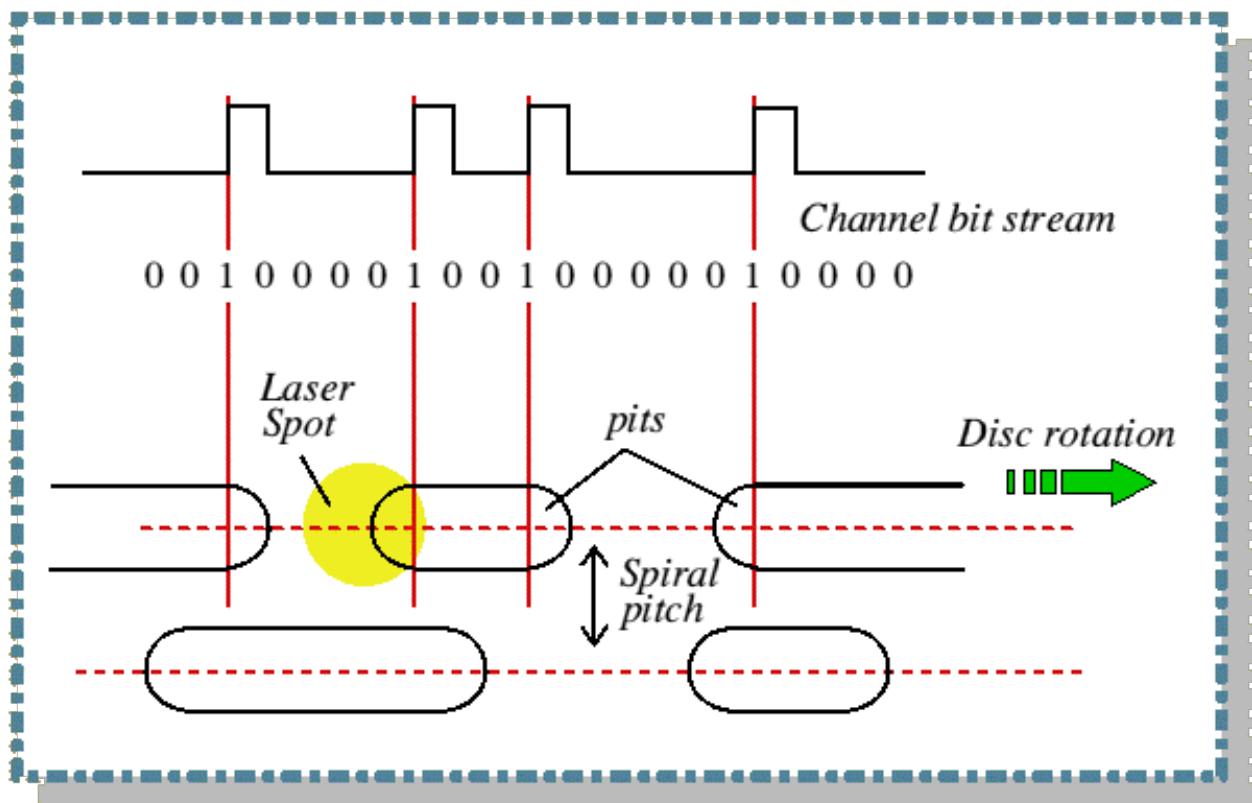


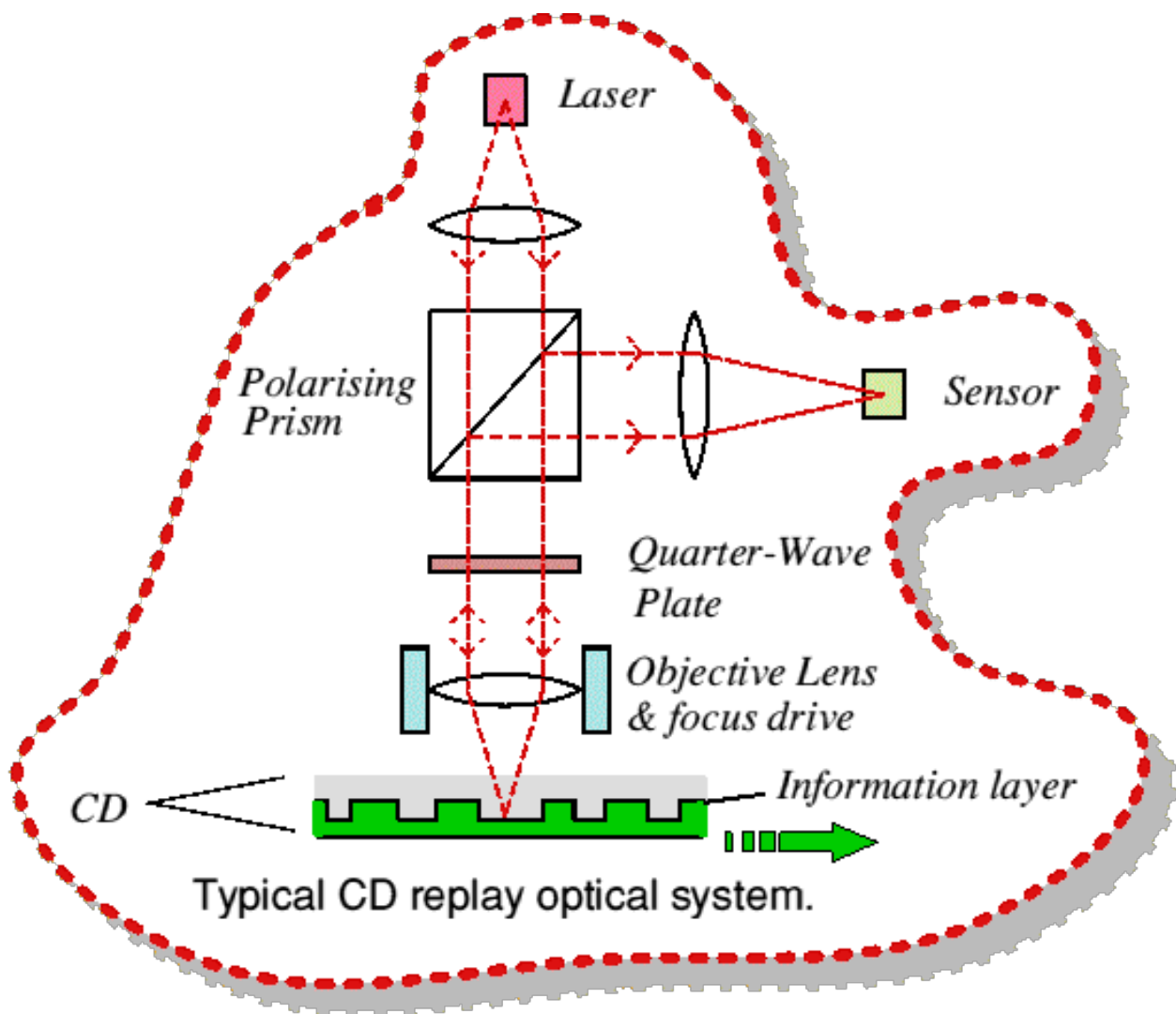
BITS & CDs

Originally taken from https://www.st-andrews.ac.uk/~www_pa/Scots_Guide/info/signals/bits_cd/bits_cd.htm

Like LP's, CD's record information in a spiral pattern on the surface of a disc. Unlike an LP, there is no 'groove', just a spiral of unconnected *pits* which are sensed with a laser beam. The pattern of pits on a CD store information as a series of binary '1's and '0's. As the disc rotates a laser beam is used to produce a '1' every time it finds a *pit edge*.



The information layer of a CD consists of a nominally flat *land* into which the pits have been made. In practice CDs are often made by injecting plastic into a metal mould which already has the inverse of the pit pattern on one wall. This produces a piece of plastic represented by the green layer in the diagram shown below.



The pitted surface is then coated with a very thin layer of metal (usually aluminium) to make it reflective. This metal surface with a flat *land* marked with lots of pits is the *information layer* of the disc. Usually, it is then coated with a another transparent layer of plastic (shown as grey in the diagram) to protect the fragile metal layer.

The depth of the pits is carefully chosen to be about a quarter of the wavelength of the laser light. As a result, when a pit/land edge passes though the scanning laser spot the reflected intensity drops briefly to zero. This happens because the light reflected from the land and from the bottom of the pit are exactly out of phase and tend to cancel out. (The light energy doesn't vanish altogether when this happens, it just gets scattered off in other directions away from the laser sensor.)

The CD player collects the bits into a stream of 16-bit binary numbers. Each number specifies the sound pressure at a particular moment, so the player can use these numbers to recreate the original music patterns.