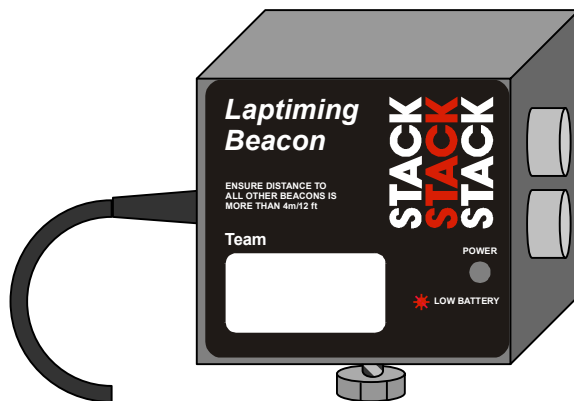


# **INFRA-RED BEACON SYSTEM**

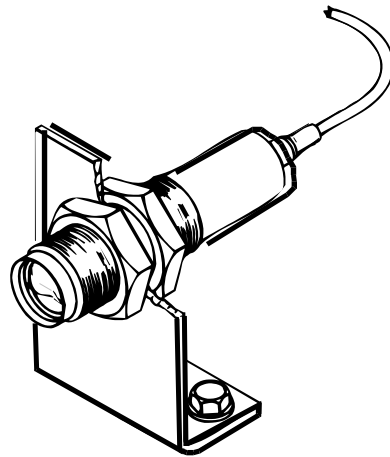
## **USER MANUAL**

(ST540004-004)

**ST544**



**ST543**





## **INTRODUCTION**

The Stack Infra-red Beacon System is a highly accurate and reliable method of automatically generating an electrical signal when a certain location on the road has been reached. The signal can be easily interfaced to other electronic equipment and can therefore be used for a wide variety of different applications.

The system components have been designed and built to the same high standards as all other Stack products, including the 1990 British Design Council Award Winner: the ST400 Intelligent Tachometer.

The system consists of two main components :

- a roadside **Sender** unit (ST544)
- an in-vehicle **Receiver** unit (ST543)

The external **Sender** Unit, positioned at the trackside, gives out a coded, infra-red beam which is sensed by the in-vehicle **Receiver** when the car passes it.

## **INSTALLATION**

### **General**

The Receiver is to be mounted on the vehicle.

The Sender Unit is to be set up at the trackside.

All equipment housings provide watertight protection.

**Care should be taken not to site these units, or their cabling, close to HT leads or strong sources of heat.**

## **On-vehicle**

### **Mechanical installation**

The Receiver should be mounted on the vehicle, so that it is level and in such a way that its field of view is unobstructed and the line of sight is square to the centre line of the vehicle. The unit is threaded with an 18mm x 1mm metric thread and nuts are provided for fixing to the vehicle. The Receiver unit may be positioned on either side of the vehicle but must, of course, be sited so as to pick up signals from the trackside Sender unit.

### **Electrical Installation**

The Receiver unit has a single lead, fitted with a mini sure seal 4-way receptacle which connects directly to all STACK harnesses marked "LAP".

### **Trackside**

The Sender unit operates effectively over a range from 2-30 metres. It should be carefully positioned, using a suitable stand or tripod, so that the vehicle will pass within this range.

The following hints will help ensure good results:

- \* The Sender unit should be at the same height as the on-car Receiver.
- \* The Sender unit should be sited on a straight section of track and at right angles to the track.
- \* Take care to ensure that the Sender unit is level, so that it emits a horizontal beam.
- \* If the sender is being used for lengthy durations in very hot, sunny conditions it may be necessary to shade it, to prevent intolerable heat building up inside the housing.
- \* The sender should not be placed directly pointing away from a low, bright sun as this will reduce the operating range considerably.

## **INTERFACING TO OTHER EQUIPMENT**

The outputs of the Receiver unit have been designed to be easily interfaced with other equipment.

The output is an 'open-collector transistor' type. This is probably best thought of as an electronic switch. When a signal is generated on the output it is effectively connecting the input of the recipient equipment to battery negative (chassis) for a pre-determined length of time.

The duration of this switched output signal is 150 milliseconds for a normal 'LAP' output .

The effect of this type of output on other equipment is exactly the same as connecting a switch between their input and battery negative for this period and the equipment will therefore need to be compatible with this type of input if satisfactory operation is to be achieved.

The maximum current which may be passed through the 'open-collector' electronic switch is 0.2 Amperes.

### **STACK equipment**

The system can be interfaced to the ST800/900 Instrumentation and Data logging systems and the range of Stack Intelligent Tachometers simply by direct connection of the Receiver output to the relevant 'switch' input. Please refer to the appropriate product manual for further information regarding configuration etc.

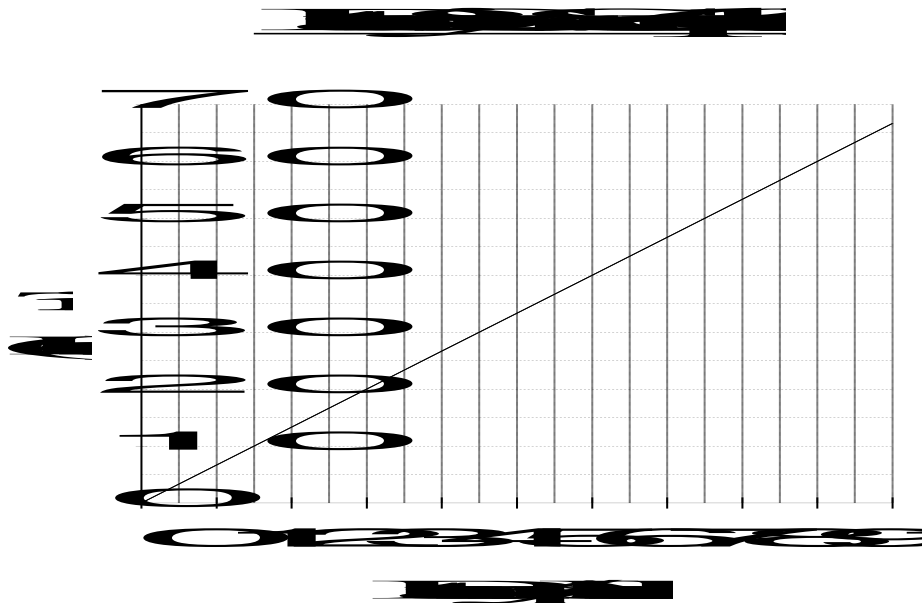
## **OPERATING THE SYSTEM**

The Receiver unit should be installed on the vehicle following the guide-lines given in the Installation section of this manual.

### **Sender power supply**

The trackside Sender unit operates from a 12v DC supply, and we recommend that a sealed lead-acid battery having a minimum rating of 2.5 Amp/hour be used to power the unit.

The following chart may be used to determine the total operating time, in hours, for a fully charged battery, when loaded with a single sender unit :



The condition of the battery may be confirmed at any time by observing the LED indicator on the front panel of the Sensor unit as follows :

- Green - Voltage OK at present.
- Red - Voltage too low.

### **Lap markers**

The Sender unit will continuously emit a 'lap' marker beam. The on-board Receiver unit will detect this beam every time the car passes it and a signal will always be generated on the output. This does mean, however, that if another team also has a 'Lap' type Sender

out on the circuit or stage then it will also be detected and an additional output generated.

### **Automatic 'Start Logging'**

It should be noted that a 'Lap' type Sender unit can also be used to trigger a Stack 'Performance Analyser' and ST800 data logging system to start recording. Please refer to the instructions for these products, if applicable, for further information.

## **TECHNICAL SPECIFICATION**

### **COMPLETE SYSTEM**

Operating distance range : 2 to 30 metres.

Operating temperature range : -10 to +65 degrees Centigrade.

Maximum detection delay : 10 mS.

Maximum repeatability error : 3 metres.

Waterproofing standard : IP66

Beam alignment tolerance : +/- 10 degrees

### **SENDER UNIT**

Nett weight : 200 grams

Nett size : 62mm x 58mm x 36mm

Power requirements : 150 mA @ between 10 and 15 Volts D.C.

### **RECEIVER UNIT**

Nett weight : 60 grams

Nett size : 18mm diameter x 78mm long

Power requirements : 12 Volts.