
Kentech Instruments Ltd.

Trigger Resynchroniser

Serial numbers J12****/1 and J12****/2

13th. December 2012



Kentech Instruments Ltd., Isis Building, Howbery Park, Wallingford, OX10 8BA

Declaration of Conformity

We:- Kentech Instruments Ltd., Isis Building, Howbery Park, Wallingford, OX10 8BA

Certify that this apparatus:-

Kentech trigger resynchroniser
Serial nos. J12****/1 and /2.

Conforms with the protection requirements of European Community Directives:-

73/23/EEC Low Voltage Directive
89/336/EEC Electromagnetic Compatibility Directive
93/68/EEC CE Marking Directive

The following harmonised standards have been applied:-

BS EN55011 Emissions Specification (Group 2 Class A)
Industrial, Scientific and Medical equipment

BS EN50082-2 Generic Immunity Standard
Part 2 Industrial

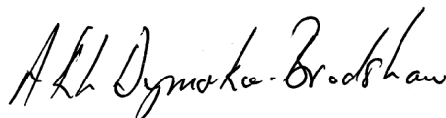
BS EN 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and
Laboratory Use

The following documents contain additional relevant information:-

Kentech file reference "trig re-synch J12****/1 and /2"

Name: A. K. L. Dymoke-Bradshaw

Signature:



On behalf of Kentech Instruments Ltd

Position: Director Issued: 13th. December 2012

RF emissions and EC directive 89/336/EEC

This equipment is a research tool that has been intentionally designed to generate short high energy electromagnetic pulses and the EM emissions will be highly sensitive to the load applied by the user, for example the radiation just from some types of output cable may exceed EC permitted levels.

The emissions from the unit itself have been tested and found to be within certain EC limits, see the Declaration of Conformity. These tests were performed with a dummy load on the output. The level of RF radiation generated by the circuit boards within the instrument is inevitably high but the emissions are largely contained by the instrument enclosure. It is therefore very important that all fasteners are securely fastened, do not operate the unit with the covers removed. The unit may still interfere with sensitive equipment at short range.

We believe that with this type of unit it has to be the system builders responsibility to verify that his unit/load system complies with the EC directive unless the system is used in a screened electromagnetic environment.

We are not able to guarantee compliance with arbitrary loads but to minimise emissions we recommend:-

1) that any load is fully contained within a conductive metal screened box, with all joint surfaces gasketed or fitted with conductive fasteners at less than 5cm intervals.

2) that the load is connected to the unit output with semi-rigid cable, the cable outer must be carefully connected to the output connectors at one end, and must be connected directly to the screened box containing the load at the point of entry. Flexible cables should only be used with caution, in particular RG303 type cable will need additional screening to control emissions.

PLEASE READ THIS MANUAL CAREFULLY BEFORE USING THE PULSER

DISCLAIMER

The manufacturers and suppliers accept no responsibility for any electric shock or injury arising from use or misuse of this equipment. It is the responsibility of the user to exercise care and common sense with this highly versatile equipment.

1 INTRODUCTION

This manual describes the operation and use of the Trigger Resynchroniser.

It is often necessary to produce a trigger signal that is synchronised to an RF waveform but occurs at a random time. The Trigger Resynchroniser will produce a low jitter output synchronised to the RF at a time after a trigger signal is received.

1.1 SPECIFICATIONS

Maximum repetition rate for high voltage output 10kHz.

Maximum repetition rate for 5 volt output > 4MHz.

Trigger input sensitivity: requires > 1.5 volts into 50Ω to trigger

Trigger input duration: the unit will trigger from a 5ns, 2.5 volt (into 50Ω pulse)

Trigger sense: the low voltage output state will be the same as the trigger input at the time of an RF edge. The unit may be used for positive or negative edge use except for the high voltage output which is AC coupled and will only operate from a positive going edge.

RF bandwidth: 1MHz to 1GHz (jitter spec is only good for up to 500MHz).

RF sensitivity: 300mV (peak to peak) at 110Mhz

750mV (peak to peak) at 500MHz

Outputs: 5 volt output will deliver approximately 5 volts into 50 ohms
30 volt output will deliver 30 volts into an open circuit or 15 volts into 50 ohms. However, this output is reverse terminated to 50 ohms so that cables do not have to be terminated. Reverse termination reduces the chance of failure if the output is into a short circuit. With the reverse termination removed the unit would deliver 30 volts into 50 ohms but might fail into a short circuit.

Trigger edge direction: The unit is only specified for use with a positive edge although in principle both edges will be synchronised to clock edges.
Note that the high voltage output is AC coupled and consequently only synchronises to a positive going trigger edge. The output will then decay. The 5 volt output will stay high until an RF edge is detected and the trigger input is low.

Jitter: We have measured this to be approximately 50ps at 500MHz but some or most of this may be due to noise on our RF source.

Indicators: power ON (red)
RF detected (yellow)
Triggered (green)

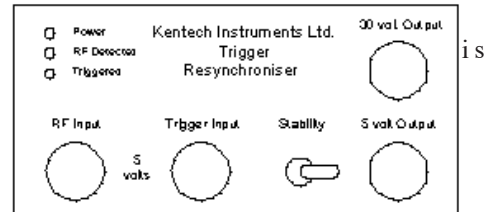
Power input: Universal
115 to 230 volts A.C. at 50 to 60Hz.
2 amp fuse, type T (anti-surge)
This unit contains an auto-resetting thermal trip rated at 70°C
Maximum average power consumption 10 watts.

Connectors:
Power: IEC
Trigger input: BNC
RF input: BNC
5 volt output: BNC
30 volt output: BNC

2 GETTING TO KNOW THE INSTRUMENT

2.1 TRIGGERING

The Trigger Resynchroniser will produce a low jitter output synchronised to the RF at a time after a trigger signal is received. In fact except for the high voltage outputs the unit DC coupled and will repeatedly clock the trigger input level (high or low) to the main output on each RF cycle. In this way it can be used for both positive and negative edge triggering. Note, however, that if the trigger pulse is shorter than an RF clock cycle the output may not get clocked through, it will depend upon the relative timing of the trigger pulse and the RF edge used for clocking, this will generally be random.



The front panel

If the trigger pulse is not random but is somewhat synchronised to the RF already then there is a possibility that successive triggers will straddle an RF clock edge. This will result in the output apparently jumping by a clock cycle and could lead to some problems. The stability switch inserts or removes a 0.5ns delay in the trigger signal path and this can be used to move the trigger pulse away from a clock edge so that reproducible behaviour is observed.

Note that the state of the triggered indicator is not useful if the RF is not detected as it will just indicate the state of the input last time an RF edge was clocked. If the unit is triggered and the RF turned off the triggered indicator will be in an unpredictable state and if it happens to be illuminated this does not mean that the trigger signal is present.

2.2 USE

Connect the unit to the mains and switch on. Connect the RF source to the RF input and the trigger signal to the trigger input. See Specifications for limits on these signal levels.

The RF power should be set high enough to make the RF detect light come on.

With a low repetition rate trigger signal the triggered light will flash.

The 5 volt output and the main output will pulse almost synchronously.

The 30 volt output will not operate at the full repetition rate of the unit, see specifications. The 30 volt output is also only synchronised to positive edges. The output then decays.

