

ATCO NEWSLETTER

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ATCO

HAM IN THE SPOTLIGHT

The featured Ham this time is John Beal, W8SJV. John has just decided to get back into ATV recently, and in a big way, as can be seen in the photo on the right! His 1250 MHz activities have produced P5 pictures into the repeater using a COPS transmitter and brick to output about 3 watts. Looking back at it, I guess it started with that LNB receiver I found for him at a hamfest.

John is also very good at the technical stuff so if you've got a question, I'm sure he can supply the right answer. By the way, while you're talking, ask him how he likes his new M² 439 MHz Yagi antenna? Could be you'll get one too!



ACTIVITIES ... from my "workbench"

I waited till the last minute to write this column, first because I felt that we'd have accomplished something useful at the repeater by this time. Correct on that one. Second, I seem to work better under pressure! No, you're probably won't buy that one. Last but not least, I procrastinate, and that's the truth! Well, as it turns out, I **DO** have more to report so here goes....

First, let me wish everyone a belated Merry Christmas and Happy New Year. I hope "Santa" brought you all of the ATV goodies you wished for, or at least allocated the monetary funds to allow you to purchase the present of your choice. Most of us fit the latter category (including myself) because it is doubtful that your spouse would have known exactly what to buy anyway.

While I have the soapbox, I'm wondering about all the hype put forth about "Y2K" for the last year or so. Now that the New Year has started and nothing significant happened, how much *would* have happened if everyone that DID prepare, did nothing. I suppose we will never know the exact answer to that one. I think that many businesses are much better off, but not for the Y2K reason. They took the opportunity to upgrade their aging operating systems that so desperately needed it anyway. And because of the Y2K scare, management gave them an open "checkbook". The rest is history, so it was a good thing but it happened for the wrong reason! On top of that, the media drove it into the ground by reporting...wait a minute, they didn't report it! They CREATED it! Also, did you notice that as soon as the New Year produced nothing significant, they questioned if it was a hoax in the first place? I've also heard, "Look how good of job we did. We fixed almost everything so naturally nothing happened". GIVE ME A BREAK, GUYS! The preceding wasn't ATV related but I now feel much better, I've cleared my mind, put "Y2K" in the past and am able to start the New Year with a more positive attitude. Let's think ATV for a while.

I am in the process of upgrading the 427 MHz repeater output. The quality has fallen off the last couple of years and wasn't too good in the first place. The present lineup includes a PC Electronics TXA5 exciter and Mirage D100 power amp to deliver about 70 watts on the sync tip. Vestigial sideband filters in the output block the lower sideband energy so it won't be transmitted but it has to go somewhere so it literally returns to the transmitter where it is dissipated as heat. Not very efficient but works to a degree. The new system I'm working on will consist of a commercial video modulator that contains the proper SAW filters in the low-level stages to properly shape the RF signal with minimal losses. It has a 1-10 milliwatt (adjustable) output so I will need an amplifier of some type to get it into the 2-4 watt range to drive the Mirage. I've selected a Mitsubishi M57716 brick amplifier that is rated for 430-450 MHz SSB service. The data sheet illustrates true linear response from 1 to 100 milliwatt input but I need linear operation for input signals below 1 milliwatt. The factory in Japan responded with an engineering graph that illustrates linear operation down to -15dBm and that was because their equipment was limited there. So, if true, this will be a good choice for a linear amplifier between the modulator and Mirage power amp. It is very important to maintain excellent amplification linearity. If even slight distortion creeps in, the removed lower sideband components will be re-inserted. If all goes well, I should have the new system in place within a month or so. After that, if everything seems to perform well, we may opt to replace the Mirage amp with a Teletec unit. That will boost the power output up into the 100 watt+ range. I'll keep everyone informed of the progress.

We've been having our share of other repeater problems as well. As most of you know, the 2.4 GHz input hasn't been working properly. I was sure that the problem was with the new antenna we installed a few months back so I replaced the entire antenna and short jumper cable that connects it to the 7/8" hardline. That didn't fix it. A resistance check of the line showed continuity in the center conductor and infinity from center conductor to outer conductor so the coax is OK. We then retuned the output tuning screw of the 2.4 GHz filter (it controls the impedance match) and the signal jumped in so I guess it works OK now except for newly introduced flashing in the picture which we haven't identified yet. Why is it that when one thing gets fixed, two more problems take its place? In any case, attention was now turned to the 2.4 GHz transmitter, which has almost no output. We disassembled the transmitter and bypassed the final to supply the antenna with about one watt of 2.4 GHz RF. The report came back as P5 from Ken, WA8RUT, 5 miles away and P1 from Jay, KB8YMQ, about 25 miles away. Well, I now conclude that the antenna and exciter are OK. The problem is in the final amp, which was repaired for no output about a year ago. We decided to remove the whole transmitter and take it to the "shop" for repairs. Dale, WB8CJW, will perform the operation.

Attention is now focused on improving the 427 MHz output quality, 147 MHz input sensitivity and 439 MHz threshold sensitivity. Sounds like the whole system is a mess doesn't it? Well, not quite. It needed attention for some time but spare time simply wasn't available because of the warm weather. Now that the snow is flying, attention turns to maintenance chores so we're trying to improve the overall quality. Bear with us. The poor video quality on the 439 input really bothers me. We're going to have to look at the receiver very close. Since we're receiving the lower sideband portion of the ATV signal, the concerns are, "does the ATV lower sideband signal have identical characteristics to the upper sideband signal?" Most certainly W8DMR's picture on 439 direct looked great here for both picture quality and sync composition. So why then, is the signal so bad into the repeater? If Bill's lower sideband is the same as the upper sideband, the repeater receiver must have something wrong with it. It's a PC Electronics receiver specifically for 439 lower sideband and I believe once upon a time it was OK. We'll find it, so be patient!

The roof camera is controls are now nearly complete. We had the camera installed without the pan/tilt controls since last year but I removed it so I can check the operation with the controller. The controller still has some software bugs but we're getting much closer. We're in the "what if" portion of software debugging so those of you that do software know exactly what I'm talking about. We hope to have it complete and installed by the time you read the next issue. Keep your fingers crossed. That's all for now.
...Art WA8RMC

GO AHEAD AND PUT UP THOSE OUTSIDE ANTENNAS

This article is most useful for Bob Tournoux, N8NT (KF8QU), who has outside antenna restrictions in his area. Go for it, Bob and let us know how it turns out! The rest of us can relax, read and enjoy. WA8RMC

FCC Rejects 'Arbitrary' Limits On Video Receive Antennas. Homeowners associations can't impose "an arbitrary limit" on the number of over-the-air video programming antennas a viewer may install--"provided they are necessary to receive the video programming available for reception in the viewer's viewing area," the FCC's Cable Services Bureau has ruled. The case involved an Indianapolis couple's operation of an antenna farm of TV and satellite TV reception devices. The memorandum opinion and order issued late Oct. 8 was prompted by a petition from an Indianapolis couple who argued that their housing development's "plat covenants" regarding outdoor antennas violate FCC rules preempting most local restrictions on "over-the-air reception devices." The Crooked Creek Villages Homeowners Association in Indianapolis had sued residents Stanley and Vera Holliday in state court after the couple erected five 30-foot "masts" and one 10-foot mast supporting a total of five TV antennas and three satellite dish antennas. The Hollidays used their antenna farm to receive signals for 10 TV sets, nine video cassette recorders, and seven satellite receivers. After the Hollidays filed a petition at the FCC, the Marion County Superior Court stayed its proceedings pending the Commission's disposition of the petition. The bureau found that the association's policy prohibiting all antennas that rise more than 12 feet above the roof line constitutes a "per se bar without articulating a legitimate safety concern," and as such, is prohibited. The bureau said the association's policy of limiting homeowners to one TV antenna and one satellite dish is an "arbitrary limit" that violates the Commission's rules. "However, the record in this proceeding does not contain sufficient information to enable us to determine whether it is necessary for petitioners to maintain five television antennas and three satellite dish antennas in order to receive the video programming available in their viewing areas," the bureau added. (Telecommunications Reports Daily - 19991012)

...Tom KA8ZNY & Trig Tabor

ATV VIDEO DISPLAYS...Will they be like this soon?

MURRAY HILL, N.J. & Lucent Technologies and E Ink Corp. will work together to develop next-generation electronic books that resemble sheets of flexible plastic. The devices will combine Lucent Bell Labs' work on organic thin-film transistors with E Ink's electronically addressable ink to create e-books that are "completely different and new," according to Pierre Wiltzius, a researcher at Lucent Technologies Bell Labs.

The resulting units will be a far cry from current e-books, which Wiltzius called "a laptop turned on its side."

The companies plan to develop a low-pixel-count prototype in less than one year and e-books plus evolutionary products over a three- to five-year period. These may include large format electronic signs, electronic shelf labels and smart cards, which will emerge as e-book technology advances and can handle more pixels and content, said Paul Drzaic, director of the display technology division at E Ink (Cambridge, Mass.).

The companies said they have the enabling technologies needed to build e-books, but may ally with other companies in the future to obtain access to content and manufacturing resources. Lucent sees the joint venture with E Ink as an opportunity to take its organic thin-film technology to the next step, while E Ink desires a well-heeled partner to provide the drive electronics that will bring its addressable ink technology to market in the form of electronic books.

E Ink's display technology is comprised of a field of millions of tiny micro-capsules with a dark dye and light pigment. When charged by an electric field, the micro-capsules change color and create images. Organic thin-film transistors are "where our expertise is and where we have had significant breakthroughs," said Wiltzius of Bell Labs. "We're ready to take the next step and see how organic electronics can be brought together with a new display technology."

Bell Labs has achieved several breakthroughs with organic thin-film transistors. In 1997, a team of Bell Labs researchers produced the first fully "printed" plastic transistor using a process similar to the silk-screening of T-shirts. In November 1998, Bell Labs reported that by using organic compounds to build transistors and light-emitting diodes, researchers hoped to speed progress toward the manufacture of low-cost, large emissive displays.

Wiltzius said Lucent believes the advances made by Bell Labs in organic thin-film technology can lead to a new kind of e-book & low cost, flexible displays. In addition, Bell Labs devised new ways of defining electrode structures needed in thin-film transistors that don't involve lithography. For instance, it has been using nano-stamping to do patterning that can achieve state-of-the-art line widths of 0.1micron.

Lucent will choose from the materials it has already developed, and does not expect to develop any new materials specifically for this organic transistor project, Wiltzius said. "The challenge is to pick from all the various possibilities the ones that will bring this project to fruition," he said.

E Ink said it has been exploring various technologies that could be combined with its electronically addressable ink to create electronic books. "Organic transistor technology struck us as the most interesting because of the use of flexible substrates and the low-cost approach," Drzaic said. E Ink approached Bell Labs several months ago because it felt "the marriage between the organic transistors and the E Ink display technology is a natural fit," Drzaic said. Asked when the companies expect their new e-book to be available, Drzaic said, "If we find no fundamental problems in marrying the technologies and are able to manufacture it with increasing resolution, it could be three to five years for a high-end application."

E Ink has developed large displays that use its electronically addressable ink, and those units are currently being tested by retail stores. The signs are capable of alphanumeric but not matrix graphics. Drzaic suggested that Bell Labs' organic transistors could help increase the pixel count to enable E Ink's large displays to handle graphics.

Wiltzius said the price of the e-book display technology will need to be much cheaper than conventional display technology if it is to catch on. "While a conventional 8 x 10 laptop display costs several hundred dollars today, we expect our device will be cheap enough to create multiple pages on an e-book," Drzaic added. Lucent and E Ink aren't alone in efforts to develop flexible electronic displays. Researchers at Xerox Palo Alto Research Center and at IBM are separately working on flexible electronic displays.

From EDN article at <http://www.edtn.com/story/OEG19991014S0033> on 10/10/99

...Art, WA8RMC

AMSAT URGES FCC TO REJECT 2.4GHz APPLICATION...They're squeezing us!

AMSAT has urged the FCC to reject Los Angeles County, California's application for an experimental license to develop a public safety video system on the 2.4 GHz band. The LA County proposal, filed August 9, seeks FCC approval to develop an experimental system using four 10-MHz channels to transmit video images from helicopter-borne cameras to five remote receiving sites with active tracking antennas. The proposal targets the 2402-2448 MHz band where Amateurs have a primary domestic allocation at 2402-2417 MHz.

In comments filed October 22 with the FCC's Office of Engineering Technology AMSAT-NA President Keith Baker, KB1SF, said AMSAT views the experimental TV operation "with the greatest concern." "AMSAT believes that any such grant would violate the spirit of Commission's own order granting amateurs primary status on much of the band in question," Baker said, "and could well disrupt amateur satellite and other amateur use of the band as well as jeopardizing its use by other existing occupants."

Baker urged the FCC to deny the experimental license application because it poses the potential for serious interference to current and future satellites and could limit the use of the pending Phase 3D amateur satellite. The Phase 3D satellite includes transmitters and receivers on 2.4 GHz. The satellite is expected to be launched sometime next year. Baker also expressed concerns that a temporary experimental license could become a permanent fixture. The ARRL expressed similar objections to the proposal last month. The decision to grant the proposed experimental license is up to the FCC Office of Engineering and Technology's Experimental Licensing Division.

...From ARRL letter Vol 18 #43 10/29/99

ATV PUBLIC SERVICE "POLICE CHECK" ...Who's watching those who watch us?

I received this humorous story involving ATV in public service with the local police and thought I'd pass it along. The writer wisely remained anonymous, and I will respect that, only speculating that he is concerned with getting more than his share of future traffic tickets... W6ORG.

It seems that at the Boise, Id. River Festival, the local Hams were able to help out using ATV with the Boise Police department for the first time last year. The Ham operator in the field was beaming live video back to the police command trailer of the crowd, vendors, etc. It just so happened that during this time, the Chief of Police popped into the trailer to see how things were going and was fascinated with the live Ham video, and began watching the monitor. There he observed 5 of his policemen standing under a tree smoking cigarettes and drinking coffee. Instantly, he asked the Ham in the trailer if he could contact the Ham with the video camera and wanted it panned back to those cops. Done deal and as the Chief of Police watched his men not doing their jobs, he called them on the radio by name and asked if they think they should be putting out those cig's and drop the coffee and get back to work. The cops in the field looked around in a panic trying to discover where their boss was hiding while they complied. Needless to say, the Ham ATV group was asked to come back next year by the Chief of Police and cover the Boise River festival.

As far back as 1968 (see May 68 QST) I was flying ATV in a helicopter for the Pasadena Civil Defense Communications and during the Rose Parade and there was an intersection that was a bad bottle neck for traffic going from the Parade to the Rose Bowl. I was asked by a Police Captain to circle the intersection and show him a pix of the traffic flow in all directions from that trouble spot. Seems the traffic cops were only letting a few cars at a time through from each direction. The Captain called the intersection cops and ordered them to let a dozen or more at a time through, especially to the Rose Bowl feeder road. The intersection cops evidently disagreed with the Captain and

kept right on letting just a few at a time through resulting in a long line of backed up traffic to that intersection. The Captain radioed the order again and the intersection cops replied that they were following orders. He then said that he could see that they were not following his orders. The intersection cops said how could that be since he was in the Rose Bowl operations center some miles away. I saw the cop look up when the Captain said to check out his video eye in the sky - glad he did not pull his gun.

...Tom W6ORG

HIGH POWER ATV...Only Henry could do this!

I have a couple of minor pieces to finish but I now have a full legal power solid state class A 100% duty cycle broadband 420-450 ATV (any mode actually) amp. I should get the last three combiners done by Christmas! I think I am the first to do this (solid state 1 watt in, 1500+ watts out CW on 420-450 no tuning!)

With 16 amps total, it takes 2 complete racks with power supplies. Power divider from the exciter feeds (4) 100 watt amps, each 100 watt amp is divided to drive (3) 150-200 watt amps, and each set of three amps puts out 300-500 watts depending on drive. The amps are then combined in pairs to provide (2) 600-1 KW outputs then combined to a final output of 1200-2000 watts. There are 28 cooling fans. The input drive is split into four RF signals. Delay lines and variable attenuators are used to match the input phase and power to obtain a balanced output for minimum reject load at the output hybrid combiners. The system runs on 40 amps of 220VAC (including fans). The amp is class A using class A video RF devices (PTV7025). The amps are all identical in basic construction and interchangeable. Each amp has four devices in parallel. The power is 26 volts DC with very low ripple and very stiff regulation. Standard strip line PCB construction is used and there are no tuning adjustments. Each amp has one capacitor for balancing RF drive between the four devices. A simple strip line input RF power divider is used likewise on the output. A broad line type hybrid combiner is used on the output with 25 watt termination resistors. The output hybrid combiners have 500 watt Bird reject loads, but only have a fraction of a watt to dissipate under normal operation, and basically protect the amps in case of a significant failure that would unbalance the hybrid. Bird RF line sensors are used on the output of each set of amps to monitor output and combiner VSWR to allow balancing the amps. Teflon coax and N connectors used throughout. Final output cables are all 1/2" Heliac. I am still wiring the AC mains input (4 sets of 220 cables) and still have to get a TX/RX relay set that can handle the power. Dow Key units melt and burn! But it is 100% key down forever full legal power, no tune, no drift, no sweat. Each amp set has already been tested into a dummy load for 30 days continuous and doesn't get warm at the full 1500 watts output.

...Henry KB9FO

LEONIDS BALLOON LAUNCH / RECOVERY SUCCESSFUL

Following a successful launch by the ground team in Huntsville at about 1:30 AM EST on November 18, 1999 the payload was tracked and recovered 100% intact by a team of Foxhunters from Atlanta, GA and Chattanooga, TN.

Eddie Foust (WD4JEM) and Larson (KF4HLH) were positioned on Sand Mountain in Alabama, near the original predicted touchdown point. They were using Radio Direction Finding (RDF) techniques as well as tracking the balloon via its GPS reports on APRS. After the balloon passed that point and continued towards Georgia, they continued videotaping the ATV signal for future use by scientists from NASA.

Ed Myszka (KE4ROC) was also tracking the balloon using APRS Plus from Mission Control in Huntsville along with Bill Brown (WB8ELK) who, after coordinating the launch activities, was making his usual highly accurate landing predictions. The Amateur Television signal was fed live to NASA's web site and relayed Worldwide.

Meanwhile Ralph Fowler (N4NEQ) was tracking from Kennesaw, Georgia using APRS Plus and RDF and proceeded to Adairsville, GA - the new predicted touchdown point. David Hoffman (KE4FGW) and Daniel Collings (KE4VRJ) were in the Chattanooga area and headed towards Ft Payne, Alabama, which, for a while, had been another predicted touchdown point. They were using RDF as well as WinAPRS, but developed a problem with their APRS position not beaconing properly. They eventually switched to a backup DOSAprs system and began showing up on the map. This was essential to allow planning between the DF crews to avoid retracing each other's steps.

The balloon, traveling at 88,000 feet, picked up speed and went due east. At one point it outran Ralph, who was almost directly below it. When it became obvious to Bill and Ed that the balloon was not going to achieve burst altitude (100,000 ft) prior to being over the North Georgia Mountains, they decided to use the remote cutdown mechanism to cause a landing in more friendly terrain. The balloon descended 88,000 feet in 24 minutes to land near Fairmount GA in the center of a 2,200 acre tree farm FULL of 20-30 foot tall pine trees spaced about 6 feet apart. To make matters worse, the area was leased to a private hunting club, it was posted no trespassing, and it was daybreak in the middle of deer hunting season.

After circling the area, analyzing the final GPS readings, and taking several RDF bearings on the 5th harmonic of the 28.8 MHz tracking beacon, It was decided to attempt to obtain permission to go into the forest. A nearby resident helped the team locate Lane Tow [rhymes

with wow], a hunting club member at his workplace. Mr. Tow graciously offered to come out escort the team through the locked gates throughout the property and over the labyrinth of private roads within the forest. A final pair of bearings led the team to the ridge that hid the landing spot about 1000 yards off the road. At about 9:30 AM on November 18th, 1999 the package was located and deactivated. The main payload was resting on the ground with the parachute, support lines, radio beacon package and strobe package spread through the tops of 3 pine trees. The package was taken to Kennesaw, Georgia, where Ralph and Ed will meet for the return of the payload.

...Ralph Fowler N4NEQ

ATV BANDPLANS vs WEAK SIGNAL ADVOCATES...A scary discussion!

An anonymous caller wishes to complain about a weak signal group wanting to outlaw ATV because it takes up too much bandwidth and could interfere with weak signal activity. This has the potential to be a bombshell for both sides and guarantees a heated discussion. Lets read on and see how the groups respond followed by W6ORG's orderly and accurate summary! The key word here is "SHARE" WA8RMC.

"A group is proposing a second ATV repeater for 70 cm in their locality. They have selected a frequency pair which includes a wide-band TV input frequency at 434 MHz. The local ATV activity with a 6 MHz bandwidth would/could prevent weak signal reception from satellites. I am in a turmoil here!!! I've asked the second group to change the input frequency with no avail.

I have heard that ARRL or the FCC has indicated a band-plan for 70 cm, but no one here seems to be paying attention to my thoughts. The second ATV group is preparing to request "frequency coordination" from "T-MARC" (the local repeater coordinator). I have attended the annual T-MARC meeting and they indicated little or no objection to the requested 434 MHz input frequency. I need some help here to convince all that a bad choice is in the making".

...Anomyous.

Dear Anomyous,

ARRL does have a suggested band plan, which is published, in several places including the repeater directory, last I checked. Within this band plan are some local options which are considered by the frequency coordinating committee. And, there is the band from 435-438 MHz for the amateur-satellite service. FCC respects local frequency coordinators for repeaters and auxiliary stations. However, every amateur radio operator signs away the right to any specific frequency as a condition of application. **Sharing is the order of the day.**

Now, there are some technical considerations. First, is the ATV power spectrum. While the total bandwidth of an ATV signal may be on the order of 6 MHz, the power spectrum is not uniform. Most of the energy in common vestigial sideband NTSC color transmissions is concentrated at three points. One is at about 1.25 MHz from the bottom of the 6 MHz "channel" for the visual carrier and it's most significant sidebands. The vast majority of the sideband energy is most likely to occur within about +/-1 MHz of the visual carrier. The other two are the color subcarrier at about 3.58 MHz above the visual carrier and the aural (sound) carrier at 4.50 MHz above the visual carrier. What's important here is that, while the power from an ATV station in the band 435-438 MHz is not zero, it may be low enough to be tolerable. How can you tell what will be tolerable? This is a normal exercise in checking compatibility. You'll have to look at your own station with its directional antenna, where the antenna is likely to be pointing, and the signal you'll be receiving and transmitting. (Yes, transmitting! You may be a source of interference to the ATV repeater.) Then, repeat the exercise for nearby ATV stations. (You may have to go a ways to find one, as they're not all that common even in our neighborhood.) Keeping in mind the power within the bandwidth of your receiver, figure out how the power received from the unwanted station will compare to the signal you want to receive.

Clearly, if you have an ATV station next door, you're much more likely to have a problem. But, as mentioned, that isn't too likely. Just run the numbers and see how it comes out. The ATV repeater folks should be doing the same thing as they will have to deal with you as a source of interference as well. Then, there's the time factor. Neither you nor nearby ATV stations will or should be on the air 100% of the time. So, there may be more sharing opportunities here.

Would it be wiser for the ATV'ers to look to wider bands like 902-928 MHz or 1240-1300 MHz or other bands? Sure. These bands could stand some heavier use to help justify their existence in the minds of those who look at such things. Probably so. But, do the ATV'ers **have to** look beyond the 420-450 MHz band? No. Not at all.

The resolution of this problem is most likely to be by means of mutual enlightened self interest. Both you and the ATV group need to find a way to get along. Technically, that may well be possible. You'll both have to run the numbers taking into account frequency, power density, receive bandwidth, time, space, and other factors. T-MARC may be able to lend a hand. (I'm sending a copy of this to a member friend.)

...Art NSIUF

The above discussion ruffled the feathers of a few more who want to vent their thoughts. WA8RMC.

"Tolerable" doesn't figure into the equation; it's a matter of whether or not it's legal. It may be "tolerable" from interference standpoint for me to operate FM in the CW portion of 20m while the band is dead, but that doesn't make it legal.

The nominal bandwidth of an ATV channel is 6 MHz for VSB-AM. Yes, the power is concentrated near the visual and aural carriers and the color burst frequency, but the bandwidth of the signal is defined by the -26 dB points. This comes from Part 97.3(a)(8). The aural carrier's upper sidebands predominantly define the upper limit of the total bandwidth, and that is nominally around 4.6 MHz above visual carrier. The lower -26 dB limit is very close to the bottom of the "channel" and dictated by a combination of "skirt" slope of the VSB filter

as well as the modulation sideband energy. So, using the -26 dB spec, the bandwidth of a VSB ATV signal is a little under 6 MHz, but not by a whole lot.

Part 97.307(b) says that emissions resulting from modulation (i.e. sidebands) must be confined to the band or segment available to the control operator. In other words, that whole 6 MHz must fit within the subbands available to the control operator. So, a visual carrier on 434 would nominally occupy spectrum from 432.750 to 438.750 MHz. Granted the energy isn't evenly distributed throughout that whole range, but that doesn't matter according to the Part 97 citations above, the entire bandwidth of the signal must "fit". 432.750 - 438.750 obviously overlaps the 431-433 MHz protected weak signal subband (excluded from repeater operation by 97.205(b)), as well as the 435-438 MHz satellite subband (excluded from repeater operation by 97.205(b)).

The conclusion I draw from this is that an ATV repeater using 434 is illegal. Anyone else see this differently?
... Jeff DePolo WN3A

The problem with their selection is that 434 MHz (if you read the rules properly) is illegal to use as a repeater input for ATV... Part 97 states that 435-438 MHz is off limits to repeater inputs or outputs.... Also ALL emissions must be kept within appropriate subbands... ATV does put emissions across 435-438 with a carrier freq. of 434 and running NTSC (and since FEW ATV USERS have a lower sideband filter, they also cause havoc with users in the 431-433 weak signal band)....The same above is true for a 2mtr rprr with an input on 146.000...it is illegal as the emissions would fall BELOW 146.000 and therefore be out of the repeater subband as per Part 97...
...Chris WB5ITT

OK...Let's see if Tom can clear this up. WA8RMC.

**I've been forwarded emails lately on the old fears of weak signal and satellite users having an ATV repeater input on 434 MHz. I have included below my write up on 434 vs 439 technical considerations as might be applicable to those that might have to fight the problem in their area or those who want to stay informed. This comes up about once a year and brings out the usual rabble-rousers.
73, Tom W6ORG**

434.0 and 439.25 MHz ATV Technical Band Plan Considerations

As more and more FM voice repeaters come on the air in any given area below 444 MHz, ATVerS get more interference and consider moving down the band. Cross band repeat with 426.25 input and 33 or 23 cm output is a good alternative if most have good line of sight and close enough to the repeater site. However the 70 cm band still goes much farther than the higher bands given the same power and antenna gains - 900 MHz is 1/2 and 1200 band is 1/3 - not to mention the higher coax loss and cost.

Forget the ARRL 70 cm band plan; it was never a technical band plan but was adopted back in 1979 after a survey of what some people happened to be using at that time by the VUAC. It has never stood technical review since then and since there are so many different local band plans now, I doubt one could be agreed upon. One of the glaring errors is the overlap of the 439.25 MHz ATV

I suggest each area have a band plan meeting with 1 or 2 of the best technically qualified representative from each amateur mode to work out an agreed upon technical band plan as we did here under SCRRBA (So. Calif. frequency coordination group) sponsorship many years ago. SCRRBA does repeater and link coordination as well as maintains the band plans but the band plans are engineered and determined by consensus of a technical committee representing weak signal, satellite, digital, experimental as well as FM voice and ATV.

Using 434.0 or 439.25 lvsb for ATV can be a win win situation for FM repeaters as well as ATVerS. Both will have room to operate with minimal interference. FM repeaters or what ever modes the local band plan works out can go down to 441.0 if 439.25 is used for ATV or 438.7 if 434.0 is used. The A line people really only have 439.25 or must forgo normal sound subcarrier.

We here are satisfied with the legal reasoning we have given to use either of these two ATV video carrier frequencies given the spirit and purpose of the FCC rule of preventing interference from terrestrial repeaters within 431-433 and 435-438 MHz segment. Each area will have to make their own minds up but those who just want to eliminate ATV from the band, or have had a personal bad experience with an ATVer, or enjoy debating or strictly interpreting the FCC Rules will just have to spend the time battling it out with local ATVerS - it seems that is more of a hobby for some than enjoying all the many modes of Amateur Radio and finding ways to work it out.

Let me restate the legal reasoning, because we did not arrive at it lightly. Also we feel to put in a request for a rule change would stir up the pot much like it has done on remailers and most of us did not feel we wanted to put the time in trying allay the interference fears by educating and responding to so many people across the country. Hopefully, as each area works out their local all mode band plans, the true technical characteristics and proof would come out to everyone concerned, just as we had to do here with our weak signal and satellite people. There is no way we could travel around the country with a spectrum analyzer and gear to make the tests to so many, and no amount of written technical proof seems to over come the fear of the possibility.

We moved down to 434.0 in Southern California over 20 years ago to allow more FM voice channels which were growing very rapidly in the 70's. Our FM voice repeaters go down all the way to 440.0 and have been full up for years - over 600 coordinated voice repeaters, most of which are on high sites greater than 4000 feet above the coastal plain. At the same time we did not want to exchange interfering with one mode only to have it with another. Given the spectrum power density of an ATV signal being 95% +/- 1 MHz from the carrier, the 434 frequency had little energy in the weak signal or satellite bands and on the air tests confirmed it to the satisfaction of all 3 parties. So we feel we have satisfied the prime directive of 97.101(a) of good amateur engineering and practice and 97.101(d) where the use of 434.0 does not cause interference to the two modes who wanted protection from repeater users with the exclusion.

In addition, the ATV repeaters use horizontal sync detectors (15734 Hz) to key up the repeater. Therefore it does not intentionally key up and repeat in the presence of any other mode - just its intended AM video modulated carrier at 434.0 MHz.

The received energy at the repeater is below the 26 dB in the 431.0-433.0 and 435.0 to 438.0 MHz segments per the definition of bandwidth per 97.3(a)(8) when using the 434.0 MHz video carrier frequency. The sideband energy from camera video is very low and random +/- 1 MHz from the video carrier. If you have access to a spectrum analyzer, watch a broadcast TV upper side band and you will notice the levels are way down. A photo can be found in the 1995-2000 ARRL Handbook page 12.48 figure 12.61 also.

The sync is the only video component that is constant and according to the Television Engineering Handbook - 1992 - Benson - Fig. 5-11, the horizontal sync harmonics sideband energy is more than 40 dBc +/- 1 MHz from the video carrier. So if you are transmitting 150 watts pep from a Teletec amp, the sync energy in the weak signal and satellite segments is no worse than transmitting a 15 mw pulse every 63.5 μ s.

In addition, a narrow band receiver is like a low pass filter to the video since at any given frequency, the amplitude of the video pulse depends on the rise time as the camera horizontal sweep goes across and sees a white to black, or vice versa transition. A full white to black vertical line in the picture is going to be a rare occurrence, more likely smaller amplitude changes in the shades of gray. Since the video amplitude change is not a continuous sine wave, but occurs at the 15.7 kHz sync rates in time, this pulse is further attenuated by the narrow IF and audio filters. Try tuning across the band with a SSB or CW receiver as an ATVer is transmitting. I doubt you will note anything outside of +/- 100 kHz of the video carrier, in fact I can only remember one case of interference here in 20 years where the ATVer was less than a half mile away from the 432 receiver and they worked it out on two meters. Some ATVers have multimode voice rigs and come on during contests just to give the 432 gang some points now.

In any given area, the local hams must decide to go to 434.0 or 439.25 Lvsb - you cannot run both 434 and 439.25 upper or lower VSB since the video will overlap. Therefore the decision will have to be what two ATV frequencies will be part of the local band plan. They need to be at least 8 MHz apart to prevent interference in the weak on channel vs. strong adjacent channel case. This is why broadcast TV skips a channel on VHF and 2 channels on UHF. Cable TV does not have that problem because they go to great lengths to equalize and filter all the channels to the same amplitude.

If more than one repeater is to be in the area on 70 cm, then sharing a common input can be done and coordinate on the two meter talk back frequency. Often, the two meter frequency is repeated back - at about 1/2 the sound subcarrier input level - on the ATV repeater sound subcarrier output. Here in So. California, a person coming on in the southern part of Los Angeles County could possibly key up 5 ATV repeaters at one time if running an omni on 434.0 MHz as well being linked to Las Vegas - we have to co-operate. See the ARRL Repeater Directory ATV section.

When using 434.0 and 439.25 lvsb, ATVers must accept the fact that local hams up-linking to a satellite will occasionally wipe out the video depending on beam headings. But most satellites are only in view for up to 15 minutes on a pass, and track in azimuth and elevation so be patient and wait. We even have some ATVers who put the satellite tracking map from their computers on the air so we can see when the pass will be over. As a consequence, many ATVers here enjoy working satellites (myself included) and vice versa.

Those using 439.25 MHz ATV can use horizontal polarization to give up to 20 dB of cross polarization loss to the vertically polarized FM repeaters. Conversely, since 432 MHz is horizontal, those using 434.0 MHz ATV should be vertical.

There is plenty of spectrum for all of us if those concerned are willing to work out the local band plan on a technical basis with all mode users. Southern California has the highest communications density of hams and the unusual geography of a high mountain range full of repeater sites that cover 100 miles up and down the coastal plain. If we can work it out here, other areas should be able to figure out engineering solutions also.

... Tom O'Hara W6ORG ARRL Technical Advisor for Spectrum Management and ATV.

I knew Tom could say it right and be fair to all parties! Hooray!!!! WA8RMC.

MORE 10 GHz STUFF...if I keep it up, someone will try ATV here.

When I started in 10 GHz work using Gunnplexors, I was unsure if I was transmitting in the band, so precision measurement was just an unfulfilled dream. I looked for but did not find a comprehensive summary of available methods affordable for hams. Of course, if you have a new, modern frequency counter, you can stop reading here since it is academic. But if you are a rather normal ham, continue reading ...

Here are 8 methods, which I have unearthed:

- 1. Ku Band LNB and Counter.** This method uses a Ku band LNB on 9.700 GHz or 10 GHz and a counter capable of counting to about 600 MHz or more with the classic bypass capacitor and choke decoupling the RF from the 18 VDC going to the LNB. I use an old Amstrad European Ku band LNB with LO on 9.750 GHz and my old 600 MHz counter. I can't cover the full 500 Hz band, but enough of it. This method was described by Michel, HB9AFO in the USKAs "Old Man" for September 1992. The same topic was addressed by Denys Roussel in "VHF Communication" of the UK for January 1995. I saw the same point made by G3RFL from the US ATVQ in a German language version in TV Amateur 28-92/94 in a copy sent to me by Michel Bernard, HB9VAZ. With a LO frequency not easy for calculations, I made a spreadsheet to show counter indicated frequency and actual frequency.
- 2. Predivider by 8 with a counter.** This method was described by Serge Riviere, F1JSR, in the Swiss ATV News for August 1995 then in the B5+ of ANTA of France in October 1995. It is a simple circuit using the Fujitsu IC FMM110HG, but I was afraid to check the price in a US catalog since Serge said it was about 1800 FF and that was close enough to give me fear of causing a heart attack! It would not work with my old 600 MHz only counter...poverty is a real handicap!
- 3. Wave Meter with Field Strength Meter and Amplifier.** I happened to obtain gratis a nice Hewlett-Packard absorption frequency meter and I coupled to it a 1N23 crystal detector and a CA3130 meter amplifier as described in the US "73 Magazine" for August 1996, page 54 and in the book "Microwave Building Blocks". I was able to use a friend's counter to determine the error at about 10.275 GHz, a common frequency for us here in PA. In my case, it is the indicated frequency minus 14 MHz.
- 4. Two-meter HT with diode multiplier.** I have not been able to find the full specifications on this but I see references to it here and there. It uses a 1N23 diode mount and a 2 meter HT. Thus $146.42 \text{ MHz} \times 70 = 10.249 \text{ GHz}$...but I have no more!
- 5. C band LNB of the USA oscillator times 2.** I think this is a NEW method. While doing some research on these Labs and satellite receiver tuning, I discovered that the oscillator is a stable DR fixed on 5.150 GHz so the 2nd harmonic is most conveniently on 10.300 GHz. I had an old LNB from prior satellite service with a 100 degree LNB. I just removed the metal cover and checked it! Voila, there it was as predicted and weak enough to avoid overloading a receiver yet strong enough to find it even 3 meters or so from the receiver. It is quite light so can I use mine in the field with two 9 volt batteries in series and a non-metallic cover over the oscillator compartment. An audio tone for modulation would make it even more usable. Idea: Take one of the Christmas jingle devices from a Christmas card!
- 6. LNB and Alinco receiver.** For information, I have used the modified European 11 GHz LNB as described and modified by Denys, F6IWF in his article in "VHF Communications" for January 1995 on pages 2-17 and US ATVQ for Fall 1997 page 14-18 to feed my satellite receiver on US Transponder 12-14 on about 1250 MHz. Then, the 70 MHz output is sent to my ICOM 706 receiver in WFM audio mode. When I recently purchased my Alinco X-10 receiver with multi mode reception, I realized I had a new method for reception and also for measurement as I could feed it directly from the LNB on about 1250 GHz in Wide Band FM using the blocking capacitor and series choke method as used with the counter/LNB method as described above. This not only provides a direct frequency readout on the Alinco receiver for reception of the other station your are working, but it does so with reduced weight and reduced error thanks to the DRO which, per Denys, is accurate to $\pm 1 \text{ MHz}$. I made a simple spreadsheet chart to relate received frequency to receiver digital readout frequency. I have also used a UK LNB from Bob Platts, G8OZP in England with great results.
- 7. European Satellite Receiver.** I have one purchased new in Prague in November 1997 which works nicely on US Ku band TV. Unfortunately, I can't get it to read the input frequency directly on 10 GHz even though I can use a LNB purchased from England with the LO on 9 GHz. If you know how to do this.....great...and please share it with us all!
- 8. A friend's frequency counter.** My friend Joe, WA3PTV, has a frequency counter effective to 18 GHz but he lives about 60 miles from me!!! This is not too handy for my measurements BUT...I have used it to establish the margin of error on my wave meter and LNB/counter.

I would be delighted to learn of other methods and I hope you will share them with me by EMAIL or regular mail.

... John, W3HMS; EMAIL W3HMS@aol.com

FALL EVENT DETAILS... The outside weather was cold but we were inside!

Another Fall Event has come and gone but what remain are memories of a great time. The turnout was rather light this time. I don't know just why but there were a few who had other plans that couldn't be cancelled. Never the less, the rest of us enjoyed good (free) food brought by WA3DTO and financed by our treasury. The agenda included a "social" time before lunch, followed by lunch, short meeting and door prizes. During the meeting we had our annual election of officers. I'm happy to announce that the present officers are re-elected for another year. We even had a cake (no special purpose) to enjoy for desert. Since the day was cold, we needed someone to keep watch of the fire and "re-fuel" it if necessary. Ken graciously accepted the challenge as evidenced by his stance in the picture below. Thanks, Ken!



The pictures above contain some of the people that attended. The table above is displaying some of the prizes. (There were enough prizes so NO ONE went home without one). The cake directly above was prepared by Rick, WA3DTO for the occasion. That's all for now. See everyone at the spring event.
WA8RMC

ATV vs SATELLITE RECEIVERS... Interference? Again, Tom clears the air!

I [W6ORG] got an email today from the ATVer who originally asked the question about possible interference to satellite ops and did a little more checking into the possibilities. I thought I'd pass it on to the ATVgroup for what it is worth in case it comes up in your area.

There is definitely the possibility of getting into a satellite with an ATV signal at 434.0 or 439.25 but not very probable. The ATVer would have to run significant erp, have a high gain beam pointed at the satellite and just happen to have something in the picture like a full screen length vertical line that went from full white to black of the right rise time to create a sideband on the satellite input frequency. And then don't forget that those receiving on the ground have a narrowband receiver that will integrate out a lot of that pulse energy.

One can calculate what erp an atv transmitter would have to have to put some energy above the noise floor of a satellite receiver, but again, keep in mind that the video sideband energy is random at any given frequency depending on what is in the camera video - it is not like a CW carrier or sine wave.

I watched a local TV channel yesterday and nothing got over -35 dBc between 1 and 3.5 MHz above the video carrier. Most ATVers run our 10 watt system (only 14% buy 100 -150 watt amps) so most ATV signals will put less than 3 milliwatts to their antenna system at the satellite or weak signal frequencies. Assuming 3 dB loss in coax and a 14 dBd antenna, the erp on the horizon will be in the order of no more than 50 milliwatts. The horizon is the highest path loss between the ATV transmitter and the satellites receiver which can be 1000 miles or more.

At 1000 miles I get the energy arriving at the satellite as about -148 dBm. As the elevation of the satellite increases and its distance gets closer, the ATV antenna has less gain and erp in that direction. Each satellite will have a different noise floor depending on its bandwidth and front end noise figure. Given a satellite receiver with a 200 kHz bandwidth, its noise floor probably is not going to be any better than -120 dBm and little antenna gain if any. So there are a lot of below the noise floor dBs one can play with from my example in terms of higher power, closer distance, etc., before significant ATV sideband energy could possibly effect a satellite receiver.

The only interference problems I have heard about (I can count them on one hand) are strictly terrestrial where the two hams are in the same neighborhood. I have never heard of an ATV transmitter getting into a satellite receiver. In fact I am surprised that the Navy ship or Pave Paws radars with their 1 to 5 megawatt erps have not been detected in the satellite receivers.

All the hub-bub is about 434.0 but keep in mind that ATVers transmitting on 439.25 put the same amount of sideband energy into the 435-438 segment. Given all the ATVers on in the country (I have almost 5000 in my customer data base), if there was a real problem, there would be lots of actual complaints.

I feel that 434.0 is an efficient use of the 70cm amateur spectrum with least probability of interference to other modes in those areas that cannot use 439.25 due to increased FM voice repeaters. If I thought that there was a real problem of interference, I would not have gone along with this as one of the ATV frequencies. I might also say that I get requests for transmitters on other frequencies that would be closer than 1 MHz or has the sound subcarrier within the satellite segments and refused to supply them.

... Tom O'Hara W6ORG

TV SURVEILLANCE DEVICES...A "sour grapes" report from a dealer!

I heard by way of an email forwarded to me by another ham that the FCC has finally acted by sending a couple of dozen "love letters" to the Manufacturers, importers and dealers marketing audio and video surveillance RF devices, most of which were in the ham bands and not Part 15 certified. Note the sour grapes page on Ramseys web site:

<http://www.ramseyelectronics.com/scstore/sitepages/hobby/fedpage.htm> While he was one of the minor offenders, compared to many others, his ads had a 434 transmitter module offered as being in the "license free band" which gave the wrong impression to anyone not familiar with FCC Rules. **As a ham, John Ramsey should have known better.** Part 15 intentional radiator limits in the 70cm ham band are only 200 microvolts at 3 meters - this is in the low microwatts to a dipole, no where near the milliwatts his stuff had. If you have any comments on his marketing to the security and unlicensed users, he has an anonymous feed back section for each product the FCC had him pull. I hope this FCC action will get around to the illegal and unlicensed users and dealers which will cut down the interference from these people who show up in our ATV repeaters and the time and hassle it has taken to run them down. My thanks to those hams who have complained to the FCC for many years about these bootleggers and the ARRL legal dept for bugging them (that's bugging as in the keep after the FCC enforcement people, not as in surveillance).

...Tom W6ORG

The following is an excerpt from the Ramsey Electronics home page listed above....WA8RMC

"Thank you for ordering this product.

However, a recent US Federal Government action has prohibited us from selling this product to you because they feel you are using it for illegal use. For over 25 years, Ramsey Electronics, Inc. has been selling wireless hobby and educational kits for your fun, pleasure, and education in kit building. Investigators believe world class "kidnappers and organized crime" are using things like our \$5.95 wireless microphone kits for their "surreptitious" international espionage use! When in reality, they've been used for years and years as a valuable educational kit used in things like model trains, amateur radio, school projects, Scout projects, baby monitoring and more. Further, our FM-5 kit has become the most popular "starter" kit to learn all about Surface Mount Technology. Schools use them around the Country for their students first hands-on project with SMT!

Yes, we've been advised that some of our award winning low cost hobby kits, the same ones you see below, and that were FORMERLY ordered by thousands of scouts, schools and hobbyists for all these years, might be in violation of US Code Title 18, Section 2512 because they believe their "primary use" was designed for such "surreptitious" use, and not for hobby, and educational use.

Unfortunately we cannot sell you this item you have selected, but we would like your input. Please take a moment to tell us how YOU would have used the product you were going to order. The information will provide documentation regarding the proper and legal use of such hobby kits. No names or other information is gathered....just the application, which goes into a database list for our use. From one hobbyist to another...thanks".

NEED A VIDEO AMPLIFIER?... Try something like this!

Looking for some circuits to split video and send them off to different inputs? One in and four out. The attached diagram should help. The schematic shows a typical non-inverting op-amp amplifier. With the proper application of devices and resistors, this can be used for either video (or audio) distribution.

The input:

This circuit requires dual power supplies and it is DC-coupled and any DC offset that is to be found on the signal being input will be amplified and passed to the output. For normal video inputs which range from 0 to 1 volts, this is no problem (and is desirable!) but for those that have built-in DC offsets (such as from many video cameras, and from some overlays like the BOB-II, there is a DC offset and capacitive coupling is recommended. For most video applications, the gain of the amplifier is 6db (a voltage gain of 2) and you want to keep away from the supply rail on the op amp's output. Most audio outputs are already capacitively coupled and, unlike video, low-frequency rolloff does no real harm to the content (aside from rolling off bass, perhaps.)

The output:

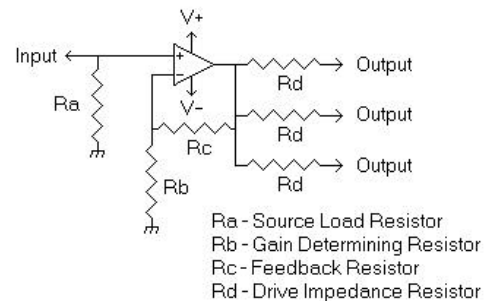
For video, keep in mind the output voltage swing restrictions mentioned above. A *single* video output is seen by the amplifier as a 150 ohm load (75 ohms for the source impedance, 75 ohms for the load) and each additional load is seen as another 150 ohm load by the device. Since there are essentially two 75 ohm resistors in series, the voltage is dropped by half. Therefore, the op amp itself needs to swing 2 volts for a 1 volt peak-to-peak output, hence the requirement for a voltage gain of 2.

A Video Distribution amplifier:

The amplifier should be a high frequency, high-output Op-Amp. Two suitable devices are the National Semiconductor LM7131 (available from Digi-Key) and the Harris HA-2544. The LM7131 is inexpensive and readily available. It happens to have the exact same pinout as the venerable 741, in case you are wondering. A word of warning: It can only tolerate a maximum power supply differential voltage of 11 volts (a +5.5 and a -5.5 volt supply, for example.) I don't have specs for the '2544 handy, so I don't know about it.

For this, Ra should be 75 ohms - this will cause this circuit to properly terminate to 75 ohms. A resistor here *is required* to provide a DC ground reference, but if you wanted to use this as a "loop through" you could simply replace Ra with a higher value of resistor, such as 1k through 10k (to keep the amplifier from drifting to a supply rail.). Rc and Rd should both be equal, and they can be anything between 1k and 2k. Much higher than this and circuit capacitance can start affecting the frequency response. Rd would be 75 ohm. The LM7131 can easily drive a 50 ohm load (i.e. 3 outputs) with a +-5 volt supply, and is rated for at least 40 milliamps output in this case. If you *are* using this for a DC-reference video amplifier (for video that goes from 0 volts 1 volt) then you might use a "lopsided" power supply, such as a -3, +7 volt supply: Remember that we only need to swing down to zero, but up to 1 volt on the output. If more outputs are needed, additional '7131 (or '2544's) may be added: The would share a common "Ra" but have their own Rb, Rc, and Rd's.

Don't forget to bypass the op-amp (*very* close to the power supply pins!) with some good filter capacitors. I personally use a 0.01 as close as possible



Note: additional power supply bypass capacitors are required

General Purpose Distribution Amplifier

by Clint Turner, KA7OEI

to

to

14

the IC, with a 0.1 and a 100 uf capacitor nearby. Using good wiring practices is essential. In some instances, the amplifier may exhibit some high-frequency ringing or oscillations. A small capacitor (usually in the 10pf area) across Rc usually does the trick. Finally, if you want to roll off some high frequencies, capacitance (or a network) across Rc will work, while a small amount of capacitance (or a network) across Rb will boost high frequency response (handy for compensating cable loss, etc).

An audio distribution amplifier:

The same rules apply as for the video D.A., but the op amp and resistor values are different. Use a good, quiet op amp (TL082's or LF353's, NE5534, etc.) or, if you must, a 741 or 1458 will work for most applications (the pinout will vary with the device, of course.)

In this case, Ra would be something on the order of 47k (or lower if the application warrants) while Rb and Rc would be equal and could be anything from 10k to 100k (the value isn't at all critical here...) Rd would be whatever you want the source impedance to be - you could make this 600 ohms if you want.

Again, watch the voltage ratings of the op amps. A +- 5 volt supply is the minimum recommended for audio applications where a +- 1 volt peak-to-peak output is needed. Good bypassing of the power supply is highly recommended.

...Clint KA7OEI

NEW FCC HAM RADIO LICENSE CLASSES...finally! (not ATV but...)

Amateur Restructuring is Here: Three License Classes, One Code Speed

NEWINGTON, CT, Dec 30, 1999--Amateur Radio will get a new look in the new millennium. The FCC today issued its long-awaited Report and Order in the 1998 Biennial Regulatory Review of Part 97--more commonly known as "license restructuring." The bottom line is that starting April 15, 2000, there will be three license classes--Technician, General, and Amateur Extra--and a single Morse code requirement--5 WPM.

"We believe that an individual's ability to demonstrate increased Morse code proficiency is not necessarily indicative of that individual's ability to contribute to the advancement of the radio art," the FCC said.

Besides drastically streamlining the Amateur Radio licensing process, the FCC said its actions would "eliminate unnecessary requirements that may discourage or limit individuals from becoming trained operators, technicians, and electronic experts."

Although no new Novice and Advanced licenses will be issued after the effective date of the Report and Order, the FCC does not plan to automatically upgrade any existing license privileges. The ARRL had proposed a one-time across-the-board upgrading of current Novice and Tech Plus licensees to General class, but the FCC declined to adopt the idea. This means that current licensees will retain their current operating privileges, including access to various modes and subbands, and will be able to renew their licenses indefinitely.

Starting April 15, 2000, individuals who qualified for the Technician class license prior to March 21, 1987, will be able to upgrade to General class by providing documentary proof to a Volunteer Examiner Coordinator, paying an application fee, and completing Form 605.

The FCC's decision not to automatically upgrade Novice and Tech Plus licensees means the current Novice/Tech Plus HF subbands will remain and not be "refarmed" to higher class licensees as the ARRL had proposed. The FCC said it did not refarm these subbands because there was "no consensus" within the amateur community as to what to do with them.

As it had proposed earlier, the FCC decided to lump Technician and Tech Plus licensees into a single licensee database, all designated as "Technician" licensees. Those who can document having passed the 5 WPM Morse code examination will continue to have the current Tech Plus HF privileges. "If documentation is needed to verify whether a licensee has passed a telegraphy examination, we may request the documentation from that licensee or the VECs," the FCC said.

In addition to reducing the number of license classes from six to three and eliminating the 20 and 13 WPM code tests, the FCC also will reduce the number of written examination elements from five to three, authorize Advanced Class hams to prepare and administer General class examinations, and eliminate Radio Amateur Civil Emergency Service (RACES) station licenses. RACES will remain, however. "After review of the record, we conclude that we should eliminate RACES station licenses because RACES station licenses are unnecessary for amateur stations and amateur service licenses to provide emergency communications," the FCC said.

Under the new licensing scheme, there will be four examination elements. Element 1 will be the 5 WPM Morse code exam. Element 2 will be a 35-question written test to obtain a Technician license; Element 3 will be a 35-question written test to obtain a General license, and Element 4 will be a 50-question written test for the Amateur Extra license. The FCC has left it in the hands of the National Conference of VECs Question Pool Committee to determine the specific mix and makeup of written examination questions. Current Amateur Radio study materials remain valid at least until the new rules become effective in April.

The FCC's new licensing plan means someone will be able to become a ham by passing a single 35-question written examination. The plan also simplifies and shortens the upgrade path from the ground floor through Amateur Extra--especially since amateurs will only have to pass one Morse code test.

Elimination of the 13 and 20 WPM Morse requirements also means an end to physician certification waivers for applicants claiming an inability to pass the Morse code examination due to physical handicap.

The effective date provides a window of upgrade opportunity for current advanced licensees. Between now and April 15, current Advanced holders may take the existing Element 4B, a 40-question test, giving them credit for having passed the current Extra written examination. Likewise, holders of a Certificate of Successful Completion of Examination (CSCE) for Elements 3B or 4B dated on or after April 17, 1999, will be able to qualify for General or Amateur Extra respectively when the new rules go into effect on April 15, 2000.

The FCC disagreed with the League's suggestion that it undertake a restructuring of operating privileges along with licensing restructuring. "We believe that in light of ongoing discussions concerning implementation of new and more modern communications technologies within the amateur service community, we should accord the amateur service community an opportunity to complete such discussions and possibly reach a consensus regarding implementation of new technologies before we undertake a comprehensive restructuring of the amateur service operating privileges and frequencies," the FCC said in its Report and Order.

In its amendments to Part 97, the FCC's Report and Order refers to a "Club Station Call Sign Administrator," something that does not exist under the current rules and which was not explained in the R&O itself. An FCC spokesperson said the Commission plans to issue a Public Notice soon to explain the program and to solicit qualified entities to serve as call sign administrators for club station applications.

A copy of the entire Report and Order (FCC 99-412) is available at <http://www.arrl.org/announce/regulatory/wt98-143ro.pdf> or at http://www.fcc.gov/Daily_Releases/Daily_Business/1999/db991230/fcc99412.txt
...Rick Lindquist, N1RL Senior News Editor ARRL HQ 860-594-0222 n1rl@arrl.org

Frequently Asked Questions about Amateur Radio Restructuring General Info FCC Report & Order

1. Will anyone lose any Amateur Radio operating privileges after April 15, 2000?

No! All current license classes and privileges remain the same, and all licensees will be able to renew their licenses indefinitely. (The sole exception is for those who obtained a Technician license or exam credit prior to March 21, 1987--see question 4, below.) The primary difference is that the FCC will stop issuing new Novice and Advanced class licenses after April 15, 2000. Beyond that, current Technician and Technician Plus licensees will be lumped into a single Technician licensee FCC database. When renewed, current Technician Plus licenses will be stamped simply "Technician." Technicians who have passed Element 1, the 5 WPM Morse code examination, will enjoy current Tech Plus HF privileges, but the burden of proof of having passed Element 1 (5 WPM or any higher Morse code element) will be on the licensee. The current "no-code" Technician license will continue to be available after the new rules go into effect, however. It will continue to offer the present VHF/UHF privileges.

2. I currently hold a Tech Plus license. Can I take the current General class written examination (Element 3B) right now, then apply for an upgrade to General after April 15, 2000? I'm a little confused on this point.

Yes. The FCC has told the League that current Tech Plus licensees holding a Certificate of Successful Completion of Examination (CSCE) for Element 3B on April 15, 2000, may apply for a General class upgrade. The present Element 3B examination has 30 questions; the new Element 3 test will have 35, so the advantage to test before April 15, 2000, is slight. CSCE holders must attend a Volunteer Examiner session, complete Form 605, attach a valid CSCE, and pay the required application fee (\$6.65 for the ARRL-VEC), if the VEC you use charges a fee. To be valid on April 15, 2000, your CSCE will have to be dated on or after April 17, 1999. A CSCE is only good for 365 days.

3. I hold an Advanced class license. Can I take the current Amateur Extra class written examination (Element 4B) right now, then apply for an upgrade to Extra after April 15, 2000?

Yes. The FCC has told the League that current Advanced licensees holding a CSCE for Element 4B on April 15, 2000, may apply for an Amateur Extra class upgrade. See question 2, above. The advantage here is that the current Advanced licensee will face a slightly shorter 40-question examination under the current licensing regime to get a CSCE for the current Element 4B. The new Extra class Element 4 will contain 50 questions (and is expected to contain many of the present Advanced class question pool technical questions). To be valid on April 15, 2000, your CSCE will have to be dated on or after April 17, 1999. A CSCE is only good for 365 days.

4. I got my Technician license under the old system prior to March 21, 1987, and I now hold a Tech Plus license as

a result. I understand that I'm now eligible to upgrade to General without having to take an additional examination. Is this correct?

Yes. Holders of a pre-March 21, 1987, Technician class license (or a CSCE) may claim credit for a new General class license after April 15, 2000. This is because under the old system, the written examination for Technician and General class was identical; the only difference was that Technicians had to pass a 5 WPM Morse code test, while Generals had to pass a 13 WPM Morse code test. The upgrade is not automatic, however. You will have to apply through a Volunteer Examiner test session, complete Form 605, attach documentary proof of having completed the requirements for a Technician license prior to March 21, 1987, and pay an application fee, if any, to the VEC involved.

5. What do I need for "documentary proof" of having held my Technician license before March 21, 1987?

Obviously, if you have an original or a copy of your Technician license issued anytime prior to March 21, 1987, that would suffice. Other documentary evidence could include an original CSCE for Element 3 issued prior to that date; an FCC verification letter of having held a Technician license prior to March 21, 1987; a document from the FCC's contractor, ITS Inc; or possibly a Callbook listing dated prior to March 21, 1987, indicating your license class as Technician.

6. I've lost my old license and didn't keep any copies. How do I get verification from the FCC that I held a Technician license prior to March 21, 1987?

You can write the FCC, Wireless Telecommunications Bureau, 1270 Fairfield Rd, Gettysburg, PA 17325. Provide the FCC with your name, address, and current call sign as well as all details of your licensing. The FCC may be able to verify in writing that you held a Technician license prior to March 21, 1987.

7. I've got an Advanced ticket now. Someone told me that I'll revert to General on April 15, 2000. Is this true?

Absolutely not, although this rumor has been making the rounds on the Internet and on-air discussion groups. You will continue to be an Advanced class licensee and have Advanced class privileges after April 15. Again, no one loses any privileges, and all license classes stay the same.

8. How can I find out where there's a Volunteer Examiner session so I can apply for an upgrade or take an examination element?

A session search engine is available on ARRLWeb at <http://www.arrl.org/arrlvec/examsearch.phtml>. Also, feel free to contact local VEs or ask local clubs for information on testing sessions in your area.

9. I'd heard that Novices and post March 87 Tech Pluses would be getting an automatic upgrade to General when the new rules go into effect. Is this true?

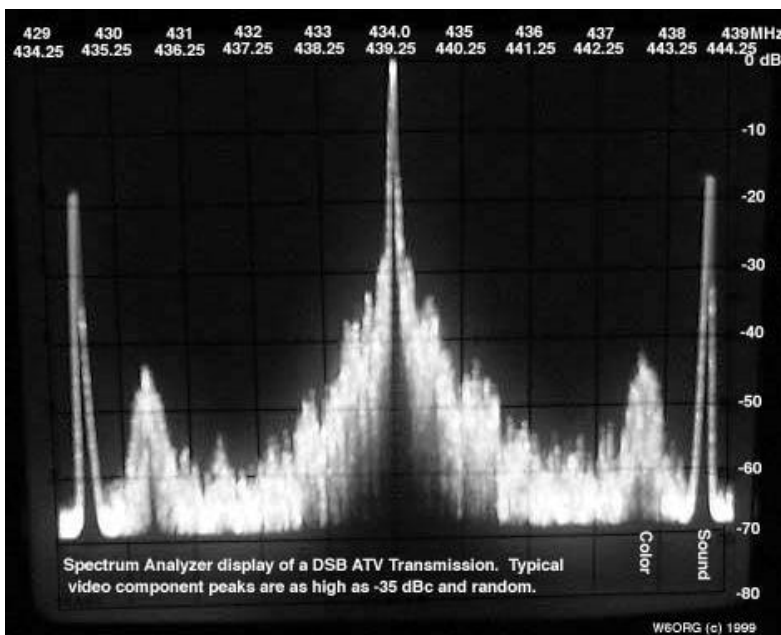
Unfortunately, no. In its comments to the FCC, the ARRL had proposed that the FCC upgrade all holders of Novice and Tech Plus licenses to General class as a one-time action to permit "refarming" current Novice/Tech Plus HF subbands for higher-class licensees. The FCC did not adopt this recommendation in its Report and Order of December 30, 1999, however.

ATV vs FM VOICE REPEATERS... Can we share? I think so!

In a band planning or discussion with FM voice people who seem to want to remove ATV from 70cm thinking that it takes up too much bandwidth, could interfere or FM will need the room to expand, here is some info and facts to fire back:

Just how many FM voice channels are needed in any given communications area? ATV needs just two and if properly selected can result in more than enough FM voice channels. At first look it would seem that the limit would be that 40 channels from 444 to 445 is all that could be used since 439.25 ATV goes up to 444.0 MHz.

From the photo and referencing 439.25, there are actually 128 FM voice channels at 25 kHz spacing between 441 and 445 MHz available depending on terrain separation, cross polarization and other variables that will allow operating FM voice repeaters within the low energy sections of the ATV video sideband, especially if the FM Repeater uses high in and low out. I noted few video sideband pulses on the screen that did not take on the photo that never got above -35 dBc of the video carrier. Add in 20 dB of opposite polarity antenna loss and that gives 55 dB down of random video sideband power that



could possibly get into an FM voice Receiver. Actually it is a little better than 55 dB given the receiver audio response curve roll off, more like 60 dB per a test I made where I connected my Kenwood TS790A multiband transceiver to a dsb video signal generator on 434.0 and tuned through 435 to 438 MHz looking for video noise.

Example: an ATV repeater transmitting 150 watts pep out of its amp (+52 dBm), 3 dB VSB filter and coax loss (+49 dBm), 5 dB gain from a horizontal omni gives an ERP of +54 dBm. The sideband energy is random at any given FM channel but would be at an ERP of -1 dBm or the equivalent of a little less than 1 milliwatt given the -55 dBc to FM voice cross polarized receivers - not much power to get very far, and you can play with the dBm's to fit your case. However for this to work, the ATV repeater cannot be located near a FM repeater site for both desense and creation of final amp generated intermod since they share the same bandpass and would not be able to reject the others inband signal. In addition, the color and sound subcarrier frequencies must not be coordinated for FM voice +/- 200 kHz each side at 442.83 and 443.75 MHz. But again, this leaves 128 possible channels in the area. I suggest that tests be made in any given area with FM voice repeaters to verify the co-channel compatibility between the ATV repeater and FM voice sites to prove to both sides.

There is little possibility of FM Mobiles hearing any video interference assuming line of sight and 5 or miles away. FM voice also has a good capture ratio and CTCSS to reduce unwanted signals from interfering. However, ATVers will see interference in the video from a FM voice repeater transmitting within its pass band and line of sight. But ATVers usually use a beam to receive the repeater which will probably have the FM voice repeater in the null off the side of the beam. One microvolt is the common maximum acceptable interfering signal input to an ATV receiver when figuring out co-channel possibilities. This is the normal noise floor of an ATV receiver and where one can just barely see the cross hatch from a CW signal in a just snow free video signal between 100 and 200 microvolts.

Normal camera video does not have large sharp white to black rise times in the picture that produce significant side band energy above 1 MHz from the carrier. Most people have the impression that the video sidebands are like a sine wave or CW carrier. They are not, but are more like pulses that occur at the horizontal and vertical sweep rate depending on their contrast and vertical percentage in the picture. The pulse rise time is usually too fast for the FM audio receivers to respond to it. But there are video patterns that should be avoided or at least verified before putting on an ATV repeater if co-channeling with other modes close by. An all red picture can boost the color subcarrier up to -22 dBc. A multiburst test pattern that goes the full vertical length in the picture can boost sidebands to -18 dBc. Computer generated ID's can also give pulse sidebands greater than -35 dBc.

If 434.0 is used instead of 439.25 the number of FM repeater channels can go from 128 to as many as 200 and no special terrain separation necessary. With 434.0 ATV, 438.7 up can be used for digital, links, simplex autopatch, crossband repeaters or what ever combination an area sees fit with out conflict.

For the same reason given with the 150 watt ATV repeater example 434.0 ATV (or the lower sideband of 439.25 MHz) does not interfere with 432 weak signal or 435-438 satellite because the spectrum power density is down more than 35 dB with a normal 100 % camera video modulated ATV picture in these segments. Here, vertical polarization is used in order to be crossed polarized to 432 weak signal operators. See figure 12.61 in the 1995-2000 ARRL Handbook or checkout any broadcast TV station or ATV station on a spectrum analyzer yourself. On the air verification with satellite users in So. California from the Jet Propulsion Lab Radio Club was done and no problems to them. ATVers do get interference from satellite uplinks occasionally, but accept it.

At the low end of the 70cm band, 420-431MHz, ATVers have to select 421.25 if they want an inband repeater or 426.25 if they want crossband or simplex, but not both in any one communications area. That gives at least 100 channels for FM links based on 25 kHz spacing. Duplex links can use 3 MHz spacing - a commercial standard at 420.

Packet can use 431.0-431.6 in channel spacing dependent on bandwidth vs baud rate. Since packet is not a repeater in the FCC definition, and weak signal ops have determined that they only need a 300 kHz buffer, packet is legal in this segment.

Therefore, there is no good technical reason FM voice people should tell ATVers they should not be on the 70cm band when there is plenty of room for all. Since there is plenty of room for all on a sound technical band plan basis, any frequency coordinator, group or person that prevents a licensed amateur from using the mode they choose could be liable for denying a civil right. Like wise ATVers need to consider their actual spectrum requirements and make all attempts to work out spectrum sharing with all other mode users based on sound engineering judgement.

...Tom O'Hara W6ORG. ARRL Technical Advisor for Spectrum Management and ATV SCRRBA Technical Committee member and 23cm band manager.

COMMERCIAL DIGITAL TV...Some things to think about.

Sinclair Finds Latest Digital TV Receivers Fail to Meet Expectations In Real World Tests

HUNT VALLEY, Md., Jan. 4 /PRNewswire/ -- Sinclair Broadcast Group, Inc. (Nasdaq: SBGI) announced today that in tests it conducted in Baltimore and Washington, D.C., the latest generation of digital television (DTV) receivers failed to provide more than marginal improvement over earlier receivers, and still failed to provide acceptable over-the-air reception using simple consumer antennas.

Sinclair, which has led a widespread broadcast industry effort of several hundred television stations to augment the DTV standard with a secondary transmission system, has completed the first phase of testing of the latest model Sony and RCA receivers. Rigorous testing conducted earlier this year with Panasonic and Pioneer DTV receivers yielded disappointing results for over-the-air reception using simple antennas. Sinclair's tests indicated that these DTV receivers were afflicted with major reception problems caused by "multipath" or reflected signals that rendered the receivers unable to provide useful picture or audio quality, regardless of the received signal strength. "We responded to reports that the newest receivers had solved the multipath problems we documented in the Baltimore tests. We were optimistic because of a recent Thomson-Multimedia (RCA) press release claiming the Thomson RCA product (DTC-100) worked in urban environments," reported Mark Hyman, Vice President of Corporate Relations. "However, based on our real world tests, such claims appear to be overstated."

In the recent tests in Baltimore, Sinclair engineers saw no improvement using the Sony receiver (KW-34HD1) over earlier generation devices and only marginal improvement with Thomson's RCA product despite the fact that signal levels were over 100 times stronger than would be theoretically required. Sinclair reported it has not yet tested the receivers in the harshest multipath environments, as both receivers failed to operate in relatively simple urban environments where today's analog television signals can be received by existing TV sets. Stated Nat Ostroff, Vice President of New Technology, "The inability to receive over-the-air broadcasts without installing expensive and cumbersome outdoor antennas leaves the consumers with no choice but to subscribe to pay television services. In my opinion, it is probably no small coincidence that DirecTV is a strategic partner of Thomson- Multimedia and that RCA's DTV sales usually include offers of satellite service."

Tests were also conducted in Washington, D.C. at a variety of prominent sites including in front of the Federal Communications Commission building and on Capitol Hill, one of the highest locations in the city and a site deemed most favorable for over-the-air reception. Even when antenna orientation was aided by expensive test equipment, the DTV receivers were never able to receive, at any one site, more than two of the five DTV stations currently broadcasting. In most cases, the second station's reception was intermittent, when available. At one downtown location, the DTV sets were not able to receive any pictures. In contrast, side-by-side tests were conducted using a two-inch Sony Watchman that easily received nine UHF analog TV stations at all test locations. "It is sobering that a Watchman costing less than one hundred dollars outperformed DTV sets costing several thousands of dollars," noted Hyman. "While DTV sets can yield startling pictures, the trick is in receiving the signal and the latest generation sets fail to accomplish that."

Hyman also reported that Sinclair will conduct DTV tests and demonstrations for members of Congress and other governmental officials in Washington, D.C. during the next 60 days. He stated that Congressional leaders have reported their commitment to free broadcast television and the failure of over-the-air DTV reception has heightened concerns in a number of Congressional offices. "The ongoing tests have underscored the critical nature of over-the-air reception for free television," said David Smith, President of Sinclair. Smith further noted that the broadcast industry has lost audience share to multi-channel, subscription-based competitors. "We are not afraid to compete, but we do not want to be disadvantaged by a technical failure of the DTV standard that relegates our industry to cable and satellite carriage if we are to be watched. It is time the Federal Communications Commission place on public notice for comment the petition that recommends augmenting the DTV standard with a secondary transmission system that is virtually immune to the problems plaguing current DTV receivers."

Sinclair Broadcast Group, Inc. is a diversified broadcasting company that currently owns or programs 58 television stations in 38 markets and 6 radio stations in one market. Sinclair's television group reaches approximately 24.4% of U.S. television households and includes ABC, CBS, FOX, NBC, WB, and UPN affiliates.

...SOURCE Sinclair Broadcast Group, Inc. CO: Sinclair Broadcast Group, Inc. ST: Maryland, District of Columbia

NEW MEMBER SECTION

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

I'm suprised! I was sure that we had a few new members join us since last time but I see none. If anyone views it differently please set me straight. So, if I'm correct, we need to make ourselves known to more people. This is the first time in a long while that I can't report any new members here. Let's get going, guys.

...Art WA8RMC

ATV EQUIPMENT SUPPLIERS... Find your ATV stuff here!

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

...Art WA8RMC

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

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

Hamtronics Inc
Ham receivers, transmitters
Antennas, Preamps
<http://www.hamtronics.com/>

M²
Antennas
7560 N. Del Mar Ave.
Fresno, Ca 93711
Phone: 209-432-8873
<http://www.m2inc.com>

CCI Communications Concepts, Inc.
508 Millstone Drive
Beavercreek, OH 45434-5840
(937)426-8600 Voice
(937)429-3811 Fax
Email:
cci.dayton@pobox.com
<http://www.communications-concepts.com> ATV Equipment

ATV Quarterly (ATVQ)
ATV magazine publisher
5931 Alma Drive
Rockford, Il. 61108
Phone 815-398-2683
FAX 815-398-2688
Email: atvq@hampubs.com

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

Black Box
1000 Park Drive
Lawrence, PA 15055-1018
(800)552-6816 Voice
(800)321-0746 Fax
Email: info@blackbox.com
<http://www.blackbox.com>
Electronic Connections

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

Allied Electronics
7410 Pebble Drive
Fort Worth, TX 76118
(800)433-5700
<http://www.allied.avnet.com>
Electronic Parts House

GEKCO Inc
TV test signal circuit boards
PO Box 642
Issaquah, Wa 98027-0642
Phone: 425-392-0638
Email: sales@gekco.com
www.gekco.com

Cable X-Perts
416 Diens Drive
Wheeling, IL 60090
800-828-3340 Voice 847-520-3444 Fax
<http://www.cablexperts.com>
Wire and Cable

DCI Communications
Interdigital filters and cavities
Box 293, 29 Hummingbird Bay
White City, SK, Canada S0G5B0
Phone: 306-781-4451
<http://www.dci.ca/>

ATV Research Inc.
TV cameras & related parts
1301 Broadway PO Box 620
Dakota City, NE 68731-0620
Phone: 402-987-3771
Homepage: www.atvresearch.com
Email: atc@pionet.net

E. H. Yost & Company
2211-D Parview Road
Middleton, WI 53562
(608)831-3443 Voice
(608)831-1082 Fax
Email:
ehyost@midplains.net
Batteries

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

MCM Electronics
650 Congress Park Drive
Centerville, OH 45459
(800)543-4330 Voice
(800)765-6960 Fax
<http://www.mcmelectronics.com>

Jameco Electronic Components
1355 Shoreway Road
Belmont, CA 94002-4100
(800)831-4242 Voice
Email: infor@jameco.com
<http://www.jameco.com>
Electronic Parts

Fair Radio Sales
1016 E. Eureka P.O. Box 1105
Lima, OH 45802
(419)227-6573 Voice
(419)227-1313 Fax
Email:
fairradio@wcoil.com
<http://alpha.wcoil/~fairradio>
Electronic Surplus Equipment

Directive Systems
RR#1 Box 282 Dixon Road
Lebanon, ME 04027
(207)658-7758 Voice
(207)658-4337 Fax
Antennas
<http://www.directivesystems.com/>

Mouser Electronics
958 North Main Street
Mansfield, TX 76063-4827
(800)346-6873 Voice
(817)483-0931 Fax
Email: sales@mouser.com
<http://www.mouser.com>
Electronics Parts House

Hosfelt Electronics Inc.
2700 Sunset Boulevard
Steubenville, OH 43952-1158
(800)524-6464 Voice
(800)524-5414 Fax

Pauldon Associates
210 Utica Street
Tonawanda, NY 14150
(716)692-5451 Voice
ATV Receivers and Transmitters

Spectrum International
J-Beams, KVG, Micromodules, VSB
John Beanland
Phone: 978-263-2145.
Email:
Spectrum@ma.ultranet.com
filters

The Wireman, Inc.
261 Pittman Road
Landrum, SC 29356
(800)727-9473
(864)895-4195
Wire and Cable

**Webster Communications,
Inc.**
115 Bellarmine
Rochester, MI 48309
(800)521-2333 Voice
(810)375-0121 Fax
Electronic Parts

Wyman Research Inc.
8339 S 850 W
Waldron, In 46182-9608
765-525-6452
<http://www.svs.net/wyman>
wyman@svs.net
ATV transmitters & transceivers
SSTV equipt.

INTERNET ATV HOME PAGES (list verified 7/10/99)

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).

Domestic homepages

<http://psycho.psy.ohio-state.edu/atco>
<http://www.radio-amateurs.com>
<http://users.erinet.com/38141/atv.htm>
<http://www.hayden.edu/Guests/AATV>
<http://www.qsl.net/aatv/>
<http://www.citynight.com/atv>
<http://www.qsl.net/atn>
<http://w6yx.stanford.edu/~stevem/atv>
<http://www.qsl.net/wb6izg>
http://www.snowcrest.net/ebell/page_ix.html
<http://home.tampabay.rr.com/k4lk/>
<http://www.nfds.net/~kb4oid/atv.html>
<http://www.qsl.net/scats/>
<http://www.bsrg.org /aatn/aatn1.html>
<http://ww2.netnitco.net/users/stealth/kens.htm>
<http://members.tripod.com/silatvg>
http://www.ussc.com/~uarc/utah_atv/id_atv1.html
<http://kcatv.winning-edge.com>
<http://www.smart.net/~brats>
<http://www.icircuits.com/dats>
<http://www1.minn.net/~n0mnb/>
<http://www.intecnet.net/vidking/>
<http://www.mt.net/~erhardt/atvrptr.htm>
<http://www.njin.net/~magliaco/atv.html>
<http://www.qsl.net/~no3y>
<http://www.lloydio.com/oatva.html>
http://www.jones-clan.com/amateur_radio/klamath_amateur_television.htm
<http://www.webczar.com/atv>
<http://www.usaor.net/users/ka3zf/>
<http://www.voicenet.com/~theo/jkat/w3phl.html>
<http://www.geocities.com/Hollywood/5842>
<http://www.stevens.com>
<http://www.wacoatv.org>
<http://www.hamtv.org/>
http://www.ussc.com/~uarc/utah_atv/utah_atv.html
<http://www.qsl.net/w7twu>
<http://www.shopstop.net/bats/>

Ohio, Columbus, ATV home page (ATCO)
Ohio, Dayton ATV group (DARA)
Ohio, Xenia KB8GRJ
Arizona, Phoenix Amateurs (AATV) Carl Hayden High School
Arizona, Pheonix Amateurs(AATV)
California, San Francisco ATV
California, Amateur Television Network in Central / Southern
California, South Bay ATV Group Stanford University
California, southern ATV Sights and Sounds
California, Redding Repeater & ATV Society (RRATS)
Florida, Tampa Bay Amateur Television Society (TBATS)
Florida, Emerald Coast Amateur Television Society (ECATS)
Florida, Melborn Space Coast Amateur TV Society (SCATS)
Georgia, Atlanta ATV
Indiana KB9I homepage
Illinois, Southern, Amateur Television group
Idaho ATV
Kansas, Kansas City Amateur TV Group (KCATVG)
Maryland, Baltimore Radio Amateur Television Society (BRATS)
Michigan, Detroit Amateur Television Ststem (DATS)
Minnesota Fast Scan Amateur Television (MNFAT)
Missouri, St Louis Amateur Television
Montana, Helena Amateur Television
New Jersey, Brookdale ARC in Lincroft
New Mexico, Farmingham
Oregon, Portland ATV (OATVA)
Oregon, Southern Oregon ATV
Oklahoma, Tulsa Amateur TV (TARC)
Pennsylvania, Pittsburg Amateur Television in Pittsburg
Pennsylvania, Phila. Area ATV
Tennessee, East ATV
Texas, Houston ATV (HATS)
Texas, WACO Amateur TV Society (WATS)
Texas, North Texas ATV
Utah ATV
Washington, Western Washington Television Society (WWATS)
Wisconsin, Badgerland Amateur Television Society (BATS)

Foreign homepages

<http://www.batc.org.uk/index.htm>
<http://www.sfn.saskatoon.sk.ca/recreation/hamburg/hamatv.html>
<http://www.gpfn.sk.ca/hobbies/rara/atv3.html>
<http://www.inside.co.uk/scart.htm>
<http://www.cmo.ch/swissatv>
<http://www.rhein-land.com/atv>
<http://lea.hamradio.si/~s51kq/>
<http://www.arcadeshop.demon.co.uk/atv/>
<http://www.burnabyradio.com/ve7rtv/>
<http://www.qsl.net/zl1qf/atvug/ATVusers.html>

British ATV club (BATC)
Saskatoon, Canada ATV
Regina, Canada ATV
UK, Great Britain ATV (SCART)
Swiss ATV
German ATV in "Niederrhein" area
Slovenia ATV
UK, G8XEU ATV homepage
British Columbia, Canada VE7RTV repeater
Auckland, New Zealand ATV

INTERNET MISCELLANEOUS HAM RELATED HOME PAGES (list verified 7/10/99)

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

http://www.stevens.com/atvq	ATVQ Magazine home page. ATV equipment & article references.
http://www.hamtv.com	PC Electronics Inc. Lots of proven ATV equipment for sale.
http://downeastmicrowave.com	Down East Microwave Inc. Lots of uhf/microwave parts & modules.
http://www.yahoo.com/Entertainment/television/Amateur_television	Listing of some of the available ATV home pages.
http://www.acs.ncsu.edu/HamRadio	General ham radio info- satellite track, call sign database etc.
http://www.arrl.org/hamfests.html	Current yearly hamfest directory.
http://amsat.org	AMSAT satellite directory/home page.
http://www.arrl.org	ARRL home page
http://www.arrl.org/fcc/fcclook.php3	ARRL/FCC revised CALLSIGN database. Search by call sign or name.
http://hamradio-online.com	Ham Radio Online "newsletter" Lot of Ham related information.
http://www.qsl.net/atna/	ATNA homepage
www.qth.net	ATNA members list server (click "select list" to subscribe to listserver)
http://www.ham-links.org	Ham Radio collection database
http://bro.net/explorer/part97.htm	FCC part 97 details. Look up the FCC regulations.
http://fly.hiwaay.net/~bbrown/index.htm	Tennessee Valley Balloon launch information (Bill Brown WB8ELK)
http://www.ipass.net/~teara/atv4.html	Arizona ATV 2.4Ghz Wavecom page (Wavecom mod. information)
http://www.ham.net/lisats.html	Space Shuttle Launch Info Service & Amateur TV System (LISATS)
http://www.svs.net/wyman/	Wyman Research Inc. W9NTP Don Miller ATV equipment
http://www.m2inc.com/	M ² Antenna Systems Inc.
http://www.dci.ca/AMATEUR.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.ipass.net/~teara/atv4.html	2.4 GHz Wavecom modification details
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

HAMFEST CALENDAR

This section is reserved for upcoming hamfests for as far in advance as we know about them. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here, notify me so it can be corrected. I maintain some fliers that compile this list so for additional info Email me at towslee@ee.net. This list will be amended as further information becomes available.

- 19 Jan Middletown, OH** Dial Radio Club <http://w3.one.net/~rkuns/swohdigi.html> Contact: Hank Greeb, N8XX 6580 Dry Ridge Road Cincinnati, OH 45252 Phone: 513-385-8363 Fax: 513-385-8888 Email: n8xx@arrl.net
- 30 Jan Dover, OH** Tusco ARC Contact: Billy Harper, KB8CQG PO Box 80407 Canton, OH 44708 Phone: 330-484-4634 Fax: 330-484-4683 Email: bharper@neo.rr.com Div: Great Lakes Sect: Ohio
- 13 Feb Mansfield, OH** Intercity ARC & Mansfield Emergency Repeater Assn. Contact: Philip Ackerman, N8ICH 63 North Illinois Avenue Mansfield, OH 44905 Phone: 419-589-7133
- 27 Feb Cuyahoga Falls, OH** Cuyahoga Falls ARC <http://www.cfarc.org> Contact: Carl Hervol, N8JLQ 11192 Cottingham Circle Uniontown, OH 44685-9185 Phone: 330-497-7047 Fax: 330-497-0090 Email: hervol@pop.raex.com
- 19 Mar Maumee, OH** Toledo Mobile Radio Assn. <http://www.tmrahamradio.org> Contact: Paul Hanslik, N8XDB PO Box 273 Toledo, OH 43697-0273 Phone: 419-243-3836
- 25 Mar Coalton, OH** Jackson County ARC Contact: Edgar Dempsey, KD8XL 110 Morton Street Jackson, OH 45640-1335 Phone: 740-286-3239 Email: kd8xl@juno.com
- 26 Mar Madison, OH** Lake County ARA Contact: Roxanne, N8BC 7480 Fern Drive Mentor-on-the-Lake, OH 44060-3233 Phone: 440-209-8953 or 440-257-0024 Email: tbrown@ncweb.com
- 30 Apr Athens, OH** Athens County ARA Contact: John Cornwell, NC8V 15100 Scatter Ridge Road Athens, OH 45701 Phone: 740-593-6474 Email: jcornwell@eurekanet.com
- 19-21 May Dayton, OH** ARRL National Convention Dayton ARA <http://www.hamvention.org> Contact: Dave Coons, WT8W 932 Hedwick St. New Carlisle, OH 45344 Phone: 937-849-0604 Email: wt8w@arrl.org
- 11 Jun Canfield, OH** Twenty Over Nine ARC Contact: Don Stoddard, N8LNE 55 South Whitney Youngstown, OH 44509 Phone: 330-793-7072 Email: n8lne1@juno.com

ATCO REPEATER TECHNICAL DATA SUMMARY

This space of each publication includes the technical information of our repeater. Each time a new feature is brought on line it's added here. Use this as a quick reference for up/down access codes as well as some of the more important parameters of our system.

Main repeater:	Location: Downtown Columbus, Ohio																																					
Coordinates:	82 degrees 59 minutes 53 seconds (longitude) 39 degrees 57 minutes 45 seconds (latitude)																																					
Elevation:	630 feet above average street level 1460 feet above sea level																																					
Transmitters:	427.25 MHz AM modulation, 1250 MHz FM modulation and 2433 MHz FM modulation. interdigital filters in output line of 427.25 & 1250 transmitters Transmitter Output Power - 40 watts average 80 watts sync tip (427.25) 50 watts continuous (1250) 8 watts continuous (2433) Link transmitter - 1 watt NBFM 5 kHz audio (446.350 MHz)																																					
Identification	The 427, 1250 and 2433 transmitters identify simultaneously every 10 minutes with video showing ATCO and WA8RUT with four different screens. Audio identification is 4 sequences of Morse Code.																																					
Transmit antennas:	427.25 MHz - Dual slot horizontally polarized 7 dBd gain major lobe west 1250 MHz - Diamond vertically polarized 12 dBd gain omni 2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni																																					
Receivers:	147.45 MHz for F1 audio input control of touch tones 439.25 MHz for A5 video input with FM subcarrier audio (lower sideband) 915 MHz for F5 video link data from remote sites 1280 MHz for F5 video input 2411 MHz for F5 video input																																					
Receive antennas:	147.45 MHz - Vert. polar. Hi Gain 12 dBd dual band (also for 446 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 2411 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni																																					
Input control:	<table border="0"> <tr> <td>427 transmitter output power</td> <td>C1* for hi power C1# for lo power</td> </tr> <tr> <td>Reset (turn signal off)</td> <td>00#</td> </tr> <tr> <td>Manual mode (stays up until keyed down)</td> <td>00*</td> </tr> <tr> <td>After 00* press the following to look at</td> <td></td> </tr> <tr> <td>439 MHz input</td> <td>1</td> </tr> <tr> <td>915 MHz input</td> <td>2</td> </tr> <tr> <td>1280 MHz input</td> <td>3</td> </tr> <tr> <td>2411 MHz input</td> <td>4</td> </tr> <tr> <td>ELKtronics ID</td> <td>5</td> </tr> <tr> <td>The following enable/disable an input from being scanned</td> <td></td> </tr> <tr> <td>Channel 1 (439 input)</td> <td>01* for on 01# for off</td> </tr> <tr> <td>Channel 2 (915 input)</td> <td>02* for on 02# for off</td> </tr> <tr> <td>Channel 3 (1280 input)</td> <td>03* for on 03# for off</td> </tr> <tr> <td>Channel 4 (2411 input)</td> <td>03* for on 04# for off</td> </tr> <tr> <td>Morse code telemetry responses</td> <td></td> </tr> <tr> <td>Send on/off status of beacon mode</td> <td>B0</td> </tr> <tr> <td>Send on/off status of scanned input(s)</td> <td>B1</td> </tr> <tr> <td>Send repeater ID</td> <td>B4</td> </tr> </table>		427 transmitter output power	C1* for hi power C1# for lo power	Reset (turn signal off)	00#	Manual mode (stays up until keyed down)	00*	After 00* press the following to look at		439 MHz input	1	915 MHz input	2	1280 MHz input	3	2411 MHz input	4	ELKtronics ID	5	The following enable/disable an input from being scanned		Channel 1 (439 input)	01* for on 01# for off	Channel 2 (915 input)	02* for on 02# for off	Channel 3 (1280 input)	03* for on 03# for off	Channel 4 (2411 input)	03* for on 04# for off	Morse code telemetry responses		Send on/off status of beacon mode	B0	Send on/off status of scanned input(s)	B1	Send repeater ID	B4
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Remote sites:	Local radar (from TV channel 4 - WCMH)	(915 MHz link output 8 watts)
	Aux link at WA8RUT QTH	(915 MHz link output 1 watt)
	Aux link at WB8CJW QTH	(915 MHz link output 1 watt)

ATCO MEMBERS AS OF 16 January 2000

K8AEH	Wilbur Wollerman wilbur.w@juno.com	672 Rosehill Road	Reynoldsburg	Oh	43068	614-866-1399
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
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WA8DNI	John Busic wa8dni@juno.com	2700 Bixby Road	Groveport	Oh	43125	491-8198
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KC8LOW	Bob Harmon kc8low@netscape.net	831 McDonell Dr	Gahanna	Oh	43230	478-2193
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N8NT (Ex KF8QU)	Bob Tournoux rtournou@columbus.rr.com	3569 Oarlock Ct	Hilliard	Oh	43026	876-2127
WD8OBT,KB8ESR	Tom Camm & sons	1634 Dundee Court	Columbus	Oh	43227	860-9807
N8OCQ	Robert Hodge	3689 Hollowcrest	Columbus	Oh	43223	875-7067
N8OPB	Chris Huhn	146 South Hague Ave	Columbus	Oh	43204	279-7577
W6ORG,WB6YSS	Tom O'Hara & family tom@hamtv.com	2522 Paxton Lane	Arcadia	Ca	91007	626-447-4565
WB8OTH	Perry Yantis pyantis@compuserve.com	1850 Lisle Ave	Obetz	Oh	43207	491-1498
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W8PGP,WD8BGG	Richard, Roger Burggraf	5701 Winchester So. Rd	Stoutsville	Oh	43154	474-3884
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KB8YIO	Ric Wise rwise@columbus.rr.com	1465 25 th Ave	Columbus	Oh	43211	291-6508
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KA8ZNY,N8OOY	Tom & Cheryl Taft ka8zny@copper.net	386 Cherry Street	Groveport	Oh	43125	836-3519
N8ZTJ	Jeff Skinner	25956 Locust Grove Rd	New Holland	Oh	43145	

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are \$10.00 per person payable on January 1 of each year. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this newsletter quarterly in January, April, July, and October. It is sent to each member without additional cost.

The membership period is from January 1ST to December 31ST. New Members will receive all ATCO newsletters published during the current year prior to the date they join ATCO. For example, a new member joining in June will receive the January and April issues in addition to the July and October issues. Your support of ATCO is welcomed and encouraged.

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris WA8RUT
Treasurer: Bob Tournoux KF8QU
Secretary: Rick White WA3DTO
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris WA8RUT
Dale Elshoff WB8CJW
Statutory agent: Rick White WA3DTO
Newsletter editor: Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

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

COMMENTS _____

ANNUAL DUES PAYMENT OF \$10.00 ENCLOSED CHECK MONEY ORDER

Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026

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 would like to 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 one hour so please join us if you can.

ATCO TREASURER'S REPORT - de N8NT (formerly KF8QU)

OPENING BALANCE (9/10/99).....	\$765.45
RECEIPTS (dues).....	\$200.00
OTHER INCOME (bank interest).....	\$ 6.51
Bank Charge.....	\$(2.00)
OCTOBER NEWSLETTER FILM/PROCESSING.....	\$(8.88)
POSTAGE (85 newsletters @ .55 ea).....	\$(46.75)
Mailing Labels.....	\$(10.99)
Fall Event Food.....	\$(168.31)
CLOSING BALANCE (09/10/99).....	\$735.03