, by-laws, purpose, objectives and so on. If anyone can help us, please speak up. That’s all for now. More news as it happens.

Art...WA8RMC

BUILD THIS SIMPLE 1250 MHz FM ATV TRANSMITTER

Here's the 1250/1280 MHz transmitter that I told everyone that I would publish for about a year now. This circuit is the same one that we use for the 1250 MHz output in the ATCO repeater. It is relatively simple, easy to construct, simple to tune up and easy to package. What more could one want?.....OK, no, I don't want to build it for you...BUT, if you ask, I'll be glad to assist in any way I can to get it up and running if *you're* willing to also do some of the work.

The input of this unit takes standard audio (about 1/2 volt) and NTSC video (1/2 volt) and produces about 3 watts of FM modulated video with 6 MHz offset FM audio. A pre-emphasis network is built in so no special video compensation is required. The heart of the device is a Plessey SP5070 phase lock loop IC that utilizes a 6 MHz crystal, multiplies it 256 times, compares that signal to a sampled portion of the RF output and outputs a DC error signal to a pair of varacap diodes controlling the frequency of a free running voltage controlled oscillator. (WOW...what a mouthful but I got it all out in one sentence!)

The audio portion starts off by amplifying the audio and driving a voltage controlled 6.2 MHz oscillator. The modulated 6.2 MHz signal is then fed directly, through a summing network, and mixed with the DC phase lock loop error signal. The 100 ohm pot controls the magnitude of this carrier injection.

The video is first amplified, like the audio, and fed into a pre-emphasis network similar to the de-emphasis network in all satellite receivers. The amplified and compensated video is then fed directly to the phase lock loop DC error signal and summed with the audio carrier so it can frequency modulate the 1250 MHz voltage controlled oscillator. The compensation networks on the output of the SP5070 are to keep the phase lock response slow enough so as not to react to the audio/video carrier modulation voltages.

The output of the MSA1104 MMIC amplifier is about 10 Mw which directly drives the M67715 "brick" to output about 3 watts of RF. This is normally enough to drive a loop yagi and produce "P5" pictures into the repeater if local. However, a post amplifier (another article) can be used to push this output up to about the 18-20 watt level if needed.

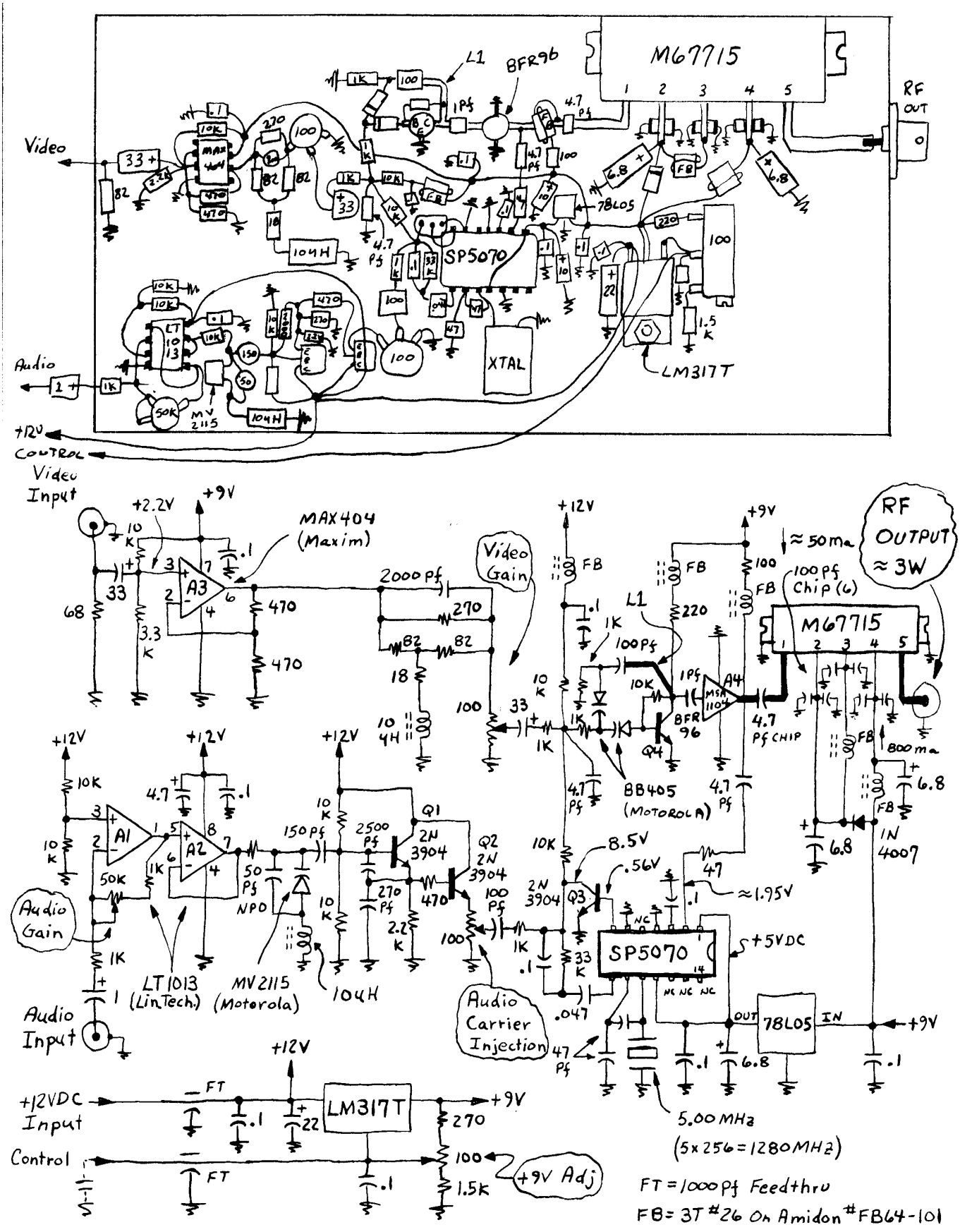
Most parts are obtainable locally or at hamfests but the Plessey SP5070 may be harder to find. The Plessey rep gave me a couple samples so I haven't tried to purchase any. They cost about $15 each. The BB405 diodes may also be hard to find. Let me know if you're looking, maybe I can help. The M67715 is available from Downeast Microwave (address in this issue). The Maxim MAX404 and the Linear Technology LT1013 op amps are available from Digi-Key.

Construction is done with the IC's soldered directly onto a piece of unetched copper clad PC board material. The full size component approximate placement is shown in the layout on the next page. The ground pins are soldered to the copper and the component connection pins are carefully bent up to attach the components. The ground pins along with the components hold the circuitry in place on the board. The input and output lines of the M67715 brick, however are 1/8" wide copper tracks. The copper was cut away from each side to create isolated approx. 50 ohm strip lines. Chamfer the 90 degree corners at 45 degrees. (not critical). The most critical part, however, is L1 which is the lead of the 100 pf capacitor about 1/2" long positioned about 1/4' above the copper plane and bent 90 degrees to connect to Q4 collector. This line may take some playing with to get the frequency low enough to allow the SP5070 to "lock". Check it with a frequency counter if possible for a free run frequency **ABOVE** the intended operating frequency because the increasing dc voltage from the SP5070 *lowers* the operating frequency. I had to load the lead up with solder to decrease the inductance and raise the frequency enough to obtain a locked condition.

Good luck with construction. I've found this circuit to work quite well and produce high resolution video in excess of the average TV receiver. I have, however, found some minor diagonal lines in the video caused by phase lock loop interference and have been unsuccessful at eliminating them. For the most part, they're not noticeable.

PS: Forgive the primitive way in which I drew the schematic and associated layout. Normally I would have done these in Autocad, but time didn't permit. As it turned out, I spent most of Saturday drawing it and rearranging it so Autocad could have been just as fast after all!

Art...WA8RMC


M67715
L1
BFR96
RF OUT
Video
Audio
SP5070
XTAL
LM317T
7BL05
+12V CONTROL
Video Input
+2.2V
+9V
MAX404 (Maxim)
Video Gain
2000 pf
RF OUTPUT ≈ 3W
≈ 50ma
100 pf Chip (6)
100pf
4.7 pf CHIP
BB405 (MOTOROLA)
800ma
IN 4007
8.5V
.56V
≈1.95V
+5VDC
Audio Gain
Audio Input
LT1013 (LinTech.)
MV2115 (Motorola)
104H
Audio Carrier Injection
5.00 MHz
(5x256=1280MHz)
+12VDC Input
Control
+9V Adj
FT = 1000 pf Feedthru
FB = 3T #26 On Amidon #FB64-101

ATCO

1997 FALL EVENT

1:00 PM - SUNDAY

OCTOBER 19, 1997

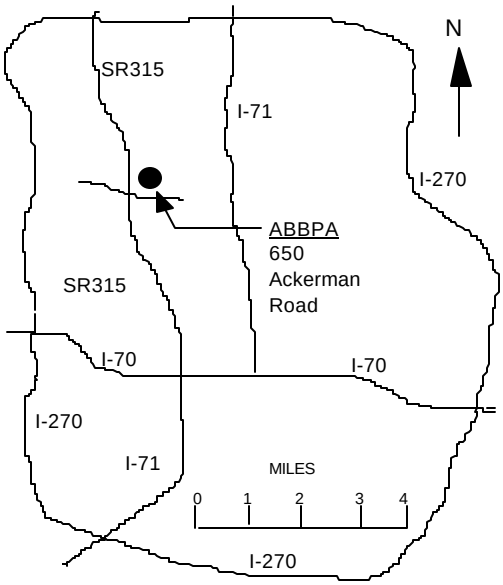
ABB PROCESS AUTOMATION
(ACCURAY)
*** SHELTERHOUSE ***
650 ACKERMAN ROAD
FOR MORE DETAILS, CONTACT
ART WA8RMC 891-9273

LUNCH PROVIDED - DOOR PRIZES

BRING A FRIEND AND SEE OLD BUDDYS

SHOW AND TELL

DIRECTIONS TO THE ATCO EVENT



From I-70 either EAST or WEST Bound:
Take Route 315 (runs north and south and is just west of Columbus) - head NORTH.
Get off at Ackerman Road Exit and turn RIGHT on to Ackerman Road.
Turn LEFT just beyond the first traffic light at the ATCO sign.

From I-71 traveling NORTH bound toward Columbus:
While traveling north on I-71, watch for the split to Route 315 just south of Columbus. Take 315 and head NORTH to the Ackerman Road Exit. Get off at this exit and turn RIGHT to Ackerman Road. Turn LEFT just beyond the first traffic light at the ATCO sign.

From I-71 traveling SOUTH bound toward Columbus:

(DIRECTIONS IF YOU'RE "NORTH" OF I-270).
Take I-71 SOUTH to I-270 Bypass Loop & head WEST on I-270.
At the Route 315 exit, turn LEFT to head SOUTH on Route 315.
Exit on Ackerman Road

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. Most 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).

http://psycho.psy.ohio-state.edu/atco	ATCO ATV home page.
http://www.bright.net/~rmeeksjr/atv_day.htm	Ohio, Dayton ATV group
http://fly.hiwaay.net/~bbrown/index.htm	Alabama, Huntsville,Tennessee Valley ATV (Bill Brown WB8ELK)
http://www.netbox.hayden.edu/Guests/AATV	Arizona, Phoenix Amateurs
http://www.citynight.com/atv	California, San Francisco ATV
http://www.ladas.com/ATN	California, **A**mateur **T**elevision **N**etwork in Central / Southern
http://w6yx.stanford.edu/~stevem/atv	California, South Bay ATV Group Stanford University
http://www.qsl.net/wb6izg	California, southern ATV Sights and Sounds
http://www.mindspring.com/~rwf/aatn1.html	Georgia, Atlanta ATV
http://www.smart.net/~brats	Maryland**,** Baltimore Radio Amateur Television Society (BRATS)
http://www.njin.net/~magliaco/atv.html	New Jersey, Brookdale ARC in Lincroft
http://www.intercenter.net/triatv/atv-web.htm	N. Carolina, Raleigh.Triangle ATV club
http://www.navicom.com/~satva/satvainf.htm	Oregon, Silverton, Salem ATV Assoc (SATVA)
http://www.lloydio.com/oatva.html	Oregon, Portland ATV (OATVA)
http://wwwwebczar.com/atv	Oklahoma, Tulsa Amateur TV (TARC)
http://members.aol.com/n3kkm/w3hzu.html	Pennsylvania, York Keystone VHF Club
http://www.geocities.com/Hollywood/5842	Tennessee, East ATV
http://www.stevens.com/HATS/home.html	Texas, Houston ATV
http://uugate.aim.utah.edu/utah_atv/root.html	Utah ATV
http://www.qsl.net/w7twu	Washington, Western Washington Television Society (WWATS)
http://scott-inc.com/wb9neq.htm	Airborn ATV from WB9NEQ in Bowling Green, Kentucky

http://www.ecn.net.au/~sbloxham	Australia, ATV (exhaustive list of other ATV & ham radio sites)
http://ourworld.compuserve.com/homepages/batc	British ATV club (BATC)
http://www.sfn.saskatoon.sk.ca/recreation/hamburg/hamatv.html	Saskatoon, Canada ATV
http://www.gpfn.sk.ca/hobbies/rara/atv3.html	Regina, Canada ATV
http://www.inside.co.uk/scart.htm	UK,Great Britain ATV (SCART)
http://www.cmo.ch/swissatv	Swiss ATV

NOTE: If you're a regular Internet browser, maybe you'd like to be kept up to date on all of the ATV related news generated Nationally. If so, subscribe to the "ATV Internet mailing list" to receive the bulletins automatically. If you'd like to SEND a message to all other subscribers this can be done also. It's free to all.

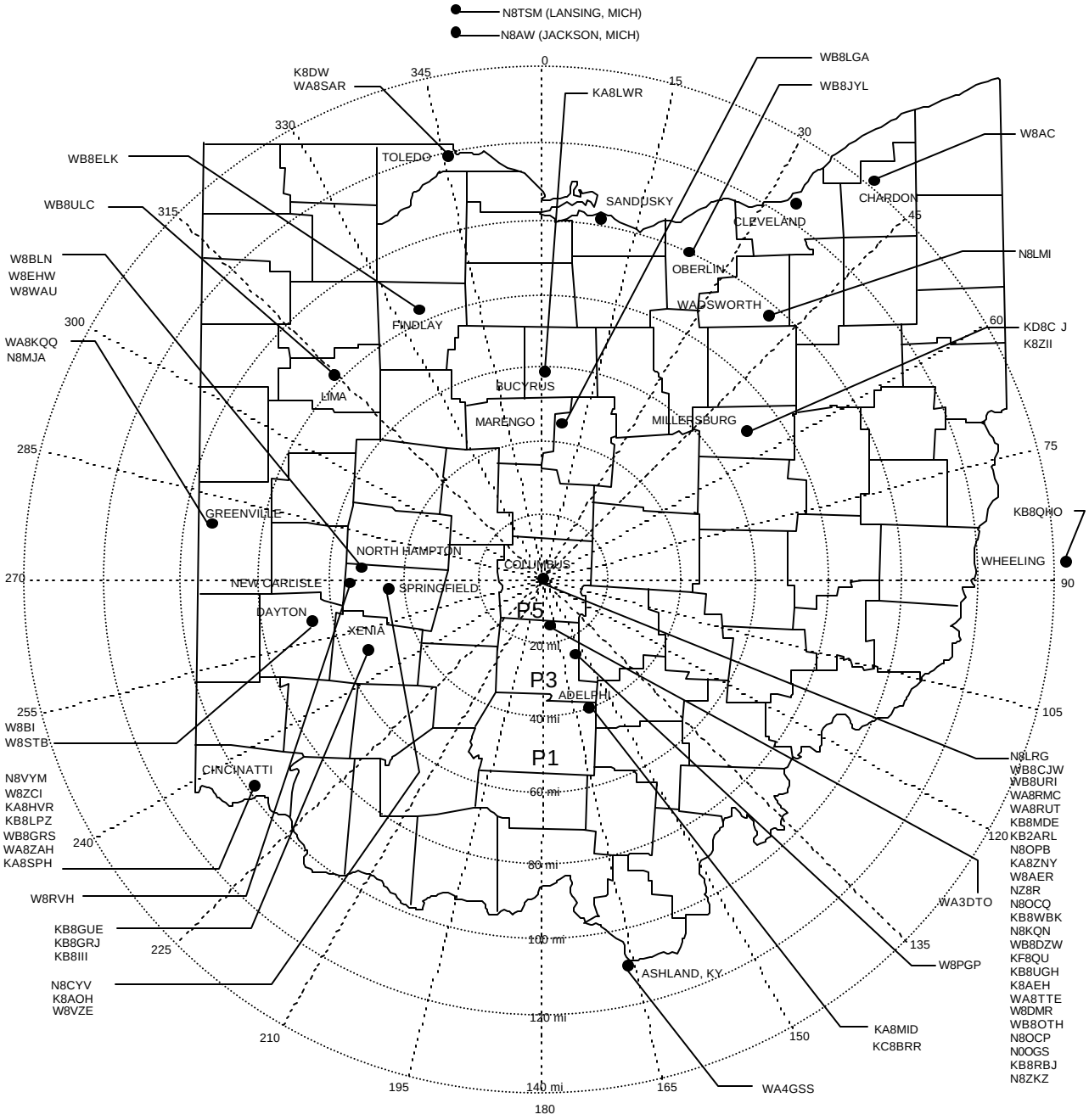
To *subscribe*, send Email to "listserv@tallahassee.net" and include in the message the line SUBSCRIBE ATV.
To *send a message* address it to "ATV@tallahassee.net".
To be *removed* from list, send Email to "listserv@tallahassee.net and include in the message "UNSUBSCRIBE ATV".

The following addresses are helpful in searching for many different Ham Radio items on the INTERNET.

http://stevens.com/atvq	ATVQ Magazine home page. ATV equipment & article references.
http://www.hamtv.com	PC Electronics Inc. Lots of proven ATV equipment for sale.
http://downeastmicrowave.com	Down East Microwave Inc. Lots of uhf/microwave parts & modules.
http://www.yahoo.com/Entertainment/television/Amateur_television	Listing of some of the available ATV home pages.
http:/www.acs.ncsu.edu/HamRadio	General ham radio info- satellite track, call sign database etc.
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://hamradio-online.com	Ham Radio Online "newsletter" Lot of Ham related information.

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 includes the technical information of our repeater. Each time a new feature is brought on line it's added here. Use this 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 1250 MHz FM modulation.
interdigital filter in output line of 427.25 & 1250 transmitter
Transmitter Output Power - 40 watts average 80 watts sync tip (427.25)
50 watts continuous (1250)
Link transmitter - 1 watt NFM 2.5 KHz audio (446.350 MHz)

Identification Both 427 &1250 transmitters identify simultaneously every 10 minutes with video showing ATCO and WA8RUT with four different screens. Audio identification is 4 sequences of Morse Code.

Transmit antenna: 427.25 MHz - Dual slot horizontally polarized 7 dBd gain major lobe west
1250 MHz - Diamond vertically polarized 12 dBd gain omni

Receivers: 147.45 MHz for F1 audio input control of touch tones
439.25 MHz for A5 video input with FM subcarrier audio (lower sideband)
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 MHz - Vert. polar. dB Products 10 dBd gain
1280 MHz - Horiz. polar. single slot 3 dBd gain major lobe west.

Input control:	Major Touch tones:	UP	DOWN
	beacon (5 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)	*77 90	*22
	(910 input)	*77 91	*22
	(439 input)	*77 92	*22
	(1280 input)	*77 93	*22
	(future)	*77 94	*22
	5 second ID	#9	*22
	Bulletin board	285 pause 92	286
	439 USB remote site input	285 pause 91	286
	Roof Camera	285 pause 95	286
	Reset to scan mode	D37 or #437	

Remote sites:
Local radar (inactive at this time) (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	Repeater trustees:	Art Towslee WA8RMC
V.President:	Ken Morris WA8RUT		Ken Morris WA8RUT
Treasurer:	Bob Tournoux KF8QU		Dale Elshoff WB8CJW
Secretary:	Rick White WA3DTO	Statutory agent:	Rick White WA3DTO
Corporate trustees:	Same as officers	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

OPENING BALANCE (4/7/97)	$ 770.73	
RECEIPTS (dues)	$ 50.00	
OTHER INCOME (bank interest)	$ 7.85	
EXPENDITURES		
July Newsletter film	$ (9.51)	
July Newsletter postage		$ (39.60)
flowers in memory of W8EOY	$ (47.79)	
CLOSING BALANCE (10/10/97)		$ 731.68

ATCO MEMBERS AS OF 14 OCTOBER 1997

K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	Ohio	43068	866-1399
K8AOH	Charley Tucker	4546 Laredo Street	Springfield	Ohio	45503	513-390-0693
WB4BBF	Randall Hash	212 Long Street	Bluefield	Va.	24605	
KC8CNV	Jack Compson	5065 Sharon Hill Dr	Columbus	Ohio	43235	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	Ohio	43065	766-5823
N8CYV	Blaire Standley	721 West North St	Springfield	Ohio	45504	
WA8DNI	John Busic	2700 Bixby Road	Groveport	Ohio	43125	491-8198
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	Ohio	42616	419-691-1625
WA4DFS	Ed Walker	PO Box 150	Mountain City	Tn	37683	423-727-9611
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	P.O. Box #32	No. Hampton	Ohio	45349	
WD4GSM	E.R. Hall	4955 Pole Bridge Rd	Wise	Va	24293	540-328-9235
K6GUC	Reuben Meeks	428 Lewiston Road	Kettering	Ohio	45429	937-294-0575
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
K8MBY,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	2630 Green Ridge Rd	Peebles	Ohio	45660	
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
N8OCQ	Robert Hodge	3689 Hollowcrest	Columbus	Ohio	43223	875-7067
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Ohio	43204	
W6ORG	Tom O'Hara & family	2522 Paxson Lane	Arcadia	Cal	91007-8537	626-447-4565
WB8OTH	Perry Yantis	1850 Lisle Ave	Obetz	Ohio	43207	491-1498
WA2PCH	Craig Stoll	PO box 1117	Orchard Park	N.Y.	14127-8117	
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
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	851-0223
W8STB	John Hey & family	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	9250 Roberts Road	West Jefferson	Ohio	43162	879-7482
WB8VJD	Rick Morris	203 Merton Street	Holland	Ohio	43528	
KA8VUQ	Jack Wolf	2681 Hiawatha Ave	Columbus	Ohio	43212-1112	263-3092
W8WAU	Jake Fuller	PO Box 117	No. Hampton	Ohio	45349	
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	Ohio	43062	927-3883
N8XYJ	Dan Baughman	4269 Hanging Rock Ct	Gahanna	Ohio	43230	
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

REMEMBER...FALL EVENT IS OCTOBER 19. EVERYONE IS INVITED!