ATCO NEWSLETTER

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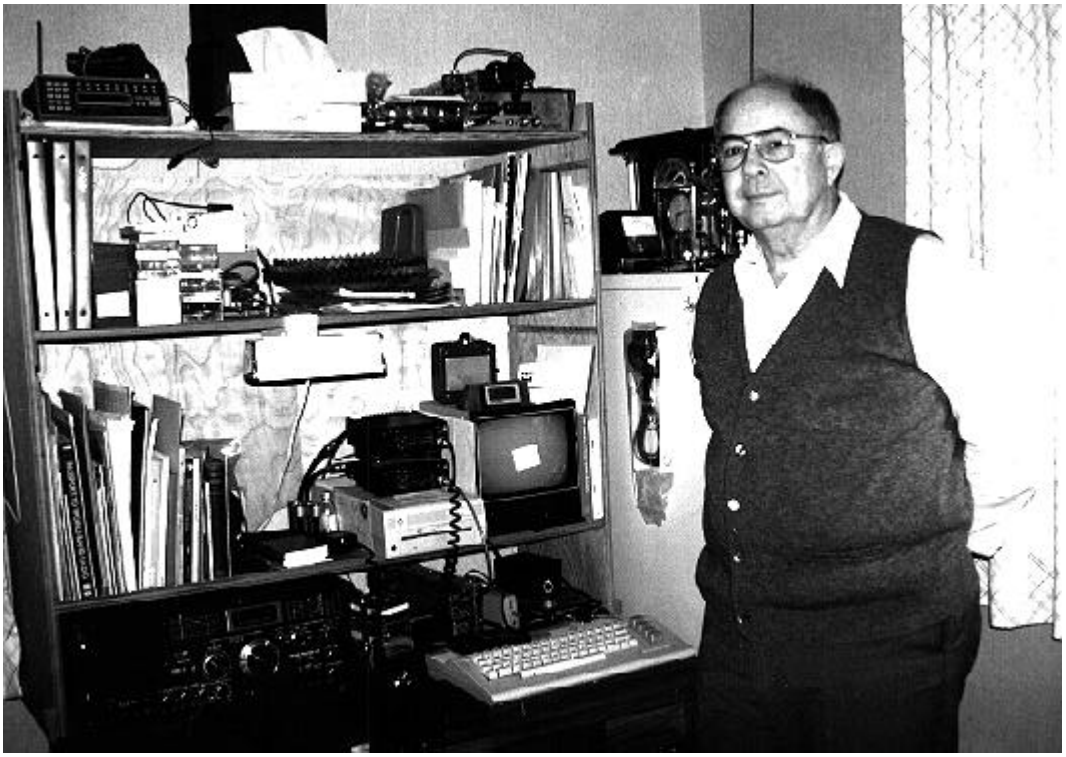
ATCO WA8RUT REPEATER UPDATE

Well, the repeater seems to be chugging along without too many problems...none serious. Our biggest headache at this time is the increasing desense caused by external RF and transmitter to receiver RF leakage. This RF world is indeed becoming more crowded and we have to learn to deal with it (in a friendly way of course). Read on for more insight, suggestions and proposed actions.

ATCO HAM IN THE SPOTLIGHT

This time we visit the home of John Busic, WA8DNI. John is relatively new to our organization but shows great interest in ATV. Since his interests are shared between ATV and his traveling, he doesn't have time right now to "instantly" build up his video transmission capabilities. But give John some time and I'm sure his future ATV signal will compete with the best of us.



ACTIVITIES ... from my "workbench"

"OK, what can I talk about this time that will be of interest to the readers?" Gosh, sometimes it's hard to think of something creative, cute, appeals to everyone and entertaining at the same time. Maybe if I enlarged the scope of subject matter to include other activities...wait a minute! The title suggests "workbench activities" so I guess that in itself this limits the subject matter quite a bit right there. OK, entertaining or not, here goes!!!

Most of my ATV related time is occupied with the camera I'm building to go downtown. It's fun to design it from scratch but admittedly this takes a lot of time that, by now, is starting to run short. Most of the mechanical design is complete including the pan and tilt mechanism. A major stumbling block was the realization that by keeping the camera stationary while rotating the optics around it was NOT going to work. I overlooked the fact that as the optics rotate, the image rotates also. This creates quite an interesting image on the monitor as it spins when the camera is panned. There are a number of ways to solve this crisis. One, correct it in software. No...that would *really* take too much time. Second, spin the optics the opposite direction to the pan. I don't know how to do this so it will become a separate project (sometime in the future). Solution: use a rotary joint (slip rings) to provide the electrical connections to the camera and lens motors while the camera spins with the housing during a pan operation. The unit is now on order and I'm back on track to finish the control electronics. Completion target: April of this year, just about in time for the next newsletter. You're probably getting tired of hearing about the camera so I'll shut up now.

Work is under way to create a test signal source for connection into the receiver transmission line at the repeater. This will be used to check receiver sensitivity by comparing the sensitivity at my QTH by lowering the signal strength until a P0 picture is obtained then repeat the process at the repeater. If at least a P0 signal is viewed, then I'd know that the receiver is at least as good as mine at home. If repair mission would be in order. It's important to be able to inject the signal direct rather than via airwaves so as to eliminate the variables. QTH to check for their receiver sensitivity. Dale WB8CJW and I intend to work on this and complete it before we attempt to "tweek" the repeater sensitivity any more.

At a recent officer/trustee meeting we discussed a number of proposed changes to the repeater system. Perhaps the most significant problem is the receiver sensitivity degradation by the transmitter. As you may recall, we decided to try the lower sideband reception on 439.25MHz. This solved (almost) desense caused by the FM repeaters operating close to the high side of the input. However now as we move the received frequency down closer to the transmitted frequency (427.25MHz) the receiver becomes noticeably desensed by our own transmitter. In order to minimize this, we feel that if we move the repeater output from 427.25 MHz down to 421.25 MHz, to increase the separation, this problem will be minimized. Everyone that I know of that can receive 427 can also receive 421 (cable channel 57) so reception shouldn't present a problem. Many of the other ATV repeaters also output on 421 but we feel that the distance is great enough so as to not cause interference. The closest is the Xenia, Ohio repeater (not operating at this time?) which rarely was seen above the P3-4 level, and easily attenuated with proper antenna rotation. Does anyone feel that the decision to try this is NOT a good idea? Please speak out because we don't want to monopolize the operation.

Also at the meeting, the value of the 910 MHz input was discussed. At this time, this input is giving us the most interference problems. It is not known the nature of the interference but I'm sure all of us, at one time or another, has viewed the repeater keying up then down repeatedly. It was felt that if we convert this input to FM instead of AM input, that the problems would go away. However, the cost of the equipment goes up. Available FM receivers for this band are not readily available at a reasonable price so maybe we could spend our money more efficiently elsewhere. We must not loose sight of our original purpose for this band which is for satellite link control. I proposed that we consider giving up on the 900 MHz band and do all of our linking via 1280 MHz. After all, that band is NOT overpopulated with ATV signals at this time and could support a link signal with minimal or no interference to other 1280 MHz operation. Think about it!

Another project has been recently started. We are in sad need of a color monitor receiver for use at the repeater site. It just so happens that I obtained 2 Liberty 5 inch TV/monitor receivers form Leland, K8MZH, which he donated to our club from a Newark school clean out. One of these works ok and the other is barely functional. I had intended to refurbish these and install them at the repeater but Rick, WA3DTO, very graciously volunteered to do the work. Maybe we WILL get them installed before the end of the decade after all. Thanks, Rick! Anyone else up to some construction work? I'm sure we can find some much needed tasks.

Well, I'm all out of steam for a while now but partially recharged just by *talking* about the things to be done. I had better quit hammering on this keyboard, fire up the soldering iron and get back to work. There'll be much more to report on next time I'm sure.

TECH TALK...Let's learn something technical

This time we have both the old (very) and the new (also very) to present this time. I found what I believe is a very good treatment of the upcoming digital television technology. HDTV (High Definition Television) is finally knocking on our doorsteps and is bound to be reality within the next year or so, which requires digital techniques, so we had better bring ourselves up to speed so we can be ready to try it with our ATV equipment someday soon. Who is going to be the first two hams to have a 2 way QSO via digital television transmission? You may snicker, or just downright laugh, but it is **NOT** that far off. Just wait and see.

To provide a vivid contrast, John, WA8DNI found an "amateur television" article published in 1928 that represents what I believe to be the **first** exchange of video information via the airwaves. If anyone can show me an earlier exchange, I'd be very interested in learning about it. What makes it even more exciting is the fact that the person that received the signal presently lives in the Columbus, Ohio area and still has the original receiving apparatus that was used. Hopefully in a future article, I can coax Murray Mercier to show us this fascinating device. I found that he is not a ham, but do you think we can entice him to get his license and try it again with more modern equipment?
Read on for I believe you will get a very good lesson on both the old and finally the new. The article is from the Columbus Ohio State Journal which is an early forerunner to the Dispatch.
…Art WA8RMC

THE OHIO STATE JOURNAL, COLUMBUS, SUNDAY, APRIL 28, 1929.

FIRST TELEVISION SERVICE STATION OPENED

M. J. MERCER

M. J. MERCER JR.

"M. J. Mercer, left, is shown at the power control of his television equipment, while his son, M.J., Jr., is operating the "scanning cabinet." The mirror-like disc in the center of the cabinet is the "eye" of the television in which scenes are brought long distances.

Remember how the folks thrilled and exclaimed "Will wonders never cease?" when they saw their first magic lantern exhibition?

Those wonders haven't ceased, and if you hearken to M. J. Mercer of the M.J. Mercer Corporation, 674 N. High St., you'll be convinced that bigger and better wonders are yet to come.

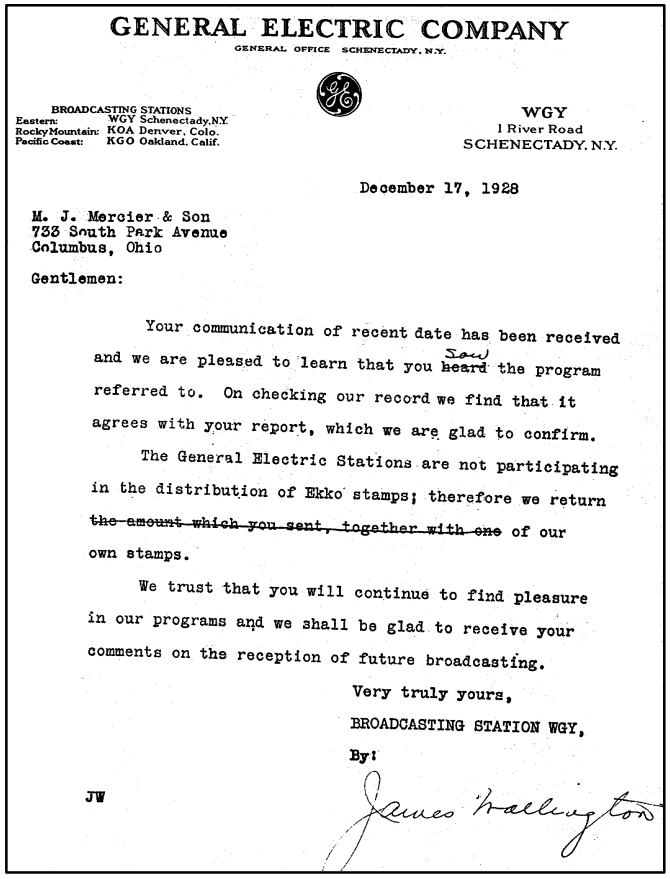
For instance there's television, on which M. J. and his son, M. J. jr., have been experimenting for more than two years. Already they have achieved success In developing an instrument that outdoes the magic mirror of storybook fame by showing a scene radiocast from another city hundreds of miles away. This is not to be confused with telephoto which reproduces the picture on paper. Television is instantaneous. For instance one can watch a prize fight or a wedding ceremony in Pittsburgh. It reproduces the scenes, as rapidly as they change, the same as a mirror would reflect them.

Mercer foresees the day when television will bring the happenings of the world and throw them upon a screen, even as moving pictures are brought today - and with sound accompaniment.

The "vision" which the Mercers now get in the television scanning cabinet are about two inches square.

The M. J. Mercer Corporation is opening a business at 674 N. High St., where it will merchandise radios and furnish general radio and television service. The radio service includes short wave radio.

This is the first television service opened In Columbus, and perhaps in the country. The Mercers have done their laboratory work in a room at their home, 738 S. Park Ave. Junior, a senior at Central High School, last year took highest honors as a mechanical draftsman".



GENERAL ELECTRIC COMPANY
GENERAL OFFICE SCHENECTADY, N.Y.

BROADCASTING STATIONS
Eastern: WGY Schenectady, N.Y.
Rocky Mountain: KOA Denver, Colo.
Pacific Coast: KGO Oakland, Calif.

WGY
1 River Road
SCHENECTADY, N.Y.

December 17, 1928

M. J. Mercier & Son
733 South Park Avenue
Columbus, Ohio

Gentlemen:

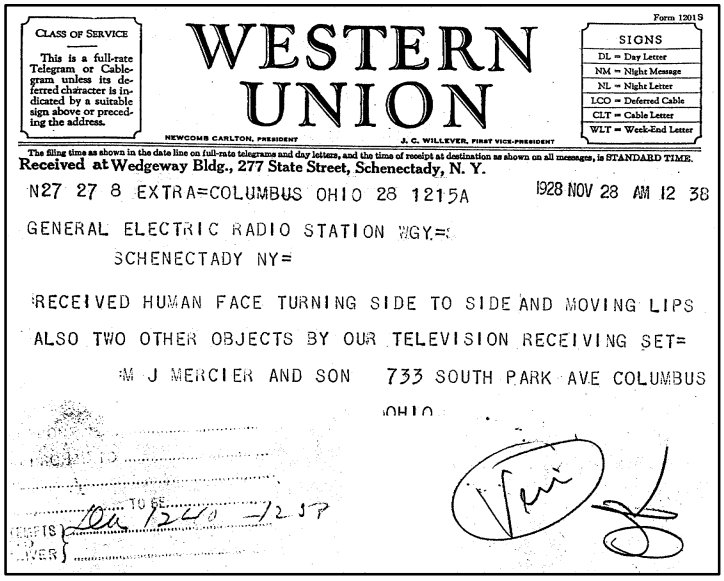
Your communication of recent date has been received and we are pleased to learn that you Saw heard the program referred to. On checking our record we find that it agrees with your report, which we are glad to confirm.

The General Electric Stations are not participating in the distribution of Ekko stamps; therefore we return ~~the amount which you sent, together with one~~ of our own stamps.

We trust that you will continue to find pleasure in our programs and we shall be glad to receive your comments on the reception of future broadcasting.

Very truly yours,
BROADCASTING STATION WGY,
By:
James Wallington

JW



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ALSO TWO OTHER OBJECTS BY OUR TELEVISION RECEIVING SET=

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OHIO

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TO BE
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And now a sampling of the new. Reprinted with permission from November 1997 RF Design magazine. Copyright 1997, Intertec Publishing Corporation, Overland Park, Kansas; 913-341-1300.

A primer on digital technology for broadcasting: digital television

Whether digital TV brings multiple program services with traditional picture quality or wide-screen, high-definition pictures, engineers will have plenty to design.

By Ernest Worthman
Contributing Editor

Digital television (DTV). It's been talked about for at least 10 years. During the next year or two, you can expect it to become a reality. DTV promises wide-screen pictures with improved definition, compact disc (CD) quality sound and dissemination of data. Additionally, it is likely that a two-way communications path will be established for value-added services such as video conferencing, real-time teleshopping and video-based location assessment. All this in a 6 MHz bandwidth - an ominous challenge for tomorrow's RF and digital engineers.

Background

Originally, in 1987, 23 competing analog standards were submitted to the Federal Communications Commission (FCC) to consider for the next generation of high-definition television (HDTV). Later, in 1993, a partnership called the "Grand Alliance," which consists of AT&T, General Instruments, MIT, Philips Electronics of North America, David Sarnoff Research Center, Thompson Consumer Electronics and Zenith, was formed to try to sort out the myriad possible platforms. Shortly thereafter, this alliance, working with the FCC's Advisory Committee on Advanced Television Services (ACATS), came up with a "best-of-breed."

The approved technology called for: QAM and 8-VSB for over-the-air transmission, and QAM and 16-VSB for cable transmission; MPEG-2 for compression; and five-channel Dolby AC-3 for audio. (QAM is quadrature amplitude modulation; VSB is vestigial sideband - 8-VSB refers to eight sidebands in a channel; MPEG is Moving Picture Experts Group, and MPEG-2 is a compression standard.)

After years of working with the Grand Alliance, the FCC decided not to issue a fixed standard. Instead, the FCC wants a general-purpose digital telecommunications standard that provides much more than just high-definition pictures and CD-quality sound. This standard requires interoperability among all major media (broadcast, cable, satellite and computer). On May 9, 1996, the commission issued a Notice of Proposed Rulemaking to adopt the Advanced Television Systems Committee (ATSC) DTV Standard as the U.S. Standard.

Now, it is likely that a uniform platform will emerge - one that probably will support interoperability between the TV and computer industries, and ultimately merge them into one. (Don't think so? - check out webTV and the Gateway 2000 integrated computer entertainment system.) This "next generation" digital video technology will be a common technology for both computer monitors and TV sets, and for wired and wireless transmission.

In broadcasting, DTV mostly involves the transmission of digital signals as compared to today's analog signals. The process of converting RF to digital and back again will challenge the traditional RF engineer.

Where ya gonna go

Once the National Television Standards Committee (NTSC) analog standard is superceded, new DTV stations are expected to use a core band from channels 7-51 inclusive. If excess interference results from these new stations, the FCC has allocated an additional 31 allotments at low VHF and 152 allotments above channel 51. However, the majority of channels are likely to fall in the UHF band.

For the broadcast engineer, broadcasting digital data introduces a unique set of problems. For example, as analog signals get weaker, the picture simply fades. Eventually it fades into the noise floor and disappears. Until it does, some picture remains discernible. With digital signals, the picture either is visible, or it isn't. That presents a problem with signal strength at the receiver. Noise-limited TV service (grade B) is defined as a signal-to-noise ratio (SNR) of 30 dB for 50% of the locations, 50% of the time. Unfortunately, such a specification in the digital domain will result, in many cases, in a signal being too weak for the receiver to decode. The receiver will produce no picture at all.

Interference is another issue. Digital signals, although relatively immune to noise, are one of an analog signal's worst nightmares. Transmitting analog and digital signals from the same site, much less the same antenna (diplexing), has all of the makings of a disaster, especially at UHF.

For these and other reasons, broadcasting the DTV signal will involve redesign in everything from antenna selection to the cathode-ray tube (CRT).

Conversion

Converting analog RF and NTSC signals to digital is, of course, the major issue. Currently, the new digital channels must fit within individual 6 MHz broadcast channels allocated one each to existing TV stations because of the FCC's decision to implement a simulcast system as opposed to an NTSC/ DTV compatible system. Eventually, NTSC will be discontinued, and the current channels

VERTICAL LINES	HORIZONTAL PIXELS	ASPECT RATIO	PICTURE RATE (FIELDS/SEC)			
1080	1920	16:9	60 I		30 P	24 P
720	1280	16:9		60 P	30 P	24 P
480	704	16:9 & 4:3	60 I	60 P	30 P	24 P
480	640	4:3	60 I	60 P	30 P	24 P

Table 1. The different display formats that are involved in the current NTSC standard. Scan type: I = interlaced, P = progressive.

may be reassigned. But that is many years off, which means that the current effort is to squeeze as much content as possible into the 6 MHz over-the-air transmission bandwidth. It also means that there is insufficient bandwidth to implement all of the desired features.

As a result, a number of interim phases will be implemented until the final standard is realized. One part of the standard, the aspect ratio (picture width vs. picture height), will be implemented immediately.

Basically, to realize the features described previously will require improving on the current formats. First, it will be necessary to increase the number of active vertical lines and horizontal pixels. The current NTSC standard of 525 lines/frame will be increased to the DTV standard of 1,080 lines/frame, and the horizontal pixels from 640 to 1,920. Second, the aspect ratio of the picture must be put into the “widescreen" format of 16:9 from the current 4:3. Third, pictures must be scanned progressively as opposed to being interlaced. Table 1 shows the different display formats involved in the standard. Note that some interim numbers are included, due to transition, film formats and backward-compatibility requirements, until DTV is fully implemented. The top row is the HDTV standard; the bottom is simply the digital equivalent of approximate NTSC quality.

Digitizing video

Next comes the issue on digitizing the analog signal. Analog-to-digital (A/D) conversions require simply that a given wave be sampled at various points and, with the aid of computers, filters, data storage (memory) and shaping components, be stored as a series of discrete levels.

Four basic video systems become involved in A/D conversion and back again. They are NTSC and phase alternating line (PAL), composite signals, and RGB, Y, R-Y, B-Y in the frequency domain. (R, G and B refer to red, green and blue colors; Y refers to luminance, or brightness.) In the digital domain they are 4fc and 4:2:2. 4fc is the term that describes sampling the color subcarrier frequency at four times the 3.58 MHz frequency for NTSC and the 4.43 MHz frequency for PAL. The digital component of the signal is referred to as 4:2:2, which is defined as the sampling frequency of 13.5 MHz. Because there is no subcarrier in component television, this frequency was chosen because it works with both 525-line NTSC and 625-line PAL scanning. This frequency must exist because without it, only one side of the equation could be digitized. The 13.5 MHz frequency that refers to the 4:2:2 digital component was derived by sampling the luminance channel at 13.5 MHz and each of the two color difference channels at 6.25 MHz, the ratio of 13.5 MHz to the two 6.25 MHz chrominance was given the 4:2:2 digital component nomenclature.

PLATFORM	RESOLUTION, FRAME RATES AND BITS LUMINANCE AND CHROMINANCE	BANDWIDTH REQUIRED
NTSC	480 × 730 × 30 × 16	168 Mbps
HDTV	1080 × 1920 × 60 × 16	1.9 Gbps

Table 2. Digitizing uncompressed HDTV video using today's capabilities. Bit-rate comparison: 16 is the number of bits—8 for the luminance channel and 4 each for the two color-difference channels.

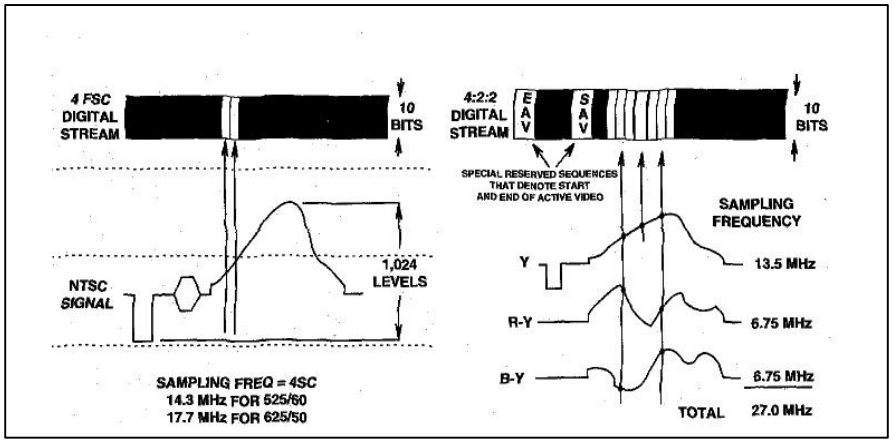
Next, based on several factors, such as the final frequency that was to be digitized, acceptable distortion levels and available equipment, it was decided to use a 10-bit digital word (that's 210 or 1,024 samples of each sampled level). Anything less would not provide a reasonable representation of the frequency being digitized. The resultant digitized signal is 10 times the frequency to be digitized. (For NTSC it is 143 Mbps, while the 4:2:2 component is 270 Mbps.)

Today's production, conversion, distribution and routing equipment pretty much tops out at around 270 Mbps, with the best only doing about 360 Mbps. Table 2 shows that digitizing uncompressed HDTV video requires nearly 2.0 Gbps of bandwidth - well beyond the capability of today's best digitizing equipment. On the other side, NTSC bandwidth is well within today's digitizing capabilities. Therefore, it is possible to begin digitizing NTSC immediately, as the first step toward an all-digital broadcast network.

Whoa!

Remember that the entire over-the-air signal must fit into the second 6 MHz channel allocated to each existing TV station. If you digitize at 1 Hz/bit, you have a maximum bandwidth of 6 Mbps. If you use the 10-bit standard, the required bandwidth *jumps* to 6O Mbps.

Figure 1 is a simplified graphic of how the digital stream is created. It is obvious that even NTSC must undergo some compression. Other problems must be overcome, too - for example, the maximum allowable payload bit rate for off-air reception is 19.28 Mbps (cable is allowed 38.56 Mbps because it is less prone to bit errors). To make the 2 Gbps uncompressed signal fit into that measly 6 MHz channel (limited to just under 20 Mbps) would require a compression ratio of 100:1 (50:1 for cable)! That feat is well beyond current available technology.



Note: Although it is true that, empirically, compression rates of 200:1 and greater have been realized under the MPEG-2 standard, bear in mind that we are referring to the world of complex video signals. These images require much more precise rendering than simple low-resolution images, thereby reducing useful compression ratios significantly.

Enter compression

Any compression scheme basically replaces redundant data with tokens or other simplified code. In the simplest example, such as the phrase "the rain in Spain is mainly on the plain," there is the string "ain" that appears regularly. If we assign eight bits per letter (or space), then there are 320 bits of data in the phrase (40 letters times eight bits per letter). If we apply an algorithm to identify the redundant strings and replace them with tokens that point to the original code, we can reduce the overall bit count. The compressed string would then look like this: The rain in sp[9,3] is m[15,3]ly on the pl[28,3]. Upon expansion, the tokens give instructions to step

backward in the phrase a certain number of characters, and replace the tokens with X characters following the starting point. In this case, the first token is 9,3. This means go backward nine characters and use the next three characters to replace the token. This is repeated for each token. Assuming, in this case, that the token takes up one byte, the total byte count for the compressed phrase is 34. Therefore, the compression ratio is (34/40) x 100. This makes the new code 15% smaller than the original code.

In video compression, the scheme is much more complex, but the theory is the same. In most pictures, a lot of data are redundant, as with the image of a patch of blue sky, or a smiley face. In this instance, a great deal of redundant data can be replaced by a much smaller placeholder.

Picture compression varies widely depending on content. Some pictures may have a lot of redundant data, others may not. High-tech compression must be designed for intelligent analysis of digital images to make sure that data are sufficiently compressed to fit the assigned bandwidth. In addition, no compression is 100% lossless. The more complex the picture, the lossier the compression, for a fixed compression ratio.

MPEG-2 compression was chosen for the DTV standard because it contains a bit stream consisting of scalable layers. The basic layer contains sufficient data for even simple decoders to recover all of the information in a conventional 525-line 4:3 TV picture. The same bit stream contains an enhancement layer that will allow future HDTV sets to recover a 16:9 picture with essentially unnoticeable losses.

Reality

Although the technology for DTV is in place, the politics are not. There are differing views about how to reallocate VHF and UHF frequencies that are expected to be vacated, eventually, by NTSC stations. Because DTV is incompatible with NTSC, stations must replace NTSC broadcast equipment with DTV broadcast equipment. Some estimate the cost to equip a typical VHF station at $8 million. Finally, other issues, such as interference and coverage areas, have yet to be resolved.

Despite the substantial implications of some of these remaining uncertainties, the mandate is that this conversion be in place within the next 20 years. Any bets?

Some charts and table data are from the Society of Motion Picture and Television Engineers (SMPTE) tutorials on digital TV.

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 910.25 V 1280 V	427.25 H 1250 V ~	~	147.45	A signal on any listed input causes an output on both listed frequencies
Xenia, Ohio	KB8GRJ	434.25 H	421.25 H	240	144.36	*10= tone up for 1 minute
Dayton, Ohio	W8BI	439.25 H 1245 1249.5	426.25 H 1287 1291.5	250	147.45	*10=ID, *71= bulletin board
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 1280	200		
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	

FALL EVENT MINUTES

Our annual Fall Event where we get together and eat, talk and swap prizes was held at the ABB picnic center on Sunday October 19. This one turned out to contain very decent weather. It stands out because I remember the one a couple of years ago where we just about froze our *** off. That year the fireplace (with fire) was a very welcome sight. This year, partly due to the earlier scheduling, was very pleasant.

There were 24 people who attended which is just about average. They were WA8TTE, WA8DNI, KB8TRP, N8CYV, KB8TCF, N8OCQ, KB8WBK, KB8UU, KB8YMN, W8PGP, K6GUC, W8RVH, WD8AOW, W8EHW, W8WAU, K8AOH, W8STB, N8STB, K8AEH, WA8RUT, N8KQN, KE8PN, KF8QU and myself WA8RMC. Now, review the calls again and see if you can pick out the ones from the Dayton, Ohio area. Yes, it DOES seem that the "out-ATV'ers are making up the bulk of the attendance. Now come on, guys! We give out good prizes…do you want all of this good stuff to remain local? If so, let's see what we can do at the upcoming Spring Event. You out-of-town guys are very important too. Don't stop coming!

The prize patrol did their job this time for we had enough prizes so no one went home without one. The number one prize was a color camera and was won by Blaire, N8CYV and number two was a 1200 MHz antenna won by John, WA8DNI. Some prizes were donated by Universal Radio, some were purchased and the rest were donated by other hams. Good job guys! See, there IS a good reason to attend.

We started with lunch consisting of subs, KFC chicken, cole slaw, beans, pop and assorted goodies. After I got over the shock of leaving some plasticware at home, I went to the local store to get more so no one had to eat with their fingers. Later we had a short business meeting where we discussed the 1200 MHz repeater antenna polarization status (we decided vertical is best), a Dayton repeater update, NAATA (ATNA) organization status, and finished with discussion about a possible Columbus to Dayton ATV link. (More on that one later). Finally, we passed out prizes and headed for home about 4:00PM. It was a very enthusiastic crowd.

…WA8RMC

ATV OPERATION ON 434MHz IN THE DETROIT AREA…an interesting discussion.

First I need to give you a quick review of the Detroit ATV repeater. The input is 439.25 (lower side band) and output 1253.25 (AM). It has been up and running for over two years now without any down time. We are located in the A line (known around here as the M line for Motorola). So no HAM activity from 420 to 430 MHz.

With over $7000 invested in the repeater, a dozen local club talks, and endless nights on 144.34 we have had a eight people try to receive the 1.2 output. Only eight people in two years! So to increase interest we investigated changing our output to 434.00 (439.25 USB is right out with all the FM repeaters) and make a 1.2 FM input. (Here's where the question comes in) Did you know it is illegal to have an ATV repeater output on 434.00 MHz? I know there's a few groups doing it but there goes my chances of a 434.00 repeater output! What an uphill battle! The FCC rule states no repeater (heh, input too?) in the 435 MHz to 438 MHz range. The FCC explained the reason for this rule (remember it's a FCC rule not a suggested ARRL rule) is NOT because it protects the satellite frequencies or something but because without it ALL available HAM frequencies would turned into repeaters.

Now what the FCC said we could do is have the repeater site in a mode that makes it a remote station. What that means is the repeater can transmit 434.00 with any video/audio source ORIGINATING at the site. We have half a dozen cameras up there to play with so that's neat but NO REPEATED output can be transmitted on 434.00. So we now have input of 439.25 LSB and 2.4 GHz, output of 1253.25, and an output of 434.00 (with no repeated audio/video) just the "simplex" sources at the repeater. The interesting part about all this is now that people can use their TV's and receive the 434 output via channel 59 cable we have had more people in the last two weeks see the repeater output than in the last two years via the 1.2 output! If I could only repeat NASA, etc. on 434.

You know one other thing I wasn't going to mention with fear of being flamed but what the hell I'd love to know how to get around this. The control frequencies for the ATV repeater are in the 446 FM area. This wasn't a problem until people started receiving the 434 output. When they try to send 440 DTMF signal to the repeater via DTMF their ATV picture gets trashed. For example when trying to rotate a camera and zoom into something. I don't have this problem because of a VSB filter at home but we are getting users who complain we aren't using 2 meters as control. I asked, and the ARRL and FCC have both said (quoting a section in Part 97) it is ILLEGAL to remote control anything below 222 MHz. And I was told point blank I would be breaking the law if I allowed a two meter frequency to control my ATV repeater. I know there's exceptions like 50 MHz RC stuff (check out my web site) and two meter repeaters, which control frequency is the input frequency. I just have too much invested in all this to risk losing my license but boy would a two meter control frequency sure would be great. Please explain how others justify doing it!
... Chris N8UDK

Chris et all:
First I see no problem with an ATV auxiliary output on 434.0 depending on video content - see fifth below, 2nd paragraph.
Second, you cannot control the RF on and off (primary control) of a repeater or auxiliary below 222, but you can do secondary control like move the camera position. This is the same as having an autopatch on 2 meters. What some ATVers have been doing illegally in some areas is on 2 meters is turn on the repeater transmitter to put out a test pattern. A way around this is to make it in this instance a crossband audio repeater with the video secondary - in other words use a specific CTCSS on the two meter transmitter that makes the ATV transmitter key up and repeat the two meter audio on the ATV repeater sound subcarrier. (*this is what we do in the ATCO repeater. Ed)* See 97.205(e), Ancillary functions. R/C does not apply here because the rules were changed some time ago to apply only to "97.215 Telecommand of model craft" and it is limited to 1W anyway. See 97.213, Telecommand of an Amateur Station - your control of remote camera by radio is under 97.201, auxiliary rules which prohibit transmission in restricted segments.
Third, the FCC did not come up with the restricted segments, it was the result of a PRM by satellite and weak signal users.
Fourth, I don't see how you can repeat 439.25 on 434.0 in the same area - no separation.
Fifth, 434.0 repeater input can be used and not violate the restriction for a repeater or link (auxiliary restricts transmitters only, not receivers) in the 431-433 and 435-438 segment so as not to interfere with weak signal and satellite modes, if it keys up only on receiving video within 433-435. If it does not key up and then repeat any mode in the restricted segments it meets the intent of the rule to prevent repeater activity interfering with satellite and weak signal activity. This is why we key up with horizontal sync. However, to be perfectly legal in this regard a separate receiver or take off of the IF to narrow the bandpass for the video operated relay should be incorporated. But unless someone purposely gets a crystal within this segment (and they won't get it from me) it is an unlikely occurrence. We selected 434.0 instead of 433.25, cable channel 59, so the sound does not fall into the restricted segment also.

The FCC definition of bandwidth is all emissions with -26 dB of the mean power. 434.0 ATV meets this unless you have an all red video. All red video results in the color subcarrier at 437.58 worst case down -22 dB which could be rolled off. Video energy in the restricted segments is way below the -26 dB of mean power with the exception of the all red color video. The fact that ATV inputs on 434.0 do not interfere with operations in the restricted segments have allowed frequency coordinators to coordinate ATV repeater

inputs on 434.0 and meet the intent of the FCC rule and also site the more important FCC rule 97.101 (a), (b) and (d) when informing the local FCC offices of their band plans. 439.25 LSB however cannot be justified as above because the lower sideband sound which is set to -15 dBc falls within the restricted segment at 434.75 and is a used satellite frequency. A hilltop 439.25 ATV repeater output would have the greatest interference potential in an area. An alternative would be to not have subcarrier sound but use 2 meters or on-carrier sound instead.
...Tom O'Hara, W6ORG tom@hamtv.com

ATV club summaries from the ATNA listserver

The following excerpts were used to describe ATV clubs in the USA to clubs in Europe by W3HMS during his recent trip to Switzerland. See also the report by John, below. I thought you might like to see the makeup of a couple other USA clubs. Enjoy! …WA8RMC.

Metrovision

Metrovision, with their ATV repeater located in Alexandria, VA, hosts the world's first fast scan amateur television repeater. On September 19, 1997, the Metrovision ATV Club celebrated its 25th Anniversary. When the club was originally formed they petitioned the FCC for a Special Temporary Authority (STA) to put ATV on the ham bands. Each STA was good for six months and after the second STA the FCC was ready to pull the plug on the WR4AAG ATV repeater forever. Bruce Brown, WA9GVK, and eighteen fledgling club members called on members of Congress to solicit their assistance in changing the FCCs attitude. Ultimately it all worked out and the FCC made a rule change that allowed Amateur Television on the ham bands.

In 1975, a computer was added to the ATV repeater. Everyone had a keyboard at home for remote access. By using the keyboard members could access the health of the repeater such as power output and input signal strength and also create messages for the video bulletin board. In 1983 the FCC approved the retransmission of space shuttle video. Club members went to the Goddard Space Flight Center in Greenbelt, MD and NASA supplied the raw video feed which was in turn RF linked to the ATV repeater whose call had then been changed to WA9GVK/R.

Metrovision has participated in many major public service events during its history. The Marine Corps Marathons were televised, Hands Across America and several Washington Metro Area disaster drills were covered by club members. Some of these events have involved setting up relay sites and camera positions in locations such as the top of the Washington Monument and the tops of Hospital and commercial buildings.

The Metrovision repeater is alive and well today with video input on 426.25 MHz, video outputs on 439.25 MHz and 910.25 MHz, and audio input and output on its 144.97 MHz replexer. Net times are 8 PM Sunday and Wednesday with regular checkins from Baltimore, MD to Norfolk, VA. Metrovision's Web Site is: http://www.bchfs.org/metrovision/atv.htm KA4CKI

HATS

Here is the history of the Houston Amateur Television Society, for inclusion into the list of histories. I also want to thank Henry Ruh for his hard work on ATVQ and I hope the new editor puts as much caring into it as he has. Fred Juch N5JXO In 1984 when I was first licensed as KA5WJA, I started reading about Amateur television in the popular HAM radio magazines. While I was at the Dallas, Texas HAM convention I purchased a 440 MHz PC Electronics downconverter to try and receive the W5PZP repeater that was shown in the repeater directory in Houston. After about 6 months of monitoring snow I finally bought a PC Electronics 1.5 Watt 440 AM ATV transmitter. Well this did it! I was transmitting on the wrong frequency and causing a lot of grief to the repeater. This scared them up (Both of them)! I was then brought into the ATV circle and found out that to operate ATV in Houston you first phoned up the other person to make a schedule, then had a fun roundtable communication.

After a few others and I became active on the W5PZP repeater, it decided to die of old age, and interference. For about two years there was no repeater in Houston. Unfortunately the repeater owner was a very busy businessman who traveled out of town quite often and we were unable to get the repeater repaired.

Then one foggy Christmas day Santa came to say…. But I digress. One November day Ed Manuel, N5EM decided that if we were going to have an active ATV community we needed to organize and form an official ATV Club. As with other great inventions to come, necessity was our inspiration.

The Houston Amateur Television Society was officially formed in December 1992. Our first order of business was to build an ATV repeater. We decided that any successful club had to have several core properties to grow and achieve their goals. They are:

· Annual Dues for income
· Monthly meetings to keep interest up (Weekly on air meeting were added later)
Hamfests to recruit new members
· Incorporated to provide legitimacy

· Provide public service to help the community

We built our own N5MBM ATV repeater with inputs on 434 MHz AM and 1255 MHz FM, and outputs on 421.25 MHz AM and 1285 MHz FM. This repeater worked okay for a while, but then the W5PZP repeater was repaired and we were faced with severe interference. After several discussions HATS and W5PZP decided to merge the repeaters at the better W5PZP site and we have done nothing but improve the system ever since.

The next major hurdle was to make the preferred input 1255 MHz FM, more affordable to the average HAM. It was decided that if we could build a transmitter for about $250-$300 US Dollars we could bring more HAMS into the ATV community, and help fund other ATV club projects.

We are blessed to have several very technical engineers in our ranks. One such HAM is Jeff Johnson, KC5AWJ who is the designer of our HATS TR-1 FM ATV Transmitter, and our upcoming Delta 900-1200 MHz transmitter. We have sold 60 of these transmitters so far, mostly in the US, but also in Canada, Japan, Australia, UK, and France. So far the only two problems experienced by our members were a broken power switch in shipping and one bad solder joint, that was fixed in the field.

We are currently also working on a mast mounted 10-Watt amplifier to match our transmitter which will also take DC up the coax for power. We are using a 24Volt design out of ATVQ magazine fed by a voltage doubler so it will run on 12Volts.

To undertake projects like these you must have several different types of people in your club. You need people to design, build, document, package, market, pack, ship, etc. in order to have a successful project. Luckily we have been able to find these people and others to keep the club moving in the right direction.

HATS currently have about 30 active members in Houston of which 20 have transmit capability to the repeater. We have another 35 members from outside the Houston area that are enjoying their HATS Kit Transmitter in their local community.
...Fred Juch N5JXO

ATV IN SWITZERLAND…a report by W3HMS

Gentlemen.....I'm delighted to report I arrived home late Thursday 23 Oct after a super time at the Swiss ATV meeting near Lausanne on 18 Oct. and QTH visits in France and Switzerland. Lausanne is east of Geneva in the French speaking region of HB9.

I also visited with several hams while there and set up many future contact possibilities with Swiss and French ATVers. I was pleased to dine and visit with Michel and his XYL, Simone, in their home and station. Michel Vonlanthen is HB9AFO and he is the President of the Swiss ATV organization. I was happy to discuss mutual ATV organization issues with him. This was my second visit to his QTH so we spoke of many topics ATV being very prominent.

I was also delighted to visit and dine in the Geneva home of Dr. Angel Vilaseca , MD, and his XYL, Antoinette. He is HB9SLV and he has done much fine work on 10 GHZ; I was pleased to see his shack and film his 10 GHZ projects. He is active, as is HB9AFO, on ATV via the 23/13 cm FM ATV repeater located at Dole not too far from Geneva.

In France, I spent an enjoyable dinner evening with Denys and Sylvia Roussel. He is F6IWF and his QTH is near Reims. We spoke of ATV and many other topics. I had been there in November 1996. Denys is the creator of the method of using modified LNBs for Ku band satellite reception for 10 GHZ reception and for work on DROs for 10 and 24 GHZ.

I also spent two days in the home of Roland and Annette Cornuel, F8MM, and his XYL in the suburbs of Paris. He is the President of the French national ATV association, ANTA . There I got to film ATV ops at 90 miles on 23 and 70 cm simultaneously as well as a QSO 23/70 cm at 18 miles with Marc, F3YX, the father of French ATV. Roland's tower is the local landmark in his small village. The aroma of his local bakery with French bread in the making was just heavenly.

The QSO F8MM/F3YX was 70 cm AM and 23 cm FM. Pictures were perfect P-5 closed circuit monitor quality in PAL. Marc has a super video mixer/processor and showed us the received signal from F8MM in a small window on screen plus a VHS film clip in the background with another small box of himself with the mike. He sent the same signal via 10 GHZ FM using 10 mw with the Gunnplexor in his shack. F8MM has an LNB modified and offset dish of about 50 cm mounted at 70 feet on his 74 foot self supporting tower which looks like a miniature Eiffel Tower.

In Europe, signal reports are expressed B1-B5 from the German B for Bild (picture).
I saw some really neat 10 and 24 GHZ ATV gear at the Swiss ATV meeting and a film of the 434 mile ATV 10 GHZ FM world record by F1JSR whom I spoke with and HB9AFO. One of the neatest things was a demo by a non-ham of a lens for 11 GHZ made

from ordinary plaster. It was 30 cm wide by 6 cm deep in front of the LNB placed on the ground. Pictures were P-5 plus from the European Astra satellite. The lens follows optical rules and he said improvements are possible in both receiving and transmitting. A P-5 pix is super for a 12 inch device in front of an LNB.

The meeting itself was nicely organized starting at 0900 with business till 1000 then time to chat informally/see demos/buy at the small flea-market. Then several videos on ATV progress/events were shown followed by a FB catered luncheon. I was pleased to greetings from North American ATVers to the group at the opening and to talk later for about 15 minutes on US ATV operations and our progress on establishment of a North American ATV organization. The afternoon sessions were all technical and made maximum use of rear TV projection on a large screen for both objects and VHS cassettes. One funny thing.....when I asked Michel, HB9AFO, how I was doing for time, he said look at the screen....there he had written a message that I was out of time!!! The Swiss are great linguists....I saw the German/French translator speaking with folks in French, German and English. I was pleased to talk with him and also to spend several hours with Carlo Lue, HB9MPL, and his wife of Lugano, Switz. Carlo and I can speak quite well together in French both using hand-gestures, HI!

All in all, I was just delighted with the marvelous hospitality and courtesy shown to me by all those who hosted me in their homes and to those I met. ATVers and their wives are VERY nice people. The chaps in Europe are quite advanced in FM, 10 and 24 GHZ work...I was impressed.
...John Jaminet, W3HMS

ARRL BAND PLANS...Henry, Tom N5GAR and Tom W6ORG go at it again.

See Sept 97 QST page 66 minute 63 of the last Directors meeting, it could be very important to us as ATVers. The ARRL is thinking of sending to the FCC a proposed rule making that would add in 97.101(a) the sentence "Amateur operators should be familiar with, and should abide by, the voluntary band plans that are applicable to the frequency bands in which they operate". This is some what watered down as far as Rules go in that it uses the word "should" rather than must be.
…Henry Ruh, KB9FO

If there is a "RM" number issued, and the FCC asks for comments on this, it will be an opportunity for those of us with facts to comment. Anyone trying to establish a "voluntary band plan" must provide for all the modes specified in the FCC Rules. This includes ATV simplex and repeater modes. The ARRL should settle on what it recognizes as "voluntary band plans" are before submitting the petition. How does the ARRL board define this term? How does it propose that the FCC define it?
…Tom Blackwell, N5GAR
This is the first reference to band plans in the FCC rules and could force frequency coordinators to actually come up with local published band plans.
…Henry Ruh, KB9FO

The ARRL has already published such a band plan, in "The FCC Rule Book." Why would there be a need for a local coordinator, seeking "recognition"* from other amateurs, to try to impose a different band plan? (*Here I use the term "recognition" per the definition of "Frequency Coordinator" in 97.3(a)(21).) (Henry, I think you and I both know the answer to this...)
If they do this, then they will be forced to consider ATV as a legal mode per 97.301 in the 420-450 MHz band and come up with a sound technical band plan. I suggest contacting your areas Director (page 10 of QST) and urging him/her to make sure minute 63 gets implemented. OK... I'm copying this to him.. (He has already offered bets that NFCC will cease to exist.)
…Tom Blackwell, N5GAR

And second get involved with your local frequency coordination council when the time comes to form and document the local band plan.
…Henry Ruh, KB9FO

I tried, but was out numbered. All I wanted was for the local coordination council to obey the FCC Rules, and also to deal with us on a 'first come first served' basis - as some of them even promised to do. There are political problems. Push for a technical committee made up of one or two technically qualified members from all modes and complete consensus for the band plan. Make a band plan that works and will be respected with room for all to operate with minimum probability of interference. We did it here with SCRRBA (Southern Calif. Repeater and Remote Base Assn.) and it works. SCRRBA voted to support minute 63 at the recent membership meeting. A sound band plan in place if and when the FCC passes the single point of contact rule.
...Tom Blackwell, N5GAR

…that's where a lot of personal politics would come in... It seems there are some people who want an FCC Rule for "SPOC" who want to abolish ATV repeaters from the UHF band - or otherwise refuse to observe the FCC's definition of "Frequency Coordinator" will prevent a lot of hassle over coordination and interference problems.

…Tom O'Hara, W6ORG

I ask you not to sell your kits to anyone else here - I don't sell HFT in California - because of the high band occupancy there isn't a wide enough segment of frequencies here that a FM ATV transmitter could be put on that would not interfere with other coordinated users...and suggested he sell the completed kit back to some one in your area so as not to be out the money. I never "bagged" on your transmitter, in fact I have mentioned it to those that call and want to build a kit instead of the ready made HFT. What I did say was that he might have some mad FM voice people string him up by his coax if he used it....Has this situation changed?
…Tom Blackwell, N5GAR

In messages between Tom Blackwell, N5GAR and Henry Ruh KB9FO on the remailers re my urging ATVers support minute 63 of the last ARRL Directors meeting, it seems to me there needs to be some clarifications. My intent is to urge the local coordination councils to consider all modes and come up with workable engineering band plans. I believe this proposed band plan rule can help do this, but only if ATVers get involved. It will not be difficult in some areas and almost impossible in others I am sure given past histories of various coordination groups and individuals on both sides. If there is no reference to band plans in the FCC Rules but the SPOC rule goes through I don't think there will be a strong enough legal incentive for coordination councils to represent all modes. I think it better to have the FCC look at a band planning rule first before any coordination council or SPOC rule is considered. Lets fight for all mode engineering band planning while we have a somewhat equal ear and access to the FCC rather than after when the first response from the FCC to our complaints would be to refer it to a SPOC who might not be as sympathetic? First the ARRL band plans published in the Repeater Directory and the ARRL FCC Rule book are just recommended band plans per recommendations by the VRAC and VUAC in the past. Current ARRL policy is that local band plans take precedence over their published recommended band plans. Page 36 of the 1997 Directory says that. This is a change from their original view back in the early 80's when they got the FCC to recognize ARRL blessed band plans of the time for frequency coordinators to go by as part of the rule change establishing coordinated vs. non-coordinated repeaters - page 6-11 ARRL FCC Rule book. Yes, they should put something in the next revision of the ARRL The FCC Rule Book clarifying this. Too many erroneously take what ever else is in this book other than the actual part 97 Rules as gospel since it is titled The FCC Rule Book. This is a good point to also mention to your local Director. The rule in minute 63 the Directors approved to put forward to the FCC for consideration (it has not been submitted but will be voted on to be submitted or not at the next directors meeting in January) still says "should" so is not absolutely binding either way as regards to whose band plan, but will make coordinators document the local band plan. Obviously if coordinators rubber stamp the Technically flawed ARRL 70cm band plan they will be in trouble. Given 97.310 and 97.305 they would have to work out a fit for all modes, and whom ever might be the Single Point of Contact, if it comes to that, will by necessity have to represent everyone, not just squelch tail'ers. We as ATVers have to be ready to participate as members of local technical committees. I doubt the FCC would go for a single mode SPOC or one who violates 97.101, 97.301 or 97.305. The longer we put this off, the tougher it will be as more and more new people occupy interfering frequencies coordinated by coordination councils that do not go by sound engineering band plans or work with all modes. My position has not changed at all, I've always advocated ATVer membership as Technical Committee members in local coordination councils and local engineering band plans ever since I saw it work at my first knock down and drag out SCRRBA meeting over 20 years ago. We all get along pretty well on the SCRRBA Technical Committee somewhat like families - minor squabbles now and then, but we work it out. Same situation on the Southern Calif. band plan, no changes. It would be tough at this point in time for FM ATV to exist between 1240 and 1260 MHz with existing high hill top AM ATV repeaters out putting on 1241.25 and 1253.25, over 80 FM voice links and 4 high speed data systems in this segment. Same basic problem with 1270 to 1294 with 1277.25 AM ATV repeaters and over 160 FM voice repeaters.
I dont see any conflict with asking someone to not sell a 23cm FM ATV kit that would cause possible interference in ones own area. Working out a technical band plan with all modes represented and approved implies asking others to respect it. I'd say that is being responsible and going out of ones way to help local hams who may not know the local band plan or usage from spending their money and time only to find they are interfering with others.
…Tom O'Hara,W6ORG

NEW MEMBER SECTION

Let's welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood them with information. The new members are the lifeblood of our group so it is important that we actively recruit new faces aggressively.

KB8ZLB Dave Kibler Columbus, Ohio
N8OOA Jeff Clark Sardinia, Ohio

NEED AN ATV MONITOR…listen up! There are bargains out there!

There are some good deals on TV sets right now thanks to the Asian stock market and financial problems. I just picked up a nice 13" color for $159 to leave tuned for the local ATV repeater.
However, I suggest checking out all the various models on display before final purchase. Turn them on and check out the picture, color and sound on a strong local channel. Then switch to an open channel to see if the screen goes to all snow rather than blue screen, and that the audio squelches. These two features are important for ATV. We want to see the sync bars in the snow with weak signals without squelching out the video with a blue screen. Also when an ATV station drops their signal we dont want to listen to the noise suddenly rush out at us like a water fall. This is especially important if you want to leave a TV st to the local ATV repeater and hear someone come on just like you would on your two meter voice rig. Another nice feature on most TV's today is A/V input which is great for monitoring your own transmitted video from the monitor output of your ATV transmitter. So shouldn't you be out hitting the local discount TV store to give yourself a present for Christmas?
The models and features of TV's are always changing. What was the hot tip last year may not be this year. Again I suggest hitting a store with lots on display and play with the remotes. Sensitivity is not a factor in the TV because the downconverters have 1 dB noise figure GaAsfets in the front end and plenty of gain to get to the system bandwidth noise floor even for the numbest ones. I like the 13" color TV's which I think is just the right size for the shack. I have 3 in mine - two Radio Shacks, and the new one a Phillips/Magnavox. Two are dedicated to the repeaters and the other for multiple use. Some TV's may not like to be set up side by side because the magnetic field of one might get into the other - have to experiment with spacing.
...Tom W6ORG tom@hamtv.com

HOW ABOUT A HOMEBREW (ATV) SATELITE?…is Henry for real on this one?

Henry Ruh, KB9FO, sent a note to the ATV Email remailer the other day that started some *very* interesting comments. I think that all of us would like to see something like this but at what cost? Until now, I had discounted it as not realistic…but is it? Maybe it *IS* possible with the help of the now forming National ATV group (ATNA). We'll just have to wait and see!!!
…WA8RMC

"*Henry writes":*
I think its time for someone besides AMSAT to enter the space ham sat. field. Does anyone know the requirements for a ham sat? (amateur radio satellite)
Henry KB9FO

"*Eric, KC5FOG responds*":
All of us put together wouldn't have enough money to fund a sat. or put in into Orbit. And if you wanted it GeoStationay It would cost even more, and its very hard to get a spot for a geostationary sat being there is a lot of them currently up there. There are not any requirements execpt maybe with the FCC and FAA and NASA. But if you have the money you can get almost anything in space.
Eric KC5FOG

"*Ed now also gets into the action*":
I'd tend to agree with Eric, Henry. There are a number of small groups, often associated with a College or University, that have gone from concept to hardware to deployment. There is plenty of technology to use. There are frequencies available. There are probably even launches to be had. Problem is money. Example is a phase III launch. Andy could probably quote better numbers but it's over 0.5 Million bucks just to use the no-charge launch! All the testing and cerfication is really expensive. Plus, you have to get a launch that gets you where you need to be. For example, the shuttle only gets you in a very low earth orbit. Ok if you want short passes, big doppler shifts, etc. So, like Bill Gates says, "Where do you want to go?"
Ed, N5EM

"*John adds his 2 cents*":
Dear Eric,
My suggestion to you is to lend Henry the funds for this worthwhile project. This would make his job easier and benefit all hams worldwide. If you don't, perhaps AMSAT will.
John, W5AUH

"*Now this gets the attention of Lou at AMSAT*":
Ed,
As a former member of HATS I have been following this discussion of hamsats with great interest. I have been very pleased to watch the terrific enthusiasm and successes of HATS since its founding. As you know I am very involved in AMSAT's work on the

SAREX and P3D projects and therefore can speak from experience in these matters. I would suggest that this process be directed toward acquiring some knowledge into the complexities of building a satellite and getting it launched before you jump into the fire, so to speak. What better way to acquire first hand knowledge and experience than to volunteer to help AMSAT in the final stages of completing the P3D project. There are literally hundreds of small tasks and many major tasks that could be delegated to willing workers with expertise. AMSAT is always in need of steady and reliable help and would welcome any individual or group who sincerely wants to get involved. AMSAT was formed to do exactly what Henry is talking about. Provide a method for Hams to pool their interest and resources to put Ham satellites in orbit for the benefit of hams. There is a lot of experience and expertise to be tapped by utilizing the AMSAT vehicle to achieve these goals. Please let me know if I can be of help in getting HATS involved.
Lou McFadin, W5DID w5did@amsat.org (P3D Integration Laboratory Manager)

"And Lou also responds to Ed's earlier comments":
I am sorry to hear that you feel that way. Obviously you haven't been following the camera experiment we are flying on P3D. While the assigned bandwidth doesn't provide for standard FSTV, P3D will beam both narrow angle and wide angle full color pictures of the earth taken from 47000Km from the earth. They should be quite spectacular based on the laboratory test photos I have seen. I would like to see the link margins on your 1w TV transmitter on 23cm or 13 cm from 47000Km. P3D also will have transmitters capable of operating on 13Cm with 50 watts max and 10Ghx with 50 watts along with 24Ghz . Is that not pushing the technology? Obviously I can't change your mind. All I can do is provide facts. I have been an ATV fan for a long time and have an ATV transmitter myself.

I am not against ATV. As a matter of fact without my efforts along with many others including Andy there wouldn't have been ATV on the shuttle. There was nothing private about our ATV experiments. You could have been included but I don't remember you asking. Regardless of that and your personal feelings, I am sure if you provided a turnkey ATV acceptable payload for a satellite builder whether AMSAT or not, you would probably find a ride.
…Lou McFadin W5DID AMSAT P3D Integration Laboratory Manager

Lets hope that the above discussion stirs up something toward an ATV amateur satellite. You never know. Keep it going guys. It's good for the creative juices.
…Art WA8RMC

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.

January 25	Tusco ARC, Dover, OH 6288 Echo Lake Rd. NE,	New Philadelphia, OH 44663 330-364-5258
February 8	Midwinter Hamfest & Computer Show	Mansfield, OH 44905 419-589-7133
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

CLUB DUES ARE NEEDED

Yes! It's that time of year again. Club dues of $10.00 are needed at this time. Each year a message similar to this one needs to be posted. After all, the dues help to pay for this newsletter cost. Support our club and be prompt with your payment. It's important. See the renewal form in the later section of this newsletter. Fill it out and send to our "infamous" treasurer, Bob Tournoux, KF8QU. Thanks.
…Art WA8RMC

THE 427.25 MHz ATV HORIZONTAL J-POLE ANTENNA

This is an antenna I built from an article in Electronics Now when I was out at Morse and Stelzer road before old Les moved in. It was night school and I needed something fun, educational and exciting to do so I went to work, put it on a 10 ft pole in a horizontal position and voila, a perfect reception from the downtown repeater site. (Bill lives only 1 mile or so from the repeater…Ed)

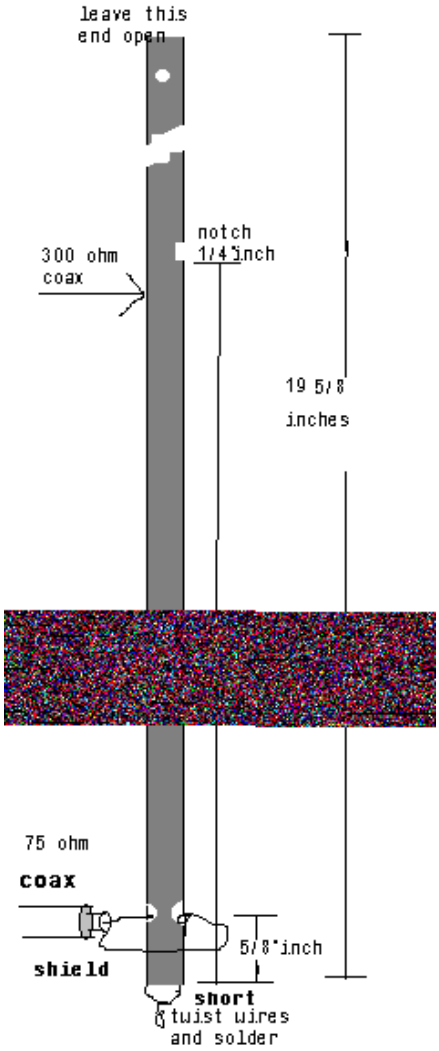
This was meant to be a vertical antenna but in the horizontal position it does the trick for 427.25 MHz ATV. It is cheap and easy. I guess you could even put it in a weatherproof container and put it on your mast. If you have any questions feel free to call me. It seems kind of amateurish but it is very functional. I have plenty 300 ohm ribbon if you need some.

This design includes velocity factor for the 300 ohm ribbon. The original design was centered at 446 MHz but I designed mine around the repeater output frequency of 427.25. 300/427.25 = .702 = wave length in meters .702 x 39.37 = 27.64 inches (39.37 inches per meter) 27.64/2 = 13.82 = 1/2 wave length 27.64/4x 85 = 5.87 = 1/4 wave + velocity factor 13.82 + 5.87 = 19.69 overall length for best swr.

This article adapted from ELECTRONICS NOW 1993 FEB. This project is easy for all and maybe that initiate neighbor or friend who has a hankerin'. I love it because it's in my living room and doesn't take up a lot of nasty space. Maybe some of those weather folk can use it once we resolve the weather radar shortage on the system.

I had a chance to run this by Bill, W8DMR, and he said it wasn't a logical design. It did seem to work for me in reality. Forgive me Bill!
…STEPHEN CARUSO KB8UGH

OK, can anyone out there to prove or disprove the accuracy of Bill's claims. Try it and report your findings by next newsletter time! Also, sorry Steve but I couldn't get the black block out of the graphic you sent. Please disregard the blocked out portion of the figure at the left.
…WA8RMC



POWER LIMITS ON 70CM BY NON HAMS…redefined by Tom!

I just got off the phone with a person at the Jet Propulsion Lab who intended to use a 100 mw ATV transmitter on 434 MHz from a source that told him it was legal. As some do, he wanted to argue about it, so he made me look it up. The popular myth is anything under 100 mw is OK. Wrong, not only is it illegal but 100 mw to a dipole on a R/C plane keyed up the local ATV repeater 5 miles away. I put him on to some other members of the JPL Radio Club which he said he contacted, but he said they thought 100 mw was OK. The applicable FCC rule is Part 15.209. The intentional radiation limit is 200 microvolts per meter in the range of 216-960 MHz which works out to about .01 milliwatt to a dipole - no where near 100 mw even into a wet noodle. Secondly any manufacturer who makes and intends to sell more than 6 units and that meets part 15 has to have type acceptance and a sticker with the FCC ID plainly affixed per Part 2. There are two things people who need or want to use the ham band for special purposes can do. They can apply to the FCC for an Experimental license or a waiver, or if a federal government agency, they can get an IRAC coordination from their areas local frequency coordinator Anything else in the ham band is illegal. On the 420-450 MHz band we only share with government radiolocation (radar).
…Tom O'Hara W6ORG tomsmb@aol.com

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.premiernet.net/~hcantrl/	Kentucky, Bowling Green (CKATS)
http://www.ecn.net.au/~sbloxham/index.html	Australia, ATV, VK4GY (large 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".

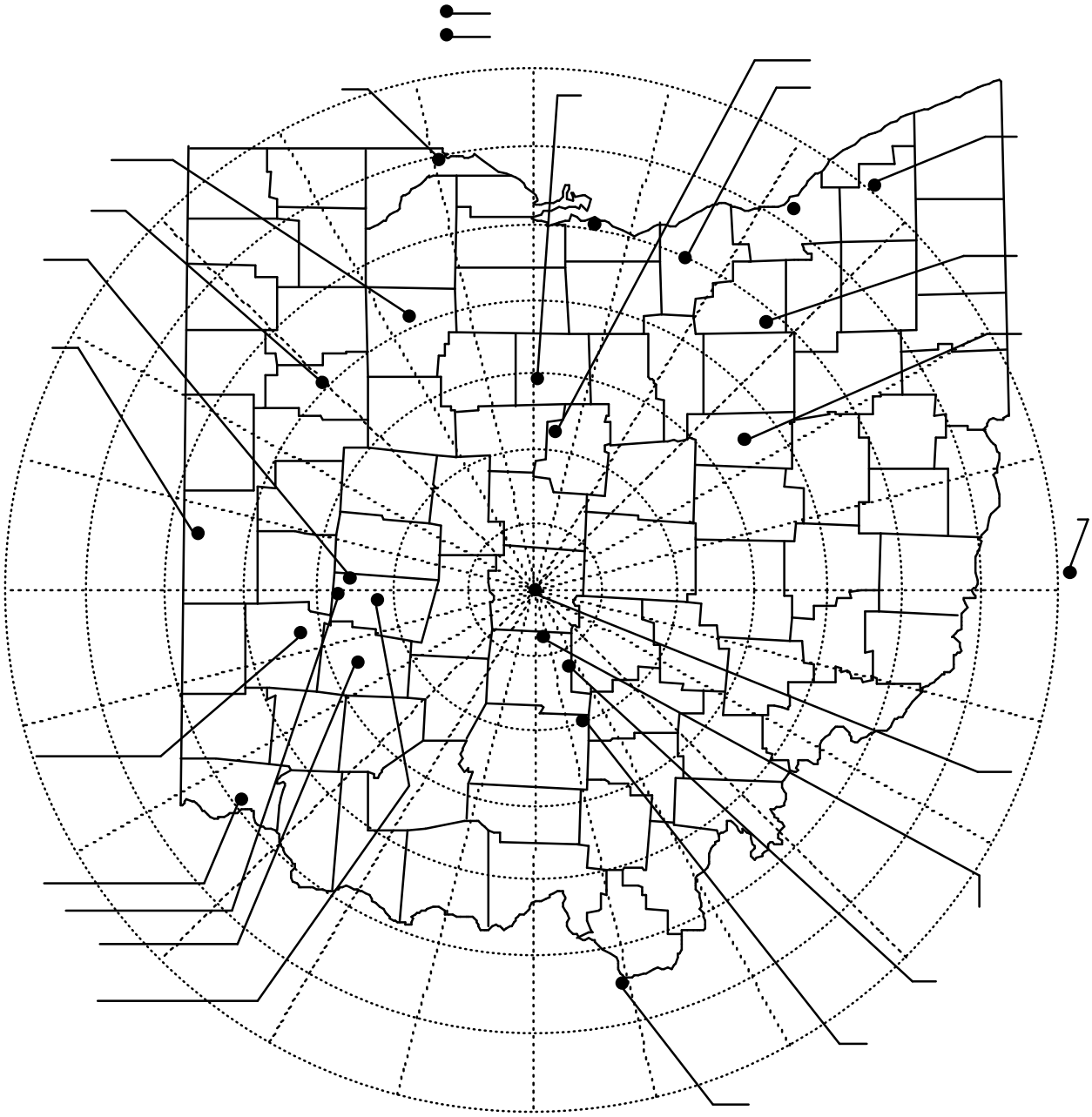
To be *removed* from list, send Email to "listserv@tallahassee.net and include in the message "UNSUBSCRIBE

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.

			UP	DOWN
Input control:	Major Touch tones:	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)
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_____
_____
_____
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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 (10/10/97)	$ 731.68
RECEIPTS (dues)	$ 90.00
OTHER INCOME (bank interest)	$ 5.71
EXPENDITURES	
November Newsletter film	$ 6.30
Fall Event food	$104.96
Fall Event prizes	$ 25.38
ATNA donation	$ 50.00
CLOSING BALANCE (1/15/98)	$640.95

ATCO MEMBERS AS OF 15 JANUARY 1998

K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	Oh	43068	866-1399	
K8AOH	Charley Tucker	4546 Laredo Street	Springfield	Oh	45503	513-390-0693	
WB4BBF	Randall Hash	212 Long Street	Bluefield	Va	24605		
KC8CNV	Jack Compson	5065 Sharon Hill Dr	Columbus	Oh	43235	451-4054	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	Oh	43065	766-5823	dale.elshoff@usiny.mail.abb.com
N8CYV	Blaire Standley	721 West North St	Springfield	Oh	45504		
WA8DNI	John Busic	2700 Bixby Road	Groveport	Oh	43125	491-8198	wa8dni@juno.com
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	Oh	42616	419-691-1625	
WA4DFS	Ed Walker	PO Box 150	Mountain City	Tn	37683	423-727-9611	
WA3DTO	Rick White	5314 Grosbeak Glen	Orient	Oh	43146	877-0652	wa3dto@aol.com
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	Oh	43026	876-6033	
W8EHW	Foster Warren	P.O. Box #32	No. Hampton	Oh	45349		
WD4GSM	E.R. Hall	4955 Pole Bridge Rd	Wise	Va	24293	540-328-9235	
K6GUC	Reuben Meeks	428 Lewiston Road	Kettering	Oh	45429	937-294-0575	
KA8HAK	Jim Reese	1106 Tonawanda Ave	Akron	Oh	44305		
N8KQN	Ted Post	1267 Richter Rd	Columbus	Oh	43223	276-1820	
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	Oh	45331	513-548-2492	
K8MBY,N8SIR,KB8UVK	Phil,Jim,Phil jr Buckholdt	153 East Bergey St	Wadsworth	Oh	44281		
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	Oh	43123	871-0751	phumphries@iwaynet.net
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	Oh	45660		deanfam@bright.net
KB8MDE/N8ZTL	Shaun Miller/Greg MacCartney	5061 County Rd 123	Mt Gilead	Oh	43338	419-768-2588	
K8MZH	Leland Hubbell	7706 Green Mill Road	Johnstown	Oh	43031	967-8412	
WD8OBT,KB8ESR,KA8ZPE	Tom Camm & sons	1634 Dundee Court	Columbus	Oh	43227	860-9807	
N8OCQ	Robert Hodge	3689 Hollowcrest	Columbus	Oh	43223	875-7067	
N8OOA	Jeff Clark	9894 Fincastle-Winchester	Sardinia	Oh	45171	937-695-1229	
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Oh	43204	279-7577	
W6ORG	Tom O'Hara & family	2522 Paxson Lane	Arcadia	Ca	91007	626-447-4565	tom@hamtv.com
WB8OTH	Perry Yantis	1850 Lisle Ave	Obetz	Oh	43207	491-1498	pyantis@compuserve.com
WA2PCH	Craig Stoll	PO box 1117	Orchard Park	Ny	14127		
KE8PN	James Easley	1507 Michigan Ave	Columbus	Oh	43201		
W8PGP,WD8BGG	Richard, Roger Burggraf	5701 Winchester So. Rd	Stoutsville	Oh	43154	614-474-3884	
KF8QU	Bob Tournoux	3569 Oarlock Ct	Hilliard	Oh	43026	876-2127	rtournoux@columbus.it.com
W8RIK	Joe Hussey	1678 Sandhurst Rd	Columbus	Oh	43229	895-7601	
WA8RMC	Art Towslee	180 Fairdale Ave	Westerville	Oh	43081	891-9273	towslee@ee.net
WA8RUT,N8KCB	Ken & Chris Morris	3181 Gerbert Rd	Columbus	Oh	43224	261-8583	wa8rut@aol.com
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	Oh	45334	513-964-1185	rgoode@erinet.com
WD8RXX	John Perone	3477 Africa Road	Galina	Oh	43021		
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	Mi	48144		
N8SFC	Larry Campbell	316 Eastcreek Dr	Galloway	Oh	43119	851-0223	larry@psycho.psy.ohio-state.edu
W8STB	John Hey & family	894 Cherry Blossom Dr	West Carrolton	Oh	45449	937-859-5295	w8stb@juno.com
N8TBU	Ed Latham	8399 Fairbrook Ave	Galloway	Oh	43119		
KB8TRP,KB8TCF	Tom, Ed Flanagan	1751 N. Eastfield Dr	Columbus	Oh	43223	272-5784	
WA8TTE	Phil Morrison	154 Llewellyn Ave	Westerville	Oh	43081		
KB8UGH	Steve Caruso	39 South Garfield Ave	Columbus	Oh	43205	461-5397	scaruso@freenet.columbus.oh.us
WB8URI	William Heiden	4435 Kaufman Rd	Plain City	Oh	43064	614-873-4402	
KB8UU	Bill Rose	9250 Roberts Road	West Jefferson	Oh	43162	879-7482	
WB8VJD	Rick Morris	203 Merton Street	Holland	Oh	43528		
KA8VUQ	Jack Wolff	2682 Hiawatha Ave	Columbus	Oh	43212	263-3092	
W8WAU	Jake Fuller	PO Box 117	No. Hampton	Oh	45349		
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	Oh	43062	927-3883	dhunter147@aol.com
N8XYJ	Dan Baughman	4269 Hanging Rock Ct	Gahanna	Oh	43230	471-1089	
KB8YMN	Mark Griggs	2160 Autumn Place	Columbus	Oh	43223	272-8266	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	Oh	43064		
KB8ZLB	Dave Kibler	243 Dwyer Rd	Greenfield	Oh	45123	937-981-4007	darlakib@bright.net
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	Oh	43125	836-3519	ka8zny@juno.com

***Email* I'm adding Email addresses. I will send each listed recipient Email notices of upcoming special events. If you'd like to be included in these mailings, let me know by letter, Tuesdaynite net or by return Email, and I'll put you on thelist…WA8RMC towslee@ee.net.**

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

FIRST CLASS MAIL

REMEMBER...IT'S JANUARY AND CLUB DUES ARE NEEDED.