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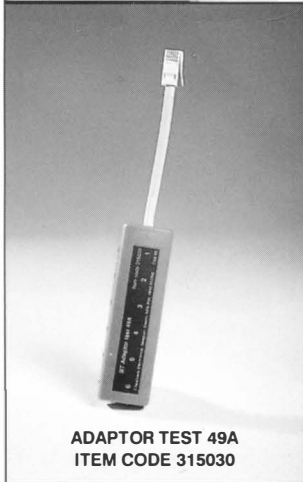
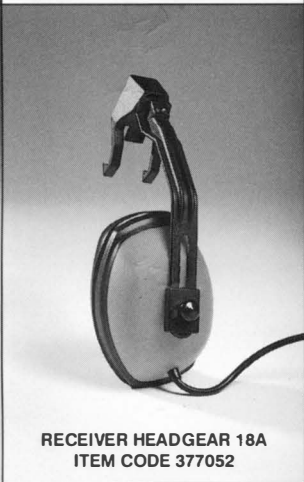
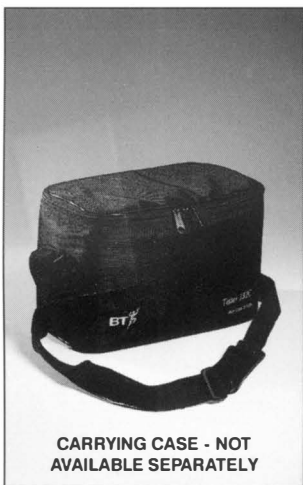


TESTER 132C OPERATING INSTRUCTIONS



**CHESILVALE
ELECTRONICS**

TESTER 132C OPERATING INSTRUCTIONS



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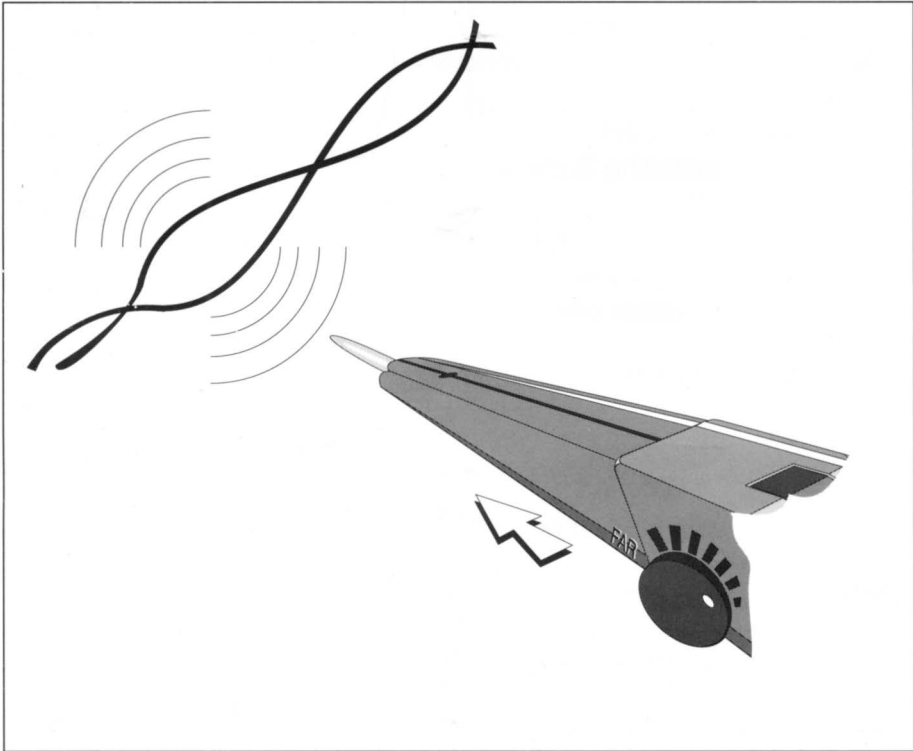
CONTENTS	PAGE
PRINCIPLES OF CABLE PAIR TRACING	
How cable pair tracing works	2
BASIC FUNCTIONS	
Oscillator 87G	4
Installing Batteries	4
Battery low	4
Making line connections	4
Adjustment	5
Operation with a headset	6
Amplifier 109H	
Installing Batteries	7
ON/OFF control	7
Sensitivity adjustment	8
Battery low	8
Headset operation	9
CABLE-PAIR TRACING TECHNIQUE	
Operation	10
Verification	11
Power-hum pick-up	12
USING TESTER 132C WITH OTHER EQUIPMENT	13
TROUBLESHOOTING GUIDE	14
CARE AND MAINTENANCE	15

PRINCIPLES OF CABLE PAIR TRACING

How cable pair tracing works

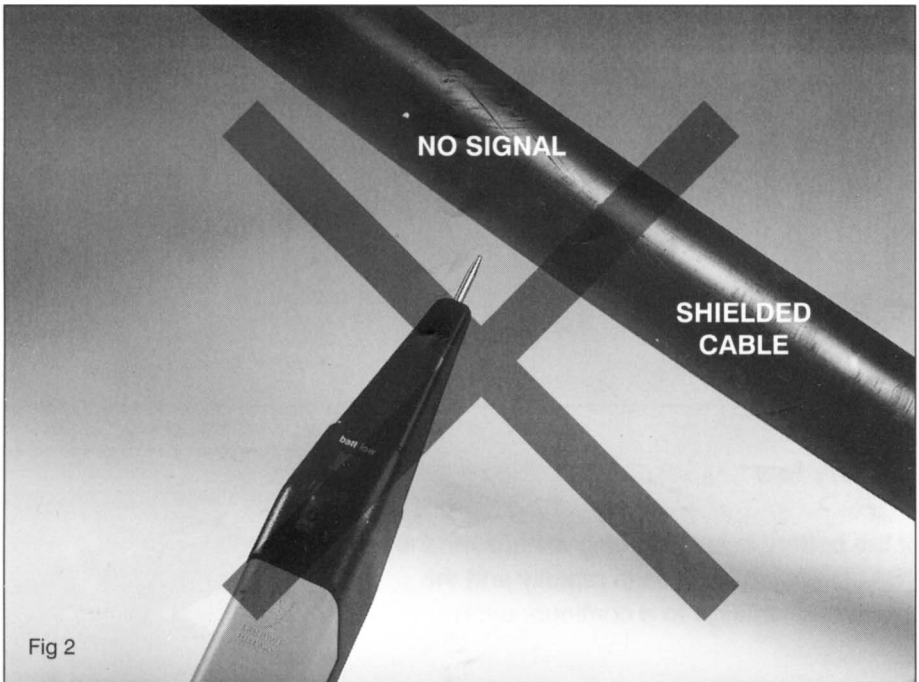
Non-contact cable pair tracing is far quicker than any other method for identifying circuits within a cable. Applying an audio frequency tone to the cable pair allows the tone to be identified at a remote location with a very high-gain probe.

Theoretically, if the cable pair is perfectly balanced then *no signal at all* will be radiated from it. As perfect balance is impossible some signal is emitted and the voltage (electrostatic) field around the cable pair may be detected up to several centimetres away. The signal will become stronger as the probe tip approaches the cable pair.



PRINCIPLES OF CABLE PAIR TRACING

Electrostatic signals will be short-circuited by any metallic barrier connected to ground and large bundles of wires will tend to obscure the signal. The greatest selectivity is therefore achieved by separating the cable pairs as much as possible at the fan-out and only trying to trace cable pairs where they emerge from a grounded shield.



Low frequency operation is chosen deliberately. The tone will not crosstalk onto another pair unless the cable is seriously faulty and the tone will not jump across a break in one or both wires. It is possible therefore to trace pairs on new and faulty cables.

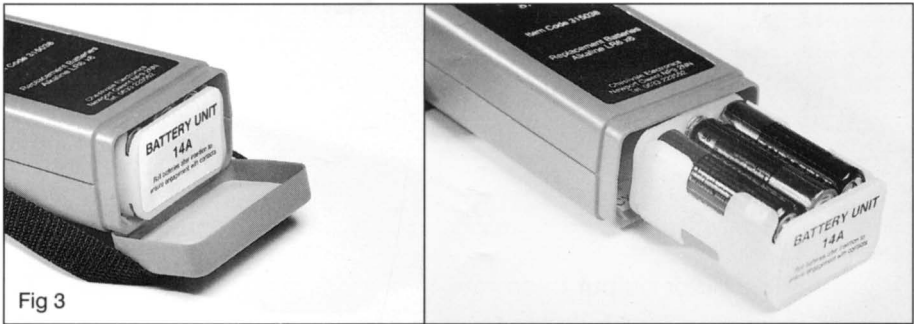
Amplifier 109H uses a click generator to indicate the strength of the received signal. The choice of this technique is deliberate and offers far more discrimination between pairs than the amplitude level change of the original tone. Every click is at maximum amplitude and it is the *repetition rate* that indicates the strength of the signal.

As with a Geiger counter, the click rate increase means a stronger signal.

BASIC FUNCTIONS - OSCILLATOR 87G

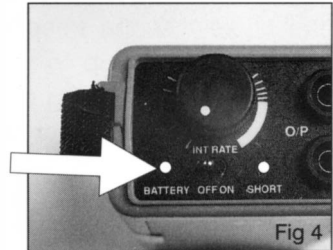
Batteries

Pop open the base of the Oscillator and remove the battery magazine. Load the magazine with 6 AA cells, ensuring that the cells are correctly inserted as shown by the symbols in the holder. Replace the magazine ensuring that it aligns with the contacts in the housing and snap-on the lid. Do not use rechargeable cells - if short-circuited they may cause overheating and possibly fire.



Battery low

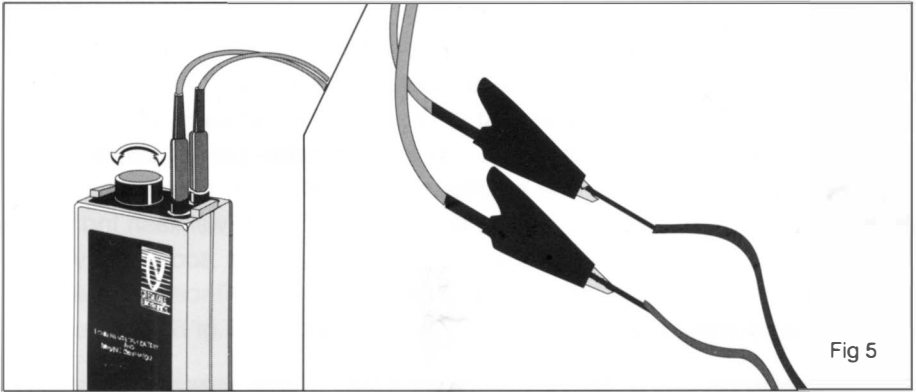
If the battery is approaching exhaustion the "BATTERY" LED will flash rapidly and the output will change to a continuous tone.



Connections

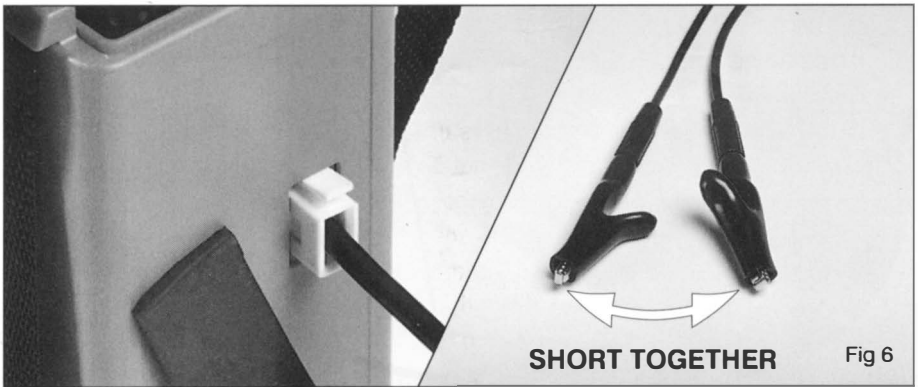
Ensure that the circuit to be traced is not in use and that it is disconnected. Connect to the uninsulated ends of the wires of the pair to be traced. Switch on the oscillator and check that the BATTERY indicator LED flashes slowly. If it flashes rapidly the batteries will need to be replaced within 2 hours. When the battery low indication is active the oscillator will transmit a continuous tone as a remote indication of failure. Check that the "SHORT" LED is not flashing before attempting to trace a pair. If it is the circuit will be impossible to trace because the pair is short-circuited.

BASIC FUNCTIONS - OSCILLATOR 87G



Adjustment

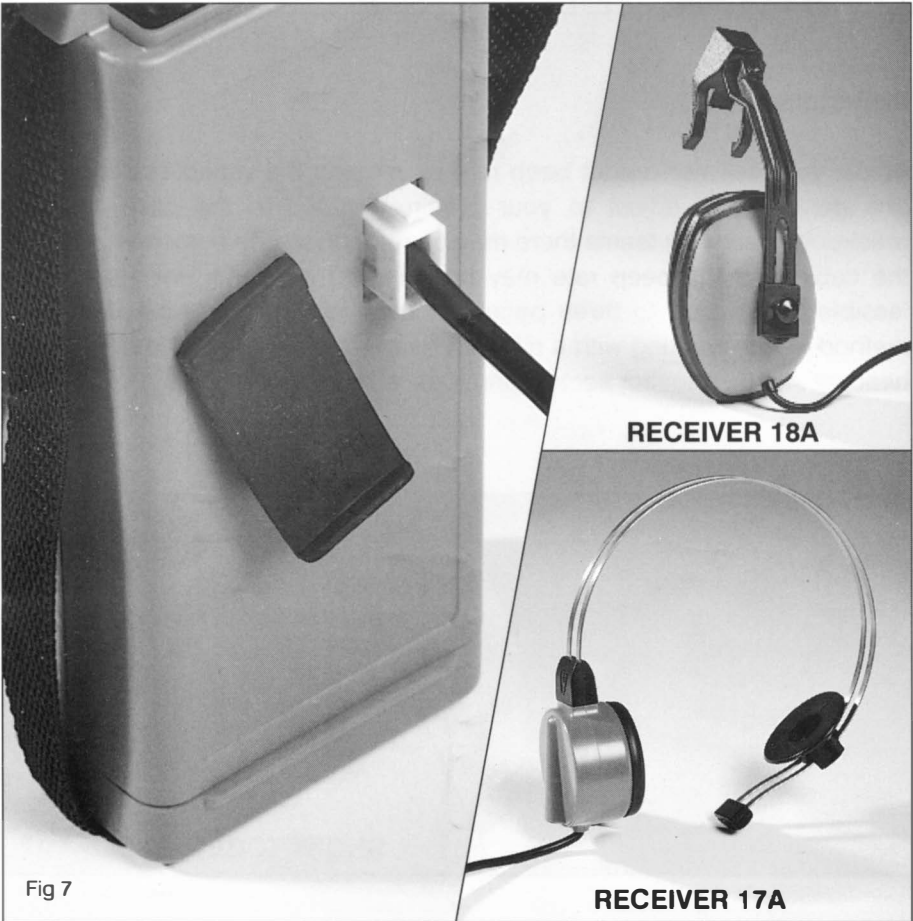
Adjust the oscillator output beep rate by rotating the variable control. For one person use, adjust to your preferred rate. In the case of cable breakdown recovery teams there may be more than one person working on the cable and the beep rate may be adjusted differently for each. It is feasible to have up to three people at each end of the cable using this method - each working with a different beep rate. To check the rate, plug a headset into the monitor socket, and loop the output terminals.



PRINCIPLES CABLE-PAIR TRACING

Headset

In two-person operation it is desirable but not essential to use a headset. It is normal for the person at the detecting end to short-circuit the cable-pair to identify the correct circuit. This test is useful at the oscillator end to signal that the cable pair has been found. When the cable pair is shorted, at a distance up to 2.5km from the oscillator, the confidence tone heard in the headset will increase substantially and the "SHORT" LED will flash indicating that the pair has been found. The headset socket is accessed via the rubber stopper. Replace the stopper when not in use. Receiver Headgear 17A or 18A (supplied with Tester 132C) or Headset No 7A or 8A are suitable.



BASIC FUNCTIONS - AMPLIFIER 109H

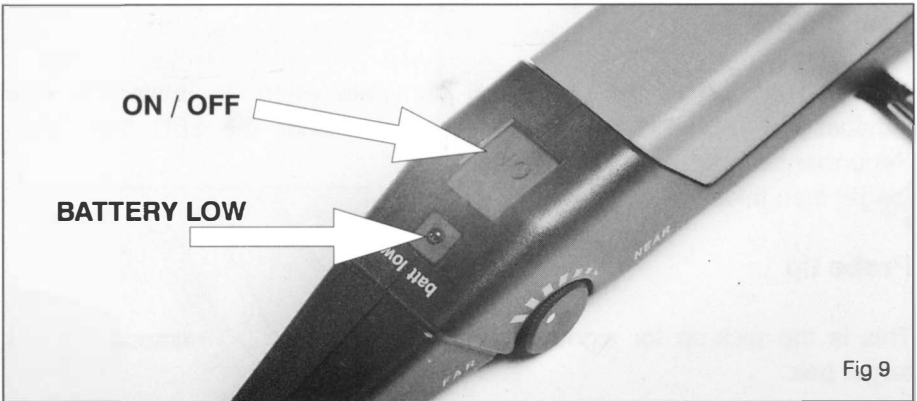
Install battery

Install a 6LR61 (PP3 type) battery by sliding back the yellow cover. Connect the battery to the flying lead and insert into the compartment ensuring that the wires are placed under or in front of the battery. The amplifier may switch-on as the battery is connected.



ON/OFF control

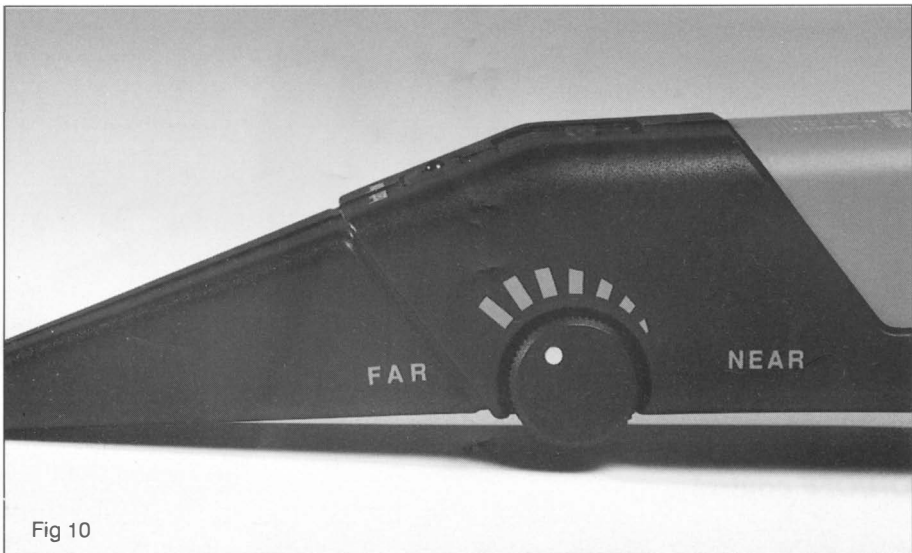
Press the button on - top once for ON and again to switch OFF.



BASIC FUNCTIONS - AMPLIFIER 109H

Sensitivity control

Note that the sensitivity control is marked NEAR and FAR. The FAR setting is high gain and is used to approximately locate the position of the pair. The sensitivity control must be adjusted towards the NEAR setting as the probe tip is brought closer to the pair. Do not confuse this control with a volume control. ***If too much gain is used the signal will appear everywhere and will be very difficult to localise.***

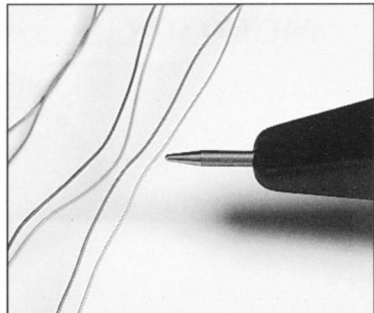


Low battery

The LED on top of the probe will illuminate when the battery is near exhaustion. About 1-2 hours use remains after the LED first lights. Performance may be erratic if used for longer than this.

Probe tip

This is the pick-up for signals from the target pair.



BASIC FUNCTIONS - AMPLIFIER 109H

Headset

If preferred, the headset socket may be used with Receiver Headgear 17A, 18A (both included in Tester 132C) or Headset No 7A or 8A. The original tone will be heard - not the clicks generated by the loudspeaker. In situations where there is strong interference from power cables, headset use is likely to be preferable.

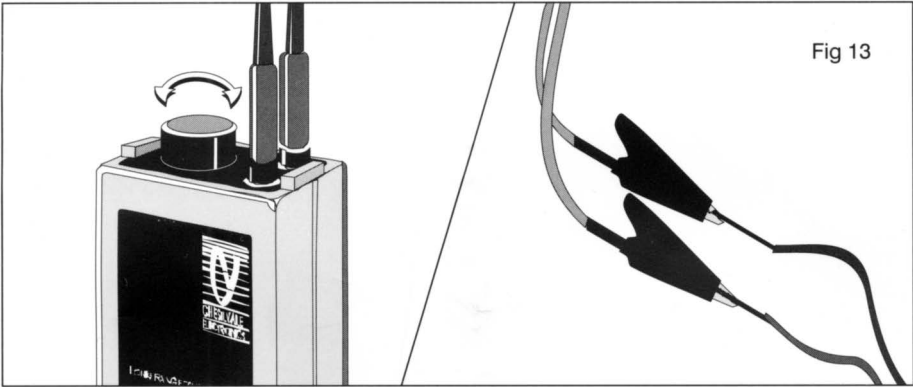


When the headset is plugged in the loudspeaker will continue to click at a low rate as a reminder that the amplifier is switched on. (Otherwise you might not be aware of this once you have removed the Receiver Headgear and the battery would discharge)

CABLE-PAIR TRACING TECHNIQUE

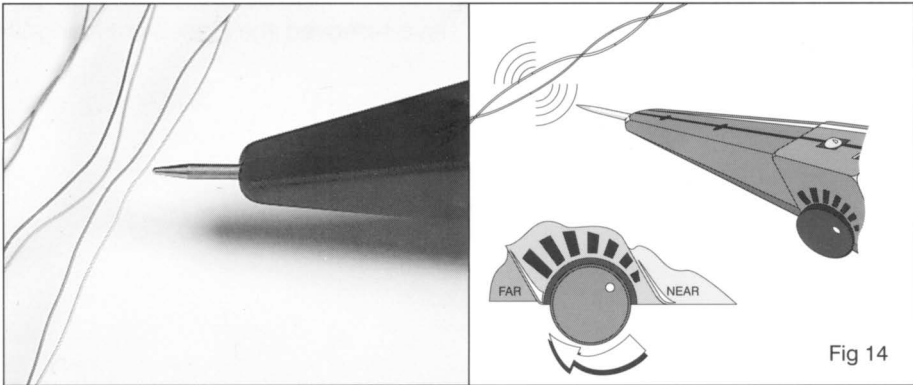
Operation

Connect the oscillator to the pair of wires to be traced and suitably adjust the beep rate.



At the locating end, set the probe to medium gain - midway between FAR and NEAR and pass the tip around the cable or up and down the connection block, looking for a peak signal.

Adjust the sensitivity control a little lower towards NEAR and repeat the search closer to the identified area. Repeat until the probe is very close to a small group of pairs.



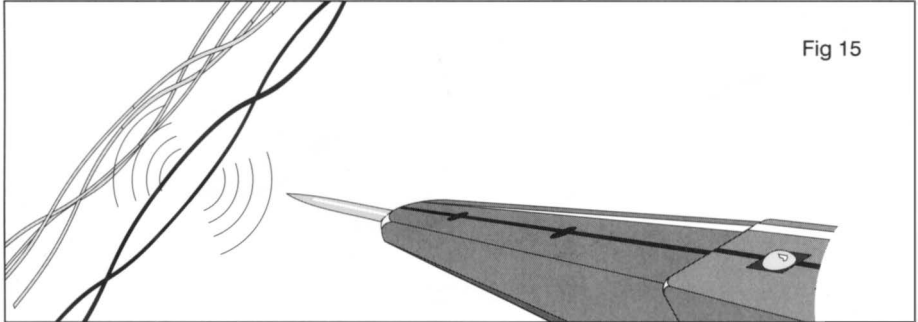
If possible, spread the suspected pairs apart and test each one.

BASIC FUNCTIONS - AMPLIFIER 109H

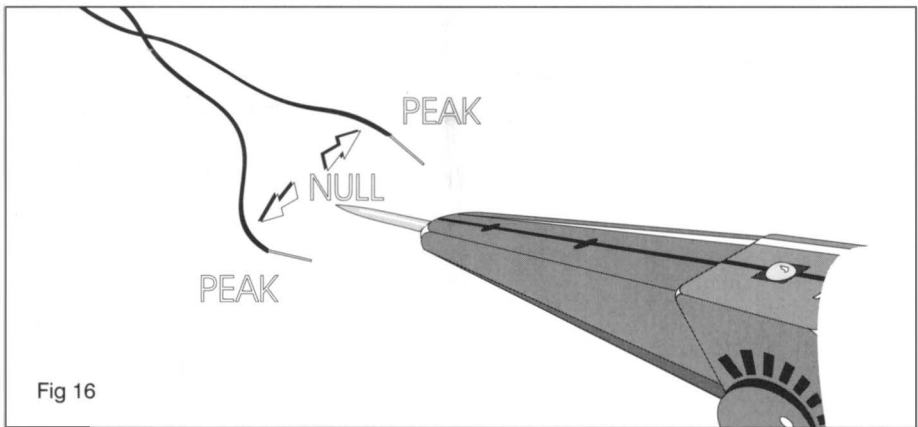
Verification

Final proof of a correct search uses one of three verification methods.

Method 1. By signal strength - one pair has a much stronger signal than the others. Copper contact gives the strongest signal. (a low gain setting is required to discriminate this way - adjust towards NEAR).

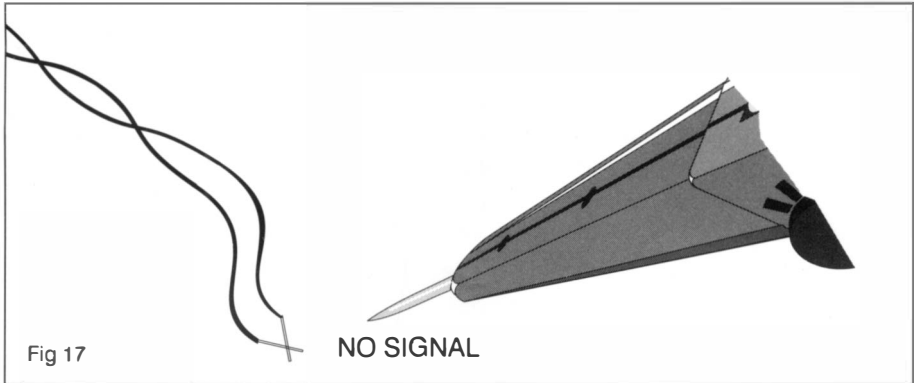


Method 2. Spread the wires of the pair apart and hold the tip vertically above the pair. Swing the tip between one wire and the other - each should produce a peak and there should be a null or zero at the centre. If the pair will not null then the pair may be split (one wire on each of two pairs) or one wire may be disconnected.



CABLE-PAIR TRACING TECHNIQUE

Method 3. (always used for two persons working). Short the pair, with the probe tip held close by. The signal should disappear totally if the pair has been correctly traced. This will also send the "SHORT" indication to the oscillator operator. If the pair does not verify correctly it may be the wrong pair, a split pair, or a faulty pair.



Power-hum pick-up

Signals emitted by power cables can be very strong and despite powerful filtering may still cause problems for pair tracing operations. This is the main reason for using a beep tone output. Even when there is significant power pick-up, the beep may still be heard on top of the noise. If the interference is overwhelming, headset operation is recommended. This will allow discrimination between power-hum and the wanted tone. As a general rule, when there is power-hum, turn the gain down and work closer-in.

Fluorescent lights are severe emitters of power-hum - again the same rule applies, turn down the gain and work close to the cable.

USING TESTER 132C WITH OTHER EQUIPMENT

Amplifier 109H and Oscillator 87G are compatible with all previous generations of amplifiers and oscillators. However, the accessories of previous generations will not fit the current amplifier and oscillator. Oscillator 87G also replaces Oscillator 99 for cable tracing operations and may be used with cable tracer - Tester 453, item code 315036.

It is possible and desirable to use Amplifier 109H and Oscillator 87G with Telephone 286B (item code 377108). In cable jointing operations it is typical to set up an intercom path between the two sites with Telephone 286's set to "Intercom" mode. This way both ends can talk to each other. To avoid having to swap handsets and headset when using amplifiers and oscillators they can be interconnected with Tele286B using a Cord 2/26B (item code 512398 supplied with each Tester 132C). At each Telephone 286B the handset is unplugged and replaced with a Headset 7A (item code 375766) or helmet mounted Headset 8A (item code 375767) (neither item is included in the Tester 132C kit).

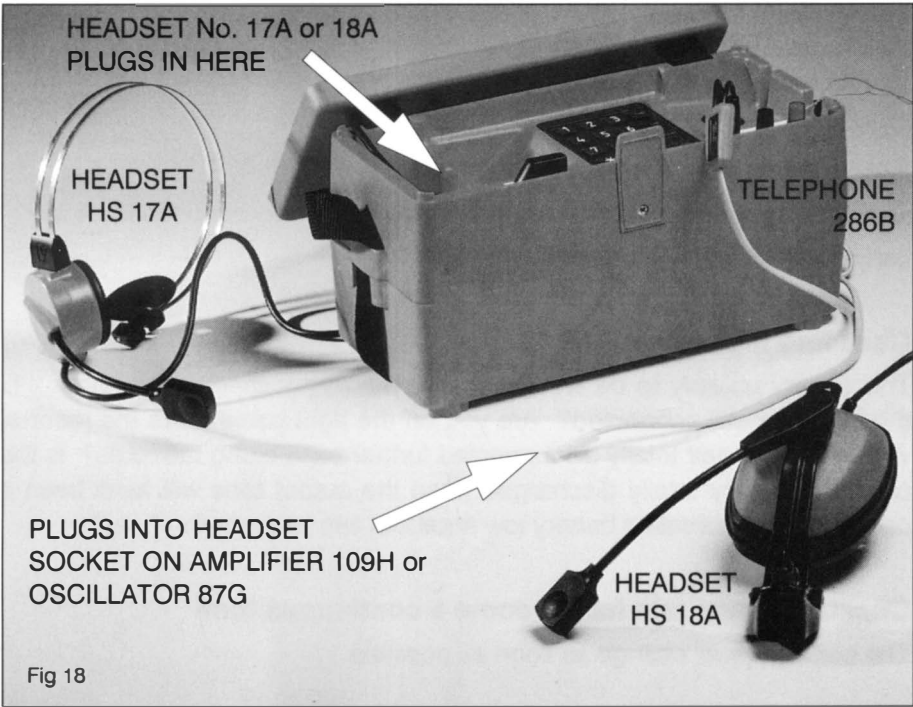


Fig 18

TROUBLESHOOTING GUIDE

Power-hum everywhere - can't find tone

Reduce the gain (towards 'NEAR') and work closer in. Listen for the beep tone over the noise. If the problem is severe use a Receiver Headgear 17A or 18A and listen to the original tone.

Tone appears everywhere - can't discriminate pairs

Reduce the gain setting. Excess gain is being used and this will cause the probe to overload.

The tone on the pair cannot be shorted or nulled at the centre of the pair

The pair is split or faulty (high resistance on one wire) or the wrong pair. Conduct DC tests to verify and check for colour code swaps / errors.

Probe is howling wildly

This is very unlikely unless the surface of the probe is covered in water - dry off and the problem should disappear.

Probe seems erratic in its performance

Check that the Battery Low is not lit and has not previously been lit. A low battery condition may cause some instability.

Can't find the tone

This is very unlikely to be an operational problem - check the obvious. Is the oscillator still connected? Are you on the right cable? Are the records wrong? Is the pair totally disconnected further back along the route? Is the oscillator battery totally discharged (if so the output tone will have been a constant tone indicating battery low for about two hours beforehand).

Oscillator beep rate has become a continuous tone

The battery is low, change as soon as possible.

TROUBLESHOOTING GUIDE

Can't hear the tone in the street

Use the headset Receiver Headgear 18A with a complementary ear defender mounted on your safety helmet. This will exclude background noise and substantially increase your reception level. However, remain aware of your surroundings as you will be somewhat isolated from them.

Can't receive the SHORT signal properly or at all on the oscillator

This technique only works up to 2.5km between site locations.

Oscillator does not work with new batteries

Check polarity in the holder and check that the magazine is inserted correctly.

CARE & MAINTENANCE OF TESTER 132C

Keep it clean

Remove dirt from the bag or instrument case with a damp cloth and some detergent. White spirit may be sparingly used on the instrument housings to remove grease. Keep the parts in the Tester 132C kitbag whenever possible.

Avoid impact and crushing

Remove exhausted batteries from the case

Do not use the amplifier probe tip as a lever

Replace rubber stoppers when not in use

If these instructions are soiled they may be cleaned with a damp cloth and soapy water.

The CE mark on this product indicates compliance with European EMC Directive 89/336/EEC.

This compliance may be invalidated if non-standard leads are fitted.

<p>USA CHESILVALE ELECTRONICS LTD. CORP 222 Antelope Drive, P.O. Box 1317 Sedona AZ 86339-1317 Telephone +1 (520) 282-6180 Fax +1 (520) 282-7270</p>	<p>EUROPE CHESILVALE ELECTRONICS LTD Unit 3, Maesglas Industrial Estate, Newport, Gwent United Kingdom NP9 2NN Telephone +44 (0) 1633-223552 Fax +44 (0) 1633 223948 e-mail 101333.324@compuserve.com</p>	<p>NEW ZEALAND CHESILVALE ELECTRONICS LTD 29 Myres Road, Manurewa Auckland 1702 NZ Telephone +64 9 2671756 Fax +64 9 2680395</p>
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