ATCO NEWSLETTER

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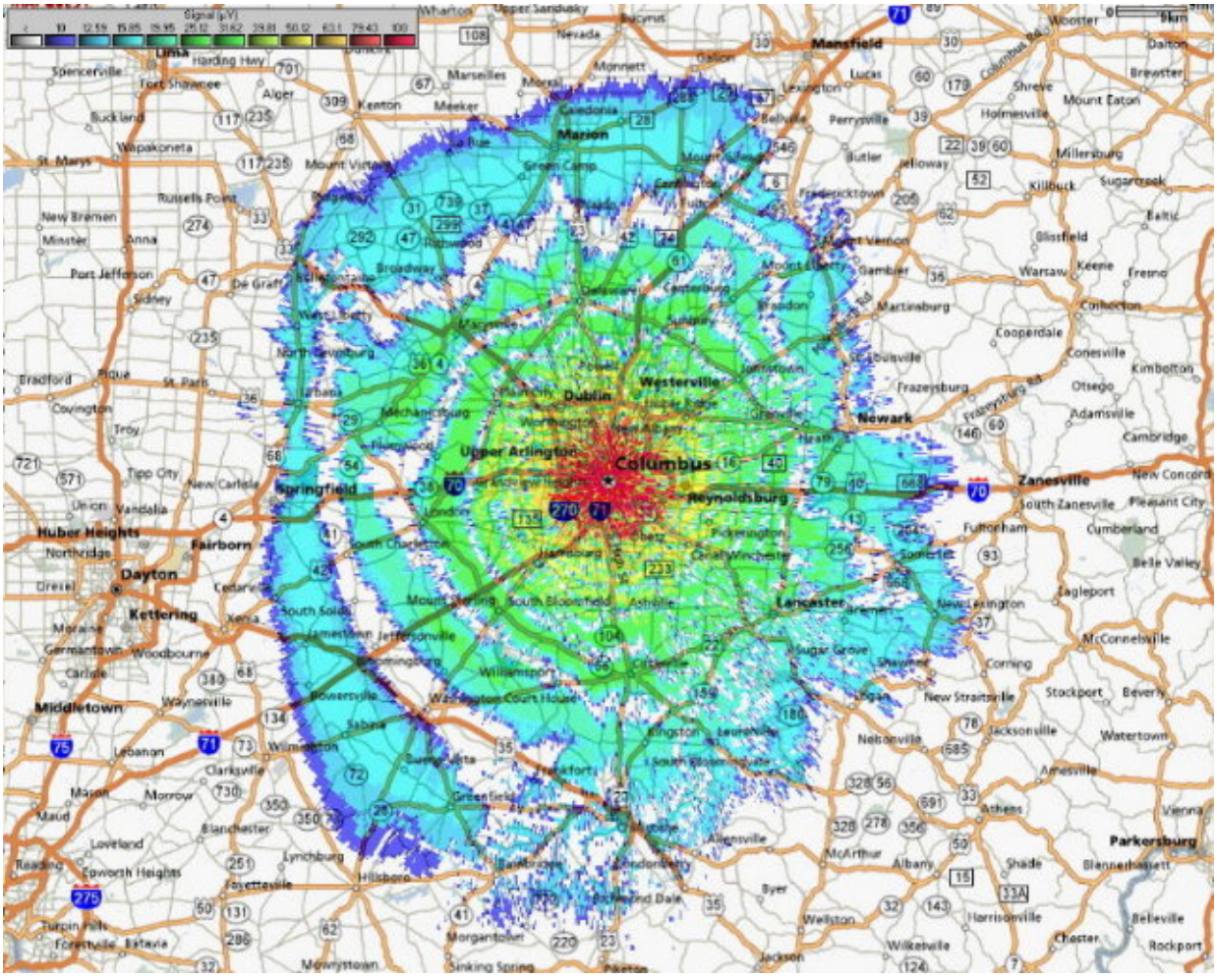
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" and is published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Here's a repeater 427MHz output signal plot vs. distance. Use it to estimate if you can see the repeater from your QTH. Charles, WB8LGA created it to give an idea of the signal contour as it spreads out from its origin across the terrain. Check the article inside for more details.



ACTIVITIES ... from my "workbench"

WOW!!!! It's mid summer and I haven't started my antenna work. SHAME, SHAME. Well, retirement DOES have opportunities but not always Ham related ones. More on that at another time!

The first thing on the agenda is to repair the 1260MHz power amp…**AGAIN**! Once before it toasted a brick (one of 4). Then the output line literally burned up. I decided that an isolator on the output line would fix the problem due to residual RF rejected by the filter feeding back into the bricks. Wrong! Recently it toasted another brick and burned up the output lines again. Downeastmicrowave doesn't have a clue to the problem. I repaired the output lines but not the brick because I felt enough is enough. The power amp is over 10 years old now and the bricks are obsolete. I can find some but they get over $100 each for them. It's time for a new amp so I'll look into building one with a pair of LDMOS bricks or, as WB8LGA suggests, build one using a single hi gain LDMOS transistor. It looks like I could get over 60 watts out with the same 3 watt drive now used for our 4 brick combo. In the meantime I replaced the failed amp with my standby unit but forgot to modify the Comtech board in it so the 1260 repeater output was all screwed up! I now have re-installed the original amp with the failed brick till I get something better but for now, that amp is working ok at a reduced power output of about 20 watts.

Next, the digital power amp needed to be put back into service. As you may remember, the power amp caused interference with ODOT because of spectral regrowth sideband energy created whenever an amplifier is added to the lineup, so I removed it until I had a solution. The solution involved building an interdigital filter with steep enough upper band edge rolloff to pass the main digital signal and attenuate the re-growth energy enough to eliminate energy at 1250MHz. The filter is constructed and successfully installed (so far, no calls from ODOT) with the power amp. Measured RF after the filter shows 10 watts going to the antenna as measured with a Bird wattmeter. I won't go into details here but the Bird reads average and not peak RF. The digital signal has much more peak energy so the Bird won't read right. A bolometer type RF meter will give yet another reading and so on… Nevertheless the signal is much stronger now as Charles, WB8LGA can now see it without breakups. That's about 40 miles from a 10 watt DATV signal. I'm satisfied!

The next item that needed attention is the 2.4GHz receiver. There is no video at the receiver output. Upon inspection, I found a broken "F" connector on the video output so the cable was out of the jack and dangling. WOW, what an easy fix or so I thought. After repair, still no video. There is power going to it so the problem must be internal. I decided to pack it under my arm, so to speak, and bring it home for further inspection. I haven't fixed it yet but found that the power supply has failed producing a little over 5 volts for the 12 volt supply. It's been on 24-7 for 5 years now so I guess that's to be somewhat expected. However, that's 2 of the same type of supply that has failed on me now so I'll not use any more of those. I hope to have the 2.4 receive input operational again within a few weeks or the next time I go back downtown.

The new 427 power amp is ready to go downtown but there always seems to be something to delay it. I won't say much more about that as I've been talking about it for years now. When it happens, I'll let you know so we can celebrate the occasion!

After that, I'd like to re-install the roof camera. I have a pan/tilt unit and now have a working touch tone controller for it as I needed something for Red-White-Boom to remote control the Gas Co. camera. Therefore the repair of that unit was a "two-fer". It would be kind of neat to get it working because the zoom lens is strong enough to be able to see clearly into the new Huntington ballpark without obstructions. I would be able to zoom in to see the person at home plate in full view. Fun to play with, huh?

That's all for now. Don't forget the Columbus Hamfest coming up on August 1st.

…73 WA8RMC

HDTV STATUS IN EUROPE COMPARED WITH OTHER CONTINENTS

INTRODUCTION
The rapid development of digital technology and digital convergence has led to some remarkable advances in the quality of audio and video broadcast and in the consumer devices that bring sound and vision into the home. Chief among these advances is digital television, from which High-Definition Television (HDTV) was first researched more than 40 years ago.

More recently, the flat-panel display, using either LCD or plasma technology, has become commonplace, and flat-panel TV sets and PC monitors are now being mass-manufactured by the majority of major consumer electronics companies. While HDTV-capable, widescreen, flat-panel TV sets, employing multi-channel sound, are widely available and becoming more affordable, the number of broadcasters creating and transmitting HD content is still rather limited.

This paper discusses the deployment of HDTV in key selected countries outside Europe and the relatively slower take-up within Europe. What constitutes HDTV and its astonishing picture quality are explained in non-technical terms. Finally, it is highlighted how Philips strongly supports the case for HDTV in Europe, describing the customer benefits, the availability of 'HD-ready' products, emerging new and advanced video codecs and the company's capabilities and credentials in digital TV, set-top box and semiconductor technologies.

MAJOR MILESTONE
If John Logie Baird, the Scotsman generally acknowledged as the inventor of television in 1926, were alive today he would be amazed at the advances in TV technology that have been achieved. What is also amazing, and not generally known, is that Baird also developed a 600-line color television system in 1941, which unfortunately never got beyond the experimental stage. In fact, color television did not become commercially available in Europe until 1967.

Since then, rapid progress has been made in TV functionality, picture size and quality, as well as in choice and number of programs transmitted by terrestrial, satellite and cable channels. Among the many milestones in television reached over the years, the most recent, enabled by digital technology, and probably the most spectacular, are the recordable DVD, flat-panel displays and digital television that enables multi-channel reception, interactivity and many other features, as well as High-Definition Television (HDTV). No doubt, technical experts would suggest a number of others, but these three milestones, closely linked to each other, have the most impact on consumers and, literally, are the most visibly prominent. After all, it's the consumer whose money ultimately fills the coffers of the manufacturers, broadcasters and network operators.

While recordable DVD and flat panel displays and TV sets are widely available and at affordable prices throughout the developed world, HDTV is at least, not in Europe. The main barrier to the deployment of HDTV has been the lack of sufficient bandwidth for satellite, terrestrial, cable and, especially, IP networks. New and more efficient video codecs (see later in this paper) and 'HD-ready' products are now available, which are encouraging operators and broadcasters to take the initiative and invest in HD technology. The initial 'push' is expected to be made by digital premium network operators. In addition, it is expected that government initiatives in stimulating the transition from analog to digital in the free-to-air services domain will embrace HDTV in order to convince consumers.

HDTV - NOT YET EVERYWHERE
So, before we delve deeper into why HDTV has yet to be seen in thousands of households throughout Europe, it would be useful to look at the scenarios in some other parts of the world, from which much can be learned.

USA: There is no doubt that the US has led the world in HDTV development. As far back as 1970, extensive research began into the feasibility of HDTV. However, without the availability of true HD broadcast it was hardly commercially viable. In addition, some of the systems proposed were hybrid analog/digital whereas there were already discussions about the real future of HDTV based on true digital technology.

Nevertheless, the ground was set for the future, leading to the International Telecommunications Union adopting an HDTV study in 1974, which acknowledged that HDTV should have a resolution comparable with 35 mm film and at least twice the horizontal and vertical resolution of existing television systems. In 1990 when the first digital terrestrial HDTV system was developed, it was realized that HDTV would eventually replace the existing US TV standard NTSC (National Television System Committee), which, with a 525 line system (compared to 1125 "1080 lines for HDTV) left a lot to be desired in terms of resolution.

By this time only four R&D groups had proposed all-digital HDTV systems that were considered to be viable for further development. This led to the formation, in 1991, of a consortium known as the Grand Alliance whose objective was to combine the proposed systems into one, optimal HDTV system. The four groups are: AT&T/Zenith, General Instrument, DSRC/Thomson/Philips and MIT. These Grand Alliance members, together with the FCC (Federal Communications Committee), certain broadcasters and CE and computer

manufacturers agreed to adopt the ATSC (Advanced Television Systems Committee) standard for HDTV scanning formats. This is now the worldwide industry standard.

Today, of the estimated 100 million TV households in the USA, about 10 per cent are HD-ready, an impressive number. Of these, cable dominates with 70 per cent, satellite with 20 per cent and terrestrial with 10 per cent. This take-up is supported by increasing sales of HDTV sets where, in the first quarter of 2004, about 1.3 million were sold an increase of more than 100 per cent from the same period in 2003.

The Consumer Electronics Association forecasts that 30 per cent of US households will be receiving HD broadcasts by 2007 the year when the government has mandated that broadcasts to the entire nation will be 100 per cent digital. In the meantime, at least a dozen broadcasters are transmitting HD channels in major city areas. One example is DirecTV, which is expanding its high-definition and enhanced digital television programming offer to broadcaster who transmits from New York and Los Angeles. The CBS-HD programming will be available to eligible DirecTV customers in markets where CBS owns and operates stations, currently in about 20 cities.

Asia: In terms of population, and with an estimated 45 million TV households, Japan is close to the USA. Coincidentally, ten per cent of TV sets sold in Japan are HDTV, but only about four per cent of households receive HD signals. Current research figures show that terrestrial broadcast dominates with 45 per cent (7 HD channels), satellite with 30 per cent (18 HD channels) and cable with 25 per cent (no HD channels). Although the first broadcast of HD content in Japan took place in 1982, consumer take-up of HDTV was understandably slow because compatible TV sets only became widely available some years later.

In 2003, Korean consumers bought two million TV sets, of which about 30 per cent are HD capable. Of the 17 million TV households in Korea only one per cent receive HD content due to the low number of available channels. Even though cable transmission has 68 per cent of the TV market, no HD service is available yet. Terrestrial (22 per cent) and satellite (10 per cent) have very few HD channels, and set-top boxes for both are expensive (about USD 500) and are not subsidized. Culturally, because both Japanese and (South) Korean consumers are willing to spend money on TV entertainment and the latest technology, the potential for strong market pull is there, with eager CE manufacturers already providing the product push. China is not far behind its neighbors and, with its immense population gradually being able to afford more luxuries than, say, ten years ago, it is expected that the potential of HDTV is equally great.

Australia: Available figures show that 90 per cent of the seven million Australian TV households have terrestrial transmission. There are five broadcasters that are mandated to transmit 24 hours of HD content per week, which is simulcast in SD (standard definition). In 2003, flat-panel TVs were about eight per cent of the 1.2 million TV sets sold, while of the 125,000 set-top boxes sold, 25 per cent were HD-capable. Interestingly, pay-TV operators are not yet willing to provide HDTV services, presumably because of the high investment cost and that subscribers are unwilling to pay the extra premium.

THE EUROPEAN SCENE

As in other areas, more and more European consumers are buying LCD and plasma flat-panel TVs and PC monitors, for which prices are considerably lower than when they were first introduced about eight years ago. Now, having seen the quality of movies on DVD, viewers are expecting the same quality from broadcast TV. Although many European broadcasters are committed to HD, there may be a few who are willing to invest in the higher (than analog or SD) shooting and post-production costs in the short-term. On the other hand, existing programs " movies, TV plays, documentaries etc. " are rapidly being converted to HD (achieved by 'up scaling' the SD signal) and stored electronically. Because creating new programs in HD is more costly (at least double that of SD), only the largest broadcasters can afford to do so at present. Foremost among these is the UK's BBC, who sees the potential of not only the huge consumer pull in Britain, a nation with the highest concentration of digital (and interactive) TV, but also the prospect of sales of HD content abroad.

An important factor in broadcasting HD content is bandwidth " HD requiring about four times more than SD. Because digital TV transmission/reception in the UK is predominately free-to-air terrestrial, it is more limited than satellite in terms of handling bandwidth. This is one of the reasons why, at present, the BBC is concentrating more on HDTV production than broadcast, with HDTV content being downconverted for standard definition transmission. Moreover, it seems that European terrestrial broadcasters prefer to use the greater digital bandwidth to offer more services in SD, rather than create new programs in HD or convert existing programs.

Satellite has the greatest potential for HD signal transmission in Europe. One enterprising broadcast company to be the first to do so in Europe is Euro1080. An initiative of Alfacam, based in Belgium and one of Europe's leading TV facilities companies, Euro1080 was launched in January this year and is currently broadcasting two channels throughout Europe via the Astra 19.2 satellite. Its Main Channel distributes four hours of programs per day to European households, as well as selected public places such as sports bars, hotels, restaurants, conference centers and airports. Euro1080's Event Channel provides live or recorded programs to 'event cinemas' that allow viewers to enjoy large-screen projection with superb picture and sound quality. Next to offer HD broadcast on a large scale will probably be BSkyB in the UK in 2006. It is expected that others will follow suit in due course.

An influencing factor for Europe to embrace HDTV is the migration from analog to digital broadcast on terrestrial, satellite and cable networks in the majority of countries by certain dates. For example, digital satellite TV in Germany is already more than 60 per cent of

the retail market, with the city of Berlin becoming the first in the world, in August 2003, to switch to fully digital TV transmission. Significantly, the World Cup 2006 football championship, to take place in Germany, will be recorded or made available in broadcast in its entirety in HDTV for the first time in the history of the competition, and will be a great momentum for broadcasters or operators to showcase the format. Obviously if broadcasters will actually broadcast in HDTV is dependent whether they have the infrastructure in place to do so.

Other countries' regions and cities are following suit progressively, with DTT trials taking place, backed by government and industry, until entire countries, like France, Germany, Italy, Spain, the UK and the Nordic group are fully digital. For some, this will take place as early as 2006 and later for others, up to 2012. In fact, it is forecast that 365 million TV households worldwide will be receiving digital signals by 2010, just over one-third of the total number of homes.

PHILIPS' POSITION

The key criteria that consumers base their decision on when deciding to purchase a new TV are:

- picture quality
- design aesthetics (e.g. flat screen)
- screen size
- sound quality
- functionality

Of these, research has shown that the first, " picture quality " is the most important factor required by consumers in Europe, the USA and Asia. It is the feature most emphasized by Philips for many years in developing and manufacturing television sets and PC monitors, and accounts for the company's huge success in sales of digital TV sets, monitors, DVD players and recorders and set-top boxes throughout the world. Philips defines three selling points for digital TV: 'Better', 'More' and 'Easier', meaning superior picture and sound; more applications and greater program choice; and ease-of-use with self-explanatory and intuitive interfaces. Also key to Philips' approach to the digital TV market is the Connected Planet vision of the future that allows people to enjoy digital content anywhere, any time, in the home and on the move, with the set-top box as the enabling gateway. Philips' strong foothold in the four key technologies of digital video, storage, connectivity and display enable new, connected products matching the continuing move towards digital convergence.

Philips has introduced many innovative picture-quality improvements over the years (see box on next page) that have been adopted almost universally by the TV industry. Two recent, major steps towards improved picture quality are the development of flat-panel displays and Pixel Plus. Together, they enable near 'high-definition' picture quality from standard TV transmission without the need for HDTV signals, achieved by up scaling an SD signal towards HD resolution.

Although this is a major achievement and goes a long way to fulfilling consumer expectations of perfect reproduction with maximum resolution, it is not 'true' HD and still does not meet the astonishing quality of picture and sound that true HDTV brings. True HDTV also means a complete 'end-to-end' digital chain from the moment the signal enters the home until it is displayed on a flat, HDTV-capable screen. Moreover, the introduction of widescreen format and flat-panel TVs, where Philips has close to 20 per cent market share in Europe, has boosted the drive towards ever-larger screen sizes, in turn further impacting awareness of picture quality among consumers.

An encouragement to satellite broadcasters and operators who are considering making the transition from SD to HD, is the evolution of new, advanced video codecs (e.g. AVC). These codecs require significantly less bandwidth than needed by MPEG-2, thus removing a major hurdle of bandwidth limitation that has long withheld operators and broadcasters from the move toward HD. The availability of new codecs coincides with the proliferation of large, widescreen flat-panel TVs, as mentioned above.

An additional driver of HDTV is the Blu-ray Disc (BD), a 'next-generation' of optical media that offers six times more capacity than a DVD disc. Moreover, BD supports data rates of up to 36 Mb/sec, far exceeding the HDTV data rate of 19 Mb/sec in MPEG-2, delivering the ultimate picture quality. Blu-ray is being developed by a consortium of 13 leading CE (one of which is Philips) and PC manufacturers. In the near future, high definition content will become available via motion picture studios on packaged media which will fuel the demand for HD-enabled displays. This will further drive the demand for HDTV broadcasting.

An important issue for moviemakers, broadcasters and service providers is the protection of HD content against piracy and illegal distribution. New business models using High-Definition Content Protection (HDCP) solutions are emerging that show promise to effectively combat piracy (see box on EICTA Recommendations for HD Labeling). Philips has digital rights management (DRM) technologies in house and is deeply involved in finding effective DRM solutions to safeguard the interests of content owners and operators.

Philips is a pioneer in both analog and digital TV technology and an active member of key industry standards organizations, including pioneering work in defining the ATSC worldwide standard for HDTV scanning formats. Also, the company already has a number of 'HD-ready' flat-panel TV and peripheral products on the market, and is now labeling its HD-capable Flat TV products in this manner through the use of a logo. It is expected that before the end of 2004 about 40 per cent of Philips' European range of large-screen Flat TV

sets will be so labeled, increasingly appreciably in 2005 (see box below). In 2005, we will also introduce a technology that will even further enhance HD picture quality.

These credentials, strengthened by long-standing relationships and co-operation with broadcasters, network operators, service providers and governments in numerous countries, makes Philips one of the few global companies in a strong position to take a leading role in the further development and roll-out of HDTV in Europe. In this context, Philips calls on broadcasters and other content owners to take the step of investing in the production or purchase of HD programs, to ensure capturing consumer interest. More importantly, the company strongly urges the formation of a clear and unified pan-European policy on HDTV that will stimulate its adoption within the entire broadcast value chain.

Philips' strategy for HDTV is most strongly based on picture quality and positioning as a major electronics player appealing directly to the consumer and retail outlets, rather than on HD technology itself. In fact, the company will also 'educate' potential purchasers to know what equipment they need and support retailers in understanding how HDTV spans the total HDTV value chain. This will also help boost sales of large-format, widescreen, flat-panel displays and TV sets and related HD devices in a highly competitive market. Philips is also able to leverage its brand name and experience in set-top boxes to gain retail market share for both DTV and HDTV products.

IN SUMMARY & A GUESS AT THE FUTURE

The many factors discussed in this paper are sure signs that HDTV is inevitable, both as the successor to analog TV and as a logical development of DTV. Philips foresees that HD will take off on a large scale, with operators taking the incentive in a competitive environment that creates differentiation or where free-to-air TV services are available. When this happens they will take the lead and make more efficient use of bandwidth, enabled through the new codecs for which silicon technology is now becoming available. In fact, Philips Semiconductors has developed global chip solutions for STBs and TVs, which are suitable for the USA and Europe. These solutions are based on the company's Nexperia flexible architecture platform, meaning that they can be upgraded to comply with the emerging new European HDTV standard once it is finalized.

Although the roll-out of HDTV in various countries is taking some time, it is evident from the factors described above that momentum is being created and the various enabling criteria are surely coming together. Consumer pull is becoming stronger; prices of HDTV gear are decreasing; technical hurdles for operators are being removed; government pressure to switch off analog is increasing; and manufacturers like Philips are relentlessly pursuing innovation. From this we can safely deduce that HDTV has enormous potential and an exciting future.

With an illustrious past, going back more than 100 years, Philips, is now a world leader in consumer electronics, with a wide range of superior products, including 'HD-ready' TVs and peripherals. This, with a proven track record in semiconductor and digital broadcast technologies, backed by considerable research facilities and active membership in numerous standards bodies, qualifies Philips as both a major force in driving HDTV and a prominent player in its roll-out. With such strategies and innovative solutions as its Connected Planet and Ambient Intelligence concepts, the Nexperia multimedia processing platform and wireless connectivity offering, the company is certain to succeed in improving the quality of life among millions of consumers all over the world.

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About Royal Philips Electronics Royal Philips Electronics of the Netherlands (NYSE: PHG, AEX: PHI) is one of the world's biggest electronics companies and Europe's largest, with sales of EUR 29 billion in 2003. With activities in the three interlocking domains of healthcare, lifestyle and technology and 166,800 employees in more than 60 countries, it has market leadership positions in medical diagnostic imaging and patient monitoring, color television sets, electric shavers, lighting and silicon system solutions. News from Philips is located at www.philips.com/newscenter.

HDTV GLOSSARY

AC-3 - The 5.1-channel sound system known as Dolby Digital.

AC-3 delivers CD-quality digital audio and provides five full-bandwidth channels for front left, front right, centre, surround left and surround right speakers, plus subwoofer, for a total of 5.1 channels.

ATSC - The Advanced Television Systems Committee in the USA, responsible for developing and establishing digital and HDTV standards, adopted by most countries in the world.

Addressable Resolution - The highest resolution signal that a display device (TV or monitor) can accept. Note: although a particular device (Digital or HDTV) is able to receive the resolution, it may not be capable of displaying it. Aspect Ratio - Refers to the width of a picture relative to its height. Most analog TV sets have an aspect ratio of 4:3 aspect ratio. HDTV has a 16:9 aspect ratio.

ATV - Advanced Television is an earlier term used to describe the development and advance applications of digital television, now referred to as DTV.

AVC - Advanced Video Codec that significantly reduces bandwidth requirement.

Bandwidth - A range of frequencies used to transmit information such as picture and sound. For TV broadcasters in the USA, the Federal Communications Committee has allocated 6 MHz for each channel. For DTV in the USA, the maximum bit rate possible within the bandwidth is 19.4 Mbps, which is one HDTV channel. SDTV has a lower bit rate, therefore the bandwidth can accommodate more than one channel. In Europe there are no public regulations available yet.

Bit Rate - Measured as 'bits per second', and used to express the rate at which data is transmitted or processed. The higher the bit rate, the more data that is processed and, typically, the higher the picture resolution.

Channel - In the USA, a 6 MHz (bandwidth) section of broadcasting spectrum allocated for one analog NTSC transmission.

Component Video Connection - The output of a video device (such as a DTV set-top box), or the input of a DTV receiver or monitor consisting of 3 primary color signals: red, green, and blue that together convey all necessary picture information. With current consumer video products, the 3 component signals have been translated into luminance (Y) and two color difference signals (Pb, Pr), each on a separate wire (YPbPr).

Composite Video - An analog, encoded video signal (such as NTSC) that includes vertical and horizontal synchronizing information. Since both luminance (brightness) and chrominance (color) signals are encoded together, only a single connection wire is needed.

Compression - A method of electronically reducing the number of bits required to store or transmit data within a specified time or space. The video industry uses several types of compression methods but the method currently adopted for DTV is mostly MPEG-2. Four full-range channels of programming and data can be compressed into the same space required by a single analog channel. New codecs are even more efficient, notably MPEG-4 part 10, also known as H.264.

DTV - Digital Television. Refers to all formats of digital television, including high-definition television (HDTV), and standard definition television (SDTV).

Downconvert - A term used to describe the format conversion from a higher resolution input signal number to a lower display number, such as 1080i input to 480i display.

EPG - Electronic Program Guide. An on-screen display of channels and programmed data.

HDMI - High-Definition Multimedia Interface. HDMI is an industry-supported, uncompressed, all-digital interface for interconnecting any compatible digital audio/video source, such as a set-top box, DVD player or A/V receiver, and a compatible digital audio and/or video monitor, such as a digital TV. HDTV " High-Definition Television. The generally agreed upon definition of HDTV is approximately twice the vertical and horizontal picture resolution of today's TV, which essentially makes the picture twice as sharp. HDTV also has a screen ratio of 16:9 as compared with most of today's TV screens, which have a screen ratio of 4:3. HDTV offers reduced motion artifacts, and offers in the USA - multi-channel - 5.1 independent channels of CD-quality surround sound.

Interlaced Scanning - In a television display, interlaced scanning refers to the process of re-assembling a picture from a series of video signals. The standard NTSC system uses 525 scanning lines to create a picture (frame). The PAL system uses 625 scanning lines. The frame/picture is made up of two fields: The first field has 262.5 odd lines (1,3,5...) and the second field has 262.5 even lines (2,4,6...). The odd lines are scanned (or painted on the screen) in 1/60th (1/50th for PAL) of a second and the even lines follow in the next 1/60th (1/50th for PAL) of a second. This presents an entire frame/picture of 525 (or 625) lines in 1/30th (or 1/25th) of a second.

Letterbox - The term used to describe the way a 16:9 aspect ratio image is displayed on a 4:3 screen, where black areas are visible above and below the image.

NTSC - National Television Standards Committee in the USA responsible for developing standards for 'traditional' analog TV, prior to digital TV and HDTV.

PAL - Phase Alternation Line. A signal format used in video equipment in Europe and parts of Asia. PAL signals provide 25 frames per second, and are not compatible with NTSC. Pixel - Term used for 'picture element', the smallest element in a television picture. The total number of pixels limits the detail that can be seen on a television. A typical television set has less than half a million pixels. The pixel count for HDTV is nearly two million.

Progressive Scanning - In progressive scanning, typically used by VGA computer monitors, all the horizontal scan lines are 'painted' on the screen at one time. Adopted DTV formats include both interlaced and progressive broadcast and display methods.

Resolution - The density of lines and dots per line which make up a visual image. Usually, the higher the number, the sharper and more detailed the picture will be. In DTV, maximum resolution refers to the number of horizontal scanning lines multiplied by the total number of pixels per line, called pixel density.

SCART - Syndicat des Constructeur d'Appareils Radio et Tlvision is the European standard audio/video connector.

SECAM - Systme Electronique Couleur Avec Mmoire is a signal format used in video equipment in France and the former Soviet Union. It is incompatible with PAL and NTSC formats.

SDTV - Standard Definition Television, refers to digital transmissions with 480-line resolution in the USA and 576 in Europe, either interlaced or progressively scanned formats. SDTV offers significant improvement over today's conventional PAL picture resolution, similar to comparing DVD quality to VHS, primarily because the digital transmission eliminates snow and ghosts, common with the current analog format. However, SDTV does not come close to HDTV in both visual and audio quality.

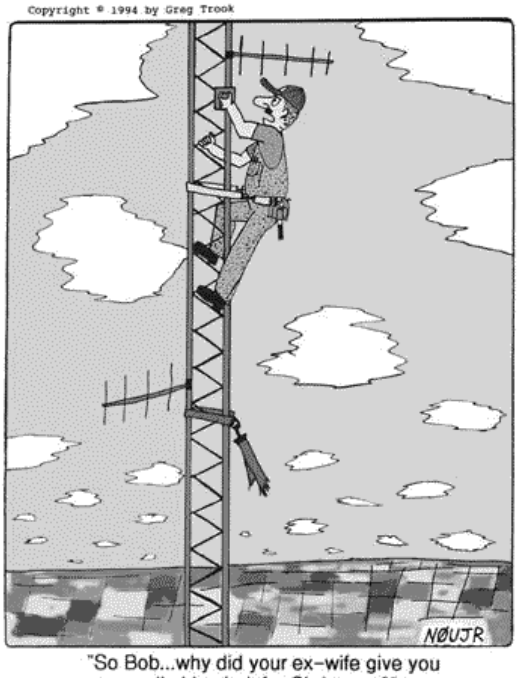
Upconvert - The term used to describe the conversion of a lower apparent resolution to a higher number, such as 'upconverting' 720p to 1080i. This is a misnomer, though, since to accomplish this, the horizontal scanning frequency is actually lowered from 45 kHz to 33.75 kHz. Resolution quality is not improved by this method.

Y, Pb, Pr - A method for interconnecting decoded video data. Generally used for a digital TV signal source. The video signal is separated into its component parts of brightness and color differentials. The latest connection standard is HDMI (see above)

Y, U, V - Also sometimes referred to as Y, Cr, Cb, where a video signal is separated into components of brightness and color.

…Royal Philips Electronics Video Imaging DesignLine (06/06/2005 10:29 AM EDT)

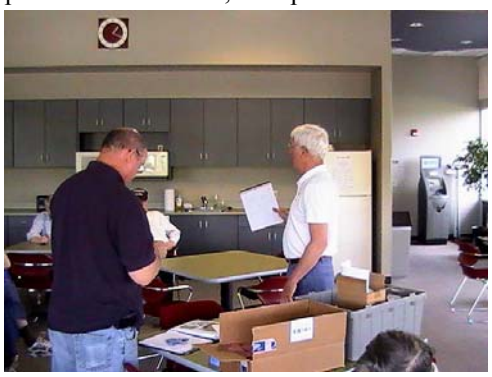
AND NOW… TIME OUT FOR A LAUGH! (reprinted with permission)



"So Bob...why did your ex-wife give you a new climbing belt for Christmas?"

SPRING EVENT

Well, here we are again at the Spring Event! This time 28 people attended…a good turnout. We all had a great time as evidenced by the pictures below. Food, door prizes and friends were on hand for the festivities. Nuf said!



KA8ZNY, Tom with back to camera & me.

WB8LGA, Charles listening carefully.

W8RVH, Dick…is he sleeping?

KB8OFF, Jess discusses the food quality.

W8RUT, Ken waits for his door prize.

W6CDR, Winn says, "I want more food".

WB8DZW, Roger reaches for his wallet.

Check out the trunk sale activity! We had quite a few people with stuff to sell. Even more important, we had buyers too. Next time remember, the flea market spaces are FREE here so let's make it even bigger for the Fall Event!

KB8YMQ, Jay seems very happy with sales!

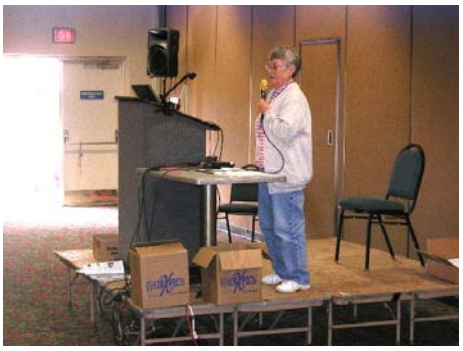
DAYTON HAMVENTION- 2009

FRIDAY NIGHT DINNER – We had about 40 people at the dinner/ ATV forum this year. Dinner was at Roush's Restaurant as it was last year. Everyone raved about the food so I recommend it as Friday evening relaxation after a full day pounding the pavement at the Dayton flea market! Plan to attend next year – I'm sure you'll enjoy the food and company. A number of speakers discussed various ATV topics including the streaming video capability of the ATN group from California. During the presentations, door prizes were handed out to the raffle winners. Many thanks to Ron Cohen K3ZKO for organizing the efforts.

Unknown person demonstrating the Wi-Fi spectrum analyzer that displays the spectrum on a laptop computer. I bought one for $65 that has an external antenna connection. Works great! The ATN person is relaying the video via internet back to the ATN repeater in California.

Here's a glimpse of the attendees. Notice Dick, W8RVH, who managed to take "center stage", then Jess, KB8OFF and Charles, WB8LGA.

SATURDAY ATV FORUM – We had a super time this year – great speakers and good attendance (I estimate about 150). Our usual spot of noon to 1:30PM was moved to 3:30 to 5 PM this year. Personally, I think it is a better time because it's not in the middle of the day and we're not kicked out if we run over because it's the last forum of the day. Most others agree so I requested the same time slot for next year. We'll see.



Gene's wife, Shari N9SH delivers a tribute to Gene, a wonderful summary of his time with us.

Next Ron Cohen K3ZKO describes the simple things about ATV and how get involved from a newbie standpoint

Here's Bill, WB8ELK talking about the new format of ATVQ Magazine…and some of his balloon experiences.

Next is Mike, WA6SVT talking about ATVQ Magazine…and the adventures of the California ATN group.

And last but most certainly not least, is Gordon West, WB6NOA inspiring the audience as only Gordy can do. (Next year, I'll ask him to talk FIRST)

RED-WHITE-BOOM

On July 3rd this year we again performed our annual Red-White-Boom public service duty for the Columbus Police by supplying crowd video to assess the concentrations. This year, because the fireworks were launched from the Veterans Memorial building, new camera positions were necessary. Also, due to the Friday holiday, businesses were closed preventing roof access to Columbia Gas and AEP buildings. Therefore KA8ZNY and I devised remote controls for those cameras and operated them from one location on the upper balcony at Police headquarters. Everything worked great and the Police were very impressed on how we could control the cameras from the handi talkie touch tone pads right in front of them in the Emergency Command Center. (At least they said so). In any case, the pictures below show the crowd and our setup. Anyone wanting to take part in future RWB's let us know as we can always use extra help and it's a great way to see the fireworks! Many thanks go to Tom KA8ZNY, Tom W8FRT, Bob W8RWR and John KB8INY for their valuable assistance.

View of the crowd looking South-West. Broad street bridge is in background.

This is looking due west. New apartment building is upper right. Fireworks launch is left of the train bridge and out of view.

This is a corner of Police HQ balcony. Three cameras peer over crowd below.

This shows the 1280MHz WU8O "Coffee Can" antenna pointing up to AEP building (shown below). It receives the AEP building roof camera.

This is the back of the 2.4GHz panel antenna receiving the Gas Co. roof camera video. The Gas Co. building is below the antenna and in the background.

Here's "Video Center" just inside the balcony area of Police HQ upper floor operated by KA8ZNY. Multiple view monitor video is sent to Police in the EOC.

Above is the 33 story AEP building which we mounted a single remote controlled camera on the roof. A "WU8O cantenna" is pointed down through the skylight area and toward the Police building across the street.

And finally… to the right is some of the skyrockets we all came to see! ⟶

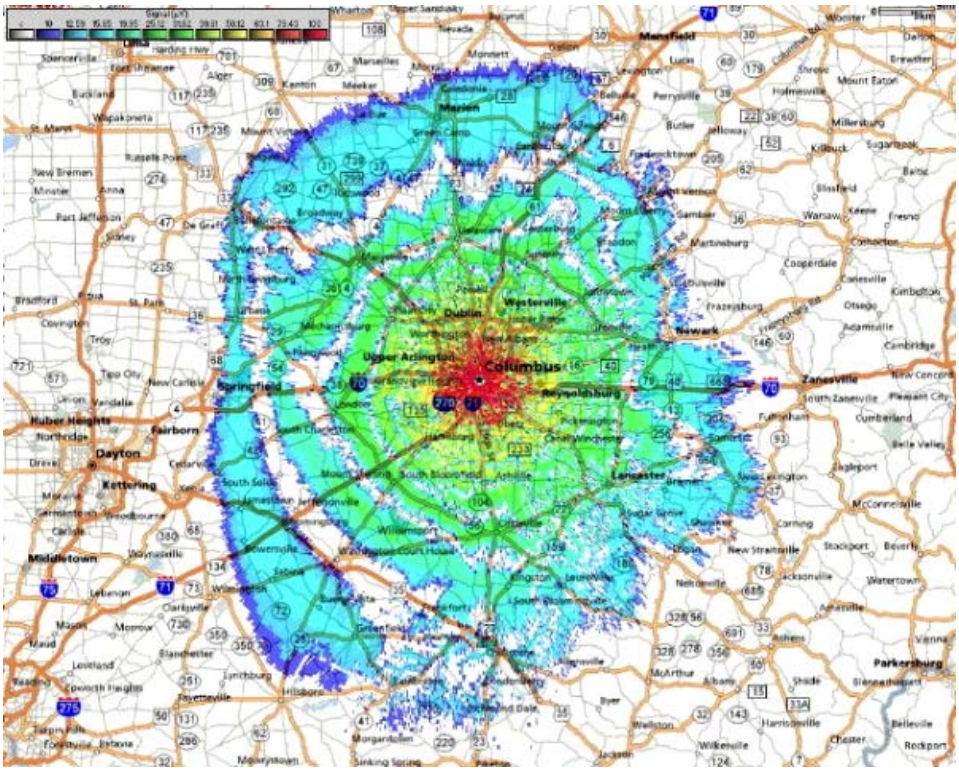
427MHz REPEATER SIGNAL STRENGTH ESTIMATE

Here is a handy polar plot of our 427MHz repeater output signal strength vs. distance. You can use this to estimate the expected signal strength at your location taking into account the terrain between the repeater and your selected location. The repeater location, antenna height, antenna gain, antenna pattern and transmitter power output is figured into the calculation. Also, it is assumed that the receive antenna is 50 feet above ground with a15dBd gain. The receive feedline loss is NOT taken into account so you must subtract any signal loss due to coax attenuation. Also, the receiver has an average preamp ahead of it.

As a guide to how the signal should look at your QTH, assume that P1 is about equivalent to a 10 microvolt signal at the receiver. That represents the dark blue fringes of the plot. Each time the signal voltage doubles the signal increases by 6dB or 1 P unit. This assumes a 3.5MHz receiver bandwidth. Therefore, the following table shows the approximate expected signal.

Dark blue = 10 uV = P1
Light blue = 20 uV = P2
Green is = 40 uV = P3
Yellow = 80 uV = P4
Orange = 160 uV = P5

If the receiver bandwidth is reduced, the threshold which a detectable signal is received will be less than the 10 uV shown here but the picture resolution will suffer. (There is **no** free lunch. If you want to be able to see a weaker signal the resulting picture will not look as good!)



WILBUR, K8AEH, SK

It's with great sadness that I must report Wilbur's passing. He developed a serious health problem early this year while at his winter home in Florida and never recovered. He was involved in ATV for many years and had earned the old-timer status. I always enjoyed his choice of head attire often displayed during our nets. We'll all miss him. The following is his obituary as reported in the Columbus Dispatch.

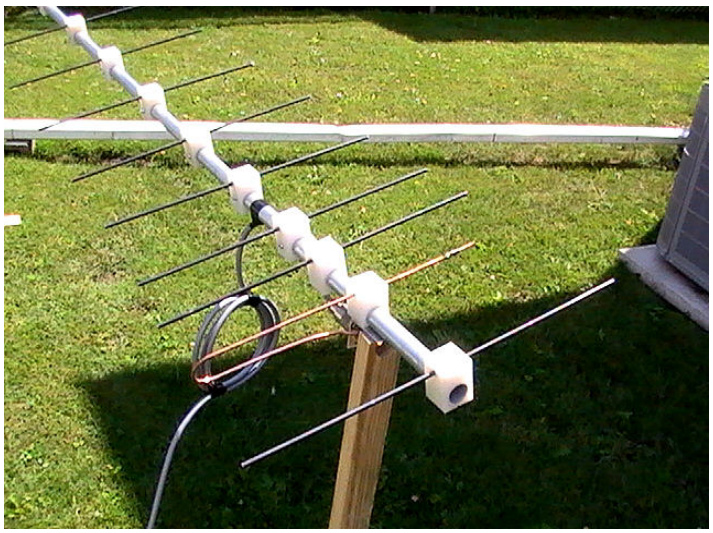
Wilbur Wollerman (K8AEH), age 70, of Reynoldsburg, died Tuesday May 26, 2009 at Mt. Carmel East Hospital. Born October 6, 1938 in Columbus to the late Vernon and Aletha (Morehart) Wollerman, he was a graduate of Groveport-Madison High School, and was retired from Western-Electric (Lucent). He had both private and commercial pilot licenses and was a member of FORKS Club, ATCO and HOG. Survived by his wife of 38 years, Joy Wollerman; children, Diana (John Mulvenna) Perlenfein, Columbus, Steven (Alexis Silknitter) Wollerman, Obetz, Jennifer (Danny) Blair, Granville, Brent Nixon and Stephanie (Sam Gardner) Nixon, both of Columbus; grandchildren Daniel Perlenfein, Gahanna, Devon Perlenfein, Columbus, Aaron (Jessica) Blair and Ashley (Dave) Caserta, both of Naples, Fla; great-granddaughters, Sierra and (Tom) Hopkins, Springboro; brother-in-law, Stephan (Alice) Johnson; two nieces, and other relatives and friends. The family will receive friends 2-4 and 6-8 p.m. Friday at the DWAYNE R. SPENCE FUNERAL HOME, 650 W. Waterloo St. Canal Winchester, where funeral service will be held 11 a.m. Saturday with Pastor Aaron Blair officiating. Interment will follow at Union Grove Cemetery. Friends who wish may donate to Mt. Carmel Hospice, 793 W. State St. , Columbus, Oh. 43222-9988 in Wilbur's memory.
…WA8RMC

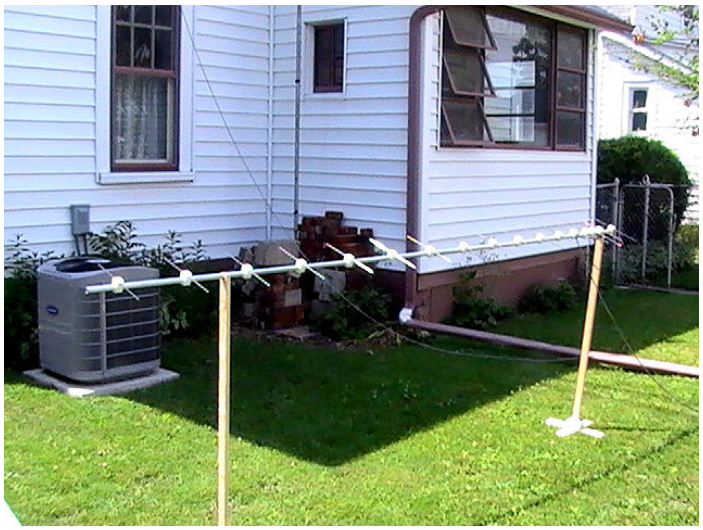
WA8KQQ IS BUSY WITH ANTENNAS AGAIN

Just thought I would send some pictures of the antennas I just finished – This one is a 36 element ring yagi for 1200 MHz - I made it to mount vertical for the Dayton W8BI ATV repeater - it will be up about 40 feet or so on one leg of my front tower and will be stationary just for the repeater - the only new part on the antenna is the bolt the driven element is mounted on - everything else is left over - the boom is from an old TV antenna - the driven element is a scrap piece of brass and copper, the reflectors and directors are made of some aluminum flashing left from when I covered my window frames. I would have had more elements but I ran out of boom.

After lunch today I went over to the neighbors and climbed his tower and took down a Sat dish mount he didn't want - brought it home and cleaned it up - went up my front tower and took down a little 12 element collinear for 439.25 ATV - put the mount in it's place and then hauled my new 36 element ring yagi up and mounted it on the old Sat dish mount and used my other beams to point it in the right direction for the W8BI repeater. It's up a tad over 40 feet. Got everything hooked up and fired up the 1200 ATV transmitter. I have 20 watts going out and about the width of the needle coming back. I am seeing the 1200 output of the W8BI repeater decent on the new Comtech receiver even though the repeater is vertical and my 36 element ring yagi is horizontal. …**DAMM, it's fun to play.**

So, now on my new 439.25MHz yagi. As close as I can figure it should be around 17db gain with 50 feet of RG8x on it. The Bird wattmeter says 50 watts out and 2.5 watts back. I left the first director, the driven element and the reflector loose for adjustment and just about wore them out sliding them in out and out. It seems that whatever I do according to an antenna analyzer it wants to be resonant at 437.25MHz which is where the analyzer says it is absolutely flat.



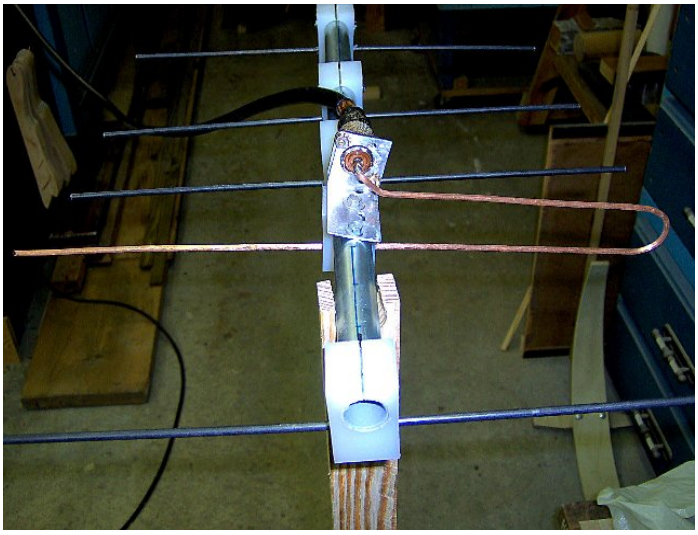


My boom is ½" EMT from Lowes 10 feet (3/4 OD), elements are heavy 1/8 inch (steel wire from the bottom of a fold out couch), driven element is heavy 1/8 inch copper, element mounts are blocks of nylon 1 inch square and 1 ½" long. I drilled the holes for the elements undersize and drove them through (they won't fall out). I drilled the holes for the boom a little under size and the cut through the bottom. That way you have to spread them a tad to get them on the boom. Once on, they are snug enough to stay where you put them so you can space them and drill a hole through the sides into the boom. Use small self taping screws to mount a coax fitting of your choice on the bottom of the boom, solder on the driven element and tune it up. - I am including a picture of the driven element.

Here are the measurements for the 439.25 yagi element lengths. All measurements are in inches.

reflector	13 5/8
driven	top 10 1/2 bend 7/8 bottom to coax connector 6 3/8
1st director	12 5/8
2nd	12 1/4
3rd	12
4th	11 7/8
5th	11 11/16
6th	11 5/8
7th	11 9/16
8th	11 7/16
9th	11 3/8
10th	11 5/16
11th	11 1/4
12th	11 1/4
13th	11 3/16
14th	11 1/8
15th	11 1/16

element spacing - all measurements are from the reflector:	
reflector	0
driven	4 7/8
1st	7 5/8
2nd	10 1/8
3rd	14 1/2
4th	19 9/16
5th	25 3/4
6th	32 5/8
7th	40 1/4
8th	48 5/16
9th	57
10th	65 7/8
11th	75 1/4
12th	84 7/8
13th	94 3/4
14th	104 7/8



OK, now here's the last one I'm working on which is an antenna for commercial DTV reception. It's a design that has been around awhile but it's worth trying to see if the over the air broadcast DTV reception gets better. It's called a Gray-Hoverman antenna fully described at **http://www.digitalhome.ca/ota/superantenna/performance.htm**. They claim 11 to 13 dBi gain which ***may*** be true but by the looks of the overall size, I'd downgrade that to 8 to 10 dBi. No hard data, just a hunch. Build it yourself and prove us either right or wrong!
…Dale WA8KQQ

LOWER LOSS COAX FOR ATV?

Let's face the issue of cost. Likely most of us are using 9913, 1/2" Heliax™ and a few of us have larger coax. We all know the larger the coax, the lower the loss. Those of us that work in commercial communications are familiar with waveguide for microwave and in some instances waveguide for high power UHF TV transmitters. UHF waveguide is noted as the longer side of rectangular and the diameter of "circular". The WR regular sizes in common use are 1150 and 1500. There is also elliptical waveguide but the loss is slightly higher than rectangular. Waveguide works to about 375 GHz.

Waveguide VSWR itself is a maximum (!) 1.01:1. That's an order of magnitude better than coax or antennas. The loss is typically 3% or better than even a good coax. If you have 1.5 dB loss on coax, you can expect 0.05 dB or less loss with waveguide. And you'll have a hard time burning out waveguide. Power handling limitation is the spark voltage of the smaller dimension so 200 KW is not an issue.

For example, at 70 cm, 1/2" Heliax™ has 1.86 dB loss per 100'. So a 100' tower and 50' tower to shack, that's 2.79 dB. Shucks, barely half of the signal gets from end to end. Of your 1.5 KW, about 600 watts are lost as heat. A waveguide would be .055 dB /100', or 0.08 dB loss. We're talking 97% less loss. That's 18 watts loss, and 1482 watts at the antenna. I bet you get the picture now!

WR 1500 operates from 490-750 MHz, but has a cutoff frequency of 390MHz and 780 MHz. So this should perk up your ears. WR1150 can be used for the 33 cm band and WR1500 can be used for 70 cm band. We can go smaller as frequency goes up. 770 waveguide covers 960-1460 MHz, but cut off is 760 and 1530, covering our 33 and 23 cm bands. OK, you get the idea. The width of a waveguide is approximately one-half the wavelength of the frequency of the signals to be propagated through the waveguide, while the height of the waveguide essentially determines its power-handling capability. W3HMS notes the advantages of waveguide to coax at high frequencies in CQ VHF from his trip to France.

The cut off frequency is generally signals with a half-wavelength larger than the width of the waveguide, will not propagate through the waveguide and are said to be beyond (below) the cutoff frequency of that waveguide The half-wavelength width supports transverse-mode propagation through the waveguide, such as transverse-electric (TE, with no electric field in the direction of propagation), transverse magnetic (TM, with no magnetic field in the direction of propagation), transverse electromagnetic (TEM, with no electric or magnetic fields in the direction of propagation), and hybrid modes (with both electric and magnetic fields in the direction of propagation). There is also a form factor where the height is several times the width, known as Tallguide™ that has 1/10 of the loss of regular waveguide. Let's call it near zero insertion loss!

Now it doesn't make much difference what the waveguide metal is. It can be as simple as aluminum foil glued to wood blocks as long published in various microwave band handbooks and articles. Copper circuit board material, aluminum, any unbroken metallic material including screening. Even in the range of high power UHF transmitters, some coax and waveguide sections can have soldered wire mesh to allow cooling air to circulate, or a slot to allow adjustment of probes and impedance correction slugs, or sample/launch/catch devices.

Now those of us that were here to watch the Big Bang, also remember five wire open line. An early version of coax, with a hot center conductor with 4 wires in a square centered on the center wire. This was for Broadcast band and HF, even VLF operation where solid coax is not needed to keep the RF from leaking out. Remember RF only requires the shielding to be smaller than ¼ λ to stay inside, and there is a small leakage factor (used for distributed radiation systems) until you achieve 100% shielding. That outer conductor can be very expensive as power levels go up.

Well shucks. Get out your hammer, nails, and sheet metal. You can build a pile of N x N wood frames from 1x1 or 2x2 wood. You can cover the inside with cheap screening material and run for "legs" to hold the frame ribs. From 250 MHz to 510 MHz, 22" by 11" works just fine. You can use 1/4" plywood if you don't have stiff grill material, You can go all the way to 15" x 7.5" for 70 cm,

For coupling into and out of the waveguide, drill a hole 1/4λ from the end panel (the ends form a 5 sided box) strip off the outside insulation from your coax and fold it back over the outside. The inner conductor and inner insulation are pushed through the hole until the coax is 50% of the depth - 3.75" in our 15 x 7.5" waveguide. The shield should be touching the aluminum foil inside. You can make a fine adjustment by watching the VSWR and adjusting the depth of the coax probe. When satisfied, solder or flash the inside foil over the coax. Be sure to get a 360 degree metal to metal contact.

If you don't want to build a wood box lined with foil or screening, you can use common HVAC ductwork, or form it from sheet metal. The important part is the junctions between sections, no gaps allowed.

To make an elbow, cut the ends of the straight sections at 45 degrees, and fashion a diagonal to fit. Similar to a door or gate frame. Triangular sections cover the top and bottom.

Now I wouldn't expect to run this up much of a tower length, but for EME and other low arrays, the lower line loss of waveguide vs. coax may be that little extra 2.5 dB you need.
…Henry, A9XW 5/20/09

MOST POWERFUL DTV SIGNAL CLAIMED

Acrodyne Industries announced on 6/19/09 that WLNY television had gone on the air with what is believed to be, "The world's most powerful Digital Television signal."

According to the FCC TV Engineering Database in CDBS, WLNY is using a Jampro JSM-16/47-TCCP circularly polarized antenna with 1,000 KW effective radiated power on Channel 47. The use of circular polarization means that a linear receive antenna, regardless of its orientation, will receive the full 1,000 kW signal. If a circularly polarized receive antenna is used, the signal will be 3 dB higher, the same as if the station were transmitting 2,000 kW in the horizontal plane only.

"We designed this system specifically to enhance our ability to reach both fixed and mobile audiences," said Robert Mulliner, director of engineering and IT for WLNY. "We believe that the use of circular polarization for digital transmission at the maximum FCC allowed power level provides the necessary foundation to achieve easy, robust reception by all devices in the WLNY market."

The Jampro JSM-16/47-TCCP antenna that the station is using has a very narrow azimuth pattern, with a 3 dB beamwidth of about 45 degrees. The high azimuth gain allows WLNY to generate a 1,000 KW circularly polarized signal with a two-IOT transmitter. The Acrodyne Industries Quantum transmitter uses the Rohde and Schwarz SX-800 exciter and two e2v ESC energy efficient multi-stage depressed collector IOT's to generate a 36.26 kW transmitter output.

The high azimuth gain of the station's antenna makes it easy to achieve maximum power with circular polarization. It will be interesting to see if other stations with lower gain azimuth patterns will make the investment in additional amplifiers needed to achieve circular polarization at 1,000 kW effective radiated power.

(Jay, I thought I heard you say that the Columbus WBNS channel 10 also has a 1MW ERP. True? Ed)

CHANNEL CHANGES VEX DTV TRANSITION

I was in Los Angeles on June 12 when two of our stations switched from normal programming to nightlight status. A third station—with an out-of-core analog channel—shut off its 14-year-old Comark transmitter for the last time.

Overall, from what I saw, the analog shutdown went very well for stations that weren't changing channels. I think most broadcasters would agree that the four month extension and extensive broadcaster and FCC education efforts paid off.

While stations that were able to stay on their pre-transition channels had few problems, those that changed channels, especially moving from UHF to VHF, were not as lucky.

One problem was that some DTV converter boxes and DTV receivers didn't update RF channel information for stations that had previously been scanned. For example, if the boxes had stored Channel 67 as the RF channel for WCAU, the only way viewers with the affected converter boxes could see the station after it moved to channel 34 was to punch in 34.1. Using 10.1 wouldn't work, even after a channel scan. The FCC issued a Consumer Alert advising viewers to "double rescan" to solve this problem.

Double rescanning involves removing the antenna from the DTV converter box or DTV set, doing a scan, reconnecting the antenna, and doing a second scan. The first scan, without the antenna, clears all stations from the memory. The second scan restores them, with the proper RF channels. The Consumer Alert also recommended viewers do additional scans after relocating their antennas.

The move from DTV on UHF channels to DTV on VHF channels caused major difficulties. I'll cover it in detail in another article.

With a few exceptions, it appears most of the problems occurred in markets where all stations used UHF DTV channels until June 12. In San Francisco, where the NBC station KNTV transmits on DTV channel 12, viewers had an opportunity to learn before the transition that they needed DTV antennas that would receive VHF as well as UHF. When ABC station KGO-TV went back to its VHF analog channel for DTV, viewers that had been watching NBC on KNTV were ready for it. That wasn't the case in New York, Los Angeles, Washington D.C., Philadelphia and other markets where there were no VHF DTV stations on air prior to June 12.

Some viewers weren't ready for the transition at all, while others had converter boxes, but didn't know how to use them. Gary Sgrignoli's Updated FAQs and Answers for the DTV Transition is a good reference for station personnel helping viewers with reception problems.

The good news for broadcasters is that these viewers—once they got their DTV sets or converter boxes working—were very happy with the excellent picture and expanded choice of channels. A director of technology that I spoke with this week summed it up well.

He said that while talking people through the setup of their converter box or DTV set could be frustrating, hearing their reaction after seeing their first DTV picture once they had it working made it all worthwhile.

BRAIN TEASER

It is said that engineers take 3 minutes to resolve this, architects 3 hours and doctors 6 hours. (My wife got it in 30 seconds). What is the 6th number?

1, 2, 6, 42, 1806, _____?

NET NIGHT STREAMING VIDEO VIA BATC

Our Tuesday night 9PM nets are now also streamed onto the internet via the BATC server. I will keep it active from approximately 8:30PM till about 10PM or when we close the net. If you are too far away to join our nets live, check in on the internet. I can see all check-ins and will acknowledge same. To join us on the internet, enter www.batc.tv and click on "ATV Repeaters" (you do not need to enter a username or password unless you are a member of BATC). Scroll down till you see WR8ATV, click on it and then click on "view stream". Then, be sure to announce your presence by typing ***/nick*** then a ***space*** followed by ***your call*** otherwise you will only be shown only as "guest xxxx". You can enter comments as desired that I can see and respond to. It's lots of fun…try it!
…WA8RMC

CONSTRUCTION ARTICLE INDEX

The following list is an index of all construction related material that has appeared in the ATCO Newsletter since its inception in the early '80's. This is a handy reference for that particular construction article that you knew existed but didn't want to wade through each issue to find it. All Newsletters below are listed in order in the ATCO homepage under "Newsletters". Once you locate the Newsletter section, the displayed list can be re-sorted as needed by clicking on the "date" in the header.

Issue	Page(s)	Article
Vol 1 II	5	439 Beam
Vol 2 I	4	439 Beam
Vol 2 II	8,9	439 Parabolic Ant
Vol 2 II	9	Video Modulator
Vol 2 III	7	1296 Ant 45 Ele loop yagi
Vol 2 III	10	RF Power Indicator (in-line) for 1296 MHZ
Vol 2 SE	2,3	Diode Multiplier for 23 CM
Vol 2 SE	4,5	1296 MHZ 10 Watt Solid State Linear Amp
Vol 4 I	3	RF/Video Line Sampler
Vol 4 II	3	P-Unit Meter
Vol 4 II	7,10,11	UHF Gated Noise Source
Vol 4 II	12	420 – 450 Broom Handle Rhombic Ant
Vol 4 III	4,8	25 Element 1.26 Loop Yagi
Vol 4 IIII	6	Video Modulator (Tube Type)
Vol 5 I	3	Video Modulator One Transistor
Vol 5 II	4,7	900 MHZ Yagi Ant
Vol 5 II	6	Video Modulator for 2C39 Final
Vol 5 III	3	440 MHZ Hidden Transmitter Finder
Vol 6 I	3	Video Line Amp
Vol 6 I	8	25 Ele 910 MHz Loop Yagi
Vol 6 II	4,6,7	Microwave Oven ATV Xmiter
Vol 6 II	5	Matching a Quad Driven Ele
Vol 6 II	8	Power Divider for 33CM
Vol 9 IIII	5,7	16 Ele Loop Yagi for 439.25 MHz
Vol 10		No Articles
Vol 11 II	4,5,6	439 48 Ele Collinear Ant
Vol 11 IIII	7	1280 MHZ Cavity Filter
Vol 12 I	6,7,8	439 & 1200 Horz Polarized Mobile Ant
Vol 12 II	5,6,7	ATV Line Sampler
Vol 12 II	10	439 & 1280 Interdigital Filter(s)
Vol 12 III	6,7,8	439 Cheap Attic Ant
Vol 13 I	9, 10	High Level Modulator for ATV
Vol 13 II	5	VGA to NTSC Converter for Computer
Vol 13 III	9, 10	AM Video Modulator
Vol 13 IIII	4	1200 MHZ Transistor Linear Amp
Vol 13 IIII	6	900 & 1200 MHz Loop Yagis
Vol 14 IIII	8	439 31 EleYagi
Vol 14 IIII	12, 13	1250 MHZ FM ATV 3 Watt Xmiter
Vol 15 I	16	427.25 Horz J-Pole Ant
Vol 15 II	14	2400 MHZ Loop Yagi
Vol 15 III	8	Wavecom Modification
Vol 15 III	12,13,14	2.4 Gig Antenna's
Vol 16 II	20	2.4 Gig Helix Ant
Vol 16 IIII	4	1280 MHZ Loop Yagi
Vol 17 I	14, 15	Video Amp (Multi Output)
Vol 18		No Articles
Vol 19 IIII	4	Pwr Supply for 28 Volt Ant Relay
Vol 20 III	9, 10	Video Sampler
Vol 21 II	4	RF Pwr Amp for 900/1200 MHZ
Vol 21 II	14	10-14 Volt Doubler for 28 Volt Ant Relays
Vol 21 III	5	S-Video To Composite Adaptor
Vol 21 IIII	3,4	Video Noise Rejection Amp
Vol 21 IIII	14,15,16,17	"S" Meter For Comtech Boards
Vol 22 I		No Articles
Vol 22 II	10	1260 MHZ Cavity Filter
Vol 22 III		No Articles
Vol 22 IIII		No Articles
Vol 23 I		No Articles
Vol 23 II	5,6	Linear 60 Watt For 70CM
Vol 23 II	8,9	Video Modulator Update
Vol 23 III		No Articles
Vol 23 IIII		No Articles
Vol 24 I	13	RF Sniffer For 2.4 GIG
Vol 24 II		No Articles
Vol 24 III	3	Quantum 1500 Rec Tuner Mod

Vol 24 IIII	9	Battery Recharge Ckt
Vol 25 I		No Articles
Vol 25 II	6,7	Comtech TX Module Improvement
Vol 25 III	11	Comtech TX Module Improvement Correction
Vol 26 I	6	Isolator (Circulator) Modification 850 To 1260 MHz

…Bob N8OCQ

LOCAL HAMFEST SCHEDULE

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. …WA8RMC.

26 Jul 2009+ Portage Hamfair '09 Portage Amateur Radio Club http://Hamfair.com Talk-In: 144.790/145.390 Contact: Joanne Solak, KJ3O 9971 Diagonal Road Mantua, OH 44255 Phone: 330-274-8240 Fax: 330-274-8527 Email: kj3o@arrl.net Randolph, OH Portage County Fairgrounds 4215 Fairgrounds Road

1 Aug 2009+Voice of Aladdin ARC http://aladdinshrine.org/hamfest.htm Talk-In: 147.24 Contact: James Morton, KB8KPJ 6070 Northgap Drive Columbus, OH 43229-1945 Phone: 614-846-7790 Fax: 614-846-2074 Email: kb8kpj@arrl.net Columbus, OH Aladdin Shrine Center 3850 Stelzer Road

16 Aug 2009+Warren Amateur Radio Association http://www.w8vtd.org Talk-In: 146.970 Contact: Chris Brister, KD8BHR 125 Argali Place Cortland, OH 44410 Phone: 440-548-5616 Email: kd8bhr1@yahoo.com Cortland, OH Trumbull County Fairgrounds 899 Everett Hull Road

22 Aug 2009+Portsmouth Amateur Radio Club http://www.portsmouthamateurradioclub.com/ Talk-In: 145.39 (PL 136.5) Contact: John W. Pick, KC8JRE 443 Diana Street Minford, OH 45653 Phone: 740-820-3366 Email: kc8jre@falcon1.net Friendship, OH Nile Township Community Building 12215 Route 52

23 Aug 2009+Hamfest and Computer Show Cambridge Amateur Radio Association http://www.w8vp.org Talk-In: 146.850- (PL 91.5) Contact: Mary Jane Rhodes-Ellis, KD8EIR 5855 Sherrard Road Cambridge, OH 43725 Phone: 740-439-6610 Email: radicalrhodes@yahoo.comCambridge, OH Pritchard Laughlin Civic Center 7033 Glenn Highway

12 Sep 2009*Great Lakes Division Symposium Findlay Radio Club http://www.w8ft.org Talk-In: 147.15/75 Contact: Bill Kelsey, N8ET 3521 Spring Lake Drive Findlay, OH 45840-9073 Phone: 419-423-4604 Email: n8et@arrl.net Findlay, OH Findlay Center for Business and Technology 1700 Fostoria Avenue

13 Sep 2009+Findlay Radio Club http://www.findlayradioclub.org Talk-In: 147.15/75 Contact: Bill Kelsey, N8ET 3521 Spring Lake Drive Findlay, OH 45840 Phone: 419-423-4604 Email: n8et@arrl.net Findlay, OH Hancock County Fairgrounds 1017 East Sandusky Street

20 Sep 2009+Greater Cincinnati Amateur Radio Association http://www.gcara.org Talk-In: 146.88 (-600) & Alt 145.37 (-600) Contact: Stan Cohen, W8QDQ 2301 Royal Oak Court Cincinnati, OH 45237-2939 Phone: 513-236-0980 (days) or 513-531-1011, 513-531-3834 (eves) Fax: 513-531-3834 Email: stanco49@zoomtown.com Cincinnati, OH Diamond Oaks Career Development Center 6375 Harrison Avenue

27 Sep 2009+Cleveland Hamfest and Computer Show Hamfest Association of Cleveland, Inc. http://www.hac.org Talk-In: 146.73 (PL 110.9) Contact: William Beckman, N8LXY Hamfest Association of Cleveland, Inc. PO Box 81252 Cleveland, OH 44181-0252 Phone: 800-CLE-FEST Email: go to Web site and click on e-mail Berea, OH Cuyahoga County Fairgrounds 164 Eastland Road

NEW MEMBER(S)

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.

No new members.

…WA8RMC

INTERNET ATV HOME PAGES (list verified 07/01/08)

Domestic homepages

http://www.atco.tv	Ohio, Columbus, homepage (ATCO)
http://www.w8bi.org/atv/atvresources.html	Ohio, Dayton ATV group (DARA)
http://www.citynight.com/atv	California, San Francisco ATV
http://atn-tv.org/ATN.htm	California, Amateur Television Network in Central / Southern
http://members.tripod.com/silatvg	Illinois, Southern, Amateur Television group
http://www.ussc.com/~uarc/utah_atv/id_atv1.html	Idaho ATV
www.bratsatv.org.	Maryland, Baltimore Radio Amateur Television Soc. (BRATS)
http://www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=10991	Michigan, Detroit Amateur Television System (DATS)
http://www.qsl.net/kd2bd/atv.html	New Jersey, Brookdale ARC in Lincroft
http://www.ipass.net/~teara/menu3.html	North Carolina, Triangle Radio Club (TEARA)
http://www.oregonatv.org	Oregon, Portland OATVA Oregon Amateur TV Association
?	Pennsylvania, Pittsburg Amateur Television
http://members.bellatlantic.net/~theojkat/	Pennsylvania, Phila. Area ATV
?	Texas, Houston ATV (HATS)
http://www.hotarc.org/atv.html	Texas, WACO Amateur TV Society (WATS)
?	Utah ATV
www.qsl.net/ww7ats	Washington, Western Washington Television Soc. (WWATS)
http://www.shopstop.net/bats/	Wisconsin, Badgerland Amateur Television Society (BATS)
http://mysite.verizon.net/vzev3ql6/id9.html	Chesapeake Amateur Television Society (CATS)

Foreign homepages

http://atv.hamradio.si	Slovenia ATV **(BEST OF FOREIGN ATV HOMEPAGES)**
http://www.batc.org.uk/index.htm	British ATV club (BATC)
http://www.cq-tv.com	British ATV Club and CQ-TV Magazine
http://oh3tr.ele.tut.fi/english/atvindex.html	Finland ATV, OH3TR repeater.
http://www.darc.de/distrikte/g/T_ATV/atv.htm	German ATV

Misc other ATV related sites

http://www.atv-tv.org	The Amateur Television Directory
http://www.atn-tv.org	Amateur Television Network
http://www.hampubs.com	Amateur Television Quarterly Magazine
http://gb3lo.camstreams.com	"GB3LO" Repeater Camstream westoft, UK
http://www.ham-radio.com/sbms	"SBMS" San Bernardino Microwave Society
http://www.qsl.net/kc6ccc/	"METS" Microwave Experimenters Television System

TUESDAY NITE NET ON 147.48 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 (04/20/09)..... $1524.33
RECEIPTS(dues)..... $ 190.00
Payments for ATVQ article..... $ 25.00
Paypal expenses..... $ (1.75)
Spring Event food..... $ (147.81)
Flowers for K8AEH..... $ (57.58)
CLOSING BALANCE (07/20/09)..... $ 1532.19

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)
TV Transmitters: 427.25 MHz AM mod,, 1260 MHz FM mod,, 1245 MHz QPSK digital, 2433 MHz FM mod, and 10.350 GHz FM mod.
multipole filters in output line of 427.25, 1245, 1260 , 2433 and 10.35 transmitters
Output Power - 427.25 MHz :40 watts average 80 watts sync tip
1260 MHz: 50 watts continuous (Analog ATV)
1245 MHz 10 watts continuous (DVB-S digital ATV - 2 channels)
2433 MHz: 15 watts continuous
10.350 GHz 1 watt continuous
Link transmitter - 446.350 MHz 5 watts NBFM 5 kHz audio
Identification: 427, 1245, 1260, 2433, 10.35 GHz xmitters video identify every 30 min. with ATCO & WR8ATV on 4 different screens
1245 MHz & 10.35 GHz - Continuous transmission of ATCO & WR8ATV with no input signal present
Transmit antennas: 427.25 MHz - Dual slot horizontally polarized "omni" 7 dBd gain major lobe east/west, 5dBd gain north/south
1260 MHz - Diamond vertically polarized 12 dBd gain omni (Analog ATV)
1245 MHz - Diamond vertically polarized 12 dBd gain omni (Digital DVB-S ATV)
2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.350 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni
Receivers: 147.48 MHz - F1 audio input with touch tone control
439.25 MHz - A5 video input with FM subcarrier audio (**lower sideband**)
449.975 MHz - F1 audio input aux touch tone control
1280 MHz - F5 video input or DVB-S digital (digital input fed direct to 1245 MHz digital output channel 2)
2398 MHz - F5 video input
10.350 GHz - F5 video input (future – not installed yet)
Receive antennas: 147.48 MHz - Vert. polar. Hustler G6-270R 6dBd dual band (also used for 446.350 MHz output)
439.25 MHz - Horiz. polar. dual slot 7 dBd gain major lobe west
1280 MHz - Diamond vertically polarized 13 dBd gain omni
2398 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni (not installed yet)

Input control:

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

Manual mode functions:

00* then 1 for Ch. 1 Select 439.25 receiver
00* then 2 for Ch. 2 Unused at this time
00* then 3 for Ch. 3 Select 1280 receiver
00* then 4 for Ch. 4 Select 2411 receiver
00* then 5 for Ch. 5 Select video ID (the 4 identification screens)

01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 (not in use at this time)
03* or 03#	Channel 3 1280 MHz scan enable
04* or 04#	Channel 4 2398 MHz & camera video scan enable
A1* or A1#	Manual mode select of 439.25 receiver audio
A2* or A2#	Unused channel at this time
A3* or A3#	Manual mode select of 1280 receiver audio
A4* or A4#	Manual mode select of 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	unused at this time
C2* or C2#	unused at this time

Auto scan mode functions:

001	2398 receiver (normal mode - returns to auto scan)
002	Roof camera (select 001 when finished viewing camera so repeater will shut down)
003	Equipment. room camera (select 001 when finished so repeater will shut down)

ATCO MEMBERS AS OF July 20, 2009

Call	Name	Address	City	St	Zip	Phone	URL
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511	rfvieth@yahoo.com
K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	OH	43068	614-866-1399	wilburapilot@yahoo.com
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703		kc3am@verizon.net
N4AK	Glen Farr	10 Autumn View Ridge	Travelers Rest	SC	29690-8024		
W8ARE	Larry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964		lcmeredith@prodigy.net
KC8ASD	Bud Nichols	3200 Walker Rd	Hilliard	OH	43026	614-876-6135	kc8asd2@netzero.com
KC8ASF	Tom Pallone	3437 Dresden St.	Columbus	OH	43224	614-268-4873	kc8asf@sbcglobal.net
KC8BTX	Dudley Field	357 N. Ridge Heights Dr	Howard	OH	43028		kc8btx@37.com
W6CDR	Wynn Rollert	1141 Pursell Ave	Dayton	OH	45420	937-256-1772	w6cdr@hotmail.com
WB8CJW	Dale & Sharon Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551	delshoff@columbus.rr.com
N8COO	C Mark Cring	3941 Three Rivers Lane	Groveport	OH	43125	614-836-2521	n8coo@yahoo.com
N8CXI	Garry Cotter	2367 Northglen Drive	Columbus	OH	43224		gjcotter@aol.com
WB8CXO	Mike Young	289 Gaylord Drive	Munroe Falls	OH	44682		
WA2CZD	Jim Gilbert	1204 Aspen Pines Drive	Wilder	KY	41071-0404		jgilbert@fox19.com
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785		
N3DGE	Mike Trachtenberg	3777 Lankenau Avenue	Philadelphia,	PA	19131-2816		mikect@verizon.net
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198	jabusic@yahoo.com
W8DMR	Bill Parker	2738 Florbunda Dr	Columbus	OH	43209		w8dmratv@copper.net
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	OH	42616	419-691-1625	
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-876-6033	MHZ52525@aol.com
KC8EVR	Lester Broadie	108 N Burgess	Columbus	OH	43204		kc8evr@beol.net
WA8FLY	Rod Shaner	16012 London Rd.	Orient	OH	43146	740-279-3614	wa8fly@copper.net
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147		w8fz@arrl.net
KB8GHW	Mike Amirault	11354 Reussner Dr SW	Pataskala	OH	43062	740-927-5005	kb8ghw@ee.net
WA8HFK,KC8HIP	Frank, Pat Amore	3630 Dayspring Dr	Hilliard	OH	43026	614-777-4621	famore@wowway.com
W4HTB	Henry Cantrell	905 Wrenwood Dr.	Bowling Green	KY	42103	270-781-9624	w4htb@insightbb.com
WG8I	Chris Vojsak Sr,	3536 W Henderson Rd	Columbus	OH	43220-2232	614-203-6000	wg8i.ham@gmail.com
WB2IIR	Michael Anthony	370 Georgia Drive	Brick	NJ	08723		
N8IJ	Dick Knowles	1799 Homeward Ave	Lima	OH	45805		rgrant2001@yahoo.com
KD8JLO	David Nulter	510 Millag Drive	Sunbury	OH	43074	614-579-6425	davnul@wideopennetworks.com
K8KDR,KC8NKB	Matt & Nancy Gilbert	5167 Drumcliff Ct.	Columbus	OH	43221-5207	614-771-7259	k8kdr@arrl.net
W8KHW	Kevin Walsh	2396 Anson St	Columbus	OH	43220	614-442-7748	kwalsh@datrix.com
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	937-548-2492	walkingcross@bright.net
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	OH	43123	614-871-0751	phumphries@columbus.rr.com
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334		cbeener@columbus.rr.com
KA8LWR	Mel Alberty	1645 Olentangy Road	Bucyrus	OH	44820	419-468-2971	malberty@columbus.rr.com
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081		w8ma@arrl.net
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660		ka8mid@qsl.net
W0MNE	Mike Doty	4300Winchester Southern Rd	Circleville	OH	43113	740-420-9060	mcubed2@hughes.net
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127	n8nt@atco.tv
WD8OBT	Tom Camm	63 Goings Lane	Reynoldsburg	OH	43068	740-964-6881	mitchellb25@netzero.com
WU8O	Tom Walter	15704 St Rt 161 West	Plain City	OH	43064	614-733-0722	wu8o@emec.us
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022		hodgerob@yahoo.com
KB8OFF	Jess Nicely	742 Carlisle Ave	Dayton	OH	45410		kb8off@sbcglobal.net
W6ORG,WB6YSS	Tom & Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565	w6org@ arrl.net
KC8OZV	George Biundo	3675 Inverary Drive	Columbus	OH	43228	614-274-7261	kc8ozv@columbus.rr.com
W8PU	Gary Poland	3347 State Route 28	Midland	OH	45148		
K2PMS	Paul Schmitter	57 East Main Street	Springville	NY	14141		pschmitter@roadrunner.com
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201	614-421-1492	jeasley11@hotmail.com
W8PU	Gary Poland	3347 S.R. 28	Midland	OH	45148		gpoland1@cinci.rr.com
KC8QJR	Adam Burley	1796 Queensbridge Drive	Columbus	OH	43235	614-886-2326	adam@digitalcave.org
W3RCJ	Thomas Farrell	1912 Burnwood Road	Baltimore	MD	21239		w3rcj@operamail.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	jhull@wcmi.org
W8RUT,N8KCB	Ken & Chris Morris	3181 Gerbert Rd	Columbus	OH	43224	614-261-8583	w8rut@aol.com
W8RVH	Richard Goode	9391 Ballentine Rd	New Carlisle	OH	45334	937-964-1185	w8rvh@ctcn.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	w8rwr@sbcglobal.net
W8RXX,KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021	740-548-7707	jper@insight.rr.com
W8SJQ	Rocky Eramo	795 Riverbend Ave	Powell	OH	43065	614-207-2740	rockyeramo@aol.com
W8SJV, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856	w8sjv@nexgenaccess.com
KB8SSH	Mike Cotts	3424 Homecroft Dr	Columbus	OH	43224	614-371-7380	mcotts@wideopenwest.com
W3SST	John Shaffer	1635 Haft Dr.	Reynoldsburg	OH	43068	614-751-0029	w3sst@juno.com
K8TPY, K8FRB	Jeff & Dianna Patton	3886 Agler Road	Columbus	OH	43219		cqcqk8tpy@yahoo.com
KB8TRP	Tom Flanagan	1751 N Eastfield Dr.	Columbus	OH	43223		chuck78@wowway.com
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-1392	s.crew@in-touch.net
KB8UGH	Steve Caruso	6463 Blacks Rd. SW	Pataskala	OH	43062-7756		dael4@columbus.rr.com
WB8UGV	Bruce Jaquish	22375 Montanna Drive	Lawrenceburg	IN	47025-7447	812-637-3805	brucewb8ugv@comcast.net
W8URI	William Heiden	5898 Township Rd #103	Mount Gilead	OH	43338	419-947-1121	wb8uri@earthlink.net
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101		kb8uwi@yahoo.com
WA8UZP	James R. Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328	wa8uzp@yahoo.com

Call	Name	Address	City	St	Zip	Phone	URL
K8VKA	Ed Schleppi	5900 Bowen Rd	Canal winchester	OH	43110		ejs@comtech-ohio.com
N8WAC	Tony Everhardt	6512 Emch Road	Walbridge	OH	43465	419-666-5178	natewac@aol.com
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	OH	43062	740-927-3883	hiram@hiramhunter.com
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123		ohiomec@aol.com
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011		sdiggs1@insight.rr.com
N8XYJ	Dan Baughman	4269 Hanging Rock Ct.	Gahanna	OH	43230		danohio@wowway.com
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064		kb8ymq@aol.com
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224		----------
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771	
AB5ZJ	Tom Phillips	6712 Hickory Pl. Ct.	N.Richland Hills	TX	76180		
K3ZKO	Ron Cohen	915 Rowland Ave	Cheltenham	PA	19012	215-828-1263	k3zko@verizon.net
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	OH	43125	614-202-9042	ttaft@columbus.rr.com
K8AEH	Wilbur Wollerman	1672 Rosehill Road	Reynoldsburg	OH	43068	614-866-1399	wilburapilot@yahoo.com
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703		kc3am@verizon.net

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.

NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received and shows due one year from that date. The actual expiration is on January of the following year so we can keep the dues clock consistent with the beginning of each year.

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: Frank Amore WA8HFK
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.atco.tv and fill out the "pay dues" section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. 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.

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

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE RIGHT CORNER OF THE MAILING LABEL
OR
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF EXPIRED.