

# ATCO NEWSLETTER

VOLUME 8 NUMBER 1

JANUARY 1991

## PAY YOUR ATCO DUES NOW!

Take a look at the address label on this issue of your ATCO Newsletter. If "12-90" appears after your name and call letters, then you know it's time to send your ten dollar check for your 1991 dues to KA8GZQ, Acting ATCO Treasurer.

Every member of record as of 31 December 1990 gets the January 1991 issue, but for those who do not renew, this is your last newsletter.

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H A P P Y     1 9 9 1  
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## EDITOR'S COMMENT

This issue begins my fifth year as editor of the ATCO Newsletter. Also, I have been acting treasurer for the same length of time.

I wish to thank the ATCO members for the recognition of my efforts given to me at our recent meeting on 14 October 1990.

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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.

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## A 1200 MHz AMPLIFIER

By John, WABE0Y

The 1200 MHz amplifier described in this article is an inexpensive cavity type tube unit. The basic cavity design is taken from an article in a British VHF-UHF Manual (1969) by G. R. Jessop, page 6.48. I would be glad to send you a copy of this article. (Please send a large 9-1/2 inch self-addressed stamped envelope.) The rest of the design is from the 1988 ARRL Handbook, page 32-41. Disregard all cavity information and start on page 32-45. Refer to schematic Fig. 100 on page 32-42.

CAVITY ASSEMBLY PER VHF-UHF MANUAL - The tube used is a 3CX100A5, but other ceramic tubes may be used. For the assembly, I used flashing copper 20 thousandths thick, but brass may be used. Build the cavity to the dimension shown with the following exceptions:

1. This cavity is a DC grounded grid. The 7/8 inch hole in the grid tray [Fig. 6.76] must be 1 inch in diameter to accept finger stock.

2. The 45/64 inch hole in the grid plate [Fig. 6.79] must be 1-1/8 inch diameter.

3. The 8 slotted holes in the box cavity [Fig. 6.75] should be changed from 7/32 to 3/32 and 13/32 to 1/2 inches.

4. Solder the finger stock<sup>1</sup> in place, the small in the anode plate [Fig. 6.78], and the large in the grid tray [Fig. 6.76].

5. Assemble the cavity but omit the grid plate at this time.

6. On the probe [Fig. 6.77], make the tubing 1-3/8 inches long and 15/32 inch in diameter<sup>2</sup>. Replace the coaxial socket with an "N" or a "UHF" fitting. Solder the fitting to the tubing.

INPUT BOX FOR CATHODE AND FILAMENT CONNECTIONS PER ARRL - Build the cathode and filament PC boards except change 3/4 inch dimensions to 7/8 inch. Install finger stock, small<sup>1</sup>. Insert a tube into the plate cavity. Make sure the grid ring is seated on the top of the finger stock of the grid tray. Install the grid plate to the grid tray. Construct the cathode/filament assembly as shown in Fig. 114A but do not screw to grid plate. Push assembly onto cathode end until spacers are in contact with the grid plate. Install filament tube made from thin wall brass tubing 7/32 inch in diameter with fine saw cuts in the end to form fingers. Position assembly so that length of the PC boards are perpendicular to the axis of the input probe. Solder spacers to grid plate, then filament tube to PC board. Remove the

(continued on page 6)

## ATCO FALL 1990 EVENT REPORT

On Sunday 14 October 1990, thirty-five ATCO members and guests attended the Fall 1990 Event held at ABB Process Automation's Shelterhouse on Ackerman Road. Rick, WA3DTQ, the chairman, arranged an interesting program and provided plenty of good food.

Awards were presented to Bill, W8DMR, and Warren, KA8GZQ. Bill was recognized for his ongoing contribution to ATV and ATCO. Warren was recognized for his service as ATCO Newsletter Editor and ATCO Treasurer for the last four years.

Members voted to relocate the ATCO ATV 147.45 MHz Net to Tuesday evening at 9.00 p.m. permanently.

Gene, W8BJN, brought the Union County Amateur Radio Club's HAMCAM Van for us to see. Gene made a video tape presentation of UCARC facilities. A video link was established between Riverside Hospital and the HAMCAM Van at the ATCO meeting in order to send Dave, W8AER, get well and happy birthday greetings.

A video describing the Warren (Ohio) Amateur Radio Club ATV Repeater was shown. This part of the program was presented by Larry, N8EWV; Herman, KD8FE; and Frank, KA8FUZ.

The ATCO Show 'N Tell portion of the event featured projects by Rick, WA3DTQ; John, W8E0Y; and Bill, W8BURI.

To those who helped to make our ATCO Fall 1990 Event a great success, we say a GREAT BIG THANK YOU!!!

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### HELPFUL HINT: $P \propto E^2/R$

By Dave, KB2ARL

Doubling your current power out ( $P_o$ ) of your fast scan television transmitter can usually be accomplished by upping the input voltage ( $V_i$ ) to the rig and amplifier. (Caution: Do not exceed 16 volts!) Since there is a square in the power equation, the 3 dB gain is not hard to realize. Tests were made using a P.C. Electronics exciter and a Mirage D15 amplifier. At 11 volts ( $V_i$ ), the average power ( $P_{avg}$ ) out was 3-1/2 watts. The average power ( $P_{avg}$ ) out rose to 15-1/2 watts at 15 volts ( $V_i$ ). This is nearly 6 dB or 1 F-unit increase in signal strength. Actual on-the-air testing verified this. The increase in drive and added amplifier headroom maintained excellent linearity. Also, the video modulation was increased slightly to compensate for changes in the blanking level. So be sure to check those input voltages under load conditions.

## NEW ATCO MEMBERS

We welcome David, AH2AR; Bob, WBBLN; Phil, KB8BQC; Dale, WB8CJW; and Jason, KB8GZO.

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## INVENTION OFFERS BRIDGE TO HDTV

A multimedia consortium of broadcasters, cable TV operators, programmers, and manufacturers of cable and satellite system hardware has unveiled technology it says will serve as a bridge between standard TV reception and long-promised high-definition television.

The system is the invention of Faroudja Research of Sunnyvale, California. The company's president said the "super sets" should be available to consumers within two years.

The digital system doubles the number of lines on a TV screen of 25 inches or more. It produces the same clarity of HDTV which is available to consumers in Japan. (Chicago Tribune.)

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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.

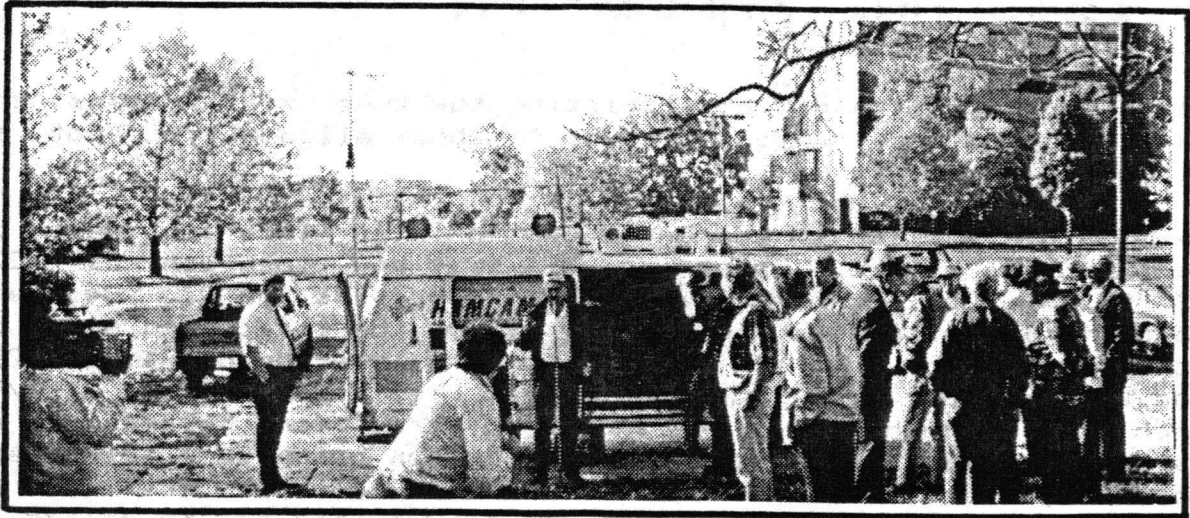
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## FCC ON PROWL

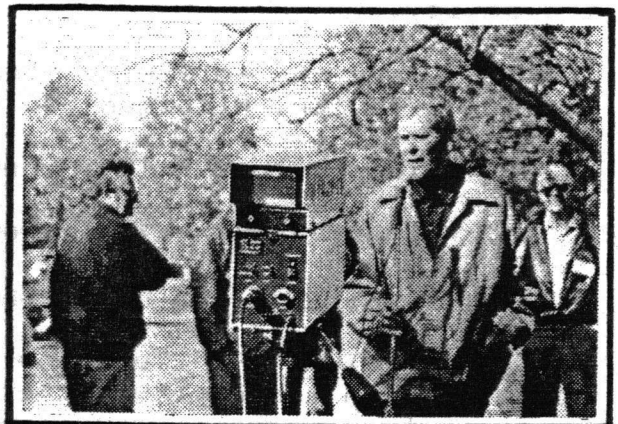
According to an article appearing in the Columbus Dispatch on 10 December 1990, the Federal Communications Commission will endeavor to squeeze future technologies such as high-definition TV, personal phones, and digital radio into the crowded airwaves.

The FCC has announced that they will initiate a search in early 1991 for frequencies to satisfy the appetites of new radio-based technologies.

FCC Chairman Alfred Sikes stated that his ultimate goal will be to create a new spectrum reserve for emerging technologies. This was good news for many would-be broadcasters and telecommunications companies, but bad news for existing licensees. He added, however, that the ultimate needs of incumbents must be considered, and some will have to find new homes. (Submitted by Bill, W8DMR.)



**\*\*\*ATCO 1990 FALL EVENT\*\*\***



## A 1200 MHz AMPLIFIER

(continued from page 2)

amplifier tube straight out; twisting the tube will damage the small finger stock. Reinsert tube to check alignment; if not in alignment, correct.

Build a box similar to the one shown in Fig. 107 but make it 2-3/8 inches square. Determine hole size and location J1, C2, C3, C4, and C5. Locate C2 and C3 on probe side and C3, C4, and C5 on tuning side [see Fig. 116A]. J1 may be located on side of box. Use "N" or "UHF" fittings. For the location of J1, C1, C2, and C3, consider zero lead length [see Fig. 116A]. Drill a 1/32 inch hole through grid plate and grid tray for relocation of parts. Remove grid plate and solder to box being sure holes are located properly. Solder from the inside of box but not in corners (mounting nuts). Remove any solder that may be melted on the bottom of the grid plate. This surface must be a good RF ground. Install J1, C1, C2, C3, C4, C5, L1, RFC1, and RFC2 [see Fig. 116A]. Assemble the box to the grid tray. Solder the plate choke to the by-pass [see Fig. 116B]. This completes assembly of the cavity.

<sup>1</sup> Note: Order the following items from Microwave Components, P.O. Box 1697, Taylor, Michigan 48180:

1. Finger stock - 12 inches small @ \$7.00.
2. Finger stock - 16 inches large - 97-135 @ \$8.50

<sup>2</sup> Note: Available from hobby shops.

PRELIMINARY TUNE UP - Tune the grid circuit first. With the tube to be used in the cavity socket, apply 3 to 5 watts of 1200 MHz power at the frequency you plan to operate and insert at J1 input. Use a wattmeter in the line. With the meter set to forward, adjust C2 and C3 for maximum forward power. Set meter to reverse, adjust C2 and C3 for zero reflected power. When the input power equals the output power, the grid circuit is tuned. These tests are made with no voltage on the tube. Insert the probe and connect power to it through the wattmeter. Loosen the eight screws that hold the cavity box and the grid tray. Ground the plate choke. Set the vane tuning so that the vane is located at 45 degrees from vertical. Adjust the cavity box up or down for maximum output power. Tighten the eight screws and check output. If maximum output occurs when the vane is at 45 degrees, the cavity is tuned. If these conditions are not met, continue to adjust cavity box. Reflected power should not be greater than 0.5 watt. This completes the preliminary tune up.

POWER SUPPLIES - Any power supply that delivers 1.5-2 kV at 1 amp  
(continued on page 7)

## A 1200 MHz AMPLIFIER

(continued from page 6)

may be used. If you use the supply in Fig. 118, C1-C4 may be 250 uF at 450 volts<sup>3</sup>. Radio Shack meter may be used. Use resistor supplied with meter in addition to resistors shown.

Build bias supply as shown. Heat sink is required for Q1 but not for U2. Filament voltage must be 6.0 volts AC not 6.3 volts AC.

<sup>3</sup> Note: Microwave components \$4.00 each computer grade.

WATER COOLING SYSTEM - Modify the tube per Fig. 119. Copper cap is for 3/4 inch copper pipe. The water system shown in Fig. 121 may be constructed, and I'm sure it will work well. However, I am going to describe a less expensive and more efficient system. The heart of the system is a No-Korode submerged pump (Granger catalog no. 377, page 1271, part no. 2P017). This is a plastic pump that will lessen contamination of the water. The water container is a Rubbermaid clear color four gallon food container 16 inches by 11 inches with a blue lid available at Meijer's department store.

A 4-1/4 by 3-1/4 by 3/4 inch thick plastic block is screwed to the container lid to form a rigid manifold for the pump power cord and water lines. Form a clamp in the plastic block for the pump power cord by drilling a hole 1 inch from the end of the block the same diameter as the power cord. Saw off the end of the block through the center of the hole and install two screws to retain the two blocks. Press fit two 1/4 inch copper tubes through the manifold for the connection of 1/4 inch plastic tubes inside and out. Cut hole or holes to pass pump line cord and tubes through the lid. Install line cord through hole in lid and clamp block and fasten block to the lid. Install 1/4 inch plastic tubing from pump to manifold and a 6 inch length for returned water. Add two gallons of distilled water and install lid.

All plastic tubing should be clamped at the joints. Your flow indicator is the ripple of the return water as seen through the container. Water leakage current may be read from either copper tube.

TUNE UP AND OPERATION - Install a small pancake fan to blow on cavity assembly. Wire two switches so that power switch turns on filaments, water, fan, and interlock to switch no. 2. Switch no. 2 should turn on plate power and bias. Follow tune up information from article where applicable. I run my amplifier at 1000 volts at 200 mills with five watts in and 80 watts out.

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**ATCO MEMBERS AS OF 31 DEC 1990**

KBAEH	Wilbur Wollerman...	1672	Rosehill Rd.....	Reynoldsburg	43068
WBAER	David Sears.....	1678	Kaiser Dr.....	Reynoldsburg	43068
KBAOH	Charles Tucker.....	1316	Kenwood Ave.....	Springfield	45505
AH2AR	David Pelaez.....	4872	Trailside Court.....	Huber Heights	45424
KB2ARL	Dave DiGiuseppe.....	5685	-B Hibernia Dr.....	Columbus	43232
WABATF	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
WB8LN	Bob Pfeiffer.....	135	S. Main P.O.Box 224.	North Hampton	45349
KB8BQC	Phil Boerger.....	15044	Scottslawn Rd.	Marysville	43040
W8CCW	John Ferrell.....	3722	Wagner Court.....	Grove City	43123
W88CJW	Dale Elshoff.....	8904	Winoak Pl.....	Powell	43065
N8CYV	Blaire Standley.....	721	Nest North St.....	Springfield	45504
W8DMR	William Parker.....	2738	Floribunda Dr.....	Columbus	43209
W83DTC	Rick White.....	5314	Grosbeak Glen.....	Orient	43146
W8EHW	Foster Warren.....	124	East Clark St.....	North Hampton	45349
KB8EMD	Larry Baker.....	4330	Chippewa Trail.....	Jamestown	45335
W8E8DY	John Schlaechter.....	3199	Lewis Rd.....	Columbus	43207
KB8ESR	Tommy Camm.....	1267	Arkwood Ave.....	Columbus	43227
N8FFO	Edward Hauff.....	2716	Columbus Ave.....	Columbus	43209
KB9FO	Henry Ruh.....	1545	Lee Street.....	Des Plaines, IL	60018
KB8GZO	Jason Pelaez.....	4872	Trailside Court.....	Huber Heights	45424
K88GZQ	Warren Duemmel.....	3488	Darbyshire Dr.....	Hilliard	43026
KB8HR	Ira Bickham.....	260	Tiki Dr.....	Merritt Is., FL	32953
KB8VA	Guy Cunningham, Jr.....	31	Birchfield St.....	Plymouth	44865
KB8ISM	Steve Iacono.....	1075	Virginia Ave.....	Columbus	43212
KB8JY	Fred Yost.....	330	Dellfield Way.....	Gahanna	43230
N8KCB	Chris Morris.....	3181	Gerbert Rd.....	Columbus	43224
W8K8Q	Dale Waymire.....	225	Riffle Ave.....	Greenville	45331
N8LEP	Patricia Parker.....	2738	Floribunda Drive...	Columbus	43209
W88LGA	Charles Beener.....	2548	SR 61.....	Marengo	43334
W880BT	Tom Camm.....	1267	Arkwood Ave.....	Columbus	43227
W880TH	Ferry Yantis.....	1850	Lisle Ave.....	Obetz	43207
W88P	Bob Mills.....	6834	Halligan Ave. East..	Worthington	43085
KB8PN	James Easley.....	1507	Michigan Ave.....	Columbus	43201
W88RMC	Arthur Towslee.....	180	Fairdale Ave.....	Westerville	43081
W88RUT	Ken Morris.....	3181	Gerbert Rd.....	Columbus	43224
W88RVH	Richard Goode.....	9391	Ballentine Rd.....	New Carlisle	45344
W88TTE	Phil Morrison.....	154	Llewellyn Ave.....	Westerville	43081
W8TV	Bob Dye.....	6118	Sedgwick Rd.....	Columbus	43235
W88UGV	Bruce Jaquish.....	4817	W. Arlington Park...	Fort Wayne, IN	46835
W88URI	William Heiden.....	4435	Kaufman Rd.....	Plain City	43064
W8VSY	Jack Schmermund.....	401	North Main St.....	West Milton	45383
K88WEX	Phil Hardman.....	949	Oakwood Ave.....	Columbus	43206
K88ZNY	Tom Taft.....	386	Cherry St.....	Groveport	43125
K88ZPF	Johnny Camm.....	1267	Arkwood Ave.....	Columbus	43227

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**ATCO FINANCIAL STATEMENT**

CASH BALANCE:	
As of 30 September 1990.....	\$403.02
RECEIPTS:	
Dues.....	\$110.00
Total receipts.....	\$513.02
EXPENDITURES:	
Printing charges for October 1990 ATCO Newsletter....	\$ 35.96
Postage for October 1990 ATCO Newsletter.....	9.25
Misc. costs incidental to publication of newsletter..	2.90
Food and incidentals for Fall 1990 ATCO Event.....	83.76
Total expenditures.....	\$131.87
SUMMARY:	
Cash Balance as of 30 September 1990.....	\$403.02
Receipts.....	110.00
Expenditures.....	-131.87

Balance as of 31 December 1990.....\$381.15  
 The above financial report was prepared as of 31 December 1990 by  
 Warren G. Duemmel, K88GZQ, Acting ATCO Treasurer.

# LOW-LOSS FEED LINE

By Foster, W8EHW

If you are one of those individuals having close to or over 100 feet of feed line, you may be interested in a very low-loss feed line. Here is some information on articles that have been published on surface wave transmission line (SWTL), also called G-line, single conductor feed line, launcher, etc. The "G" in G-line stands for Dr. George Goubau who did the first research on the SWTL feed. Goubau describes a system for 1700 MHz, and the theoretical loss of the conductor is about 0.7 dB per 100 feet.

## References:

1. Journal of Applied Physics, 21, pp. 1119-1128 (1950).
2. Goubau - Proceedings of the IRE, 39, pp. 619-624 (1951).
3. CQ Magazine, April 1953, p. 13, Major Walter White, Jr., K2CHF.
4. G-line appeared in Radio and Television News in mid-fifties.
5. QST Magazine, June 1974, p.11, George A. Hatherell, K6LK.
6. ARRL VHF Manual (first edition) 1968, p. 154.
7. Warren Weldon, W5DFU, and Merlin Berrie, W5HTZ, "How We Put the G-line to Work."
8. Ham Radio Magazine, 1988, "Efficiently Launch VHF/UHF Wave (G-line)", p. 63.

If any of you do any work on the G-line, I would like to hear from you. My address is in any callbook, and I am listed on page 8 of this issue of the ATCO Newsletter.

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## ATCO MEMBERSHIP APPLICATION

(PLEASE CIRCLE CHANGES)

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RENEWAL [ ]                      NEW MEMBER [ ]                      DATE.....

NAME.....CALL.....

ADDRESS.....HOME PHONE.....

CITY.....STATE.....ZIP.....

FCC LICENSED OPERATORS IN IMMEDIATE FAMILY.....

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COMMENTS.....

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ANNUAL DUES PAYMENT OF \$10 ENCLOSED.....CHECK [ ].....CASH [ ]

Make check payable to Warren G. Duemmel, Acting ATCO Treasurer.  
Mail to K8BGZQ, 3488 Darbyshire Drive, Hilliard, Ohio 43026.

Editor: Warren, KABGZD

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**RENEW YOUR ATCO MEMBERSHIP NOW!**  
PLEASE USE APPLICATION FORM ON PAGE 9  
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