QUASAR CODE 3148T6 - STOPWATCH with PAUSE (9999H 59M 59S)

General Guidelines for Electronic Kits and Assembled Modules

Thank you for choosing one of our products. Please take some time to carefully read the important information below concerning use of this product. The assembly and operating instructions are on the following pages. Help with component identification can be found on our website at www.quasarelectronics.co.uk/componentid.htm. If you are unsure about any aspect of the assembly or use of this product please contact our Support Team before proceeding.

WEEE Directive (Waste Electrical and Electronic Equipment)
Notice To All European Union Citizens. Important environmental information about this product.
The crossed out wheeled bin symbol on this product, package or documentation indicates that disposal of this product after its lifecycle could harm the environment. Do not dispose of this product (or batteries if used) as unsorted municipal waste. It should be disposed by a specialized company for recycling.
The unit should be returned to your distributor or to a local recycling service. Please respect the local environmental rules. If in doubt contact your local authorities about waste disposal rules.

Safety: General rules concerning safe use of our Kits or Modules.
To ensure your safety, please observe these safety measures. In no way are these complete. As safety requirements vary, please check with your local authorities, in order to comply with local requirements. If in doubt, seek the help of a qualified person.

Battery or wall-adaptor operated devices are safe devices. They do not require special attention unless mains voltage is connected to an output e.g. a relay.

To ensure electrical safety, and also protection from fire or personal injury, make sure your mains operated equipment complies with these safety hints:

- Use a suitable plastic enclosure. If a metal enclosure is used, make sure it is properly earthed.
- Use a power switch if the device consumes more than 10W. Use a double pole switch for mains operated, transformer-less kits.
- Mount a fuse in series with the mains switch. Use a slow blow (T) 50mA fuse for transformers up to 10W and a 100mA fuse for transformers up to 20W.
- Use a mains input connector, or a robust power cord with a clamp.
- Internal wiring carrying mains voltages must have a minimum cross-sectional area of 0.5mm^2.

If supplied, attach the power rating label near the power cord of the device and fill-out the mains voltage, frequency, power consumption and fuse values.

Troubleshooting and Support

90% of non working kits are due to poor soldering.
We operate a Get-You-Going service for non-working kits but there is a charge based on the time and components needed to complete the repair. Quite often it is not economically viable for us to repair and it is cheaper to supply a new ready made product at full cost.

Disclaimer

Quasar Electronics reserves the right to change product specifications or to discontinue products without notice. Quasar Electronics cannot be held responsible for any loss or damage, direct or indirect, which might occur from the use of a product. Quasar Electronics Kits or Modules are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they are not suitable for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

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Another in the series of timer kits based on the 3148 hardware platform. This is similar to our 3148T2 classic stopwatch timer with pause but without the timing is in hours, minutes and seconds (no hundredths of a second) up to a maximum of '9999:59:59'. An output signal which pulses low every minute is also available.

Refer to the "**3148 4-DIGIT TIMING MODULE**" documentation for details of hardware features, circuit description and assembly instructions.

TIMER SPECIFICATIONS

Timing ranges	0 to 9999h 59m 59s
Timing resolution	1 second
Inputs	Start, Stop and Reset
Output pulse	20mS second active low every minute.
Output type	Open collector NPN transistor, 100mA @ 30V
Display	4-digit 7-segment with decimal point, 14mm RED LED
Supply voltage	9 to 12V DC
Supply current	30 to 50mA, depending on the number displayed.
Physical size	51mm x 66mm (2.0" x 2.6")
Connection	10-way right-angle SIL header pins, 0.1" spacing

OPERATING INSTRUCTIONS
On power up or reset the display shows minutes and seconds as '**00.00**' (MM.SS). Press the START button to commence timing. The display starts counting up in seconds.

At the **end of every minute** the display changes over for **1 second** to show the elapsed hours and minutes time. It then reverts to displaying and counting seconds.

PAUSE function
While the timer is running press the START button – the display will 'freeze' at the current elapsed time. The timer is still running in the background – only the display has been stopped. **Note:** The output pulse every minute will continue because the timer is still running. Press the START button again to re-start the display. It will jump to show the current elapsed time.

The PAUSE function can be used to measure LAP times during a race. However the 'LAP' time does not reset when the START button is pressed again.

STOP function
Similarly, pressing the STOP button while the timer is running also causes the display to freeze. **However the timer is stopped as well**. The output pulses every minute are also stopped. Press the START button again to continue on.

Displaying hours and minutes
In both the above cases when the display is 'frozen' you can press the STOP button to toggle the display between hours and minutes/seconds.

The hours display does not have a decimal point between the hours and minutes digits.

RESET function
At any time you can reset the timer via an earth on the RESET input to the module (just short the reset pins together). You can also reset the timer using the STOP button. In this case 'freeze' the display as described above then press **and hold** the STOP button for 1/2 a second. The display will blink off momentarily and then display '**00.00**' again.

OUTPUT pulse
At the end of every minute the open collector output pulses 'low' for 20mS. (For more information about what an open collector output is please read the notes at **www.quasarelectronics.co.uk/ds.htm#3148**

You can use this output to externally count the number of elapsed minutes. This feature can be altered in the firmware on request. If, for example, your application needs an output pulse every hour instead of every minute. Or it needs an 'overflow' output when the timer rolls over from '9999:59:59' to '00:00:00.00' (a pulse every 10,000 hours) then please contact the software writer below and he may be able to do a special firmware chip for you. It is only software after all. It is not like adding new cmos IC's to the PCB like in the old days.

APPLICATIONS
The most obvious use would be in timing races, either by hand or via external signals as they cross the finish line. We have one customer who uses a slightly modified version as the heart of a greyhound racing timing system.

Add a timing function to your slot car or train set. Or measure the duration of a telephone call.

CONNECTING TO THE TIMER
A 10-way header strip provides external connection to the timer, including power. All the inputs and the output are organized as 'pairs' of pins, with each input or output having a corresponding ground pin, as per the following diagram.
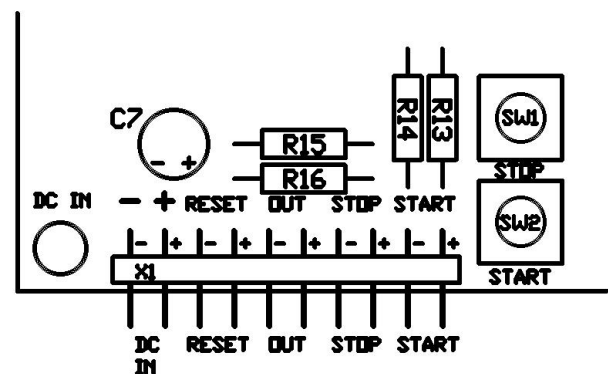
The '+' sign indicates the actual input or output pin and the '-' sign indicates its associated ground pin.

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Note: When using the output to switch a load (relay, buzzer, etc) connect the load between the output pin and a positive DC voltage. For example, if switching a 12V relay connect the relay between the output pin and +12V.

Accuracy. Timing will be accurate to within +/- 1.8 sec per hour (3600 seconds.)

OTHER TIMING MODULES

There are other firmware IC's available for 3148:

1. **3148T0**. Programmable Down Timer counting down in seconds from a maximum 0f 10,000 sec
2. **3148T1**. Simple Photographic Timer
3. **3148T2** Stopwatch with Pause Function (in Hundredths to 99H 59M 59.99S max.)
4. **3148T3**. 40KHz Auto Ranging Frequency Meter
5. **3148T4** Programmable Down Timer counting down in minutes from a max of 10,000 minutes
6. **3148T5** Programmable Down Timer counting down in hours from a max of 10,000 hours

See out website at **www.quasarelectronics.co.uk** for

details. You can contact our technical support by email:

support@quasarelectronics.co.uk

Please note we do not provide the source code for any of our firmware.