



# Locator 8A

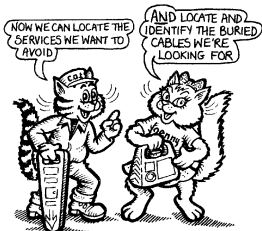
**Comprising:  
receiver 8A and  
transmitter 8A  
(C.A.T and Genny)**





# Locator 8A Handbook

1	The theory	page 2
2	The receiver 8A	5
3	Learn to locate with the receiver 8A	6
4	The transmitter 8A	11
5	Learn to apply the transmitter signal	12
6	Using the receiver to avoid buried services	16
7	Avoiding buried services continued	17
8	Locating with the receiver and transmitter	18
9	Locating metal covers	20
10	Precautions when locating buried services	22



# 1 The theory

Pipe and cable locators detect the magnetic field from the electric current flow in a cable or other metallic service. This field is called the signal.

The receiver 8A detects three different types of signal:

## P or 'power' signal

The 'power' signal radiated by loaded electric power cables and often found on other nearby metallic services.



## R or 'radio' signal

There is often, but not always, an R or 'radio' signal originating from distant radio transmitters that penetrates soil and is re-radiated by metallic services.



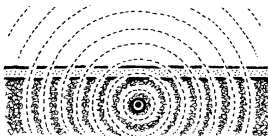
## G or transmitter signal

The transmitter 8A signal is an easily identifiable signal which can be applied to the cable or pipe.

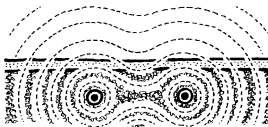


## The signal

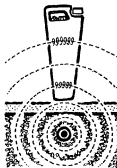
The signal has a cylindrical shape around the cable or pipe.



If two cables or pipes run parallel separate signals indicating the two services can be located.



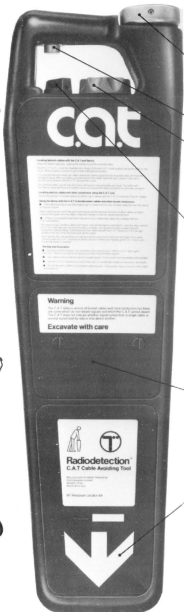
The receiver gives maximum response when it is directly over the cable or pipe with the blade at right angles so that the signal flows through the search coils.



MAKE GOOD USE OF THE GAIN  
CONTROL-IT'S THE KEY  
TO SUCCESSFUL  
LOCATING.



ALWAYS HOLD THE RECEIVER  
VERTICAL  
TO THE GROUND - THAT'S WHERE IT WILL  
FIND THE CONDUCTOR.  
**NEVER SWING IT!**



# 2

## The receiver 8A (C.A.T)

### Loudspeaker

Keep in place unless you need to unscrew it to hold it up to your ear. Always screw it back in the housing after use.

### On/Off trigger

Keep it squeezed when using the receiver.

### Gain control

Making good use of the gain control is the key to successful location. The gain control varies the volume at which you hear the signal. A weak signal requires an increase in gain and a strong signal needs a reduction. As soon as you hear a signal, reduce the gain to get a narrow positive response to pinpoint the conductor.

### Function switch

Use the function switch to choose the detection mode. There are 3 modes for locating metallic services, the **P** power mode picks up the 50Hz energy signal present on most buried power cables and often present on other nearby cables or metal pipes. The **R** radio mode detects buried metallic services as they re-radiate radio energy. These **R** signals may not be present everywhere, but they make a useful additional locating mode when they are. The **G** mode detects the special transmitter signal, if this has been applied to the metallic services or cable.

### Battery compartment

Two quarter turn fasteners open the compartment when you need to change the battery. Keep a spare battery in the space provided.

### Direction arrows

The receiver gives a maximum response when the blade is at right angles to the cable or metallic service and the arrows directly over it.

# 3 Learn to locate with the receiver 8A

## Familiarization

Find an outdoor site crossed by a single cable radiating a good **P** signal. Hold the receiver and stand to one side of the cable.

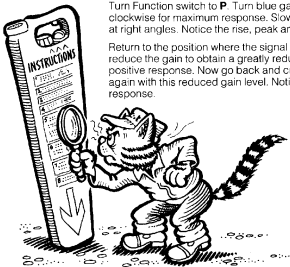


*Read instruction 1* and hold the receiver so that it is comfortable. Squeeze the trigger to make the receiver locate.

*Read instruction 2.* Make sure you recognize the battery test bleep. Learn how to change the battery. Make sure the receiver is loaded with a spare battery.

Turn Function switch to **P**. Turn blue gain control fully clockwise for maximum response. Slowly cross the cable at right angles. Notice the rise, peak and fall of the signal.

Return to the position where the signal was highest and reduce the gain to obtain a greatly reduced but still positive response. Now go back and cross the cable again with this reduced gain level. Notice the narrow response.





Make another crossing and reduce the gain to find out how narrow you can make the response. Remember to keep the blade vertical: no swinging. Make a number of crossings and learn the technique of starting with maximum gain and then reducing it to obtain a narrow response directly over the cable.

Adjust the gain to give a narrow response and make a crossing inching slowly forward. And then another moving briskly. Which gives the clearer response? Yes, the brisk movement.

Go directly over the cable and turn the gain control to maximum. Now imagine the receiver as a pivot and rotate it through  $90^\circ$ , another  $90^\circ$  and then another  $90^\circ$ . The receiver gives a maximum signal at right angles to the cable and a minimum signal in line with it. So: the receiver tells you *two bits of information at the same time*: position of the cable and its direction.



### Pinpointing

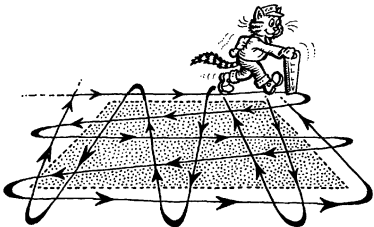
Read instruction 5. This is *pinpointing* a cable: locating the exact position of the cable and defining its direction. Practice until you are confident you can pinpoint.

### Tracing

First read the two paragraphs of instruction 6. Tracing is easy with the receiver because it indicates the direction of the service. As you trace, move the receiver from side to side in front of you keeping the blade vertical.

### Sweeping

A third technique will also be useful: *sweeping*. It is useful when you need to locate buried plant in a given area. Sweep until you find a cable or other metallic service. Pinpoint and trace it and then complete the grid sweep to find if other services are present.



### General

The technique for using the receiver to pinpoint, trace or sweep in the **R** and **G** modes is the same as the **P** mode.

In congested areas tracing should be done using the **G** mode once a transmitter signal has been applied to the cable.

Control the gain level with care when cables or services radiating the same signal are close to each other. If they are too close they radiate a single signal and cannot be located separately.

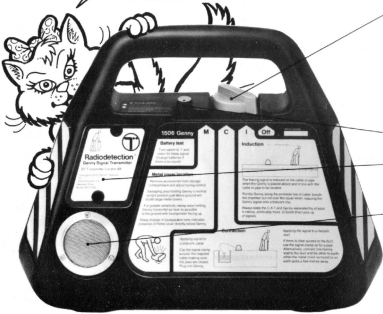


If there is serious interference it will often be possible to reduce the gain to lose the interference but still keep the signal. If the interference is very bad it may be necessary to switch out of the **P** mode into the **R** or **G** mode.

The receiver will not receive signals through metal covers which act as a screen to the signal. But there should be no problem receiving signals through concrete reinforcing mesh.



THE TRANSMITTER APPLIES A DISTINCTIVE IDENTIFIABLE SIGNAL TO A CABLE SO IT CAN BE LOCATED AND TRACED USING THE RECEIVER.



**Radiodetection**  
 Gemmy Signal Transmitter  
 97 Frequency - 1.44 MHz

**1008 Gemmy**

**Battery Test**  
 Turn switch to "1" and  
 press the battery signal  
 button to determine if  
 power is on board.

**Metal object location**

Remove all electrical items from storage  
 compartment and adjust frequency control  
 to 1.44 MHz.

Hold the transmitter in one hand and  
 sweep the antenna over the ground with  
 the other hand.

For greater sensitivity, sweep areas holding  
 Gemmy transmitters or use the pointer  
 in the ground with background tracing. A  
 sharp change in background tone indicates  
 presence of metal cover, identify Gemmy.

**Induction**

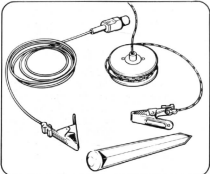
The hearing signal is induced in the cable or pipe  
 when the Gemmy is placed about one foot with  
 the cable or pipe to be located.

Put the Gemmy along the probable line of cable, locate  
 the transmitter, but not over the cover when inducing  
 Gemmy signal into induction pipe.

Please note the O.A.T. and Gemmy receptivity of most  
 metals, preferably those, if used that take up  
 programs.

**Response for signal to a receiver**

If there is noise coming to the Gemmy  
 use the higher number on the scale.  
 Alternatively, connect your Gemmy  
 with the Gemmy and the other to earth  
 after the noise must occur and it  
 will give a few feet away.



## 4

# The transmitter 8A (Genny)

## Function switch

The Function switch has four positions:

**1 'Off'**

**2 'I' induction**

Induces the transmitter signal onto a cable through up to 1.5m (5ft) of soil.

**3 'C' connection**

Applies the transmitter signal directly to a cable through the connection leads or signal clamp.

**4 'M' metal cover location**

In this mode the transmitter becomes a high performance manhole cover locator.

## 'M' Control

The 'M' control tunes the Genny for metal cover location.

## Battery

Undo the two quarter-turn fasteners for access. The battery needs replacing if there is no positive signal with switch turned to **I**.

## Loudspeaker

Bleep signal indicates if battery is OK when switched to **I**. A change in the loudspeaker tone indicates that the transmitter signal has been successfully applied to the cable in Connection mode. The loudspeaker tone also serves as a reminder to switch off after use.

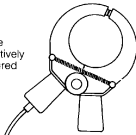
## Storage compartment

The storage compartment is opened by a quarter-turn fastener and contains: Connection lead for connecting the transmitter signal directly to the cable, 10 metre earth lead on a spool and a stake for making an earth connection to provide a return path for the signal. There is also storage space for the signal clamp.

## Signal clamp

(Inductor coil 238A)

The signal clamp applies the transmitter signal very selectively to a particular cable. If required the clamp can be fitted to extension rods for clamping around overhead wires or around cables in chambers.



## 5

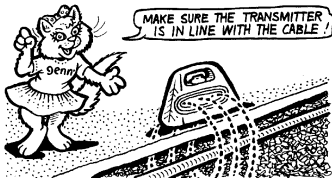
## Learn to apply the transmitter signal

Take the transmitter to a straight length of buried cable.

Always check the battery has enough power. Turn the switch to **I** and replace battery if there is no bleep signal.

### Induction

Induction is a convenient and quick way of applying the transmitter signal to a cable. It is often the only possible way but, because you can't see to identify the cable and because you may induce the signal onto more than one cable, it should only be used if connection or clamping are not possible.



Place the transmitter directly over and in line with the cable. Turn the function switch to **I**.

Ask someone to take the receiver about 15 metres away from the transmitter and pinpoint the line of the cable.

Check that the receiver is receiving the transmitter signal from the cable; make sure the receiver is not receiving any signal directly from the transmitter by reducing the gain.

Now move the transmitter out of line with the cables and notice how it affects the strength of response in the receiver. Now try offsetting the transmitter from the cable and again notice the change in response from the receiver. Recognise the importance of placing the transmitter correctly over the cable.

The transmitter Induction signal radiates into the atmosphere as well as onto the conductor and will be picked up by the receiver if it gets too near the receiver with the gain too high. By reducing the receiver gain carefully it should be possible to receive the transmitter signal from the cable only and reject it from the atmosphere when the receiver is only 4 or 5 metres from the transmitter. Practice using the receiver to locate the cable about 5 metres from the transmitter.



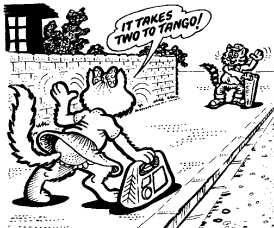
It is usually possible to induce a signal onto a mains cable at the bottom of a street light or at some other place where the pipe or cable enters the soil. Be sure to adjust the transmitter position to get the best possible application of signal.

Never place the transmitter on a cover. Always place it over the cable before it enters or after it leaves the chamber.

Precise positioning of the transmitter and receiver is important in congested areas. You may find that keeping the receiver stationary and inching the transmitter sideways will help discriminate between two services or cables.

### Transmitter and receiver sweep

Sweeping with the transmitter and receiver is a useful technique to check if any cables not radiating **P** or **R** signals are present in an area. Two operators about 12 metres apart, one with the transmitter switched to **I** and the other with the receiver on **G** with maximum gain, cross the area in parallel. The transmitter induces a signal onto any cable or service directly below it and



these are then detected with the receiver. Always keep the receiver at right angles to the line of the transmitter to pick up the signal. The technique is easy and effective to use after a little practice.

### Using the signal clamp

This is the most convenient way of applying the transmitter signal to working or dead cables, with a diameter up to 75mm (3"). The cable must be earthed at both ends.

Plug the clamp lead into the socket in the transmitter storage compartment and turn the function switch to **C**.



Put the clamp round the cable to be traced and make sure the jaws are closed round it. The cable will now be carrying the transmitter signal and can be traced with the receiver.



## Connection

Connection is the best way of applying the transmitter signal to a cable, you see what you are connecting to and are sure of its identity.

Plug the connection lead to the socket in the storage compartment and use the clip to attach the lead to the cable.

Fit the earth lead to the green socket in the storage compartment and the clip to the earth spike hammered into the ground 3 or 4 metres away. Alternatively attach the clip or magnet to the frame of adjacent box or to a metal fence post, but not to another pipe or cable.

Make sure each crocodile clip or magnet is making a good electrical connection. If necessary clean off rust, paint or scale to ensure a good connection.

Turn the transmitter switch to **C**. Listen to bleep signal. Withdraw one of the leads from the transmitter and listen for change of tone. Sharp tone change indicates successful application of the transmitter signal to the cable. Unchanged tone indicates that the signal is not getting onto the cable and it will be necessary to check the metal to metal contacts of the clips to the cable and to the earth point. Replace the lead in the socket and use the receiver to trace the cable. Keep the receiver away from connection and earth leads.

Sometimes the earth connection may apply the transmitter signal to other services or to buried concrete reinforcing bars. These unwanted signals can be eliminated by reducing the Receiver Gain Control to a level just sufficient to obtain a response from the cable being traced.

On no account may direct connection be made to anything other than B.T. plant.

## 6

## Using the receiver to avoid buried services

Always locate and mark the position of buried cables before excavation.

Follow the routine outlined in Sections 4 thru 7 of the receiver instruction panel.

Define the area to be excavated and 'sweep' in the **P** search mode across the area following the grid pattern of Section 4.

Turn gain to maximum; but then reduce if there is a blanket signal across the site.

Make the sweep in two directions and be sure to extend the sweep beyond the edges of the area to be excavated.

Stop when there is a response indicating a buried cable and 'pinpoint' the cable. 'Trace' it out of the excavation area.

Resume sweeping where you left off and continue to follow the grid pattern.

Check if the **R** signal is present; a response over the known position of a main telecom cable will confirm. If it is present the receiver should locate cables that do not radiate a detectable **P** signal, so repeat the grid sweep in the **R** search mode.

Make sure that all buried cables crossing the excavation area have been well marked so that they can be seen when excavation begins.

Local knowhow, plans or knowledge about the presence of buried cables and services always helps with locating work; they indicate what to expect. But only trust your own findings.

LIKE I SAID EARLIER,  
USING THE GAIN  
CONTROL IS THE KEY  
TO SUCCESSFUL  
LOCATING.



# 7 Avoiding buried services continued



## Using the transmitter with the receiver

The receiver sweep should locate the main cables. However some house connections, streetlight cables or metal pipes may not have a detectable **P** or **R** signal.

If you suspect any of these unlocated services may be present across the excavation site, apply the transmitter signal at a nearby point where the service comes above ground.

If there is a metal street light or illuminated sign use the magnet to connect the transmitter to the metal support. If this is not possible, induce the transmitter signal and trace with the receiver to check if the cable crosses the excavation area.

Induce the transmitter signal at each side of any nearby covers and trace with the receiver.

Do a transmitter and receiver sweep if you think unlocated services may still be present in the excavation area.

## 8

## Locating with the transmitter and receiver

Procedures for locating and identifying buried cables and services are different in a city centre location, a spread out suburban area or in a confused industrial site.

However there are several rules that always apply:

- 1 Identification is an important part of positive location. This means applying the transmitter signal to the cable or service at an access point where it can be identified with certainty.
- 2 Sweeping with the receiver in its **P** or **R** mode indicates the position of buried metallic services. Their identity should then be checked by applying a transmitter signal and tracing it.
- 3 Where possible, 'direct connection' or 'clamping' is preferable to 'induction' for applying the transmitter signal.
- 4 If certainty of the cable or service identity is vital, go through normal location procedure and then reverse the procedure by applying the transmitter signal to the cable or service and tracing it back to the original point of application.

### Cables

'Clamp' the transmitter signal to the cable.

If possible, clamp round cables in a jointing chamber or joint box.

If there is no access point for applying the transmitter signal, do a **P** (and **R**) sweep with the receiver; when it locates a cable, induce a transmitter signal and trace the cable to a point where it can be identified. Reverse the process to be certain of identity.

If the cable or service cannot be found in the **P** or **R** search modes, it will be necessary to do a transmitter and receiver sweep to find it and then induce a transmitter signal to it so that you can trace its position.

## Elimination

If you are unable to identify the service you are looking for make a receiver sweep or a transmitter and receiver sweep across the area and mark the position of all the services that are located. Trace them back to a point where they can be identified and mark each service with its identity: Telecom, power, water, etc., until you build up a complete picture to find the service you are looking for.



## Procedure

The above procedures are some of the more common methods of obtaining results with the Locator 8A. There are many others.

Devise your own procedure to use the Locator 8A for solving your location problem. This procedure will be a combination of local knowhow about your buried services together with the most effective way of using the Locator 8A.

## 9

## Locating metal covers

The transmitter is a sensitive yet simple metal cover locator. It will detect small metal box covers at a depth of 150mm (6") and larger covers at a depth of up to 300mm (12").

Check the battery.

Empty storage compartment.

Switch to **M** – metal cover location.

Adjust **M** tuning control situated next to the function switch. Turn control fully counterclockwise. Then rotate control clockwise until high pitch loudspeaker tone is obtained. Continue to rotate slowly to give a null signal and then just out of the null to a slow low growl signal.

For locating large metal covers hold the transmitter in normal upright position and sweep area. Hold the transmitter as near to the ground as possible.



The transmitter is most sensitive when held on its side with the loudspeaker facing up. Small covers should be located with the transmitter used on its side. Always sweep with the transmitter as near to the ground as possible.

There is a sharp change in loudspeaker tone when the transmitter is directly over the buried cover.



If necessary check tuning is correct by using the transmitter to locate a metal cover that is visible.

It may be necessary to reset the **M** tuning control if the mode is used for any length of time.

Note that the transmitter is designed to be a metal cover locator and not a metal locator.

When the transmitter is switched to the **M** mode but has not been tuned, the speaker will bleep once every few seconds. This is to remind you that the Genny is on and using up its batteries.

# 10

## Precautions when detecting buried services

### Separation distance

During the 'radial' search the distance between the transmitter and receiver should be kept constant if possible but narrow roads, parked vehicles, or other obstructions may make it necessary to vary this separating distance. When this occurs, the signal will increase or decrease accordingly. Do not confuse the effect with the sudden increase or decrease of signal caused by crossing over a service.

### Routes of services

When a service is detected, do not assume that it follows a straight path between the transmitter and receiver.

For example, at the initial detection, a service may appear to run diagonally across a road. With further tests it may be found that the route follows the line of the road for some metres and then turns through a right angle before crossing the road. To confirm this, trace the route for a short distance moving the transmitter and receiver one at a time to find the line of maximum signal.

### Diameter of services

A Locator can indicate the centre line of a service quite accurately, but cannot determine its diameter. For this reason do not excavate with power tools within 0.5 metres of the indicated line of a service unless the diameter of the service is known.





---

## **Electrolocation**

Electrolocation Limited  
Western Drive  
Bristol BS14 0Z  
England  
telephone (0272) 839581  
telex 44806 Locate G

