

HEATHKIT DEMODULATOR PROBE

Model #337-C

The #337-C Demodulator Probe greatly extends the usefulness of any oscilloscope. It provides a means of showing modulation envelopes of RF or IF carriers as found in radio and television receivers. Thus the oscilloscope can be used as a signal tracer, a gain analyzer and an alignment indicator. Many other uses will become evident as the user becomes more familiar with the characteristics of the probe and oscilloscope combination.

A well shielded probe with the detecting elements contained in the housing is necessary for satisfactory indications at high RF frequencies. The Heathkit #337-C Demodulator Probe meets these requirements. Input leads are extremely short in order to eliminate extraneous signal pickup which can give false readings. The metal probe housing is grounded to prevent hand capacity effects from causing deflection of the trace. Etched circuit wiring cuts down circuit capacity, improving high frequency performance.

The input capacitor is rated at 500 volts DC and the probe should not be applied to circuits where DC voltages higher than this are found. AC or RF voltages in excess of 30 volts RMS should not be measured as damage to the crystal diode may result. However, the probe can be connected to high voltage points in a unit, such as the plate of a tube, as long as the DC voltage present does not exceed the 500 volt DC limit.

PARTS LIST

<u>PART No.</u>	<u>PARTS Per Kit</u>	<u>DESCRIPTION</u>	<u>PART No.</u>	<u>PARTS Per Kit</u>	<u>DESCRIPTION</u>
1-20	1	10 K Ω resistor	343-2	1	Shielded test lead
1-23	1	27 K Ω resistor	345-1	1	Flat braid
21-11	1	150 $\mu\mu\text{f}$ condenser	390-13	1	Label
21-14	1	.001 μfd condenser	438-13	2	Banana plug
56-26	1	Crystal diode	459-2	1	Red probe tip end (tapped)
70-4	1	Acetate insulator sleeve	459-3	1	Black probe tip end (not tapped)
85-3	1	Etched circuit board	476-8	1	Aluminum probe body
250-355	4	Sheet metal screw	477-3	1	Solderless phone tip
260-1	1	Alligator clip	331-6		Solder
340-2	1	Bare wire		1	Instruction sheet (See part number below.)

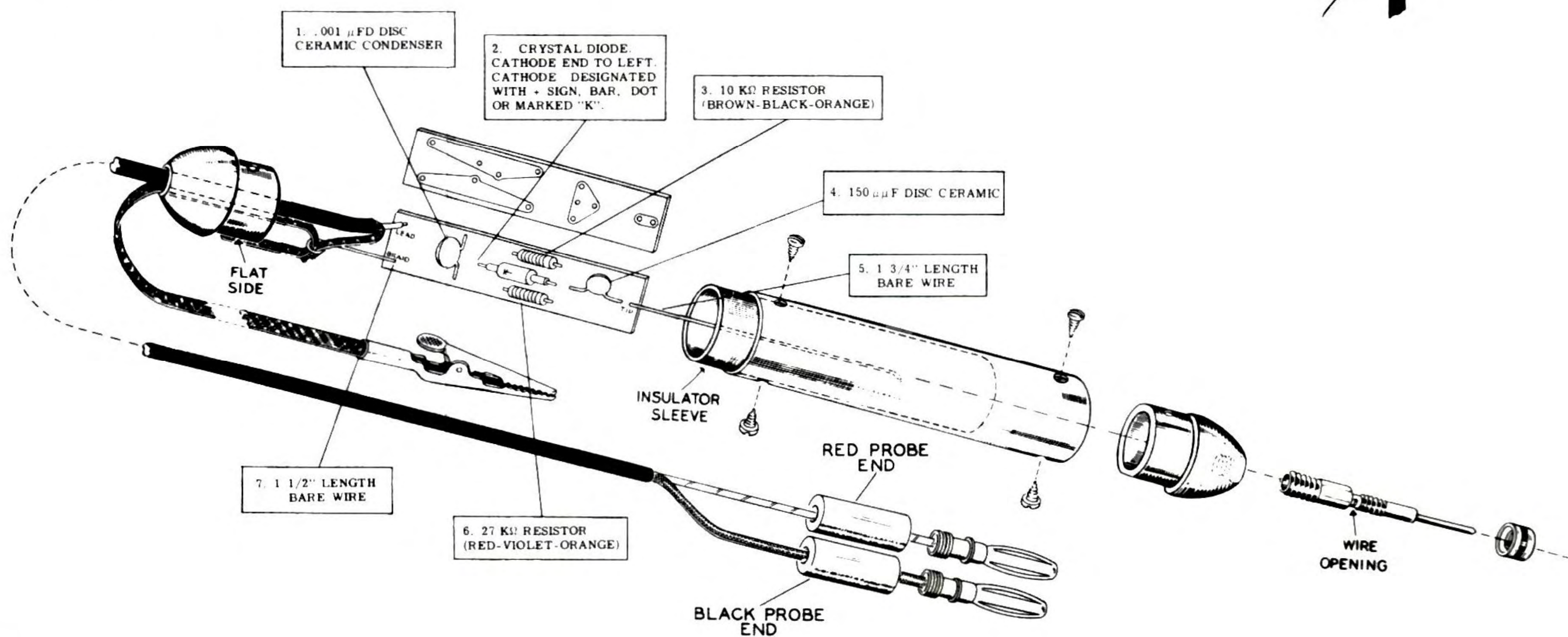
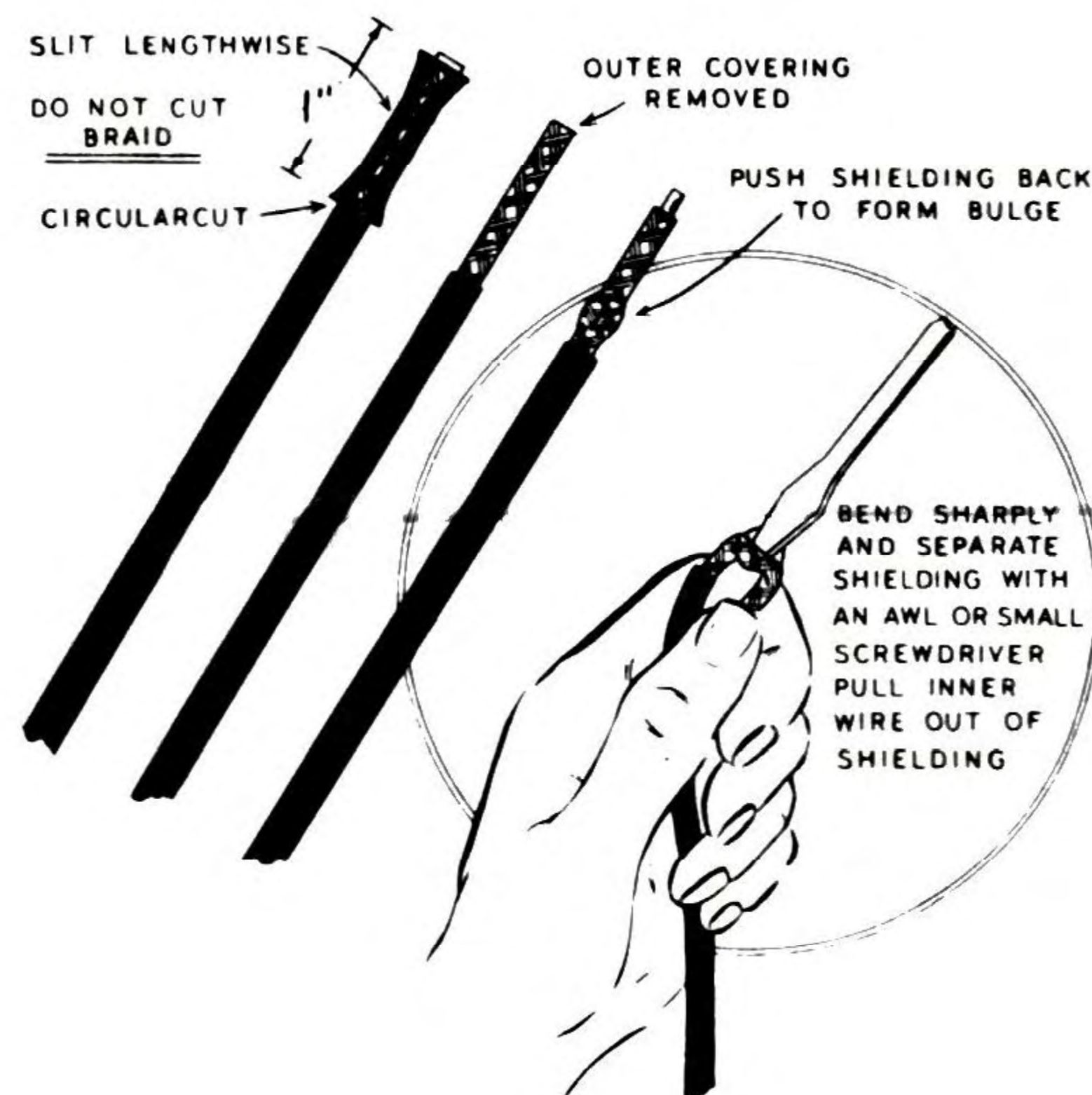
PROBE CONSTRUCTION

ROSIN CORE SOLDER HAS BEEN SUPPLIED WITH THIS KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THIS KIT. ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE ROSIN CORE (60:40 OR 50:50 TIN-LEAD CONTENT) RADIO TYPE SOLDER.

The pictorial clearly shows assembly detail of the probe and etched circuit board. Begin construction by mounting the components on the circuit board in the numbered sequence shown on the pictorial. All parts will mount on the unmarked side of the board, with their leads coming out on the etched side. Generally, it is best to mount all components before soldering, bending the leads over slightly to lock the parts in place. After all parts are secured, the board should be turned over and each lead soldered at the point where it comes through with a 25 or 50 watt soldering iron. After soldering, all leads should be clipped off.

For best soldering results, a 25 to 50 watt iron is recommended. The tip should be clean and well tinned in order to obtain a quick, clean solder joint. Hold the tip of the iron at the junction of the component lead and the etched board conductor, and apply solder at the same point until a good connection is obtained between the two parts. When all parts are clean, the connection can be made very quickly, preventing heat damage to resistors and condensers. In order to protect crystal diodes, a clamp, needle nosed pliers or some other type of heat barrier should be clamped on the diode lead between the diode and connection, on the opposite side of the board from the connection.

Place the length of flat braid and the shielded cable through the black probe end. Remove 1" of black outer insulation. Push the braid back until a bulge develops near the end of the outer insulation. Bend the end over, poke a hole in the shield braid and pull center conductor through as shown. Bend the flat braid and shield braid back together over the flat portion of the probe end and solder together. Make sure that the two braids are as flat as possible or it will be difficult to install the probe body.



Fit the insulator strip tight against the probe end and solder the shield lead coming from the circuit board to the two braids near the center conductor. Cut the center conductor to a length sufficient to reach the hole marked "lead." Strip away 1/8" of insulation and solder the center conductor at this point. Cut off all excess wire at this end.

Prepare the probe body by inserting the large sleeve. Slip the entire assembly over the circuit board and rear probe end and secure with two sheet metal screws. Install the phone tip in the red probe end and remove the collar. Insert this end into the probe body, making sure that the lead from the circuit board tip appears through the hole at the side of the tip. Secure with the remaining sheet metal screws. Wrap the wire around the tip in the space provided and reinstall the collar. Solder an alligator clip to the end of the flat braid.

At the opposite end of the cable, strip away 3" of black outer insulation. Prepare as before. Install the banana plugs, with the probe ends, on the center conductor and shield as shown. This completes the assembly of the Demodulator Probe.

USE OF THE PROBE

Standard RF signal tracing techniques can be observed using the oscilloscope and Demodulator Probe. RF and IF signals can be traced from the second detector of the unit in question back to the mixer and antenna circuits. The probe can be applied to the grid and plate of each stage without the necessity of using isolation capacitors, etc. It must be remembered that the sensitivity of the probe is limited by the characteristics of the oscilloscope and it will be difficult to obtain adequate indications in low level circuits. However, strong signals will usually be evident from the grid of the first IF stage to the second detector. Indications in the first stages may require the use of a signal generator to provide adequate signal level. Television sweep alignment procedures are made easier by use of the probe, for it is possible to check waveforms at different points in the IF circuits as well as the overall bandpass characteristics in tuners and boosters.

SPECIFICATIONS

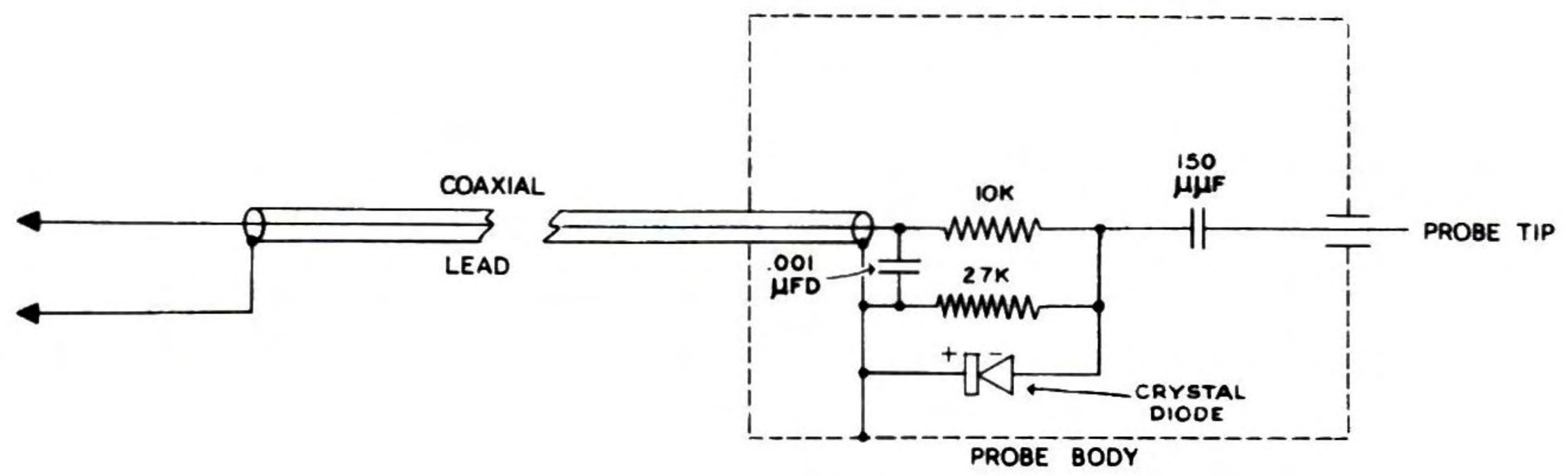
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WARRANTY

The Heath Company warrants parts in its kits for 90 days after shipment. Under this warranty, we will exchange any defective part returned prepaid within the 90 days. If a part is defective, its replacement is shipped prepaid by us anywhere in the continental United States or to APO and FPO addresses. Shipments to all other areas are FOB factory. Heath's obligation is limited to such replacement or repair by Heath, and Heath is not responsible under this warranty or otherwise for any consequential damage or other loss in connection with the purchase, assembly, or use of the kit or parts. Use the Parts Order Form in the kit to notify us of the defective part and return instructions will be sent to you, or contact any Heathkit Electronic Center.

Questions relating to repairs or warranty replacement in the continental United States (APO and FPO included) should be addressed to Heath Company, attention: Customer Relations, or the nearest Heathkit Electronic Center. In all other areas please contact the authorized Heathkit representative in your country, or Heath Company, attention: International Division.

HEATH COMPANY
Benton Harbor, Michigan 49022



**SCHEMATIC OF THE
DEMODULATOR PROBE #337-C**

REPLACEMENT PARTS PRICE LIST

<u>PART No.</u>	<u>PRICE Each</u>	<u>DESCRIPTION</u>	<u>PART No.</u>	<u>PRICE Each</u>	<u>DESCRIPTION</u>
1-20	.10	10 KΩ resistor	459-2	.15	Red probe tip end (tapped)
1-23	.10	27 KΩ resistor	459-3	.10	Black probe tip end (not tapped)
21-11	.10	150 μμf condenser	476-8	.40	Aluminum probe body
21-14	.10	.001 μfd condenser	477-3	.15	Solderless phone tip
56-26	.30	Crystal diode	331-6	.15	Solder
70-4	.10	Acetate insulator sleeve			
85-3	.25	Etched circuit board			
250-355	.05	Sheet metal screw			
260-1	.15	Alligator clip			
340-2	.05/ft	Bare wire			
343-2	.10/ft	Shielded test lead			
345-1	.10/ft	Flat braid			
390-13	.10	Label			
438-13	.20	Banana plug			

The above prices apply only on purchases from the Heath Company where shipment is to a U.S.A. destination. Add 10% (minimum 25 cents) to the price when ordering from a Heathkit Electronic Center to cover local sales tax, postage and handling. Outside the U.S.A. parts and service are available from your local Heathkit source and will reflect additional transportation, taxes, duties and rates of exchange.