(WESTON AUTOPATCH PROCEDURES (Continued)

tivities. Interested individuals will be provided with information on how to construct the circuitry using inexpensive, readily available parts.

The trustee and technical crew of the Weston repeater will support this activity only to the extent of providing information on how to use this alert mechanism. It is suggested that the organization of any assistance activity be coordinated with the public service committee.

Summary

Autopatch access numbers are available to any MMRA member in good standing. These numbers may be obtained from any MMRA officer, board member, or control operator by presenting the following information:

a) Call sign

b) Name

c) Membership Number

d) Expiration date

Under no circumstances are access numbers to be passed on by other than the above procedure.

The preceding procedures have been devised in an effort to provide a valuable service to MMRA members while meeting both the intent and spirit of the law. Abuse of this privilege can affect all of us.

Requests for clarifications and interpretations of these guidelines should be directed to either the trustee or technical supervisor of 22/82.

de R. W. Wilmarth
W1CMR

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10 Meter Summer DX: As thin as the honeopathic soup that was made by boiling the shadow of a pigeon that had been starved to death!

Cheers to MMRA high scorers W1FM, N1HR, K1MEM in both C.W. and Phone ARRL S.S. last November.

REPEATER UPDATE

Anyone listening to 61 during the past year will agree things have been running very smoothly. Improvements to the equipment have included a new preamplifier and a sharper IF filter. These additions have improved an already great receiver. The redundant repeater control package has been delayed due to a lack of time to work on the project. Present plans are to complete it during the late summer or early fall.

Plans for the future call for a new transmitter for the old repeater and a new repeater on 220 MHz. A frequency pair of 224.44 MHz output and 222.84 MHz input has been assigned by the frequency coordinating committee. Those interested in the 220 project please let the Marlboro tech crew know. This way we can have an idea of the amount of interest. 220 is a lot like 2 meters in coverage and can be a lot of fun. We in Marlboro feel it's time the association started generating activity on the other bands. Our plans call for a Spectrum Communications SCR-1000 repeater for now and an RF Power Labs amplifier in the future. We figure we might as well have two high fidelity repeaters.

See you on 2 for now and 220 later,

73's de Steve K1ST
(Trustee WR1AAH)

ANNUAL AUCTION

Sponsored by SOUTH SHORE AMATEUR RADIO CLUB, Braintree, Mass. June 3, 1979; 2 to 6 PM at the Viking Club, 410 Quincy Avenue, Braintree. Flea-market (weather permitting), 10 AM to 2 PM in Viking Club Parking Lot. $3 for space and own table(s). (15% Club Commission on Auction items only.)

TECHNICAL ARTICLES

CONNECTORS FOR

ONE INCH LOW LOSS UHF COAXIAL CABLE

Recently, large quantities of "1 inch" CATV cable have become available from various sources, at modest prices, from tag-end to full reel lengths up to 2400 feet. The cable is illustrated in Figure 1, below.

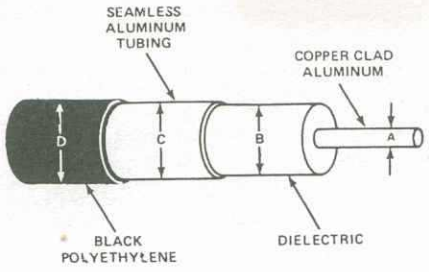


FIGURE 1. 1 INCH "HARDLINE" CATV CABLE.

Table I describes electrical characteristics and physical properties. The former make it very attractive for amateur VHF-UHF - applications, particularly for long, or very long, transmission line feed runs.

DIMENSIONS Metric System	CONSTRUCTION			DIMENSIONS U.S. System
5.766 mm	A — Conductor - Solid Bare Copper Clad Aluminum	O.D.	Nom.	.227"
22.606 mm	B — Insulation - Extruded Foam Polystyrene	O.D.	Nom.	.890"
25.4 mm	C — Shield - Aluminum, Seamless Tubing	O.D.	Nom.	1.000"
28.448 mm	D — Jacket - Polyethylene, Extruded Black	O.D.	Nom.	1.120"
	PHYSICAL PROPERTIES			
	Max. Pulling Force		575 Lbs.	
	Min. Bending Radius		10 X Cable O.D.	
640.7 Kgs/Km	Wt. Nom.			430 Lbs./1000'
Vp - .92	ELECTRICAL CHARACTERISTICS			Zo ≈ 75 Ω
@ 20°C (attenuation varies ± 2% nom. per 10°C variance in ambient)	0.26 db per 100 Mtrs.	Max. Attenuation at 5 MHZ	0.08 db per 100 Ft.	@ 68°F (attenuation varies ± 1% nom. per 10°F variance in ambient)
	0.66 db per 100 Mtrs.	Max. Attenuation at 30 MHZ	0.20 db per 100 Ft.	
	0.85 db per 100 Mtrs.	Max. Attenuation at 50 MHZ	0.26 db per 100 Ft.	
	1.94 db per 100 Mtrs.	Max. Attenuation at 216 MHZ	0.590 db per 100 Ft.	
	2.05 db per 100 Mtrs.	Max. Attenuation at 240 MHZ	0.625 db per 100 Ft.	
	2.15 db per 100 Mtrs.	Max. Attenuation at 260 MHZ	0.655 db per 100 Ft.	
	2.21 db per 100 Mtrs.	Max. Attenuation at 270 MHZ	0.675 db per 100 Ft.	
	2.30 db per 100 Mtrs.	Max. Attenuation at 300 MHZ	0.702 db per 100 Ft.	

TABLE I. TYPICAL 1 INCH CATV CABLE DATA.

This article suggests some of the cable's less desirable features and some ways to circumvent the latter. The cable's major drawbacks are "handling" at less than 75°F (where it has the ductility of gas-pipe), relatively large minimum bend radii, and, most of all, the expense of commercial end connectors.

Figure 2 pictures, from left to right, a commercially available end connector which can be bought for about the indicated cost, an amateur connector design in the raw, and finally, the amateur design in a moisture-proofed final configuration. Relative costs for the two designs have been displayed for emphasis.

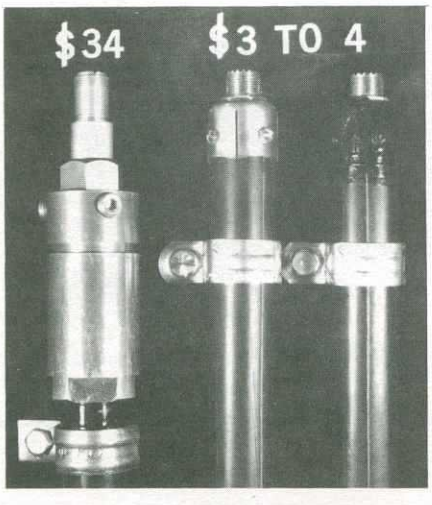


FIGURE 2

For the obvious reasons of cost, and (to this writer, at least) because of the relative bulk of the commercial connector, the amateur design was evolved to be fabricated with fairly common, available, materials and, to a large degree, common hand tools.

Other major considerations in the amateur design were no electrolytic action between dissimilar metals, resistance to moisture penetration, and minimum "discontinuity bumps" in line impedance introduced by the connector. These are considered as achieved objectives, in actual use.

Table II lists materials needed for the amateur design:

TABLE II - MATERIALS LIST

1 ea. #4-40 x 1/2" B. H. or R. H. nickelplated screw
1 ea. #83-378 Bulkhead UHF female receptacle (Amphenol)
1 ea. Copper End Cap for 1" Rigid Copper Water Tubing
4 ea. #6 x 1/4" S. S. Hex-head sheet metal screws
1 ea. Bottle Liquid Tape, 2 fl. oz. (G. C.)
1 ea. End of CATV cable to attach to connector

Figure 3 illustrates the raw parts needed for the suggested amateur design, denoted as "A, " "B" & "D, " "C, " and "G. " Figure 3 also suggests not only the steps of physical assembly, but interrelated with the text, the features and mechanics of fabrication, treatment, and parts usage to the point of final assembly as shown at the right hand side of Figure 2.

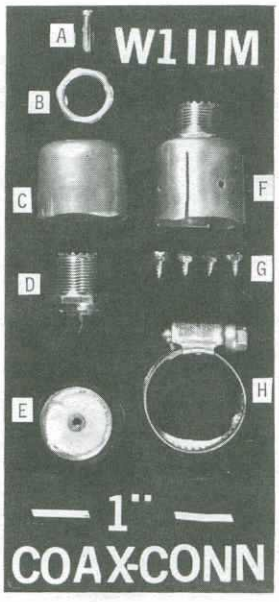


FIGURE 3

The tools required should be available to the average ham, his circle of ham buddies, or rentable from local tool outlets. They are listed below in Table III.

TABLE III - TOOL REQUIREMENTS

1 ea. 1" Tubing Cutter for copper or aluminum
1 ea. Fine Tooth Hack Saw blade and frame
1 ea. 3" Vise
1 ea. 1/8" wide flat-blade screwdriver
1 ea. Fine, Flat, File
1 ea. Bernzomatic Torch or 150 watt Soldering Iron
1 ea. Center Punch
1 ea. Electric Drill with 1/4" or 3/8" Chuck
1 ea. #4-40 Tap and Tap Wrench

1 ea. 5/8" O.D. Greenleaf Socket Punch

1 ea. #1/4-20 Machine Bolt, Lockwasher, Nut

1 ea. #12 S.S. Compression Hose Clamp

1 ea. Drill Bits, H.S., #42, #33, #29, 1/4" (0.250")

1 ea. Wrench, open, box or socket, for 1/2" bolt head

1 ea. Piece Steel Wool

1 ea. 10" - 24" corrosion-proof rosin solder

FABRICATION

1. Using a tubing cutter make a cut through the black vinyl jacket and seamless aluminum jacket about 6 to 10 inches from the (possibly moist) end of the cable; then fine-hacksaw through the dielectric and inner conductor, as flush with the outer surfaces as possible, and so as to produce a flat, square, cut. Blow or brush away any aluminum chips from the dielectric surface. (See "B" of Figure 1.)

2. By the best means available, find the precise center of the outer face of the copper pipe cap, center-punch it, and drill through it at that point with a #42 (0.0935") sharp drill. Remove any burrs from the inside of pipe cap. Force the pipe cap on firmly over the square end face of the cable as the latter is shown in "E" of Fig. 3.

3. If possible, clamp the cable in a vise, vertically, and using the pipe cap center hole, very carefully, drill a #42 size tap-hole straight down 1/2 inch into the copperclad center conductor of the cable. (For quantity jobs, get a machinist friend to make up a drill guide as shown in Fig. 4.)* Then tap the center conductor for the #4-40 screw, removing chips from the tap and the hole after each half turn of the tap.

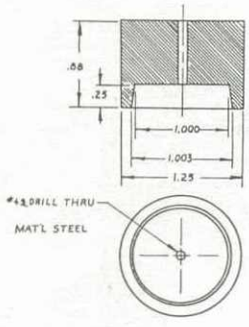


FIGURE 4

*Use of the drill guide requires temporary cut and removal of about 1/4" of the black polyethylene jacket to allow the guide to slip down over the aluminum jacket, (c), of Figure 1.

4. Remove the hex nut and lock washer from the bulkhead connector (#83-879) and discard the lock washer. Mount the connector upright in a vise, and carefully drill down from the top, through the solder tip, with a #33 (0.113") drill. Set connector with its (now) short tip aside.

5. Reduce the head diameter of a #4-40 x 1/2" screw to about the same O.D. (see "A," Fig. 3), as the male tip of a PL-259 plug, by "chucking" the screw in a drill and rotating the head against a fine, flat, file, for a final O.D. of 0.150".

6. Using another #4-40 screw to temporarily block the tapped hole of the center conductor, liberally coat and seal the face of the dielectric, outer conductor, and black jacket of the cable against moisture with "GC" liquid tape or equivalent material.

7. Drill out the hole in the face of the pipe cap to 1/4", and using an upside down 1/4 inch bolt and nut to secure the cap in a vise, make four fine hack-saw cuts at 90°, about 3/4" down from the lip of the cap (see "F" of Figure 3). Between slots, drill 4 #42 holes about 1/4" back from the same lip, about 90° from each other.

8. Remove the cap from the vise, and remove the now superfluous 1/4" hardware. Insert a 5/8" diameter Greenleaf punch, with its 1/4" bolt, tighten, and punch a clean 5/8" hole in the copper cap face.

9. Burnish the cap surface with steel wool, insert the body of the bulkhead receptacle from the inside of the cap, and tighten the flat nut (see "F" of Figure 3). Then, with a Bernzo-matic torch and minimum flux, solder the flat nut to the cap surface, with care given to filling the void on the flat, keyed, side of the receptacle body.

10. Insert the #4-40 screw, threads down, in the female flange fingers of the receptacle, push the cap-connector assembly down on the face of the coax, and tighten the #4-40 screw into the tapped center conductor. Slip the #12 hose clamp down over the cap to the lip of the cap, tighten it as a holding tool, and very carefully drill through the guide holes in (a) the copper cap, (b) through the black jacket and (c) just deep enough to puncture the outer seamless aluminum jacket of the coax, using the #42 (0.093") drill. Carefully enlarge the 4 copper cap holes with a #29 (0.140") drill, just enough to allow the #6 x 1/4" sheet metal screw shanks (see "G" of Figure 3) to pass through the cap material. Then install these screws, firmly, hand-tool tight, through the cap, vinyl, and into the outer aluminum jacket of the coax.

11. Remove the #12 hose clamp. Check for any possible shorts or high leakage from the inner to outer conductor. If all is well, coat the body of the cap, hex-head screws and junction of vinyl jacket, using Liquid Tape, "Tool-Dip," heat sensitive wrapping tape, or 1 1/2" heat-shrink tubing treated with the torch, keeping the connector O.D. threads nice and clean.

Notes: Metal to metal contacts will be reasonably non-electrolytic, i.e., silver plated connector (inner) to stainless #4-40 to aluminum inner conductor, and stainless sheet metal screws from copper cap to aluminum jacket. The nominal impedance of the completed connector seems about 65 ohms, and will show a small "bump" at 146 MHz. For matching considerations using 50 ohm or 75 ohm sources and loads see References 1-4.

1.	QST	July 1978	Page 14
2.	QST	April 1976	Page 34
3.	H.R.	Sept. 1978	Pages 28 & 31
4.	RSGB VHF-UHF	1976	Page 7.7

Many thanks for help on this project to W1SCS, W1WME, K2TJZ, K1MOQ, W1TXK, WA1YRQ, and W1IBF.

de Jack, W1IIM

TECHNICAL TOPICS

A SHORT THING ON TV

K1LJN - Mike

This article was originally going to be just a short piece including a block diagram of a circuit I put together to decode encoded TV signals. In talking to many of my fellow MMRA members at the February meeting, I felt the need to expand things because most of us have no background in any kind of TV! With that in mind, here is a quick review of basic TV for North America. (TV systems differ in other areas.)

The system used in North America is called N T S C (stands for National Television Standards Committee, or some such). The system has 525 lines per picture, and approximately 60 pictures per second. To take advantage of how we see, the system is set up so it sends all the oddlines (1, 3, 5, 7, etc.) called Field One, and then all the even lines (2, 4, 6, 8, etc.)Field Two.

In order to help your TV set keep track of where it should be painting a picture, mixed in with the picture are syncronizing pulses. These 'sync' pulses come in two varieties called H and V. H sync comes at the end of each line (or the start of each line, depending how you look at it), and V sync comes at the end of each Field (or the start).

So the basic TV signal is composed of V sync, H sync, and video (Video is the picture information, that is: black, grey, less grey, white).

OK! Now we have the basic signal to send pictures, but how do we make a radio signal out of it? That was the hardest job of the NTSC. Even though some folks think NTSC stands for "Never Twice the Same Color," the committee did do a fine job. (The original stuff was put together in the 30's.) Video goes from black to white and in between and stuff (grey). Should white be more modulation or black?? Should a burst of static or noise show up as white or black? That's the real question. They decided to make black up, so noise is black (makes it hard to see). The system is still the same today. It's set up as follows:

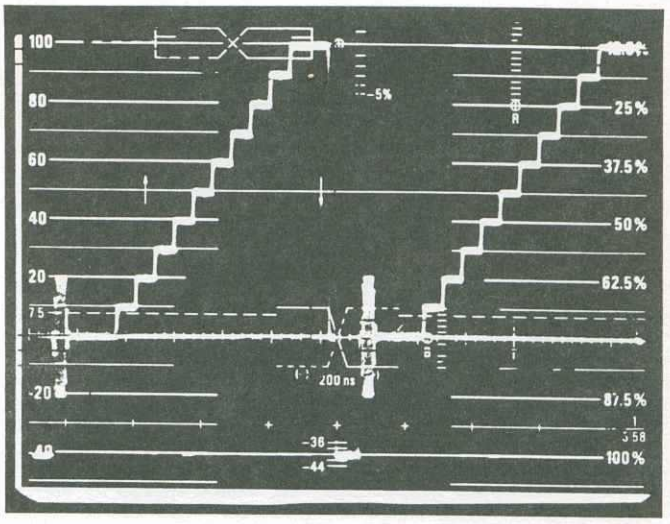
1. White is equal to 12.5%
2. Black is equal to 75%
3. Sync is equal to 100%

Fig. 1 is a scope pix of a line, sync pulse, and a line. The signal is called 'Ten Step.' At the bottom center is the sync pulse at 100%. Then moving to the right we go from black through greys to white at 12.5%.

Your TV set knows all about these different levels and can break up the composit signal into video, H, and V, putting each in the right place. The TV set looks at the flat part of sync to know where to set the Auto Gain control. It can use it since the relationship between sinc and video is fixed and known.

Enough about this basic picture stuff, how about the sound you ask? Well that is really simple. The sound is sent on another transmitter which is adjusted to 4.5 Mhz higher in frequency than the Pix transmitter. The sound is done by FM rather than by AM like the pix. This helps keep the pix from getting into the sound. There are also filters to keep sync out of sound since there is so much of it.

Next time we will see how a TV signal might be goofed up to make it hard to receive without a special black box. (Continued in next issue)



THOUGHT for the DAY

WRITING ARTICLES FOR INTERMOD

Got an idea you want to share with others? Perhaps you'd like to comment on a new piece of gear you picked up at the convention or give advice on how to chase DX. How about the young ladies in the MTARA - must be something you would like to say about the OM's weird operating habits or the latest recipe that turned out to be disastrous.

Intermod is your voice. We have 280 some odd members, many of whom get on the radio and swap yarns. These stories could be of a lot of interest to our readers. Yet, the number of articles and letters coming in are a bit scant, indicating shyness or perhaps a measure of mystery about the whole process, so here's how.

Writing an article for Intermod is easy as pie. You simply sit down with a pad of paper and a pencil and tell a story as you might verbally tell it to a friend. Don't write an essay, don't worrv about punctuation, spelling, or form, just simply put it down the way it comes to mind. It is completely unnecessary to type the script unless you have a terrible hand. If you type it, that's fine, too; but we retype it anyway, so as I say, don't worry about it. Also, it doesn't matter if it's long or short as long as it's a good tale.

You can send your article at any time to me, W. J. Hall, R. F. D. #1, Box 77, Brimfield, Mass., and it will get into the next issue of the newsletter.

Without your contributions, Intermod is going to get skinnier and skinnier, because I am fast running out of ideas. I am an amateur at it like anyone else and my resources, like the well at my QTH, can dry up when it is over used.

Congratulations to the staff of Zero Beat for being awarded the honor of being the best newsletter in New England at the October convention. The HCARA has always had class! W1JP

[EDITOR'S NOTE: The above article appeared in INTERMOD - the Newsletter of the Mount Tom Repeater.]