

# ATCO NEWSLETTER

VOLUME 7 NUMBER 1

JANUARY 1990

## IT'S DUES PAYING TIME!

Take a look at the address label on this issue of your ATCO Newsletter. If "12-89" appears after your name and call letters, then you know it's time to send your ten dollar check for your 1990 dues to KABGZQ, Acting ATCO Treasurer.

Every member of record as of 31 December 1989 gets the January 1990 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 0 !  
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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.

Any reproduction of material printed in the ATCO Newsletter without the written consent of ATCO is prohibited.

## EDITORIAL

As reported in the October 1989 issue of the ATCO Newsletter, Bill, W8DMR, has resigned as Technical Editor of our newsletter.

It was through the efforts of Bill and your present ATCO Newsletter Editor that regular publication was resumed in January 1987 on a quarterly basis.

Not only did Bill review all technical material published, but he wrote many technical articles and his column "ATV News Items of Interest."

Also, the success of our ATCO events was largely due to Bill's efforts.

We regret Bill's decision to resign and wish to express our appreciation for his contributions to Amateur Television in Central Ohio.

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## NEWSLETTER PUBLICATION POLICY

For the past three years, the ATCO Newsletter has been published regularly as stated at the bottom of page one. As you know, we rely on you to submit material for publication.

Our immediate plans call for us to continue as a quarterly publication, but this can be done only with your cooperation. In the event that sufficient material is not available to your editor to publish a newsletter which meets the quality and quantity standards on the specified publication date, publication and distribution will be delayed.

Within each calendar year, it is planned that four issues of the ATCO Newsletter will be mailed to our members. If less than four issues of the newsletter are published, the period of membership will be extended accordingly.

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## OUR CONTRIBUTORS

Thanks to the following ATCO ATVers for their contributions to the January 1990 issue of the ATCO Newsletter:

John, W8EDY; Bill, W8DMR; Bill, W8BURI; Bob, W8BP; Ray, N8FC; Bob, W8TV; and Dale, W8KQQ

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## MICROWAVE OVEN FEED LINE DEVELOPMENT

Dave Pacholok, the designer of the microwave oven ATV transmitter, has stated that "long line effect" can cause frequency jumps. Dave recommends a maximum length of 17 feet. This problem was discussed with Dave, and he proposed mounting the magnetron at the antenna or the use of hardline. Since the WABE0Y transmitter is assembled in two separate enclosures, the prospect of mounting the magnetron unit at the antenna looked promising. Wrong!

A meltdown occurred and it wasn't known to be happening because the magnetron couldn't be seen from the shack. There was no evidence of meltdown except for the loss of video. In this meltdown, eight inches of coax, two PL259's, the E-field probe, and the magnetron probe cap were all burnt to cinders. From this meltdown experience, it was determined that all units must be located in the shack. This was the sixth meltdown of several that happened during the design and development of the unit. Most meltdowns are caused by hot coax and fittings (bad SWR).

A long 40 foot length of coax with fittings was designed using Columbia C-1180 and the new Radio Shack teflon PL-259 (RS# 278-188. This coax ran cool but pulled the frequency up to 2450 MHz (band edge). The frequency was pulled down to 2410 MHz with a redesigned E-field probe. The new long cable and probe have been in operation for several months without any frequency jumps or meltdowns. On-time was ten minutes or until the magnetron gets too hot to oscillate properly, and off-time was three to four minutes for cooling.

A detailed drawing of this new E-field probe may be obtained from John, WABE0Y. (Submitted by John, WABE0Y.)

### \*\*\*\*\* FLEXIBLE 9913 COAX SOURCE

The solid center conductor used in RG-9913 transmission line is the main reason for its stiffness. Routing RG-9913 around the rotor at the top of the antenna tower will eventually cause fatigue of the center conductor. At the Findlay Hamfest, Dick, WBBVNC, found a supplier for flexible RG-9913. The center conductor is stranded and provides greater flexibility. This item is available from RF Products, 728 Meadowlane, P.O. Box 195, Greenfield, Indiana 46140. Phone: 317-462-6146.

Cable part number is 4XLIIA, and the cost is approximately 50 to 75 cents per foot. About 15 to 20 feet is all that is required to connect from your beam antenna, down the mast, and around the rotor. If your antenna is rotated to accommodate vertical polarization for receiving ATV repeaters, the flexibility of the RG-9913 solves that problem, too. (Submitted by Bill, W8DMR.)

**WANTED!!!!**

The ATCO Newsletter is in need of a volunteer to serve as its Technical Editor.

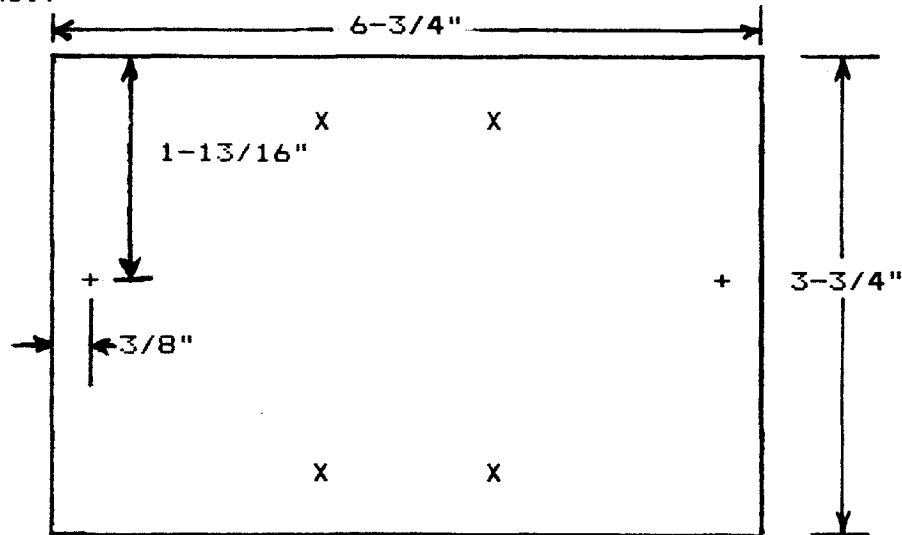
If you are interested, please contact Warren, K8BGZQ.

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**MOUNTING PLATE FOR MICROWAVE ANTENNA**

When installing a 1200 MHz antenna, it is usually necessary to somehow customize the mounting system. It seems the antenna manufacturers assume that this is the only antenna you will have on your mast and it will go up at the top.

The accompanying diagram shows dimensions for a mounting plate for a 1200 MHz 45 element Downeast microwave antenna. With this plate you can mount the antenna on a vertical crossboom using the existing holes and hardware supplied with the antenna. The mounting plate is made from 1/8" thick aluminum. (Submitted by Bill, WB8URI.)



NOTES: Center holes at X to accept 1-1/2" U-clamps.  
Not drawn to scale.

**CUSTOM MOUNTING PLATE FOR MICROWAVE ANTENNA**

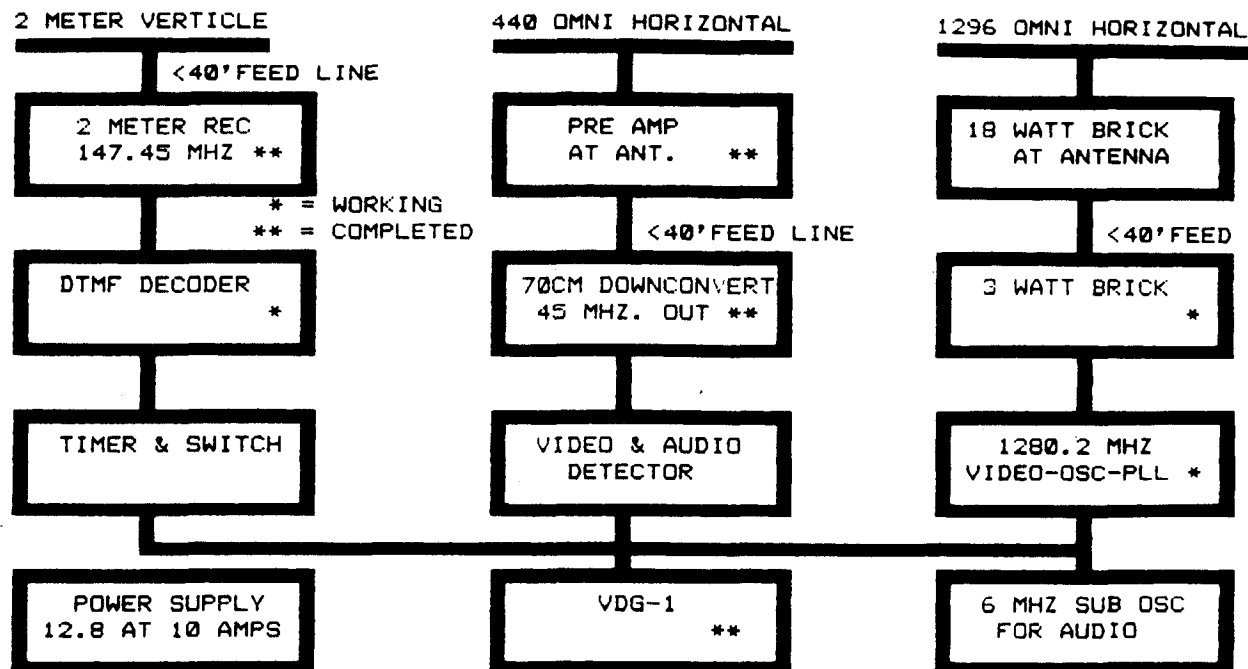
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**SUGGESTIONS, COMMENTS, ETC.**

When filling out the form on page 11, please list any comments you have concerning ATCO activities and the ATCO Newsletter.

## WM8P ATV REPEATER

This is a progress report on the WM8P ATV repeater which will have an input on 439.25 MHz and an output on 1280.2 MHz. The system will have a 147.45 MHz input for tone control functions. The block diagram of the system (see below) gives a basic design impression.



BLOCK DIAGRAM FOR WM8P REPEATER

In all probability, the system will serve mainly as a signal source for 1296 MHz band conditions. The repeater will not repeat unless the 70 cm window is opened by tone control. Also, a long ID may be triggered for testing purposes. Plans are to assign control codes as follows: TONE 1 for 440 MHz WINDOW; TONE 2 for LONG ID; and TONE 9 for RESET.

Bill, W8BURI, has offered to hang some antennas on the side of his 60 foot tower for the purpose of testing the system. It should be interesting to see how 18 watts delivered right at a simple antenna is received in Central Ohio. Once the system is debugged, a permanent site will be sought. The video generator is from Elktronics, and Bill, W8BELK, created some excellent screen graphics for repeater use. With help from Bill, W8DMR, and Dick, W8RVH, a 1296 MHz oscillator has been phase-locked successfully. The VDG has been hooked up and modulates the PLL circuit nicely.

Most of the parts to complete the system have been purchased.  
 (continued on page 8)

## CENTRAL OHIO 2 METER REPEATERS

The following is a list of 2 meter repeaters which are known to be operational and accessible from the Columbus area using an omnidirectional antenna. (Submitted by Ray, N8FC.)

<u>FREQUENCY</u>	<u>CALL</u>	<u>LOCATION AND/OR SPONSOR</u>
145.11-	WB4LAI	Dayton/Columbus KMC ARC
145.15-	WDBEDI	Athens ARA
145.17-	WB8SMK	Delaware
145.23-	WB8MMR	Grove City
145.29-	KCBMJ	Delaware
145.31	W8OG	Springfield
145.35-	NBIIID	Marysville, Honda America Plant
145.39-	WD8PRH	Wide Area, Central and SW Ohio
145.43-	K8DRE	Columbus, CCRA
145.45-	K88WV	Springfield
146.61-	KJ8N	Zanesville
146.67-	W8ZPF	AT&T Plant, E. Columbus
146.70-	K8QIK	Lancaster
146.76-	W8WTB	Columbus Weather Watch, CORC
146.79-	N8CIY	Mt. Vernon
146.805-	W8VMS	SE Columbus
146.835-	K8DFC	Circleville
146.88-	W8WRF	Newark
146.97-	W8RRJ	Westerville, CORC
147.00+	W8EBG	Bellefontaine
147.03+	K8QIK	Lancaster
147.06+	K8DDG	Columbus, ARES
147.09+	K1LT	Columbus, OSU RC
147.15+	W80HI	Columbus, Battelle RC
147.18+	N8BY	Circleville
147.21+	W88DZW	Columbus, CCRA
147.24+	K8DRE	Columbus, CCRA
147.285+	N8CWU	London, MARC
147.30+	K88DF	Marion
147.33+	W88SYK	Columbus, CORC
147.39+	W8BJN	Marysville, Union Co. RC

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**A REMINDER**

ATCO invites FCC licensed spouses and children of members to join our group without payment of additional dues.

Children must be under 18 years of age.

Only one copy of the quarterly ATCO Newsletter will be mailed to each household.

Spouses and children will be considered as members of ATCO, but will not be eligible to vote in any ATCO election.

Names of spouses and children will be published on the roster of ATCO members.

Those wishing to join ATCO under the above conditions should complete the application on page 11.

# HAM COMPUTER PROGRAM

The following program for calculating values for resonance of inductance and capacitance circuits was submitted by Bob, W8TV. If you wish an original size copy of this program, send your request to K8BGZQ the ATCO Newsletter Editor.

```
3 REM BY B. DYE 1/12/80
4 BASIC PROGRAM FOR CALCULATING VALUES FOR RESONANCE OF INDUCTANCE & CAP
5 ACITANCE CIRCUITS
10 CLS:BEEP
12 PRINT IPRINT
13 GOTO 100
-----
20 PRINT "
25 PRINT "
-----
28 PRINT IPRINT
30 INPUT "Series or Parallel? enter S or P " :XS
35 IF XS="S" THEN GOTO 100
36 IF XS="P" THEN GOTO 100
37 IF XS=" " THEN GOTO 200
38 IF XS=" " THEN GOTO 200
40 GOTO 10
100 CLS:BEEP:PRINT "
-----
110 PRINT DATES"
115 PRINT "
-----
120 INPUT "SOLVE FOR FREQUENCY, Y or N " :F#
122 IF F#="Y" THEN GOTO 141
123 IF F#="N" THEN GOTO 141
125 PRINT :BEEP:INPUT "SOLVE FOR INDUCTANCE, Y or N " :I#
127 IF I#="Y" THEN GOTO 160
128 IF I#="N" THEN GOTO 160
130 PRINT :BEEP:INPUT "SOLVE FOR CAPACITANCE, Y or N, or Q to Quit " :C#
132 IF C#="Y" THEN GOTO 240
133 IF C#="N" THEN GOTO 240
134 IF C#="Q" THEN RUN
135 IF C#=" " THEN RUN
136 IF C#=" " THEN SYSTEM
137 IF C#=" " THEN SYSTEM
140 RUN
141 F#=243.1415926#
143 PRINT :BEEP:INPUT "INDUCTANCE IN MICROHENRYS " :I
144 PRINT :BEEP:INPUT "CAPACITANCE IN MICROFARADS " :C
145 IF I=0 THEN RUN
146 IF C=0 THEN RUN
148 L=1/1000000:CC=C/1000000
150 K=L*CC:KK=SQRT(K)
151 JJ=PI*KK#
152 F#=(JJ)
153 FF=FF/1000
154 PRINT :BEEP:PRINT "THE RESONANT FREQUENCY IS " :FF " KILOHERTZ or " :FF*1000 " H
ERTZ
155 PRINT IPRINT IINPUT "RUN AGAIN, or Q to QUIT " :DY#
157 IF DY#="Q" THEN SYSTEM
158 IF DY#=" " THEN SYSTEM
-----
159 RUN
160 CLS:BEEP:PRINT "
-----
161 PRINT DATES"
162 PRINT "
-----
163 PRINT :BEEP:INPUT "FREQUENCY IN KILOHERTZ " :F#
164 PRINT :BEEP:INPUT "CAPACITANCE IN MICROFARADS " :C#
165 IF F#>0 THEN RUN
166 IF C#>0 THEN RUN
167 "FF*1000"
168 CC=C/1000000
170 XX=48FF*FF*CC*3.1415926#*2
171 Y#=(XX)
172 Y#=(Y#)
173 PRINT :BEEP:PRINT "THE INDUCTANCE FOR RESONANCE IS " :Y# " HENRYS or " :Y# " MICR
OHENRYS
175 PRINT IPRINT IINPUT "RUN AGAIN, or Q to QUIT " :DY#
177 IF DY#="Q" THEN SYSTEM
178 IF DY#=" " THEN SYSTEM
179 RUN
200 PRINT "
-----
210 PRINT "
-----
215 CLS:BEEP:PRINT "
-----
220 BEEP:INPUT "SOLVE FOR FREQUENCY, Y or N " :F#
225 INPUT "SOLVE FOR INDUCTANCE, Y or N " :I#
230 INPUT "SOLVE FOR CAPACITANCE, Y or N " :C#
235 IF F#="Y" THEN GOTO 250
237 IF I#="Y" THEN GOTO 260
239 IF C#="Y" THEN GOTO 270
240 CLS:BEEP:PRINT "
-----
261 PRINT DATES"
262 PRINT "
-----
271 PRINT :BEEP:INPUT "FREQUENCY IN KILOHERTZ " :F#
272 PRINT :BEEP:INPUT "INDUCTANCE IN MICROHENRYS " :I#
273 IF F#>0 THEN RUN
274 IF I#>0 THEN RUN
275 FF=F#*1000
276 MM=H/1000000
277 XX=48FF*FF*MM*3.1415926#*2
278 Y#=(XX)
280 PRINT :BEEP:PRINT "THE CAPACITANCE FOR RESONANCE IS " :Y# " MICROFARADS
282 PRINT IPRINT IINPUT "RUN AGAIN, or Q to QUIT " :DY#
283 IF DY#="Q" THEN SYSTEM
284 IF DY#=" " THEN SYSTEM
288 RUN
```

## \*\*\*\*\* HERE'S ANOTHER HAM COMPUTER PROGRAM

This program for Commodore 64 was submitted by Dale, W8BKQQ. Change it to suit your TV station's call letters.

```
1 PRINT CHR$(147):POKE53280,7:POKE53281,7:POKE646,0:PRINT"(DOWN)
(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)"
2 PRINT"(7 SPACES)COLOR TV ALIGNMENT CHARTS":FOR DW=1TO1000:NEXT
3 PRINT"(12 SPACES)(DOWN) BY W8BKQQ":FOR DW=1TO1000:NEXT
5 PRINT"(5 SPACES)(DOWN) TO CHANGE PATTERN USE F1 (WAIT)":FOR
DW=1TO5000:NEXT
10 PRINT CHR$(147);:POKE53280,0:POKE53281,0:FOR I=1TO24
20 PRINT "(RVS)(RED) W (BLU) A (YEL) B (GRN) K
(WHT) Q Q (OFF)":NEXT
30 GOSUB 200
40 FOR I=1TO24:PRINT " (40 PERIODS) ";:NEXT
50 GOSUB 200
60 FOR I=1TO24:PRINT " (40 SHIFTED PLUS) ";:NEXT
70 GOSUB 200
80 GOTO 10
200 GET A$: IF A#="" THEN 200
210 PRINT CHR$(147);:RETURN
220 REM CHANGE CALL LETTERS IN LINE 20 TO SUIT
```

## WM8P ATV REPEATER

(continued from page 5)

Some sort of IF detector board is needed for the 440 MHz signal. For this purpose, use of a mc1350 IF amp and a mc1330 video detector is being considered; however, anybody having an old board at a reasonable cost that would do the job should contact WM8P. Available time to complete construction and necessary testing is limited, but it is expected that the repeater will be ready for installation by early March of 1990.

Here is a list of things yet to be accomplished: test 3 watt brick; mount and test 18 watt brick; construct tone decoder; construct timer and control board; construct 10 ampere regulated power supply; and mount all in a waterproof cabinet.

Please let WM8P have your suggestions concerning this project. (Submitted by Bob, WM8P.)

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## THE PLESSEY SP-5060 PLL

In the October 1989 issue of Amateur Television Quarterly, an article about a low cost 23 cm (1280 MHz) phase-locked loop exciter has created much interest. Several ATCO members have inquired regarding a source to purchase the SP-5060 IC. The fixed-modulus frequency synthesizer may be purchased in quantities of six or more at a cost of \$15.05 per piece from Pioneer Electronics, 1200 Troy Street, Dayton, Ohio 45404 (allow six to seven weeks for delivery). Dick, W8RVH located this source about three months ago. W8RVH, W8BURI, WM8P, W8DMR, and others have successfully duplicated the 23 cm PLL exciter using the PC TVG-12A free-running oscillator and the SP-5060 IC. The total cost to construct the exciter was less than \$48.25. (Submitted by Bill, W8DMR.)

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## TVG 12A FREQUENCY LOCK

Here is some information for those of you who will be attempting to frequency lock the TVG-12A. Although it seems to be no problem to lockup this unit, some difficulty has been encountered when following it with two brick amplifiers. Try the following: first, replace the coax from the TVG-12A to the brick amp with 1/8" hardline as short as physically possible; then solder a 57 ohm resistor with leads as short as possible from the output to the ground; finally, vary the voltage on pin 2 of the SC 1043 brick from 8 volts down to 4 volts. (Submitted by Bill, W8BURI.)

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## ATV NEWS ITEMS

(The following items of interest to ATVers were compiled from reports submitted by Bill, W8BURI.)

ATCO GOES NATIONAL AGAIN - ATCO member W8DMR's article on frequency locking the PC Electronics TVG-12A was published in a recent issue of ATVQ Magazine.

J BEAM ANTENNA SHORTAGE - It appears that a manufacturing problem in England is causing a shortage of this antenna in the United States. Rick, WA3DIO, and Bill, W8BURI, continue to anxiously await the arrival of their new antennas after being on backorder for several months.

1200 MHz REPEATER PROJECT - Bob, W8BP, continues to have success with his 1200 MHz repeater/beacon project. He has successfully frequency locked his free-running oscillator and has his 5 watt brick in operation. (See "W8BP ATV Repeater" elsewhere in this issue of the ATCO Newsletter.)

W8BURI HAS NEW TOWER - Bill, W8BURI, has his new tower up and is back on 2 meters and 1200 MHz. He has been able to frequency lock his 1200 MHz test oscillator and is currently running 18 watts of FM video at 1280.2 MHz. At present, he is working on a 2C39 tube amplifier for even more power out at 1280.2 MHz.

W8BELK BALLOON LAUNCH - The photo below was taken by W8BURI during the recent W8BELK balloon launch at Champaign, Illinois. To receive the signal, a 15 element ground mounted quagi antenna on a stepladder was used with a 5" Multitech TV receiver direct tuned to 439.25 MHz.



**ATCO MEMBERS AS OF 31 DEC 1989**

K8AEH	Wilbur Wollerman...	1672	Rosehill Rd.....	Reynoldsburg	43068
W8AER	David Sears.....	1678	Kaiser Dr.....	Reynoldsburg	43068
K8A0H	Charles Tucker.....	1500	E. Leffel Lane.....	Springfield	45505
KB2ARL	Dave DiGiuseppe.....	5685	B Hibernia Dr.....	Columbus	43232
W8BATF	Emmett McDonald...	14120	Flintridge Rd. SE...	Glenford	43739
W9AZD	Jim Walter.....	2662	St.Rt. 39 NW RD#3...	Mansfield	44903
W8BBW	Joe Schumann.....	5418	Marietta Rd.....	Chillicothe	45601
KB8BIY	Bob Shaw.....	59	Parkview Ave.....	Westerville	43081
W8BJN	Gene Kirby.....	13613	U.S. 36.....	Marysville	43040
W8BLN	Bob Pfeiffer.....	135	South Main St.....	North Hampton	45349
W8CCW	John Ferrell.....	3722	Wagner Court.....	Grove City	43123
N8CYV	Blaire Standley.....	721	West North St.....	Springfield	45504
KN8DMK	Bill Delker.....	8460	Bowers Rd.....	Amanda	43102
W8DMR	William Parker.....	2738	Floribunda Dr.....	Columbus	43209
WA3DTP	Rick White.....	5314	Grosbeak Glen.....	Orient	43146
N8DUK	Ron Reynolds.....	4642	Glengate Dr.....	Columbus	43232
W8EHW	Foster Warren.....	124	East Clark St.....	North Hampton	45349
W8BELK	Bill Brown.....	12536	T.R. 77.....	Findlay	45840
W8E0Y	John Schlaechter...	3199	Lewis Rd.....	Columbus	43207
KB8ESR	Tommy Camm.....	1267	Arkwood Ave.....	Columbus	43227
N8FC	Ray Jepsen.....	1070	Wiltshire Rd.....	Columbus	43204
N8FFD	Edward Hauff.....	2716	Columbus Ave.....	Columbus	43209
K8GZQ	Warren Duemmel.....	3488	Darbyshire Dr.....	Hilliard	43026
K8HRR	Ira Bickham.....	260	Tiki Dr.....	Merritt Is., FL	32953
K8HVA	Guy Cunningham, Jr...	31	Birchfield St.....	Plymouth	44865
W8BI	Chris Vojsak.....	2050	Ellington Rd.....	Columbus	43221
K8ISM	Steve Iacono.....	1075	Virginia Ave.....	Columbus	43212
K8JGY	Fred Yost.....	330	Dellfield Way.....	Gahanna	43230
W8KQQ	Dale Waymire.....	225	Riffle Ave.....	Greenville	45331
N8LEP	Patricia Parker.....	2738	Floribunda Drive...	Columbus	43209
W8LGA	Charles Beener.....	2548	SR 61.....	Marengo	43334
W8OBT	Tom Camm.....	1267	Arkwood Ave.....	Columbus	43227
W8OTH	Perry Yantis.....	1850	Lisle Ave.....	Obetz	43207
W8BP	Bob Mills.....	6834	Halligan Ave. East..	Worthington	43085
KE8PN	James Easley.....	1507	Michigan Ave.....	Columbus	43201
K8PYQ	Lowell Brown.....	16149	Twp. Rd. 217.....	Mt. Victory	43340
W8RMC	Arthur Towslee.....	180	Fairdale Ave.....	Westerville	43081
W8RUT	Ken Morris.....	3181	Gerbert Rd.....	Columbus	43224
W8RVH	Richard Goode.....	9391	Ballentine Rd.....	New Carlisle	45344
W8RZG	Corwin Miller.....	4966	Haughn Rd.....	Grove City	43123
W8TTE	Phil Morrison.....	154	Llewellyn Ave.....	Westerville	43081
W8TV	Bob Dye.....	6118	Sedgwick Rd.....	Columbus	43235
W8UGV	Bruce Jaquish.....	4817	W. Arlington Park...	Fort Wayne, IN	46835
W8URI	William Heiden.....	4435	Kaufman Rd.....	Plain City	43064
W8VSY	Jack Schmermund.....	401	North Main St.....	West Milton	45383
K8WEX	Phil Hardman.....	940	Oakwood Ave.....	Columbus	43206
K8YAH	Ronald Vanke.....	5094	Longrifle Rd.....	Westerville	43081
W8YIF	William White.....		Rt. 2, Box 344.....	Little Hocking	45742
K8ZPF	Johnny Camm.....	1267	Arkwood Ave.....	Columbus	43227

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TUESDAY NIGHT NET MEETS EVERY WEEK AT 8 PM!

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**ATCO FINANCIAL STATEMENT**

**CASH BALANCE:**

As of 30 September 89.....\$287.03

**RECEIPTS:**

Dues.....\$ 10.00

Total receipts.....\$ 10.00

**EXPENDITURES:**

Printing charges for October 1989 ATCO Newsletter....\$ 45.92

Postage for October 1989 ATCO Newsletter..... 20.25

Misc. costs incidental to publication of newsletter.. 9.24

Total expenditures.....\$ 75.41

**SUMMARY:**

Cash Balance as of 30 September 1989.....\$287.03

Receipts..... 10.00

Expenditures..... -75.41

Balance as of 31 December 1989.....\$221.62

The above financial report was prepared as of 31 December 1989 by Warren G. Duemmel, KABGZQ, Acting ATCO Treasurer.

**ATCO MEMBERSHIP APPLICATION**  
(PLEASE CIRCLE CHANGES)

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

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

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

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

OTHER FCC LICENSED OPERATORS IN FAMILY (see page 6).....

COMMENTS.....

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

Make check payable to Warren G. Duemmel, Acting ATCO Treasurer.

Mail to KABGZQ, 3488 Darbyshire Drive, Hilliard, Ohio 43026

Editor: Warren, KA86ZQ

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

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**LAST CHANCE**  
**TO RENEW YOUR ATCO MEMBERSHIP!**  
PLEASE USE APPLICATION FORM ON PAGE 11  
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