QUASAR PROJECT KIT # 3148T0 - PROGRAMMABLE DOWN TIMER

T0 - PROGRAMMABLE DOWN TIMER

With kit 3148 we supply the 'T0' firmware chip which is a 4 digit programmable down timer with output and reset. Timing is in seconds with a maximum programmable time of 10,000 seconds (0000) which is 2 hours, 46 minutes and 40 seconds. It has four operating modes that control the output function when the timer reaches zero.

HARDWARE SPECIFICATIONS

Timing range	0000 to 9999 seconds Starting at 0000 gives 10,000 seconds (2h 46m 40s)
Inputs	Start, Stop and Reset Active low (see text)
Output	Open collector NPN transistor, 100mA @ 30V
Supply voltage	9 to 12V DC
Supply current	30 to 50mA, depending on the number displayed.
Display	4-digit 7-segment with decimal point, 14mm RED LED
Physical size	51mm x 66mm (2.0” x 2.6”)
Connection	10-way right-angle SIL header pins 0.1” spacing. Male or female

After you place the uC in the socket and apply power the display will show **0000**

PROGRAMMING THE TIMER

The two buttons marked S**TART** and **STOP** are used to **program the starting time** (4 digits) first, and **select the operating mode** (1 digit) second.

When you apply power you will see **0000** in the display.

If you press the **START** button now you will start to count down from 10,000 secs. So do not do that. If you did, reconnect the power and start again at **0000**

Programming the start value is done **one digit at a time** starting with the leftmost thousands digit. The decimal points are used to indicate which digit to its left is being set.

Press the **STOP** button once to enter programming mode. The leftmost decimal point will come and show **0.000** Now use the START button to set the value required from 0-9. When you have selected the thousands digit you want (say 5) press the STOP button and you will see **50.00** The 5 has been set and you are now ready to program the hundreds digit. Press the START button to set the hundreds digit, say 4. Press the STOP. You will see **540.0**

Repeat the steps above for the tens and units digits.

After you set the units digit and press STOP the display will switch to allow the **operating mode** to be set. The current operating mode, probably **1** will be displayed. Use the START button to set which of the 4 operating modes you want (see below for a description of each.) After you have selected the mode you want then press the **STOP** button. The display will blank momentarily to indicate that programming mode has ended and the 4 digits you set to count down from will be displayed. For example **5460** if you want to count down from 91 minutes (60 x 91 = 5460 seconds.) The timer is now programmed ready to go.

STARTING THE TIMER

Press the **START** button or apply a ground to the start input and the timer will start counting down towards zero. **NOTE**: the STOP button or input has no affect while the timer is counting down.

STOPPING THE TIMER

The only way to stop the timer is via the reset input. Short the Reset pin to ground. The timer will reset to its programmed value - the operating mode is not affected. If the timer loses power it will restart in Mode 1 with a preset value of **0000** (10,000 seconds).

OPERATING MODES

There are four operating modes that control the timer and the output. The RESET input does not affect the operating mode.

Mode 1. Timer Stop, Output Hold (default)
This is the default mode at power up. The timer stops when it reaches zero and the Output goes low and stays low. You have to press Reset (short the Reset pin to ground) to continue.

Mode 2. Timer Overrun, Output Hold
Same as Mode 1 except the timer continues counting down past zero, wraps around to 9999 and starts counting down from there. The Output pin goes low and stays low. Short the Reset pin to ground to return to the preset timer value.

Mode 3. Auto Reset, Pulse Output
When the timer reaches zero the Output pulses low for 20mS and the timer resets itself to the programmed value and stays there. You can start to count down again from the preset value by pressing START.

Mode 4. Timer Overrun, Pulse Output
Same as Mode 2 except the output pulses low for 20msec instead of staying low. Counting wraps to 9999 and starts counting down. Short the Reset pin to ground to return to the preset timer value.

If the counter has stopped counting down you can reset the timer value by pressing STOP and resetting the time and the mode.