OCTOBER 1983 — VOLUME II ISSUE 3

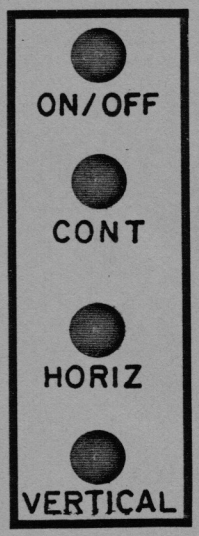
WA8RUT AND WA8RMC

PRESENTS

ATCO

NEWSLETTER

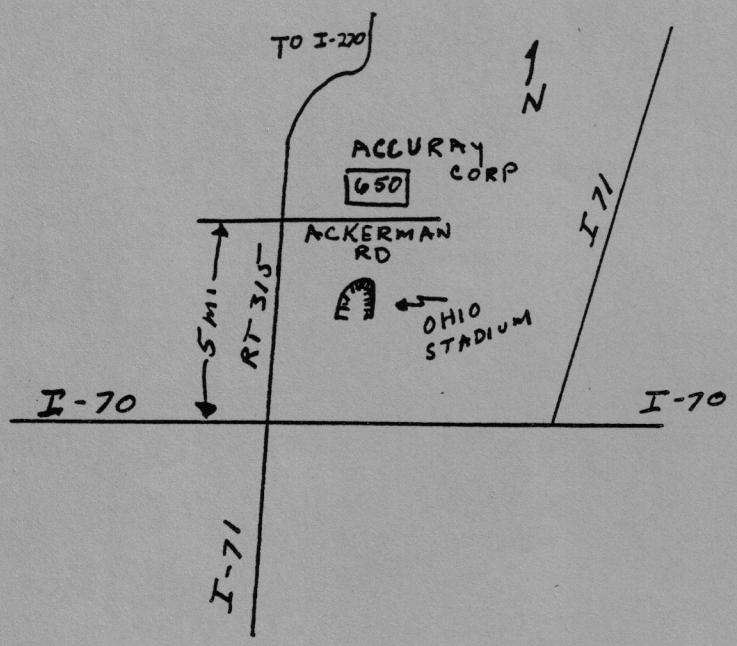
This issue rated P3



Amateur Television in Central Ohio

Participants at the July antenna party

at WB8LGA's QTH



EXIST OFF RT315
EAST ON ACKERMAN
1ST LIGHT (1 BLOCK)
ENTER ACCURAY
PARKING LOT
TALK-IN 147.45

NEXT ATCO MEETING

WHEN: OCTOBER 22, 1983 (SATURDAY)
TIME: 1:00 - 4:00 P.M.
WHERE: ACCURAY CORP, 650 ACKERMAN RD.
(JUST NORTH OF OSU) SEE MAP
TALK IN: 147.45 FM

AGENDA

- Welcome new members/visitors
- Election of Club Officers
- Repeater Reports
- Discussion of potential club projects
- ATV and public service work
- ATCO Newsletter

The ATCO Newsletter is the official journal/newsletter of the Amateur Television in Central Ohio Club. The ATCO Newsletter is published quarterly by WA8RUT and WA8RMC.

ATCO NEWSLETTER

- The ATCO Tuesday Night Net is gaining more check-ins each net as the fall months drive more ATVers from outside activities. In case you have forgotten, the net meets on Tuesdays at 8:00 P.M. local time on 147.45. Check-ins are normally taken from 174.45, 439.25 and 425.25 (repeater output).

- ATV on the 23 cm band is getting a good start in Central Ohio. Some of the recent accomplishments include a full duplex contact (1278.75 and 439.25) between WA8RUT in Columbus and WB8UGV in Centerville (south of Dayton), a 65 mile path. WA8RUT was running about 7 watts on 1278 to an antenna 50' high. WB8UGV was using a P.C. Electronics Converter mounted on an antenna also at 50'. This path has only been attempted twice and both tries yielded P3-P4 picture on 1278 and P4 pictures on 439.25.

- The cross band repeater (439.25/1278.75) is on the air. It currently is located on a tall building in downtown Columbus. The 439.25 antenna is a stacked turnstile of the WA8RMC design. The 1278 mhz antenna is a vertical stacked ½ waves of the W6ORG design. The repeater currently runs 2 watts at the antenna on 1278 mhz. The coverage of the "machine" so far, appears impressive. The first major use of the machine will be for the Bank One Marathon in Columbus on October 16th.

- Public service work demand for ATV is growing in Central Ohio. Last year a small effort was made to provide coverage of the Columbus marathon with good success. This year the marathon will be covered by ATV with the aid of a repeater. The Red Cross has inquired about our capabilities for potential use in other public service events and disasters. If more ATVs in Central Ohio have an interest in public service work, please let WA8RUT know. This is a chance to use our hobby and knowledge in a meaningful way.

- Art, WA8RMC has joined the newsletter staff (that makes a total of two!) Although this issue is a week later than planned, it should be a better than average issue. Art is one of the primary technical contributors to this newsletter and with Art's more active involvement in this newsletter, the quality of it will surely improve!

- Associate Editors for the ATCO Newsletter are still needed to take on specific departments of the newsletter. Such departments as the "swap shop", maintaining activities list, "ATCO Club Happenings" are in need of associate editors. If you would like to join the ATCO Newsletter staff, please contact WA8RUT or WA8RMC. The pay isn't good, but the fame is great!

- The last ATCO club meeting was just terrific. The club meeting was also an antenna measuring contest, using WB8LGA's computerized antenna range. There were an awful lot of deflated ego's when individual's antennas were "put up on the pole". Fred, K8JGY had the best antenna (a long boom Quagi) with a gain of about 13 dbd. The popular 11 element gama feed beam showed about 7.5 dbd. The best part of the meeting was lunch! Chuck and his XYL put on an outstanding feed!

439.25 TO 1260.0 MHZ TRANSPONDER PROGRESS REPORT

I feel somewhat defeated and inadequate! Much to my surprise, Ken (WA8RUT) achieved operational results on his transponder (or is it a translater or repeater - let us know) before I did (I still haven't) even though he started after I did - no fair Ken.

All kidding aside - my transponder project is slowly progressing forward and I am learning quite a bit in the process. All of which, I'll pass along to any interested party. As most of you know, I am working on a 439-1260 Mhz transponder to serve primarily as a remote receiver link for our desense plagued 439-425 Mhz ATV repeater. This unit is being designed to be a completely self-contained receiver-transmitter in a weatherproof box for "top of the tower" mounting with only an AC power source going up the tower to supply it. This eliminates antenna feedline losses and makes installation easier. If we can secure a high tower location, the relatively low gain of the receiving antenna (439.25 Mhz) will be offset. The 1260 Mhz output (1 watt) will be vertically polarized via an omnidirectional antenna so its output may be seen by anyone locally with 1260 Mhz receive capabilities. It will serve as a repeater up link and as a remote sensitive receiver to enhance local 439.25 Mhz incoming DX ATV for those interested in watching the 1260.0 Mhz output.

The circuit details are as follows:

1. 439.25 Mhz antenna - Omnidirectional 3-6 db gain is hoped for. I will use the Octopole design if I can get the bugs out.
2. Input - MGF 1202 gas-fet preamp yet to be built.
3. Receive converter - 3SK97 Gas-fet Rf Amp to a double balance mixer. IF from mixer at 45 Mhz is amplified thru a 3N200 low noise Mos Fet IF amplifier. The oscillator chain to drive the mixer is a 80.830 Mhz fet xtal oscillator and source follower into a multiplier to 485.0 Mhz for feeding the mixer. The converter is designed and working well.
4. Video Detector - This is an RCA phase lock loop synchronous detector IC design similar to that used in many modern TV receivers. This unit has been bread boarded and works but has not been reduced to final design.
5. 1260 Mhz transmitter - This consists of 3 parts - a 70 Mhz oscillator and amplifier, a 70 to 420 Mhz multiplier and power amplifier, and a varactor trippler to 1260 Mhz. The first two have been built and tested. The CW output at 420 Mhz is about 7 watts. The varactor trippler design is known, but has not been built at this time.
6. Video Modulator - The modulator will modulate the 420 Mhz 7 watt final Amp. This is the part I am presently working on. I find it reasonably difficult to collector modulate a stage that draws about 1.5 Amps with sufficient bandwidth to pass 5 Mhz video. (I'll continue working on this one.)

7. Power supply - This will be last on the agenda since total current comsumption is unknown at this time. I plan to use 48 vac as the "up the tower" supply and use a switching supply to minimize heat dissipation within the box.

8. Packaging - I already have a stainless steel 10" x 12" waterproof box to house all the above components.

9. 1260 Mhz Antenna - This will be a vertically polarized omni-directional antenna of unknown design at this time. Probably a coax - colinear type. Desired gain is at least 3 db - this shouldn't be too hard to achieve - anyone have suggestions?

That's about it. Work is slow because other projects must be multiplexed in. Originally, I was hoping to have it operational this fall but I guess freezing weather will beat me to it. It now looks like early next summer is more likely.

Art Towslee - WA8RMC

OCTOPOLE ANTENNA UPDATE

At the time I published the Octopole Antenna in the newsletter last winter, it had not been fully tested, but preliminary tests were encouraging. Since then, at the antenna party - WB8LGA's QTH, tests have proven to be somewhat discouraging.

1. The antenna's radiation pattern is not omnidirectional. It has about 3 db notches in it which is poor for a 4 db gain antenna.

2. The angle of radiation is not at the horizon, but rather up and down about 15 degrees from the horizon. I believe this to be the key to the problem - how can the angle of radiation be altered?

I have no concrete idea on how to correct the problem at this time. Guessing as to what to do about antenna design changes is a total waste of time. There are too many factors to consider. If anyone has any good suggestions, please let me know. At this time, work on the Octopole is on the "back burner" and only keeping warm.

Art Towslee - WA8RMC

This month, I received a letter from Ron Stefanskie, W9ZIH, in Chicago. I thought you'd like to hear a little of what's going on in the Chicago area.

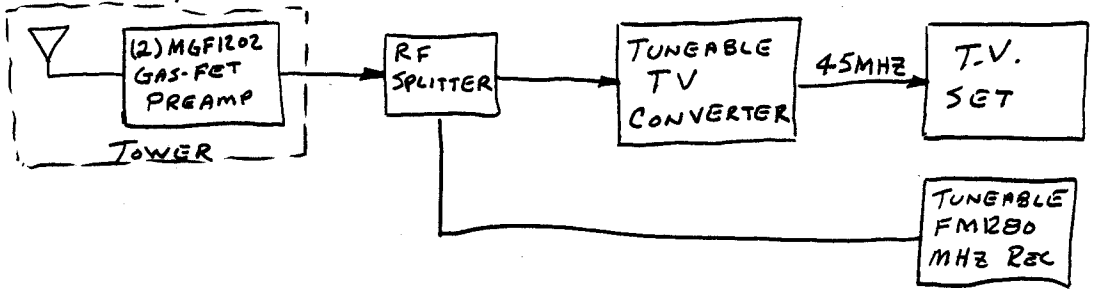
"At this time activety on 1280 Mhz video is very poor, but we have quite a few people with equipment for that band.

I work K9KLM and WA9HOH in Southeast Wisconsin on 1280 but they transmit FM only. They promise to have video going soon (only 3 years waiting).

Locally, we have N9CRN, WA9CGZ, W9NAU, W9YTM with 1280 Mhz gear.

My equipment includes a tower mounted Gas-Fet Preamp (2 stages) and a home-brew tunable 1280 to 40 Mhz converter with 2 stages of Gas-Fet, an interdigital mixer and 600 Mhz tunable oscillator.

The entire system looks like this.



My 1280 Mhz video transceiver consists of an old tube-type exciter. FM modulator to a 2 tube cavity driver amp to the 4 tube cathode modulated amp. (2C39)

I am seriously thinking about rebuilding a large part of the transmitter soon and get rid of most of the exciter tube circuits, in favor of solid state.

I also want to work over the 4 tube amp and get rid of some of the bugs in it.

We have had good results with video on 1280 Mhz but need activity in other areas to look for. I surely would like to work Ohio on that band and am sure it could be done when conditions are good.

We do not have any video repeaters in this area and do not welcome a 439.25 to 426 type repeater. We do welcome a 426 to 1250 type video repeater. This has never been done here but someone might try in the future."

Ron and I have, in the past, maintained a Sunday morning sked on 436 Mhz FM. Due to my poor FM receiver sensitivity, our 2 way contact success was less than 50%. He could hear me 70-80% of the time though. Based upon the fact that he transmits higher power and he has a higher gain antenna than I, it would seem to reason that I should hear him better than he hears me. I'll work on that when other higher priority items are completed. In the meantime, are there any others who would like to try their luck? I'm certain Ron wouldn't mind; contact either of us to set up a sked.

WA8RMC.

45 ELEMENT 1296 MHZ LOOP YAGI ANTENNA

The following loop yagi design was submitted by Dave Wagner K8DW. It is basically the G3JVL design and is also shown in the RSGB handbook. I have not tried this design yet, but it has been reported in QST to have been tested at the Eastern VHF/UHF Conference Gain Measurement Contest at 19.5 db.

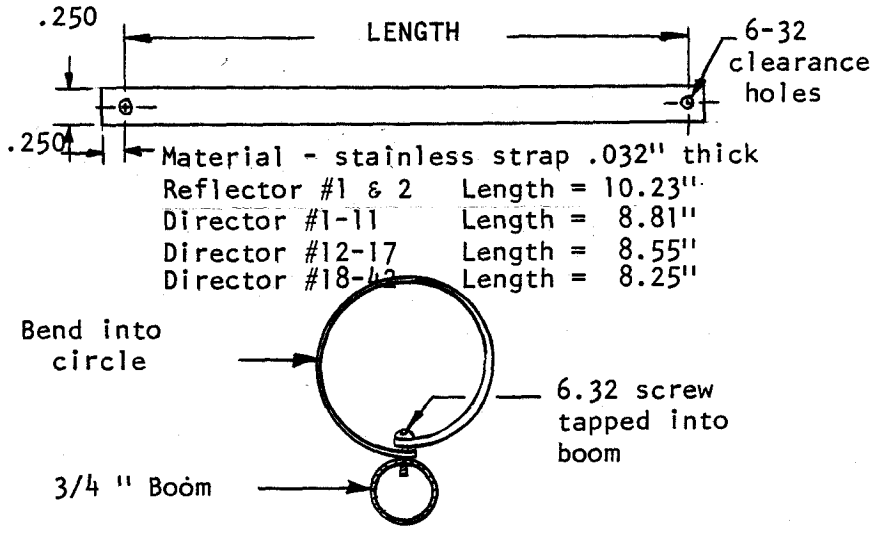
Please note that the loops are 1 full wavelength in circumference, thereby producing the high current point at the place where they touch the boom. Make this connection tight and spray with varnish after assembly to avoid oxidation producing a high resistance connection.

WA8RMC

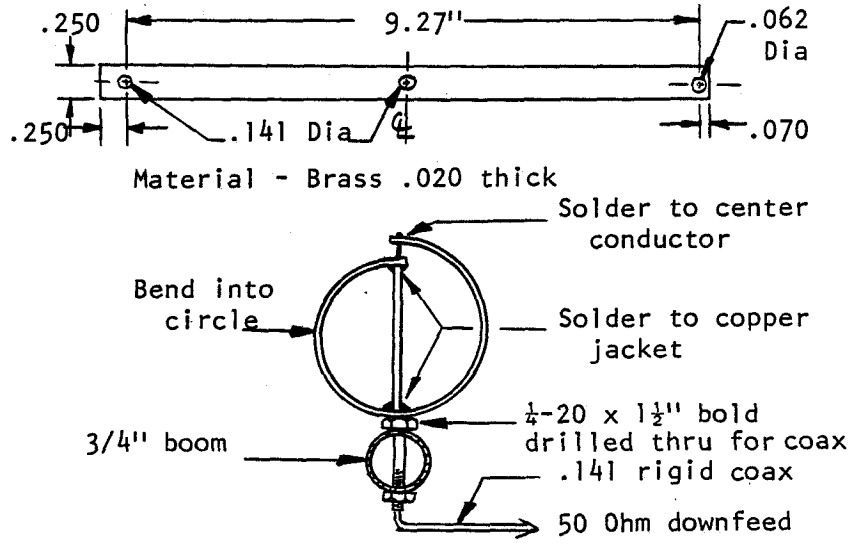
Element	Distance from Ref.#1
Reflector #1	0.00"
#2	3.10
Driven element	4.05
Director #1	5.17
2	6.00
3	7.78
4	9.56
5	10.81
6	13.12

3.56" between each element 7-42.

Reflector & Director Elements



DRIVEN ELEMENT DETAIL



Channel Assignments

UHF

With Video — Audio — Color Carrier Frequencies
— And ½ Wave Length Measurements —

VHF

Channel No.	Frequency Range MC	*½ Wave Length Inches	Picture Carrier MC	Color Sub-Carrier	Sound Carrier MC
2	54-60	103.8	55.25	58.83	59.75
3	60-66	93.8	61.25	64.83	65.75
4	66-72	85.7	67.25	70.83	71.75
5	76-82	74.8	77.25	80.83	81.75
6	82-88	69.5	83.25	86.83	87.75
7	174-180	33.4	175.25	178.83	179.75
8	180-186	32.8	181.25	184.83	185.75
9	186-192	31.5	187.25	190.83	191.75
10	192-198	30.3	193.25	196.83	197.75
11	198-204	29.4	199.25	202.83	203.75
12	204-210	28.5	205.25	208.83	209.75
13	210-216	27.7	211.25	214.83	215.75
14	470-476	12.5	471.25	474.83	475.75
15	476-482	12.4	477.25	480.83	481.75
16	482-488	12.2	483.25	486.83	487.75
17	488-494	12.0	489.25	492.83	493.75
18	494-500	11.9	495.25	498.83	499.75
19	500-506	11.8	501.25	504.83	505.75
20	506-512	11.6	507.25	510.83	511.75
21	512-518	11.5	513.25	516.83	517.75
22	518-524	11.3	519.25	522.83	523.75
23	524-530	11.2	525.25	528.83	529.75
24	530-536	11.1	531.25	534.83	535.75
25	536-542	11.0	537.25	540.83	541.75
26	542-548	10.8	543.25	546.83	547.75
27	548-554	10.7	549.25	552.83	553.75
28	554-560	10.6	555.25	558.83	559.75
29	560-566	10.5	561.25	564.83	565.75
30	566-572	10.4	567.25	570.83	571.75
31	572-578	10.3	573.25	576.83	577.75
32	578-584	10.2	579.25	582.83	583.75
33	584-590	10.1	585.25	588.83	589.75
34	590-596	10.0	591.25	594.83	595.75
35	596-602	9.9	597.25	600.83	601.75
36	602-608	9.8	603.25	606.83	607.75
37	608-614	9.7	609.25	612.83	613.75
38	614-620	9.6	615.25	618.83	619.75
39	620-626	9.5	621.25	624.83	625.75
40	626-632	9.4	627.25	630.83	631.75
41	632-638	9.3	633.25	636.83	637.75
42	638-644	9.2	639.25	642.83	643.75
43	644-650	9.2	645.25	648.83	649.75
44	650-656	9.1	651.25	654.83	655.75
45	656-662	9.0	657.25	660.83	661.75
46	662-668	8.9	663.25	666.83	667.75
47	668-674	8.8	669.25	672.83	673.75
48	674-680	8.7	675.25	678.83	679.75
49	680-686	8.7	681.25	684.83	685.75
50	686-692	8.6	687.25	690.83	691.75
51	692-698	8.5	693.25	696.83	697.75
52	698-704	8.4	699.25	702.83	703.75
53	704-710	8.4	705.25	708.83	709.75
54	710-716	8.3	711.25	714.83	715.75
55	716-722	8.2	717.25	720.83	721.75
56	722-728	8.1	723.25	726.83	727.75
57	728-734	8.0	729.25	732.83	733.75
58	734-740	8.0	735.25	738.83	739.75
59	740-746	7.9	741.25	744.83	745.75
60	746-752	7.8	747.25	750.83	751.75
61	752-758	7.8	753.25	756.83	757.75
62	758-764	7.7	759.25	762.83	763.75
63	764-770	7.7	765.25	768.83	769.75
64	770-776	7.6	771.25	774.83	775.75
65	776-782	7.5	777.25	780.83	781.75
66	782-788	7.5	783.25	786.83	787.75
67	788-794	7.4	789.25	792.83	793.75
68	794-800	7.4	795.25	798.83	799.75
69	800-806	7.3	801.25	804.83	805.75
70	806-812	7.3	807.25	810.83	811.75
71	812-818	7.2	813.25	816.83	817.75
72	818-824	7.2	819.25	822.83	823.75
73	824-830	7.1	825.25	828.83	829.75
74	830-836	7.0	831.25	834.83	835.75
75	836-842	7.0	837.25	840.83	841.75
76	842-848	6.9	843.25	846.83	847.75
77	848-854	6.9	849.25	852.88	853.75
78	854-860	6.8	855.25	858.83	859.75
79	860-866	6.8	861.25	864.83	865.75
80	866-872	6.8	867.25	870.83	871.75
81	872-878	6.7	873.25	876.83	877.75
82	878-884	6.7	879.25	882.83	883.75
83	884-890	6.6	885.25	888.83	889.75

CLASS D CITIZENS BAND FREQUENCIES

26.965 mc.	27.035 mc.	27.115 mc.	27.185 mc.
26.975 mc.	27.055 mc.	27.125 mc.	27.205 mc.
26.985 mc.	27.065 mc.	27.135 mc.	27.215 mc.
27.005 mc.	27.075 mc.	27.155 mc.	27.225 mc.
27.015 mc.	27.085 mc.	27.165 mc.✦	27.255 mc.
27.025 mc.	27.105 mc.	27.175 mc.	

✦This channel shared with Class C Radio Control.

VELOCITY OF PROPAGATION

Television Cable Made With Polyethylene Dielectric

Coaxial Cable ____ 66%
Flat Twin Lead (300 ohm) ____ 82%
Tubular Twin Lead (300 ohm) ____ 84%
Free Space — Air Dielectric ____ *100%

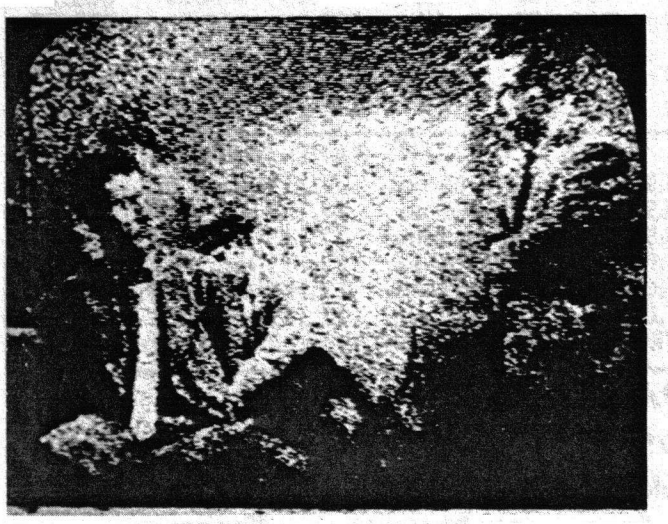
SIGNAL STRENGTH REPORTING

5 EXCELLENT
No noise visible

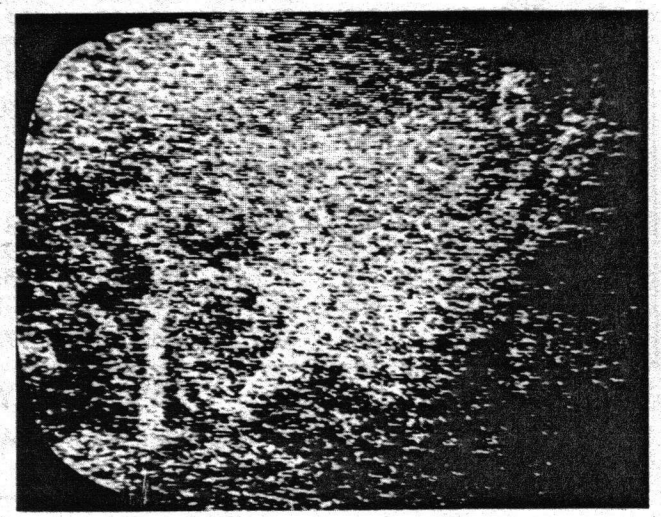
4 GOOD
Slight noise visible

3 FAIRLY GOOD
Noticeable Noise

2 PASSABLE
High noise level



1 LIMITED USE
Objectionable noise



0 NOT USABLE
Picture lost in noise

Amateur Television Magazine
PO Box 1347, BLOOMINGTON, INDIANA 47401

Simple in-line rf power indicator for 1,296MHz

A simple and reliable rf power indicator for insertion in the output line of a 1,296MHz transmitter can readily be constructed taking advantage of the microstrip technique mentioned in the tuned circuit chapter. For this purpose, good quality fibre glass double clad board is needed, one side being the earth plane and a section of the line etched on the reverse, together with the coupling loop for the indicator.

From the data given in the earlier chapter the line section may be calculated and designed for any appropriate impedance. Fig 10.111 shows details for a 50Ω line.

The insertion loss of this type of indicator is of the order of 0·5dB, and it may therefore be left permanently in circuit.

The spacing between the line and the coupling loop will need to be decided on the basis of the power (voltage on the line) expected to be used normally.

The whole assembly should be enclosed in a suitable metal box.

Although the device is defined as a forward indicator, if the connections are reversed it may alternatively be used for indicating reflected power.

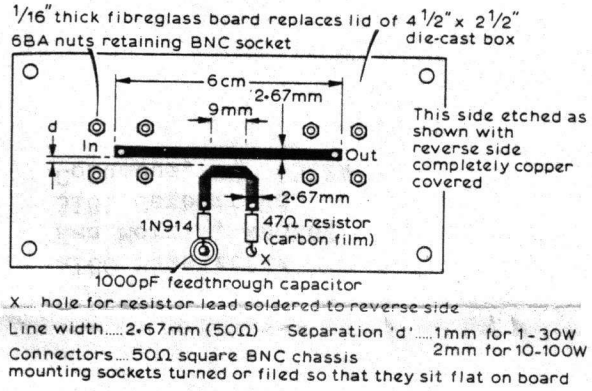
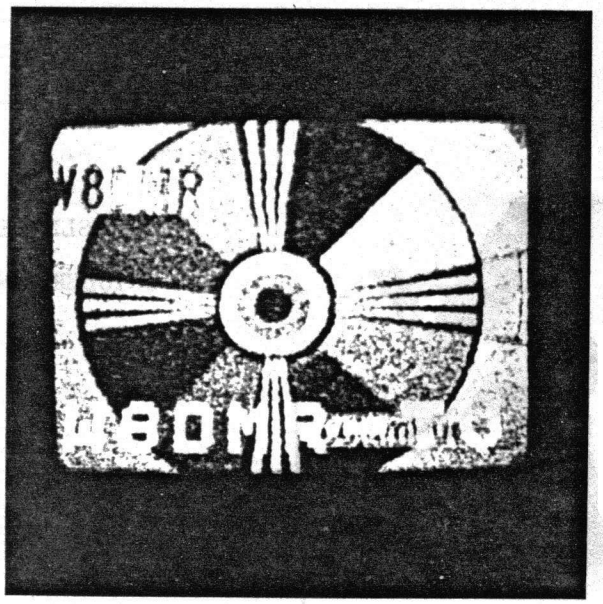


Fig 10.111. A simple forward power indicator

N8CNP AND STATION

439.25/1278.75 repeater

WA8RUT/R



...AS RECIEVED AT N8CNP's QTH

REMOVE STAPLE CAREFULLY!!!

ATCO Newsletter
Ken Morris, WA8RUT
3181 Gerbert Rd.
Columbus, OH 43224

ATCO NEWSLETTER

OCTOBER, 1983