

# Equipment

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The following equipment is desirable :-

**CNC Router** or Laser or Waterjet and if not one of these then a Scrollsaw or a Bandsaw.  
Small Lathe, this is not absolutely essential but it would make making the clock a lot easier for all of the round parts that are needed.

**Small Milling** machine or **Pedestal Drill** with work holding vice. There are a lot of holes to be drilled and cleaned up after CNC machining and fabrication so the drill is pretty much essential. It may be possible to get away with an ordinary electric drill in a stand but a work holding vice is still necessary.

**Drill Bits** in the following sizes,  $\varnothing 2$ ,  $\varnothing 3$ ,  $\varnothing 3.1$ ,  $\varnothing 4$ ,  $\varnothing 4.1$ ,  $\varnothing 8$ ,  $\varnothing 10$ .

**Router Cutters**  $\varnothing 2$ ,  $\varnothing 3$  and possibly  $\varnothing 6$  for cutting out the larger frames.

**Reamer**  $\varnothing 10$  for reaming out the holes in the frame for the bearings.

**Hand tools** all the normal things that are used in the workshop, Files, screwdrivers hammers pliers etc.

If you want to save a lot of time then look at a **Sanding disk** and a **Drum sander** but these are really nice to have.

## **Consumables**

Sand paper in various grades from rough to fine

Danish oil for finishing.

Gorilla Glue

PVA

Dry Film Lubricant in a spray can for the gears after everything is finished.

# MATERIALS

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## For all the wooden Parts

The choice of material to build the clocks from is a very personal one and is really down to you to decide. I personally prefer to use actual timber, Cherry for the frames and Maple for the gears and other parts. I use timber machined to a standard size of 120mm x 9mm and 120 x 12mm, and these are fabricated into blanks for the larger components by gluing two strips together.

You can however use a quality grade of plywood (Marine Ply) this route is a lot quicker as you can layout multiple parts on a sheet and have the whole thing cut out in an day, still need to put in the time cleaning up the parts and making all the other bits, but generally speaking the whole thing can be done a lot thicker.

Generally speaking I wouldn't recommend MDF unless you are laser cutting as the parts can be easily damaged. If you use a laser however the burnt finish is actually carbon and will act as a lubricant.

You can also use Perspex with which you can create some quite colourful clocks ( see clock 19). Also you can of course use Brass or Steel or even Aluminium but this latter would need some post treatment to stop the wear that can happen between two aluminium parts in rubbing contact.

Whatever you use the flat 2D parts are all laid out for you on the Profile cuts sheet, this comes as a DXF file that is 1000mm square, you can manipulate this in your own CAD program, which you will probably need to do to be able to feed the files into your CAM program.

## For all the other parts

Ø4 Silver Steel for all the shafts and numerous pins - 3 rods 13" Long

Ø3 Silver Steel for pins 1 rod 13" long

Ø2 Silver Steel for pins 1 rod 13" long

Ø6 mm Stainless steel threaded rod 500mm

Ø8 mm Brass Rod 150 mm for Drive Shaft

Ø20 mm Brass Rod 100 mm for pendulum

Carbon Fibre tube Ø6 x Ø4 bore x 10mm for Pendulum.

Ball Bearing Ø8 2 required

Ball Bearing Ø6 4 required

Ball Bearing Ø4 8 required

Ø6 Dome nuts Brass 4 required

Ø6 Locknuts 2 required

Woodscrews Ø4.5x60mm 2 required

Clevis Pins Ø4x 20 4 required( saves you making the headed pins)

Lead 3kg (either Lead shot or Sash weights)

Note these are the minimum amounts of material necessary to build the clock I used more in the prototype and you may well be advised to by extra to cover those accidental losses that occur.

If I have missed anything here you will find them in the parts list for the clock anyway.