Which capacitor to use for load capacitance

What is the required load capacitance?
The required load capacitance is specified by the crystal manufacturer in the datasheet,usually as C L. The crystal manufacturer is saying that if the capacitance across the leads of the crystal is equal to C L,the crystal will resonate at its specified frequency.

Are load capacitors the only capacitance across the leads of the crystal?
If the load capacitors were the only capacitance across the leads of the crystal,that would indeed be the case. However,there are additional sources of capacitance in the oscillator circuit. The first source is the "stray capacitance" of the circuit board traces.

What is recommended load capacitance (CL)?
The recommended load capacitance (CL) for a given crystal is generally specified in the crystal manufacturer's datasheet. The specified load capacitance is the total load capacitance which should be used for that crystal(as opposed to the capacitance needed at each leg of the crystal).

What is the optimum load capacitance for a crystal?
The optimum load capacitance for the crystal,CL,is given in the crystal datasheet and C1 and C2 should be matched to this value according to Where,Cx is the sum of the capacitance in Cx,the parasitic capacitance in the PCB trace and the capacitance in the terminal of the crystal. The sum of the two latter parts will typically be in the range of

How do I choose a load capacitor for a crystal oscillator?
Most often the best starting point of selecting load capacitors for a crystal oscillator is the datasheetof the device being driven. To give an example,an ATMEGA328PB-MU Please note the 16Mhz crystal would be used in a 5V application.

What capacitors should a Maxim RTC clock use?
The recommendations for some of the Maxim RTC clocks is a 6pF crystal. The 6pF is supplied by the IC and traces. Let's say you have a Crystal rated with 8pf Load Capacitance. So how do you know which capacitors to use? Easy. Every crystal datasheet lists something called the Load Capacitance (CL). In the case of the crystal above,it's 8 pF.

So how do you know which capacitors to use? Easy. Every crystal datasheet lists something called the Load Capacitance (CL). In the case of the crystal above, it"s 8 pF. C1 and C2 need to match this Load Capacitance, with the following formula being the key:

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The minimum capacitance of the example decoupling capacitor. Here, you should use--at least--a 6 nF capacitor to compensate for a 0.5 V maximum voltage within 6 ns. Note that some guidelines would recommend using two 3 nF capacitors in parallel in this example as this would reduce ESR by a factor of 2, but this will also reduce ESL by a ...

The load capacitance mentioned in the crystal datasheet is 10pF and the shunt capacitance is 5pF. In the design, the load capacitors that I have placed with the IC are 18pF and the design works fine. A stray capacitance of 2pF is considered for the calculation. I made this load capacitor calculation considering the below formula from the datasheet.

For the total load capacitance in the circuit, all capacitances need to be considered. Therefore, not only the two capacitors, but also the input and output capacitance ...

Designers can optimize power efficiency by selecting the appropriate load capacitance, leading to extended battery life for portable devices and reduced energy consumption in larger systems. Additionally, load ...

This means that if the load capacitance of a crystal is 20 pF, both capacitors would need to be 20 pF. However, this is not correct and this would cause frequency shifts. Another misconception is that the load capacitance on the crystal datasheet needs to be equal to the sum of both capacitors. If we use the same example with a 20 pF crystal ...

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