ATCO NEWSLETTER

VOLUME 7 NUMBER 2 APRIL 1990

ATCO "TECH TALK" FRIDAY 6 APRIL

ATCO's first event of 1990 will be held Friday Evening 6 April at the DeVry Institute of Technology (1350 Alum Creek Drive on the eastside of Columbus).

The program will begin at 7:30 p.m. Instead of a "Show 'n Tell," this time we will have 5 to 15 minute discussions by different ATCO members concerning topics on which they have a good understanding.

If you have found the best way to handle a particular VHF/UHF/ATV eqipment problem, please consider sharing it with other ATCO

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The ATCO Newsletter is the official publication of a group of television amateurs known as "AMATEUR TELEVISION IN CENTRAL OHIO" and is published in January, April, July, and October.

Membership in ATCO is open to any FCC licensed radio amateur who has an interest in amateur television.

WATTS UP ON 1296

By Bill, WB8URI

This article describes a single tube 2C39/7289 plate line amplifier for 1296 MHz which can be built with a minimum of parts and machining.

The input circuit is a Pi-network that consists of two 1-10 pF trimmer caps and a coil which is made from #18 wire.

The output circuit is a plate line that uses a homemade "flapper capacitor" for plate tuning. Output coupling consists of a coil of #12 wire and another 1-10 pF capacitor.

Filament, cathode, and grid connections to the tube are made with double sided PC board. Finger stock is soldered around the holes cut to fit the tube. The grid compartment is enclosed in a 2" x 2" x 1-1/2" box. The plate compartment is enclosed in a 4" x 4" x 2" box with suitable holes for cooling.

Initial testing showed 32 percent efficiency with about a 12 dB power gain. Of course these values will vary with differing input powers and plate voltages.

Further reading on this project may be found in the following publications:

VHF for the Radio Amateur, p. 97, 1962.
RSGB VHF UHF Manual, p. 9.13, 1985.
1989 ARRL Handbook, p. 32-41.

Also, thanks to WA8EOY, WM8P, KA8ZNY, W8DMR, and W8RVH for parts and technical assistance.

For complete information and details on this project, please contact WB8URI.

This project may be seen at the 6 April "Tech Talk" event!

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"TEST-YOUR-MATH SKILLS"

By Bob, W8TV

Mark can repair the uplink HPA (High Power Amplifier) in 7 hours less than Rick. If they are both good amateur TV technicians, both together can repair the HPA in 9 hours less than Mark alone. Find the actual amount of hours it will take if they work together to make the repairs on this uplink transmitter. Which answer below is correct?

a. 16 b. 2 c. 18 d. 14 e. 12

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ATCO "TECH TALK" FRIDAY 6 APRIL

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members so we all may benefit from your experience.

Some suggested topics are:

* Techniques for matching 75 ohm hardline to 50 ohm.
* Why does it seem to help to put a preamp at the antenna AND in the shack? Or does it?
* The use of baluns at VHF/UHF.
* Path loss versus antenna height.
* How to test coax, power tubes, baluns, etc.
* Power supply regulation and protection.
* When and where to use ferrite beads.
* Or whatever!

Please let Bob, WM8P, know if you wish to speak.

While an actual demonstration can be done with apparatus, a theoretical discussion using the blackboard or a slide projector would probably best stay within the time period.

The program at DeVry is planned to end at about 9:00 p.m., then we will go to a nearby restaurant (to be determined) and continue the evening's discussions over "buy-your-own" coffee and dessert.

Dave, KB2ARL, will host a talk-in on 147.45 MHz.

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WANTED ! ! ! !

The ATCO Newsletter is in need of a volunteer to serve as its Technical Editor. If you are interested, please contact Warren, KA8GZQ.

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ATCO NEEDS GROWTH

Bob, WM8P, sent all ATCO members a personal letter at the close of 1989 in an effort to stimulate interest in ATV activity among ATCO members.

In his letter, Bob stated, "The real problem that is facing ATCO is one of growth. We need new members to bring enthusiasm to us, to help with the things that need to be done, to give back to us the fun of helping new ATVers accomplish the things that we have done."

Bob outlined a number of immediate and long term goals for ATCO and invited ATCO members to discuss his views during a Special ATCO Net on Sunday 7 January 1990

RADIATION RESISTANCE CHANGE DUE TO OXIDATION

By Bill, W8DMR

Conductance at the surface of parasitic elements is a critical factor. The best practical material should be employed for the many parasitic elements used in high gain VHF/UHF antennas. Due to skin effect, if copper and aluminum are allowed to oxidize, their surface resistance will increase considerably. Silver is well-known as the best conductor, but silver must be applied as a smooth and homogeneous plating. A poor silver plating job may offer more resistance to RF currents than plain copper or aluminum.

Since silver oxide is also a good conductor, the silver plating may be allowed to oxidize without greatly affecting the antenna performance. Other metals, namely copper and aluminum, are not as fortunate. An expensive but practical plating material for antenna elements is gold; it will not oxidize while providing excellent conductivity. Gold can be applied in extremely thin plating coats, and by using gold there is less chance of poor plating deposition.

Regardless, all elements in a parasitic beam antenna should be coated with polystyrene or a similar substance having a low dielectric constant and high insulating properties. The coating must also withstand the ultraviolet rays from continued exposure to the sun. Otherwise, the protective coating will not seal the antenna elements when it begins to crack, flake, and peel loose. Skin effect substantially raises the radiation resistance of very small diameter antenna elements. The performance of the antenna reduces so slowly that the gain reduction may go unobserved for many months.

The radiation resistance of the driven element in an extended parasitic antenna with tightly coupled launching directors is a fairly low value of resistance. A median value could be from about 10 to 20 ohms, and even with a perfect impedance match between the transmission line and the driven element, the loss due to skin effect because of the higher RF current flowing can lower the antenna performance. Any energy lost in heat is not radiated as part of the RF signal.

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EDITOR'S NOTE

Technical articles appearing in this issue of the ATCO Newsletter have not been edited for technical content. Readers having questions or comments concerning such articles should contact the authors. Please do not contact the ATCO Newsletter Editor.

PLL ON 439.25 MHz

By Bob, WM8P

I have successfully duplicated the PLL on the 1296 test oscillator from PC Electronics as described by ATCO member Bill, W8DMR, in Amateur Television Quarterly. An extra SP5060 IC was on hand so it was decided to try the same circuit on a 70 cm oscillator.

The same circuit electrically as the PC 1296 test oscillator was used with the following exceptions:

A MRF901 transistor was used for the oscillator.

Using a Dremel drill, a circuit board was made and the needed solder lands were cut out.

A five turn 1/4 inch diameter coil was used instead of a stripline for the inductance.

On the PLL board the only change was to use a crystal cut for 1.7158 MHz. The crystal can be ordered from Jan Crystals in Ft. Myers, Florida.

This oscillator should put out between 80 and 100 milliwatts. This may be sufficient to drive some bricks such as the MWH710; however, it is not enough to drive a linear brick such as the SAU4 to full output. A buffer amplifier will be required. Another MRF901 with an untuned input will probably be sufficient to get in excess of 200 milliwatts.

I have tested the oscillator with the brick, this gave about seven watts output. As yet, I have not built the buffer amplifier and tested it but expect to by the time this is published. The spec sheet lists a maximum input to the SAU4 at 300 milliwatts; 250 milliwatts is graphically depicted as giving 20 watts output.

This would make a very inexpensive 70 cm ATV transmitter. Consideration is being given to putting the whole transmitter in a water tight box along with a downconverter and relay and mounting it at the antenna and feeding video up to it. If I typically have 3 dB of line loss between the shack and the antenna and this is eliminated, this would give the equivalent of 34 watts from the shack.

Using a junk box for miscellaneous parts and purchasing a SP5060 IC, a SAU4 brick, and a crystal should yield a nice ATV transmitter for under $100. This would be only 3 dB less than a D1010 system, about 1 P-unit.

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ATV NEWS ITEMS

(The following items of interest to ATVers were compiled from reports submitted by Bill, WB8URI.)

ACTIVITY WITH INDIANA ATVers CONTINUES - 7:30 a.m. schedules with Indiana television amateurs on 144..34 MHz include W9NTP, W8EHW, W8BLN, W8RVH, WM8P, W8DMR, WA8EOY, WB8URI, W9PRD, and WB8UGV (now located in Fort Wayne). TV frequencies in use are 439.25, 434.0, 1255, and 1280 MHz.

PC ELECTRONICS DOWNCONVERTER NO LONGER AVAILABLE - The tower mounted 1296 MHz ATV downconverter has been discontinued. PC now sells a downconverter for in-shack use and recommends a preamp at the tower.

ATCO ACTIVITY - Rick, WA3DTO, recently worked Tom, WA8ZAH, in Cincinnati and Guy, K8HVA, in Plymouth (Ohio) on 439.25 MHz. In the past month, John, WA8EOY, Worked Dick. WB8VNC, in Findlay with P2 reports both ways on 439.25 MHz.

WB8URI HAS NEW J BEAM ANTENNA - Bill has installed a new 439.25 MHz antenna and is transmitting on this band again.

DID YOU SAY BAND HOG? - You've heard of the ground hog, but how about the band hog? Recently, a station was seen transmitting TV on 400 MHz and 1200 MHz and talking on 2 meters all at the same time. This person was even seen repeating received 1200 MHz signals back on 439.25. For more details check into your ATCO Net at 8:00 p.m. on Sunday and Tuesday. After time change, the nets will meet at 9:00 p.m. EDST.

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HELPFUL HINT

Using a scanner as a low cost programmable oscillator is easy. On most models with a 10.7 MHz IF (such as Radio Shack Pro-57), just add the IF to the frequency desired as the oscillator output. For example, 439.25 MHz plus 10.7 MHz equals 449.950 MHz.

Therefore, if 449.950 MHz is programmed in as the monitor frequency there will be an RF signal out at 439.250 MHz. This signal can be modulated to a degree and is ideal for test purposes. It is suggested that experiments be conducted with different bands. (Submitted by Dave, KB2ARL.)

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OUR CONTRIBUTORS

Thanks to the following for their contributions to the April 1990 ATCO Newsletter: Bill, WB8URI; Bob, W8TV; Bill, W8DMR; Bob, WM8P; Dave, KB2ARL; and John, WA8EOY.

DOs AND DON'Ts

By John, WA8EOY

The construction of my antennas is such that a preamp, downconverter, or transmitting brick for 1200 MHz (23 cm) is mounted close to the driver elements. This system works quite well but requires some maintenance.

I found that when checking the power output on the brick it had decreased two watts. The brick assembly was removed and disassembled. The brick is mounted to the heat sink and the heat sink is supported from an aluminum plate by standoffs. The brick is sandwiched between the heat sink and the aluminum plate. The plate is mounted to the antenna mast with U-bolts. The standoffs are made from brass tubing with brass screws tapped into the aluminum heat sink. When I attempted to remove the screws, I discovered that the brass screws were bonded to the aluminum heat sink. The brick assembly had been exposed to the elements for two years, and the exposed lengths of the screws had oxidized. Two screws were removed with a lot of TLC, but the other two had to be drilled out and then retapped.

Conclusions:

1. Don't use brass screws in aluminum tapped holes.

2. Do use stainless or steel screws.

3. Do select screw length and tubing length that allows the end of the screw to be flush with the end of the tapped hole.

4. Do use an anti-seize compound on all threads. "Never-Seez" is available at auto supply stores.

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ANSWER TO "TEST-YOUR-MATH SKILLS" - Remember, the key item to solving this type of problem is: RATE times TIME equals the AMOUNT. So, let Z = the amount of time that Mark can make the repairs. Therefore, we must construct the following table of information:

	Rate	x	Time	=	Amount
MARK:	1/Z	x	(Z-9)	=	(Z-9)/Z
RICK:	1/(Z+7)	x	(Z-9)	=	(Z-9)/(Z+7)

and, add both amounts together to make 1 repair-time:

$$(Z-9)/Z + (Z-9)/(Z+7) = 1$$

Solve for Z which yields 21 hours for Mark alone to make the repair; and, by substitution in (Z-9), we get 21 - 9 = 12 hours for both to make the repairs.

W8DMR ARTICLES APPEAR IN ATV PUBLICATIONS

Bill informs us that BATC CQ-TV Magazine published his article in its February 1990 issue which described a 24 cm ATV transmitter including an AM and FM video modulator. The five page article is the second that Bill has had published in CQ-TV.

Watch for the April 1990 issue of ATVQ! Three articles amounting to 12 pages of Bill's material will be included. He says ATVQ honored him with a free subscription to its popular magazine.

February 1990 73 Magazine printed a picture of a 13 cm antenna Bill has mounted on the side of his tower. W8DMR XYL Pat (N8ELP) did the photography work.

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ANTENNA CLEARANCE

Columbus Southern Power included a leaflet with the mailing of electric bills recently concerning clearance when erecting antennas. It is quoted here in its entirety:

"Thinking about erecting a TV or radio antenna? Before you start work there's one very important thing we want you to think about: clearance.

"The tragic fact is, if you touch a power line while erecting your antenna, you could be seriously injured or even killed. So the safe alternative is to avoid coming in contact with one. You do that with clearance.

"How? You simply check in all directions - and up - when you're considering a site for your antenna. The antenna (including its supporting mast and structure) should be located at least 1-1/2 times its total height from all power lines. COMMON SENSE AND SAFETY BELONG TOGETHER. POWER LINES AND ANTENNAS DON'T."

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MORE ATV NEWS ITEMS

(The following items of interest to ATVers were compiled from reports submitted by Bill, W8DMR.)

WB8ELK NOW 73 MAGAZINE STAFFER - Bill has joined the 73 Magazine staff as a technical editor. Until recently, he was a member of ATCO.

WA8EOY GETS 2430 MHz SIGNAL REPORT - Although the P-report was a weak P1, John, WA8EOY, was happy to have any report since W8DMR is the only station that can monitor his pioneering 13 cm efforts. John was not able to see Bill's one watt video modulated signal.

ATCO MEMBERS AS OF 28 MAR 1990

K8AEH	Wilbur Wollerman	1672	Rosehill Rd.	Reynoldsburg	43068
W8AER	David Sears	1678	Kaiser Dr.	Reynoldsburg	43068
K8AOH	Charles Tucker	1500	E. Leffel Lane	Springfield	45505
KB2ARL	Dave DiGiuseppe	5685-B	Hibernia Dr.	Columbus	43232
WA8ATF	Emmett McDonald	14120	Flintridge Rd. SE	Glenford	43739
W9AZO	Jim Walter	2662	St.Rt. 39 NW RD#3	Mansfield	44903
KB8BIY	Bob Shaw	59	Parkview Ave.	Westerville	43081
W8BJN	Gene Kirby	13613	U.S. 36	Marysville	43040
W8CCW	John Ferrell	3722	Wagner Court	Grove City	43123
N8CYV	Blaire Standley	721	West North St.	Springfield	45504
W8DMR	William Parker	2738	Floribunda Dr.	Columbus	43209
WA3DTO	Rick White	5314	Grosbeak Glen	Orient	43146
W8EHW	Foster Warren	124	East Clark St.	North Hampton	45349
WA8EOY	John Schlaechter	3199	Lewis Rd.	Columbus	43207
KB8ESR	Tommy Camm	1267	Arkwood Ave.	Columbus	43227
N8FFO	Edward Hauff	2716	Columbus Ave.	Columbus	43209
KA8GZQ	Warren Duemmel	3488	Darbyshire Dr.	Hilliard	43026
K8HVA	Guy Cunningham, Jr.	31	Birchfield St.	Plymouth	44865
K8ISM	Steve Iacono	1075	Virginia Ave.	Columbus	43212
K8JGY	Fred Yost	330	Dellfield Way	Gahanna	43230
N8KCB	Chris Morris	3181	Gerbert Rd.	Columbus	43224
WA8KQQ	Dale Waymire	225	Riffle Ave.	Greenville	45331
N8LEP	Patricia Parker	2738	Floribunda Drive	Columbus	43209
WB8LGA	Charles Beener	2548	SR 61	Marengo	43334
WD8OBT	Tom Camm	1267	Arkwood Ave.	Columbus	43227
WB8OTH	Perry Yantis	1850	Lisle Ave.	Obetz	43207
WM8P	Bob Mills	6834	Halligan Ave. East	Worthington	43085
KE8PN	James Easley	1507	Michigan Ave.	Columbus	43201
WA8RMC	Arthur Towslee	180	Fairdale Ave.	Westerville	43081
WA8RUT	Ken Morris	3181	Gerbert Rd.	Columbus	43224
W8RVH	Richard Goode	9391	Ballentine Rd.	New Carlisle	45344
WA8TTE	Phil Morrison	154	Llewellyn Ave.	Westerville	43081
W8TV	Bob Dye	6118	Sedgwick Rd.	Columbus	43235
WB8UGV	Bruce Jaquish	4817	W. Arlington Park	Fort Wayne,IN	46835
WB8URI	William Heiden	4435	Kaufman Rd.	Plain City	43064
W8VSY	Jack Schmermund	401	North Main St.	West Milton	45383
KA8ZPF	Johnny Camm	1267	Arkwood Ave.	Columbus	43227

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ATCO FINANCIAL STATEMENT

CASH BALANCE:

As of 31 December 89	$221.62
RECEIPTS:	
Dues	$320.00
Total receipts	$320.00
EXPENDITURES:	
Printing charges for January 1990 ATCO Newsletter	$ 37.98
Postage for January 1990 ATCO Newsletter	11.25
Misc. costs incidental to publication of newsletter	23.75
Total expenditures	$ 72.98
SUMMARY:	
Cash Balance as of 31 December 1990	$221.62
Receipts	320.00
Expenditures	-72.98
Balance as of 28 March 1990	$468.64

The above financial report was prepared as of 28 March 1990 by Warren G. Duemmel, KA8GZQ, Acting ATCO Treasurer.

Editor: Warren, KA8GZQ

FIRST CLASS MAIL

ATCO NEWSLETTER
c/o Warren G. Duemmel
3488 Darbyshire Drive
Hilliard, Ohio 43026

ATCO "TECH TALK"
FRIDAY 6 APRIL AT DeVRY 7:30 PM
DETAILS INSIDE
