ATCO NEWSLETTER

VOLUME 20 NUMBER 1 **January 2003**

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 HAM IN THE SPOTLIGHT

This time the "Candid Camera" stops at W8SMK, Ken Bird's house. Ken is a newcomer to ATV but has been involved in Ham radio since about 1974. His dominant activity (up to this point) has been with repeater coordination through the Ohio Area Repeater Council. His "spare" time is devoted to keeping the 145.17 MHz Delaware repeater operating. Maybe we can convince him to devote more attention to ATV and supply us with a little guidance of his own. He works with microwave engineering at his day job guys, so look out for microwave ATV activity! He's really come a long way in just a short time so I'm sure he is going to be a big player in our arena! Check out the tower arrangement in the right picture. Some of us are hard pressed for one tower but Ken's got two. His 100 footer is in the background.

His wife Diana is licensed as KA8PYL and his daughter Sarah is KC8CNW. Good job Ken! Now, let's see them get on ATV. It looks like the whole family joined in on the hobby.

ACTIVITIES ... from my "workbench"

Boy, I don't know where to start this time. Lots of stuff brewing but nothing complete. Oh well, that's life.

Let's start with the ATCO/DARA ATV link. As you may recall, we are attempting to link our repeater with the one in Dayton to create a seamless combined activity. This should result in more activity because hams in Dayton will not have to wait for a band opening to see us. The activity there will be repeated here and vice versa. Details must be worked out but initial work has begun. A midpoint tower site has been found that provides a "line of sight" path between the tower site the Dayton repeater and us so the communication path will be there for all weather conditions. We've already installed a 1250/1280 MHz antenna at the site and tested it with a 10 watt ATV transmitter. A P5 picture was received in Columbus validating mathematical predictions. Cold weather set in before additional antennas could be installed but we shall continue in the spring. In the meantime, we will work on equipment designs. A preliminary schematic has been prepared and we plan to discuss it with the DARA group for the desired features. See the pictures of the site in South Vienna taken during the antenna installation in November later in this Newsletter..

The next topic is the condition of the repeater 1250 MHz signal. We had some problems with the antenna last year resulting in its replacement. Since the replacement antenna was not performing well and had a high SWR, we decided to switch back to the original antenna as I was convinced that any problem with it was eliminated even though I could not find anything specific. It turned out that the antenna itself was not the problem but its placement WAS. To shorten the story, we replaced it with another dual band antenna and solved the proximity and SWR problem. The signal is now reported to be back up to and beyond its original point. Exception: KB8YMQ says it's better but still below the level it once was. I don't know what to say other than "let's work on your antenna, Jay". While I was working on the antenna problem, I also re-worked the 1250 MHz amplifier so it's back up in power from 35 watts to about 60. That's not a lot extra but we can use all we can get. I now believe that the 1250 MHz transmitter and antenna are working properly.

The next item on the agenda is the introduction of digital television to the repeater. This is a very new mode of operation and little is known about it but we are studying and trying to learn as much as we can. To that end, the only way to learn is to DO. Therefore we have a digital transmitter board set on order from a German ATV group. The goal here is to become the first ATV group in the United States to transmit digital television from an ATV repeater as there no others doing this right now as far as we know. The output will be placed on 434 MHz because the transmitter is set up for that from the supplier. Since 434 is possibly used for weak signal work in our area, the signal will be enabled on command and not brought up with the other repeater outputs. As we get more activity, we could possibly move it up to the 1200 MHz portion of the band. Note that in the previous paragraph I discussed antenna replacement with a dual band antenna. That was done on purpose to provide an antenna for our 434 MHz digital experiment. So, now you know "the rest of the story". We'll keep you informed. In the meantime, read up on digital television in an article on this subject later in this issue.

Next, Ken, W8RUT, is busy designing a 10 GHz output for the repeater. Presently, he has a one watt transmitter on order which we plan to install sometime in the spring. We picked up a 12Dbd horizontally polarized omni antenna at Dayton last year that will be perfect for the application. Ken is experimenting with various arrangements now so we should be ready when the weather breaks. If you've been thinking about 10GHz experimentation, here's your chance to try your hand at a Gunplexer receive setup and put those spare "brake light testers" to good use. Who will be the first to receive that signal? Anybody willing to guess?

I am putting the finishing touches on the new 446.350 MHz link transmitter to be installed at the repeater to replace the present one. I've spoken about it before so you should be aware of it but as a reminder, soon the link output power will go from about one watt to around 8-10 watts. Added to that will be a 449.350 input frequency primarily for control purposes but could be used as a 449.350/446.350 repeater. The output power boost is in response to requests for a little more "punch" and also to help access to the new South Vienna link when it gets installed. We need some way to control the functions at that site and 446.350 seem like the right choice.

I haven't forgotten the 427.25 MHz transmitter improvements. That transmitter is sitting on the basement floor right now waiting patiently for me to resume construction. However, there have been so many other things that seem important that this one has taken a back seat, but not for long. As soon as the other tasks get completed, I'll resume this one.

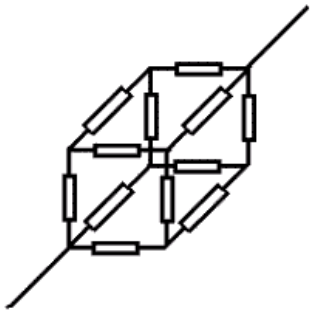
Finally, the Wavecom project has taken center stage. As you know, we moved the 2.4 GHz repeater output from 2433 to 2398 on a trial basis to get away from the wireless Ethernet activities in our area. We decided to stay on 2398 but now that presents a problem as it is not a standard Wavecom frequency. Since Brian WB7UBB, makes alternate pics to change the Wavecom to any ham frequency in the 2.4 GHz band, I ordered enough pic chips to modify the Wavecoms for those who want them. Since the replacement chip is a small surface mount device and those who have not worked with them would probably destroy the Wavecom trying to replace it, I offered to do the replacement task if they brought me the Wavecom. I've modified two of them now and it isn't too bad using the right tools. I have a chip for all of those who ordered one but I will order more if there are more people who want one. Let me know. Price is $15 each.

That's all for now, guys. More next time. PS: It's January and the 2003 dues are needed. Check your mailing label for your status and notify Bob or myself if you disagree with it. We **DO** make mistakes sometimes.
…WA8RMC

BRAIN TEASERS - Let's see if you're ATV material!

You are standing in a room that has two strings hanging from a high ceiling. If you grab just one string and walk to the other, the second string is several feet out of reach (because it is hanging straight down). Your task is to tie the two strings together. You have just three things to perform this task, a book of matches, 2 single squares of toilet paper, and a screwdriver. How do you tie them together?

OK, here's one more in line with electronic stuff. If you solve this one and your main job doesn't involve electronics, there's an electrical engineering position in your future.



There is more than one way to skin this cat. I will rate you on how you do it. (I almost succumbed to building it on my bench and checking it with a meter when I had a flash of insight).

Imagine a cube of 1 ohm resistors arranged on the edges as shown at the right.
What is the resistance at the open leads? Note that the resistors pointing to the center are NOT all connected. All connections consist of a junction of three resistors.
The answer(s) and the type of person that solves it in a particular way are identified later in this Newsletter. Good luck and no peeking until you have, what you think, is the answer.
…WA8RMC

DIGITAL VIDEO MPEG-4 INTEGRATED CIRCUIT IS DEVELOPED

The following article is my attempt at bring more digital television knowledge to the group. As I find tidbits of engineering information, you will see them here. If you're definitely NOT interested in digital video developments, please bear with me but be warned, you will be missing out on a lot of entertainment…WA8RMC

Divio Inc. is sampling an integrated MPEG-4 codec it claims can deliver 30-frame/second video quality in systems targeting the emerging solid-state camcorder market.

The NW901, providing full TV resolution, offers CIF/SIF resolution, high-fidelity (384-kbit/s) audio and still images at up to 4-megapixel resolution, said Steve Musallam, director of marketing for Divio (Sunnyvale, Calif.).

The idea behind the NW901's 30-frame/s functionality is Divio's view of a digital still camera market that's poised to stall at 5 Mpixels. The market will hit roughly 37 million units by 2006, the company believes, dominated by 3- and 4-Mpixel cameras. "Do you need more when 3.3 or 4 megapixels gives you a great image printed in 8 x 10?" Musallam asked. "The next feature is video."

While a lot of talk has been devoted to the wireless applications MPEG-4 can enable, Divio is convinced that lightweight consumer devices, some of which are coming onto the market now, are ready to take advantage of the codec's high frame rate coupled with considerable flash-memory storage to deliver the capability of videotaping and then playing back 30-frame/s, high-quality images on one device, Musallam said.

A 64-Mbyte storage card, for example, can hold 8.5 minutes of video taken at 1 Mbit/s, but the same card could hold up to 30 minutes of video if the rate is toggled down to 282 kbits/s. A 256-Mbyte card could hold a half-hour of high-quality video taken at 1 Mbit/s, which has implications for a variety of consumer and business-to-business applications, such as insurance claims.

The NW901 video codec is capable of handling I, P and B frames and scales from 64 kbits/s to 2 Mbits/s. While it supports CIF and SIF resolutions, it also supports QCIF and lower formats. The AAC audio offers two-channel stereo and user-selectable sample rates of 24, 32, 44.1 and 48 kHz, along with user-selectable bit rates of 16 to 384 kbits/s.

The megapixel digital still-camera block supports up to 4-Mpixel VGA and has auto exposure, auto white balance and auto flash-strobe control.

The 3.3 million-gate NW901 is implemented in 0.18-micron CMOS at Taiwan Semiconductor Manufacturing Co., Musallam said. It has a 3.3-volt I/O (1.8-V in the core) and is packaged in 352-pin ball-grid array. The price is $19 each in production volumes, he said.

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ILLEGAL TRANSMITTERS BITE THE DUST AGAIN – (Hooray!!!)

12/02/02 . Looks like they finally got Supercircuits like they did Ramsey for selling transmitting equipment on Ham bands to anybody primarily for surveillance purposes. See below.
…Tom O'Hara, W6ORG P. C. Electronics www.hamtv.com

Company admits it sold illegal audio bugs. Customs Service says hidden microphones violate privacy laws.

A Liberty Hill company that specializes in spy-like gadgets has admitted to illegally selling audio eavesdropping devices, ending a three-year investigation by the U.S. Customs Service.

Supercircuits Inc. was found to be selling smoke detectors, clock radios and hundreds of other household items that contained tiny video cameras with microphones. On Wednesday, the company agreed to a punishment that could include five years in prison for executives and a fine of no more than $500,000.

Vincent Klink, the Customs Service agent in charge in Austin, said Supercircuits might get a year's probation and pay a fine of about $250,000. A sentencing date will be set in the next month or two.

"There's a huge privacy issue involved here," Klink said. Even law enforcement -- itself a big Supercircuits client -- has to get permission from a federal judge to use eavesdropping devices, he said.

"This case is significant because of the volume of sales Supercircuits does," Klink added. "They're definitely among the largest companies in the world in this area."

Supercircuits, founded in 1989, grew from a small mail-order surveillance camera business to one with sales of about $20 million last year. The company has said its sales grow by about 50 percent a year.

When the company recently moved to Liberty Hill from Leander, owner and founder Steven Klindworth paid for the 15 acres and a 18,000-square-foot plant in cash.

Supercircuits' tiny cameras are tucked into clothing, buttons and other items. The company made the 2002 Guinness Book of World Records for making a color video camera the size of a sugar cube.

But it was the mini-microphones that got the Customs Service going. After noticing the eavesdropping products in a Supercircuits catalog, agents seized about 650 devices during a raid in late 1999. The audio quality of the devices "was as good as you and I talking right now," Klink said during a non-cellular telephone call.

The Customs Service continues to investigate the buyers of the thousands of eavesdropping products Supercircuits sold. The more than 100 groups, which include hotels, lawyers, news organizations and schools, could face charges for owning the products, Klink said. "There's no one local," he added.

Foreign governments bought the items, but the Customs Service is only looking at U.S.-based groups, Klink said. Klindworth said in a statement that at the time the company didn't know it was illegal to sell such items to the public. *(Yea, Right!)* "Supercircuits is a law-abiding company," Klindworth said. "In fact, nearly half of our sales are to law enforcement and military agencies. ... Supercircuits deeply regrets its actions."

The sales of the products represented 2.4 percent of the company's sales, Klindworth said. Klink said the eavesdropping devices will be destroyed once Supercircuits is sentenced.
…By Cara Anna AMERICAN-STATESMAN STAFF Thursday, November 28, 2002
http://www.austin360.com/auto_docs/epaper/editions/thursday/business_4.html

EARLY TV MUSEUM TO HAVE SWAP MEET

An Early Television Swap Meet will be held At the ET Museum in Hilliard on the 12th & 13th of April. It will be held in the large indoor heated warehouse area which is part of the museum itself. Saturday evening beginning at 7 PM, refreshments will be provided.

Other members of the Experimental Television Society from around the country are expected. Peter Yantzer, a highly recognized expert, will be there demonstrating his latest ET project. The museum will be open from Noon to 9 PM Saturday, and from Noon to 5 PM Sunday. The swap meet will be open also.
…W8DMR

NEW ATV LINK IN THE WORKS

I reported earlier we are working on an RF link to connect us with the DARA group in Dayton. We are lucky enough to have the Springfield repeater group allow us to install linking antennas on their tower and equipment in their transmitter house at the base of the antenna. Their site is the most ideal place to locate linking equipment because it is almost exactly halfway between us and it is the highest structure in the area. In fact, a topographic study shows that we actually have a line of sight path from both DARA and us to the link tower. As a result, a mathematical model shows that a 5 watt signal will maintain a snow free picture for both the 1200 MHz and 900 MHz paths. As proof, we connected a 10 watt transmitter to the newly installed 1200 MHz link antenna and were able to get P5 pictures into our repeater.

The link will be accomplished with a 1250/1280 MHz path between us and the link site and a 910 MHz path from the link to the DARA repeater. The sequence will be somewhat like this: Transmit a signal to our repeater in the normal way. It will be sent via our 1250 MHz output to the link where it will be received and repeated out on 910 MHz to Dayton. When received there it will turn on the Dayton 421.25 repeater output. When the person at this end stops transmitting, both link receivers go into the active receive mode waiting for a signal from either end. If a person at the Dayton end sees the Columbus signal and wants to respond, he simply transmits into the DARA repeater where the signal is also sent to the link via 910 MHz. The link then repeats the signal out on 1280 MHz where it is received by our repeater in the normal way. See…simple! Yea, right. Yes, there will be bugs to be worked out but I believe in a short time we'll having it working seamlessly.

So far, only the 1250/1280 MHz antenna is installed at the link site in South Vienna, Ohio. When the weather breaks in the spring, the 910 MHz antenna will go up. Hopefully, we will also be able to install a 439 MHz antenna there for a remote receive site for both DARA and us. We'll have to see how it works out. In the meantime, enjoy the pictures we took while Ken, W8RUT, Tom, KA8ZNY Jim, WA8UZP and I installed the antenna on what it turned out to be the last warm day of the season (late November). Thanks to Ken, Jim and Tom for their invaluable assistance during antenna and coax installation. A special thanks goes to Tom, KA8ZNY for his donation of the 80 foot run of 7/8" Heliax and connectors.

The left picture shows the repeater 110 foot tower to the left of a 40 foot tower with a wind driven electric generator used for AC power to supplement Edison. The repeater tower already has the 1200 MHz loop yagi installed just below the side mounted existing antenna for the Springfield repeater.

Ken, W8RUT poses for the camera in the picture below. The concrete block equipment house is to the left. Note that the installation is REALLY in a remote site in the country. A 100 acre field is in the background.

…WA8RMC

HDTV PRIMER! – It's coming folks! Know what you're looking at!

What you need to know to buy your first HDTV. The salesperson's information MAY sound good but don't bet on it!
Author: Ken Nist MSEE (ret), KQ6QV. From http://hometown.aol.com/kq6qv/HDTVprimer.html.

Presently, buying a TV is more complicated than buying a house. If you try to 'simplify' your choice by selecting a standard TV, it will become obsolete before it wears out. To make you an expert on HDTV, read through all of the following issues:

The Telecommunications Act of 1996
This act was passed by congress and signed by the president. One of its provisions requires all terrestrial TV stations in the country to convert to digital modulation. (Contrary to a persistent rumor, the VHF channels will not be abandoned.)

The deadline for this switch is a little fuzzy, but is currently around 2007. Exactly what cable TV companies will do is also a little fuzzy. Probably all cable systems will convert to digital for competitive reasons, but there is no deadline for that.

The pre-existing TV technology is called analog. It is also called NTSC (National Television System Committee), which are the people who defined it. The NTSC spec was created in 1946, updated for color in 1953, and updated for stereo in 1984. Both of these updates were backward compatible, rendering nobody's TV set obsolete. But the new digital standard is totally different. The only thing it has in common with NTSC is the 6 mega-hertz channel width. To continue using an NTSC TV after 2006 you might have to buy a converter box, which will probably cost about $200. These boxes are not yet available. (The RCA DTC-100 will do it, but it does much more and costs $550.) You will not need such a box if you have a cable or satellite box that has an NTSC output.

The new digital standard is called ATSC (Advanced Television Standards Committee). The government will require all new TVs to receive ATSC channels (The manufacturing phase-in is gradual). The ATSC standard includes multiple formats from 640x480 pixels to 1920x1080 pixels. All TVs must receive all of these digital formats and display them suitably. The broadcaster chooses the format.

To make the transition gradual, the FCC is temporarily giving all terrestrial TV stations a second channel, so that they can broadcast a digital channel along with their analog channel until 2006. There are 1500 terrestrial TV stations in the U.S. 550 of them have their digital channel on the air. Most of these transmit some high definition programs. About 80% of the U.S. population can receive some high definition programming from these stations. (These numbers are as of September 2002.)

The bad news:
* The cost to consumers of the new hardware.
* Home TV systems may be especially complicated during the transition.
* The picture-in-picture feature many people enjoy will largely disappear as TV set designers concentrate on more important things, but it will eventually make a comeback.

The good news:
* The quality of TV reception will improve dramatically. Temporary inconvenience, permanent improvement.

Should I buy an HDTV?
The two main questions you must consider are:
1. How much HDTV programming is available to me? This issue is addressed at length later in this primer.
2. Can I afford the step up to HDTV?

The top-of-the line HDTVs go for about $10,000 and up, but a minimal compromise in quality will put you in the $3000 range. (The first color TVs cost $500, which adjusting for inflation would be $3200 today.) What you loose are screen size and horizontal resolution.

Full horizontal resolution for HDTV is 1920 pixels. But many sets being sold today only resolve to 1280 pixels, and it is often difficult to see the difference. 1280 is still considered hi definition

Smaller HDTVs are now available in the $1500 range. If this is still beyond your budget, you have two choices:
1. Postpone the purchase. Set prices will continue to come down, although much of this decline will be from the introduction of sets with lesser features.
2. Buy a cheap standard TV and hope your finances improve with time.

How is viewing HDTV different?
It is radically different.
The optimum viewing distance for NTSC sets is 8 times the screen height. If you sit closer, the picture will be slightly blurry and you may feel some eyestrain.

For a HDTV set displaying 1920x1080 pixels, the optimum viewing is 3 times the screen height. The optimum for 1280x720 pixels is 4.5 times the screen height. Note that for people who always sit at the optimum distance, "high definition" is actually a misnomer. "Giant picture" is what these sets really are. HDTV is more like a movie theater experience than it is the traditional TV experience. "Home theater" is now the truth. Note also that just because your HDTV is 3 times bigger than your old NTSC TV doesn't mean that you can sit 3 times as many people in front of it. In fact you can't fit any more people in front of it, at least if you want the full theater experience.

Note also a built in annoyance: Every time the broadcaster changes resolution you have to move your chair. No one actually does this. They just suffer the mismatch. The only solution is to wait patiently for the day when all broadcasts are hi-def. Until then, room layout is an unsolvable problem.

What exactly is ATSC?
"Advanced Television System Committee" is the name of the technical standard that defines the digital TV (DTV) that the FCC has chosen for terrestrial TV stations. ATSC employs MPEG-2, a data compression standard. MPEG-2 typically achieves a 50-to-1 reduction in data. It achieves this by not retransmitting areas of the screen that have not changed since the previous frame.

Digital cable TV systems and DBS systems like DirecTV have devised their own standards that differ somewhat from ATSC. Their new set top boxes (STBs) conform to ATSC at their output connectors. All of these systems use MPEG-2.

ATSC has 18 different formats. All TVs must be able to receive all of these formats and display them. Some TV sets will display only 1 or 2 of these formats, but will convert the other formats into these. All 18 formats are shown in the following table.

Spec	Name of format	Horizontal pixels	Vertical pixels	Aspect ratio	Frame rate	Field rate	Transmitted interlaced
ATSC	1080i	1920	1080	16:9	30	60	Yes
					30	30	No
					24	24	No
	720p	1280	720	16:9	60	60	No
					30	30	No
					24	24	No
	480p	704	480	16:9	60	60	No
	480i				30	60	Yes
					30	30	No
					24	24	No
	480p	704	480	4:3	60	60	No
	480i				30	60	Yes
					30	30	No
					24	24	No
	480p	640	480	4:3	60	60	No
	480i				30	60	Yes
					30	30	No
					24	24	No
NTSC	Note 1	~640	483	4:3	30	60	Yes

Note 1: Some people refer to NTSC as 480i.

Interlacing
The term "interlacing" refers to the practice of drawing all of the odd numbered lines on the CRT, and then drawing all of the even numbered lines, which are drawn interspersed with the odd numbered lines. For 1080i, the 540 odd numbered lines are one "field", and the 540 even numbered lines are the other "field". When interlacing is employed, there are always two fields per frame. "Progressive scan" means that interlacing is not employed.

One advantage of interlacing is that, for a given bandwidth, it allows higher resolution (more pixels). Another advantage is that it reduces CRT flicker: A bright white area of the screen will flicker if that area is drawn only 30 times per second. Drawing 60 fields per second will prevent that. A disadvantage of interlacing is that, with only 30 frames per second, it doesn't portray motion as smoothly. Another disadvantage is that data compression is not as efficient. Also, when the TV set grows old, the two fields often become misaligned.

1080i and 480i are interlaced formats, while 720p and 480p are progressive formats. If you look at the second ATSC format in the above table you will note that it is called 1080i but the transmitted data is not interlaced. Why then is this called 1080i, an interlaced format? That is because most CRT TV sets must draw this image interlaced to prevent flicker even when the data is progressive. (Sets that can draw 1080 lines at 60 frames per second are very uncommon.)

Which is better: 1080i or 720p?

1080i and 720p require about the same bandwidth when showing live action: A 1080i image has twice as many pixels, while 720p shows twice as many frames per second. While showing films at 24 frames per second, 720p requires about half the bandwidth of 1080i. A common opinion is that 720p is better for sporting events, while 1080i looks better for documentaries, dramas, and anything that comes 24 frames per second. Unfortunately the networks are picking one format for all their shows. ABC and ESPN have chosen 720p. FOX has chosen 480p but

will switch to 720p in the future. All other networks are using 1080i. Hopefully some day they will choose the format according to the content. 1080i and 720p are called High Definition TV (HDTV). 480p is called Enhanced Definition TV (EDTV). 480i is Standard Definition TV (SDTV). Except when showing live action, 480p is generally no better than 480i (although an exception exists: Some line doublers have motion-adaptive logic that converts 30 frames per second into 60 frames per second.).

DVD Quality
DVD images are usually 720x480 pixels, 24 frames per second. DVD quality is a step up from NTSC because:
1. digital technology is noise-free.
2. there are a few more pixels per line.
3. when a progressive scan monitor is used, field misalignment cannot occur.
4. NTSC has an "overlapping sidebands" problem.

"Overlapping sidebands" is a compromise in NTSC that works most of the time. It will cause wrong colors to appear when showing diagonal lines or fabrics with tweed patterns. Special "comb" filters improve the image slightly, but DVDs avoid the problem altogether.
Of course, this improvement is lost if the DVD output is converted to NTSC. Many DVD owners have been buying monitors that have component video inputs, thus avoiding NTSC. DVD quality is essentially 480p (EDTV).

DBS Quality
Present DBS systems (DirecTV and Dish Network) have a bandwidth problem: too many channels. These companies have resorted to some filtering to reduce the bandwidth per program. This allows them to carry more channels, but it gives the images a slightly blurry look. They call it "noise filtering", but in effect they have reduced the resolution to below 640x480. Exactly what this resolution is has not been stated (550x400? Nobody knows.) On a 17 inch TV this problem is not very noticeable. But the larger the set is, the more offensive it is. You might find it to be a compelling reason to put an antenna on your roof. This filtering has been applied only to standard-definition channels. The satellite HDTV channels are uncompromised.

Bandwidth
The bandwidth for NTSC is always 6 MHz. Without data compression, the bandwidth for 1080i would be 300 MHz. With MPEG-2 data compression the bandwidth varies according to how fast the image changes. For 480i the bandwidth rarely goes above 1 MHz. For 1080i and 720p the bandwidth rarely goes above 3 MHz. Thus it is possible to put six 480i programs or two 1080i programs in a 6 MHz channel. The FCC allows this. Thus terrestrial DTV stations have sub-channels. It is up to the station managers how many sub-channels to have and what programming will air on those sub-channels. ATSC is an imperfect standard in that occasionally the bandwidth requirement will exceed the channel size. When this happens, the picture gets jumpy as frames are deleted. A more graceful failure should be possible since that bandwidth exceeds what the human mind can absorb. Hopefully in the future, compression schemes will be developed that fail in an unnoticeable manner.

What types of sets are available?

Direct view
A CRT produces a bright, sharp image that can be viewed from any angle in a fully lit room. The largest are about 38" (measured diagonally). You may find fitting more than 2 people in front of one of these to be a problem. LCD HDTVs are not yet available. They will probably take the low end of the market. (480p 16:9 sets are available.)

Plasma TVs are an excellent technology. They cannot have a misadjusted focus or convergence. They have two problems: price (as much as $25,000) and resolution (only enough pixels for 720p). Some people think the image is sharp enough to overcome the shortage of pixels. But other people think CRTs still have slightly better colors and shading.

Rear projection
Rear projection sets come in sizes 40" to 70" and so may become the most popular HDTV technology. Most are based on CRTs, but there are other competing technologies.

Typically, these sets have three CRTs (red, green, and blue) hidden inside a box. They point upward into a flat mirror and then onto a diffuser screen. The CRTs have lenses that focus the image at the screen. Adequate intensity is a problem, so the diffuser screen is designed to not radiate light in directions where there are no viewers. A fully bright image is visible to about 45° to the left and right, but only to about 10°-15° above and below any spot on the screen.

Typically, if you sit closer than 3 times the screen height, you will not be able to see the top and bottom of the screen at full brightness. Although 3 times the screen height is a correct distance, if your head moves vertically even a few inches, you may lose brightness at the top or bottom of the screen. Sitting at 3.5 times the screen height would reduce this problem. If you don't mind the loss of brightness you can watch standing up.

Room lighting must be controlled, but a blackened room is not necessary. Indirect ceiling lighting works well, but the image of any lamps can usually be seen in the large, flat screen. Ditto for windows. You will probably want dark shades for windows that reflect in the screen. If the salesman tells you the screen is non-reflective, check it out for yourself.

Front projection
For larger than 70", front projection is the way to go. Usually the projector is ceiling mounted or on a shelf behind the viewers. Since the screen is white, a blackened room is necessary. Otherwise the blacks will be gray. Some systems are bright enough to project onto a gray screen, reducing this problem somewhat.

What HDTV programming is available?

Terrestrial broadcasts (Over the Air)

Long ago, many people switched from roof antennas to cable service because the picture quality was a little better. This argument no longer applies. ATSC channels are like satellite TV in that, if you get a channel, the picture will be perfect, snow free and ghost free. You may not want to give up cable because of the many other channels. But in many locations, over the air (OTA) broadcasts will be the largest source of HDTV programming for the next 4 years. All of the network stations in these cities are broadcasting HDTV:

Atlanta Boston Columbus Chicago Dallas-Ft Worth Detroit Los Angeles Philadelphia San Francisco Washington-Baltimore
If you live somewhere else, you will have to ask around to find out what is available.

You will need an antenna. The web site www.AntennaWeb.org will tell you where the transmitters are in your area and will recommend an antenna. Their recommendations are close but not perfect, so you may want to see what others in your neighborhood have done. If you have been told that you may not erect a small outdoor TV antenna that is probably wrong. The Telecommunications Act of 1996 has a provision that preempts (overrules) nearly all local restrictions such as deed restrictions, home-owners association rules, renters contracts, and so on. For more details see FCC Fact Sheet.

If you are in an area where reception is difficult, you may see occasional distortions (pixelation) in the image and drop-outs lasting 5 seconds or so. A bigger antenna may help. Note that as antennas become bigger they become more directional, making aiming more sensitive. Note also that nearby trees affect UHF much more than VHF. If putting a UHF antenna on your roof doesn't get it above the trees, you must find a place to mount it where you can see the horizon in the direction of the station. A UHF antenna should be at least 6 feet above ground, but mounting it higher does not get you a stronger signal (unless the distant horizon is less than 200 yards away). VHF antennas should always be mounted as high as possible. The best weak-signal UHF antennas are the multi-bowtie-reflector antennas, such as the Channel Master 8-Bay.

Cable TV

The cable TV industry was slow to take up the transition to DTV, but is now charging ahead. Digital cable is now being introduced in many areas, and some of these are carrying a half-dozen HD channels. A special HD cable box is usually necessary. Ask your cable company what HDTV they carry. At present there are no HDTVs with built-in digital cable receivers, but these are coming. Some analog cable systems have added a few ATSC channels to their lineups. You can receive those channels by connecting an OTA DTV receiver to the cable system. This is temporary as the whole cable TV industry will be converting to digital cable.

DirecTV

HBO, Showtime, HDnet, and a pay-per-view channel are available. You must have the oval dish that receives three satellites: 101°, 110°, and 119° west longitude. (Showtime is the only HD channel on 110°.) DirecTV and Dish Network are moving very slowly toward HDTV since they are spectrum limited and cannot implement their plans until the merger question is solved.

Dish Network

HBO, Showtime, DiscoveryHD and some pay-per-view channels are available. CBS is available to a few people. These HD channels are carried by a satellite at 61.5° for East Coast viewers, and also on a satellite at 148° for West Coast viewers. In addition to the regular Dish Network dish, you will need a second dish for the HD satellite.

C-band 4DTV

"C band and Ku band" refers to the satellite systems that require an 8-foot dish. 4DTV is a digital service available on these bands. HBO east, HBO west, Showtime east, Showtime west, and Discovery HD Theater are available.

Set Top Boxes

'Set top box' is a term that can include any type of accessory that may connect to the HDTV. Common STBs are satellite receivers, cable TV receivers, OTA receivers, DVD players, VCRs, and so on.

STB video output options

The problem here is that a single universal standard for unit-to-unit video connections does not exist. Eventually, through competition, the best of the following will survive. Any STB you acquire will probably have more than one of these output connectors. When you buy an HDTV and an STB, you must select only units that can connect to each other.

1. CH3/CH4 output ATSC output by this method is very rare.
2. Composite video This 1-wire standard, in use for many years, conveys complete video images. It is designed for NTSC and cannot transport HDTV images. It can be connected to any NTSC monitor or VCR.
3. S-video. A 2-wire standard & an improvement over composite video. It's designed for NTSC & cannot carry anything better than 480i.

4. Component video This 3-wire standard, originally designed for DVD players, can carry HDTV via three wires with phono plugs. The three wires carry analog raster (image scanning) signals, either red/green/blue or Y/Pr/Pb. (Y=intensity, Pr=Y-red, and Pb=Y-blue.) Some can handle either color scheme. You must verify both units can use the same scheme. Neither scheme is better than the other.
5. VGA This 5-wire standard, originally devised for computer monitors, carries HDTV raster signals, usually red, green, blue, Hsync, and Vsync. However in some units Y, Pr, and Pb can substitute for the colors. Usually the 5 wires are bundled into a single cable. Five separate cables are advised for runs longer than 12 feet. The connector can be either a 15-pin VGA connector or five BNC connectors. Note: There is a $130 device from RCA, Radio Shack, and others that convert VGA signals into component video signals.
6. DVI (Digital Visual Interface) This connector conveys HDTV raster-like signals in binary data form. The data rate is very high (1.65 Gb/s). Binary data is preferred by monitors that are not CRTs, such as plasma, LCD, DLP, LCOS, and others. DVI comes with a decryption option called HDCP (High-bandwidth Digital Content Protection), which will decode encrypted programs such as first-run movies. There is a serious problem here. The motion picture industry is going to try to require distributors (HBO, etc) to use HDCP encryption on all high-def movies. The DVI connector is proprietary, and any hardware manufacturer must sign a contract in order to include it in his product. That contract forbids hi-def analog output (VGA or component video) on any device with a DVI interface, and allows HDCP decryption only in the monitor. This is an attempt by Hollywood to prevent unauthorized copying and distribution of hi-def material. But it means that millions of HDTVs already sold that have only analog inputs would become useless (or low-def) except for viewing whatever sitcoms or dramas networks allow. The FCC has not yet ruled on this and doesn't seem to be in a hurry.

7. IEEE 1394 Also called Firewire or i.link, this is a high-speed serial bus common in computers. IEEE 1394 is fast enough to carry compressed MPEG-2 video data plus audio and controls. There is an encryption standard for IEEE 1394, called DTCP (Digital Transmission Content Protection, also called 5C copy protection). But since IEEE 1394 is an open standard, Hollywood has less control over it. Since it is a two-way bus, it could allow units to control each other. This holds out the promise of eliminating the need for 5 or 10 hand held remotes to control the home theater. IEEE 1394 is just a connector definition plus a software shell. Additional software is required for the units to talk to each other. HAVi (Home Audio Video Interoperability) is such software. HAVi allows plug-and-play recognition of devices, interoperability, and brand independence.

DVI and 1394 are presently competing for the hearts and minds of the manufacturers. Which will win is unclear. A third possibility is that both will be adopted, DVI for video and 1394 for audio and control.

How can I avoid risk?

You can't. You must decide among DVI, 1394, or analog (VGA and component video are analog). There is no telling which will become the long-term winner. Presently, Hollywood does not want any DBS or cable set-top-box to have a 1394 connector passing MPEG-2 data. They even consider analog to be a piracy threat. If the DVI interface catches-on big, Hollywood could order all DBS and cable companies to disable all STB analog or 1394 video outputs whenever a hi-def movie is showing. Most people think the FCC would delay that order by ten years to allow depreciation of the millions of HDTV sets that would become OTA or SD only.

STB audio output options

An STB is likely to provide one or more of the following audio outputs:

1. 6 channel audio (6 wires with phono plugs)
2. Coaxial digital audio (1 wire with phono plug)
3. Optical digital audio (1 TOSlink fiber optic line)
4. IEEE 1394 audio and video
5. DVI audio and video

Again, it is wise to plan this before buying. There are no outboard conversion options (except a switch for coaxial digital), so the TV and STB must have enough of the right connectors.

Accessories: VCRs, TiVO, etc.

VCRs

Presently only 3 models of high-def D-VHS recorders are available:

1. Panasonic PV-HD1000 with 5C (discontinued)
2. Mitsubishi HS2000U with HAVi
3. JVC HM-DH30000U with 5C

None of these is able to record hi-def material from DBS, C-band, or digital cable. They can record OTA hi-def programs or play purchased hi-def tapes. All three accept hi-def input only from an IEEE 1394 connector and output hi-def video through that connector. Only the JVC has component video outputs. There might never be a VCR that can record DVI, VGA, or component video signals because of the technical difficulty.

Presently, Hollywood does not want any DBS or cable set-top-box to have a 1394 connector. They will allow a DVI connector. But the DVI data rate is probably too high for any recording device. If Hollywood gets its way, the only way to time-shift a hi-def program will be with a TiVo-like device.

TiVO, ReplayTV, and the like
None of these products works with HDTV. Development of HDTV versions of these products has been held up by the lack of a digital cable TV standard.

DVDs
Presently there are no DVD players for HDTV. Two groups are developing them. One group uses blue lasers, the other employs red lasers and a Microsoft data compression technique. Which will win out is unclear.

Set Top Boxes
If you have a satellite receiver, you may want it to feed other TVs as well as your HDTV. HD STBs are able to feed HD and SD sets, but never both at the same time. There is always a switch for you to select the output you want active.

Audio Amplifiers
The audio standard for ATSC is Dolby Digital 5.1, which is also called AC-3. It allows for 5 speakers plus a sub-woofer. The TV set will probably allow you to outboard some or all of these speakers, or it may provide a digital output line that you can connect to a power amplifier that has an AC-3 decoder. It is unlikely that the set provides more than 20 watts per channel. But if you decide to use an outboard amplifier, the TV system may be complicated and possibly hard to operate, especially if some STB audio goes to the amplifier without going through the TV.

The RCA DTC-100 receiver for DirecTV and over-the-air TV channels
This 5-year old design is still one of the most popular STBs. It has two limitations: It will not output 720p (It up-converts everything to 1080i.), and it has a first-generation receiver that is not the best in weak-signal areas.

A checklist for the buyer
Pioneering designs
Some units have DVI without HDCP, others have IEEE 1394 without DTCP. These units were designed before these options were defined. There is additional risk in buying one of these: There is no telling when Hollywood will disable these units for hi-def films.

If you are considering a 1394 unit that lacks HAVi, get a complete list of the units it will work with. That list might never change.

Attention all sports-fans !!
If watching sporting events is important to you then so is 720p. This is the only hi-def format that displays 60 frames per second. Most HDTVs will draw either 1080i or 720p, and convert the other. A good STB will allow you to select 1080i or 720p output. Know what you are buying. (ABC and ESPN will begin regular 720p sports events in 2003.)

Before you go into the store
1. Decide how much you can afford to spend.
2. Find out how much HD programming is available to you.
3. Decide how much of that HD programming you want to “pull in”.
4. Make a tentative decision on what STBs you want.
5. Research the STBs. Find out what the output connectors are. The Internet is a good source.

When you go into the store
1. Ask for the HDTV expert. Get his business card or write down his name.
2. Ask to be shown the HDTVs in your price range.
3. For each set that interests you, ask what horizontal resolution, in pixels, is truly visibly achieved.
4. Ask how the set draws each of these: 1080i, 720p, 480i, 480p.
5. If he ever says the phrase “1080p”, ask him if that is 60 frames per second.
6. Find out if the set has enough connectors for all the STBs you want.
7. When you know what set you want, go home and look it up on the internet. Verify that what you were told is accurate.
8. Don’t buy anything until you are sure all the units fit together.

EQUIPMENT DONATION/BID RESULTS…Thanks to donor & recipients

We have been very fortunate to be the recipients of Ham equipment from WA8CXO (sk) donated by his son Michael Wilson Sr. from Tempe, Arizona. It was his desire to donate his father's equipment to an active Ham club in central Ohio and picked us. I assure you, Mike, the proceeds from the equipment will be put to good use. First, we want to make the items available to our members at an attractive cost. Second, the proceeds will help build our much-needed ATV link between us and the DARA group in Dayton. I believe we have done that for our members and are working on the link at this time. (See the link details elsewhere in this Newsletter).

As promised, below are the results of the bidding held between November and December of 2002. All items are spoken for but a few items have yet to be delivered. It was anticipated that extra items would be taken to our flea market spaces in Dayton this year but it looks like that won't be necessary. The winners and the bid values are as follows:

Item #1. Yaesu model CPU-2500R 2 meter FM tranceiver. ----------KB8YMQ	$ 25
Item #2. Yaesu model FT227R "Memorizer" 2 meter FM tranceiver.---KB8YMQ	$ 25
Item #3. Heathkit model SB200 HF linear amplifier----------W8FZ	$377
Item #4. Kenwood model TS850S HF tranceiver----------W8RUT	$525
Item #5. Kenwood model TS440S HF tranceiver----------KB8YMN	$306.51*
Item #6 Kenwood model TR7930 2 meter tranceiver----------W8RUT	$ 61
Item #7 Astron model RS-35A linear 12 volt 35 amp power supply-----N8KQN	$ 49
Item #8 Drake model MN2700 antenna matching network----------K8STV	$101**
Item #9 MFJ model MFJ-16010ST antenna tuner----------KB8YMN	$ 22.61
Item #10 Drake model W4 wattmeter----------KC8LZC	$ 35
Item #11 DSI model 3550 550 MHz frequency counter----------N8KQN	$ 11
Item #12 CDE Tailtwister model T^2X antenna rotor control----------N8KQN	$ 27
Item #13 CDE model 5-032 antenna rotor control box----------WA8DNI	$ 18
Item # 14 Drake model TV-1000 low pass filter----------No bid	$ 5**
Item # 15 Larson NMO-MM 2 meter ¼ wave car roof antenna----------WA8DNI	$ 12
Item #16 Unknown manufacturer 5 position antenna switch----------W8RWR	$ 10
Item #17 Homemade linear 12V regulated power supply----------W8RUT	$ 15
Item #18 Cushman model CE50A communications monitor----------KA8ZNY	$350*

*This item has a problem. I will repair and return.
** This item waiting for delivery. W8STV said he'd take the unbid filter at the minimum asking bid of $5.

To date we have collected $1,213 for the treasury from the above equipment. Again, thanks to everyone involved for your most generous support.
…WA8RMC

NELSONVILLE HAMFEST…A nice place to meet fellow ATV'ers.

On Sunday January 19 the Nelsonville hamfest was held. The hamfest itself was rather small, about 200 or so people but the ATCO ATV group was well represented and was a significant percentage of the total (you do the math). I didn't take an official head count but believe there were about 10 of us present. That's a great showing for us and I'm sure the Nelsonville organizers know it.

We all had a great time even for those of us that didn't buy anything. However, as usual, Ken W8RUT found some goodies that he couldn't pass up. His prize was a 12 GHz frequency counter that he needed for the work on his 10 GHz stuff. I found two special connectors that, as it turned out, Roger, WB8DZW was selling. It was a long trip for just the connectors but it was worth it.

At the right is a picture I took of our "little" group.

Let's see more of you here next year!
…WA8RMC

SPECIAL EVENT - ARISS Contact To Mark Transmission Centennial

From ARRL Headquarters Newington CT December 27, 2002 To all radio amateurs

Special event station KM1CC will be on the air January 11-19, 2003, to mark the 100th anniversary of Guglielmo Marconi's inaugural wireless transmission between the US and Great Britain January 18, 1903. Marconi used a 35 kW rotary spark transmitter and a massive antenna system to transmit a 54-word greeting from President Theodore Roosevelt to England's King Edward VII. The monarch promptly acknowledged receipt of the message via land line and cable.

The special event will take place at the former Coast Guard station at Coast Guard Beach in Eastham, Massachusetts, which is near the original Marconi site. Operation will include several amateur modes, including SSB, CW, FM, digital and satellite. The special event station will open to the public from 9 AM until 5 PM EST (1400-2200z), but operating will take place 24 hours a day.

An Amateur Radio on the International Space Station (ARISS) school contact is to be scheduled during the weeklong celebration. Selected students from three Cape Cod high schools will speak via KM1CC with a member of the new Expedition 6 ISS crew. Marconi's daughter, Princess Elettra Marconi, is scheduled to attend the a reenactment of the groundbreaking wireless transmission on January 18, when KM1CC will transmit the text of Roosevelt's original message to King Edward VII.

Additional details are on the Marconi Radio Club Web site at http://personal.tmlp.com/k1vv/w1aa .

PHOENIX ATV REPEATER BITES THE DUST

I was talking to Brian, WB7UBB, the other day about the PICS for our Wavecoms, when he mentioned that he had an ATV repeater for sale. I was interested, not to buy his, but to find out just why his repeater was no longer on the air. Brian explains it like this:

"Actually the reason I took it down was the expensive site rent. They were charging $178 a month for the site and that was their discounted ham rate. We held this site for 3 years at this rate. It was about the only site that could serve the East valley of Phoenix as well as it did. It was even able and did link to the White Tank ATV repeater which is currently undergoing a project that will link it to the ATN network in California. I had always hoped that we would get enough membership to defer the costs. It would have taken 62 members at our membership rate of $35 to break even. Other members and myself were at most hamfests trying to promote membership. We had 24 members at one time. The club voted to increase the membership to $75, God bless their hearts, hoping to help but the membership dropped to 13 so we were just a little better than before. My wife and I were paying the bulk of the expense. The site owner would not negotiate.

Hello all, I have a fully functional complete ATN (Amateur Television Network) style ATV repeater for sale. It comes with all the necessary link equipment to link to another ATV repeater, was used to link Usery MTN in Mesa, AZ to White Tank MTN in West Phoenix.

The inputs are 2441.5 MHz FMTV and 434 MHz AMTV. The output is 1277.25 but can be changed easily to another ATV freq. using an Agile Cable Modulator. The 2 gig receiver is a Wavecom using one of my freq chips to keep it on 2441.5 MHz. The 434 receiver is from PC Electronics. The 2 M receiver is a Alinco DR-570T/E Dual band rig , transmit is bad but not needed.
Tower Preamps: 434, 2 G - Gaasfet Down East Microwave 13LNAH
Filters: 1277 MHz 6 MHz wide 6 pole, 1250 - 1300 MHz 3 pole, 2441.5 MHz, 434 MHz 6 MHz wide, 146.43 can, 1253.25 MHz
Modulator: ISS GL2610XT - Agile
Power Supplies: 2 - SEC 1223 20 Amp switcher
Amplifiers: 1.2G 65W DownEastMicrowave driven by brick amp, brick amp driven by 10 mw to 1W brick, 10 mw to 1W brick
Hardline: Enough for ant. on 150 ft tower, 7/8" for 1200, 7/8" for 434, 7/8" for 2 M, 1/2" 75 Ohm for 2 gig, 1/2" jumpers 20 ft. each
Antennas: GP-21 1260-1300 MHz 1/2 wave 14.9 dbi, GP-24 2400-2450 MHz 1/2 wave 15.4 dbi, Dual band 2/70 used for 146.43 receive
Controller: Intuitive circuits ATV-4 4 input DTMF controlled
ID Screen Generator: Amiga 500 Computer, Amiga 520 RGB to Video adapter modified to put out 1VPP
Professional Monitor: Panasonic BT-S1300N
Cabinet: 6 Ft Rack with Bud B54 Blower
Link Equipment: Wavecom transmitter with a 1W amp 2417.5 MHz, PC Electronics XTAL downconverter 1200 MHz, 1253 MHz filter all above in a weather proof CABLE TV line box set up to mount to a pole 8 FT Scientific Atlantic Grid dish with assoc hardware, 3 runs 100 ft of RG-6, 1 run 100 ft long 12 GA 2 conductor for power Agile Cable Demodulator set to down converter output - CATEL
Special features: Intuitive circuits OSD-SSM Signal strength overlay on 2 gig input controllable on 2 Meters

I may be forgetting some things about it. If interested call me at 602-996-9253 or email wb7ubb@cox.net
…Brian WB7UBB

Good luck, Brian. Reading this makes me feel so lucky that we have a site 650 feet above street level that is temperature controlled, standby power supplied and rent free! We must make sure our extreme privilege is not abused in any way.
…WA8RMC

ATCO FALL EVENT…A great time to remember.

On November 27 of 2002 we had the ATCO fall meeting at the ABB shelter house at 650 Ackerman Road. There were 26 people in attendance with food and drink for everyone. The weather was great which allowed us to enjoy the outdoors during our get together. First we had the food, then show and tell, a business meeting and finally the door prizes.

Several items were discussed during the meeting and listed below in no specific order:

1. The RF link to DARA will be located in South Vienna, which is very close to halfway between Columbus and Dayton.
2. Michael Wilson Sr. who is the executor of his father's estate (Carl Wilson WA8CXO) donated much of his father's Amateur Radio equipment to ATCO. ATCO needed to document the fair market value of the equipment so the estate could take the appropriate tax credit. We had much discussion as to the fair and appropriate way to sell this equipment. After discussion it was decided to have a closed bidding process where I would take written bids via letter or Email. After a grace period, bid submissions would end and the winner would be announced. All the equipment was described and was to be sold "as is".
3. The Messy Ham Shack contest was voted on and W8PGP (Dick Burggraf) was judged the winner. He received a nice hat and T-shirt as a prize. Check out the picture at the lower right. Have you ever seen a happier guy!!!
4. Digital TV that is being used in Germany was discussed. A PC card might be available ($700) to experiment with.
5. Jim Reed brought up the possibility of ATCO's involvement in the "Arnold Swartzenager" event in downtown Columbus over the weekend of February 28, 2003. There did not appear to be any interest from the other members.
6. Initial plans were made for an ATCO Pizza party December the 14th.
7. Art asked for volunteers to work on the rotor used for the antenna party.
8. The decision was made to continue renting the flea market spaces at the Dayton Hamvention. Additional discussion as to how these spaces will be used is still needed.
9. Election of officers: Wilbur motioned to keep the present officers. Everyone present seconded this.
10. Ken demonstrated his newest toy, an RC car with a Wavecom powered video camera. NEAT!

Below are a few pictures of the activity.

…WA8HFK

A NEW WIRELESS VIDEO CHIP IS AVAILABLE

I hope you don't get bored with another "engineering" article. I feel you'd like to know some of the video related stuff being offered by IC manufacturers even though you may never design something around one of these. Sometimes it's interesting to see what others' are doing. There's definitely going to be more home wireless devices offered in the near future. We only see the tip of the iceberg here! …WA8RMC.

Chips support wireless video over home nets http://www.eet.com/story/OEG20030106S0042
MANHASSET, N.Y. Building on the earlier launch of its Xcode video chip, ViXS Systems Inc. is offering a companion IEEE 802.11a wireless communications processor that lets standards-based 802.11a hardware fully support wireless video. The Matrix chip is designed for gateway appliances, using two 802.11a channels to enable the distribution of video to multiple wireless devices. Together, the chips provide an end-to-end wireless video solution for home networks.

The combination of Matrix and XCode allows media gateways and access points to stream video simultaneously to digital devices — such as laptops, Webpads, PDAs, personal video recorders, game consoles, and next-generation high-definition TVs — that use basic off-the-shelf 802.11 device cards. "The chip set has solved a very difficult and very real problem for the consumer electronics and PC industries, and we are seeing great demand with our partners in the United States and Japan," said Sally Daub, president and chief executive officer of ViXS Systems, based in Toronto. XCode is a Moving Picture Experts Group/video network processor that guarantees a broadcast-quality video stream at 30 frames per second with quality-of-service (QoS) that is expected from reliable broadcast-quality video transmission.

All about reliability. Rather than tackle the bandwidth restriction problem from a data-centric point of view, we opted to ignore the pipe and concentrate on providing a reliable video stream no matter how narrow or wide the pipe," said Wendell Smith, marketing manager of the company's U.S. development center in Austin, Texas.

The inherent variability of an 802.11 (Wi-Fi) wireless network presents challenges for streaming broadcast-quality video to multiple devices. These include the distance a remote client is from the gateway device and impediments, such as doors and walls, typically found in the home environment. Also, only a limited number of client devices can accommodate broadcast-quality video. For that matter, only one client device receiving video from the Wi-Fi network would typically use the full capacity of the available bandwidth.

ViXS' solution, including a video network processor, 802.11 chip and network management software, is said to deliver video QoS throughout the home. The market that ViXS is pursuing is potentially huge, but so far has been hampered by inconsistent and unreliable video experiences. If the frame rate is below 30 frames per second, video quality becomes poor, and if that quality deteriorates further because the transmitted data is dependent on available bandwidth, the viewing experience is intolerable. "We think that we can change that equation with our two-chip set for home networks that sport multiple video reception terminals, whether they be TVs or PCs," said Smith.

Sanguine forecasts. The potential market for home networks can be derived from several market research firms' data. In 2004, IDC predicts 69 million set-topboxes, a media gateway for the home. Also next year, Cahners/In-Stat expects 21 million home gateways, 51 percent of which will distribute video content. In-Stat/MDR forecasts 33 million 802.11 devices sold by 2006. In addition, 81 million TV sets will be sold in 2003, and 147 million PCs are sold worldwide every year, according to industry sources. Together with an anticipated 350 percent increase in wireless LANs, all that data points to a home network composite that is hard to ignore. As with every new market opportunity, growth depends on the confluence of market demand and technological viability: If the technology is not there, opportunities are forfeited, and if there is clear demand, technical obstacles may not produce the needed results.

In wireless home networks, the needed bandwidth has long been considered the stumbling block to transmitting reliable QoS content. But a data-centric model may not be the most efficient way to ensure reliable broadcast-quality video. By concentrating on transmitting quality video over any size channel, ViXS is turning the bandwidth problem on its head. "Our video-centric approach to QoS guarantees broadcast-quality video throughout a home, without wires or coax cable, and video can now be received on multiple clients," said Daub.

Consumer giants Sony Corp. and Samsung Electronics Co. Ltd.; wireless LAN providers such as Cisco Systems Inc.; and media gateway providers such as Microsoft Corp., with its E-home and Longhorn projects, support ViXS' approach and may be among the first companies to climb aboard when the chip set becomes available in volume in the second quarter. Samples of the Matrix chip are to be available in the first quarter; consumer electronics companies are already sampling the XCode chip.

During this week's Consumer Electronics Show in Las Vegas, ViXS will conduct the first public demonstration of the integrated XCode/Matrix chip set with simultaneous wireless video streaming to a variety of devices. The streaming solution, from a set-top box or video gateway, will include HDTVs as well as various digital and CE devices over 802.11a and .11b networks at distances of as much as 125 feet. Show attendees will be able to carry a Web Tablet or PocketPC across the Las Vegas Convention Center while receiving broadcast video entertainment being streamed wirelessly from a centralized media server.

"ViXS has redefined the unique requirements for an end-to-end video networking solution that enables reliable and robust transmission across a video-over-IP network," said ViXS' Daub. For more technology news, visit http://www.eet.com

DECEMBER PIZZA PARTY – Paid for by ATCO!

We decided to have an impromptu pizza party before it got too close to Christmas so December 14th was it! It was held at the Easton Donato's and what a party it was. Donato's said they wouldn't reserve the party room on weekends because of the heavy business but would during the week because of light business. Think about that one! If they don't have a lot of business, there is no need to reserve it in the first place. Oh well, on with **our** business.

As it turned out, I showed up early and kept the party room to us. Shortly thereafter everyone else came and jammed the place. I didn't take an official count but I believe there were about 15 of us talking and gobbling pizza, pop and beer. It looks to me that if ATCO picks up the tab, we have a lot of takers. All kidding aside, it looks like the treasury can support a few more of these during the 2003 year! The pictures below indicate the great time had by all attendees. If you missed it, please try to join us next time. Time and place TBD.

Above, it looks like Bob, W8RWR takes center stage. At the right, Stan, AA8XA is wondering when the next beer is going to show up.

To the right is Margurite, WA8DNI"s wife, John WA8DNI himself and on the far right is Bob, N8NT.

On the far left is Stan, AA8XA, (how did he get in there again?) followed by Ted, N8KQN and Ken, W8SMK one of our newest members (see large photo on first page)
…WA8RMC

NEW MEMBERS

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 him or her with information. New members are our group's lifeblood. It's important that we actively recruit new faces aggressively.

KB8OFF Jess Nicely Dayton, Ohio
KC8ASF Tom Pallone Columbus, Ohio
W8SMK Ken Bird Delaware, Ohio
WB8LGA Charles Beener Marengo, Ohio (Chuck returns after a few years absence)

…WA8RMC

BRAIN TEASER ANSWERS

There are several ways to solve this. They are listed below.

- The Mathematician will generate the nodal equations and solve the 12 equations for all values.
- The Programmer will make a Spice model and solve it.
- The Practical Engineer will build one and measure it.
- The Philosopher will see a pattern and solve the problem with basic math and superposition.

Here is the last example in written form.
Put a constant current of 1 ampere across the 2 corners. You will see that 1/3 Amp travels through each resistor connected to this point. From here each 1/3Amp splits into (2) 1/6Amp legs. Now the reverse happens, 2 of the 1/6Amp legs recombine (from different 1/3A original sources) into a 1/3Amp current. Then the (3) 1/3Amp currents recombine into the original 1Amp. Looking at the symmetrical pattern, you will see 1/3V across the first and last 1 ohm resistor. And 1/6V across any of the middle ones, which gives a total voltage of 5/6Volts. Since we picked a 1Amp source, the voltage is directly related to the resistance which is 5/6 ohm.

I'm open for other solutions. Personally, I had enough resistors and a little extra time so I built it and measured it (to verify my correct answer of course!) I'll take other suggestions on the Tuesday night net.

By the way, have you solved the "strings on the ceiling" puzzle yet? If not, here's a hint: You must know what a pendulum is and how to build one. Again, tune in the Tuesday night net for the answer.
…WA8RMC

INTERNET ATV HOME PAGES (list verified 01/18/02)

If you have access to the INTERNET, you may be interested to know of some of the HAM related information that is available. Most addresses listed below are case sensitive, so type exactly as shown. (For comments or additional listings contact me at towslee@ee.net).
Note: The listings below without URL's have disappeared! If any of you know otherwise, let me know.

Domestic homepages

http://psycho.psy.ohio-state.edu/atco	Ohio, Columbus, homepage (ATCO)
http://www.activedayton.com/community/groups/rmeeksjr/index.html	Ohio, Dayton ATV group (DARA)
http://users.erinet.com/38141/atv.htm	Ohio, Xenia KB8GRJ
http://www.qsl.net/ka8mid	Ohio, Chilicothe area, KA8MID homepage
	Alabama - Gulf Coast Amateur Television Society
http://www.hayden.edu/Guests/AATV	Arizona, Phoenix Amateurs (AATV) Carl Hayden High School
http://www.w7atv.com	Arizona, Pheonix Amateurs(AATV)
http://www.citynight.com/atv	California, San Francisco ATV
http://www.qsl.net/atn	California, Amateur Television Network in Central / Southern
http://www.qsl.net/scats/	Florida, Melborn Space Coast Amateur TV Society (SCATS)
http://www.bsrg.org/aatn/aatn1.html	Georgia, Atlanta ATV
http://members.tripod.com/silatvg	Illinois, Southern, Amateur Television group
http://www.ussc.com/~uarc/utah_atv/id_atv1.html	Idaho ATV
	Kentucky, Lexington Bluegrass ATV Society (BATS)
	Kansas, Kansas City Amateur TV Group (KCATVG**)**
http://www.bratsatv.org	Maryland, Baltimore Radio Amateur Television Soc. (BRATS)
http://www.icircuits.com/dats	Michigan, Detroit Amateur Television System (DATS)
http://come.to/amateurtv.mn	Minnesota Fast Scan Amateur Television (MNFAT)
	Missouri, St Louis Amateur Television
http://www.qsl.net/kd2bd/atv.html	New Jersey, Brookdale ARC in Lincroft
http://www.no3y.com/radio.html	New Mexico, Farmingham
http://www.ipass.net/~teara/menu3.html	North Carolina, Triangle Radio Club (TEARA)
http://www.oregonatv.org	Oregon, Portland OATVA Oregon Amateur TV Association
http://www.jones-clan.com/amateur_radio/klamath_amateur_television.htm	Oregon, Southern Oregon ATV
http://www.nettekservices.com/ATV/	Pennsylvania, Pittsburg Amateur Television
http://members.bellatlantic.net/~theojkat	Pennsylvania, Phila. Area ATV
http://www.geocities.com/Hollywood/5842	Tennessee, East ATV
http://www.hats.stevens.com	Texas, Houston ATV (HATS)
	Texas, WACO Amateur TV Society (WATS)
http://www.hamtv.org/	Texas, North Texas ATV
http://www.ussc.com/~uarc/utah_atv/utah_atv.html	Utah ATV
	Washington, Western Washington Television Soc. (WWATS)
http://www.shopstop.net/bats/	Wisconsin, Badgerland Amateur Television Society (BATS)

Foreign homepages

http://lea.hamradio.si/~s51kq/	Slovenia ATV **(BEST OF FOREIGN ATV HOMEPAGES)**
http://www.batc.org.uk/index.htm	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
http://www.rhein-land.com/atv	German ATV in "Niederrhein" area
http://www.arcadeshop.demon.co.uk/atv/	UK, G8XEU ATV homepage
	British Columbia, Canada VE7RTV repeater
	Auckland, New Zealand ATV
http://www.cq-tv.com	British ATV Club and CQ-TV Magazine
http://oh3tr.ele.tut.fi/english/atvindex.html	Finland ATV, OH3TR repeater.

INTERNET MISC HAM RELATED HOME PAGES (list verified 01/18/02)

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

http://www.hampubs.com/	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.arrl.org/hamfests.html	Current yearly hamfest directory.
http://amsat.org	AMSAT satellite directory/home page.
http://www.arrl.org	ARRL home page
http://www.arrl.org/fcc/fcclook.php3	ARRL/FCC revised CALLSIGN database. Search call sign or name.
http://hamradio-online.com	Ham Radio Online "newsletter" Lot of Ham related info.
http://www.qsl.net/atna/	ATNA homepage
http://www.ham-links.org	Ham Radio collection database
http://fly.hiwaay.net/~bbrown/index.htm	Tennessee Valley Balloon launch info (Bill Brown WB8ELK)
http://www.ipass.net/~teara/atv4.html	Arizona ATV 2.4Ghz Wavecom page (Wavecom mod. info)
	Space Shuttle Launch Info Service & Ham TV System (LISATS)
http://www.svs.net/wyman/	Wyman Research Inc. W9NTP Don Miller ATV equipment
http://www.m2inc.com /	M2 Antenna Systems Inc.
http://www.dci.ca/amateur_radio.htm	DCI Digital Communications Inc. Bandpass filters
http://scott-inc.com/wb9neq.htm	Kentucky, Airborn ATV from WB9NEQ in Bowling Green
http://www.icircuits.com/	Intuitive Circuits Inc
http://www.qsl.net/kd4dla/ATV.html	KD4DLA ATV web page index
http://www.severe-weather.org	Columbus, Ohio severe weather net at Columbus airport
http://www.mods.dk	Ham radio modification lists.
http://gullfoss.fcc.gov:8080/cgi-bin/ws.exe/beta/genmen/frequency.hts	look up any frequency on the FCC data base.
http://www.fcc.gov/wtb/	Starting point from which all radio license holders can be found
http://www.labguysworld.com	Lab Guy Antique TV camera listing
http:\\www.earlytelevision.org	Antique television museum in Hilliard, Ohio
http://radioscanning.wox.org/Scanner/scanner.htm	Radio scanner info for all frequencies in Columbus, Ohio area.
http://www.labguysworld.com/	Television recorder history web page. Lots of tv info.

HAMFEST CALENDAR

This section is reserved for upcoming hamfests. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here, notify me so it can be corrected This list will be amended, as further information becomes available.

26 Jan 2003+Tusco ARC Contact: Gary Green, KB8WFN 32210 Norris Road Tippecanoe, OH 44699 Phone: 740-922-4454 Email: kb8wfn@tusco.net New Philadelphia, OH
2 Feb 2003+Northern Ohio ARS http://www.apk.net/noars/winterfe.htm Contact: Clark Beckman, N8PZD 3407 West 135th Street Cleveland, OH 44111 Phone: 216-671-8795 Email: electro7@apk.net Elyria/Lorain, OH
9 Feb 2003+Inter-City ARC & MASER http://www.maser.org Contact: Dean Wrasse, KB8MG 1094 Beal Road Mansfield, OH 44905 Phone: 419-589-2415 or 419-522-9893 Email: deanwrasse@yahoo.com Mansfield, OH
23 Feb 2003+Cuyahoga Falls ARC http://www.cfarc.org Contact: Ted Sarah, W8TTS 239 Bermont Avenue Munroe Falls, OH 44262 Phone: 330-688-2013 Email: w8tts@arrl.net Cuyahoga Falls, OH
16 Mar 2003+Toledo Mobile Radio Association http://www.tmrahamradio.org Contact: Brian Harrington, WD8MXR 4463 Holly Hill Drive Toledo, OH 43614 Phone: 419-385-5624 Email: wd8mxr@arrl.net Maumee, OH
23 Mar 2003+Lake County ARA http://hamnet.org/lcara Contact: Roxanne 7480 Fern Drive Mentor-on-the-Lake, OH 44060-3233 Phone: 440-209-8953 (Leave Message) Email: roxanne@lcara.org Madison, OH
27 Apr 2003+Athens County ARA http://www.seorf.ohiou.edu/~xx150/ Contact: Drew McDaniel, W8MHV 61 Briarwood Drive Athens, OH 45701 Phone: 740-592-2106 Email: mcdanied@ohiou.edu Athens, OH
16-18 May 2003xDayton Hamvention Dayton ARA http://www.hamvention.org/ Contact: Dayton, OH
8 Jun 2003+Fulton County ARC http://www.fcarc.8m.com Contact: Angela Infante, KB2AVN 7649 County Road L Delta, OH 43515 Phone: 419-822-4382 Email: lindsay@powersupply.net Wauseon, OH
21 Jun 2003+Milford ARC Contact: Chris Reinfelder, KB8SNH 3782 Grovedale Place Cincinnati, OH 45209 Phone: 513-351-2776 Email: kb8snh@cs.com Milford, OH
26 Jul 2003+OH-KY-IN ARS http://www.ohkyin.org Contact: Mr. Lynn Ernst, WD8JAW 10650 Aspen Place Union, KY 41091-7665 Phone: 859-657-6161 Email: wd8jaw@arrl.net Cincinnati, OH
2 Aug 2003+HAM "OH" RAMA Voice of Aladdin ARC http://www.qsl.net/w8fez Contact: James Morton, KB8KPJ 6070 Northgap Drive Columbus, OH 43229-1945 Phone: 614-846-7790 Email: kb8kpj@cs.com Columbus, OH
6-7 Sep 2003**Great Lakes Division Convention Findlay Radio Club http://www.findlayradioclub.org Contact: Bill Kelsey, N8ET PO Box 587 Findlay, OH 45839 Phone: 419-423-4604 Email: kanga@bright.net Findlay, OH

ATCO REPEATER TECHNICAL DATA SUMMARY

Location: Downtown Columbus, Ohio
Coordinates: 82 degrees 59 minutes 53 seconds (longitude) 39 degrees 57 minutes 45 seconds (latitude)
Elevation: 630 feet above average street level (1460 feet above sea level)
Transmitters: 427.25 MHz AM modulation, 1250 MHz FM modulation and 2433 MHz FM modulation.
Interdigital filters in output line of 427.25, 1250 & 2433 transmitters
Output Power - 427.25 MHz:40 watts average 80 watts sync tip
1250 MHz:50 watts continuous
2433 MHz:15 watts continuous
Link transmitter - 446.350 MHz 1 watt NBFM 5 kHz audio
Identification: 427, 1250 & 2433 xmtrs. Video identify every 30 minutes showing ATCO & W8RUT on four different screens
Transmit antennas: 427.25 MHz - Dual slot horizontally polarized "omni" 7 dBd gain major lobe east/west, 5dBd gain north/south
1250 MHz - Diamond vertically polarized 12 dBd gain omni
2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
Receivers: 147.45 MHz - F1 audio input control of touch tones
439.25 MHz - A5 video input with FM subcarrier audio (**lower sideband**)
915 MHz - F5 video link data from remote sites
1280 MHz - F5 video input
2398 MHz - F5 video input
Receive antennas: 147.45 MHz - Vert. polar. Hi Gain 12 dBd dual band (also used for 446.350 MHz output)
439.25 MHz - Horiz. polar. dual slot 8 dBd gain major lobe west
915 MHz - DB Products vertically polarized 10 dBd gain omni
1280 MHz - Diamond vertically polarized 12 dBd gain omni
2398 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni

Input control:	Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
	00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
	00*	turn transmitters **on** (enter manual mode -keeps transmitters on till 00# sequence is pressed)
	264	Select Channel 4 doppler radar. (Stays up for 5 minutes) Select # to shut down before then.
	697	Select Time Warner radar. (Stays up till turned off). Select # to shut down.

Manual mode functions:		
	00* then 1 Ch. 1	Select 439.25 receiver - manual mode (hit 00* then 1 to view 439.25 signal only)
	00* then 2 Ch. 2	Select 915 receiver - manual mode
	00* then 3 Ch. 3	Select 1280 receiver - manual mode
	00* then 4 Ch. 4	Select 2411 receiver - manual mode
	00* then 5 Ch. 5	Select video ID - manual mode (the 4 identification screens)
	01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this receive channel & 01# to disable it)
	02* or 02#	Channel 2 915 MHz scan enable
	03* or 03#	Channel 3 1280 MHz scan enable
	04* or 04#	Channel 4 2411 MHz & camera video scan enable
	A1* or A1#	Manual mode select of 439.25 receiver audio
	A2* or A2#	Manual mode select of 915 receiver audio
	A3* or A3#	Manual mode select of 1280 receiver audio
	A4* or A4#	Manual mode select of 2411 receiver audio
	C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
	C1* or C1#	427.25 transmitter power output select (C1* = 40W output power or C1# = 1.5W output)
	C2* or C2#	2433 transmitter for on/off. (C2* enables transmitter and C2# disables it)

Auto scan mode functions:		
	001	2411 receiver (normal mode - returns to auto scan)
	002	Roof camera (select 001 when finished viewing camera so repeater will shut down)
	003	Equipt. room camera (select 001 when finished viewing camera so repeater will shut down**)**

CAMERA CONTROLLER KEYPAD FUNCTIONS

002 = ENABLE CAMERA Note: sometimes enter 003 for room cam then 002 for roof cam is better.

001 = RETURN TO NORMAL

FOCUS 1	ZOOM 2	APER-ATURE 3	DISABLE AAA A
FILTER (4 STEPS) 4	TILT 5	PAN 6	ENABLE B
IN/RT/DN 7	8	INC SPEED (PAN/TILT) 9	C
OUT/LF/UP *	0	DEC SPEED (PAN/TILT) #	D

OK, that's it folks. Play with it to your heart's content. Oh, one more thing. Use the camera in the repeater automatic mode only. If you access it in repeater manual mode, the first time you hit a function button, the controller thinks you want another input and shuts it down. In auto mode hit "002" to enable the roof camera and "001" when finished to return the controller to the 2400 MHz input. Since there will be no 2400 MHz signal, the repeater will then shut down. Use the keypad diagram at left as a function reference. Cut it out and paste it beside your keypad if you prefer. Thanks to Dale, WB8CJW, for the handy work.

ATCO MEMBERS AS OF 24 January 2003

Call	Name	Address	City	St	Zip	Phone	URL
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011		sdiggs4590@aol.com
K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	OH	43068	614-866-1399	wilbur.w@juno.com
KC3AM	David Stepnowski	735 Birchtree Lane	Claymont	DE	19703-1604		kc3am@aol.com
KC8ASD	Bud Nichols	3200 Walker Rd	Hilliard	OH	43026	614-876-6135	kc8asd1@netzero.com
KC8ASF	Tom Pallone	3437 Dresden St.	Columbus	OH	43224	614-268-4873	
W8CQT	Jim McConnell	350 N. State Road	Deleware	OH	43015-9644	740-363-1008	w8cqt@arrl.net
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551	delshoff@columbus.rr.com
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198	jbusic@copper.net
W8DLB	Denny Beardmore	PO Box 313	Bethesda	OH	43719-0313	740-484-4822	dlb@1st.net
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	OH	42616	419-691-1625	
WA3DTO	Rick White	133 Concord Way	Cranberry Twp.	PA	16066	724-776-2436	wa3dto@aol.com
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-876-6033	wb8dzw@aol.com
KB8FLY	Rod Shaner	124 West Walnut St.	Lancaster	OH	43130-4344	740-654-5694	rshaner@copper.net
KS4GL	John Barnes	216 Hillsboro Ave	Lexington	KY	40511	606-253-1178	jrbarnes@iglou.com
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147		W8fz@arrl.net
KC8HCE	Adam Porr	6825 Ridgeway Ct.	Pickerington	OH	43147	614-837-6489	Kc8hce@arrl.net
WA8HFK,KC8HIP	Frank, Pat Amore	3630 Dayspring Dr	Hilliard	OH	43026	614-777-4621	
WD8ITF	Larry Fields	953 W. Hopocan Ave	Barberton	OH	44203-7007	330-825-7148	lfields@neo.rr.com
K8KDR,KC8NKB	Matt & Nancy Gilbert	5167 Drumcliff Ct.	Columbus	OH	43221-5207	614-771-7259	k8kdr@arrl.net
K4KLT, KD4ODQ	Bob & JoAnnSchmauss	P.O. Box 1547	Land O' Lakes	FL	34639-1547	813-996-2744	schmauss@att.net
N8KQN	Ted Post	1267 Richter Rd	Columbus	OH	43223	614-276-1820	n8kqn@juno.com
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	513-548-2492	walkingcross@mail.bright.net
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	OH	43123	614-871-0751	phumphries@columbus.rr.com
WB8LGA	Charles Beener	SR 61 2548	Marengo	OH	43334		cbeener@columbus.rr.com
WB2LTS	Manny Diaz	8 Pearl Ave	Holtsville	NY	11742-1711		wb2lts@worldnet.att.net
KC8LZC	Tom Walter	15704 St Rt 161 West	Plain City	OH	43064	614-733-0722	kc8lzc@go.com
W8MA(ex wa8tte)	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081		
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660		ka8mid@qsl.net
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127	n8nt@columbus.rr.com
WD8OBT,KB8ESR	Tom Camm & sons	1634 Dundee Court	Columbus	OH	43227	614-860-9807	
N8OCQ	Robert Hodge	PO Box 23473	Columbus	OH	43223	614-875-7067	
KB8OFF	Jess Nicely	742 Carlisle Ave	Dayton	OH	45410		kb8off@prosurvisp.com
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	OH	43204	614-279-7577	
W6ORG,WB6YSS	Tom & Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565	tom@hamtv.com
W2OTA,WA2DTZ	Michael Chirillo	942 Bruce Drive	Wantagh	NY	11793	516-785-8045	
KC8OZV	George Biundo	3675 Inverary Drive	Columbus	OH	43228	614-274-7261	kilowatt@biundo.org
WB8PJZ	Dave Morris	2323 Allentown Road	Lima	OH	45805	419-226-6997	dave@towercomminc.com
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201	614-421-1492	jeasley11@hotmail.com
W8PGP,WD8BGG	Richard, Roger Burggraf	5701 Winchester So. Rd	Stoutsville	OH	43154	614-474-3884	rgburggraf@juno.com
K4PRS	Peter R. Sinkowski	4532 W Kennedy Bl #114	Tampa	FL	33609-2042		k4prs@yahoo.com
WA8RMC	Art Towslee	180 Fairdale Ave	Westerville	OH	43081	614-891-9273	towslee1@ee.net
W8RRF	Paul Zangmeister	10365 Salem Church Rd	Canal Winchester	OH	43110		w8rrf@copper.net
W8RRJ	John Hull	580 E. Walnut St.	Westerville	OH	43081	614-882-6527	
W8RUT,N8KCB	Ken & Chris Morris	3181 Gerbert Rd	Columbus	OH	43224	614-261-8583	wa8rut@aol.com
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	OH	45334	937-964-1185	w8rvh@glasscity.net
W8RQI	Ray Zeh	2263 Heysler Rd	Toledo	OH	43617		zehrw@glasscity.net
KB8RVI	David Jenkins	1941 Red Forest Lane	Galloway	OH	43119	614-878-0575	kb8rvi@hotmail.com
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904	614-276-1689	rrector677@aol.com
W8RXX	John Perone	3477 Africa Road	Galena	OH	43021	740-548-7707	
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	MI	48144		
N8SFC	Larry Campbell	316 Eastcreek Dr	Galloway	OH	43119		
W8SJV	John Beal & family	5001 State Rt. 37 East	Deleware	OH	43015	740-369-5856	w8sjv@midohio.net
W8SMK	Ken Bird	244 N Parkway Dr	Delaware	OH	43015	740-548-4669	ken@midohio.net
N8SNG	Terry Rankin	414 Walnut Street	Findlay	OH	45840		
W3SST	John Shaffer	2596 Church Road	York	PA	17404		w3sst@juno.com
K8STV	Jim Carpenter	823 Quailwood Dr	Mason	OH	45040		k8stv@arrl.net
KB8TRP,KB8TCF	Tom, Ed Flanagan	1751 N. Eastfield Dr	Columbus	OH	43223	614-272-5784	ed48@columbus.rr.com.com
W8TZ	Ross Hatfield	47 Wildflower Lane	Chillicothe	OH	45601	740-774-2777	w8tz@qsl.net
KB8UGH	Steve Caruso	6463Blacks Rd SW	Pataskala	OH	43062-7756	740-927-1196	mixter.1@osu.edu
WB8URI	William Heiden	5898 Township Rd #103	Mount Gilead	OH	43338	419-947-1121	
KB8UU	Bill Rose	9250 Roberts Road	West Jefferson	OH	43162	614-879-7482	
WA8UZP	James R. Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328	wa8uzp@qsl.net
WB8VJD	Rick Morris	203 Merton Street	Holland	OH	43528		wb8vjd@glasscity.net
KB8VUQ	Jack Wolff	2682 Hiawatha Ave	Columbus	OH	43212	614-263-4816	kb8vuq@arrl.net
W2WIA,KA2EVC	Ed & John Kuligowski	63 Connecticut Ave	Massapequa	NY	11758	516-541-3172	w2wia@netscape.net
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	OH	43062	740-927-3883	hiramhunter@aol.com
KB8YMN	Mark Griggs	2160 Autumn Place	Columbus	OH	43223	614-272-8266	mmgriggs@aol.com
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064		
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771	
KB8ZLB	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-4007	Bricks@dragonbbs.com
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	OH	43125	614-836-3519	ka8zny@copper.net
N8ZTJ	Jeff Skinner	25956 Locust Grove Rd	New Holland	OH	43145		

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 this newsletter quarterly in January, April, July, and October. It 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. As an option for those joining after mid July, they can elect to receive a complementary October issue with the membership commencing the following year Your support of ATCO is welcomed and encouraged.

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT
Secretary: Frank Amore WA8HFK
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Dale Elshoff WB8CJW
Statutory agent: (open)
Newsletter editor: Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
HOME PHONE _____
NAME_____
INTERNET Email ADDRESS_____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS_____
_____
_____
_____

ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ MONEY ORDER ○
Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, pay dues via the Internet with your credit card. Go to www.tournoux.com/~atco and fill out the form. Payment is made through "PayPal" but you DO NOT need to join PayPal to send your dues. Simply DO NOT fill out the password details and there will be no PayPal involvement.

TUESDAY NITE NET ON 147.45 MHz SIMPLEX

Every Tuesday night @ 9:00PM WA8RMC hosts a net for the purpose of ATV topic discussion. There is no need to belong to the club to participate, only a genuine interest in ATV. All are invited. For those who check in, the general rules are as follows: Out-of-town and video check-ins have priority. A list of available check-ins is taken first then a roundtable discussion is hosted by WA8RMC. After all participants have been heard, WA8RMC will give status and news if any. Then a second round follows with periodic checks for late check-ins. We rarely chat for more than an hour so please join us if you can.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (7/18/02)..... $1237.50
RECEIPTS(dues)..... $ 360.00
OTHER INCOME (bank interest)..... $ 6.69
Donated equipment receipts from bids..... $1213.00
Donations..... $ 50.00
October Newsletter postage & supplies..... $ (84.00)
Pay Pal charges..... $ (1.92)
Bank check charges..... $ (2.00)
Web domain name & web fees ..... $ (80.00)
Fall Event pop and food..... $ (158.95)
2003 Hamvention 12 advance tickets and space rental..... $ (444.00)
Pizza party at Easton Donato's..... $ (123.71)

CLOSING BALANCE (01/24/03).....$1972.61

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

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK MAILING LABEL FOR THE EXPIRATION DATE AND SEND N8NT A CHECK IF EXPIRED.