GRIFFITHS COMMUNICATIONS LIMITED

TARGET TRACKING SYSTEM

The Target tracking System is designed for tracking and locating a moving target under a wide variety of conditions. The basic equipment consists of a small, V.H.F. transmitter and a tracking receiver.

The Transmitter is fitted to the target which may be a vehicle, boat, package or person. The tracking receiver is normally fitted in a road vehicle or boat and the accompanying antenna system is fitted such that the receiver automatically indicates the direction and range of the target to be followed without the requirement of difficult setting up procedures. The receiver also supplies an audio signal giving auxiliary information on the status of the target vehicle, ie whether it is moving or stationary.

In covert applications the transmitter can be fitted using clamps, or magnets as appropriate, to the underside of the vehicle or other concealed place. Power to operate the transmitter can either be taken from the target vehicle or from a battery pack. The transmitter antenna which is approximately 20cms. long is inconspicuous.

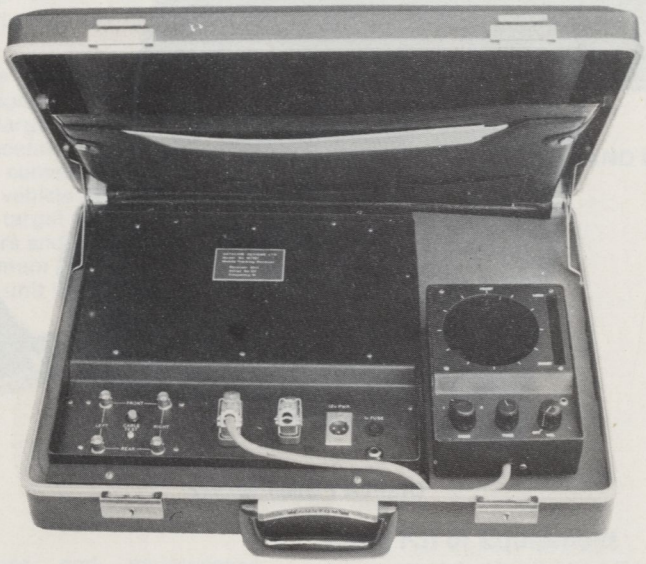
In other applications, such as V.I.P. protection, greater range can be achieved by the use of higher power transmitters and locating the antenna in a different position.

The system can operate on continuous or pulsed emissions so as to make it compatible with equipment which the customer may already have in service.

A range of transmitters of different size and different power outputs which can operate in pulsed or continuous mode are available together with a number of other units which can assist in the deployment of the tracking equipment, or which provide other facilities associated with target location and surveillance.

The receiver is built into a strong attaché case and is completely portable requiring only to be connected to the tracking vehicle power supply and antenna system to be operational. The receiver system can normally be installed in the tracking vehicle by non-technical personnel in about ten minutes and it is not necessary to have a vehicle dedicated to target surveillance.

The frequency range of the system is from 27 MHz to ~~155~~ 175 MHz. Up to 88 MHz it is possible to use the "Roof Rack" antenna system in the tracking vehicle. Above 88 MHz it is necessary to use four short vertical elements on the roof of the tracking vehicle.



RECEIVER M7101

Key Features

- Ground to ground range of 8 km (open terrain) to 3 km (city).
- Wide range of small target transmitters, and remote control facilities (see separate leaflets).
- Operates by simple change in continuous or pulsed mode.
- Separate unambiguous indication of range and bearing of target whether target is moving or stationary.
- Simple to fit, no setting up required, does not require dedicated vehicle.
- Frequency range 27 MHz to ~~155~~ 175 MHz.
- Audio indication of target status.

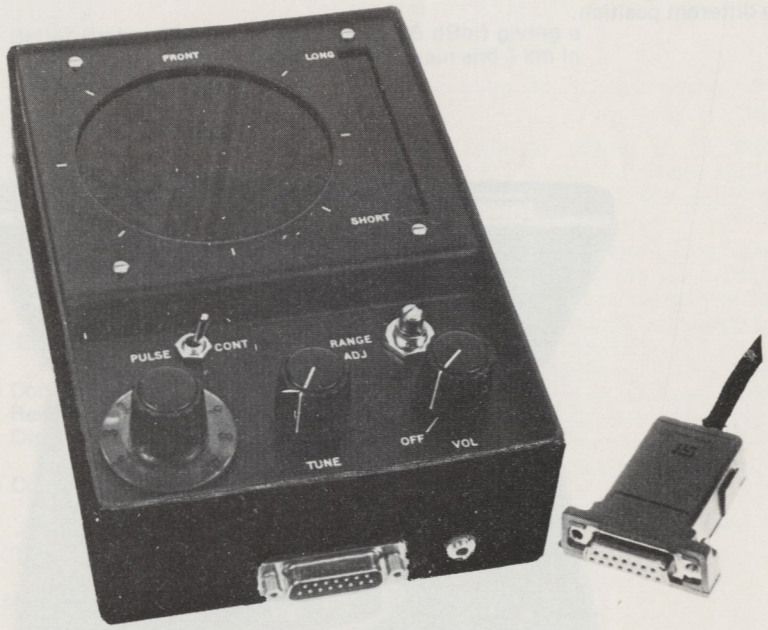
Applications

- Tracking suspect vehicle, boat or package.
- Tracking movement of personnel.
- Detecting opening or closing of doors or packages or removal or movement of packages.
- V.I.P. protection.

Mobile Tracking Receiver

The receiver equipment comprises a receiver unit and a control and display unit. The system will operate in the range 27 MHz to 156 MHz. Various antennae may be used for particular situations but for covert applications in the frequency range 27 MHz to 88 MHz an antenna is available in the form of a roof-rack which clamps to the tracking vehicle. Above 88 MHz it is necessary to use four short vertical elements in a square configuration on the roof of the tracking vehicle. The antenna is connected to the receiver via miniature co-axial cables. The system can be fitted to boats or fixed wing aircraft but the attachment of antennae to aircraft is by arrangement with the appropriate authorities. The receiver is built into a strong attache case. It is completely portable requiring only to be connected to the tracking vehicle power supply and antenna system to be operational. Contained in the receiver case is the display unit which is supplied with 5 metres of cable so that the user can operate the equipment in the front of the vehicle whilst the receiver is located elsewhere. The receiver is available in two versions. Type M7101/10 is fitted with 10 crystal controlled frequencies and model M7101 is fitted with 4 crystal controlled frequencies. (see specification).

The display unit houses all the operating controls for the receiver and also displays the indications of bearing and range. The unit can be hand held or mounted on the dashboard of the vehicle. Connection to the receiver is by a multicored cable fitted with a plug and socket for easy detachment. The display unit is also fitted with a loudspeaker which enables the target status to be monitored using a special audio signal.



DISPLAY UNIT M7112

FACILITIES

1. The bearing of the target is indicated on a 360 degree array of LEDs. This provides an unambiguous indication of the target direction.
2. Target range is provided on a linear array divided into three colour bands to represent short, medium and long range.
3. A rotary switch allows the selection of four or ten crystal controlled receiver frequencies depending on model.
4. A receiver on/off switch which is integral with the audio control adjusts the volume of the loud speaker, also contained in the display unit.
5. A rotary control adjusts the pitch of the signals received from the target transmitter, indicating the status of the target i.e. engine running, vehicle moving or alarm.
6. A two position switch which can be set to receive continuous or pulsed transmissions, depending on the emissions from the target transmitter, allows operation as follows.
   a) ''Cont'' In the continuous emissions mode the receiver will provide continuous visual indication of bearing and range and also audio information relating to the status of the target when transmissions are received from the range of M7 transmitters. The advantage of the continuous mode, in addition to clear audio target status information, is better indication of target bearing at extreme range and city use.
   b) ''Pulse'' In this mode the display time constant has been reduced so that it will react to pulse lengths down to 50 milli secs. The range and bearing will be held between pulses and will hold for several seconds after the last pulse. The advantage of this system is longer battery life in the target transmitter.
7. A socket which will accept a pair of headphones. Insertion of the headphone plug mutes the internal loudspeaker.
8. A control to calibrate the range indicator to allow for different target transmitter powers.

Target Transmitters

A range of transmitters is included as part of the Targeting System. Most of the transmitters can, by a simple switching operation, be made to function in a ''continuous'' or ''pulsed'' output mode. This enables the transmitters to be used in conjunction with other systems, as well as providing the operator with the choice of extended battery life or maximum efficiency depending on the operation. Information on output power and pulse characteristics is detailed in the technical section of the brochure.

The transmitters are frequency modulated by a movement sensor and by an identification signal. These signals when received by a tracking receiver, (M7101) will indicate the status of the target vehicle ie. whether the engine is running or whether the vehicle is in motion. This information is in addition to the indications of bearing and range. The identification signal will give the operator confidence that he is tracking the correct target. When the system is being used for VIP protection the transmitters can be wired to a switch which when operated will radiate an ''Alarm'' signal to the tracking vehicle. This facility can also be employed to detect the closing or opening of doors etc.

Note

The audio signals outlined above are only effective when the ''Continuous mode is used.

The transmitters operate on a single crystal controlled frequency. The crystals are fitted ''at works'' to customers requirement. The transmitters will operate on DC only on voltages between 9v. and 15v.

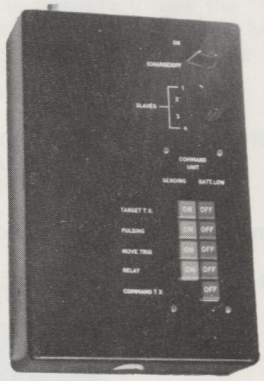
Transmitters are available in various packages and power outputs, some of the units have integral battery packs and antennae for rapid attachment to the target. A version of this unit fitted with powerful magnets has recently been added to the range. For some applications it is more convenient to locate the transmitter in a concealed place, ie. a vehicle trunk, and attaching the antenna to the underside of the target vehicle. For these applications a range of small transmitters and antenna matching units are available. To ensure maximum radiated output a directional power meter is offered. This unit is simple to use and is a very useful accessory.

See separate leaflets for full information on transmitters and accessories.

Remote Control System

This system has been designed to enable the tracking vehicle operator to control a number of functions in the target vehicle, ie. turn on/off the transmitter, turn on/off the vehicle ignition, flash lights etc. A single Command Unit can control up to four Slave Units and can control four functions on each Slave Unit. The Slave Units derive their power source from the target vehicle or from a separate battery pack. By using time sharing the system can use the same frequency as the target tracker equipment.

For complete list of command and remote control systems see separate leaflet.



COMMAND UNIT M7601

GENERAL

Comprehensive operating instructions and maintenance information is provided with the system.

The equipment is guaranteed for 12 months from date of purchase.

When ordering equipment please state precise frequencies required and in the case of the M7101 receiver the channel allocation. (See receiver specification for details of channel spacing).

The ''roof rack'' antenna is supplied with clamps for mounting on vehicles fitted with rain gutters. We will be pleased to supply information on other types of antenna systems if required.

Basic Kit of Equipment

A recommended basic kit of Tracking Equipment is given below:

★	M7101	Mobile tracking Receiver
★	M7101A	Antenna
★	M7062 & M7014	2W pulse/continuous Target Transmitter and Aerial Matching Unit.
★	M7063 & M7014	300mW Target Transmitter and Aerial Matching Unit.
★	M7013	Directional Power Meter.
★	M7041	Battery and Power Saving Unit.

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Receiver Specifications

Frequency	— Crystal controlled in 27 MHz to 175 MHz Band.
Number of Channels	— 4 (10 optional) 4 channel model No. M7101 S 10 channel model No. M7101/10
Channel Spacing	— Minimum: 5 kHz between adjacent channels. Maximum: 2% of operating frequency between highest and lowest channels.
Display Type	— Light emitting diodes.
Display Format	— Circular display of red light emitting diodes giving 360° vector for target direction. 11¼° resolution, i.e. 32 sectors. — 16 light emitting diodes in a linear scale to indicate target range. Three colours are used to denote short, medium and long range.
Sensitivity	— Better than —130 dBm (typically —135 dBm) giving a range of approximately 8 km in open terrain and 3 km in cities, with 2 watt transmitter.
Precision	— RMS error — less than 10° on clear site.
Controls	— ON/OFF. Audio volume. Channel select. Audio tone. CW/pulse switch. Range indicator adjustment.
Audio Output	— 1 watt nominal into loudspeaker fitted in display unit. Earphone socket on display unit.
Size	— Complete unit — 500mm x 360mm x 130mm. Receiver — 300mm x 300mm x 75mm. Display unit — 180mm x 120mm x 60mm.
Weight	— Complete unit — 6.5 kg.
Power Requirement	+ 11 to + 16 volts D.C. — Total current 350 mA approximately.

Specification subject to change without notice.

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