Fall 2003

Volume 16 - No 4

ISSN 1042-198X
USPS 003-353

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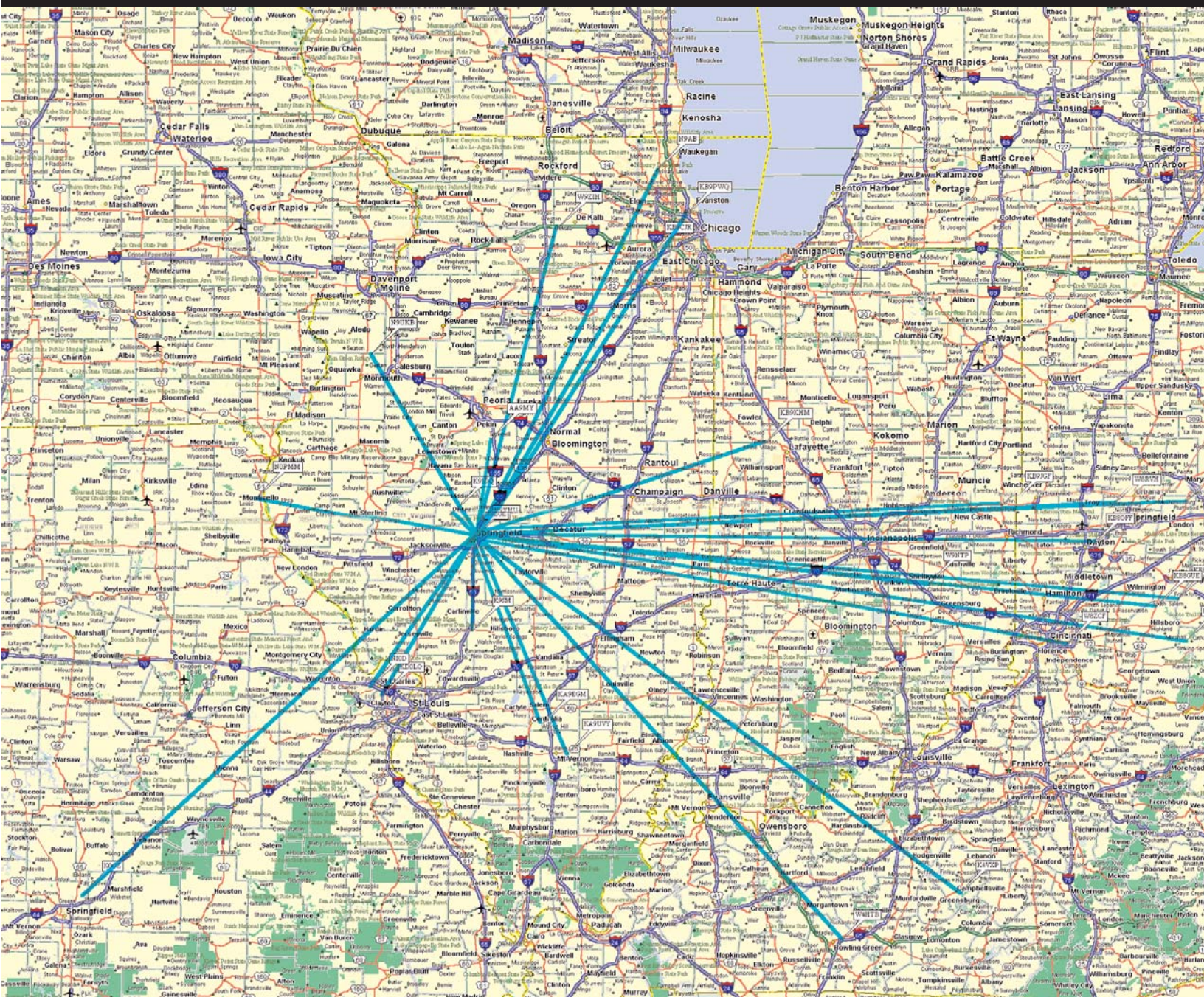
Amateur Television Quarterly

ATV Contest 2003
How far can you "see" on ATV?



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ATV Application notes, links, catalogue, price list, etc.

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ATV

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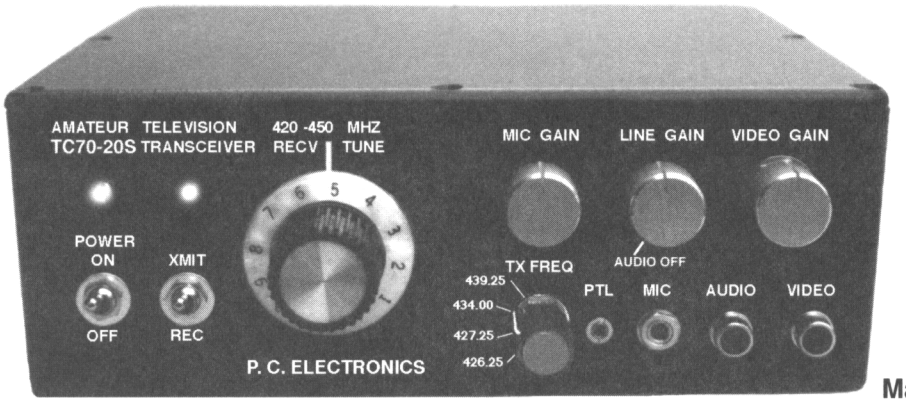
Get on ATV with a Buddy, Save $50 ea.

If you buy 2 or more TC70-20S at one time - $499 ea. Offer good til 1/04



TC70-20S ONLY $549

Total unit price shipped within 24 hrs of your call via UPS surface in the contiguous USA, Visa/MC

≥20 Watts p.e.p. Output

-Adjustable, down to 2 watts pep to drive 100 watt amps like the Mirage D1010N-ATV

All you need for 420-450 MHz ATV in one box!

Plug it in and you are ready to play with this fun mode, Just add camera, TV, 13.8 Vdc @ 5A and 70cm antenna and you are on the air!

Made in USA.

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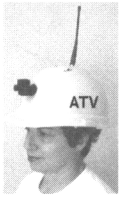
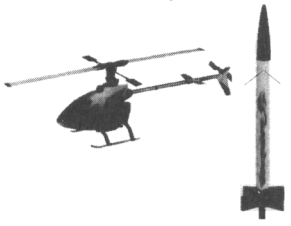
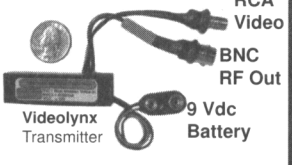
Front panel select 426.25, 427.25, 434.0 or 439.25 MHz transmit frequency, no more extra crystals to buy - other freq. by special order. Sensitive low noise GaAsfet downconverter tunes whole 420-450 MHz 70cm band down to your TV channel 3 or 4 for receiving. The rear panel has a type N antenna jack, type F jack to the TV set for receiving and phono jack for optional tx camera video monitor. Front panel phono jacks accept composite video and line audio from your camcorder or VCR. Requires 12-14 Vdc @ 5 Amps. 100% duty cycle. Line of sight DX is over 100 miles with DSFO ATV-25 ($169) antennas at both ends, 21 miles with OAL 5L-70cm's ($75).

Hard Hat Cam, R/C Vehicle, Rocket, Balloon ATV





App notes available on our web page 3



Video ID Boards

from Intuitive Circuits

See page 7 of our catalogue and at www.icircuits.com

Overlay your call, GPS or other info on your camera video

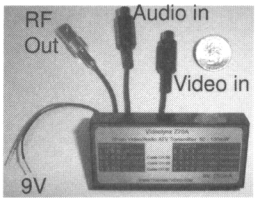
$99 to $139

LB-1000 mini color camera.$99

1.5" sq., 3oz., *380* lines, 6mm lens, Sony CCD, mic/line audio output, takes just 9Vdc @40ma. RCA A/V jacks.

Videolynx 434 MHz Video Xmtr.$99

50-100 mW, .6x.8x2.3", 1.5 oz., 9V@40ma Great for line of sight up to 1/2 mile. Use LB-1000 or BC-20 color camera.

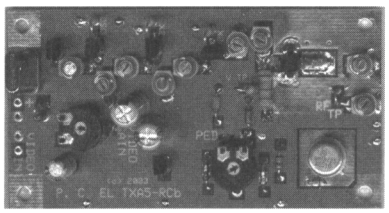


Videolynx Z70A 4ch ATV Xmtr with sound.$149

Now you can plug in the line audio from the LB-1000 color camera and have audio with your hat cam. Digi-switch select 439.25, 434.0, 427.25 or 426.25 MHz as well as internal video and audio test generator. 50-100 mW RF out, .75x1.5x3.25", 4 oz., 9V@250ma.- run two 9V alkalines in parallel for the Hard Hat Cam or R/C vehicle.

Micro-mini color Camera...$99

BC-20 is perfect for R/C vehicles weighing only 1 oz. & 1.0 x .75" sq. Runs on supplied 12Vdc PS or 9V alkaline battery. RCA phono jack video output. lens included. 330 line resolution. Use with Videolynx transmitter for 1/2 mile radius around a flying field.



NEW Smaller TXA5-RCb 1.5W TX.....$139

We have reduced the size of our popular 1.5 watt 70cm ATV transmitter board to 1.8x3.5 inch size and 2 oz. weight to accomodate more R/C vehicles. Adjustable RF out - 1.5 p.e.p. to 100 mW. Draws 350 MA @ 13.8 Vdc at 1.5 Watt p.e.p., 200 ma at 100 mW, runs on 11 to 14Vdc. Has adjustable sync stretcher and provisions for sound from the FMA5-F board. Comes with one xtal.

NEW!

23/33FMR-3 Receiver

RCA A/V jacks. Digi-switch select frequency. 5x3x1" Imported.

FM ATV RECEIVER 23/33FMR-3....$169

Dual band synthesized 5 ch 33cm, 11 on 23cm including 910, 915, 920, 1252, 1255, 1265, 1280 and others. Very sensitive, doesn't require a preamp in the shack. 12V 300 ma PS, F to N jack adaptor and opt. video de-emphasis parts included.

FREE UPS surface shipping in the Cont. USA on orders over $70

http://www.hamtv.com 11/2003

Hams, ask for our free ATV catalogue or download from our web site - AM, FM, 70cm to 10GHz

Application notes can be downloaded or requested from page 3 of the web site - We have it all!

Name Tags by Gene

New from Harlan Technologies - beautiful, colorful, plastic name badges! Available with locking safety pin, magnetic bar, luggage strap, or lanyard.

These colorful badges can be made from our sample artwork, or if you like to be creative, you can make your own. Great to have a club badge with your club logo, or for proper identification with group such as ARES.

Prices

Badge with safety pin.....$10.00
Badge with magnetic bar $12.00
Badge with luggage strap $10.00
Badge with lanyard.....$10.00

You must see our many designs on our web page:
www.hampubs.com
Order your new name tag today!

Name Tags by Gene

Beautiful COLOR name tag / badges with photos, artwork, or plain colored backgrounds.

Design # from book _____ or
Background color _____ or
Picture file name _____

Picture insert #1 _____
Picture insert #2 _____
Picture insert #3 _____

TEXT
Line #1 _____
Line #2 _____
Line #3 _____
Line #4 _____
Line #5 _____
Line #6 _____

Name _____ Call _____
Address _____
City _____State ___ Zip _____
Phone _____
QTY _____ @ $10 = $ _____
QTY _____ @ $12 = $ _____
QTY _____ @ $10 = $ _____
QTY _____ @ $10 = $ _____

Credit Card #_____
Expires _____

Signature _____
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AMATEUR TELEVISION QUARTERLY

Published by
Harlan Technologies

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Amateur Television Quarterly (ISSN 1042-198X) is published quarterly, in January, April, July, and October for $20.00 per year by Harlan Technologies, 5931 Alma Dr., Rockford, Illinois 61108-2409. Periodicals Postage Paid at Rockford, IL and additional mailing offices. POSTMASTER: Send address changes to:
Amateur Television Quarterly,
5931 Alma Dr., Rockford, IL 61108.

Amateur Television Quarterly is available by subscription for $20.00/yr in the USA; $22.00/yr in Canada; $29.00/yr elsewhere. Single issues $5.50/USA; $6.00/Canada; $8.00 elsewhere.
Send all address changes to:
Amateur Television Quarterly,
5931 Alma Dr., Rockford, IL 61108

Amateur Television Quarterly

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Editors Notes

Thanks to all that sent articles and other information for this issue of ATVQ. It is so nice that I always seem to have plenty to choose from, and this time I had to hold some stuff back for another time!

It is sad to hear that another ham radio publication has closed their doors. Wayne Green has announced that 73 Magazine is no longer. In his remarks, he stated that he could not get the articles that he used to. I feel so privilaged that all of you support ATVQ and help keep it alive. A big thanks to you and to the advertisers that keep us going every issue. Don't forget to mention that you see their ads in ATVQ when you call and talk to them. Give them a big THANKS for their support.

Our local ATV repeater is getting closer to a reality. Just a few more things to put together and we will start testing on the air. It still will need to go to its' final destination once we see it work from our home for a while.

I hope everyone has a plesant holiday season. It is hard to believe that it is close enough to say that already, but it is.

Gene Harlan - WB9MMM ATVQ

SpaceCam1 International Space Station Project

The MAREX-MG team is pleased to announce a new educational Amateur Radio project scheduled to be used on board the International Space Station (ISS) in the year 2004. The new imaging project is called SpaceCam1. The SpaceCam1 Slow Scan Television (SSTV) project is a joint project between MAREX-MG and ARISS (Amateur Radio International Space Station). This system is an entry-level PC based Slow Scan Television (SSTV) imaging system which was designed to be used on board the International Space Station.

The SpaceCam1 system will support multiple common SSTV transmission modes. SpaceCam1 has been specifically designed to be accessible to as many amateur radio stations and short wave listeners as possible, around the world.

The SpaceCam1 software project is 100% complete. Our final task is in finishing the approval process for Space Flight Certification. We even have a tentative rocket launch schedule for early 2004 on board a Russian Progress Cargo rocket.

Gregory Miles Mann, CEO MAREX MG

Please send donations to MAREX MG Headquarters.
http://www.marexmg.org/fileshtml/donations.html ATVQ

Midwest ATV DX Report

By: Bob Delaney - KA9UVY - Email KA9UVY@hotmail.com
10630 N. Delaney Lane
Mt. Vernon, IL 62864

An Introduction:

This column will be devoted to ATV DX'ing and propagation studies. It will highlight some of the exotic contacts that are made on ATV in the Midwest. Even if you're not in the Midwest please send in your information so we all can see what is going on. I will also try and pass along some simple tips that you can use when you are trying for DX on ATV. I would ask that you e-mail your reports to me via KA9UVY@hotmail.com or mail them to me at my QRZ address. If you get a chance to capture a picture of your DX please send it along in JPG format. I also can be reached by phone at 618-242-7063 and invite you to call anytime day or night to report extreme band conditions or contacts. This columns success depends on your input and any feedback is welcome.

I'll start with the information I have gathered on some of the DX that was experienced during the contest period.

??/??/?? - KB9JGF, Bill in Lynn, IN, experienced P-5 live video with several stations at an approximate distance of 230 miles. The opening lasted a couple of hours and was into Kentucky. Stations worked were K4VXP, Paul of Camblesville and 3 others in the Bowling Green area stations worked were W4HTB, Hank, K4NQV, Dean and Marshall, KC4WFN.

08/20/03 - A nice opening was caught by Craig, K1CRA, of Orchard Park, NY. He found the band open into the Chicago IL. area from 04:00z to 15:00z he managed to work 2-way P-3 contacts with Andy, N9AB, of Mundelein, IL (477mi.) and Roland, KB9PWQ, of Harwood Heights (467 mi.) and a contact with Ron, W9ZIH, Malta, IL. Towards the end of the opening stretched the distance to a lengthy 523 miles with P-1's both

ways! Craig was also on the ball enough to capture some pictures of KB9PWQ, Live + ID and N9AB's ID slide.

08/28/03 - On this morning at about 12:00z N9XHU came on the air and heard an attempted QSO between W8ZCF in Ohio and KD0FW in Independence MO. taking place. Leonard (N9XHU) was very pleased to see W8ZCF on the screen @ P-3 level. When he had given them ample time to work he asked W8ZCF to turn the antenna up toward him and he received a whopping P-5 from Farrell. In his excitement he turned the transmitter on but failed to activate his Mirage D1010 amp. See photo below for the result with only 6 watts avg. power @ 286 miles!

Oh you were wondering if Mike, KD0FW, and Farrell, W8ZCF, made it that morning? Well unfortunately they had to settle for a 1-way, Mike did get into W8ZCF with a P-2 at an outstanding 537 miles!

Post contest reports:

09/08/03 On this evening @04:41z K0PFX Mel in St. Louis caught an opening into Alabama hooking up with WB8ELK, Bill Brown in Huntsville AL. @359 miles. They enjoyed P-1 to P-2 signals for approximately 15 minutes. Several ID's were exchanged and live video was received of K0PFX. Bill's antenna is reported to be only 8 feet above ground! He is of course on a mountain. Coordination was on 144.340.

09/09/03 Bill, KB9JGF of Lynn, IN. reports that he enjoyed a good 2 1/2 hour opening into the Chicago land area on 1.2 FM ATV. He worked P-5's with KB9PWQ @ 198 miles and W9ZIH, Malta, IL a distance of 272 Miles! 70cm was open as well with P-5 pictures from both stations. Coordination was on 144.340.

09/15/03 The first ever 2-way 23cm FM ATV contact between the St. Louis and Southern Illinois Groups took place between 06:00z and 07:00z. KA9UVY exchanged P-1 video with Dale, NI0D of St. Peters Mo. @ 100mi. KA9UVY was also seen P-2 in Wildwood Mo. by John KD0LO but John hasn't found his 23cm transmitter since his move from St. Louis.

Well, that's all of the reports that I managed to get for this columns first run and if you look at the distances involved I think you would agree that this summer was pretty good from a DX standpoint. The contact between KB9JGF and W9ZIH on 1.2 FM on 09/09/03 is the furthest I personally have heard of and may even be an overland record at 272 miles? If you have worked further please let me know. Maybe in the future ATVQ will become the official record keeper for ATV distance records and publish them yearly?

Let me know what you think and please send in your reports so all of us can share in your exciting ATV DX accomplishments. Remember DX is not just a summertime activity and some of the legendary BIG OPENINGS come in the fall and winter. If you're on your toes you might make the best contact of your life this year!

DX Tip: An ID can make or break a P-1

During the contest I had the pleasure of looking for call signs on everything from clocks to hand held QSL cards even a coffee mug! Let me tell you there is nothing more frustrating than having a station locked in at P-1 but not being able to give the report because you can't read the call sign.

If you are serious about DX then please take the time and produce a full screen callsign slide. You don't have to own a computer do this. A simple card can be made with stencils and a dedicated camera and light set up for an instant easy to read slide.

You should make the call sign in bold text fill the screen and it would be best in black and white. There has always been much debate about what works best, black letters on white background or white letters on black so make two, one of each to keep on hand. If you know someone with a computer go ahead and ask if they will make you a good DX slide and record it on videotape so you can have it ready to play the next time the band is open. It can and will make the difference! ATVQ

Mt. Lemmon Repeater Rebuilding

Good news!!!! The replacement repeater for Mt. Lemmon is under construction and this time will feature a full VSB exciter, 4 to 6 times more output power, a 440 MHz band voice repeater linked to the White Tank repeater and we are also working on a video link for phase two of the project.

We received a generous donation from Norm K7OLD "Thank you". Some of the gang has also pledged donations and we welcome the help. The site owner is negotiating tower replacement with a higher and more rugged tower (larger link antenna could be installed).

Mike Collis - WA6SVT

ATV Contest 2003 A Sucess!

By Gene Harlan - WB9MMM Email: ATVQ@hampubs.com
5931 Alma Dr.
Rockford, IL 61108

And a big THANKS to Bob Delaney, KA9UVY, for the idea.

Well, it has been a long time since we had an ATV contest, and now it is over. But, those that participated say they enjoyed it and want to do it again. One even said we should do it more than once a year. We will definitely do it again same time next year.

The list of participants are:

CLASS - HOME

Call	Distance Miles	Total Points
N9XHU	6550	13,100
KA9UVY	6356	12,920
KA8MID	5824	11,648
K1CRA	2379	4758
N9AZZ	2371	4846
KD0FW	2200	4400

CLASS - VIEWER

Call	Distance Miles	Total Points
WB8ELK	1101	2202

As you can see from the map on the cover and other pictures and logs printed here, you can have a lot more fun than most people think at 440 MHz and above. So, you ask, what were they using. First we will look at what the winner used, Leonard, N9XHU:

Station of N9XHU, EM59et

Leonard McWhorter
837 N. Hill St. - Springfield, IL. 62702-6229 USA
mcwhortera@insightbb.com

2 Meters

YAESU all mode transceiver FT 847.
MIRAGE B2516G, 160 Watts amplifier.
LMR 600 feed line.
Antenna CUSHCRAFT A148-20T vertical and horizontal Yagi at 55 feet.

70 CM

RECEIVER

P. C. Electronics down converter TVC4G.
2 SHARP 13 inch color cable ready televisions.
Antenna M2 440-21 ATV Yagi at 55 feet.
LMR 600 feed line.

TRANSMITTER

Homebrew B. T. Bryant (K9KKL)
Blonder Tongue FAVM 450 Agile modulator with a P. C. Electronics 20 Watt brick, 6 Watts with video.
MIRAGE D3010 amplifier 100 Watts. 30 to 40 Watts with video.
Computer driven slide with call. Black letters on white background.
Antenna M2 440-21 ATV Yagi at 55 feet.
LMR 600 feed line.

ACCESSORIES

SHARP VC-A410 VHS tape player and recorder.
HYUNDAI CO 1120 auto electronic switcher.
RCA Small Wonder cam recorder.

So that doesn't look so bad, does it. So, now let's take a look at his log (page 10).

Station of KA9UVY, EM58ng

Bob Delaney
10630 N Delaney Ln. - Mount Vernon, IL 62864
ka9uvy@hotmail.com

Contest Equipment: 70cm Transmitter: Blonder Tongue AP-60 Agile Processor, driving a Misubishi M67705M into a Mirage D1010N followed by either a K2RIW or converted AM-6155 Tube Amp.

Receiver: PC Electronics Downconverter with an ARR Preamp into a Samsung 13”color set.

Antenna: Single Directive Systems DSFO-25ATV at 68ft .

Equipment 23cm: Transmitter: cop module driving 2 Down East Microwave amps to 22 watt output.

Receiver: Bensat with Down East Preamp and 2 gain blocks.

Antenna: single Directive Systems 45 el Loop Yagi fed with 7/8” Andrew Hardline

Soapbox: All in all I found activity to be up and worked many old friends that had not been seen here for years. The one real surprise was working Paul, K4VXP in Cambelsville, Ky. Not seen here since around 1995!

I also managed a new personal best DX contact and new ATV State with KC0HFL in Witchita, KS at 461 miles! Antenna work kept me off air much of August but should be done before next Summer for sure. Best 3 peat contact was with KB9JGF @243 miles!

Station of KA8MID, EM89ic

Bill Dean
P.O. Box 175 Latham,Ohio 45646

Antenna M2 9WL 115 ft above the ground ground elevation 1265 asl

Feedline 7/8 Andrews 145 ft

Transmitter P. C. electronics TC70-10

Amp TPL model PA6-1AC (30 watts sync tips)

Station of N9AZZ, EM57mv

Richard "Flip" Minton
904 E Poplar St. - West Frankfort, IL. 62896

PC Electronics TC70-10 transceiver
Teletec DXP-U150
FO25 yagi

"Cops" 1.2 transmitter
Downeast Microwave 20 watt Brick Amp
Bensat receiver
Downeast 1.2 pre amp
45 Element looper

All Contacts were made to HOME STATIONS

SOAPBOX:

ATV DXing from the same area as KA9UVY, shouldn't I get combat pay?

Comments: KD0FW, EM29tc

Mike Bogard
1304 North Kiger Road - Independence, MO 64050
kd0fw@blitz-it.net

Here is my contest log and thanks for getting a contest going again as it has been a long time. All contacts were made on 70 cm and home station to home station.

I worked only three states and was seen in five states. The longest one was with Farrell, W8ZCF, who received me at p1 at 539 miles. The band conditions came back up the day after the contest ended and I missed 3 new qso's. If ATVQ is quarterly then maybe the contest needs to be quarterly. It was a shame that it had to end as it has been a very long time since I have seen this amount of great activity.

Next Year

So, those were the comments that were submitted with the logs. It looks like everyone enjoyed the event and want more of it! We will definitely do it again next year in the same time period. I have to say that I have never made a contact as far away as these ATV’ers did, and you do have to watch for the band openings. If you are not watching, you won’t know they are going on.

Winter is coming and all good hams know that cold weather is the best time for putting up antennas that work the best. I have a 440 MHz preamp that I bought at the Dayton Hamvention a year and 1/2 ago, and still is not up. I am sure most of you have things that need to be done so you can give a contest, or just a pleasant evening of ATV, better performance than you currently have. So, get out today and do it.

I took a bit of time (!) and made maps of each contestants contacts so everyone will get the idea that ATV is not always just line of sight. This is why I published the logs as well. I hope I did not make too many mistakes when doing this.

N9XHU, EM59et LOG Class Home

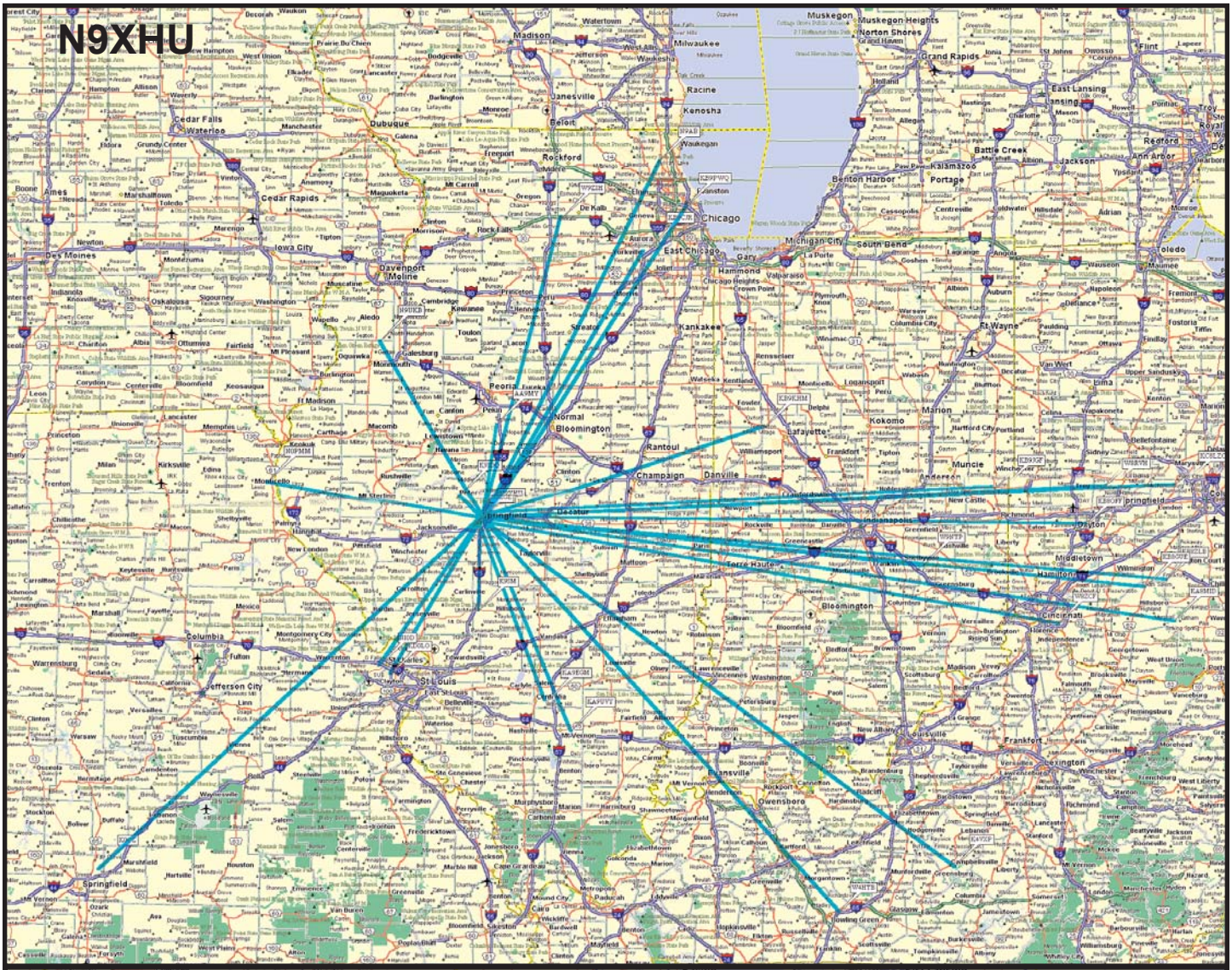
STATION WORKED	GRID SQ.	RRPT	SRPT	UTC	DATE	FREQUENCY	DISTANCE	CLASS
KA9UVY	EM58ng	P1	P1	1207z	6/1/2003	439.250Mhz	113.741	Home
K91DQ	EN50ba	P4	P4	0228z	6/7/2003	439.250Mhz	19.57	Home
K9KKL	EM59ds	P5	P5	0250z	6/7/2003	439.250Mhz	5.285	Home
N9ZGE	EM59ds	P5	P5	1910z	6/7/2003	439.250Mhz	5.285	Home
KA9EGM	EM58km	P2	P1	1300z	6/21/2003	439.250Mhz	93.06	Home
W9NTP	EM79ek	P1	P2	0107z	6/24/2003	439.250Mhz	214.951	Home
KB9JGF	EN70mb	P1	P1.5	1123z	6/24/2003	439.250Mhz	248.422	Home
KB9CJR	EN61aq	P2	P1	0210z	6/25/2003	439.250Mhz	156.16	Home
W9ZIH	EN51nw	P5	P4	0254z	6/25/2003	439.250Mhz	151.801	Home
KA9MID	EM89ic	P1.5	P1.5	0421z	6/25/2003	439.250Mhz	342.135	Home
AA9MY	EN50gn	P1	P3	0101z	7/16/2003	439.250Mhz	52.492	Home
N9AB	EN52xg	P1	P2	0453z	7/17/2003	439.250Mhz	188.724	Home
KA9UVY	EN58ng	P1	P2	1245z	7/17/2003	439.250Mhz	113.741	Home
KA9EGM	EM58km	P1	P1	1303z	7/25/2003	439.250Mhz	93.06	Home
KDOLO	EM48sr	P1	P1	0242z	7/27/2003	439.250Mhz	87.072	Home
KO0Z	EM48qs	P1	P2	0304z	7/30/2003	439.250Mhz	89.65	Home
K9SM	EM59gd	P5	P2	0125z	8/1/2003	427.250Mhz	46.846	Home
KA9EGM	EM58km	P2	P2	0152z	8/2/2003	439.250Mhz	93.06	Home
KA9UVY	EM58ng	P1	P1	1205z	8/19/2003	439.250Mhz	113.741	Home
KB9JGF	EN70mb	P3	P2.5	0144z	8/20/2003	439.250Mhz	248.422	Home
KA8MID	EM89ic	P2	P1.5	0244z	8/20/2003	439.250Mhz	342.135	Home
KB9KHM	EN60kl	P1	P1	0258z	8/20/2003	439.250Mhz	140.131	Home
KB8ZLB	EM89hh	P2	P1	0309z	8/20/2003	439.250Mhz	335.456	Home
W8RVH	EM79xw	P2	P2	0316z	8/20/2003	439.250Mhz	296.883	Home
N9AB	EN52xg	P3	P1	0355z	8/20/2003	439.250Mhz	188.724	Home
KB9PWQ	EN61cx	P4	P3	1255z	8/20/2003	439.250Mhz	177.663	Home
KDOLO	EM48sr	P1.5	P2	0126z	8/24/2003	439.250Mhz	87.072	Home
Ni0D	EM48qs	P1	P1	0259z	8/24/2003	439,250Mhz	89.65	Home
NOPMM	EN40da	P3	P1	0218z	8/25/2003	439.250Mhz	111.608	Home
KC8LZC	EN80ge	P2	P2	0319z	8/25/2003	439.250Mhz	328.174	Home
KB8GUE	EM89fi	P4	P4	0354z	8/25/2003	439.250Mhz	326.223	Home
W9ZIH	EN51nw	P5	P3	0435z	8/25/2003	439.250Mhz	151.801	Home
W4HTB	EM66tx	P1	P1.5	1355z	8/25/2003	439.250Mhz	263.236	Home
N9UKB	EN41rb	P4	P5	0204z	8/26/2003	439.250Mhz	98.863	Home
KB8OFF	EM79wr	P1	P2	0230z	8/26/2003	439.250Mhz	292.828	Home
K4VXP	EM77hi	P1	P3	0247z	8/26/2003	439.250Mhz	285.777	Home
W8ZCF	EM77tb	P5	P5	1210z	8/26/2003	439.250Mhz	342.104	Home
W9NTP	EN79ek	P1	P1	1105z	8/30/2003	439.250Mhz	214.951	Home

MILES 6550.497 **POINTS 13100.994**

WB8ELK EM64oj CLASS: VIEWER

Call	Report	Time(UTC)	Date	Freq	Distance	Points
N4TXI	P5	0200	6/22/02	439.25	20 mi	40
W9NTP	P3	1130	6/24/03	439.25	354 mi	708
W4HTB	P2	1140	6/24/03	439.25	178 mi	356
N9AB	P1	0411	6/25/03	439.25	549 mi	1098

Total Miles: 1101 mi Total Points: 2202 points


N9XHU


KA9UVY

KA9UVY EM58ng CLASS: HOME

Summary: 44 QSO's in 6 states, best Opening's 7/20 and 8/25. Only 2 QSO's on 23cm.

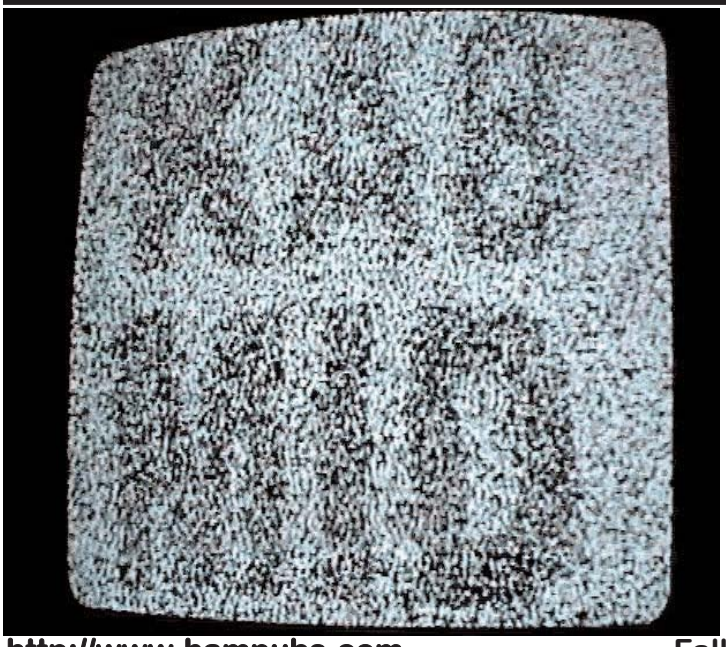
STATION WORKED	GRID SQ	RPT	UTC	DATE	FREQUENCY	DISTANCE	POINTS:
N9AZZ	EM57mv	P-3	00:19	06/01/03	439	26	52
N9AZZ	EM57mv	P-1	00:24	06/01/03	1265	26	156
W9AZZ	EM57mv	P-3	00:30	06/01/03	439	26	52
W9AZZ	EM57mv	P-1	00:33	06/01/03	1265	26	156
N9XHU	EM59et	P-1	12:01	06/01/03	439	113	226
KB9JGF	EN70mb	P-1	12:27	06/01/03	439	243	486
K9KKL	EM59ds	P-1	12:13	06/02/03	439	112	224
KA9EGM	EM58km	P-4	13:30	06/16/03	439	21	42
KO0Z	EM48qs	P-2	04:55	06/21/03	439	100	200
KD9SG	EM58br	P-2	05:10	06/22/03	439	62	124
WD9IVD	EM58at	P-3	05:50	06/22/03	439	69	138
KB9CJR	EN61aq	P-2	13:05	06/22/03	439	240	480
N0PNM	EM48	P-1	01:29	06/23/03	439	100	200
W4HTB	EM66tx	P-2	00:34	06/24/03	439	163	326
N9ZGE	EM59ds	P-1	01:27	06/24/03	439	112	224
K9IDQ	EN50ba	P-2	02:30	06/24/03	439	132	264
W0DQY	EM48rs	P-1	05:20	06/24/03	439	96	192
K0PFX	EM48ts	P-2	05:58	06/24/03	439	88	176
N9TWH	EM57mt	P-2	23:48	06/26/03	439	31	62
K9SM	EM59gd	P-5	13:10	06/27/03	439	68	136
KD0LO	EM48sr	P-2	05:50	06/29/03	439	91	182
K0PFX	EM48ts	P-2	12:50	07/03/03	439	88	176
KA9JJS	EM58nh	P-5	00:45	07/07/03	439	2	4
K9KKL	EM59ds	P-1	01:40	07/08/03	439	112	224
W9TZB	EM58nh	P-5	22:04	07/11/03	439	2	4
N9XHU	EM59et	P-1	12:45	07/17/03	439	113	226
KB9JGF	EN70mb	P-1	01:41	07/18/03	439	243	486
KD0FW	EM29tc	P-2	11:21	07/20/03	439	302	604
AA9MY	EN50gm	P-1	12:04	07/20/03	439	158	316
KC0HFL	EM17io	P-2	13:10	07/20/03	439	461	922
K9KKL	EM59ds	P-2	01:46	08/19/03	439	112	224
N9XHU	EM59et	P-2	12:06	08/19/03	439	113	226
KB9JGF	EN70mb	P-2	01:42	08/20/03	439	243	486
NI0D	EM48qs	P-1	03:50	08/24/03	439	100	200
K0PFX	EM48ts	P-1	04:45	08/24/03	439	88	176
KA8MID	EM89ic	P-1	02:22	08/25/03	439	307	614
W8RVH	EM79xw	P-3	03:44	08/25/03	439	284	568
N9AB	EN52xg	P-3	04:05	08/25/03	439	279	558
KB8GUE	EM89fi	P-2	04:13	08/25/03	439	297	594
KD0FW	EM29tc	P-2	04:38	08/25/03	439	302	604
K4VXP	EM77hi	P-2	10:59	08/25/03	439	201	402
W9NTP	EM79ek	P-2	11:05	08/25/03	439	192	384
W4HTB	EM66tx	P-2	13:32	08/25/03	439	163	326
W8ZCF	EM79tb	P-1	12:38	08/26/03	439	249	498

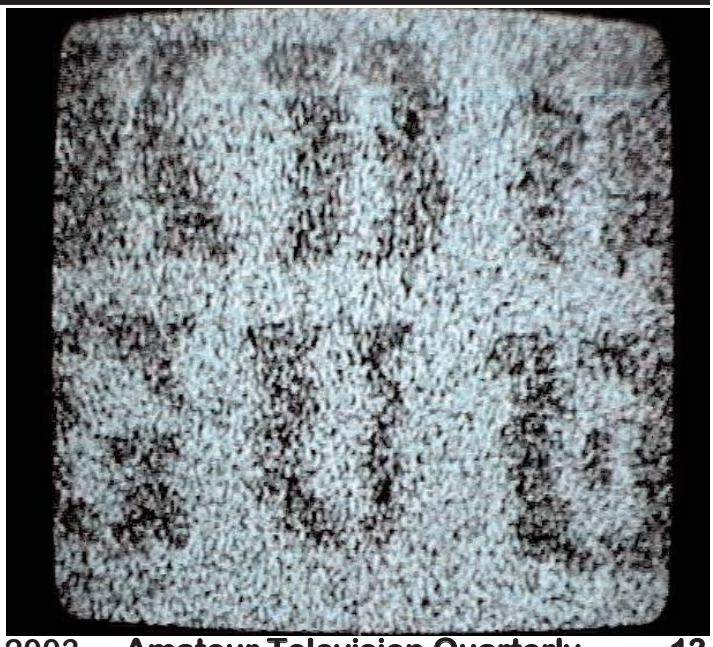
Actual miles: 6356 Claimed Score: 12,920

KA8MID EM89ij CLASS: HOME

Date	Call	P sent	P rec	Time	Grid Sq.	Miles	Points
6-1	KC8OVP	P3	P4	14:20	EM89fe	15	30
6-1	KB8GUE	P5	P3	14:38	EM89fi	22	44
6-1	KB9JGF	P2	P2	14:42	EN70mb	111	222
6-1	KB8ZLB	P5	P5	15:28	EM89hh	16	32
6-1	KB8VUM	P1.5	P1.5	15:34	EM89gm	31	62
6-8	W8RVH	P2	P2	15:44	EM79xw	71	142
6-18	W8DMR	P1.5	P1	17:27	EM89ou	63	126
6-18	W8RRF	P2	P2	17:30	EM89ou	59	118
6-19	K8AEH	P3	P3	18:05	EM89ow	64	128
6-23	K8GCS	P1	P1	16:38	EM79wq	60	120
6-24	W4HTB	P1	P1	17:10	EM66tx	222	444
6-24	KC8LZC	P2	P1.5	17:38	EM80ge	76	152
6-24	KB8YMQ	P2	P1.5	17:40	EN80ib	67	134
6-24	N9AB	P3	P3	18:00	EN52xg	332	664
6-24	W9ZIH	P3	P3	18:05	EN51nw	353	706
6-24	N9HXU	P1.5	P1.5	19:23	EM59et	342	684
7-2	KB9JGF	P5	P5	15:23	EN70MB	111	222
7-24	KA8HBT	P3	P3	15:58	EM79us	68	136
7-27	W4HTB	P4.5	P5	15:28	EM66ts	222	444
8-19	N9HXU	P1.5	P2	17:44	EM59et	342	684
8-24	KA9UVY	P1	P1	17:20	EM58ng	307	614
8-24	NI0D	P1	P1	17:50	EM48qs	395	790
8-24	KD9SG	P1	P2	18:53	EM58bs	355	710
8-24	WD9IVD	P2	P2	19:02	EM58at	359	718
8-24	N9AB	P5	P4	19:04	EN52xq	332	664
8-24	W9ZIH	P5	P4	19:25	EN51nw	353	706
8-24	N9AZZ	P2	P2	19:43	EM57mv	318	636
8-24	KB9PWQ	P3	P2	19:59	EN61cx	309	618
8-25	W8ZCF	P2.5	P3	15:51	EM79tb	58	116
8-25	K4NQV	P1.5	P2	17:25	EM66sw	227	454
8-25	K4VXP	P2	P4+	17:35	EM77hi	164	328

TOTAL 5824 Miles 11,648 Points





N9AZZ EM57mv CLASS: HOME

Date	Call	Report	UTC	Freq	Dist	Points
06-01-2003	KA9UVY	P3	00:21	439.250	26	52
06-01-2003	KA9UVY	P1	00:24	1265.00	26	156
06-01-2003	N9TWH	P5	00:36	439.250 5	10	
06-21-2003	KA9EGM	P1	02:58	439.250	44	88
06-22-2003	KD9SG	P3	05:57	439.250	78	156
06-22-2003	WD9IVD	P1	06:08	439.250	83	166
06-25-2003	KB9CJR	P2	01:39	439.250	266	532
06-25-2003	K0PFX	P2	01:49	439.250	97	194
06-25-2003	KB9JGF	P3	03:50	439.250	262	524
08-25-2003	N9AB	P3	04:08	439.250	305	610
08-25-2003	KA9MID	P2	04:45	439.250	318	636
08-25-2003	KB8GUE	P2	04:46	439.250	309	618
08-25-2003	KB9PWQ	P1	05:21	439.250	288	576
08-25-2003	NI0D	P3	05:49	439.250	103	206
08-25-2003	KD9SG	P5	05:56	439.250	78	156
08-25-2003	WD9IVD	P3	06:07	439.250	83	166

Total 2371 Miles 4846 Points

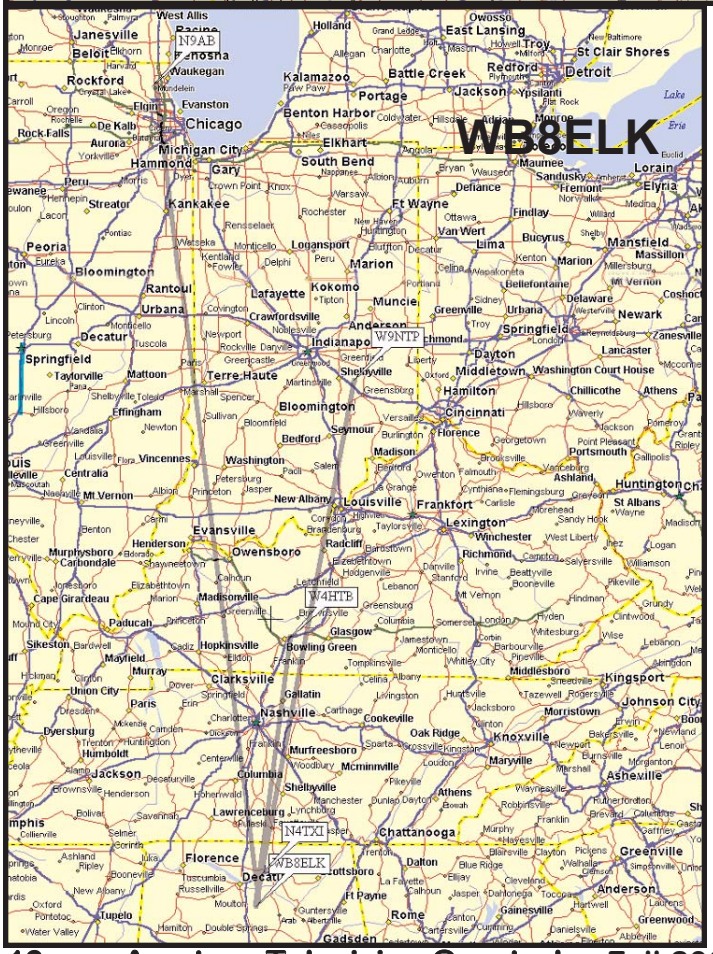
KD0FW EM29tc CLASS: HOME

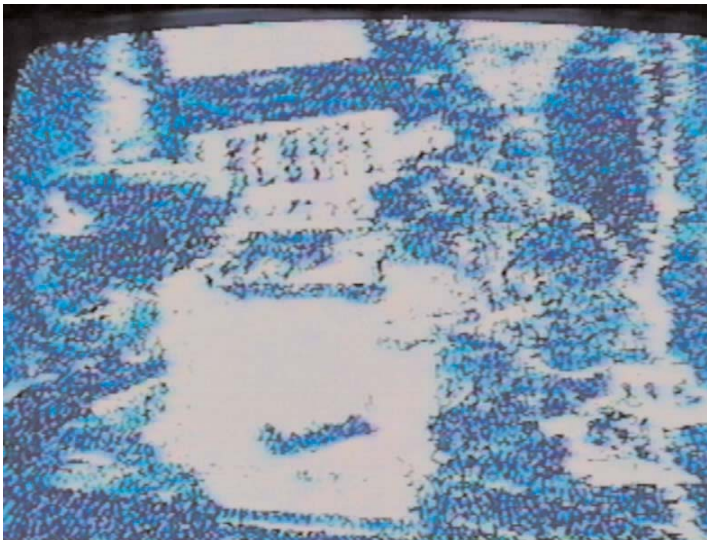
Date	Call	Report	UTC	Freq	Dist	Points
7/20	KA9UVY	p1/p2	11:21	439.250	304 Miles	608
8/24	KD0LO	p1/p1	02:00	439.250	214 Miles	428
8/25	K0PFX	p3/p3	04:20	439.250	218 Miles	436
8/25	WD9IVD	p3/p2	04:25	439.250	240 Miles	480
8/25	NI0D	p1/p1	04:30	439.250	204 Miles	408
8/25	W9NTP	p1/p1	04:32	439.250	471 Miles	942
8/25	KD9SG	p1/p1	04:34	439.250	245 Miles	490
8/25	KA9UVY	p2/p2	04:36	439.250	304 Miles	608

For a total of 2200 points x 2 for 70 cm = 4400 points

K1CRA FN02ps CLASS: HOME

Date	Call	Report	Freq	Dist	Points
8/20/03	WA9EUN	P4	439.25	510	1020
8/20/03	KB9PWQ	P3	439.25	468	936
8/20/03	K8ATV	P3	439.25	399	798
8/20/03	N9AB	P3	439.25	478	956
8/20/03	W9ZIH	P1	439.25	524	1048
Total	2379 Miles	4758 Points			





KC0HFL
Pictures in the article by
Craig Andersen [k1cra@arrl.net]

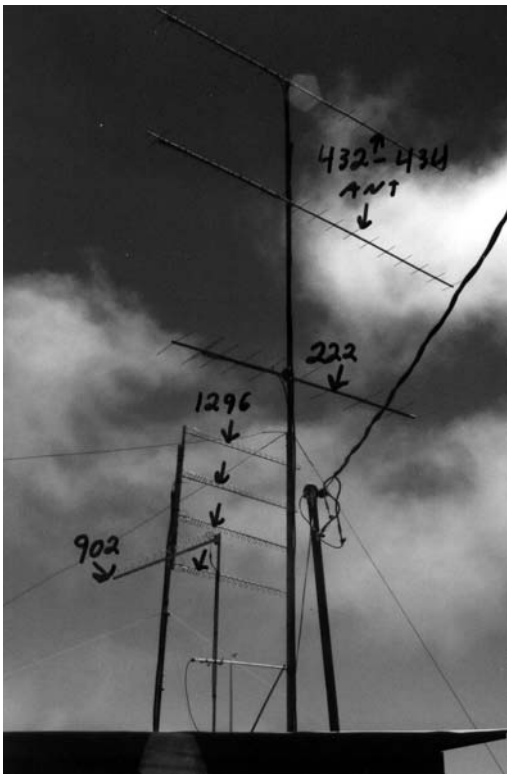
ATVQ

ATV DX Record
Hawaii to California!

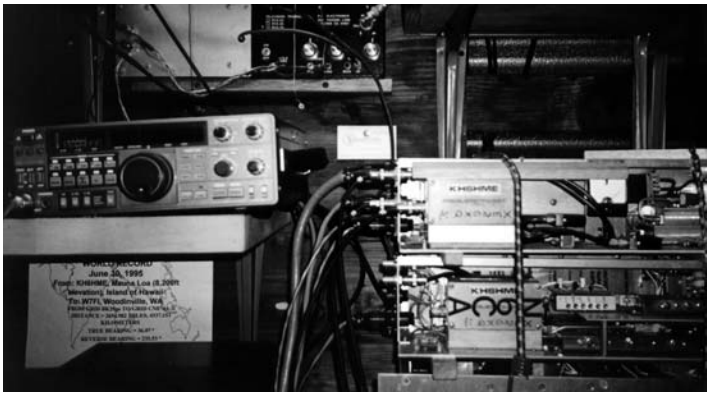
by Mike Collis - WA6SVT Email: WA6SVT@aol.com
POB 1594
Crestline, CA 92325

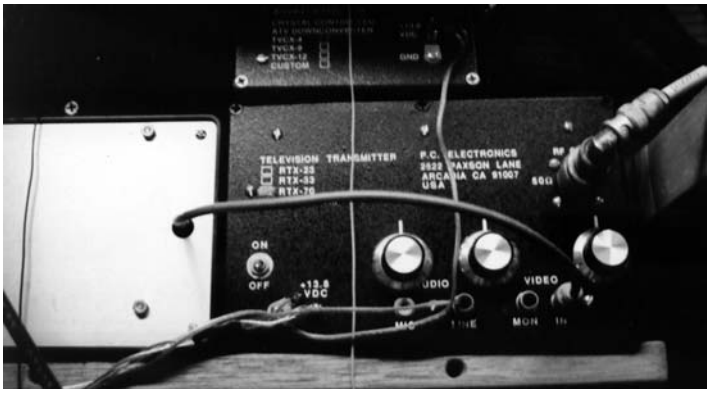
ATV DX via tropo ducting is exiting. The ATV DX record between Paul Lieb, KH6HME, from his famous remote ham shack on the east slope of the Mauna Loa Volcano, Hawaii to Mike Henkoski, KC6CCC, San Clemente, California is over 2,000 miles. Earlier the same day Gordon West, WB6NOA, in Costa Mesa, California made history by being the first to receive Paul's ATV signal. This record was set back in the mid 1990's. This summer the tropo was back in full force and Gordon received Paul's ATV signal as well as ATN's repeaters on Santiago Peak and Mt. Wilson giving many ATV'ers the thrill of ATV DX and sets the record of best DX into an ATV repeater.

I had the pleasure to visit with Paul in Hawaii on July 3rd while on vacation. The drive took me from my time share on the beach in Kailua-Kona on the west (Kona) coast of the Big Island past coffee plantations just outside of town on highway 190, the terrain changed drastically within 1 mile's distance from tropical to dry desert land as we turned north past Hualalai Volcano. The land started to change to dry grassland with cattle ranches. Soon we entered the eastern edge of the famous Parker Ranch and turned southeast on highway 200 AKA "Saddle Road" then through an army base in the dry center of the part of the island that looked more like Arizona than Hawaii. A few miles past the army base was the turn off were I met Paul. We drove up the eastern slope of Mauna Loa about two thirds of the way to the top.



Paul said the top of the volcano (13,677 ft.) is above the tropo duct and not usable, the photo of Mauna Loa taken from the airliner in route to Kona Airport clearly shows the top of the inversion layer (tropo duct). Paul's famous shack is part of a TV microwave relay site that connects a TV station on the island of Maui to a TV station in Hilo. The shack houses several weak signal CW beacon stations on 144.17 MHz and all bands to 10 GHz. The 2 meter and 70 cm beacons are normally left on unless Paul is working stations stateside or Mexico. The





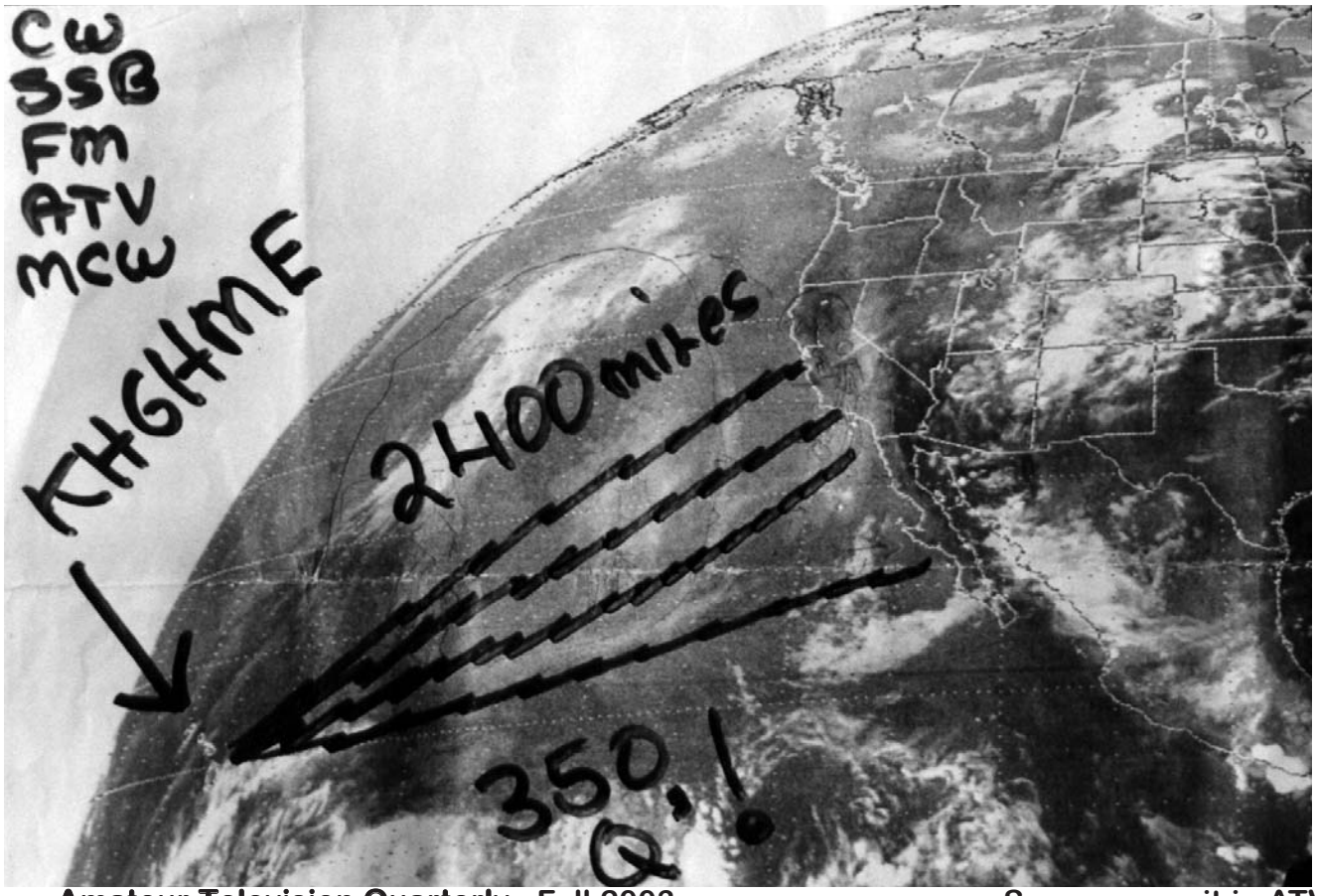
ATV beacon shares the same antennas as the 432 beacon and is turned on when signals on 432 MHz are reported strong.

The ATV beacon equipment was described in detail by Tom, W6ORG, in last month's "Q" while announcing this summer's ATV opening. The power out is about 90 watts on sync tips with about 19 dB of antenna gain. The polarization is horizontal due to the use of the 432 MHz antennas normally used for weak signal CW and SSB station and beacon. Stations in Southern California wanting to pick up the signal need to have a clear path to the ocean aiming 256 degrees with a horizontal antenna and a 434 MHz ATV receiver.

The photo of Paul's signal is from Gordon's QTH with modest single yagi and no mast mounted preamp. Stations with stacked antennas and preamp could get even better pictures. The tropo DX from Hawaii to California is unique because it is actually made possible due to two separate tropo ducts, at the Hawaii end the duct is about 1,500 ft. thick centered at about 6,000 ft. and California at sea level to at times 6,000 ft. during the summer and early fall with the peak during July. When a weather tropical disturbance southwest of Hawaii is formed (see photo), the ducts are connected.

During my visit to Hawaii, I donated a 434 MHz preamp, filter and T/R relay to enhance Paul's ATV receive capability and hopefully a two-way ATV contact can be made. I want to thank Paul for his warm Hawaiian welcome to his Mauna Loa shack and later a tour of the city of Hilo and surrounding area. I also wanted to thank Gordon for sending me the photos of the ATV beacon picture as received at his QTH and weather satellite picture.

ATVQ



The HAMbulance Hits The Road With Video

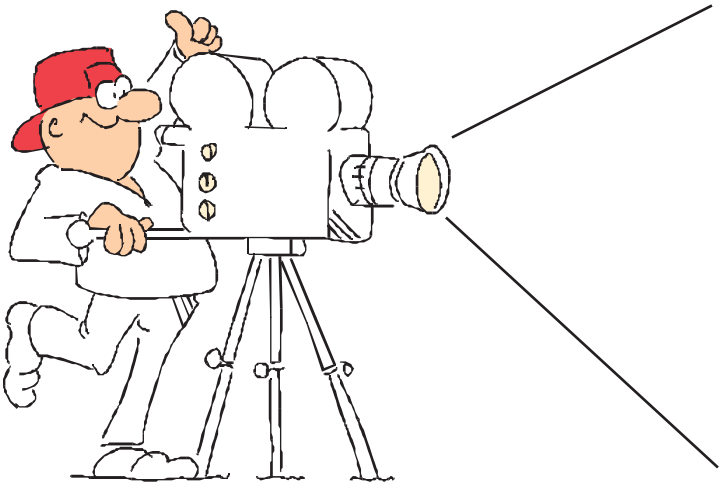
ATV hits the road and hamfest circuit with the introduction of the "HAMbulance". Craig Andersen - K1CRA, in conjunction with the K1CRA Radio WebStore has begun retrofitting the former Millgrove, New York ambulance with full HF, VHF, UHF and ATV equipment.

With four heavy-duty batteries and power inverter, the HAMbulance is fully prepared to provide instant demonstrations and introduce Ham Radio to the general public. To encourage existing hams to explore new modes, the HAMbulance will visit local radio clubs regularly with an emphasis on ATV. Plus, several events with the Boy Scouts are planned, including the Fall Jamboree on the Air (JOTA). The HAMbulance will also be utilized as a rover in several upcoming contests. A special QSL card and awards will be forthcoming.

Onboard equipment changes regularly, however the intent is to maintain ATV on at least two bands and full VHF/UHF and HF at all times. Current ATV configuration is a PC Electronics TC70-1d driving a Mirage D1010 amp and a DK9SQ 2m/70cm 4 element log periodic on top of a 33' DK9SQ 33' telescoping mast. Other equipment consists of a Yaesu FT-847 as needed, permanently mounted vertical whips and for HF, a wire vertical and 3 band dipole using the 33' foot mast as the center support.

To see more pictures and learn more about the HAMbulance, visit **www.hambulance.com or www.k1cra.com**.

Craig Andersen - K1CRA
k1cra@arrl.net



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Gene Harlan - WB9MMM - Editor/Publisher

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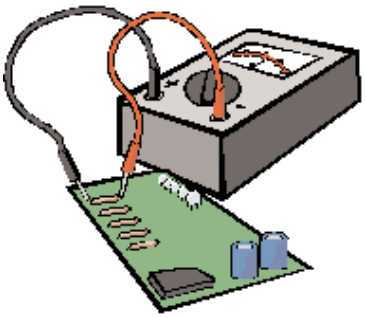

Sparks from the Bench

by Ron L. Sparks - AG5RS - Email: atvq@sparkles.com
P.O. Box 945
Katy, TX 77492

"BLT-19"
A Regular Featured Column!

We did it! BLT-19 was a resounding success. The South Texas Balloon Launch Team (BLT) held their 19th launch on August 23, 2003. I was responsible for the ATV package and am relieved to say it worked as planned. Photo 1 is a screen capture from the videotape. This was at an altitude of about 85,000 feet – the edge of space! If you look carefully you can see the curvature of the earth, which just begins to be visible at this altitude.

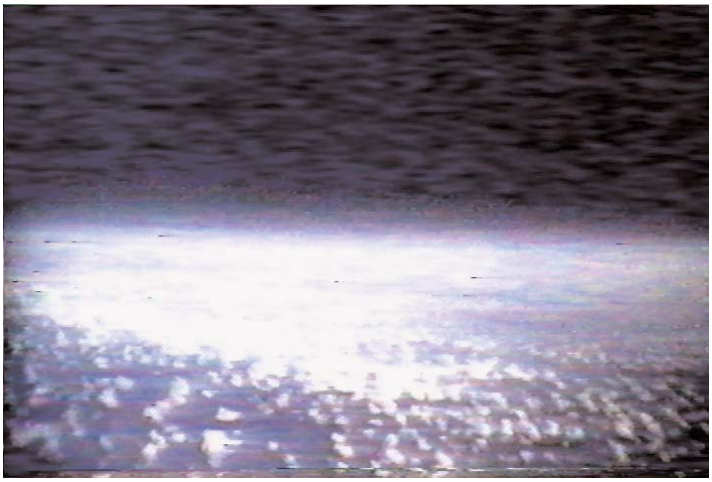

Photo 1 -The view from 16 miles up after burst. Notice the support cord on the right edge of the photo.

In case you missed my last column, the BLT-19 team selected me to provide the ATV system for this year's balloon launch. The job was interesting because it provided both a long history and new challenges. With many successful launches, there was a good history of what things worked well. But at the same time, there was an equally long history of problems. I saw this as a challenge to repeat the successful items and eliminate the problematic bits.

Also last time I discussed my approach to projects and described it as "incremental development". This is a process of building things one section at a time and testing them as you go. But the primary aspect of it, for me, is prioritizing the sections so that the most critical items are done first. That puts the "nice to haves" at the end of the available time and provides a little cushion for unforeseen events.

Saved by the Process

In this particular instance, the incremental development process saved the project for me. I had all the critical components built and tested and had begun work on the onscreen display components about two weeks before the launch date. Sadly, my elderly mother-in-law passed away about 10 days before launch. As you might expect, there was not a lot of time available to work on the balloon ATV system.

Fortunately, I was able to seal up the equipment as it was and hand it off to Andy MacAllister, W5ACM, for integration into the flight systems. The only thing we had to do was add a patch between the ID'er audio and the ATV system. While I did not finish all the "whistles and bells", the launch and video went off without a hitch. This all just served to reinforce my belief that you should ***always*** have things in a position to where you can drop out unexpectedly without jeopardizing the work of the rest of any team.

As it worked out I had just enough time on my return to town to put the finishing touches on the receive antenna system. But, I still had my 1.2 GHz M^2 yagi as a backup in case I had not had that time.

The Basic System

I guess a little recap is in order to refresh your memory about how the system was set up. Since there have been 18 previous balloon launches, we have a pretty good idea as to what ATV equipment works and what doesn't. The best combination of weight and efficiency seems to have occurred with the 23 centimeter (1.2 GHz) transmitter that was developed a number of years ago by the Houston Amateur TV Society (HATS). Coupling this transmitter to an omni-directional inverted ground plane antenna seems to be a simple and proven design. On the receive side a number of different approaches have been taken. One of the most successful was a coffee can feed coupled with a 5 ft dish. While various 1.2 GHz Yagi antennas have been tried, their gain often seems to be right at the edge of acceptable reception, especially if the balloon moves very far down range.

For the receive side, my plan was to have a backup antenna and a main antenna. The 1.2 GHz yagi mounted on a PVC tripod and moved by an "armstrong" rotator was to be the fail safe backup. The primary receive antenna would be my 5 ft dish with a patch feed. I had very good success on 1.2 GHz with this arrangement when working AO-40 for AMSAT field day. A simple re-tuning of the patch feed (developed by Jerry Brown,

AG5RS Dish

AG5RS Presetup

K5OE) would allow it to work for the ATV frequency.

One key part of using the dish as a primary antenna was moving it. The calculated gain from the dish is a very useful 25 dBi, but the half power beamwidth at this frequency is less than 10 degrees. Especially when the balloon is in the early minutes of flight, the antenna needs to move quickly. This has proven difficult to do manually and I felt that a rotor system would be mandatory to eliminate tracking problems on the big dish. I did not have the budget for a rotor system large enough to move a 5-ft solid dish and feed. That left only the homebrew option. I will detail the system sometime in the future. I spent a little less than $150 on all the parts and plan a little fine-tuning, but suffice it to say that it worked fine and met my expectations. I did not have a computer controlled rotator box ready for this launch, but by quickly wiring the motors to a 12 volt supply I could aim the dish easily from my operating position.

One nifty little trick was that I added a mount for a camera right on the back of the feed. That allowed me to see exactly what the dish was seeing. When there was a break in the clouds I could often see the balloon on the dish-cam and therefore be sure I was tracking it precisely. Photos 2 through 5 show my setup in its various poses.

For the 1.2 GHz receiver, I used a Bensat receiver that I obtained from Tom O'Hara, W6ORG a few years ago. While nearly any satellite downconverter can be modified to operate as a 1.2 GHz FM receiver, many of them do not have the controls and gain necessary to be a good choice. I have recently made the modifications that Tom described in his ATVQ articles (summer 1999). These involve boosting the video gain, changing the compensation to NTSC (from PAL), reversing the tuning direction, and converting to 12 volt operation. As a "just in case" sensitivity improvement, I added a C-band LNA that was broad

AG5RS Video setup

AG5RS Dish operating

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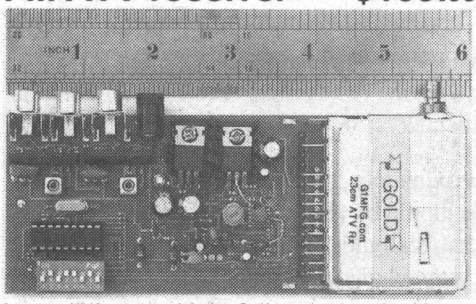
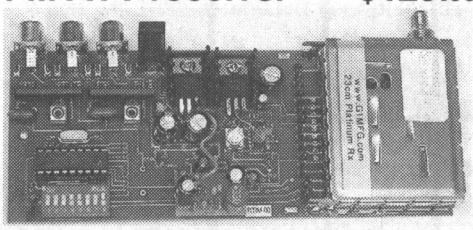


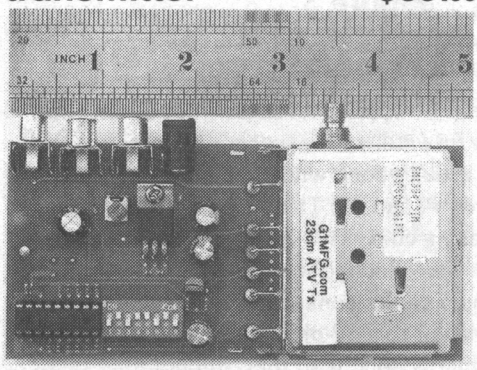
Incredibly sensitive, fully synthesized, covers the 23cm band (and beyond) in 500kHz steps. Includes 6.0 & 6.5MHz intercarrier sound. Runs from 12-15V DC, RCA sockets for audio & video, SMA RF socket. Built & tested.

'Platinum' 23cm FM ATV receiver $129.99



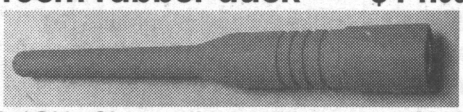
Includes video de-emphasis circuit, all other specifications similar to the Gold receiver (above). Built & tested.

23cm FM ATV transmitter $89.99



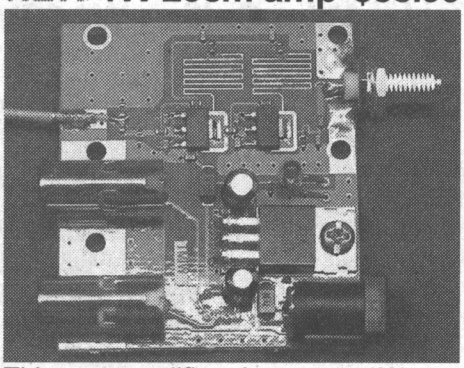
Fully synthesized, covers the whole 23cm band (and beyond) in 500kHz steps. Includes 6.0 & 6.5MHz intercarrier sound. Runs from 12-18V DC. RCA audio & video connections, SMA RF socket. Typically 50mW RF output.

13cm rubber duck $14.99



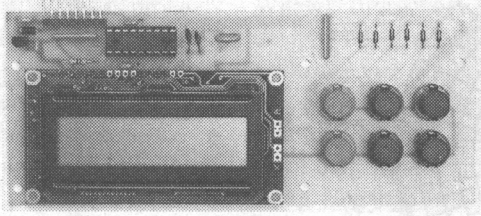
2.4GHz Sleeve dipole with integral SMA plug. Suitable for Rx or low power Tx.

NEW 1W 23cm amp $88.99



This new amplifier gives up to 1W output from our 23cm transmitter. The input is via a SMA plug on a 4" flying lead (not shown in photo) and the output is via a SMA socket. Built & tested, just plug it in for more power!

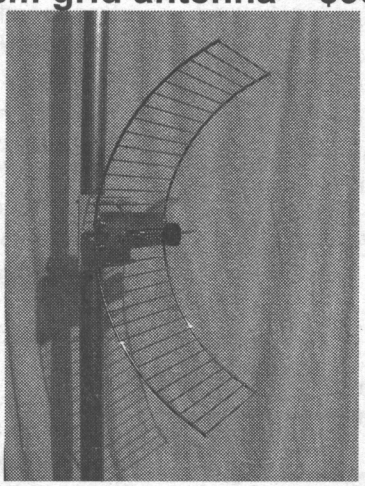
23cm LCD transceiver controller $89.99



Connects to our receiver and transmitter for pushbutton frequency control in 125kHz steps. Adds 3 VFOs for Tx, 3 for Rx. Can auto-tune the receiver to the transmitter frequency (for checking your input to the repeater). Many more features including wideband receive from 800-1800MHz! Built & tested.

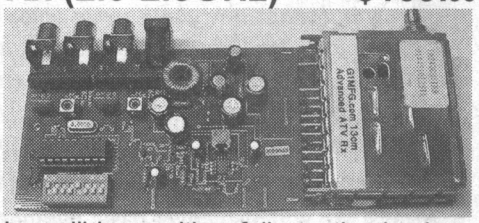
Will not work a transmitter without a receiver.

23cm grid antenna $99.99



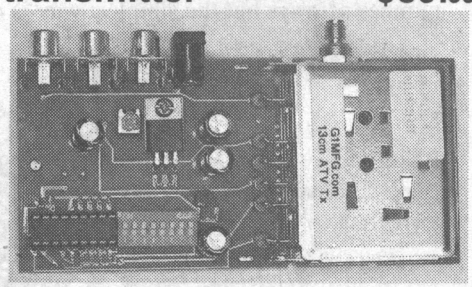
Wide band antenna, ideal for use with our transmitters and receivers. Transmits great across the **whole** 23cm band, OK for receive 800-1800MHz! Max gain 13dB. SMA connecting socket.

'13cm Advanced' FM ATV Rx (2.3-2.5GHz) $109.99



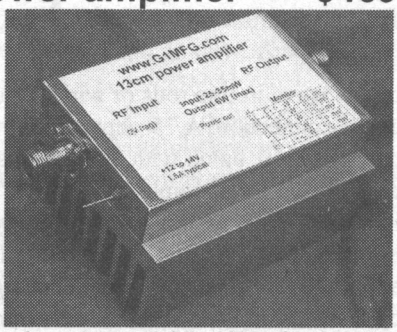
Incredibly sensitive, fully synthesized, receives 2.305-2.559GHz in 1MHz steps. Includes 6.0 & 6.5MHz sound. Runs on 12-15V DC. RCA's for audio & video, SMA RF socket. Built & tested.

13cm FM ATV transmitter $89.99



Fully synthesized, covers 13cm band & beyond in 1MHz steps. Includes 6.0 & 6.5MHz sound. Runs on 12-18V DC. RCA audio & video connections, SMA RF socket. Typically 20mW RF output. Built & tested.

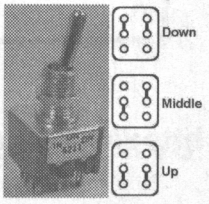
13cm high gain 6W power amplifier $469.99



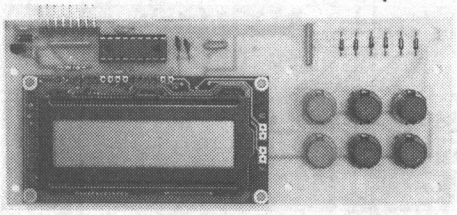
Requires around 25mW in for 6W out, typically gives 5W from our 13cm Tx. Runs on 12-14V. Fairly broadband - covers whole 13cm band without retuning. Built, tested and aligned.

Tx/Rx sequencer switch $4.99

Special switch for simple Tx/Rx sequencing. Full details on web site. Please add $1.50 shipping (free shipping if bought with any other item.)

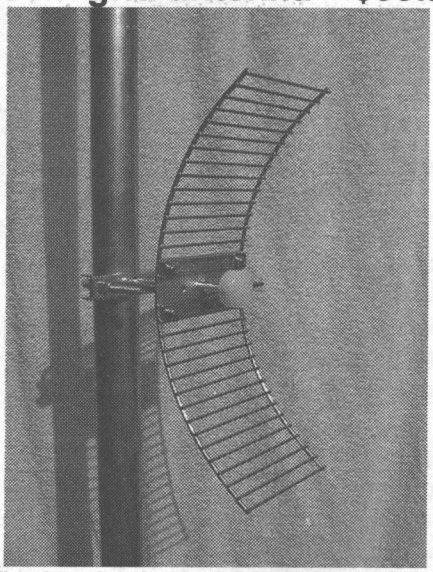


13cm LCD transceiver controller $89.99



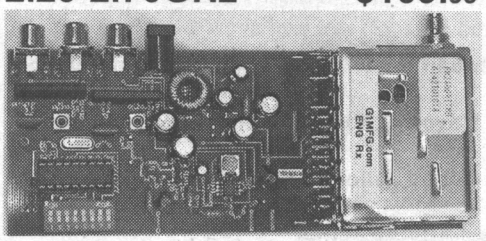
Connects to our Rx & Tx for pushbutton frequency control. Features like our 23cm controller but receives 2.200 - 2.700GHz. Built & tested.
Will not work a transmitter without a receiver.

13cm grid antenna $99.99



Wide band antenna, ideal for use with our transmitters and receivers *or wireless networking*. Transmits great across the **whole** 13cm band, OK for receive 2200-2700MHz! Approximately 13dB gain in 13cm band. Connection is via an integral SMA socket.

'ENG' FM TV receiver 2.20-2.70GHz $109.99



Incredibly sensitive, fully synthesized, receives 2.2-2.7GHz in 2MHz steps. Covers a lot of the outside broadcast frequencies, video senders and lots of other interesting stuff. All other specs similar to our 13cm Advanced receiver. Runs on 12-18V DC. Supplied built & tested.

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Brief specifications

Frequency step size : 125kHz — Power requirement : 12-14V DC
RF input : SMA female — Video and audio outputs : RCA female
Minimum detectable signal: typically -94dBm (in 20 MHz bandwidth))

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Full review in the next issue of ATVQ!

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MA/COM (or equivalent) SMA plugs for 1671A (large qty available) .....$2.19 ea
Short cable SMA - N adapter..... $9.99 Short cable SMA-BNC adapter ..$9.99
3 metre (~10ft) SMA-SMA aerial cable (see web site for attenuation data) ..$21.95
As above 5 metre (~15ft) .....$27.95 As above 10 metre (~33ft).....$34.95
70cm (435.5 MHz) ATV Tx, crystal controlled, 100mW output, to clear.....$99.99
70cm ATV power amplifier kit, 100mW in for 10-15W output, to clear.....$99.99
Transco (or similar) 4 port transfer relay, SMA, good for microwave use $79.99

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enough to give a useable gain on 1.2 GHz (L-band). A photo of the transmitter, antenna, receiver, patch and pre-amp ready for testing was shown in my last column.

The final critical component in this setup was the camera. I tested a number of cameras to find the one that operated best in this wide range of lighting conditions. This is critical because the camera has to operate in a huge range of temperatures and still cleanly resolve light from the black of space to the full sun glare off white clouds. A number of years ago I acquired a junk video analyzer and repaired it. That became quite useful in seeing which cameras handled the full range of lighting without saturating or overloading. My test setup was quite modest. I taped a piece of black construction paper to the wall in the shack next to the white door. By placing a halogen flood so that it shined brightly on the door, I could simulate a very large contrast and lighting difference.

One final area that needed attention was power. The power bus supplied by the balloon's lithium ion batteries is more than 14 volts (4 * 3.6). When the batteries are fresh they can put out up to 3.8, or more, volts. So the ATV package needed low dropout voltage regulators on the input to drop the input and hold the power at a constant 12.0 volts throughout the launch. Since lithium ion batteries are similar to nickel metal hydride in that that they have a discharge curve with a sharp fall off at the end rather than a gradual decline like gel cells, boosting regulators were not necessary for this package. I did use a staged approach and use one big regulator to take the input down to 13.8 volts for the transmitter and then followed it with two smaller units to give 12.0 volts for the camera and 5.0 volts for the digital circuits.

The Launch

As things got a bit messed up for me, I did not get to go to the final integration meeting. But I had the transmit package done and the rest of the team got it to fit neatly. One thing I might mention is the way I built the package. Like had been done in the past, I used aluminum cooking pans to form the housing for the ATV gear. But I took a few extra steps that ultimately paid off.

First, I soldered a copper strap to each cooking pan so that they had an excellent RF connection. What is that you said? "You cannot solder to aluminum." That is definitely not true. It turns out that you cannot solder to aluminum oxide, but you can solder to aluminum. The trouble is, aluminum turns to aluminum oxide within milliseconds when it comes in contact with air. The trick (which I learned from the Radio Society of Great Britain) is to coat the aluminum with a nice puddle of motor oil, then sand off the oxide with emery cloth, and *tin it with solder while still under the oil*.

Once the two pans were connected I covered the joint with more copper strap backed with conductive adhesive. All leads into the package were decoupled with 0.1 uF bypass capacitors and ferrite cores. This prevented the RF interference that previous packages had experienced. Any system for balloon or rocket or satellite or repeater use will be in a RF intensive environment and you cannot overdo the filtering and decoupling.

On the day of the launch all went well. I did the ATV set-up while the balloon team was loading the batteries and filling the balloon. Along with the ATV gear was a GPS system hooked through a mini-TNC to give APRS reporting, digital packet data transmitters, and HF beacons.

I am proud to say the video was often P-5 even at maximum altitude. There was some fading due to package rotation that I would like to find a way to eliminate and during the course of the next year I plan to work on a different antenna design.

The only problem we experienced was a camera failure shortly after burst. We could still see the carrier, but the camera just "died" about 20 seconds into the descent. Once the package was recovered, I eagerly removed the ATV gear and ran back to the bench to do a "*post mortem*". When I fired the system up, it worked perfectly. So what happened?

Past launches had often resulted in various failures at the same point in the flight, so we did a bit of brainstorming and developed a theory. When the package is rising, the air in it is at ground pressure and temperature. Along with the heat generated by the transmitters, things stay a fairly comfortable temperature and the airflow is from inside to outside. But, as the package begins to descend the air pressure internally becomes lower, relatively speaking, than the outside and the outside air is *very* cold. The camera is mounted at a hole in the Styrofoam container and this cold air is sucked in right past it. The effect is the same as hitting it with a nice long blast of –40 degree freeze spray – instant hibernation.

Our plan is to insulate the camera for the next launch. I had thought about vacuum packing it in a plastic bag. However, one of our resident rocket scientists (really, he works at Johnson Space Center) pointed out that pressurizing the container would be better. It turns out that in a vacuum there is less air for convection and things get real hot, real quick. So we could have an opposite problem from the one we currently have.

All in all this was one of the most fun ATV projects I have ever had the opportunity to do and I hope to be able to do it again.

Check it out

The South Texas Balloon launch official web page is **http://www.qsl.net/w5acm/** and I would recommend you surf by and have a look at all the other fun things that went on. I continue to work on the onscreen display and hope to report on it soon. In the mean time I hope the holidays bring you the time and energy to do more ATV projects. Maybe it will for me, too.

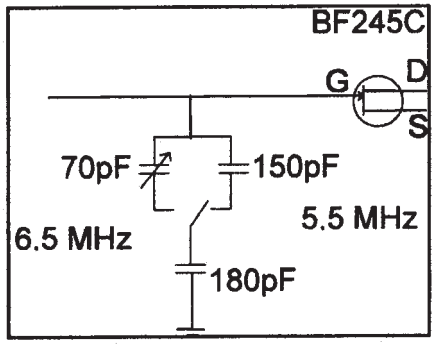
ATVQ

Home-Made FM-ATV Baseband Exciter

by Thorsten - DG7RO
Translations - Klaus Kramer - DL5KCK
DL4KCK@t-online.de
AGAF e.V.
www.agaf.de

Goal

In order to transmit audio together with the video signal we have to mix it. In our baseband unit the sound is frequency modulated onto an rf carrier 5.5 or 6.5 MHz, that is mixed with preemphasized video and output to the TX modulator stage.



Functions

In the baseband unit the video signal is amplified and then the higher frequencies are raised in the "preemphasis" group (CCIR/PAL standard) 75 Ohm/18 Ohm and 9.5 uH, 300 Ohm and 2 nF. This is done in order to expand the overall signal to noise ratio (the receiver has an equivalent stage called "deemphasis" that reduces the higher frequencies together with the induced channel noise).

The sound is leveled by a simple AGC (BF245A) and then frequency modulated onto the audio subcarrier (BF 245C/BF199) that is filtered by the following tuned circuit BV5056 and 120 pF.

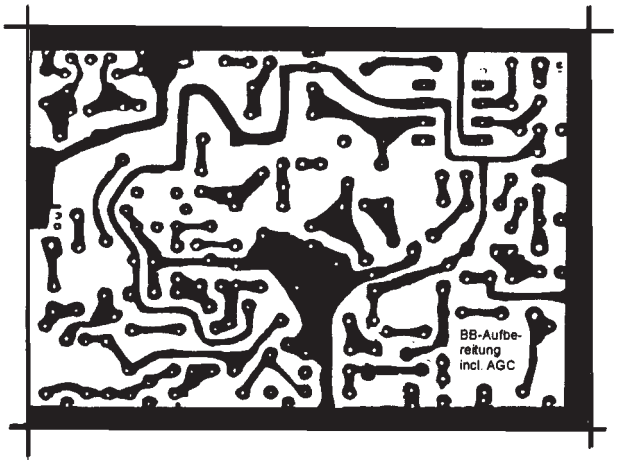
Construction

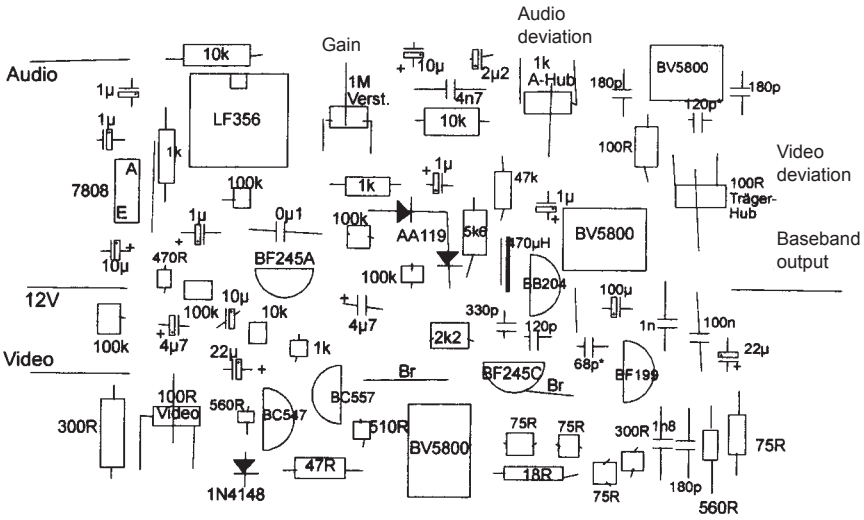
There are different sound subcarrier frequencies in use in some regions, and this unit works ok with 5.5 and 6.5 MHz. In order to switch between both frequencies we have to exchange the 68 pF capacitor at the gate of BF245C with a combination of 180 pF and (switchable) 150 pF or a 70 pF trimmer. Leads have to be short, so best is to solder it all to a miniature relay laid onto the diode AA119.

Stuffing of the board should be performed step by step - first the video part, then the audio. In between it is advisable to apply supply voltage and measure the overall current (max. 100 ma) in order to isolate faulty parts. Level trimmers for video and audio subcarrier (100 ohm each) are on-board, potentiometers for audio gain (1 Meg ohm) and audio deviation (1 K ohm) are mounted on the front panel. A lead for audio signals and supply voltage should be a feed-through capacitor, for video and output a teflon feed-through. A small heat-sink should be applied to the voltage regulator 7808 if possible.

Alignment

You need an oscilloscope and a frequency counter with 8 MHz capability at least, also helpful is a functioning receiver baseband unit and a video monitor. At first video level is set near maximum and coil cores to a middle position, with 12 V supply. The current should read less than 100 mA. After placing a video signal to the input you should see a disturbed video on the monitor at the output.





Clamp
A circuit that forces a specific portion (either the back porch or the sync tip) of the video signal to a specific DC voltage, to restore the DC level. Also called "DC restore." A black level clamp to ground circuit forces the back-porch voltage to be equal to zero volts. A peak clamp forces the sync-tip voltage to be equal to a specified voltage.

Color Bars
A standard video waveform used to test the calibration of a video system. It consists of a sequence of the six primary and secondary colors plus white with a standard amplitude and timing. The color-bar sequence is white, yellow, cyan, green, magenta, red, and blue. There are several amplitude standards, the most common being 75% amplitude (brightness) with 100% saturation (intensity of the color).

Color Burst
The color burst, also commonly called the "color subcarrier," is 8 to 10 cycles of the color reference frequency. It is positioned between the rising edge of sync and the start of active video for a composite video signal.

Color Saturation
The amplitude of the color modulation on a standard video signal. The larger the amplitude of this modulation, the more saturated (more intense) the color.

Color Subcarrier
See Color Burst.

Component Video
A three-wire video interface that carries the video information in its basic RGB components or luma (brightness) and two-color-difference signals.

Composite Video
A video signal that combines the luma (brightness), chroma (color), burst (color reference), and sync (horizontal and vertical synchronizing signals) into a single waveform carried on a single wire pair.

Differential Gain
Important measurement parameter for composite video signals. Not applicable in Y/C or component signals. Differential gain is the amount of change in the color saturation (amplitude of the color modulation) for a change in low-frequency luma (brightness) amplitude. Closely approximated by measuring the change in the amplitude of a sine wave for a change in its DC level.

Differential Phase
Important measurement parameter for composite video signals. Not applicable in Y/C or component signals. Differential phase is the change in hue (phase of the color modulation) for a change in low-frequency luma (brightness) amplitude. Closely approximated by measuring the change in the phase of a sine wave for a change in its DC level.

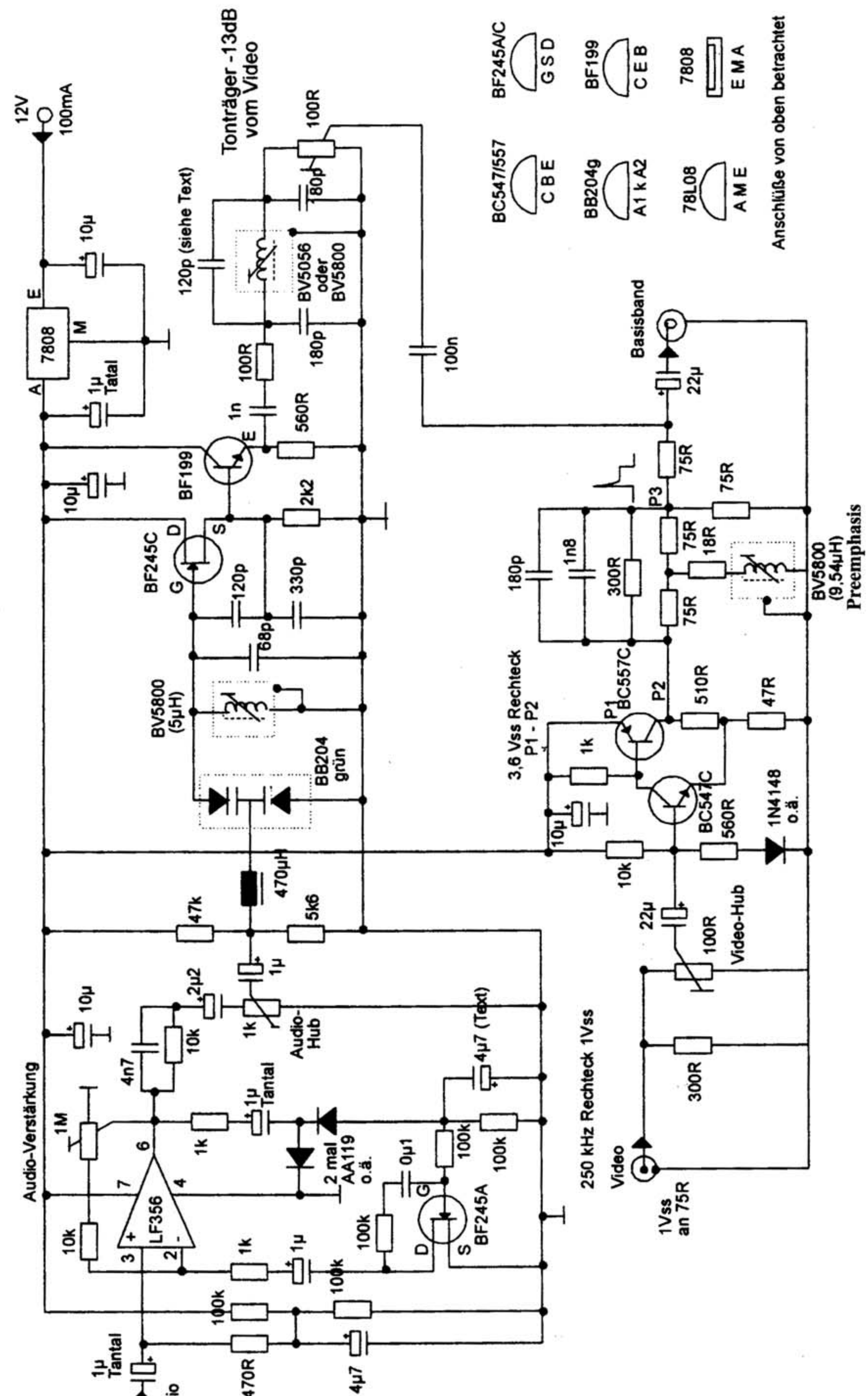
Fields and Frames
A frame is one complete scan of a picture. In NTSC it consists of 525 horizontal scan lines. In interlaced scanning systems, a field is half of a frame; thus, two fields make a frame.

Front Porch
The area of a composite video waveform between the end of the active video and the leading edge of sync.

Horizontal Blanking
See Blanking Level and Blanking Interval.

Horizontal Line Frequency
The inverse of the time (or period) for one horizontal scan line.

Interlaced Scan
The process whereby each frame of a picture is created by first scanning half of the lines and then scanning the second set of lines, which are interleaved between the first to complete the picture. Each half is referred to as a field. Two fields make a


12V
100mA
7808
A
E
M
1µ Tatal
10µ
Tonträger -13dB vom Video
120p (siehe Text)
BV5056 oder BV5800
180p
100R
100n
1n
560R
BF199
E
10µ
2k2
BF245C
D
S
G
120p
330p
68p
BV5800 (5µH)
BB204 grün
470µH
47k
5k6
1µ
2µ2
1k
Audio-Hub
10k
4n7
10µ
Audio-Verstärkung
1M
6
7
4
LF356
3
2
10k
1k
1µ Tantal
2 mal AA119 o.ä.
4µ7 (Text)
100k
0µ1
G
D
S
BF245A
100k
1k
1µ
100k
100k
470R
4µ7
1µ Tantal
Audio
250 kHz Rechteck 1Vss
Video
1Vss an 75R
300R
100R
Video-Hub
22µ
10k
560R
1N4148 o.ä.
BC547C
10µ
3,6 Vss Rechteck P1 - P2
1k
P1
BC557C
P2
510R
47R
180p
1n8
300R
75R
18R
75R
P3
75R
75R
BV5800 (9,54µH)
Preemphasis
22µ
Basisband
BC547/557
C B E
BF245A/C
G S D
BB204g
A1 k A2
BF199
C E B
78L08
A M E
7808
E M A
Anschlüße von oben betrachtet

BATS Great 2.4 GHz Antenna Shootout

Jim Paul - N9LHK - Email: jim@shopstop.net
Tom Weeden - WJ9H - Email: tcweeden@tds.net
Badgerland Amateur Television Society
http://shopstop.net/bats

Editor: The following is an interesting train of thoughts as the Wisconsin BATS group prepares for a balloon launch and wanting to use 2.4 GHz for ATV. They go through a lot of testing before the launch which is worth sharing.

Jim Paul,N9LKY, wrote:

We are still looking for ideas for an upcoming balloon flight. I was thinking of flying a 2.4 GHz FM ATV transmitter instead of the usual UHF ATV transmitter. I have a modified Wavecom Jr. transmitter and one receiver. WJ9H and I had a 27 mile or so reception using it with a 2' dish and parabolic gain antennas from Owen Park to Bluemounds Park a few years ago - so it would have some range. A patch antenna on the balloon would be easy, provide circular polarization, and wide coverage.

Using a gain antenna (Conifer parabolic or dish) on the ground would probably work OK and perhaps provide better pictures than the AM used before.

The Wavecomms have stereo audio - so there will be two audio channels to play with. Perhaps one simple use for this might be an audio ID on one channel and experimental data on the other. A simple experiment might be just a microphone and preamp in the box along with a constant audio source. By monitoring the received audio levels, as the the balloon goes up and there is less air - the volume ought to go down - no air no sound! It would be nice to have several receivers - one at the launch site, one at Space Place, and a few chasers. Anyone else have any Wavecom Jrs or 2.4 GHz gear?

Jim Paul, N9LKY

Jim and gang,

From what I'm seeing here, the direct to ground doesn't have a chance. Yes, the antenna on the ground can be anything we need for gain (anyone got a 100 foot dish we could borrow?). But, the antenna on the balloon almost has to be a isotopic pattern for it to work right.

1- It has to be omnidirectional along the payload axis due to payload rotation.

2- The radiation pattern is not unlike a total upside down sphere or should I say a dome with a max radiation pattern that is almost omni. When the payload is at first liftoff it's far away and low on the horizon it's about 45 miles away, and to the payload space place is also low on the horizon. As the payload gets higher of course it is getting closer, and if the flight path is anything like the numerous past flights it will be at like 60,000+ feet as it passes slightly south of Madison and now the signal is almost directly below the payload.

With the shootout, all I see is high gain at both ends of the path. The balloon can't have a sharp pattern at all.

Joe Mayenschein

Jim didn't mention that the horn antenna on his end had little change in gain at 45 degrees off axis. We did some rough beamwidth measurements on the more promising antennas. If I recall right, the receiver on our end had an "S-6" signal on axis, and fell to "S-3" when they were panned 45 degrees from us. So that would provide about a 90 degree beamwidth from the balloon. I picture a wide cone of coverage looking down from the payload.

I wasn't taking the notes, that's just from memory...

Tom Weeden, WJ9H

Attached is a proposed plan for the BATS balloon flight project (just a starting point anyway). It's designed to try and put a more public face on ATV in particular, and other aspects of amateur radio including APRS and SSTV. The plan calls for Space Place in Madison to act as a public demonstration site of our capabilities. The launch site will probably have to be "mobile" based on wind soundings and balloon track predictions to choose a launch site for a favorable pass over Space Place.

The proposed plans call for a relatively simple payload - video camera with the usual mirror and DTMF control into a modified Wavecom Jr. on 2411 MHz into a circular waveguide feed antenna - providing a fairly omnidirectional beam. The two audio channels on the Wavecom carry a scanner output for a crossband repeater and the GPS/APRS which is also fed to a separate 2m transmitter.

The plan also calls for a Balloon Recovery Unit - sort of a main chase vehicle to coordinate the search efforts with the chasers and maybe can provide SSTV of the balloon recovery.

Jim Paul, N9LKY, jim@shopstop.net

Comments about signal and beamwidth measurements at shootout

Some explanation of our methods for measuring received signal and antenna beamwidths may clear things up. Tim's X10 receiver was modified to show signal strength by taking an internal AGC voltage and displaying it with a 10 segment LED bargraph. So the max signal would be a 10 and the minimum would be a 0 - actually the noise level was at a 1. We are not exactly sure how this AGC voltage varies with received power.

Our beamwidth measurement procedure consisted of measuring the maximum signal strength at bore sight and then recording the angular displacement needed to drop this by one half (if max was 8, then we rotated the antenna until we had a 4 and recorded that azimuth angle). Thus the measured angles are plus and minus about the boresight.

If the AGC was linear with power, this procedure would yield half-power (-3dB) half beamwidths - that is the 3 dB beamwidth would be twice our measured angles. The following table shows typical expected gains and beamwidths for the three dish sizes used and our results:

DIA inch	GAIN dBi	BW deg	BW deg	MEAS deg	2*MEAS deg
18	18.24	19.03	17.4	12	24
22	19.98	15.57	14.24	7.5	15
48	26.76	7.14	6.53	10	20

Two different approximations for the beamwidth were found in the literature and both are shown.

Our estimates of the 3 dB beamwidths (2*MEAS) aren't too far off considering our experimental method. The 22" dish beamwidth was fairly accurately done using a protractor and is nearly right on. I'm not sure how the angles at Bluemound were determined - I suspect less accuracy for the 48" dish propped up against the picnic table, but I'm not sure.

As another check on the numbers the gain difference between an 18" and 48" dish should be about 8.52 dB - from our experiments #1 and #7 the received signal numbers lead to 8-6=2 units difference, so 8.52/2=4.26 dB per unit - in the ball park of 3 dB.

Carrying this through to the helix and beam - their measured 3dB beamwidths would be 50 and 90 degrees. I think that the measured beamwidth of the helix is high - it should be more like the 18" dish numbers - same gain should be about the same beamwidth. I think the measured beamwidth of the horn is low since it should be noted that when using the horn we had acceptable pictures even when the horn was oriented 90 degrees to boresight!

Jim Paul,N9LKY

Before we schedule an organizational meeting at Space Place for the balloon launch, we should conduct a preliminary site survey at Space Place to ascertain its suitability for the project. We need to insure that there are adequate lookangles and no RF interference.

I suggest that a small team of volunteers (WJ9H, W9OUO, N9SZF ?) arrange a visit to Space Place and conduct the site survey in the near future. I'd like to see:

A) Minimum lookangle panorama. At a likely antenna site, record the minimum unblocked visual elevation for azimuth samples, say every 20 degrees or so, for the full 360 degree rotation. A tripod and sighting tool (sight tube, attached protractor and plumb bob) would be needed.

B) 2.411 GHz RFI survey. At a likely antenna site, record the RSSI for azimuth samples for the full 360 degree rotation. Needed equipment would be 2.4 GHz receiver, antenna, tripod, and TV. The TV should be watched as the antenna is turned to look for interference that might not show up on the RSSI. It might be a good idea to set up a local 2.4 GHz transmitter and receiver and just verify that clean pictures can be obtained.

C) 2m repeater survey. See if the 147.315 machine is reachable from SP by HT or will we need more power, better antennas for general communications.

Jim Paul,N9LKY

I'm trying to get a date set with Jim Lattis and Don Michalski at Space Place, hopefully something agreeable with N9SZF and WO9U.

Great 2.4 GHz Antenna ATV Shootout

						KEY	DESCRIPTION			
	W9OUO, WJ9H					BM	Bluemounds State Park			
	K9EV, KB9VMC, N9LKY					OP	Owen Park			
						WAV	Wavecom Jr. (modified)			
						PIC	Picture			
	Saturday					x10	X10			
	8/9/03					ELEC	Electronics			
						BW	Beamwidth in degrees			
QTH	OP	OP	OP	OP	BM	BM	BM	BM	BM	PIC
#	MODE	ELEC	ANT	BW	MODE	ELEC	ANT	SIG	BW	NOTES
1	TX	WAV	22" dish w/patch	7.5	RX	X10	18" dish w/ patch	6	12	OK
2	TX	WAV	22" dish w/patch		RX	X10	LHCP Helix	2		POOR
3	TX	WAV	22" dish w/patch		RX	X10	RHCP Helix	6	25	OK
4	TX	WAV	22" dish w/patch		RX	X10	11 element loop yagi	1		no pic
5	TX	WAV	horn (vert)		RX	X10	18" dish w/ patch	2		OK
6	TX	WAV	horn (hor)		RX	X10	18" dish w/ patch	1		no pic
7	TX	WAV	22" dish w/patch		RX	X10	48" dish crossed dipoles	8	10	OK
8	TX	WAV	horn (hor)	45	RX	X10	48" dish crossed dipoles	5		OK
9	TX	WAV	horn (vert)	45	RX	X10	48" dish crossed dipoles	5		OK
10	TX	WAV	colinear		RX	X10	48" dish crossed dipoles			no pic
11	TX	WAV	patch		RX	X10	48" dish crossed dipoles			no pic
12	TX	WAV	grd plane		RX	X10	48" dish crossed dipoles			no pic
13	RX	WAV	22" dish w/patch		TX	CAM	48" dish (CAM @ fp) VERT			OK
14	RX	WAV	22" dish w/patch		TX	CAM	48" dish (CAM @ fp) HOR			OK
15	RX	WAV	22" dish w/patch		TX	WAV	48" dish crossed dipoles			OK

I'm trying to get a date set with Jim Lattis and Don Michalski at Space Place, hopefully something agreeable with N9SZF and WO9U.

I have access to a clinometer, which I used last weekend to measure our antenna beamwidth angles. It's a combination compass and elevation angle sighting device, kind of a poor man's transit, with one-degree precision. I can use that to map out the elevation angle to the skyline in all directions, both on the ground and on the roof if they'll permit access.

As far as 2.4 GHz, I can bring my Wavecom stuff, and maybe N9SZF could bring his Apple notebook with built-in 802.11x so he can sniff the area for wireless LANs. Of course, I'd make him turn it off to test the video!

Tom Weeden, WJ9H tcweeden@tds.net

Last Saturday WJ9H, W9OUO, K9EV, KB9VMC and I tried various 2.4 GHz antenna combinations to examine the feasibility of 2.4 GHz FM ATV from a balloon. The path was from Owen Park to Bluemounds Park - a distance of about 32 miles - about what we think would be adequate to provide continuos ATV coverage of a balloon flight using Space Place and the launch site as fixed reception sites. The attached spreadsheet details our experiments.

The Antennas and Polarization:

1 22" dish with patch feed - RHCP
2 Circular horn - LP
3 8 element collinear array - LP
4 Patch antenna - LHCP
5 Ground plane - LP
6 18" dish with patch feed - RHCP
7 11 element loop yagi - LP
8 48" dish with crossed dipole feed - RHCP
9 22 turn helix - RHCP
10 22 turn helix - LHCP

Transmitters:

1 Modified Wavecom Jr
2 X10 camera

Receivers

1 Wavecom Jr.
2 X10 receiver and preamp. (has signal strength meter mod)

Preliminary Results:

The helixes and 18" dish performed about the same. The horn and four foot dish provided sufficient gain for the path, but horn and small dish or the helixes would be marginal for the long path but would be adequate for chasers. The X10 (2.413 GHz) and the Wavecom (2.411 GHz) can interoperate and roughly performed the same. Attempts at full duplex were unsuccessful -

Test path map

from WIFI there.

More info can be found at:

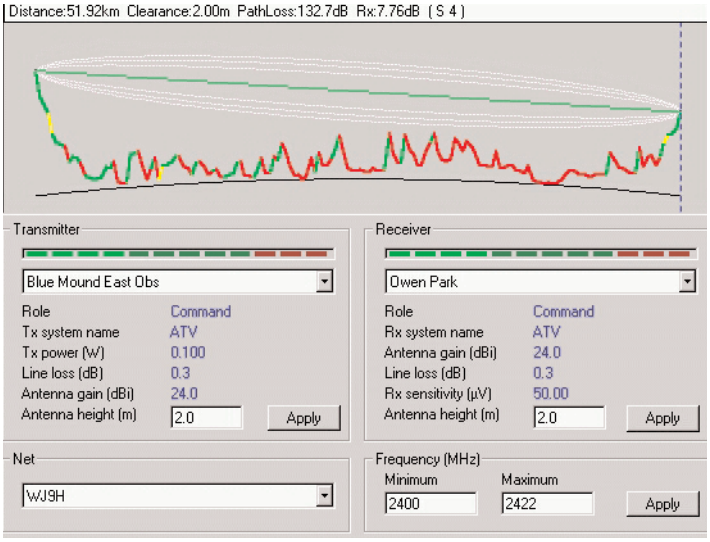
http://personalpages.tds.net/~tcweeden/bats/bats.html
http://www.cs.wisc.edu/~timc/flying/rc-video.html
http://www.cs.wisc.edu/~timc/x10/

73 de N9LKY.

Balloon Status

The short version is that the balloon is missing!

The BATS balloon was launched at 8:28 AM Saturday October 4th from about 7 miles west of Lake Delton. Unfortunately, APRS was not received by anyone. 2.4 GHz video was seen by the launch crew for about the first 5 miles of the flight. WJ9H was unable to receive any pictures at Madison, although I did pick up a faint sync bar (which I now believe was not the balloon but possibly a reflection of some other video source off a nearby tower). Several stations copied the



Test path profile

CW beacon on 28.322 MHz, but all stations lost the signal at about 11:55 AM, roughly 3 1/2 hours into the flight. Rough beam headings put the package at an azimuth around 90-105 degrees from Madison.

Other BATS participants may want to chime in with more details of the subsequent search & rescue mission, but I wanted to suggest that this message be forwarded to anyone in SE Wisconsin with HF capability to listen for a faint CW beacon on 28.322 signing "KB9SFS" or possibly tuning either side of the standard APRS frequency of 144.390 for any packets from the package in case its frequency drifted. It's unknown how long the batteries will last...

Scramble the aircraft!!

BATS home page: **www.shopstop.net/bats**

Tom Weeden, WJ9H

ATVQ

Vidicon Camera For Sale

For any of you ATV buffs that enjoy experimenting, I came across a vidicon camera that I built around 1965 & would like to sell since my current interests & need for money are for eme.

This camera circuit was designed by Mel, W0KYQ, who is the owner of ATV Research, Inc. I have the complete documentation for it including Mel's construction manual, vidicon data sheet & info sheets on the focus coil & deflection coils.

Operating condition is unknown. It worked for me well for several years in the late '60's & has been sitting in a storage cabinet since then. Reduced to $60 OBO + shipping fm zipcode 92708. Think the lens & parts are worth lots more than that. It looks much too nice to me to tear it apart & hope someone reading this may have the desire to play around with it.

Bob Kocisko, K6PF (ex - K7KYQ)
k6pf@ix.netcom.com

ATVQ

Amateur Radio Communications Trailer

Lee R. Kelly - K6ZVA Email: leebobk@earthlink.net
570 Park Terrace
Twin Falls, ID 83301

This trailer is specially designed and built as a one man quick response communications unit. Although as a RACES/ARES command center was of primary importance, all regular amateur radio modes and activities are accommodated. Up to three operators can be comfortably seated.

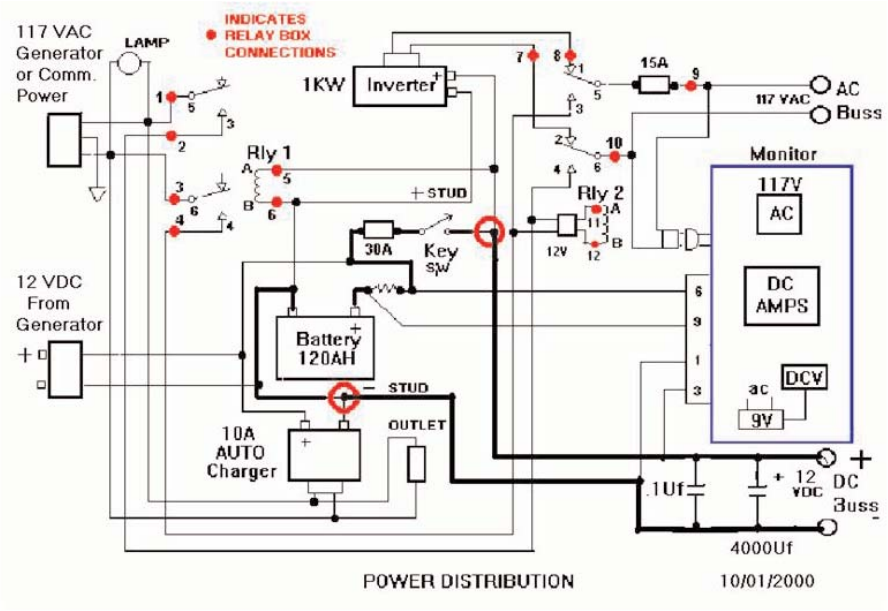
The highly organized equipment area and hidden cabling provide a safe and efficient operating environment. This arrangement also allows for quick operational training

Basic living needs are met for extended periods including a microwave oven, refrigerator, water storage, basin and porta-poti. A storage cabinet is available. Sleeping facilities would normally be within the towing vehicle.

POWER SOURCES

All power supplied to the unit is processed in a steel cabinet installed against the forward bulkhead. The master switch located m this cabinet is key locked to prevent un-authorized use. A 125 Ah deep cycle battery within is the main 13.8 Vdc source. It is maintained from 117 Vac external power with a 10 amp automatic charger.

A 1000 Watt AC inverter provides power for several regulated DC supplies, This arrangement insures constant regulated power for the HF and ATV transceivers as well as AC lighting and electrical outlets during full mobile operations. Fast switching occurs during loss of external power.

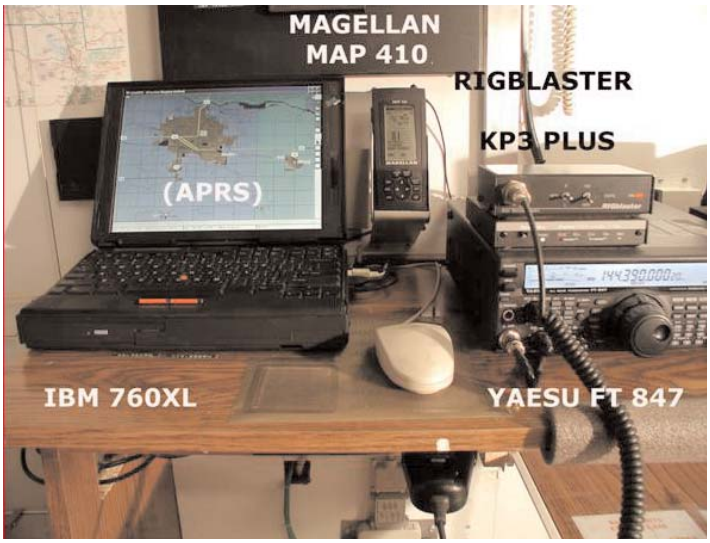


GENRAC 4500 WATT 117VAC GENERATOR
12 VOLT DC 15 AMPS
(TRANSPORTED ON BOARD)

COMMUNICATIONS EQUIPMENT

Yaesu FT 847: This unit allows for all ham. modes, see specs.
Rigblaster : PSK. SSTV etc
Kantronics KPC 3 PLUS: TNC
Magellan MAP 410 ú GPS
IBM 760EL - Laptop Computer
8 Amp Regulated Power Supply (For TC 70 - 20)
20 Amp Regulated Power Supply (For FT 847)
PC Electronics TC 70 - 20 ATV Transceiver
23 Cm Tuner (For NCR 1300 Downconverter)
Yaesu FRG 9600 - VHF/UHF Scanner
Radio Shack HTX 252 : 2M Transceiver
ICOM O2AT : Hand Held Transceiver
5 IN Color ATV Monitor
Ambico Video Title Writer
Pelco - P/T Controller for Roof Cain.
Sansui 13 IN ATV Monitor/ Video Selector
Panasonic WV - CP232 Color Camera
Rainbow Lens L4mm GE
Hat Camera - See Details
PC Electronics 23Cm Crystal Cont. Downconverter (Hat Cam)
Radio Shack TRC 437 CB
HP 720C Printer
Several Switch and Control boxes

PHOTOS OF ABOVE INSTALLED EQUIPMENT



TELEVISION PERFORMANCE

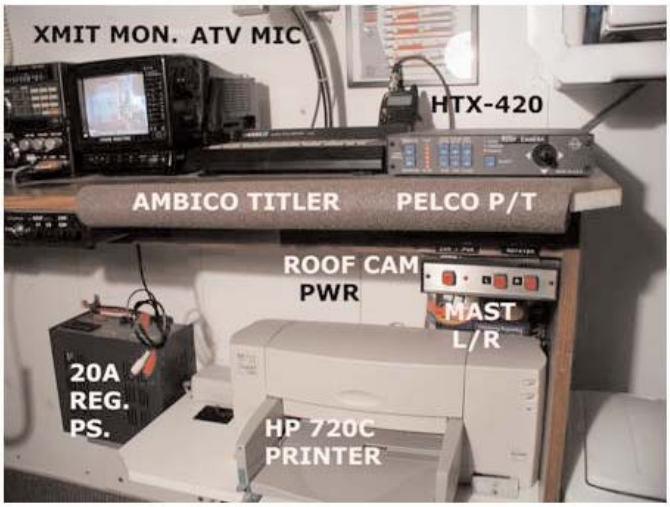
Amateur Television , (ATV), is of primary importance. In the location of origination, a television repeater located on Mt. Harrison in southeast Idaho was used as a test site, A 100 mile omni range can be expected. The up !ink frequency is 434 MHz. The repeater transmits on 1253.125 MHz. The trailer equipment was designed to be compatible with this repeater. It can however, operate simplex on 70 CM as well. The PC Electronics TC 70-20 transceiver uses a 9dB yagi antenna mounted on the 25 foot telescoping mast. Excellent performance at distance is obtained. When two-way contacts were required, a North Country Radio antenna mounted downconverter is utilized. A loop yagi antenna, connected by RG6 coax, mounted on the same mast provided very good results.

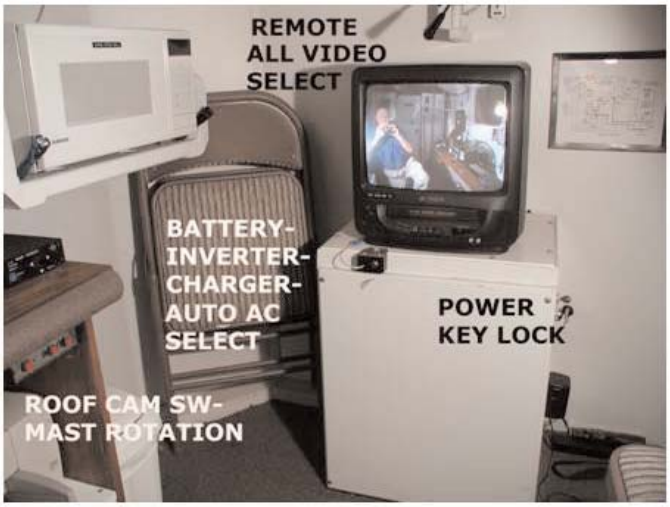
Of particular interest is the design of the Hat Cam. It was felt that it would be of maximum use if used at a considerable distance from the trailer relay. A North Country Radio 1277 MHz 1 watt A/V transmitter was chosen. Powered by a cell phone battery, at least 2 hours of P5 link was obtained up to two city blocks away. A PC Electronics 23 CM crystal, (VHF CH 10), controlled downconverter as shown was processed by the Sansui TV inside. The baseband video could then be uplinked on 434 MHz. A self-powered camcorder was used with the Hat Cam.

ROOF CAMERA

A Panasonic Color Camera Is housed in a Cohu environmental tubular case. A Fujinon -TV Z 1:1.8/16-160 10”16 lens with full control of zoom, focus and iris as well as the Pelco P/T are operated by the Pelco control unit inside. The P/T is a Pelco 24 VAC outdoor unit. The Panasonic camera was installed in place of the original BW camera. This high quality equipment was obtained surplus from the Idaho National Energy and Engineering Laboratory (INEEL).

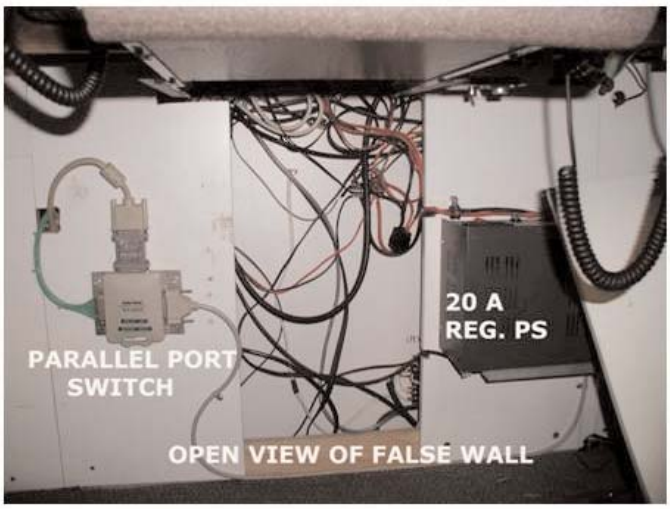

FRG 9600
SCANNER
8 AMP REG PWR FOR TC70-20
XMIT MON.
HTX 252
VIDEO
SOURCE
SELECT
PRINTER


XMIT MON. ATV MIC
HTX-420
AMBICO TITLER
PELCO P/T
ROOF CAM
PWR
MAST
L/R
20A
REG.
PS.
HP 720C
PRINTER


REMOTE
ALL VIDEO
SELECT
BATTERY-
INVERTER-
CHARGER-
AUTO AC
SELECT
POWER
KEY LOCK
ROOF CAM SW-
MAST ROTATION


TOOLS
REMOVABLE
PANELS
HIDE CABLING


AC AND DC BUSS POWER MONITOR


20 A
REG. PS
PARALLEL PORT
SWITCH
OPEN VIEW OF FALSE WALL

Roof Camera Stored

INTERIOR CAMERA

For transmitting crew and inside operations shots, a Panasonic color camera with a wide angle lens is used. All video transmitted and processed by the Sansui TV can be recorded on it's internal VHS tape.

VIDEO SOURCE SELECTION

The Sansui AC/DC TV has all channels, baseband input and output on RCA jacks. All video is output this way. All are selected with the remote. When line one is selected, the video switch box selects (C1) roof cam, (C2) inside cam or camcorder cable. When TV channels are selected, the hat cam is on CH 10. The TC70-20 70 CM output is on CH 3 or the output of the 1253.125 MHz downconverter is also on CH 3. The video output is cabled to the Video Title Writer then thru the Snappy .jpg image capture device, (for SSTV), and then to audio and video inputs of the TC70-20.

LAPTOP COMPUTER CONTROL

The IBM 760 EL ports are well used. In addition to the standard 9 pin serial port a PCMCIA module provides a second. This port is dedicated to the Magellan GPS. A 56K modem is also PCMCIA. Earthlink 5.0 and a telephone share the aux. phone jack. The parallel port is switched between the printer and Snappy image capture. Front loaded CD drive and an aux. floppy drive are easily accessible.

When the serial port switch is in the SSTV position, (RIGBLASTER), MMSSTV, PSK and other modes can be accessed.

When the serial port switch is in the TNC position, (KPC3-plus), all 1200 baud packet, APRS, KA-NODE, WEFAX, KISS modes are available with Pacom.

The FT 847 all band transceiver packet port and mic. are under the IBM control.,

ANTENNAS

The criteria for choosing the various antennas was the requirement that all must be stored neatly within an assigned interior space. Each was researched for optimum performance. For the FT 847, the 40M to 70CM ATAS screwdriver was selected. With the use of a diplexer, a more effective 2M, 70CM Diamond X50 is used. When 75M - 80M operation is necessary, two Hustler resonator types are on standby, All antenna and camera jacks are located on the left or street side of the trailer roof. All are readily accessible from the fender step or included stepladder, The rotor operated telescoping mast collapses flush with the roof and when fully extended reaches to about 27 feet. Other antennas are 1/4 wave ground plane types for 2M - 70 CM. scanner and the 2M HTX 252 transceiver, The Magellan GPS uses a roof mounted patch type antenna. TX antennas are the 27 element 1253 MHz Loopyagi and 7 element 70CM. Yagi.

THE TRAILER

When the first thought of constructing a communication unit with a definite budget in mind, an RV, Motor Home and a Trailer were considered With both the original cost and maintenance as well as storage and size. the RV and Motor Home were ruled out. A local trailer manufacturer was chosen for a custom size and layout. A limited garage door height set the clearance and a practical length for towing in small spaces set the dimensions. The vertical clearance is 93 inches. Width is 96 inches outside wheel to wheel. The interior is 6ft wide, 6ft high and 10ft long The order stated the need for a side door, a rear door, a roof vent using the above dimensions. It is constructed using 1 inch square steel tubes for the cage. The interior is covered with painted 3/16 inch paneling. The 15 inch wheels arid axels are on torsion bar suspension. Installed later was 1 inch Styrofoam inside roof insulation. The interior cabin work was created from the purchase of a large Sauder cabinet. It was modified to provide all the necessary material for all finished surfaces.

ATVQ

INTERIOR SPECIAL FEATURES

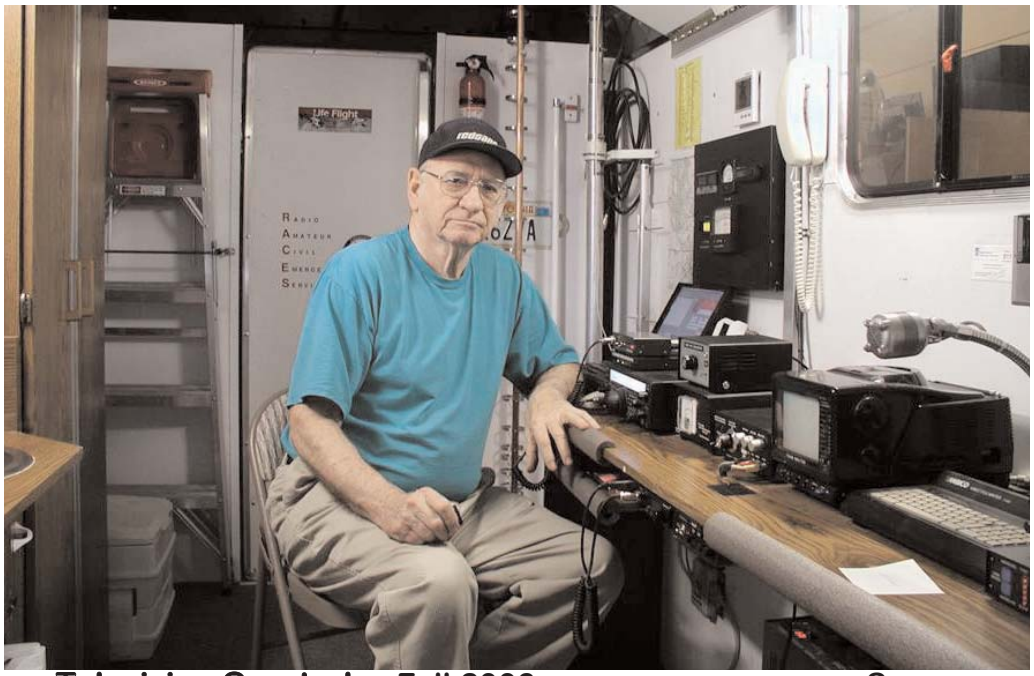
HIDING THE ANTENNA CABLES

OVERALL INTERIOR SHOT LOOKING FORWARD

SOME EXTERIOR SHOTS

AC OPEN

AC CLOSED



BUILDING A DIGITAL TUNER FOR YOUR WAVECOM JR

By Mike Berg - N0QBH Email: mikeberg@ringolake.com
10929 11th St. NE
Spicer, MN 56288

Many hams are using the Wavecom Jr as a low cost way of getting into 2400 MHz FM ATV. At under $60 per transmitter and receiver pair, it's easy to see why they've become so popular. These units are designed to accept video and audio inputs from almost any standard source (camera, VCR, DVD, etc) and send this in FM format to a matching receiver that will output the signal to almost any device designed to accept NTSC video.
The following text provides an overview of the instructions, photographs and the PIC assembly programs that can be found at these web pages. Download them before starting to modify!!

Receiver:
http://www.ringolake.com/pic_proj/wavecom/wavecom_rx.html

Transmitter:
http://www.ringolake.com/pic_proj/wavecom/wavecom_tx.html

How It Works

The Wavecom Jr transmitter and receiver both use the Zarlink SP5055 frequency synthesizer integrated circuit to do the tuning. The Zarlink IC is a serially controlled device using the I2C format (pronounced eye squared sea). This means all tuning instructions are sent via two lines from a microcontroller.
In its stock configuration, the Wavecom Jr has four channels programmed into a PIC micro. At regular intervals the position of the channel select switch is checked and the corresponding frequency is loaded into the synthesizer.

My tuner replaces the original four channel controller with one capable of tuning across 400 MHz (2300 - 2700 MHz) in 250 KHz steps. It's controlled by two buttons (up and down) and has a LCD display showing the selected frequency.

The VFO Interface

When built, the interface consists of a PIC 16F627, a 16 character LCD display, two switches, two resistors and one cap.
This design uses the PIC's built in oscillator, eliminating the need for a clock crystal and further simplifying construction.

There are four connections to the Wavecom Jr:
1. Serial CLOCK at original PIC pin #8.
2. Serial DATA at original PIC pin #9.
3. +5 volts at original PIC pin #14.
4. Ground

Transmitter Modification Overview

I found the easiest way to install the VFO interface in the Wavecom Jr transmitter was to remove the stock PIC and solder three jumpers across its former location. The main reason for doing this is because the PIC is located inside a RF shielded enclosure and I wanted to avoid compromising the shield integrity. This method reuses the channel select data lines to connect the VFO interface to the frequency synthesizer.

Receiver Modification Overview

Installing the interface to a Wavecom Jr receiver is a little more flexible because the original PIC is located on the main circuit board outside of the RF shielded enclosure. You can either lift the serial clock and data pins of the PIC and solder the interface clock and data lines in their place or remove the PIC altogether and make the same connections.

Using the new VFO

The interface is powered from the Wavecom Jr and starts when you turn the power switch on. The LCD display will show the startup frequency which is 2300 MHz and the Wavecom Jr will be operating at that frequency. There are two buttons (up and down) to change the frequency.

On the receiver, pressing either button for more than 2 seconds will latch the unit into scan mode, pressing the opposite button will stop it. The receiver also has a narrow scan mode that is activated by holding either switch during power up. In this mode the tuning limits are from 2400 to 2500 MHz and the scan latch works the same way as before.

Adding a external antenna adapter

Most hams will want to use a different antenna than the stock patch type that came with the Wavecom Jr. There are at least two ways to accomplish this.

1. If you are able to install the type of connector you want onto RG 174 type coax, the easiest way is to use the existing coax located inside the patch antenna. Take the antenna off of the case and remove the small Phillips screws holding the patch antenna halves together. Cut the coax free from the flat antenna and attach the connector in its place.

2. If you want a longer pigtail, buy or make one with a bare end and after removing the old antenna coax, solder the new pigtail in its place inside the metal RF enclosure.

Note: I'd strongly recommend using an N type connector at these frequencies.

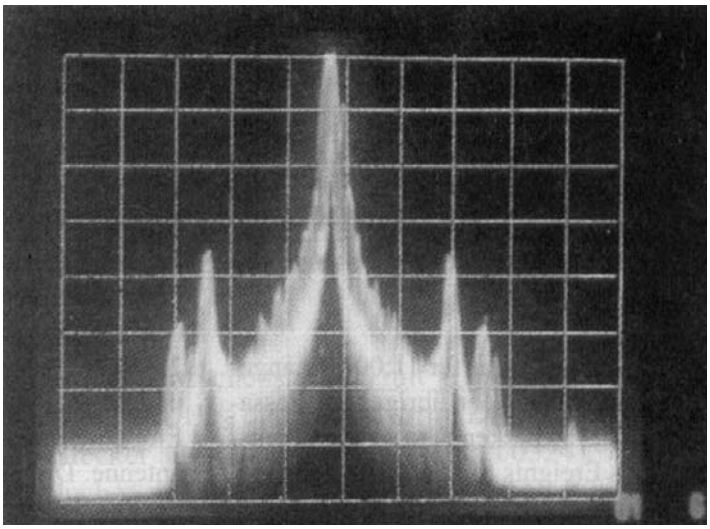
For more Wavecom modifications and info:
http://www.ipass.net/~teara/atv4.html

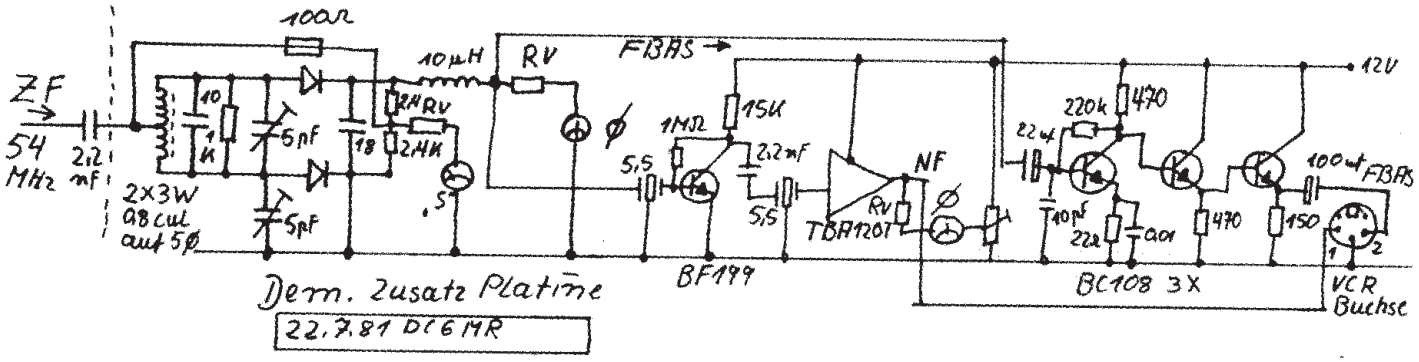
ATVQ

Looking back on 22 years of FM-ATV (Heinz, DC6MR)

More than 22 years ago we took on first experiments with FM-ATV in DL (after successfully receiving some TV satellite signals in FM-TV from a Russian made Earth satellite "Gorizont"). Our first transmitted FM-ATV went off on 20.5.1981 on the frequency of our existing ATV repeater`s AM-ATV input. The result on the output was not a hit, so we constructed a secondary input on 1275 MHz with our self developed diode-discriminator for FM-TV. Soon a lot of stations with the new mode came on the air, and a first article on FM-ATV in our magazine TV-AMATEUR 43/1981 started a wave of FM-ATV activities all over Europe.

ATVQ





If You Move

Please send us your NEW ADDRESS! We pay 70 cents for each returned ATVQ. And we are usually nice and send another copy to your new address which costs us $1.29. Please help us from having to do this. Thanks!

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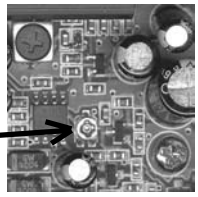
Tel: **(626) 447-4565** m-th 8am-5:30pm pst (UTC - 8) Tom (W6ORG) & Mary Ann (WB6YSS) O'Hara
24 hr FAX order line (626) 447-0489 Email: tomsmb@aol.com
Web site: http://www.hamtv.com

33/23FMR-2 Two Band FM ATV Receiver

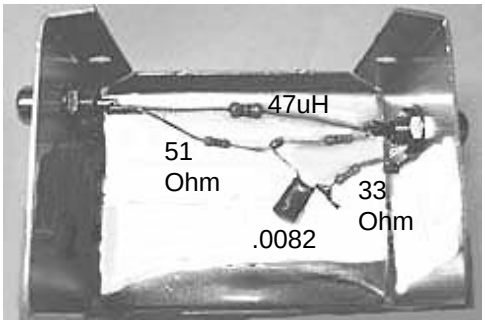
This imported FM video receiver has been converted by us to receive in the 33 and 23cm ham bands. The frequencies are selected by the front panel digiswitch - on each switch position vs. frequency on the chart, up is 1 and down is 0. If other frequencies are desired in the ham bands, the PIC can be replaced with one from WB7UBB, Brian. Miles, 12015 N. 34th St., Phoenix AZ 85028 email: wb7ubb@cox.net, however the AFC is very wide and will lock on to frequencies typically within 10 MHz of the channel frequency.

A wall plug power supply is provided, however, the receiver can be powered from any 12 to 14 Vdc power supply @ 250 ma.

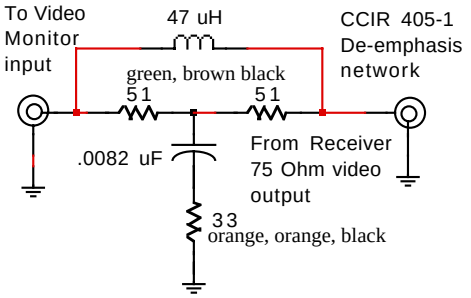
The front panel has video and line audio RCA jack outputs. Sound subcarrier is 5.5 MHz. Video de-emphasis is standard on these ham bands but is not built into this unit and must be added if used in your area. Pre-emphasis of the video frequencies in the transmitter and corresponding de-emphasis in the receiver reduces the noise bandwidth and results in about 6 dB more sensitivity or twice the distance for a P4 to 5 picture. However, you cannot mix those with and without the network or you will get very distorted video or unstable sync.



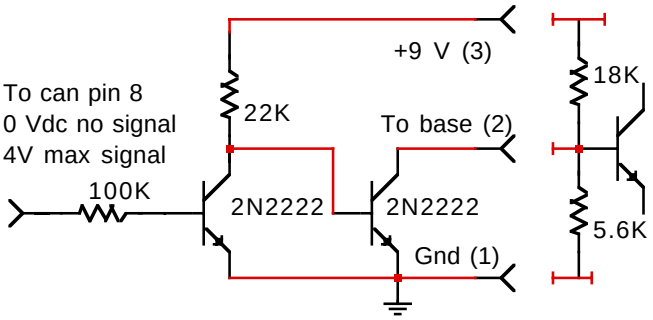
De-emphasis detail: Parts less box and connectors are supplied . The photos and schematic show the network mounted in a Radio shack 270-235 aluminum box. Run a short RCA plug shielded jumper between the receiver video out jacks and the de-emphasis box. To make up for the loss through the network, turn up the video gain pot, see photo, for 1 Vp-p output into a 75 Ohm resistive termination.

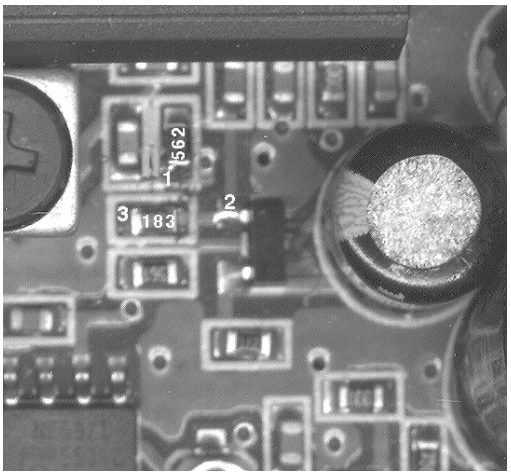


Twist one end of the 51 Ohm and .0082 uF leads together and then solder the parts as shown. Twist the other end of the cap with one end of the 33 Ohm resistor and solder together. Cut off excess leads from the solder joints. Connect and solder the 47 uH to each RCA jack along with each end of the 51 Ohm resistors. Solder the 33 Ohm resistor lead to one of the ground lugs.



Audio squelch can be added this receiver using the circuit below and shown in the photo. Pin 8 on the downconverter can is the AGC test pin (counting left to right). The audio outputs will open with about a P4 picture. The transistor leads are used to make solder connections at the numbered locations on the resistor ends and transistor base as shown in the photo and schematic.





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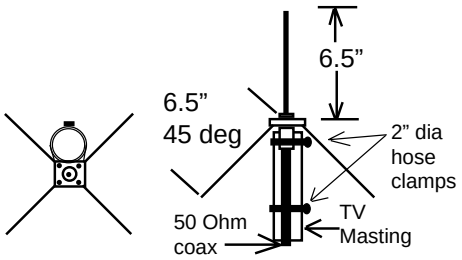
Web site: www.hamtv.com

Ground Plane Antenna You Can Build

The Ground Plane vertical omni directional antenna is very easy to build with just some #12 solid copper electrical wire and a UG58 type N chassis jack. Gain is about 2 dBd 15 degrees above the horizon. The drop off on the horizon is only a dB or so and insignificant. By using the very flexible and coated solid copper electrical wire, the ground plane is easily transported and set up for R/C ATV reception, transmitting at public service events and demos where omni directional coverage is desired.

Use Belden 8214 coax and UG21 type N plug with Teflon dielectric at the ground plane end - they are very low loss at UHF and above and water proof. You can use PL259 on the radio end if need be to match the equipment, but they must be made properly to prevent losses and really should not be used above 420 MHz. Hold the N plug to the top of the TV masting with a 2" diameter hose clamp. Align the 1/4 wave vertical element to be as perpendicular to the ground as possible and the 4 radials at 45 degrees. Place the antenna high and in the clear in order to maintain line of sight to the transmitter antenna - 2 or 3 of the 5 foot Radio Shack 15-862 TV masts work well and held in place with a 15-517 mast tripod mount; all are easily transported in a car.



426.25 ATV Ground Plane

Construction:
Start by cutting 5 wires a half inch longer than listed for the desired frequency and strip one end on each 1/4 inch. Solder the quarter wave vertical wire to center socket, measure from flange surface to the top of the wire for the frequency in use and cut to length. Solder the 4 radial wires to the respective holes in the UG-58 jack or bolt on solder lugs and solder to them. Bend the radials to a 45 degree angle away from the coax and masting. Then trim to length measuring from the outer edge of the dielectric to the tip of the wire.

Frequency MHz	Length Inches
146	19.1
426.25	6.5
915	3.0
1265	2.2
2398	1.2

Length of the vertical radiator and 4 radials in inches is 2800 divided by Frequency in MHz.

ATVQ TO PAY FOR ARTICLES! CONTRIBUTORS GUIDE

Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay $25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

Preferred method of receiving articles is from **Microsoft Word**, however **Wordperfect** is OK too. Next preference would be **ASKII text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to PCX or JPG formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format.

When sending in articles in Microsoft Word, please SAVE with FASTSAVE OFF and save in Word 6 format. Also, articles written in any word processor, consider what will happen when it is re-formatted to fit the style that I might put it in. An example would be setting up tables or adding figures into the article. They can be very hard to strip out. If possible, put the tables, figures, each in a file by itself. This will help me to be able to import into the magazine format.

Articles can be sent to:
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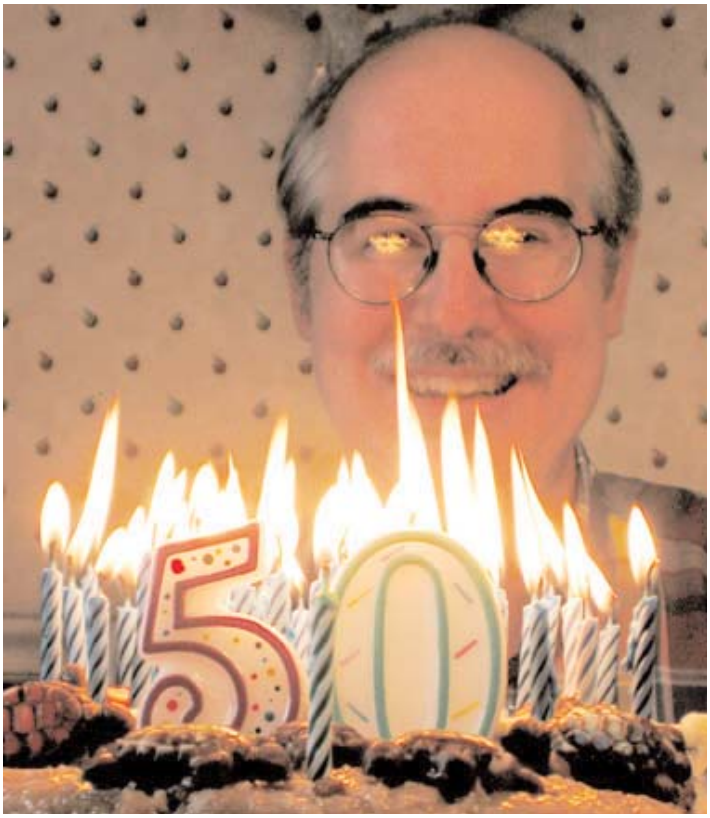
or to our email address: **atvq@hampubs.com**
Also note our web page address: **http://www.hampubs.com**



Bill Brown, WB8ELK, turns 50. I hear that your brother nearly nearly had to call the Dayton Fire Department!

United States Postal Service

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1. Publication Title	2. Publication Number	3. Filing Date
Amateur Televison Quarterly	1 0 4 2 - 1 9 8 X	09-28-2003
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
4 Times per year	4	$20.00

7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*
Harlan Technologies, 5931 Alma Dr., Rockford, IL 61108-2409
Contact Person: Gene Harlan
Telephone: 815-398-2683

8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not printer)*
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13. Publication Title: Amateur Televison Quarterly		14. Issue Date for Circulation Data Below: Summer 2003	
15. Extent and Nature of Circulation		Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies *(Net press run)*		1000	1000
b. Paid and/or Requested Circulation	(1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	622	583
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i. Total *(Sum of 15g. and h.)*		1000	1000
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16. Publication of Statement of Ownership
X Publication required. Will be printed in the Fall 2003 (Oct) issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Eugene Harlan — Date: 09-28-2003

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

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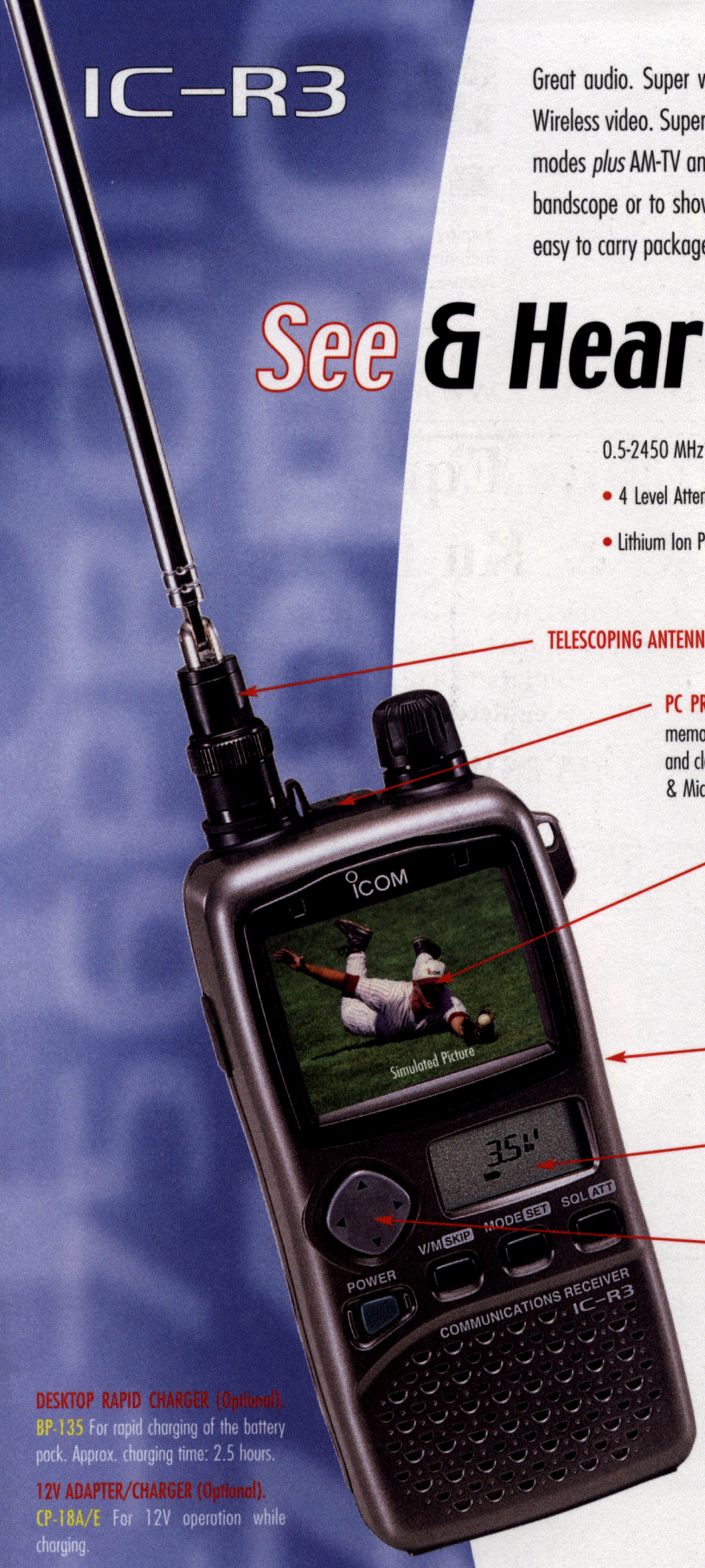

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