ATCO NEWSLETTER

VOLUME 11 NUMBER 1 **JANUARY 1994**

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

ATV REPEATER UPDATE

The ATV repeater is now installed at its final location in downtown Columbus. Operation in beacon mode is good but other modes need to be improved upon. See the inside pages for further details.

ATCO HAM IN THE SPOTLIGHT

This month we feature another active ATV ham...WA3DTO Rick White. Rick has one of the best ATV signals I've seen on both 439 and 1281. Take a close look at the photos below and this gives a clue as to why. I don't believe I've seen a more elaborate and complete shack anywhere else. I'll bet that there are many hams that wish they had a shack half this good!!!!

REPEATER ACTIVITY ..... from my workbench

Lets see now, what have I accomplished this last summer? Boy, that's scary just to think about. On one hand a lot of ATV work got done. On the other hand, very little house and yard work was given enough attention. In light of that, I had better get some chores finished so my wife will start talking to me again. To that extent, I've installed a heater in the garage so car maintenance can be performed while it's cold outside. (too cold to do antenna work...smart huh?) Well, on to the ATV work - but first, Christmas decorations must come down.

The repeater is now in place in downtown Columbus. However, true to form, Murphy is among us. The repeater while at Ken's temporary location for more than 6 months ran almost flawless. Shortly after we installed it downtown the power supply failed. Then the output would mysteriously switch to low power for only long enough to identify a problem existed but not long enough to track it down. We changed the final amplifier and it hasn't reappeared but I don't think that was the problem (the only reason I'm telling you this is that I believe it will either force the gremlin out or identify itself). Other adjustment problems have surfaced also. Oh, by the way, never construct anything with the attitude that once an adjustment is made it need not be accessible. Given another chance (and I assume we will) all adjustments will be made accessible from the front of the rack without removing anything.

The vestigial sideband filter needed retuning. From the manufacturer, it didn't perform correctly at all so I retuned it but adjusted it to roll off on the lower side of the video center carrier (427.25 Mhz). That was wrong! Since then I retrieved and retuned it to roll off at about 426.25 Mhz on the low side and 432.0 Mhz on the high side. After a significant amount of tweaking I was able to maintain no more than 1 DB loss thru the filter from 427 to 432 Mhz and still achieve about 20 DB of attenuation at 425 and 433 Mhz. To help with the retuning task, I built a sweep oscillator from an old varactor tuner by stripping out the signal portions and leaving only the oscillator. To that I added a unijunction type sawtooth oscillator to sweep the varactor oscillator. The result was a 427 Mhz signal source swept about 6 Mhz either side of 427 at about a 10 Khz rate. The resultant signal was then fed thru the filter to a spectrum analyzer where the bandpass was displayed allowing a "real time" display of my adjustments. It was a lot of work for a seemingly simple task at first but the work was worth it. The signal is now noticeably stronger.

The 1258.25 Mhz transmitter is finished, installed and running. This signal follows the 427 signal so both are viewable at the same time. The main purpose for this is to provide a secondary signal viewable by the originator of the 439 signal to the repeater while he is sending it. The output is 1258.25 Mhz FM video and FM audio offset from the video carrier by 6.2 Mhz. Output power is about 15 watts to a single slot antenna (horizontally polarized) mounted right below the 427 antenna.

The NASA SELECT video (video from the space shuttle) is partially operational at this time. It is being manually enabled by KA8ZNY at his QTH. Tom is continuing to work on the control electronics so soon it will be able to be remotely enabled.

I am now working on the airport weather radar control unit. This unit will consist of a video scan converter to convert the live radar image to NTSC video, a video identifier, a 910 Mhz link transmitter, and a 147.45 Mhz control receiver. A touch tone code sequence on 147.45 will then be enable and disable the radar signal as well as local control at the airport. So far the receiver is ready but needs packaging. Target completion is the later part of February to be ahead of "tornado season".

That's all for now...Bear with us while we work out the bugs. All comments both positive and negative are welcome.

Art...WA8RMC

OOPS.....I GOOFED IN THE LAST ISSUE & NOBODY CAUGHT IT

Upon preparing this issue, I discovered that the last TWO issues were headlined as "VOLUME 10 NUMBER 3 JULY, AUGUST, SEPTEMBER 1993". Obviously the last issue was "VOLUME 10 NUMBER 4 OCT, NOV, DEC.".

This brings up another point. I got into this bind by trying to follow the format of ATVQ magazine which labels them as "OCT, NOV, DEC. etc to signify the 3 month time span till the next issue. However, since it was published in October for the OCT-NOV-DEC issue, November and December hadn't occurred yet. This now seems inappropriate and confusing. Sorry, Henry, but I believe I'll go back to labeling the issues with the single month that it was published. Please re-read and re-label the last issue. My apologies!
Art...WA8RMC

HAMFEST CALENDAR

To my knowledge, there are only three hamfests between now and the time the next Newsletter is published.

Mansfield hamfest- February 13th 7am-4pm. Talk-in 146.34/94. Advance orders to 419-589-7133 after 4pm.

Great lakes division convention- February 26 & 27 in Cincinnati Ohio. Amateur radio convention and computer show. WA8RUT has further details if you're interested.

Madison, Ohio Hamfest- March 27 at Madison High School. 8am-3pm. Talk in on 147.21 & 224.50.

Art...WA8RMC

SPACE SHUTTLE UPDATE

The following information was in the January 1994 issue of QST magazine:

Commander Charles Bolden Jr. & mission specialist Ronald Sega passed the technician class test & are awaiting their calls. They will fly on the STS-60 Shuttle launch in February. It will be in a 57 degree inclination which means that it will be high enough in the sky to be able to be seen with the naked eye if the launch time is right.

If that's not enough, I also received E-mail from mission specialist Jay Apt (N5QWL) who I met a few years ago at the Amsat meeting in Houston. He tells me that he's scheduled to go up in April on the STS-59 mission.

Hopefully the Ham frequencies used for 1993 will be the same for 1994 as listed below.

Amateur Radio frequencies for voice QSO's:

	uplinks	downlinks
Europe	144.70, .75, .80	145.55
Rest of world	144.91, .93, .95, .97, .99	145.55

Amateur radio frequencies for packet QSO's:

	144.49	145.55

Perry...WB8OTH

NOTE: Launch information schedule lists the next shuttle launch to be Discovery mission STS-60 on February 3, 1994. NASA select video will be controlled by KA8ZNY on the repeater during parts of the mission and should be interesting to watch. If anyone would like to find the latest launch information as well as viewing sites and car passes (if you're in the Florida area) they can be obtained by calling 407-452-2121 and responding to the automated attendant. I have requested a "future launch " brochure and will publish it in the next newsletter.

Art...WA8RMC

ATCO FALL EVENT MINUTES

The annual ATCO ATV party on October 17,1993 was a huge success as usual. We had 24 participants some who came from as far away as the Dayton Ohio area. Food was provided by Rick, WA3DTO with some assorted goodies by others. Ken, WA8RUT brought the receiver portion of the new ATV repeater for all to inspect and ask questions as well as other show and tell items. A number of donated door prizes were handed out to about 8 people.(I couldn't believe it!!!! I won a new callbook- only the second time in my life that I've won something)

After we got our fill of the delicious food, we held a short meeting mainly to elect officers for the 1994 season. The main purpose here is to have an official complete signed constitution needed for coordinated repeater assignments and for possible club incorporation (which is still pending).

The elected officers are:

Art Towslee WA8RMC- President
Ken Morris WA8RUT- Vice president
Rick White WA3DTO- Secretary (and statutory agent)
Fred Yost K8JGY - Treasurer
(corporate trustees same as officers)

The event participants are as follows:

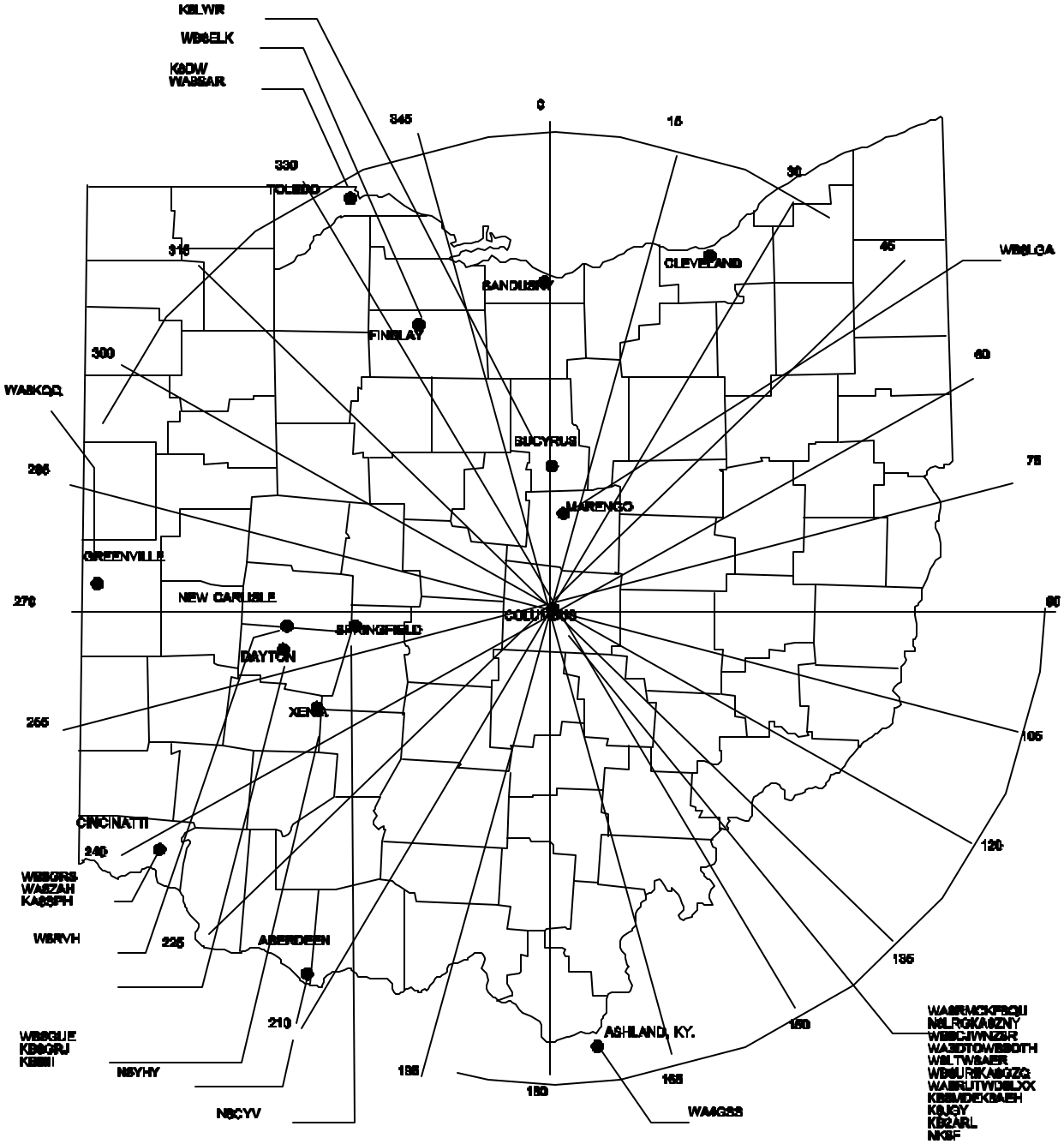
Rick White WA3DTO	Cris Huhn N8OPB	Dick Goode W8RVH
Jake Fuller W8WAU	Dale Waymire WA8KQQ	Rob Peebles WD8LXX
Art Towslee WA8RMC	Foster Warren W8EHW	Phil Humphries N8LRG
Dave DiGiuseppe KB2ARL	Tom Taft KA8ZNY	Larry Campbell N8SFC
Warren Duemmel KA8GZQ	Maxine Duemmel N8TUU	Bill Heiden WB8URI
John Schlaechter WA8EOY	Bob Tournoux KF8QU	Martha Yost KA8WGX
Fred Yost K8JGY	Wilbur Wollerman K8AEH	Jim Easley KE8PN
Dale Elshoff WB8CJW	Greg Ratcliff NZ8R	Ken Morris WA8RUT

It was suggested that we also have a Spring event. Most said that it was a good idea. We'll plan to have something after the next newsletter is published but before the Dayton Hamfest. More next time.

Below are some of the pictures taken that day.

ATV LOCATOR MAP

Below is an Ohio map complete with counties, main cities, beam heading (from Columbus) and all of the hams that I know of that have had video on the air recently. Please report to me anyone that you know of that has had video on and you have seen recently. If video is not reported for a given individual in about a year, I will remove that one from the map. Lets see if we can make Ohio near the top for ATV activity.



ATCO Repeater Amazing Results.... And we've only started!

P5 anywhere in the central Ohio area... mobile! (20 mile radius), P5 in Maringo (35 Miles) P3 mobile in Mt. Gilead (44 Miles), P3½ in Cincinnati (85 Miles), P4 in Dayton (60 Miles), P3 in Findlay (79 Miles), P3½ in Bucyrus (56 Miles), Sync detected in Ft. Wayne,Ind (135 Miles), etc. These are the kind of reports we have been getting since we put the transmitters up on top of the State Office Tower (650' above street level) in November. We expected the signal to be much improved, but these reports far exceed expectations! In fact, many ATVers (new and old timers alike) locally are using a cable ready TV or VCR on CATV Channel 58 (427.25 Mhz) with only "rabbit ears" to monitor the repeater! The 1258 Mhz repeater output (15 watts) is strong enough to be copied P5 in central Ohio with only an "LNB" satellite receiver, no pre-amp, with an outside antenna.

A Major pleasant surprise is that the 910.25 Mhz link receiver survives with 24 different 800-900 mhz transmitters in the same room as ours, with all of the antennas nested together! Anyone who has tried to generate a 910.25 signal (even with milliwatts!) has been copied and repeated! In fact, the link transmitter (on 900 Mhz) carrying the 439.25 Mhz input is only running about 1/2 watt some 8 miles away.

During the last space shuttle (the "service call" on the telescope), Tom, KA8ZNY, provided the NASA Select Video via his TVRO system and linked it to the repeater on 910.25 Mhz (great pictures Tom, Thanks!). During the past few weeks, Art WA8RMC and I have been busy "tweaking" and fixing and tweaking some more. In the past couple of weeks, we've had trouble keeping the Sub-carrier audio tweaked and staying tweaked! The video in and outs on both 427.25 and 1258 Mhz seem stable now. Art, WA8RMC, did a "super tweak" on the 427.25 Interdigital filter using his newly built sweep generator. The 910.25 Rx is working fine and the 439.25 receive site is working well but needs a better antenna (currently using a single mini-wheel).

What's next?

Current projects in the works include Weather Radar Video capture and link transmitter being designed by Art, WA8RMC. The overlay Video ID and Tone Decoder for the Wx Radar part of the system has been built and supplied by Chuck, WB8LGA. Dale, WB8CJW is actively working on the control receiver, Tone Decoder and control logic for the 439.25 & 1280 Receive site.

We have received two Micro Computer Concepts VS-100 Video controllers. One will be installed at the transmitter site and the other one, purchased by Tom, KA8ZNY, will be used to remote control the NASA Select Link and other sundry things which Tom may have in mind. The new transmitter site controller will provide about 30 different control operator and user command functions including possible additions of a video bulletin board and a roof top camera. Some of the functions the new controller will be able to perform, once installed, include:

1. Beacon mode (Video ID On) much like today.
2. Repeat one minute, sync detected or not. (handy for zeroing your antenna)
3. Periodic Transmit (20 sec every 10 minutes) (Handy for DX stations looking for band openings)
4. Audio select Sub-carrier or 2 meter audio (4 Channels total)
5. Ten (10) Channels of video select (2nd, 3rd Rx, Bulletin board, remote camera, etc)
6. Scan all 10 channels
7. Scan all Rx channels
8. Up to 8 on/off functions (Power Amp On/Off, etc)
9. Touch Tone Pad Test Function (you press TT number and it sends it back in Morse code on the 4.5 sub)
10. Various control enable/disable, various timers and other functions for the control operator.
11. Sub-carrier CW IDer.

Located at other sites will be TT decodes for turning on the weather RADAR, NASA Select and other functions. A list of active user command Touch Tone Codes will be published in the next issue of the ATCO newsletter.

Naturally, a project like this will take several more months before all of the listed functions are installed and functional (watch future issues of the ATCO newsletter for new developments). However, the present operational system has caused our ATV ranks to swell over the last couple of months as indicated by the number of check-ins at 9:00PM on the 147.45 Mhz Tuesday night ATV net.

I would like to take this opportunity to again thank some of the people who have contributed time, components and money to the ATCO Repeater systems. Chuck, WB8LGA has been a great help with advice, time, ID and Tone decoder modules. Bill, W8DMR has contributed his advice and repaired the VOR! Roger, WB8DZW has provided us with valuable signal reports and contributed a power supply and chassis for the machine. Wilbur, K8AEH has contributed signal reports and money for the effort. Rick WA3DTO, Bill WB8URI, Fred K8JGY and Dick W8RVH have all played an important role in their encouragement, valuable advice, time and signal reports. Dale WB8CJW has constructed several of the modules used in both the transmitter and the receive sites which have proven to be quite reliable, even under a great deal of abuse!

Special thanks must go to Art, WA8RMC for his many hundreds of hours (and dollars!) in this project and literally, this project would not have been possible without Art's drive, coordination and overall contribution.

(ED NOTE: Ken is modest and does not give himself credit. Likewise, if **HE** hadn't participated, none of this would have been possible. Ken has many pieces of equipment at his disposal to try without going out and purchasing it first. I'll let you in on a secret. He has a great affinity for antennas. Any hamfest that has any unusual antenna for sale will attract Ken. So, when it came to antennas, we had first hand knowledge of the designs that definitely wouldn't do the job and ideas that ultimately resulted in the final design that does do the job. Additionally, Ken's place of work had an accessible roof upon which to test the antenna as well as various repeater designs easily.)

And I'm sure TOM, W6ORG at PC Electronics must be thanking us because we bought enough of his products to able to buy a new helicopter by now! If not, not to worry Tom....we will have more orders coming!

A block diagram of what the Transmitter site should look like in January, 1994 is on the following page. Not shown on the diagram is the local Video monitor, Waveform monitor, various power supplies/ A.C. & ground distribution panel and the lighting protection on all Hardline runs and A.C. input, manufactured by Polyphaser (all currently installed). Also not shown are the Repeater receive site equipment, Weather Radar link and the NASA Select feed system. Some of the key system specifications are as follows:

* Transmitters: - 427.25Mhz 200 W ERP peak VSB
  - 1258.25 Mhz 30 W ERP FM Video

* Antenna system: - 70 cm Dual Slot (7dbd gain) w/60 ft of 7/8" Hardline
  - 23 cm Single Slot (3dbd gain) w/60 ft of 7/8" Hardline
  - Both antennas: Horiz OMNI

* Video Link: - 910.25 (A5) 4.5 Mhz Sub-carrier
  - Antenna: Vertical OMNI

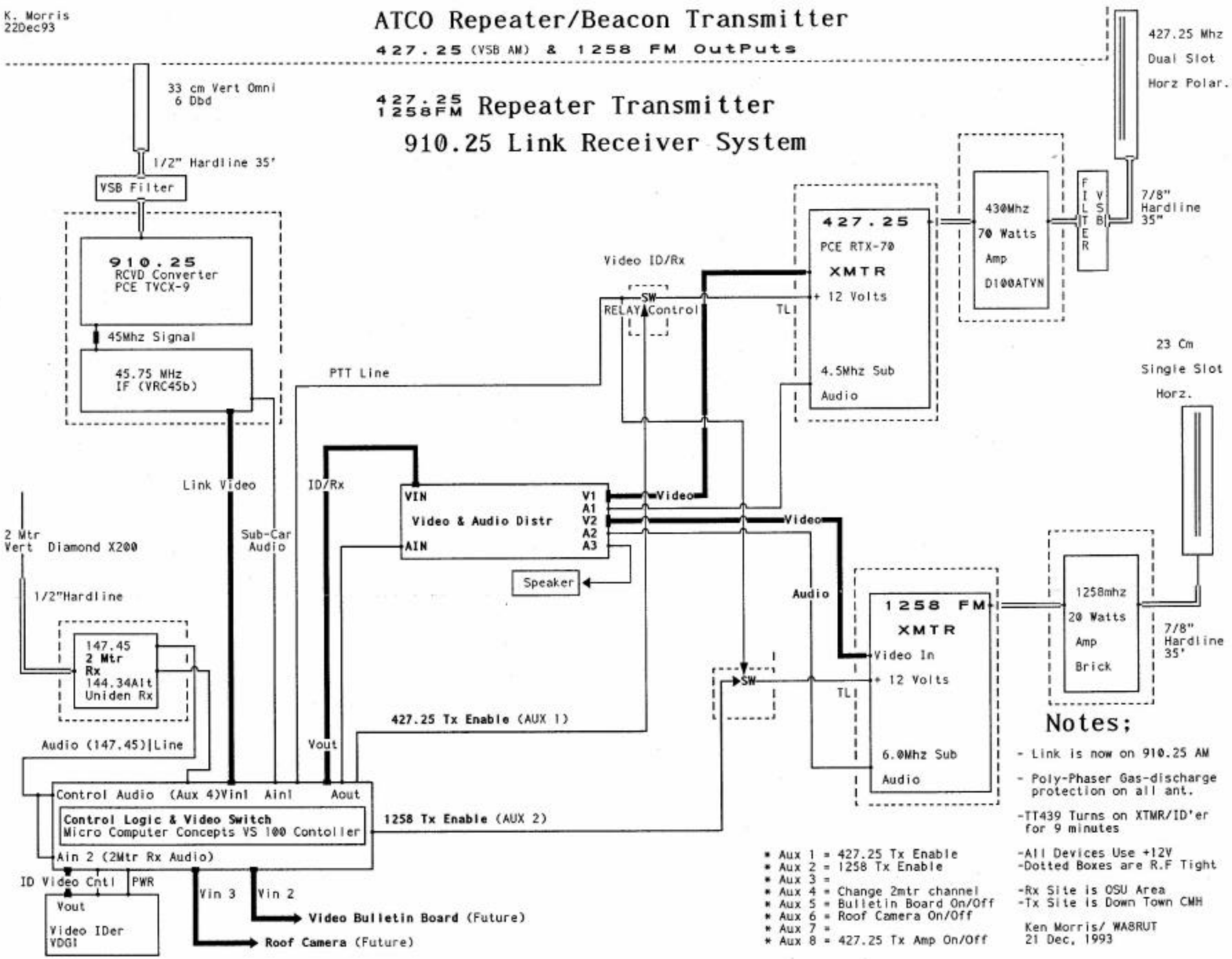
* 2 Mtr Voice: - 147.45 Mhz, User command frequency
  & voice repeated on Sub-carriers
  Antenna: Vertical OMNI

* User Rx Inputs: - 439.25 Mhz (active now)
  - 1280 Mhz FM (future)
  - Receivers linked to transmitter
  via 910.25 Mhz (A5)
  - Antennas: Horiz OMNI

* Modes of operation: - Beacon Mode (TT 439 up, TT #0 Down)
  - Repeater Mode: Sync Detect (VOR)
  - New controller expected to be installed in January, 1994 that will add several more modes of operation.

Check-in to the Tuesday 9pm ATCO net on 147.45 for up-dates on the Repeater progress and new developments.

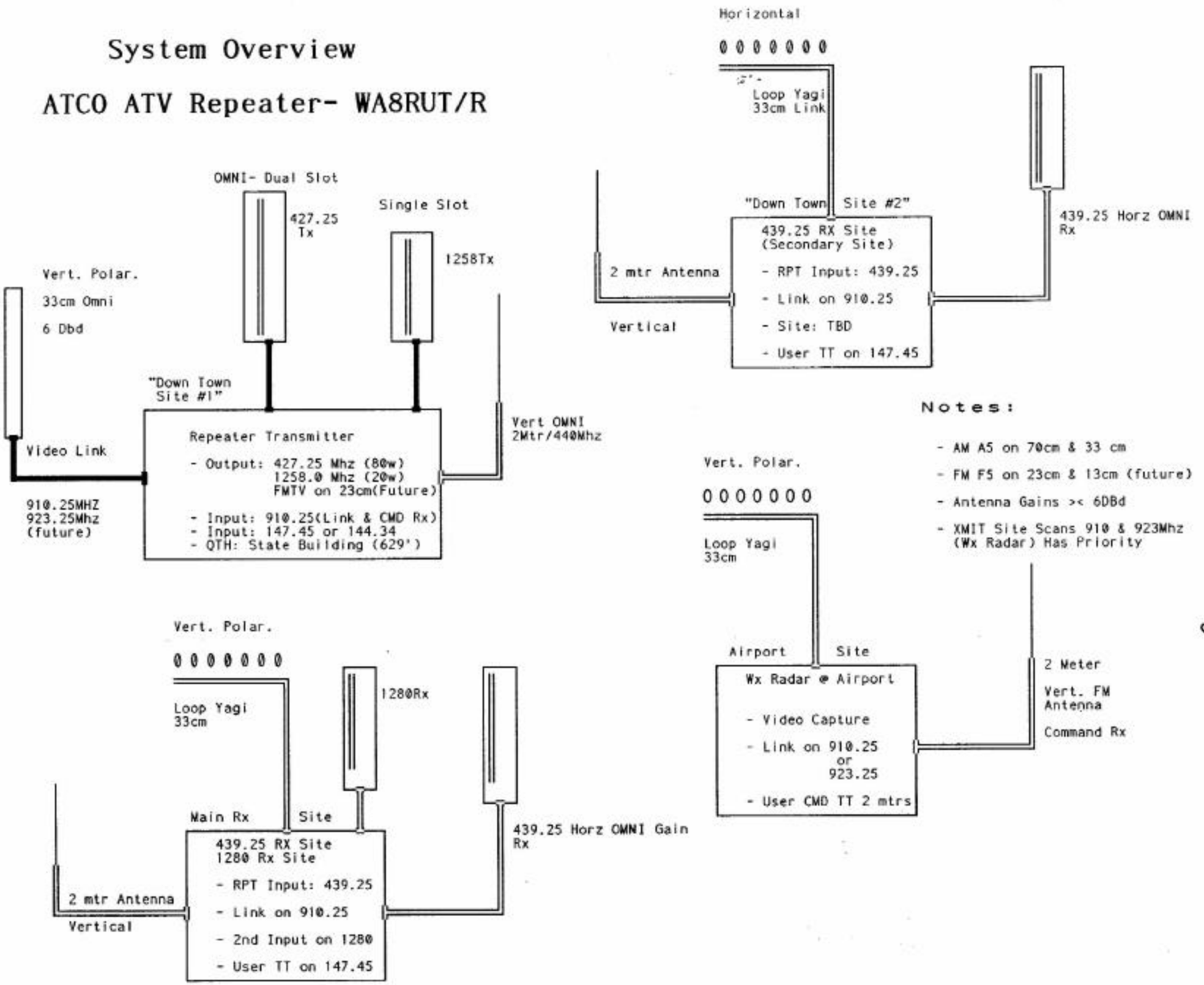
Ken...WA8RUT


K. Morris
22Dec93
ATCO Repeater/Beacon Transmitter
427.25 (VSB AM) & 1258 FM OutPuts
427.25 Mhz
Dual Slot
Horz Polar.
33 cm Vert Omni
6 Dbd
427.25
1258FM Repeater Transmitter
910.25 Link Receiver System
1/2" Hardline 35'
VSB Filter
910.25
RCVD Converter
PCE TVCX-9
45Mhz Signal
45.75 MHz
IF (VRC45b)
Video ID/Rx
SW
RELAY Control
427.25
PCE RTX-70
XMTR
+ 12 Volts
TL
4.5Mhz Sub
Audio
430Mhz
70 Watts
Amp
D100ATVN
FILTER
VSB
7/8"
Hardline
35'
23 Cm
Single Slot
Horz.
PTT Line
Link Video
ID/Rx
Sub-Car
Audio
VIN
Video & Audio Distr
AIN
V1
A1
V2
A2
A3
Video
Speaker
2 Mtr
Vert Diamond X200
1/2"Hardline
147.45
2 Mtr
Rx
144.34Alt
Uniden Rx
Audio (147.45)|Line
Vout
427.25 Tx Enable (AUX 1)
1258 FM
XMTR
Video In
+ 12 Volts
TL
6.0Mhz Sub
Audio
1258mhz
20 Watts
Amp
Brick
7/8"
Hardline
35'
Control Audio (Aux 4)Vin1 Ain1 Aout
Control Logic & Video Switch
Micro Computer Concepts VS 100 Contoller
1258 Tx Enable (AUX 2)
Ain 2 (2Mtr Rx Audio)
ID Video Cntl
PWR
Vout
Video IDer
VDGI
Vin 3
Vin 2
Video Bulletin Board (Future)
Roof Camera (Future)
* Aux 1 = 427.25 Tx Enable
* Aux 2 = 1258 Tx Enable
* Aux 3 =
* Aux 4 = Change 2mtr channel
* Aux 5 = Bulletin Board On/Off
* Aux 6 = Roof Camera On/Off
* Aux 7 =
* Aux 8 = 427.25 Tx Amp On/Off
Notes;
- Link is now on 910.25 AM
- Poly-Phaser Gas-discharge protection on all ant.
-TT439 Turns on XTMR/ID'er for 9 minutes
-All Devices Use +12V
-Dotted Boxes are R.F Tight
-Rx Site is OSU Area
-Tx Site is Down Town CMH
Ken Morris/ WA8RUT
21 Dec, 1993

Ken Morris
WA8RUT
17 July, 1993
Rev 22Dec93

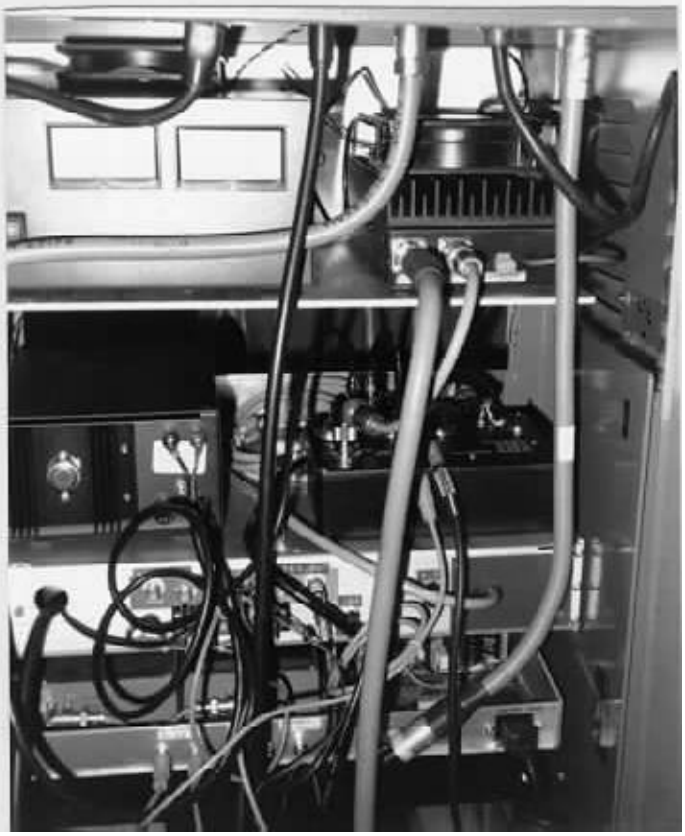
System Overview

ATCO ATV Repeater- WA8RUT/R



REPEATER SITE PICTURES.....See how messy we can be and still make it work!

Below are some pictures I took of our repeater location so everyone can get a feel of what it looks like. The upper left picture is a closeup of the cluster of antenna systems at this location. (our 427 Mhz antenna is barely visible as a thicker vertical "stick" just to the right of the upper center dish). The picture below it is the building under this cluster. The right top picture is the front view of our equipment rack. (all antenna cables enter on the top). On the left is a commercial transmitter and the right cabinet belongs to another repeater group. The lower right picture is a somewhat cluttered rear view showing the cables.



COMPUTER VIDEO STANDARDS

For those of us that feel it would be easy to put their computer video on ATV, think again. Because of the many computer formats available, most of the time it is very impractical to do. Only the older CGA format is compatible with the standard NTSC video scan rates and even that needs to have the separate red, blue, and green signals combined at specific amplitudes to work properly(subject matter for a future article). The formats below help to illustrate the various modes available. Compare them to the standard NTSC commercial TV video rates of 60 Hz vertical and 15.750 Khz horizontal(black/white).

MDA: (Monochrome Data Adapter) - This IBM standard developed in 1982 was designed for PC/XT and AT computers and compatibles. It was made for textual data only.

CGA: (Color Graphics Array) - This IBM standard developed in 1981 was designed for PC/XT and AT computers and compatibles. CGA has two graphic modes that supports High Resolution Black and White data and Low Resolution Color data. With 100% compatibility to the Horizontal and Vertical Sync requirements of the NTSC video format, this becomes the easiest standard to adapt to ATV.

EGA: (Enhanced Graphics Adapter) - This IBM standard developed in 1984 was designed for PC/XT and AT computers and compatibles. It retains compatibility with CGA but has new graphics modes. It has much higher resolution than CGA and can display more colors at a given time.

VGA: (Video Graphics Array) - This IBM standard developed in 1987 for the PS/2 series of computers (except models 25 and 30) has become the fastest growing and most widely accepted standard. It also supports 286, 386, and 486 processor based computers. Its higher resolution display along with better and more test and graphics modes provides additional performance advantages over the EGA standard. The Sync standards, however, become less friendly to the NTSC standard values and ATV. The **MCGA:** (Multicolor Graphics Adapter) - is very similar to the above standards but supports only the PS/2 models 25 and 30.

SUPER VGA: This IBM standard developed in 1988 has higher resolution and greater color compatibility. Super VGA is merely an enhancement of the above VGA standards.

XGA: (Extended Graphics Array) - This standard is faster than the VGA standards, causes less eyestrain and works only on Microchannel 386 SX and better computers. It retains compatibility with VGA standards, offers more than double the resolution. It not only uses memory assigned as Video Ram but can also use System Ram.

8514/A: This IBM standard is currently being used on the PS/2 model 55 computers. Its capabilities are virtually identical to those of the XGA standard.

The following table shows the differences in resolution, sync frequencies, type, and colors for the computer video formats in use today. While there are more and different formats in use, these represent the most history and greatest cross section of computer video. While the AMIGA computer system speaks for itself in terms of great ATV compatibility, little is known by this author on the compatibility of Apple Computer video.

COMPUTER VIDEO FORMATS

FORMAT	MAXIMUM RESOLUTION	HORIZONTAL SYNC	VERTICAL **SYNC**	TYPE	**COLORS**
MDA	720 X 350	18.43 Khz	50 Hz	TTL	MONOCHROME
CGA	640 X 200 320 X 200	15.75 Khz	60 Hz	TTL	2 of 16 B&W 4 of 16 Col
EGA	640 X 350	21.85 Khz	60 Hz	TTL	16 of 64
VGA	640 X 480	31.50 Khz	60 Hz	ANALOG	16 of 64
Super VGA	800 X 600	48.00 Khz	72 Hz	ANALOG	256 @ 256000
XGA	1024 X 768	35.52 Khz	43 Hz	ANALOG	256 @ 256000
8514/A	1024 X 768	35.52 Khz	43 Hz	ANALOG	256 @ 256000

The following tables represent the "Pin-Out" connections for the above Video Formats.

VGA, SUPER VGA, AND XGA DB15 HD CONNECTOR	
Pin Configuration:	
1 ..... Red	9 ..... No Pin
2 ..... Green	10 ..... Ground
3 ..... Blue	11 ..... ID Bit
4 ..... ID Bit	12 ..... ID Bit
5 ..... N/C	13 ... Horiz Sync
6 . Red Return	14 .... Vert Sync
7 Green Return	15 ..... N/C
8 .Blue Return	

EGA DB9 CONN.	CGA DB9 CONN.	MONOCHROME DB9 CONN.
1 ..... Ground	1 ..... Ground	1 ..... Ground
2 ... Red Intensity	2 ..... Ground	2 ..... Ground
3 ..... Red	3 ..... Red	3 ..... N/C
4 ..... Green	4 ..... Green	4 ..... N/C
5 ..... Blue	5 ..... Blue	5 ..... N/C
6 . Green Intensity	6 ..... Intensity	6 ..... Intensity
7 .. Blue Intensity	7 ..... N/C	7 ..... Video
8 ..... Horiz Sync	8 ..... Horiz Sync	8 ..... Horiz Sync
9 ..... Vert Sync	9 ..... Vert Sync	9 ..... Vert Sync

With a little luck, I should be able to gather enough information for the next issue of the ATCO Newsletter on Computer Video to NTSC Baseband Video Converters. With the advent of more and more inexpensive computers entering the market, this method of generating both intricate and high resolution graphics for ATV falls within the reach of the average ATV enthusiast.

Rick...WA3DTO

BROADCAST AND CABLE TV CHANNELS AND FREQUENCIES

On the following page, I have provided a handy reference of most of the Cable / Broadcast TV channels and frequencies. Note that I put the frequencies within the 420-450 Mhz Ham band in **bold** so they'll stand out. Remember that our repeater is on cable channel 58 which means that a standard "cable Ready" TV or VCR can tune it directly....**if** you remember to disconnect it from the cable system and attach it to an outside UHF antenna **first!!!!!**

Room does not permit separate listings for the audio and color burst frequencies. However, to obtain the color burst frequency simply add 3.58 Mhz to the video carrier frequency listed below. Likewise, the audio carrier frequency is located 4.50 Mhz above the video carrier frequency.

For reference, the normal video broadcast channel is 6 Mhz wide with the frequencies approximately 1.25 Mhz below the video carrier frequency (lower sideband) attenuated. This is called Vestigial Sideband operation.

Art...WA8RMC

Broadcast and Cable TV Channels and Frequencies

VIDEO FREQUENCY	CABLE CHANNEL		BROADCAST	VIDEO FREQUENCY	CABLE CHANNEL		BROADCAST
Mhz	NCTA	STANDARD	CHANNEL	Mhz	NCTA	STANDARD	CHANNEL
(VHF lo band)				385.25	51	OO	-
55.25	2	2	2	391.25	52	PP	-
61.25	3	3	3	397.25	53	QQ	-
67.25	4	4	4	403.25	54	RR	-
77.25	5	5	5	409.25	55	SS	-
83.25	6	6	6	415.25	56	TT	-
(FM band)			-	**421.25**	**57**	**UU**	-
91.25	95	A5	-	**427.25**	**58**	**VV**	-
97.25	96	A4	-	**433.25**	**59**	**WW**	-
103.25	97	A3	-	**439.25**	**60**	**XX**	-
109.25	98	A2	-	**445.25**	**61**	**YY**	-
115.25	99	A1	-	451.25	62	ZZ	-
(VHF mid band)			-	457.25	63	-	-
121.25	14	A	-	463.25	64	-	-
127.25	15	B	-	469.25	65	-	-
133.25	16	C	-	471.25	-	-	14
139.25	17	D	-	475.25	66	-	-
145.25	18	E	-	477.25	-	-	15
151.25	19	F	-	481.25	67	-	-
157.25	20	G	-	483.25	-	-	16
163.25	21	H	-	487.25	68	-	-
169.25	22	I	-	489.25	-	-	17
(VHF hi band)			-	493.25	69	-	-
175.25	7	7	7	495.25	-	-	18
181.25	8	8	8	499.25	70	-	-
187.25	9	9	9	501.25	-	-	19
193.25	10	10	10	505.25	71	-	-
199.25	11	11	11	507.25	-	-	20
205.25	12	12	12	511.25	72	-	-
211.25	13	13	13	513.25	-	-	21
(VHF super band)			-	517.25	73	-	-
217.25	23	J	-	519.25	-	-	22
223.25	24	K	-	523.25	74	-	-
229.25	25	L	-	525.25	-	-	23
235.25	26	M	-	529.25	75	-	-
241.25	27	N	-	531.25	-	-	24
247.25	28	O	-	535.25	76	-	-
253.25	29	P	-	537.25	-	-	25
259.25	30	Q	-	541.25	77	-	-
265.25	31	R	-	543.25	-	-	26
271.25	32	S	-	547.25	78	-	-
277.25	33	T	-	549.25	-	-	27
283.25	34	U	-	553.25	79	-	-
289.25	35	V	-	555.25	-	-	28
295.25	36	W	-	559.25	80	-	-
(Hyper band)			-	561.25	-	-	29
301.25	37	AA	-	565.25	81	-	-
307.25	38	BB	-	567.25	-	-	30
313.25	39	CC	-	571.25	82	-	-
319.25	40	DD	-	573.25	-	-	31
325.25	41	EE	-	577.25	83	-	-
331.25	42	FF	-	579.25	-	-	32
337.25	43	GG	-	583.25	84	-	-
343.25	44	HH	-	585.25	-	-	33
349.25	45	II	-	589.25	85	-	-
355.25	46	JJ	-	591.25	-	-	34
361.25	47	KK	-	595.25	86	-	-
367.25	48	LL	-	597.25	-	-	35
373.25	49	MM	-	601.25	87	-	-
379.25	50	NN	-	603.25	-	-	36
						-	-
						-	

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 are included at no extra cost.

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

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

Your support of ATCO is welcomed and encouraged.

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
NAME _____ CALL _____
ADDRESS _____ HOME PHONE _____
CITY _____ STATE _____ ZIP _____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY_____
_____
COMMENTS _____
_____
_____
_____

ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ CASH ○
Make check payable to Martha Yost (for Fred Yost-ATCO treasurer) & mail to:

Fred Yost K8JGY
330 Dellfield Way
Gahanna,Ohio
43230

NOTICE: IT'S DUES TIME AGAIN!!
IF YOU HAVEN'T SENT IN YOUR $10.00 FOR 1994, PLEASE TAKE A MOMENT TO DO SO NOW. THE NAMES IN THE FOLLOWING LIST WITH * AFTER THEIR NAMES HAVE PAID FOR 1994 AS OF 1/1/94.

ATCO FINANCIAL STATEMENT

CASH BALANCE (as of 10/01/93).....	$ 804.91
RECEIPTS (dues).....	$ 120.00
OTHER INCOME	$0.00
EXPENDITURES (postage).....	$- 14.50
(Fall Event Food).....	$-126.01
BALANCE (as of 12/31/93).....	$ 784.40

ATCO MEMBERS AS OF 07 JANUARY 1994

K8AEH	Wilbur Wollerman	1672 Rosehill Road		Reynoldsburg	Ohio	43068	
W8AER	Dave Sears	1678 Kaiser Dr		Reynoldsburg	Ohio	43068	
AH2AR	David Pelaez	4872 Trailside Court		Huber Heights	Ohio	45424	
KB2ARL	Dave DiGiuseppe	391-3A Directory Dr		Columbus	Ohio	43213	
WB8BIY	Robert Shaw	82 Troy Court		Westerville	Ohio	43081	
WB8CJW	Dale Elshoff	8904 Winoak Pl		Powell	Ohio	43065	
N8CYV	Blaire Standley	721 West North St		Springfield	Ohio	45504	
WA3DTO	Rick White	5314 Grosbeak Glen		Orient	Ohio	43146	
W8EHW	Foster Warren	124 East Clark St		No. Hampton	Ohio	45349	
WD8EMS	Lee Coyle	7495 Lithopolis Road		Groveport	Ohio	43125	
WA8EOY	Jonh Schlaechter	3199 Lewis Rd		Columbus	Ohio	43207	
KA8ERS	Rick Shepherd	3296 Karl Road		Columbus	Ohio	43224	
KB8EWX	Cris Bauer	6227 Arapahoe Pl	Dublin	Ohio	43017		
NK8F	Rich Budd	734 Hager Court		Gahanna	Ohio	43230	
N8FFO	Edward Hauff	2716 Columbus Ave		Columbus	Ohio	43209	
KB9FO	Henry Ruh	1545 Lee St Suite 73		Des Plaines	Illinois	60018	
KB8GZO	Jason Pelaez	4872 Trailside Court		Huber Heights	Ohio	45424	
KA8GZQ	Warren Duemmel	3488 Darbyshire Dr		Hilliard	Ohio	43026	
K8HRR	Ira Bickham	260 Tiki Dr		Merritt Island	Florida	32953	
N0IKJ	Ruth Budd	734 Hager Court		Gahanna	Ohio	43230	
K8JGY	Fred Yost	330 Dellfield Way	Gahanna	Ohio	43230		
N8KCB	Chris Morris	3181 Gerbert Rd		Columbus	Ohio	43224	
WA8KQQ	Dale Waymire	225 Riffle Ave		Greenville	Ohio	45331	
WB8LGA	Chuck Beener	2548 State Route 61		Marengo	Ohio	43334	
N8LRG	Phillip Humphries	1237 Summer Breeze Dr	Columbus	Ohio	43223		
WD8LXX	Rob Peebles	PO Box 1334		Dublin	Ohio	43017	
N8MCQ	John Unverzagt	159 Chapelfield Road		Gahanna	Ohio	43230	
KB8MDE	Shaun Miller	3469 Oakcrest Rd	Columbus	Ohio	43232		
N8OOY	Cheryl Taft	386 Cherry Street		Groveport	Ohio	43125	
N8OPB	Chris Huhn	146 South Hague Ave		Columbus	Ohio	43204	
WB8OTH	Perry Yantis	1850 Lisle Ave		Obetz	Ohio	43207	
KE8PN	James Easley	1507 Michigan Ave		Columbus	Ohio	43201	
KF8QU	Bob Tournoux	3569 Oarlock Ct		Hilliard	Ohio	43026	
N8QLD	Rick Callebs	P.O. Box 266		Jackson	Ohio	45640	
NZ8R	Greg Radcliff	1763 Hess Blvd		Columbus	Ohio	43212	
WA8RMC	Art Towslee	180 Fairdale Ave		Westerville	Ohio	43081	
WA8RUT	Ken Morris	3181 Gerbert Rd		Columbus	Ohio	43224	
W8RVH	Richard Goode	9391 Ballentine Rd		New Carlisle	Ohio	45334	
WA8SAR	Gary Obee	3691 Chamberlain	Lambertville	Mich	48144		
N8SFC	Larry Campbell	5483 Wescott Dr		Columbus	Ohio	43228	
WA8TTE	Phil Morrison	154 Llewellyn Ave		Westerville	Ohio	43081	
N8TUU	Maxine Duemme l	3488 Darbyshire Dr		Hilliard	Ohio	43206	
W8TV	Bob Dye	6118 Sedgwick Rd		Columbus	Ohio	43235	
KE8U	John Greene	7585 Centeral College Rd		New Albany	Ohio	43054	
WB8URI	William Heiden	4435 Kaufman Rd	Plain City	Ohio	43064		
W8WAU	Jake Fuller	PO Box 117		No. Hampton	Ohio	45349	
KA8WGX	Martha Yost	330 Dellfield Way	Gahanna	Ohio	43230		
KA8ZNY	Tom Taft	386 Cherry Street		Groveport	Ohio	43125	

ATCO Newsletter 29c
c/o Art Towslee-WA8RMC
180 Fairdale Ave
Westerville, Ohio
43081

postage
here

FIRST CLASS MAIL

HOW DO YOU LIKE THE WINTER WEATHER!!
GET THE HOME CHORES FINISHED SO
SERIOUS ATV WORK CAN RESUME NEXT SPRING!!!

Actual photo of one of the repeater ID screens (courtesy of W8DMR)