# ATCO NEWSLETTER

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## ATCO HAM IN THE SPOTLIGHT

This time we travel north into Morrow county near Marengo, Ohio to feature WB8LGA Charles Beener. Even though Charles is a new member to ATCO, he is by no means new to ATV. In fact, many of you don’t know that Charles is the builder of ATCO’s first ATV repeater. It was built around 1989 or 1990 and was housed in a garage in Westerville just below a 105 foot tower. It was an interesting experiment and we learned a lot but it didn’t work very well. I digress so more on that subject at some other time.

Charles is very good at building things from scratch. With both hardware and software capabilities, his projects seem to be ongoing. In fact, he hosted our very first antenna party for which he designed and built an antenna plotting program for our measurement uses. It ran on a home built Apple II computer and is the forerunner to what we now use.

Since that time (around 1985) he has built his own log cabin home and a host of other things around the house. When he doesn’t look at ATV, he’s busy talking to Mel, WB8LWR, on slow scan.

All in all, Charles is a very busy boy. Even though he lives almost 40 miles north of Columbus, he receives the repeater about P3 on both 439 and 1250 MHz with antennas on a 40 foot tower! WELCOME BACK TO ATV CHARLES!!!

## ACTIVITIES ... from my "workbench"


This past winter has been chocked full of various chores that somehow have not been completed yet. Even though the winter was harsh, other inside activities (or the lack of) seemed to take center stage. With warmer weather finally here, I now realize how little really got done. Oh well, the goal now is to try to FINISH something before starting something else new. I guess we're all guilty of that to some extent but for some reason this year I went overboard. So, now is the time to re-group and clean up some straggling projects.

Perhaps the most important item to me has little to do with the repeater. It is my packaging of my LCD 5" monitor video board with 1250 MHz and 2433 MHz receive modules from G1MFG. I found a perfect size surplus stainless enclosure from work that just fits the components. I want to make a portable video receiver that I can use for signal checking at the repeater and also for Red White Boom activities. It's nearly complete and even though I probably should be working on the ATCO-DARA link, for instance, I want to finish it and THEN move on. So, in the meantime, bear with me for eventually it all will get done.

Recently, we had a failed power supply in the 915 MHz repeater receiver leaving us without Channel 4 radar information for a day or so. It occurred the day before the severe weather drill activity so there was no time to fix it at that time. It was very bad timing for equipment failures. They survived without us, however, and the drill went off without any other problems. A few days later I installed an alternate receiver that is now in place and the original receiver is fixed and waiting for a trip to the repeater.

Another item on the agenda is the construction of the ATCO-DARA link equipment at the South Vienna site. As you may recall, last fall we installed and tested the 1250/1280 MHz antenna pointing toward Columbus but have not installed any equipment yet. It was planned to do some work over the winter but….Oh well, that's a subject already discussed. The folks in Dayton are now searching for 915 MHz equipment for use at the DARA repeater site for their part of the link. (It was rumored that they might not be able to keep their present tower location so work was temporarily on hold till the matter was cleared up. It's now confirmed they will have their tower site into the foreseeable future so work commences). They hope to be able to find some equipment at the Dayton Hamvention coming up in May.

While we're on the subject of the DARA repeater, Jesse, KB8OFF, is working on replacing their present repeater antenna. They now have a Lindsay antenna for both transmit and receive and are working on replacing it with two dual slot antennas (one for transmit and one for receive). I am working with them on it and plan to bring the transmit antenna to my QTH for a tune-up. They also want me to look at the transmit interdigital filter so in the near future, the DARA ATV repeater signal will improve significantly. I'll keep you posted.

The next item is the installation of 10 GHz transmit equipment. The parts have now arrived and are waiting to be installed in a weather proof box. Since RF losses are very high at that frequency, the transmitter will be installed in this box and tower mounted. The video and DC power will then be sent to the box from the repeater in the control room below. I've got a box available but have not had time to finish construction yet. When complete, the box will have a 10 GHz 10dBd gain commercial slot antenna directly mounted to the top of it and fed with a 1 watt transmitter from within. Ken, W8RUT, is working on a receiver module that uses a standard "Direct TV" type of 18" dish which are very plentiful at hamfests for free to $5 each. The module output will directly feed an LMB receiver of the same type used presently for 1250 MHz so 10 GHz reception should be a "snap". Best of all, the module is available from the UK for less than $100.

Another item in the works is the repeater roof-cam rebuild. After a number of service years and too much time pointed toward the sun, the camera has a low contrast image and faded color. Also, the focus motor is intermittent again. So a new simpler design is in the works. We have a new outdoor pan-tilt unit that I'm trying to integrate into the present controller design but haven't looked into it enough yet to determine if it's going to be easy. In any case, we need to have it operational for the annual RED-WHITE-BOOM festivities in July.

In addition to the above activities, the new ATCO link transmitter (the 446.350 one) is just about complete but needs some testing to prove reliability before we cart it downtown. I want to be sure it's ok because once I pull the existing one, it's going to be difficult to go back if things aren't quite right. This project is getting further toward the back burner in preference to things we don't have VS enhancements to the things that presently work. When complete and installed, the link should have better coverage due to a power increase from 1 to 10 watts.

For the next item, I'm looking for someone who knows which end of the soldering iron to hold onto. If you don't have burns on your hands, you qualify for this one. I need to re-design the antenna controller for our antenna measuring parties. I've got the circuit designed and parts available but need someone to breadboard the stepper motor drive circuitry. Once complete, I've got a stepper motor that will give MUCH better positioning accuracy than an open loop antenna rotor motor. N8NT needs to update the software also but he tells me that it will be easy if I use this motor control circuit that automatically sequences the motor from start, stop and step commands. If there's anyone willing to help out, I can supply all parts, schematic and, hopefully, guidance.

There's more but I don't want to think about them right now until we clear up some of the HOT items. Don't forget, the Spring Event May 4. We will have a guest speaker and there will be a lot to talk about including our presence at the Hamvention. We hope to see you at both activities! (In Dayton we will be at outside spaces 3037,3038 and 3039 so bring your stuff to sell).
…WA8RMC

# FUJI FILM WIDENS DYNAMIC RANGE OF CCD SENSOR

From: EE Times Newsletter [mailto:EDTN@newsletter.EDTN.com] Sent: Wednesday, January 29, 2003 8:00 AM
By Yoshiko Hara EE Times January 28, 2003 Reprinted by permission.

TOKYO — Fuji Photo Film Co. Ltd. has developed a new pixel structure that expands the dynamic range of its fourth-generation CCD image sensor to levels approaching what's available with film, the company said. Fuji Film said it will incorporate the sensor into digital cameras that will be available this spring.

The company's Super CCD SR sensor includes 3.35 million highly sensitive S-pixels and 3.35 million dynamic range R-pixels in a chip measures 1 x 1.7 inches. The sensor can capture images with about four times the dynamic range as its third-generation CCD introduced last year.

Fuji Film engineers got the idea for the Super CCD SR pixel structure from film, which combines a high-sensitivity layer and low-sensitivity layer for each of the three primary colors. While the layers in film are piled vertically, the engineers laid the high- and low-sensitivity elements horizontally in the CCD SR sensor.

A digital still camera capturing a high-contrast image is subject to losing detail in the dark and bright areas of the image because of a CCD's narrow dynamic range, Fuji Film said. The dynamic range of the S-pixels in the new CCD SR sensor is almost the same as conventional CCD image sensors, but the addition of low-sensitivity R-pixels does not saturate the image and allows about four times as much incoming light, accounting for the new sensor's wider dynamic range, the company said.

The S- and R-elements are made of the same material but have different structures to realize different performance, said Yasuo Nagashima, manager of the Technical Service Marketing Division at Fuji Film's Electronic Imaging Products Division. While the dynamic range of the CCD SR is about 4 times wider than previous sensors, the dynamic range realized by an individual camera will depend on the model's design, he said.

# INDUSTRY'S FIRST HDTV DECODER CHIPS WITH MPEG-4

From: ChipCenter Product Picks Monday, February 03, 2003 Product Picks Vol. 4, No. 106 Reprinted by permission.

New decoder family with unique features for next generation digital TV already adopted by e-BOX, National Semiconductor and Toshiba

### The manufacturer says . . .

Sigma Designs, Inc. a manufacturer of IP video streaming solutions, announced today the industry's first family of integrated high-definition television (HDTV) decoder chips to support MPEG-4, marking the company's formal entry into the digital TV and media gateway markets. Sigma's new EM8605 and EM8610 decoder chips offer a high performance architecture that supports digital TV, DVD, video-on-demand (VOD) and personal video recording (PVR) applications. Sigma Designs will showcase its EM8605 in their demonstration suite at this week's CES show in Las Vegas.

High definition television and advanced CODEC technologies are expected to top consumer electronics trends for the next several years. Driven in the U.S. market by an FCC mandate and a major cable industry proposal, digital televisions offering both ATSC and cable compatible interfaces are expected to appear on retail shelves near the end of this year. In turn, high definition video, which occupies four to six times the bandwidth of standard video, is driving subscription video service providers to use more efficient CODEC technologies to maintain a full complement of channels. MPEG-4 provides this alternative and has been adopted by the e-BOX company, a joint venture led by Pioneer and Sharp with plans to execute field trials at Comcast during the first half of this year. Today, the majority of new MPEG-4 consumer appliances are based on chipsets offered by Sigma Designs.

"MPEG-4 is a technology that is being deployed today to generate new revenues from bandwidth-limited applications that cannot be supported by MPEG-2," said Ken Lowe, vice president of strategic marketing at Sigma Designs. "As a leader in advanced CODEC technologies, Sigma introduced the first set-top decoder solution for MPEG-4 a year ago, which has been designed into new consumer appliances by over 20 independent companies." Designing Media Gateways and Advanced Set-top Boxes Using the EM8605 Sigma's new EM8605 was designed as a full function PCI-based media processor, operating in conjunction with a high performance embedded CPU to match the requirements of a next generation media gateway or advanced set-top box. The EM8605 features high definition decoding, multi-stream video decoding in MPEG-4, MPEG-2, or MPEG-1 formats, multi-stream audio decoding, 2D graphics acceleration, transport stream handling with CSS (DVD) decryption, and advanced display processing. Advanced set-top boxes supporting HDTV and MPEG-4 along with a flexible set of interactive applications will ideally benefit from the EM8605's rich feature set.

Media gateways represent the next level for home entertainment, providing a scalable solution for processing multiple media types, external broadband communications and internal home connectivity. Typical functions include digital TV reception, broadband Internet access, DVD playback, personal video recording, video-on-demand and home networking. As most households have more than one TV, this architecture can offer a more economical overall solution by adding simple, low-cost video endpoints to service additional televisions.

The EM8605 uniquely provides the complete range of hardware and software features required to support all of the media processing needs required in a media gateway.

Designing Multi-function Consumer Appliances Using the EM8610 Manufacturers of DVD players, television sets and other consumer equipment are steadily moving toward multi-function devices that offer a wider range of digital media based features. With the proliferation of new standards, file formats and downloaded media from the Internet, users are now demanding more universal media support for video, audio and photographic images. This includes playback of MPEG-4 based movies offered by companies such as DivX Video (tm), listening to music downloaded as MP3 or Windows Media Audio (WMA) and viewing JPEG-based digital photographs in high resolution. Following this trend, advanced DVD players are adding network connectivity, local hard disk storage with PVR functionality and in some cases digital TV reception.

Sigma's new EM8610 was designed as a stand-alone system-on-chip solution for multi-function consumer appliances and digital televisions. The EM8610 offers an on-chip RISC processor, PCI-bus hosting, and IDE controller along with the same media processing functions as the EM8605 to enable highly efficient designs for systems supporting the widest range of digital video/audio features. Configured with standard tuners and front-end components, the EM8610 provides a full-featured solution for next generation digital televisions, with unique display processing features for both flat panel and direct view displays.

The EM86xx family of media processors offers unparalleled quality of video and audio processing. Video decoding capabilities include MPEG-4, MPEG-2 & MPEG-1 compressed video formats while audio decoding includes Dolby® Digital (AC3), AAC, Windows Media Audio (WMA) and MPEG-1 Layers I, II and III (MP3) and MPEG-2 BC Layers I and II. MPEG-4 video support is based on the advanced simple profile at full DVD resolution. Any decoded content form can be output in either progressive or interlaced format. Also supported is Picture CD (JPEG) format for viewing digital photo content, which provides a substantially enhanced image when utilizing the high definition output. For supporting a robust graphical user interface and interactive applications, the EM86xx family offers a full 2D graphics accelerator capable of bit-blt operations at 75 megapixels per second, separate on-screen-display, and selectable flicker filtering.

Beyond the decoding and rendering process, the EM86xx family of media processors also provides the most advanced display processing features available, which recreate many elements of cinema picture quality. The family of parts is based on a unique architectural approach to mixing multiple video and graphics sources together with arbitrary scaling and conversion while also supporting multiple television outputs. Two separate video sources plus accelerated graphics, OSD, and hardware cursor elements are scan converted, scaled, and mixed together in real time to support complex screen composition. Dual video and audio stream processing along with two independent television outputs enable the use of multiple TVs, or a TV and video recorder combination. Additionally, the chip offers composite and S-video TV outputs, interlaced or progressive analog component video outputs (YPbPr or RGB).

e-BOX corporation, formed in March 2002 to develop the next generation system for advanced cable services based on MPEG-4, is developing a set-top box based on the Sigma EM8605. The e-BOX solution supports HDTV, VOD with the look-and-feel of DVD and PVR, all in one low cost set-top box.

National Semiconductor has been in partnership with Sigma Designs for several years, having jointly established more than 40 set-top box customers designs based on their Geode™ embedded x86 technology. National is now in the process of developing new products for the high definition digital set-top box market, based on Sigma's EM8605 HDTV decoder and other advanced technologies from National. Together, National & Sigma anticipate introducing a new set-top box reference design to the marketplace during the 2nd quarter of this year.

"National will continue working closely with Sigma to develop advanced set-top box solutions for digital TV, video-on-demand, and media-centric applications," said Mike Polacek, vice president of the Information Appliance Division, National Semiconductor Corp. "The new reference platform will provide our customers with a compelling solution for the development of HDTV applications."

Toshiba America Electronic Components, Inc.(TAEC) has been working with Sigma Designs on the development of a series of new home entertainment gateway reference designs, based on their TMPR7901A 64-bit super-scaler MIPS instruction processor. The first reference design, using Sigma's EM8475 MPEG-4 decoder chip, was successfully demonstrated by Toshiba at Japan's CREATEC show in Oct. Toshiba intends to introduce a higher performance platform based on Sigma's EM8605 HDTV decoder during the first half of this year.

"As part of Toshiba America Electronic Components (TAEC) overall development of configurable, leading-edge reference platforms for Residential Gateways, set-top boxes and other applications, we are very pleased to announce the new collaboration between TAEC and Sigma Designs. This will enable us to develop platforms based on the high-performance, highly integrated Toshiba/ArTile TX7901/A MIPS-based RISC processor and Sigma Designs' advance EM8605 high-definition decoder. This development complements our existing platform, which is based on the Toshiba/ArTile TX4927/TX7901 MIPS-based RISC processors and the Sigma Designs' EM8475 MPEG-4 decoder," said Farhad Mafie, vice president of the ASSP Business Unit at Toshiba America Electronic Components, Inc. Sigma Designs specializes in silicon-based MPEG decoding for streaming video, progressive DVD playback and advanced digital set-top boxes. The company's award-winning REALmagic® Video Streaming Technology is used in both commercial and consumer applications providing highly integrated solutions for high-quality decoding of MPEG-1, MPEG-2 and MPEG-4. Headquartered in Milpitas, Calif., the company also has sales offices in China, Europe, Hong Kong, Japan, Korea and Taiwan.

## ChipCenter's Paul O'Shea says . . .

The EM8605 and EM8610 chips are HDTV-capable chips that are comparable to what other companies are offering in the industry, with the exception that they support MPEG2 and MPEG4. The chips are follow-ons to the EM8470 (/analog/products_700-799/prod752.htm ) that was reviewed a little more than a year ago. The EM8605 and EM8610 can support multiple streams, decoding MPEG2 or MPEG4 and can support high definition video output. The real angle that Sigma Design has is that the products apply to digital STBs and TVs. While there isn't much content yet that is supported for MPEG4, there are product trials and a lot of speculation looking at it. Some companies are incorporating the MPEG4 with existing MPEG2 decoder products as a hedge against a design that could be obsolete if content is supported in MPEG4.

The MPEG4 standard supports downloading Internet Protocol video content, the use of DivX video content and of course better compression than MPEG2. Comcast, the cable provider, will be going to trial in the first half of this year with an MPEG4-based system for cable and if they decide it's important then STB manufacturers want to be ready. For example, up to 24 MPEG-4 SDTV programs (instead of 8-12 MPEG-2 SDTV programs) may be transmitted using a single 6-MHz 256-QAM digital cable channel. In this case, the MPEG-4 video quality meets or exceeds that of MPEG-2.

Sigma Designs believes that MPEG4 has continued to penetrate and it has gained acceptance in the IP world and Sigma has 3 or 4 DVD players based on MPEG4, supporting DivX video. DivX is the name given to a video codec and is based on the MPEG-4 compression format. DivX videos are usually only about 15 percent of the size of a standard DVD file. Typically, they only take half the time to encode and are smaller in size than MPEG-1, this due to the compression technology.

The EM8605 and EM8610 chips are not for mid-range DVD players but for multi-function DVD players with PVR, a network connection. It is really a convergence device. The EM8605 is designed to work with a separate CPU and for an advanced STB or gateway, where you need the horsepower of a CPU outside the chip because there are too many functions for the just the EM8605. Full video-on-demand streaming and Digital video STB type functions require a more robust CPU like the EM8605.

The EM8610 is the same basic chip as the EM8605, except that Sigma put it into a configuration where they created a complete application environment that can run with the on-board RISC processor. For example, there's an IDE port and PCI hosting capability. It's also ideal for multifunction consumer devices that don't need horsepower but need flexibility. They need the capability to playback a DVD, PVR, and control a network. The EM8605 and EM6810 incorporate 12-bit 54 MHz video DACs for the composite and S-video outputs. For the YPbPr/RGB video outputs, 12-bit video DACs are also used, clocking up to 148.5 MHz. What that means is video quality is improved over previous versions and the number of external components used for filtering is reduced, which of course lowers cost.

The EM8610 is designed to go into the new digital generation DVD player that supports playback, has a hard disk, supports PVR and will have a network connection - so through this device you can run all the media that you will play on your TV. You download it from the Internet and connect it to your cable, if necessary, and use the PVR function. There are some new DVD players that will allow you to download directly from the Internet and will support web browsing sufficient for you to get to the web site and download material directly to the hard drive.

The company had not decided on an exact price for the chips at the time of this review but said the EM8610 will be in the low $40 range in 10k quantities because it supports High Definition, multiple streams, and has a RISC processor on board. The EM8605 will be about $35 in 10k quantities. Samples will be available in March with production scheduled for June 2003.
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# ARRL CONCERNED ABOUT HAM RADIO IMPACT OF 70-CM CHANGES

ARRL Bulletin 22 ARLB022 From ARRL Headquarters Newington CT February 24, 2003 reprinted by permission.
**To all radio amateurs:**
The ARRL said two FCC-proposed actions could negatively affect Amateur Radio in comments filed in ET Docket 02-305. One would substantially expand the geographical area of power limitations on 70 cm. The other would deploy National Weather Service wind-profiler radars in the 448-450 MHz segment.

In a Notice of Proposed Rule Making (NPRM) late last fall, the FCC proposed on behalf of the National Telecommunications and Information Administration (NTIA) to vastly increase the size of the geographical area in New Mexico and western Texas where amateurs in the 70 cm band would be limited to 50 W PEP to protect military radiolocation service operations.

The proposed region has 67 affected repeaters. ARRL said the proposed area is "in most respects far beyond line-of-sight paths to any military facilities." The ARRL asked the FCC and NTIA to cooperatively evaluate the restriction, which could also affect weak-signal operations, to determine whether it is overly broad.

Concerning the wind profilers, the League said it had understood that the National Weather Service, which operates the radars, would notify ARRL of their locations as selected. "Ideally," the League said, "since the amateur repeaters are incumbent in the band now, the National Weather Service should select sites that minimize the effect on those repeaters."
…ARRL

# AN ATV CONTEST IDEA

Tue, 11 Mar 2003 17:43:02 -0600 Resent-from: atv@www.kd4moj.org From: Bob Delaney <ka9uvy@hotmail.com>

**Hello ATV'ers**
A while back I ran into Hank W4HTB on 144.340 and he said he was looking for ideas on an ATV contest. He asked for my input and at the time I had none. I have been giving it some thought due to the serious lack of activity and below I have outlined some basic rules for such a contest. I want to lay this on the table and would like to see if anyone has something to add to the mix. Please E-mail your comments to the reflector for all to see and comments directly to me are welcome.

Awards, Sponsor, Log submission and processing to be determined for such contest.

**Amateur Television Contest proposed rules:**
Contest would run for a period of 3 months maybe June, July, and August in order to catch the Tropo season.
Points would be determined by distance between stations. (miles =points) Miles to be determined by coordinates from the Latest QRZ database and rounded down to the nearest mile.
If operating mobile or portable then your coordinates would have to be determined by GPS and shown in
your log for each location where stations were worked from.
The program used to determine distance would be the ARRL endorsed ( Bearing and Distance) by W3EP
No changes allowed to coordinates on file at QRZ after contest period starts unless you actually move!
Multipliers would be State boundaries for Home stations and Counties for Mobile stations. Also a multiplier would be applied for the different bands as follows:
70cm = 1 point per mile
33cm = 2 points per mile
23cm= 3 points per mile
2.4 Gig and up would get 5 points per mile!
example: (N9AZZ in Illinois works W4HTB in Kentucky at a distance of 212 miles on 33cm)
424 points logged and one multiplier
If they worked again on 70cm They would get an additional 212 points and 1 multiplier.
Stations could be logged only once per band unless they were over 100 miles and if over 100 miles could be logged once per month per band. (This rewards any one who can reliably break the 100 mile barrier)
Also this should even things out, stations in populated ATV areas might work many stations but not very far apart. Stations in the middle of nowhere might only make a few contacts but should get the mileage payoff.
The use of 144.340 calling frequency is encouraged and schedules made by phone, mail, e-mail, prop loggers or whatever means necessary! Just make contacts!!
Repeater contacts of course don't count. The purpose of this contest is to promote activity and to reward
hams who put together an ATV station that is capable of Long haul contacts and are ACTIVE!
Let's get it going and maybe this year we can build up some excitement!
To put a little pressure on and try to focus our energy maybe the 3 month period should be weekends only?
What do you think, guys???
… Bob KA9UVY-TV

*Gene Harlan at ATVQ Magazine responds*:
ATVQ has wanted to have a contest for some time, but I was not able to get interest, except from maybe two people. It sounds like maybe now is the time. Bob, if you finalize the rules, I will be happy to publish them in the spring issue (deadline April 1st - on the street the first week of May), and if you will be the judge (or maybe you want me to so you can be in the contest???), I will make certificates for ALL participants. What say?
…Gene Harlan - WB9MMM

## DIGITAL TELEVISION PRIMER…Another 0ne!

I was recently alerted to the existence of a good web page with lots of digital TV information. The following is a somewhat shortened version of the "white paper" presented at the http://www.hauppauge.com web site. They also have cards for your computer that receive digital TV and display the signal on your VGA monitor. Check it out. I gave you an introduction to digital TV last issue so at the risk of turning you away completely, digest this article and become among the very few that truly understand digital TV. (At least, impress the salesman at Best Buy with your knowledge and find out how much he DOESN'T know!). Our digital signal for the repeater is not far away so read up! Here goes…
…WA8RMC

# Digital Television and the PC

By John B. Casey & Ken Aupperle at **Hauppauge Computer Works, Inc. (** http://www.hauppauge.com**. )**

### WHAT IS DIGITAL TELEVISION?

A Digital Television (DTV) signal is transmitted over the same general set of frequencies used by analog television broadcasts, but instead of continuous analog components carrying video and audio information, there is a single, high-speed bit stream. This bit stream is a combination of encoded video, encoded audio and system data.

### Digital Video vs. Analog Video

The analog television video standard in the United States is NTSC composite video. It is called "composite" because it is the combination of base-band luminance information up to about 3 MHz, a separate signal which encodes chrominance modulated onto a 3.58 MHz subcarrier, and horizontal and vertical synchronization signals represented as negative-going pulses. In contrast, a digital video signal is created by digitizing the image to be transmitted into a frame of pixels, then reducing the number of bits needed to represent the image using a compression method sanctioned by the Motion Picture Experts Group known as MPEG-2. MPEG-2 uses techniques such as Discrete Cosine Transformation (DCT), motion estimation, and predicted frames in order to accomplish this compression.

### Digital Audio vs. Analog Audio

The analog audio that accompanies analog video is simply modulated up onto a 4.5 MHz subcarrier prior to inclusion in the broadcast envelope. Should stereo audio be desired, the presence of a pilot tone signals the receiver that the base-band audio information consists of the sum of the right and left channels, and that a difference signal is available at a slightly higher
frequency in the broadcast envelope. A Secondary Audio Program (SAP) may also be present at yet another frequency. This method, sanctioned by the Broadcast Technical Systems Committee, is similar to that used in FM stereo radio transmissions with the exception that a frequency-dependent companding method known as dbx-TV, licensed by THAT Corporation, is used to reduce the effects of system noise. If surround sound matrix information such as Dolby Surround Pro Logic is included in the original source material, it is preserved by this transmission method, allowing a receiver to reproduce the center and surround channels if desired. On the other hand, a digital audio signal is created by digitizing the sound to be transmitted, then compressing the number of bits needed to represent the audio signal using a compression method called AC-3 (also known as Dolby Digital), which provides for 5 separate channels of audio plus a low-frequency subwoofer channel.

### Established Digital Approaches

Consumers are already familiar with several digital technologies in the entertainment area – Direct Broadcast Satellite (DBS), Digital Versatile Disc (DVD) and Compact Disc (CD). Both DBS and DVD technologies use MPEG-2 encoding to dramatically reduce the bit rate required for transmission of video content, and all three use digital audio. They also permit the addition of data, typically a program guide in the case of DBS, extra program-related content for DVD, and song titles and artist information on CD. The fact that these technologies actually deliver on the promise of high-quality pictures and sound should help position DTV in the minds of consumers.

### The ATSC Formats

The Advanced Television Systems Committee (ATSC) has established 18 approved formats for the broadcasting of DTV in the United States. These formats are encoded into a stream of binary bits, which are then modulated using a method known as 8VSB into a 6MHz analog channel "envelope" in preparation for transmission. The broadcaster then "up-converts" the signal to the frequency that has been allocated by the Federal Communications Commission (FCC), and it is sent to the transmission tower. Manufacturers of receivers are encouraged to support all of the formats in order to increase consumer satisfaction and reduce confusion in the marketplace. It is important to note that a digital broadcast is simply an encoded stream of binary information at a rate of 19.4 Million bits per second. The broadcaster and receiver are responsible for imposing meaning on this bit stream. In fact, it is often useful to think of a DTV transmitter and the receivers tuned to it as being a kind of high-speed unidirectional data network. Since the number of bits per second actually used by the encoded video and audio will vary widely depending of the chosen format and efficiency of the encoding process, there will typically be a portion of the bit stream remaining unused. These "extra bits" can be used to transmit additional data along with the primary program content being broadcast. There has been considerable debate in the market regarding which of the 18 formats should be used, by whom, and for what purposes. For instance, an initiative by Intel, Compaq and Microsoft in early 1997 to establish a set of medium-resolution progressive-scan formats as a "first step" to market acceptance of digital broadcasts met with negative responses from consumer equipment manufacturers. The CE community saw this as an attempt by the PC industry to gain control of the new broadcast medium, and did not want to be tied in any way to the standards of the PC market.

### Digital Television (DTV)

The acronym DTV is normally used to encompass all digital television broadcasts and formats, including High Definition Television (HDTV), Standard Definition Television (SDTV) and the use of digital signaling to broadcast data.

## HDTV

It is generally held that the term HDTV refers to any of the six broadcast formats that provide greater detail than the approximately 640x480 pixels in a good quality NTSC television picture. There are two groups of such formats: 1,920x1,080 pixels refreshed 60 times per second at a 2:1 interlace (yielding 30 complete frames per second), or refreshed progressively at either 30 or 24 frames per second; and 1,280x720 pixels refreshed progressively at 60, 30 or 24 frames per second. All of the HDTV formats use a 16:9 "wide screen" aspect ratio. The formats using 24 frames per second are designed to allow excellent reproduction of motion picture (movie studio) content, which would otherwise suffer timing artifacts from being converted to 30 or 60 frames per second.

## SDTV

The ATSC approved a total of 12 formats that are collectively referred to as Standard Definition Television. This was done in order to accommodate the wide variety of source material, and to enable easy conversion from a number of existing formats, and from the PC world, to digital broadcasting. The 12 SDTV formats are the result of all possible combinations of three resolutions with four frame rates. The resolutions are 704x480 with pixels compressed slightly yielding a 4:3 aspect ratio; 704x480 with pixels expanded slightly to yield a 16:9 aspect ratio and 640x480 with square pixels for an exact 4:3 aspect ratio. The frames are refreshed 60 times per second at a 2:1 interlace (yielding 30 complete frames per second), or refreshed progressively at 60, 30 or 24 frames per second.

## Multiplexing / Multicasting

Only the highest resolution formats require the majority of the 19.4 Megabits per second that make up a DTV broadcast. In fact, depending on the encoding used, a Standard Definition program can be made to use as few as 4.5 Megabits per second, sometimes even less. This opens new opportunities for broadcasters, who can take advantage of this situation by transmitting more than one program within a single 19.4 Megabit stream, and/or adding various kinds of data to the stream. Some uses for this technique include multiplexing several unrelated programs (typically 4) on a single feed, multicasting a single program such as a sporting event from several different camera angles (allowing the viewer to select the point of view by changing to a different program within the stream) and broadcasting multiple time-shifted copies of a program. Another interesting proposal has been to allow for some limited forms of interactivity by letting a viewer select a different ending to a movie, or select an answer to a question during a distance learning program with the choice resulting in positive feedback or a further explanation of the topic. Finally, in a PC environment, either the "extra bits", or even the entire 19.4 Megabit stream, can be used for the broadcast of data. By way of comparison, a 19.4 Megabit stream could transfer the contents of an entire CD-ROM in just five minutes!

## The FCC' s DTV Implementation Plan

The Federal Communications Commission, a part of the government of the United States involved in making sure that communications technologies best serve its citizens, has a multi-step plan for the implementation of Digital Television that attempts to take into account the realities of the consumer broadcast markets. In order to encourage broadcasters to deploy Digital Television, the FCC allocated an additional broadcast channel for each broadcaster currently transmitting using analog television technology. With some broadcasts beginning this fall, digital broadcasts are required to be available to half of all U.S. households by a year from now, and to all by May of 2002. While there is apparently no legal requirement for a broadcaster to use the new frequency allocation for HDTV (as opposed to SDTV, Multiplex, Multicast or even pure data) transmissions, there is strong political pressure in Congress for such use, at least for part of the broadcast day. It is also the intent of the FCC and Congress that DTV transmissions are "free" to receivers, inasmuch as there has been talk of inventing new taxes on broadcasters who profit by the transmission of access-controlled programming. Often characterized as a "give-away", the additional frequency is actually "on loan" to the broadcaster to allow the start of digital broadcasting in parallel with the existing analog system. Beginning in the year 2006 the FCC plans to begin taking back the then-obsolete analog frequencies and auctioning them to the highest bidder. By then, it is reasoned, the maturing demand for digital services will drive a larger premium for those frequencies than could have been obtained today. At the same time, the cost of set-top conversion boxes for consumers unable or unwilling to buy new digital televisions will have fallen to easily affordable levels, allowing service for all and disenfranchising none.

## THE IMPORTANCE OF DTV TO THE PC INDUSTRY

The inception of DTV will create new opportunities for the PC industry. These opportunities revolve around three general ideas – PC' s used as DTV receivers, DTV reception in PC' s, and Data Broadcasting.

## Opportunities for PC OEMs in the TV Market

For several years, various PC manufacturers have offered PC' s with large-screen displays for use as "theater"-type televisions. While moderately successful, the product category has been hampered by being more expensive than its main competitor, the large-screen television set. Most of the prospective customers with the disposable income to purchase a high-end PC with a large-screen display already have a large-screen television, and are probably fairly happy with it. The battle to unseat an incumbent is a difficult one! However, there are no large numbers of Digital Televisions in America' s living rooms today. As consumers consider the purchase of an HDTV, they could also be shown the capabilities and benefits of a high-end PC with a large-screen display, equipped for DTV reception. Such a unit is likely to cost far less than an HDTV, and offer increased benefits, such as Internet access. PC manufacturers do not need to capture a large percentage of potential HDTV purchases in order to significantly increase their unit sales and revenues.

## The PC-in-a-TV Market

The market for analog television receiver cards for installation in PC' s has increased by 50-100% in each of the last three years. Users install television receivers in PC' s primarily for the entertainment value, for instance, to be able to watch television while surfing the Internet. There are also business and educational uses for these cards. Pre-installing a DTV receiver in some models of its product line might make a PC manufacturer' s products more attractive to end-users.

## Economics of PCs vs. TVs

Most consumer HDTV sets are being introduced at price points between $5,000 and $10,000. A well-equipped PC, with a DTV receiver and a large-screen monitor, should cost the consumer no more than half as much, and offer far more functionality.

## Connectivity and the Future of Data Broadcasting

Connectivity is very important to PC users, many of who purchase a PC with the express purpose of being able to access the Internet or other communications resources. With the advent of DTV broadcasting, the potential exists for digital broadcasting to play a role as a high-speed, unidirectional "overlay" to the Internet. Over time, data that is accessed by many people can be broadcast, leaving the traditional bi-directional Internet more available for true point-to-point communications, such as e-commerce and video teleconferencing. There are various business models available for the Data Broadcast market to exploit, including advertiser-supported and pay-for-information possibilities.

# CURRENT ISSUES IN DIGITAL BROADCASTING

## DTV and the Cable Industry: VSB vs. QAM

One of the thorniest current issues in DTV is the role of cable MSO' s. On the one hand, the "must carry" rules might be interpreted to mean that cable operators must find a clear frequency on their cable for each broadcaster in their region with a digital signal and simply carry the same signal that exists over the air on their cable system. But many cable operators have fairly full systems, with very few if any available channel allocations. This means that one profitable cable network would need to be sacrificed in order to make room for each new digital broadcast. To further complicate matters, many cable operators are in a digital rollout of their own, with new digital set-top boxes that provide more features and capabilities at lower costs. By and large, cable systems use a digital scheme known as Quadrature Amplitude Modulation (QAM). Among the new features are better access control, and the ability to carry up to 9 properly encoded programs in a single 6Mz channel. Some cable MSO's ask why they cannot simply "carry" the existing channels by multiplexing them onto a single channel, and transcoding the VSB broadcasts into QAM. While perhaps in violation of the spirit of the "must carry" rules, because all subscribers would now need a digital set-top box, this method probably preserves the most television channels for the most people. As of this writing, this issue is far from being settled.

## DTV over Satellite

While the earliest satellite television systems were analog and required large dish antennas, the current generation of DBS products use digital signals and smaller dishes to implement resolutions comparable to SDTV. Nothing is stopping the satellite operators from transmitting HDTV, except for the lack of consumer HDTV sets. Satellite transmissions have tended to use Quadrature Phase Shift Keying (QPSK) modulation, so it is also not clear what method would be used to connect a satellite HDTV receiver to a consumer HDTV set. Among the leading possibilities are IEEE 1394, or transcoding from QPSK to VSB modulation.

## Access Control Issues

## MPAA Concerns

The Motion Picture Association of America (MPAA) represents movie producers, and is concerned about the possibility of perfect digital copies being made without authorization. To minimize this possibility, the MPAA is insisting that encrypted protocols be used whenever the DTV signal is transferred from one component to another, for instance, from a DTV "set-top" receiver to the high-resolution display.

## The Role of IEEE 1394

One method that has been proposed to satisfy the MPAA requirement is to use a high-speed digital link such as the IEEE 1394 bus to communicate between the receiver and display. New encryption keys would constantly be exchanged between the two, making a simple recording of the externally visible bits useless. Some camcorders and VCR' s already have 1394 interfaces, as do a few PC' s, so the industry has a growing knowledge of this technology.

# IMPLEMENTATION DIRECTIONS

The roll-out of Digital Television promises to be one of the more confusing in recent memory, as consumers are faced with a number of complex choices, and relatively little information on which to base buying decisions. In the words of Joseph Flaherty of CBS, "if they're confused, they'll just put their money right back into their pockets." There will be a number of ways for consumers to receive Digital Television broadcasts, each with its own set of trade-offs. We expect the most common implementations to be:

## Initial Consumer HDTV Sets

Initial consumer HDTV receivers are just now making their way into appliance stores. They are typically implemented as two pieces – a high-resolution 16:9 display and a "set-top" receiver. In some cases, manufacturers have been talking about replacing the receivers to handle any changes that turn out to be needed to accommodate the movie industry' s concerns about access control. Given the size and weight of the monitors, this makes a lot of sense!

## Capabilities and Performance

While it is clearly in the best interest of all concerned that no appliance sold as a HDTV receiver should "go black" for any broadcast format that it is tuned to, the actual display resolution of the first wave of consumer HDTV's is expected to vary widely. According to some reports, many of the large-screen displays that will be shipped will only have about 600-800 lines of horizontal resolution, a far cry from the 960 that a 1,920-pixel format would imply. The manufacturers apparently intend to down-sample the image in order to display the highest-resolution broadcasts on these displays. While viewers will still be very impressed with the picture quality, there will no doubt be plenty of opportunities for the magazine reviewers and test laboratories to do their jobs, comparing the offerings of the various manufacturers, just as they do with today' s prevailing analog products.

## Early Set-top Box Products

The purpose of a set-top box is to adapt a particular broadcast technology to a different receiving technology. For instance, most cable television subscribers are familiar with the need for a set-top box to handle access control for premium and pay-per-view channels. In the case of Digital Television, the purpose of the set-top box will be to receive the DTV broadcast, convert it to a standard definition signal, and pass it on to an analog television for display. The three available ways to implement the path from set-top to television are, in decreasing order of performance, S-Video, Composite Video, and RF (the familiar "Channel 3 or 4" technique).

## Capabilities and Performance

Again, as with full-fledged HDTV receivers, set-tops will generally receive all broadcast formats. However, unlike HDTV receivers which must be touted as having great resolution in order to justify their price tags, set-tops can be expected to be sold primarily on price, as a way for the consumer to receive DTV broadcasts without needing to buy a new television. As such, they are likely to have just enough resolution to get by. In the case of a set-top that outputs S-Video, resolution will be on the order of 300-400 horizontal lines in the Luma signal (roughly 600-800 pixels), with some softening of color edges due to the reduced bandwidth of the Chroma signal. To the viewer, this will approximate the quality of a Digital Satellite broadcast. When connected via a Composite video path, the resolution will be degraded by two factors – the reduction in luminance bandwidth to accommodate the chrominance signal, and the re-introduction of "chroma crawl" due to the tendency of analog television sets to interpret detail in the luma signal as chroma information and vice versa. The need to connect to some older televisions via RF will result in all of the problems of a Composite connection, plus the inherent addition of noise (snow) to the signal due to the modulation and demodulation steps.

## PC + Customized Set-top Box

Some PC' s are already equipped with the ability to receive analog television broadcasts, many more are able to capture Composite and/or S-Video signals and display them on the PC' s monitor. Simply adding a set-top box as described above will allow for the reception of DTV broadcasts. If the set-top box is specifically designed for use with such a PC, additional capabilities can be added.

## System Requirements

A PC equipped for use with such a set-top will have an S-Video input, a provision for control of the set-top (such as an $I^2C$ or USB connection), and an external input for the broadcast' s audio component. If the PC already has a television tuner, it will now be capable of receiving both analog and digital transmissions.

## Product Capabilities

A customized set-top box should be able to receive broadcasts in any DTV format, render the video portion of the program into S-Video and the audio portion into a stereo, line-level signal. To the viewer, this will approximate the quality of a Digital Satellite broadcast in terms of both picture and audio quality. In addition, a connection could be provided for transferring to the PC any data that may be part of the broadcast.

## PC + PCI Card

One of the most obvious ways to add Digital Television to a PC will be through the use of a PCI-based add-in card. With analog television receiver cards becoming increasingly popular, their digital counterparts are not far away. There will be two main implementation directions:

## Software-based Alternative

As mentioned above, one way to analyze a digital broadcast is simply as a 19.4 Megabit network feed. The DTV program is then one of what may be any number of simultaneous streams of data, a bit stream which must be rendered into pictures and sound in order to be appreciated by the viewer. The requirements of this rendering are then similar to, but more demanding than, those imposed by a desire to watch streaming video over the Internet. System Requirements: The hardware requirements consist of a tuner to select the desired channel out of the frequency bands available, a demodulator to extract the 19.4 Megabit binary stream, and an interface to a standard PC bus. The PCI bus is the logical choice here, partly because the 19.4 Megabit stream is equivalent to 2.43 Megabytes per second, which is too large a fraction of the bandwidth of the ISA bus to be practical, but also because the ISA bus is an endangered species! A further requirement is a high-performance CPU, given the software stack that must be supported. Once the bit stream makes its way across the PCI bus into the PC, several layers of software handle it. A device driver controls the PCI card itself, and arranges for the bit stream to be placed in buffers in memory. Higher layers of software filter the bit stream in order to synchronize and separate the video, audio and PSIP streams. The video stream is decoded from MPEG-2 into a sequence of frames by a software decoder, which may receive a performance boost from specialized functionality built into the PC' s graphics display subsystem. The audio stream is similarly handled en route to the PC' s sound subsystem. The software responsible for the Human Interface uses information from the PSIP stream to allow the user to navigate between and, in the cases of Multiplexing or Multicasting within, channels. Resolution / Performance Roadmap: As might be expected, this software-oriented approach places great demands on the PC' s CPU. In particular, the MPEG-2 decoding is very compute-intensive; especially if there is not a good deal of computational support built into the graphics display subsystem. Currently, SDTV formats can be handled by a Pentium-II / 450MHz class processor; HDTV formats must be down-sampled in order to be rendered by that class of machine. Of course, faster processors will be available in the future, making this type of implementation increasingly plausible for OEM PC manufacturers who control the characteristics of the machines that they build.

## Hardware-based Decoding

Another approach is to use a hardware processor to decode the video and possibly the audio streams. While this adds cost, it dramatically reduces computational requirements, making after-market add-on DTV receivers a possibility.

**System Requirements**:

The hardware consists of a tuner to select the desired channel, a demodulator to extract the 19.4 Megabit binary stream, a hardware decoder to render the MPEG-2 video stream into a sequence of frames of pixels and a PCI bus interface. Typically, a board such as this will transfer the rendered pixels directly into the frame buffer of the graphics display using master-mode bus transactions so as not to burden the CPU. In order to host such a board, the PC will need to have a graphics display subsystem with solid DirectX drivers. The software involved consists of low-level device drivers that set up the board, a software stack that interfaces with DirectX to arrange a display window in the graphics display subsystem, and Human Interface software for control and navigation. Performance and Resolution Issues: A hardware-based decoder could in principle render its input stream into any desired format. In most cases, the output format will be chosen so as to be compatible with other data types that the PC handles well. For instance, if a PC is already optimized to deal with NTSC images, the decoder could be set to render all ATSC input formats into an SDTV resolution, for forwarding to the graphics display subsystem in cooperation with DirectX. As the resolution of the output format increases, two additional practical factors come into play. One of these is the bus bandwidth required to move the live video image across the PCI bus from the decoder to the graphics display

subsystem, while the other relates to the performance of the graphics display subsystem itself. Transferring SDTV is not a large load for the PCI bus, but transferring 1,920x1,080 resolution HDTV images 30 times a second will almost completely fill up the bus. At the same time, the graphics display subsystem must be able to accept and display all of that information. Yet another minor variant of this architecture would be to have the video decoding circuitry as close as possible to the graphics display subsystem. The advantage of this variant is to keep the traffic on the PCI bus low, since only the un-decoded streams must travel across it. The disadvantage is cost, since the system always carries the cost of the decoder, even when the DTV board is not installed.

## Mid-range Consumer Digital Televisions

While the initial motivation for most consumers purchasing DTV will be the enhanced quality available with HDTV programming, which is best experienced on a large screen, the widespread deployment of digital broadcasts will result in additional product categories. Chief among these is the mid-range consumer DTV, which will begin to replace the market niche currently served by 19-27" analog televisions. These units are not likely to sport full 1,920x1,080 pixel resolution, but will receive all DTV formats, rendering the HDTV programs into display resolutions somewhat better than SDTV, at costs comparable to today' s mid-range televisions.

## Consumer 1394 Boxes in the PC Market

As mentioned above, some consumer electronics companies are planning on using the IEEE 1394 interface as the "secure channel" between their receivers and displays. While not yet widely deployed in the PC world, IEEE 1394 interfaces are available and growing in popularity. It is likely that in the future, a consumer DTV receiver that outputs 1394 can be connected to a PC with the appropriate software, creating another alternative for DTV reception and display.

## Device Bay and Digital Television

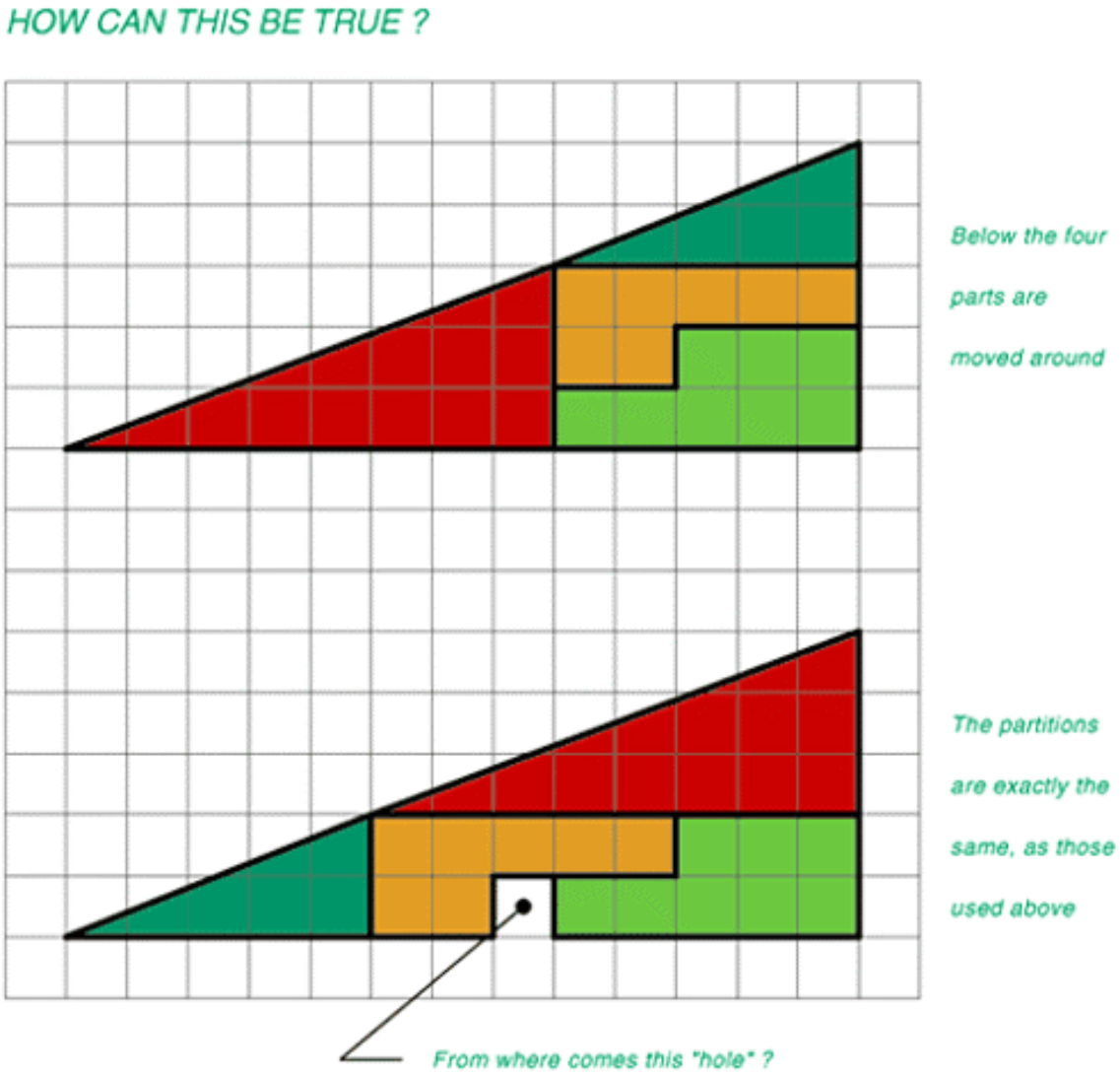
The need to open a PC to add a device such as a DTV receiver card creates a confrontation level that many PC users cannot overcome – they will simply make do without the enhanced capability. The Device Bay standard fills the need for a way to expand the capabilities of a PC without opening the chassis. Device Bay consists of an IEEE 1394 channel, a USB port, and a standardized physical form factor that allows the unsophisticated user to easily attach a high-performance peripheral device. Although it is not yet included on mainstream PC' s, once Device Bay becomes more widely available it will be another good alternative for adding DTV capability to a PC.

# “TWIST YOUR NOODLE” BRAIN TEASER

OK, I presented a brainteaser last time and was expecting some reaction to it and got none. This leads me to wonder if, 1.) They were too tough and no one wanted to admit they didn’t know the answer or, 2.) They could care less! Well, let’s try it again with, maybe less relevance to electronics this time. Remember; let me know during the Tuesday net what you think about it.
…WA8RMC

## How Can This Be True?

I always like a good brainteaser, and this one stumped me for a while. Take a long hard look and see if it makes you question the laws of physics, or at least brush up on your geometry skills. I even cut the pieces out and pushed them around on my desk. Hope you don't need to go that far.



# RECEIVER CHIP AIMS TO REVIVE SLOW-DEVELOPING DTV MARKET

By Junko Yoshida EE Times Magazine April 7, 2003.

**PARIS** — Hoping to boost the lagging U.S. digital TV market, ATI Technologies Inc. (Markham, Ontario) is introducing a next-generation DTV receiver chip integrated with digital terrestrial/cable demodulation capabilities and analog TV reception features.

The new chip will be unveiled at this week's (April 7-11) National Association of Broadcasters conference in Las Vegas.

With its new Theater 310 chip, ATI said it hopes to set a "new benchmark for digital cable-ready DTV products, both in its integration and performance," said Mike Gittings, ATI's director of digital television marketing.

Chip vendors are banking on growing interest among OEMs in integrated digital cable/digital terrestrial/analog TV receiver ICs after following a DTV agreement reached late last year between the cable and consumer electronics industries. The deal would allow TV manufacturers to launch long-awaited digital cable-ready DTV sets requiring no cable set tops.

The Theater 310 chip demodulates and decodes vestigial sideband (VSB) for the U.S. terrestrial digital TV broadcasts and 64 and 256 quadrature amplitude modulation (QAM) for digital cable. It also handles analog NTSC (National Television Standards Committee) video signal demodulation and analog BTSC (Broadcast Television Systems Committee) audio signal modulation and decoding.

Although digital TV makers are already familiar with integrated VSB/QAM receiver chips through use of ATI's previous generation chip or similar offerings, until now they have not seen a receiver IC that "has pulled together BTSC and NTSC front-end audio and video receivers and IF components all into a single-chip VSB/QAM receiver," Gittings said. The Theater 310 chip effectively eliminates the need for three SAW filters and one intermediate frequency (IF) amplifier, he added. Higher integration is only half the story for the new chip, according to Gittings. He said "there is still some room left for improvements in VSB reception," adding that several new techniques are incorporated in the Theater 310 to boost the VSB performance. For one, the equalizer span used in the Theater 310 was extended from 53.5 to 88 microseconds. "We make a very efficient use of equalizer tap, so that 88 microsecond span is a true-span measurement," Gittings said. ATI's engineering team also developed a newly enhanced semi-blind and blind equalization algorithm for the chip.

Gittings said the chip may be the first capable of handling Rayleigh fade, a condition caused by multipath interference. When the waves of multipath signals are out of phase, reduction in signal strength can occur. Signal strength can fluctuate, thus causing a momentary, but periodic degradation in quality. Traditional equalizers do not handle such a fading, Gittings said. ATI engineers also focused on slow channel changes that could occur as consumers hop from one channel to another, and between VSB, QAM and NTSC signals. An 8-bit micro-controller and dedicated hardware resources integrated on the Theater 310 aim to make faster channel change possible — as fast as 50 milliseconds, Gittings said. The Theater 310, which starts sampling in the third quarter, will be manufactured by using Taiwan Semiconductor Manufacturing Corp.'s 0.15-micron process. ATI would not disclose the price of the new receiver IC, saying only that "the price for DTV products depends on the volume and other conditions."

**DTV politics**

Indeed, politics evolving around the U.S. digital TV could still affect all parties involved in the DTV food chain, ranging from chip companies to TV set manufacturers. While the Federal Communications Commission is being urged to quickly adopt the proposed digital cable- ready DTV specification, Hollywood studios remain a wild card, and their support for the proposal remains unclear. So-called "encoding rules" that limit use of copy protection technology remains an issue for some content owners. That debate continues at the FCC.

Complicating matters further, the consumer electronics and cable industries remains at odds over a certification process for digital cable-ready DTV sets. Although it has been four months since the two industries reached the so-called “plug-and-play" agreement for digital cable-ready DTV, no decisions have been made on what aspects of plug-and-play DTV sets that need to be tested by CableLabs, the cable industry's technical arm, and what should be left to TV set manufacturers for self-certification.

… Junko Yoshida EE Times Magazine Reprinted with permission.

# JIM, WA8UZP, SUPPORTS ATV – GIVES TALK TO OLD TIMERS

Jim, our hats are off to you for volunteering to give up some of your valuable time to discuss ATV with the “Old Timers”. Good job!
…WA8RMC

# AMATEUR TELEVISION ATV
# Presented by WA8UZP “Jim”April 9 th , 2003

Yes, it’s true. Last Wednesday at the "Old Codgers Ham Radio" lunch at Milano's Restaurant on 3C Highway I gave a talk on ATV and the ATCO group. Over 25 were in attendance, the average age over 70 years. After, pulling some heads back from falling asleep in their lunch several had reported being ATV'ers in the past and hadn't realized how this has grown.

I also, gave a 70cm receive demonstration in the parking lot, but too cold and windy. Picture was about a P-2 with a 7 element Ted yagi just over the truck.
…Jim (WA8UZP)

## THE COLUMBUS HAMFEST GOES BIG TIME!

Art,
I have just received info that you take care of the newsletters for your club. Looking ahead to August of this year I have attached a copy of our flyer. We have changed the name from Hamfest to Ham "OH" Rama just for some fun. We hope to have a code sending contest. Everyone will have to take of their left shoe and send by their big left toe.
Thank you
…Jim Morton

# 13th Annual
# HAM "OH" RAMA

Sponsored by the **VOICE OF ALADDIN** Amateur Radio Club

**When: Saturday, August 2, 2003 8:00 a.m. - 2:00 p.m.**
**Free Parking on site (vendor setup at 6:30 a.m.)**
**Located in the Air Conditioned Aladdin Shrine Complex at 3850 Stelzer Road**
**TALK IN: 147.24 (+600 MHz input)**

**DIRECTIONS: Exit I-270 at the EASTON exit. Proceed West to the first light then turn North (right). The Aladdin Complex is located about 1/10 of a mile up the road on the right. Entrance to the HAMFEST is near the rear of the building.**

**Commercial Exhibits, Flea Market, Free Seminars, Refreshments, Prizes and VE Sessions.** Exams begin at 9:30 a.m. Please be on site to register no later than 9:00 a.m. if you are planning to take an exam.

**Admission tickets are $5.00 at the door, $4.00 presale.** Children under 10 are free. Advance sales available at Universal Radio and Hall Electronics in Columbus, Ohio, the Aladdin Shrine Complex or with a SASE sent to: Jim Morton KB8KPJ, 6070 Northgap Drive, Columbus, OH 43229-1945. Telephone (614) 846-7790 evenings for further information. (Tickets will be available after June 10, 2002.) Club website http://www.qsl.net/w8fez

**Indoor Display Tables (6 ft.) are $8.00 each at the door, $6.00 presale. Outdoor flea market is $5.00 per marked parking space, the day of the HAMFEST.**

Presale requests must be received no later than **July 20, 2003.**

## THE A.T.N.A. PROGRAM FOR DAYTON 2003

**Friday 16 May 2003 Stockyards Inn - 1065 Springfield St. - Dayton, OH 45403 - Phone 937-254-3576**

| | |
|---|---|
| 1745 –1900 | Dinner from menu with separate check. PLEASE dine with ATNA. |
| 1900 – 1905 | Program review by MC, Ron Cohen, K3ZKO |
| 1905 – 1915 | A video of the "Critter Cam", by John, W3SST. |
| 1915 – 1920 | First Prize Drawing by Art Towslee, WA8RMC |
| 1920 – 1950 | Linked ATV Repeaters via Amateur TV Network by Mike Collis, WA6SVT (Video report followed by Tech talk with Q and A. |
| 1950 - 2020 | Giles, G1MFG compares and contrasts amateur television activities between Europe and USA. |
| 2020 – 2030 | Break with refreshments courtesy of ATNA. |
| 2030 - 2035 | Second Prize drawing by Art Towslee, WA8RMC |
| 2035 – 2120 | "High-Speed Digital ATV", presented by the ARRL HSMM Working group. |
| 2120 – 2155 | Upcoming Balloon flights by Bill brown, WB8ELK. |
| 2155 – 2200 | Wrap up Announcements / Good Night to all |

**Saturday 17 May 2003**
1800 – 2200 Informal dining with the ATVers and their friends.

# ATCO

## *2003 SPRING EVENT*

1:00 PM - SUNDAY

MAY 04, 2002

ABB PROCESS AUTOMATION

*** SHELTERHOUSE ***

650 ACKERMAN ROAD

FOR MORE DETAILS, CONTACT

ART - WA8RMC 891-9273

LUNCH PROVIDED - DOOR PRIZES -

BRING A FRIEND AND SEE OLD BUDDYS

MINI HAMFEST - SHOW AND TELL

**DIRECTIONS TO THE ATCO EVENT**

From I-70 either EAST or WEST Bound:

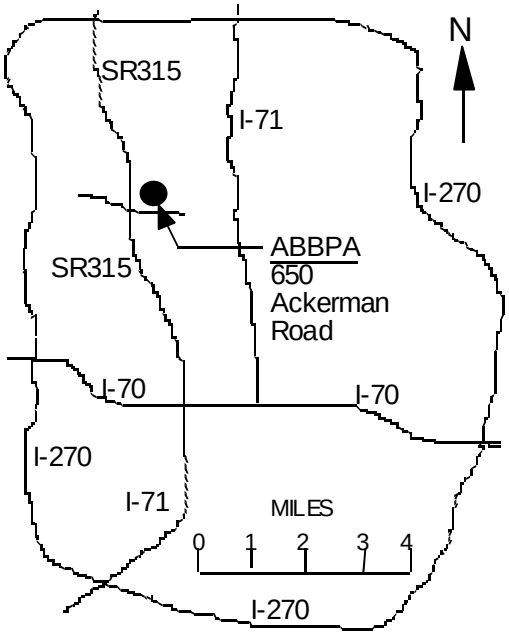
Take I-70 to SR-315 near downtown Columbus. Exit onto SR-315 north about 4 miles to Ackerman Road. Turn east on Ackerman about 200 yards to first driveway on left.

From I-71 traveling NORTH bound toward Columbus:

While traveling north on I-71, continue past I-70 and onto SR-315 north. Travel on SR 315 north about 4 miles to Ackerman Road. Turn east on Ackerman about 200 yards to first driveway on left.

From I-71 traveling SOUTH bound toward Columbus:

(DIRECTIONS IF YOU'RE "NORTH" OF I-270).
Take I-71 SOUTH to I-270 Bypass Loop & head WEST on I-270 to SR 315. Take SR 315 south about 5 miles to Ackerman Road. Turn east on Ackerman (under SR 315) about 200 yards to first driveway on left.



# MIDWINTER PIZZA PARTY

Well, about the first of March some cabin fever sets it sooo…..the first thing we (Ted) thinks of is Pizza! So here we are again for our March first Pizza get together at Donato's. This time we chose the Donato's on south High Street near the Northern Lights shopping center. It was small but we all fit in rather nicely. Other patrons that arrived later than us found no room to sit so they left leaving us essentially with the store to ourselves. Nice, huh?

As usual we always seem to have about 20 to 25 people attend. Funny, now that I think about it, the attendance has picked up significantly since ATCO has been picking up the tab! That's OK for we all had a good time describing the things we are going to do as soon as the weather warms up and Pizza tastes real good on a cold winter evening. The next Pizza party probably will sometime in early summer or…Ted, speak up!

## 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.

WB8MMR Mike Knies Columbus, Ohio
N8XYJ Dan Baughman Gahanna, Oh
…WA8RMC

# DAYTON HAMVENTION ACTIVITIES

Again this year ATCO will have 3 outside flea market spaces, 3037, 3038 and 3039 for ATCO members and friends. Tom, KC8LZC, will be parked in these spaces with a 20 foot enclosed trailer. We can use the trailer to dodge the rain (or snow) if on a remote chance, it does one of those, store our purchased goodies or store goodies to be sold. We are all invited to use the spaces to sell our personal items as long as we also help to stay there while others are hunting for their items. Please don't bring a huge pile of items to sell as if everyone did that, we wouldn't have enough room for all. All we ask monetarily is that if you do sell items; consider donating a small portion of the profits to ATCO to help defray the costs.

In addition, ATCO will try to maintain a cooler with pop and ice for our use. Also, if you have an extra folding chair, bring it along for you and others' use to rest the feet from time to time. Last year the space also proved to be a great gathering spot to congregate and discuss purchases. All are welcome.

The Friday night ATV gathering will again be hosted by A.T.N.A. at the Stockyards Inn - 1065 Springfield St. - Dayton, OH 45403 - Phone 937-254-3576 starting about 7:00PM. Details are listed earlier in this newsletter.

Saturday the ATV forum will again be moderated by our own Bill Parker W8DMR. In room 1 at 12:15 to 2:30 PM

**Speakers:**

Mike Collis WA6SVT – "What is ATV and what can you do with it?
Video showing ATV operation both simplex and via repeater with latest California mountaintopping.

Giles Read G1MFG - "A comparison and contrast of ATV activities between Europe and the USA".
UHF & microwave ATV as presently operated from across the pond, 1.2 & 2.4 GHz FM ATV operation

**Announcements:**

DARA ATV repeater status
ATNA activities
ATVQ, editor WB9MMM
ATCO, editor WA8RMC (yeah, Bill wants me to say something so here's my chance).

# 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.

**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 2003**xDayton Hamvention Dayton ARA http://www.hamvention.org/ Contact: Dayton, OH
**25 May 2003**+Franklin County Hamfest Committee Contact: Chris Lind, KC8BUO PO Box 14281 Columbus, OH 43214 Phone: 614-267-7779 Fax: 614-263-7934 Email: clind2@juno.com Hilliard, OH
**8 Jun 2003**+Goodyear ARC Contact: Rich Kuster, N8ZDQ 1341 Whippoorwill Trail Stow, OH 44224-2327 Phone: 330-688-3589 Email: RichJKuster@aol.com Suffield, 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
**19 Jul 2003**+Northern Ohio ARS http://www.apk.net/noars/noarsfe.htm Contact: Tom Porter, W8KYZ 161 Herrmann Drive Avon Lake, OH 44012 Phone: 440-930-9115 Wellington, 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
**27 Jul 2003**+Portage ARC http://parc.portage.oh.us Contact: Joanne Solak, KJ3O 9971 Diagonal Road Mantua, OH 44255 Phone: 330-274-8240 Email: ljs@config.com Randolph, 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
**23 Aug 2003** x Portsmouth Radio Club Contact: Kim Lozier, N8ZW Phone: 740-456-1616 Email: n8zw@falcon1.net Friendship, 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 & WR8ATV 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 20 April 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 | Delaware | 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 | 2540 State Route 61 | 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 |
| WB8MMR | Mike Knies | 1715 Winding Hollow Dr. | Columbus | OH | 43223 | 614-875-4236 | |
| N8NT | Bob Tournoux | 3569 Oarlock Ct | Hilliard | OH | 43026 | 614-876-2127 | n8nt@columbus.rr.com |
| 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,KA8IWB | John Perone | 3477 Africa Road | Galena | OH | 43021 | 740-548-7707 | |
| WA8SAR | Gary Obee | 3691 Chamberlain | Lambertville | MI | 48144 | | |
| N8SFC | Larry Campbell | | 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 |
| 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 |
| KB8WBK | David Hunter | 45 Sheppard Dr | Pataskala | OH | 43062 | 740-927-3883 | hiramhunter@aol.com |
| N8XYZ | Dan Baughman | 4269 Hanging Rock Ct. | Gahanna | OH | 43230 | | |
| 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 |

## 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 O NEW MEMBER O DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES O NO O
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 O MONEY ORDER O
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 (01/24/03)..... | $1972.61 |
| RECEIPTS(dues)..... | $ 150.00 |
| OTHER INCOME (bank interest)..... | $ 3.67 |
| Donated equipment receipts from bids..... | $ 456.00 |
| Pay Pal charges..... | $ ( 0.59) |
| Winter pizza party at South High St Donato's..... | $ (81.65) |
| Bank check cashing charges..... | $ ( 2.00) |
| Fudge factor..... | $ ( 6.49) |
| CLOSING BALANCE (04/20/03)..... | $2481.55 |

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.**