

# GRIFFITHS COMMUNICATIONS LIMITED

## BEACON CONTROL SYSTEMS



M7601

M7704A

M7114

### SYSTEM

The Beacon Control System employs a radio link to remotely control a number of functions associated with beacons (target transmitters) in a target tracking system. A commandable beacon can be conveniently installed prior to commencement of surveillance and then remotely controlled into its various modes of operation as conditions require. In this way, optimum target tracking performance can be achieved and the beacon battery lifetime can be extended. Each commandable beacon comprises a target transmitter and a remote control receiver which responds to digitally encoded, FM radio messages from a command unit. The control is performed by a well-proven system which allows a considerable command range with high reliability of operation. An additional unit, Beacon Status Display, indicates the status of the commandable beacon currently being monitored by the tracking receiver.

### COMMAND UNIT — Model M7601

This hand-held unit controls four functions in up to four beacons independently.

#### Features:

- \* four Beacons independently controllable
- \* four functions controllable for each Beacon
- \* portable
- \* internal rechargeable batteries (M7022 Charger optional)
- \* can operate on same radio frequency as beacon transmitter



#### Control functions:

- \* beacon transmitter on/off
- \* continuous or pulse transmission
- \* movement trigger on/off
- \* relay contacts closed/open

#### Specification:

- \* RF Power Output. Approx. 7 Watts into 50 Ohms.
- \* Antenna. 50 Ohm external (Helical whip supplied)
- \* Crystal Controlled in range 27–175 MHz. (as required)
- \* F.M. Deviation approx 1 KHz.
- \* Digitally encoded channel and command addressing.  
Up to 4 Beacons (Slaves) addressable.  
Can operate on same frequency as Beacon transmitter if required.
- \* Size: 230 x 145 x 60mm.

### **COMMANDABLE BEACONS**

#### Models currently available:

**M7704A.** Unit incorporating a 1 Watt beacon transmitter and antenna matching unit.  
Requires external 12V DC power.

#### Features:

- \* transmitter on/off
- \* continuous or pulse control of transmitter
- \* selectable movement trigger
- \* independently controllable relay contacts
- \* integral beacon transmitter
- \* integral antenna matching unit
- \* identification signal
- \* external "alarm" contacts which enable state of external switch to be monitored
- \* movement monitor signal
- \* transmission is encoded to include slave identity and current status of unit (i.e. Tx on/off, pulsing on/off, movement trigger on/off, relay open/closed) which can be displayed at the tracking receiver on Beacon Status Display Unit model M7114

**M7706A Commandable Beacon** incorporating 1/4 W transmitter, antenna matching unit and internal batteries

#### Features in addition to those of M7704A:

- \* internal batteries
- \* transmission encoded with battery low warning which can be indicated at the Tracking Receiver or Beacon Status Display Unit Model M7114
- \* can be used independently of Command Unit as a movement - triggered beacon in either continuous or pulsed mode

### **BEACON STATUS DISPLAY UNIT – Model M7114**

This unit plugs into the 'Auxiliary' socket of the Tracking Receiver Unit (M7111) to indicate the status of the commandable beacon currently being monitored by the tracking receiver.

#### Indications include:

- \* slave number (identity)
- \* mode of operation
  - 1) target transmitter on/off
  - 2) pulsing on/off
  - 3) movement trigger on/off



- 4) relay closed/open
- \* moving/stationary
- \* slave battery low (not for M7704A)

### **COMMANDABLE BEACON -- MODEL M7704A**

The 7704A Commandable Beacon is a small unit which can be controlled by Command Unit (M7601) into the following modes:-

- a) Transmitter on/off
- b) Pulsing/non-pulsing transmitter operation
- c) Movement trigger on/off
- d) Independent relay contacts closed/open

The unit requires an external 12 volt power source. An internal Antenna Matching Unit is used for both the Control Receiver and the Beacon Transmitter, and connections are supplied to allow fine adjustment of the antenna wire for maximum range.

Non-pulsing transmissions are modulated with an identification and a movement signal which can be monitored on the audio output of the Tracking Receiver. Both pulsing and non-pulsing transmissions include digitally encoded data which can be used at the Tracking Receiver to indicate the operating mode and movement status of the Beacon. This is particularly useful to show whether the Beacon is moving or stationary during pulsed transmissions which would not otherwise convey this information. The digital data is decoded and displayed by the Beacon Status Display (M7114) which plugs into the 'Auxiliary' socket of the Tracking Receiver Unit (M7111).

The 'movement trigger' mode provides a power-saving facility in which the transmitter is energised only when the movement takes place. When movement ceases, the transmitter continues to be energised for an over-run period of approximately 15 minutes, after which it is energised in a low duty ratio mode to conserve power. In this mode, short 'confidence' pulses are transmitted periodically to confirm that the transmitter is still functional.

The relay provides a pair of independent voltage-free contacts. A magnetic base (M7080) can be fitted if required.

### **MODEL M7704A SPECIFICATIONS**

#### **General**

#### **Features**

All remotely controllable:-

- a) Transmitter on/off
- b) Pulsing/non-pulsing transmitter  
Pulse rate:- 1/4 second every 2 seconds (Alarm contacts closed)  
1/4 second every 1/2 second (Alarm contacts open)
- c) Movement trigger on/off  
With trigger on:-
  - i) Movement turn-on of internal transmitter with approx. 15 minute overrun
  - ii) Confidence pulse every minute  
Pulse length:- 2 second (non-pulsing selected)  
1/2 second (pulsing selected)
- d) Independent voltage-free contacts closed/open



**M7704A**

### **COMMANDABLE BEACON -- MODEL M7706A**

The Commandable Beacon is a small self-contained dual-function unit which may be used as a stand alone beacon or as a slave under the control of the Command Unit (M7601).

A magnetic base (M7080) can be fitted if required.

#### **1) Stand Alone Mode**

When initially powered-up, the unit is automatically set into the movement trigger mode permitting it to be operated as an independent movement-triggerable beacon, without the need of a command unit. The transmitting mode (pulsing or non-pulsing) is operator



selectable by use of a wire link connected to the unit's external terminals.

## 2) Slave Mode

When used as a Slave the following modes are controlled by the Remote Control Command Unit:-

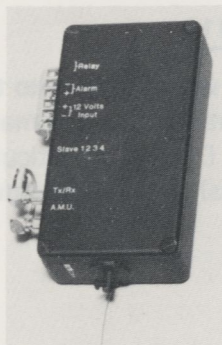
- a) Transmitter on/off
- b) Pulsing/non-pulsing transmitter operation
- c) Movement trigger on/off
- d) Independent relay contacts closed/open

## 3) Common Features

The unit can be powered externally, or internally from three readily obtainable alkaline manganese batteries. An internal Antenna Matching Unit is used for both the Control Receiver and the Beacon Transmitter, and connections are supplied to allow fine adjustment of the antenna wire for maximum range.

Non-pulsing transmissions are modulated with an identification pulse and a movement signal which can be monitored on the audio output of the Tracking Receiver. Both pulsing and non-pulsing transmissions include digitally encoded data which can be used at the Tracking Receiver to indicate the operating mode, movement status and battery state of the Beacon. This is particularly useful to show whether the Beacon is moving or stationary during pulsed transmissions which would not otherwise convey this information. The digital data is decoded and displayed by the Beacon Status Display (M7114) which plugs into the 'Auxiliary' socket of the Tracking Receiver Unit (M7111).

The 'movement trigger' mode provides a power-saving facility in which the transmitter is energised only when movement takes place. When movement ceases, the transmitter continues to be energised for an over-run period of approximately 15 minutes, after which it is energised in a low duty ratio mode to conserve power. In this mode, short 'confidence' pulses are transmitted periodically to confirm that the transmitter is still functional.



M7704A

## SPECIFICATIONS

### General

#### Power source

Internal -- 3 off 9V alkaline manganese (e.g. Mallory MN1604)  
or External +9 to +15V  
Supply current (approx.) at 9V  
1 mA transmitter off  
80 mA transmitter on

#### Endurance

With fresh batteries:-

Mode	Lifetime
Transmitter off (receiver operating)	60 days
Transmitter on — pulsing	5 days
Transmitter on — non-pulsing	8 hours

#### Size

118mm x 93mm x 32mm approx.

#### Weight

500g approx. (including batteries)



### Control Slave section

Frequency	Crystal controlled single frequency in 30-175 MHz band
Receiver Sensitivity	-160 dBm (approx. 5km command range in open terrain with helical whip on the command unit)
Antenna	Shares Antenna Matching Unit with transmitter
Relay	max. switching power 35W max. switching voltage 150V d.c. max. switching current 2A

### Transmitter section

Power Output	1/4W nom. into 50 ohms with 9V supply
Frequency	Crystal controlled single frequency in 30-175 MHz band
Features	Identification signal (non-pulsing transmission) Movement monitor signal (non-pulsing transmission) Binary encoded data included in transmission to convey:- a) Slave Number (identity) b) Mode of operation c) Status - moving or stationary d) Battery state

### Antenna Matching Unit

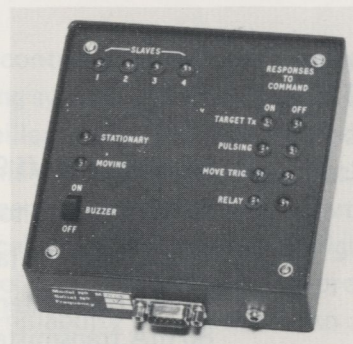
Impedance	50 ohms when wire length correctly adjusted
Wire length	Approx 160mm
Wire type	24 swg phosphor-bronze

### BEACON STATUS DISPLAY Model M7114

The Beacon Status Display is a small unit which plugs into the 'Auxiliary' socket of the Tracking Receiver Unit (M7111) to indicate the status of the commandable beacon currently being monitored by the Tracking Receiver. The Display is particularly for use with the Commandable Beacon M7706A (and all future slave units) but also operates, with only slightly reduced facilities, with M7704A.

Information indicated includes:-

- a) Beacon identity
- b) Mode of operation
  - 1) Target transmitter on/off
  - 2) Pulsing on/off
  - 3) Movement trigger on/off
  - 4) Relay closed/open
- c) Moving/stationary
- d) Beacon Battery Low (not for M7704A)



M7114

The main function of the display is to confirm responses to commands, especially those which might not otherwise be confirmed, such as relay operation. The unit also indicates beacon movement status which is particularly useful during pulsed transmissions when the information is not available on the Tracking Receiver audio output. Additionally, a switchable buzzer gives a warning when the beacon commences moving after being set in the movement trigger mode, so obviating the need to constantly monitor the Tracking Receiver audio output. A low battery warning (not for M7704A) allows the operator to replace the Beacon batteries before the unit ceases to function.

**Note:** The status of the beacon can only be conveyed to the Display when the Slave Unit is transmitting. When used with Slave Unit M7704A the Display does not confirm the 'Target Transmitter Off' command. However, the Commandable Beacon M7706A transmits a special signal to confirm this command.



Power source	External 10V (via 'Auxiliary' socket on M7111)
Input	Binary data (via 'Auxiliary' socket on M7111)
Size	120mm x 120mm x 38mm approx.
Controls	Buzzer on/off
Indicators	<ul style="list-style-type: none"> <li>a) Slave 1 to 4</li> <li>b) Responses to command <ul style="list-style-type: none"> <li>1) Target transmitter on/off</li> <li>2) Pulsing on/off</li> <li>3) Movement trigger on/off</li> <li>4) Relay on/off (closed/open)</li> </ul> </li> <li>c) Moving</li> <li>d) Stationary</li> </ul> <p>The Slave indicators give a unique response for a Slave low battery state (not M7704A)</p>
Buzzer	Internal buzzer giving unique responses for slave low battery state (not M7704A) and for movement in the movement trigger mode
Earphone Output	<p>Responds as for buzzer above</p> <p>Automatically disables the internal buzzer</p>

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