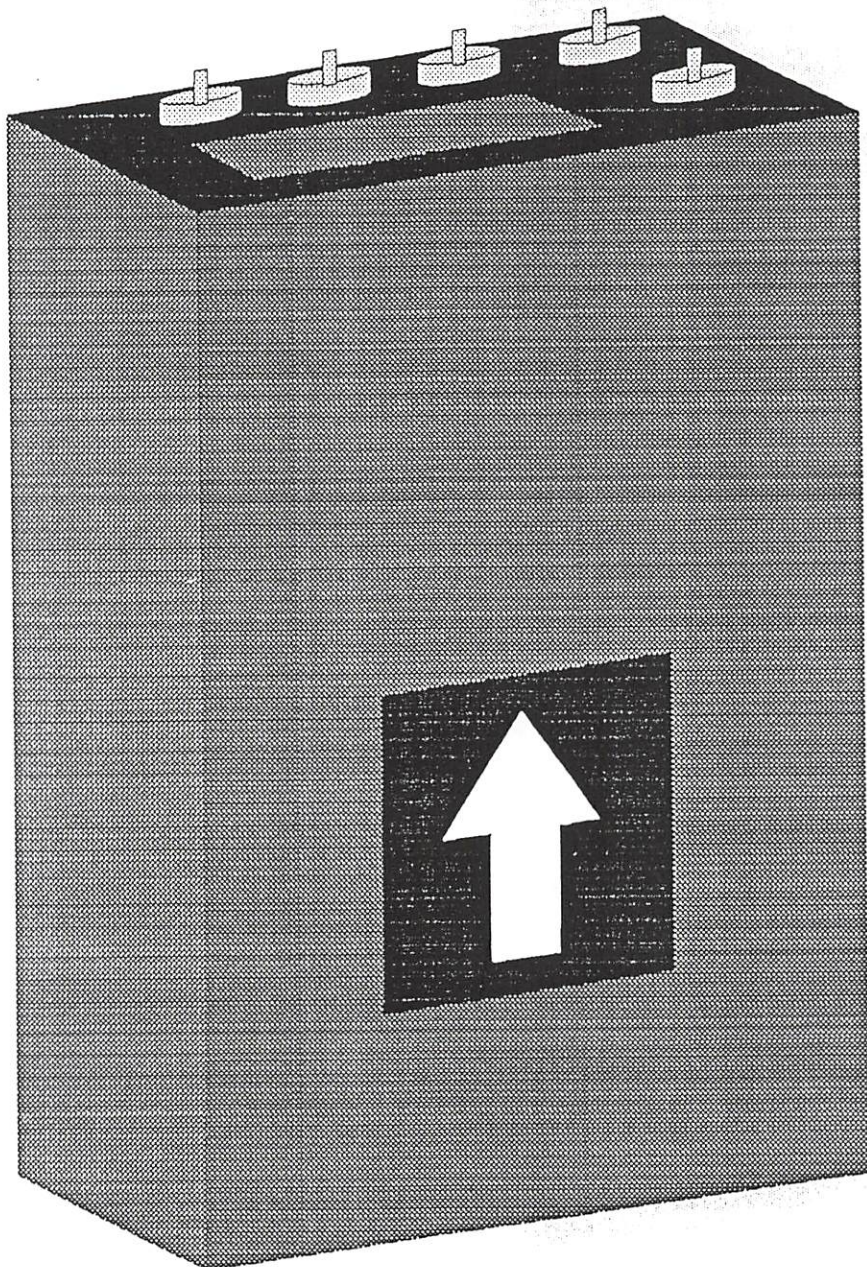


PET

Performance Enhancer for Tracker

Confidential Data Sheet for Official Users Only



The Datong Performance Enhancement for Tracker (PET) unit, when connected to the DF4 direction finding equipment, will improve the system performance in the presence of multipath.

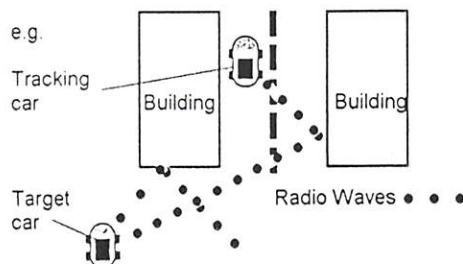
The PET unit employs sophisticated processing algorithms and extra sensors which stabilise the bearing indication of the Tracker, without decreasing its response time to actual changes in bearing caused by the tracking car's motion.

Installation and operation of the unit is remarkably simple.

What are reflections?

In an ideal world radio signals would travel in a straight line and would always manage to travel straight through any material - unfortunately this is not the case in real life.

Buildings and many other objects tend to reflect radio waves rather than allow them through and so alter the direction from which a signal appears to be coming from. This of course spells trouble for direction finding and tracking equipment, which can only display the direction from which a signal appears at the antennas of the tracker and cannot tell whether or not that signal has been reflected:



In the above example the Tracker would receive a signal coming from behind and to the right (approx 140°) rather than from the left (approx 220°).

How can reflections be overcome?

The software within DF4, on its own, averages out/integrates the received signal, so that odd reflections do not affect the display whilst the car is in motion. However, in a city, when there are many buildings and other objects around causing prolonged reflections. Even the maximum average rate of the DF4 (2.5 secs) can still get its bearing displayed inaccurately. The effects of reflections become more pronounced the higher the frequency of operation.

At first glance it could be argued that in order to remove more reflections the averaging/integration time should simply be increased. This would, indeed, allow for fewer reflections to affect the display, because over longer time periods, whilst the tracking car is moving, it is probable that the average of all the signals received will work out to be from the direction of the target.

There is, however, a snag with just using longer averaging times in that the more averaging is used, the longer it takes the display to show actual changes in the direction. This means that when the tracking car changes direction - the change in direction to the signal could take too long to register on the display.

If the changes in movement of the car were known to the Tracker then those changes in direction could be taken into account when displaying the bearing. High averaging times could then be used without the effect of making the display slower to respond to changes in direction of the tracking vehicle, however with the described advantage of cancelling the effects of more and more reflections. The Datong PET box has been designed to put this into practice.

The Performance Enhancer for Tracker (PET) box.

The PET unit is housed in a box one quarter the size of the DF4, and as such can easily be mounted alongside the DF4 in the spare compartment of the suitcase. Connection to the unit simply involves disconnecting the old display cable from the DF4 and connecting it to the PET box and then connecting a short jumper lead between the, now vacated, DF4 display output and the PET box.

With the PET unit in place, an extra set of averaging modes and a new menu are added to the DF4. Apart from these the system works exactly as before. The following table displays the new averaging times:

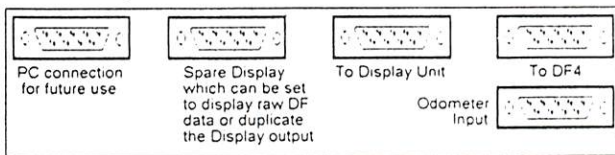
Mode	Averaging Period	Mode	Averaging Period
AV2	0.3 Seconds	AV6	5 Secs with sensor
AV3	0.6 Seconds	AV7	10 Secs with sensor
AV4	1.2 Seconds	AV8	20 Secs with sensor
AV5	2.5 Seconds	AV9	40 Secs with sensor
AVA	2.5 - 60 Secs selected automatically.		

Averaging modes AV2-AV5 behave in exactly the same way as before the unit was connected, whereas the new averaging modes (AV6-AV9) and the automatic mode (AVA) integrate the DF information over longer periods of time whilst using a sensor built in to the PET to cancel out the effects of changes in direction of the tracking car.

The PET unit is also capable of sensing when the tracking car is stationary and when it is moving. It is therefore able to ignore readings which are obtained when the tracking car has stopped (eg at a traffic light), where long term reflections could affect the displayed bearing.

Inputs and Outputs

The following connections are available on the unit:



Future Expansion

The PET unit is software controlled and will form the basic part of any future expansion to the DF4 system. This may involve inputs from other sensors to improve the direction algorithm.

It may also be possible to connect the PET system to DFs from other manufacturers - please contact the factory for details.

Technical Data

Input Voltage Limits:	9 Volts to 30 Volts (As the supply is usually derived from the DF unit, it should be noted that the voltage limits specified for the DF remain unchanged).
Typical Power Consumption:	0.84 Watts
Input Current in off mode:	< 100µA.
Operating Temperature:	< -10°C to + 60°C
Weight:	1280 grams.
Dimensions:	310mm X 170mm X 65mm (with the connectors in place).

The information in this data sheet is subject to revision without prior notice