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WO 2003/017227 A   US 6243644 B
US 6223125 B   US 20020177942 A

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UK CL (Edition X) **G4Q**
INT CL **G08G**
Other: **EPODOC, WPI.**

(54) Abstract Title: **Traffic detector that is programmed using a short range wireless configuration device.**

(57)   The detector system, disclosed, can detect the
presence and/or movement of objects within a region.
The system has a programmable detector for observing
the region and a configuration device for selecting the
settings of the detector. The selected settings are
programmed into the detector by a short range
communication link. The system may be used to detect
traffic and/or pedestrians. The settings may include the
detection range, the shape of the detection zone,
threshold values relating to the object eg speed or size,
sensitivity and hold times. The communication link may
be a radio link such as a Bluetooth link from a handheld
unit such as a PDA handset. The detector may have a
memory to hold the received settings and a backup set
of data settings. The detector may also hold a default
set of parameters to be used if the downloaded set is
lost or corrupted. The system may have several
detectors each with means to identify themselves to the
configuration device. The configuration device may
have software for a plurality of detectors and be able to
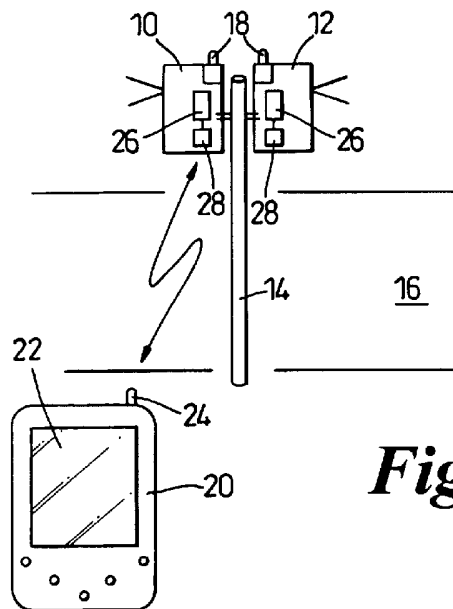select the correct software for a particular detector.

Fig. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the
formal requirements of the Patents Rules 1995
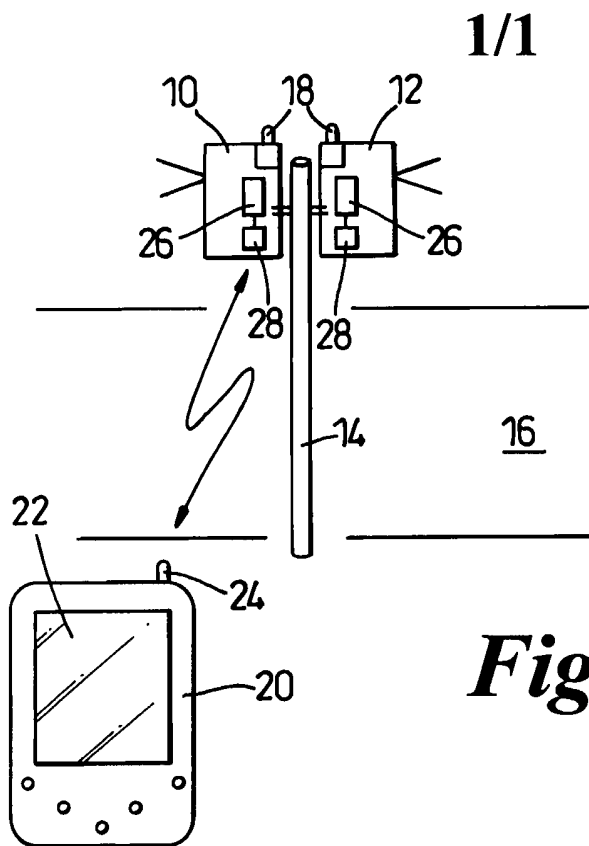
Original Printed on Recycled Paper

10 18 12

26   26

28 28

14 16

22

24

20

Fig. 1

ESTABLISH
RF LINK

IDENTIFY
DETECTOR

RETRIEVE S/W
& DETECTOR
ON PDA

TRANSFER
DATA TO
DETECTOR

DUPLICATE
DETECTOR
DATA

Fig. 2

1

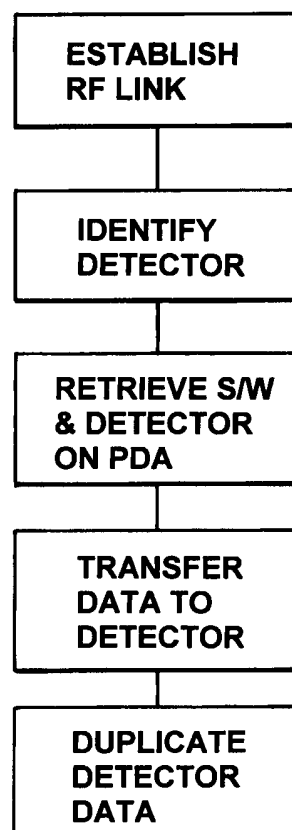## Detector Systems

This invention relates to detector systems and in particular, but not exclusively, to detector systems for use in traffic control. The invention is not however so limited as the detector systems described herein may be used for example in other applications such as intruder detection systems where, for example, a static detector is installed to monitor activity.

Detection for traffic control has been adapted for many years by means of a set of switches on the electronic equipment which provides the function. Thus in the case of loop detectors, the switches are on the electronic processing card and provide adjustment of function such as the presence time and loop sensitivity. In the case of pole-mounted detectors adjustable functions may be controlled by means of a set of switches accessed though a protective port positioned on the detector. Recently, we have developed equipment whereby quite complex functions can be controlled over and above that allowed by simple switching. In our AGD 930 Livewire™ system, the settings on the detector are configured by means of a handheld device such as a PDA connected by cable to a connector on the detector. For safety and security, the electrical connection on its own is insufficient to achieve the correct functionality. The detector has a separate memory which can only be written to when the cable is connected between the handheld device and the detector and a "write enable" pin is activated on the separate memory so that the settings transmitted down the cable from the PDA can be saved during set up. When the set up cable is disconnected, the memory is no longer changeable and this gives an indelible robust format for the settings even upon power interruptions and software bugs

etc.

Although this development allows much greater flexibility in setting up of the detector, it still suffers from the disadvantage that the engineer has to climb the pole on which the detector is mounted to connect the cable and likewise to

5   disconnect the cable and replace the protective cover when he is finished configuring the detector.

Accordingly, in one aspect, this invention provides a detector system for detecting the presence and/or movement of objects within a region, said system comprising:

10   a detector for observing said region and being programmable to allow one or more settings thereof to be selected;

a configuration device for allowing settings to be selected for said detector, and

short range communication means for allowing settings to be transferred

15   from said configuration device to said detector.

In this manner, the need for the engineer to climb the pole to connect and disconnect the cable is obviated, thereby facilitating the process and removing a potential health and safety hazard. Furthermore, the speed with which several detectors can be configured or reconfigured is increased.

20   Although the detection system is broadly applicable to detection activity, in preferred embodiments the detector is operable to detect the presence and/or movement of pedestrians or vehicles on a carriageway or walkway.

The number and nature of the settings that can be varied will depend on the particular application but typical settings include one or more of the following:

- The detection range

- The shape and/or extent of the detection zone

- Threshold values relating to the objects, such as speed, size etc.

- Sensitivity

5   • Hold times.

Although numerous different types of short range communication means

may be used in the form .e.g of a beam, it is preferred for this to provide a short

range radio link such as Bluetooth™, Zigbee™.

Preferably, the detector includes a memory for storing the main setting

10 data received from said configuration device, the memory being further operable

to receive and store a duplicate set of settings data. In this manner, a write

protect function may be provided. Thus if the main settings are corrupted by,

say, a power interruption during the memory write routine then the second set

may be recovered in uncorrupted form. Preferably also the detector memory

15 has stored therein a default set of parameters so that, if performance is

compromised by, say, a software bug within the detector resulting in loss of the

saved parameters, then the default set is adopted. This allows operation to

continue albeit in non-optimised fashion.

In many applications, there may be several detectors sharing the same

20 pole and so the system preferably includes means to identify which of the

detectors is in communication with the configuration device. Thus, for example,

the detector or memory therein may contain a unique application such that when

wireless access is made, a signal is sent back to the configuration device to

identify to the commissioning engineer which of the detectors is currently in

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communication. The configuration device then preferably selects appropriate settings and set up software corresponding to the detector.

Preferably, the configuration device contains configuration software for a number of different detectors and is operable to select the correct software for a

5   particular detector.

Preferably access to the detector settings is allowed only if the operator inputs a pre-determined user ID and password to the configuration device.

Whilst the invention has been described above, it extends to any inventive combination of the features set out above or in the following

10   description.

The invention may be performed in various ways, and an embodiment will now be described by way of example only, reference being made to the accompanying drawings, in which:

Figure 1 is a schematic view of a detector system employing a detector

15   and a handheld configuration device in accordance with this invention, and

Figure 2 is a block diagram of the steps involved in setting up a communication link and programming one of the detectors in the arrangement of Figure 1.

The arrangement illustrated in the Figures is intended to allow an

20   engineer at street level to programme a detector with various settings to configure it for its intended use, using a handheld configuration device and obviating the need to climb up a pole to establish a direct cable connection.

In the illustrated embodiment, two different detectors 10,12 are secured at the top of a pole 14 to one side of a carriageway 16 with the detectors

monitoring activity in either direction. The detectors could be Doppler detectors, infra red detectors or an imaging device such as a digital camera. Each detector has a number of settings which may be programmed into it such as the range of the detected/viewed scene, its shape, or threshold parameters for object in the

5   scene such as speed or size thresholds etc. In this manner the detection zones can be suitably positioned and shaped so that they detect activity in a specified zone. The zone may be shaped, for example, to provide objects or areas which may give rise to unwanted artefacts in the signal.

Each detector also has associated therewith a radio transceiver 18. A

10   handheld configuration device such as PDA 20 is provided which has a touch-operated display screen 22 which acts as a graphical user interface. The configuration device 20 also has a transceiver module 24 which is capable of setting up a short range radio link with the transceivers 18 of the detectors 10 and 12. By way of example, the short range link may operate on the Bluetooth™

15   or Zigbee™ protocols.

The configuration device is programmed with software which enables it to transmit to the detectors the various settings described above. In addition, where the detector is for example an imaging device, the detector may transmit the image back down the short range link to be displayed on the display of the

20   configuration device 22. The software implemented by the configuration device may also allow interactive real time adjustment of the field of view of an imaging device on the detector.

Each detector 10,12 has an internal processor 26 and an attached memory 28. Likewise the configuration device 20 has a memory and a store for

storing configuration software for a number of different detectors.

In use, as shown in Figure 2, the configuration device 20 is operated to set up a communication link with the transceivers 18. As part of the initial handshake routine in setting up the radio link the processors 26 operate to

5   identify themselves to the configuration device 20 and the configuration device allows the engineer to select which of the detectors in the radio range he wishes to connect to. Each detector will be identified by a unique number such as its serial number. To assist the operator the detector may also have an indicator such as an LED which shows when the detector is in programmable mode.

10   When the engineer makes a selection, the configuration device retrieves the appropriate configuration software and loads it so that the engineer is able to input the required settings. Where the detector is an imaging detector this may involve transmitting an image back down to the configuration device. Once the required values for the settings have been transmitted, the processor 26 stores a

15   main set of the configuration settings in one area of memory and then also stores a duplicate set of these settings in another area of memory. This is done so that if a set is corrupted by, say, an interruption during the memory write routine, then the second set may be recovered.

In addition, the memory 28 contains a default set of settings so that if

20   performance is compromised by, say, a software bug within the detector resulting in a loss of the saved parameters, then the default set may be adopted, and a fault registered by the detector. This provides "safe mode" operation pending visit by the engineer.

Once the engineer has completed configuring the settings of the first

detector then he may acquire a link with another of the detectors currently in range and repeat the process until all the detectors have been appropriately configured.
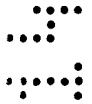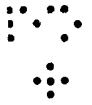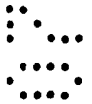
CLAIMS

1.   A detector system for detecting the presence and/or movement of

objects within a region, said system comprising:

a detector for observing said region and being programmable to allow one

5   or more settings thereof to be selected;

a configuration device for allowing settings to be selected for said

detector, and

short range communication means for allowing settings to be transferred

from said configuration device to said detector.

2.   A detector system according to Claim 1, wherein, in use said

detector is operable to detect the presence and/or movement of pedestrians or

vehicles on a carriageway or walkway.

3.   A detector system according to Claim 2, wherein said settings

include one or more of the following:

15   • the detection range

• the shape and/or extent of the detection zone

• threshold values relating to the objects, such as speed, size etc.

• sensitivity

• hold times.

20   4.   A detector system according to any preceding claim, wherein said

short range communication comprises a short range radio link.

5.   A detector system according to any preceding claim, in which the

detector includes a memory for storing the main setting data received from said

configuration device, the memory being further operable to receive and store a

duplicate set of settings data.

6.   A detector system according to any preceding claim, wherein the detector memory has stored therein a default set of parameters so that, if performance is compromised by resulting in loss or corruption of the saved

5   parameters, then the default set is adopted.

7.   A detector system according to any preceding claim, which includes several detectors, and the system includes means to identify which of the detectors is in communication with the configuration device.

8.   A detector system according to Claim 7, wherein said detector contains a unique application, operable on establishing the communication link to cause a signal to be sent back to the configuration device to identify which of the detectors is currently in communication.

9.   A detector system according to Claim 8, wherein the configuration device is operable to select appropriate settings and set up software

15   corresponding to the detector.

10.   A detector system according to claim 9, wherein the configuration device contains configuration software for a plurality of different detectors and is operable to select the correct software for a particular detector.

11.   A detector according to any preceding claim, wherein access to the

20   detector settings is allowed only if the operator inputs a pre-determined user ID and password to the configuration device.

12.   A method for configuring a detector system for detecting the presence and/or movement of objects within a region, in which the system comprises a detector for observing said region and being programmable to allow

one or more settings thereof to be selected, said method comprising using a configuration device to allow settings to be selected for said detector, characterised in that said configuration device communicates with said detector by a short range communication means for allowing the settings to be

5   transferred from said configuration device to said detector.

13.   A detector substantially as hereinbefore described with reference to, and as illustrated in, any of the accompanying drawings.

14.   A method of configuring a detector substantially as hereinbefore described with reference to the accompanying drawings.

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Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 - 4, 6 - 8, 11 and 12	WO 2003/017227 A (RENDAHL) See paras 14, 25, 32, 43-49, 61 and fig 2.
A	none	US 6243644 B (DENGLER) See column 3.
A	none	US 2002/0177942 A (KNAIAN et AL) See para 56.
A	none	US 6223125 B (HALL) See column 10.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

G4Q

Worldwide search of patent documents classified in the following areas of the IPC

G08G

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI.