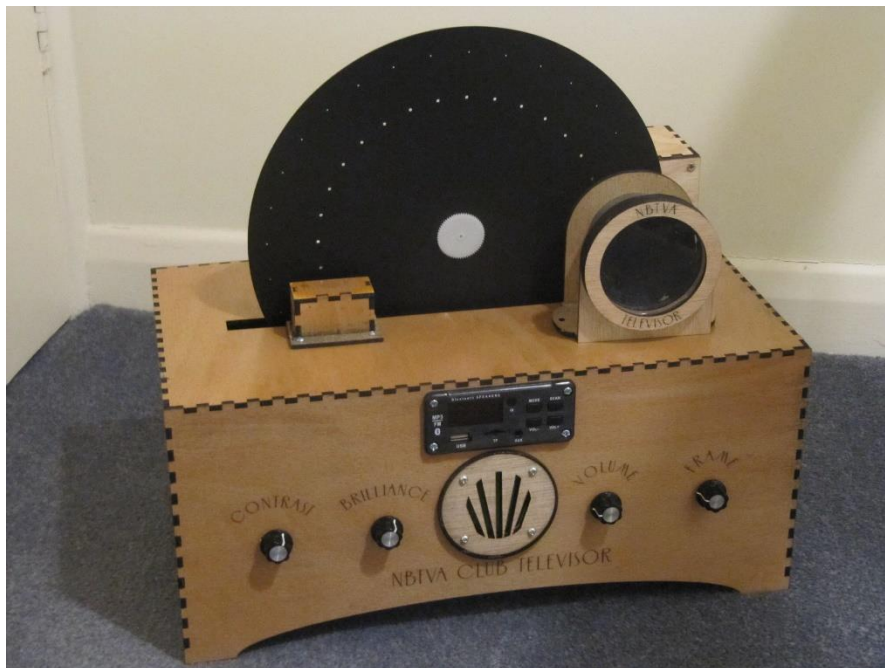
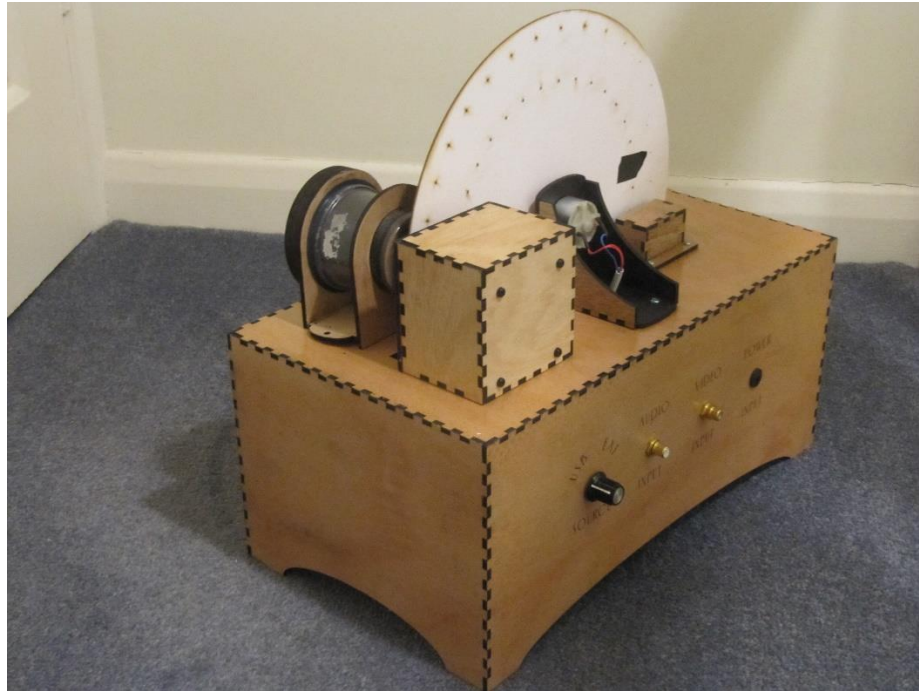


## Laser-cut Televisor design James Sheehan and Chris Lewis

In order to stimulate interest in the hobby after discussions with James Sheehan who I met at last year's convention we looked at several ideas to simplify the design and build of an entry level NBTV televisor. Many people who have limited skills or facilities to build conventional apparatus may be interested in the following project. By using the recommended parts from the [club shop](#) the unit should not require any experimentation with electronic component values to optimise picture stability and quality.

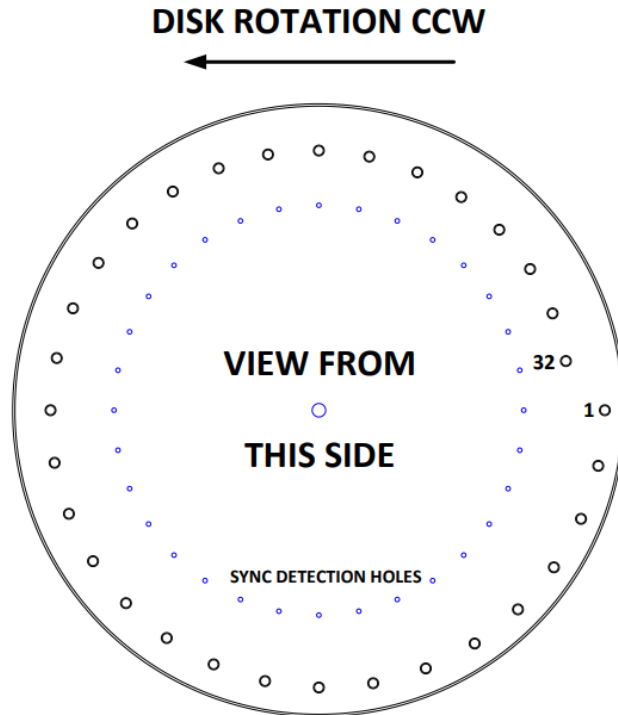
This publication contains all the information for building this superb self-contained period looking Baird type televisor and will no doubt become a talking point to both friends and family and could take pride of place in any room within the house. This project is aimed at the beginner so no prior knowledge is required other than basic use of hand tools. There is no need to go down the laser cut route if you are competent in basic carpentry, nothing is critical other than the spinning disc which needs to be purchased from the [club shop](#) unless you have a laser cutter and use our DFX files to produce your own.





#### Features

- Proven design, no optimisation of components
- No exposure to mains Voltages. Powered by single external 16 Volt supply
- Minimum setting up required
- High quality printed circuit board design
- Easily obtainable components
- Minimum hand tools required.
- Self-contained unit
- Internal USB/microSD card player
- Bluetooth compatibility. Ability to play files from external sources i.e. PC or mobile devices.
- Will accept external hardwired NBTV/audio signals
- Internal amplifier and speaker
- Remote IR control unit
- Internal VHF FM radio

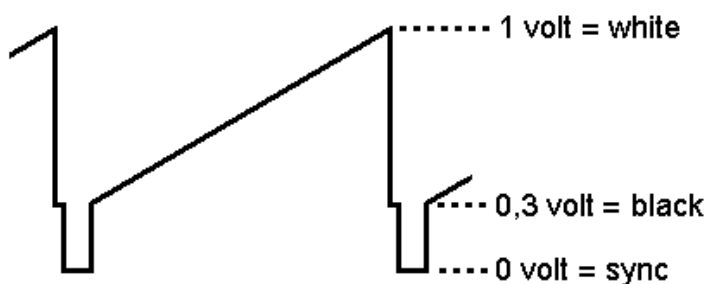


**NOTE THAT THE LOCATION OF SCAN HOLE #1 IS CLOSEST TO THE OUTER EDGE OF THE DISK.**

Let us look at the operation of the television before we go any further. The disc above is rotated counter clockwise by a small dc motor. On the periphery we see 32 holes that form a spiral. As the disc rotates the holes scan from right to left forming the picture when illuminated from a modulated LED light source from behind the disc. The inner circle of 32 holes allows us to synchronise the speed of the disc to the incoming video source. During final testing we blank one of the holes out (missing synch detection) and this absent pulse tells the control electronics where the framed image starts. The single control board provides the modulated LED signal for display, an output to drive the motor and synch pulse detection circuitry.

In Baird's original television the audio and picture channels were produced simultaneously by two separate transmitters. Likewise the early NBTVA club standard was based on the 'line output signals' of a CD player normally RCA type connectors (often called phono sockets). The left-hand side channel video and right-hand side audio.

The NBTV video signal is shown here. The white level is 1 Volt whilst the black is 300mV. Between zero and positive 300mV we see the regular synchronising pulses which lock the disc speed and position to the incoming video. Unfortunately not all players are consistent with the polarity of this signal and, as this is important for the synch pulse detection circuitry, we need to invert this signal if indeed it is the wrong way up. If we are using Gary Millard's software to convert standard video to 32-line NBTV audio there is a feature to invert the .WAV file polarity in the form of a 'tick box' within his software.



This inversion does not affect the audio channel as it is fed directly into an amplifier. Initially we shall be using the internal media player using files stored on USB thumb drive or MicroSD card created by Gary Millard's program which will require inversion. Later you may decide to use external NBTV sources, a

provision has been made for this in the design. If this is battery operated you can normally swap over the two incoming NBTVA signal wires to invert the video signal polarity if required.

The main components including base unit, motor mount, lightbox and viewing window are laser-cut and can be sourced by an ever-increasing number of local workshops springing up to produce such components. The 12-inch disk is readily available from the club shop as is the motor and blank LED display board. Other versions of the disc may be made available to club members

#### **IMPORTANT NOTE REGARDING HEALTH & SAFETY**

**A high-speed spinning disk is inherently dangerous and may cause serious injury if accidentally touched during operation. The NBTVA strongly advise that a protective cover is fitted around the disk to avoid accidents. As such, the builder agrees to undertake all risks associated with the construction of this monitor together with the understanding that the NBTVA cannot be held responsible for any injuries that may be incurred by the builder**

For safety reasons this unit is powered externally from a plug top type 16-volt 2 Ampere power supply. Inside the base unit sits the control board which can be my own designed motor and LED driver PCB.

Also inside there is space for a small off the shelf audio amplifier and standard two-inch speaker as well as an internal media player to generate signals for your televisor. Provision has been made to switch between both external and internal sound and NBTVA signals.