Universal Trigger Box
Users Guide

Introduction

The universal trigger box is intended for use on marine survey vessels as a mean to synchronise multiple acoustic systems in order to reduce or eliminate mutual interference.

The unit uses the latest microcontroller technology to produce a user friendly interface whilst maintaining full flexibility to ensure the operator can set up the survey systems for optimum performance.

All settings are saved to none volatile EEPROM memory every time the user changes a setting. This means that the unit always powers up in the same state it was when power was removed.

Modes

The units have four operating modes, Internal Trigger, External Trigger, Flip Flop, and GI.

Internal Trigger

Internal trigger mode is used when a master clock pulse is required, the rate of the output pule train and the length of the pule can be set as can it's polarity, but as the mode name implies there is no external synchronisation in this mode.

External Trigger

In External trigger mode a trigger source is applied to either the I/P1 BNC connector or via the 9 pin serial connector. An output trigger is generated in relation to the train of pulses detected by the unit. In this mode the rate setting is a gate which allows the rejection of pulses which arrive too fast. Because of the rate setting it is possible to convert almost any serial output, from a navigation computer or such, to a TTL trigger. The basic output trigger rate is derived from the input rate by dividing the input. A delay can be added to the output pulse so that it occurs a fixed time after the input.

Flip Flop

Flip Flop mode activates the outputs in turn in relation to the input trigger, all other functions, delay divide, pulse length etc. function in the same way as in External Mode.

GI Mode

GI mode is specifically designed for generating the trigger pulses required to correctly firing a GI gun by connecting suitable Solenoid PSU units it is possible to connect O/P1 to the Generator and O/P2 to the injector. The Generator to Injector delay is set by modifying the delay variable through the user interface.

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Menu Structure

The user interface consists of four buttons used to navigate through a menu structure displayed on a Liquid Crystal Display. The menu structure is listed below, the up and down buttons are used to change the menu level (shown on the top line of the LCD) and the left & right buttons are used to change the option for the menu level displayed.

1   Mode

> Internal Trigger
> External Trigger
> Flip Flop
> GI Gun

2   Divide by

> 1 – 255

3   Delay

> 0 – 65000ms

4   Trig Rate

> 0 – 65000ms

5   Pulse Length

> 0 – 65000ms

6   I/P Polarity

> +ve or -ve

7   O/P Polarity

> +ve or -ve

8   Inhibit

> off, -ve, or +ve

When the LCD top line shows mode, it is possible to change the operating mode by

Shetland Universal Box

pressing the left and right buttons until the desired operating mode is shown on the bottom line of the LCD. Other settings are changed in a similar manner, with the numerical values being incremented by pressing the right arrow and decremented by pressing the left arrow. When changing one of the numerical values each button press will change the value by 1, however if the button is held down the value will increase slowly. If the button is held down for more than a few seconds then the rate of change speeds up to allow rapid setting of the desired value.

Shetland Universal Box

Detailed Description of Operating Modes

Internal Trigger.

In internal trigger mode the unit ignores any input on the serial port and on the I/P1 connector. However it does pay attention to the inhibit input on I/P2 if enabled.

To enable the inhibit input navigate down the menu to the inhibit option, use the left or right arrows to select either -ve or +ve polarity for the inhibit signal. Now there will be no output from the trigger box whenever the signal applied to I/P2 matches the menu setting. So if the menu says +ve there will be no output from the box whilst I/P2 has a TTL high applied but normal operation will resume when a TTL low is applied.

In Internal mode the trigger rate, pulse length and polarity can all be set through the menu structure. The delay, divide, and input polarity menu options have no effect in this mode.

External Trigger

An external trigger can be applied to the unit either through the TTL input I/P1 or via the RS232 Serial port. Box will generate an output trigger which is related to the input trigger by the divide and delay variables.
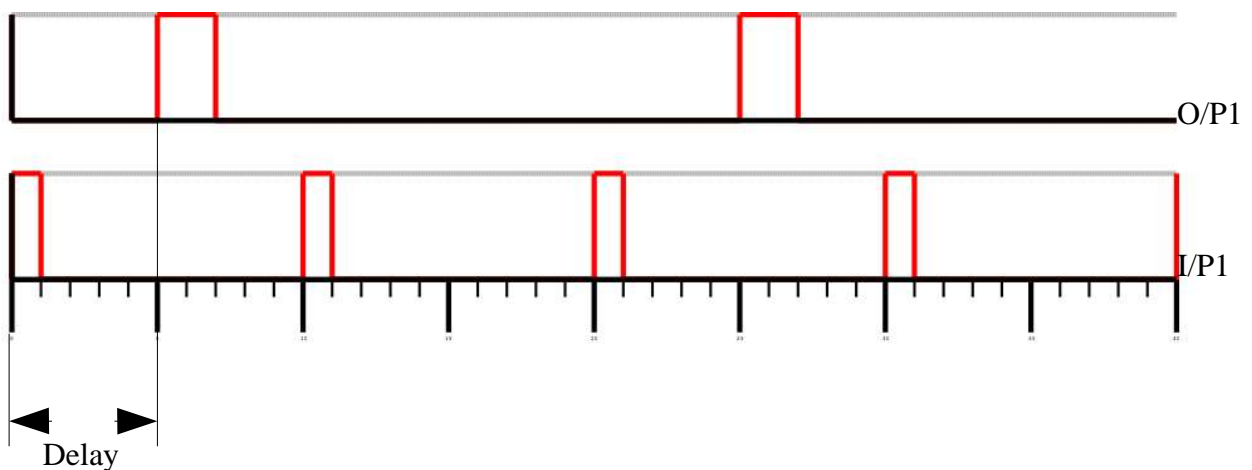
In the above example the divide value has been set to 2 so that one output is generated for every two inputs. Note that there is also a Delay value set so that the output pulse is shifted in relation to the input pulse.

The delay value can be used to ensure that any interference produced by one system on another can be 'moved' so that it appears either in the water column or off the end of the

useful data.

Also note that in the above example the pulse length has been set so that it is longer than the input pulse length. By changing the length value the pulse length can be changed between 1ms and 60 seconds.

In external mode, as in all other modes it is possible to feed an inhibit signal in to I/P2 to ensure that no outputs are generated when the inhibit signal is active. The inhibit signal may be configured through the inhibit menu, use the buttons to scroll down to the inhibit menu then use the left, right buttons to set either off, -ve or +ve inhibit signal.

Flip Flop Mode

In Flip Flop Mode the unit activates each output in turn in relation to the input trigger. The output pulse length and polarity may be changed through the menu as may the input polarity and inhibit settings.

Flip flop mode is specifically designed for firing two seismic sources in turn and as such it is not appropriate to apply a delay to the output pulses.

GI mode

GI mode is designed specifically for operating a particular type of seismic source known as a GI gun. In this mode O/P2 is activated a set time after O/P1. The time between O/P1 being activated and O/P2 being activated is set by the delay value. In this mode the divide value is ignored.

Serial Port Operations.

In order to use the serial port as an external trigger source apply a serial string to the serial port. Serial settings should be 9600,8,n,1. The unit will trigger on the first character received. The unit will re-trigger on serial port activity after the period set by the rate value has passed so if multiple trigger outputs are a problem you probably need to increase the rate value.

Shetland Universal Box

Example Configuration
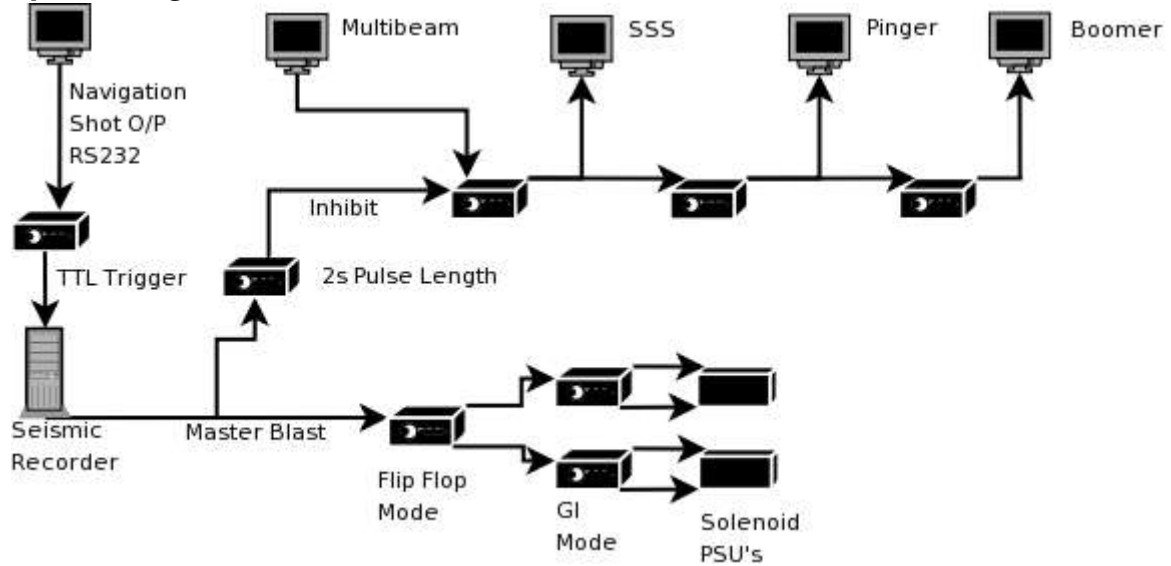
The above diagram shows how a number of Universal trigger box's may be connected together to form a complete integrated survey system for single pass operations, using High Resolution Seismic, Multibeam Sonar, Side Scan Sonar, Pinger and Boomer systems. Other systems that may be integrated include single beam echo sounders, Doppler velocity logs, and acoustic navigation / tracking systems.

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