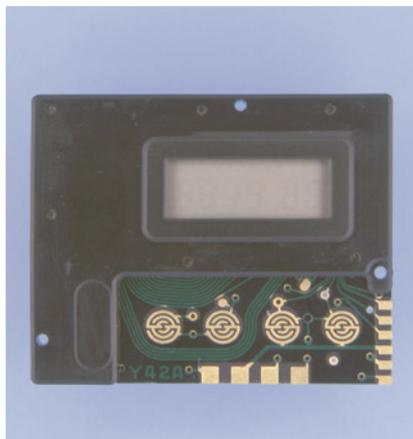


Camera Auto-Dating Module for Photographs August 1981



Time display accuracy: Monthly rate ± 90 seconds
 Display: STN liquid crystal
 Date printer: STN guest host (dichroic dye)
 liquid crystal with Ni mask
 Size: (W)40 x (D)33.3 x (T)*3.8 mm
 * Maximum thickness: 5.2 mm
 Weight: 6.5 g

Product Features

The world's first auto-dating module with an LCD was an integrated module premised on being mounted on the rear cover of the camera in order to set and change the time and date. Architecturally, it comprised two panels—an external display panel and a date-stamping panel for burning the information on the panel to the film—along with a lamp for the burning, and an electronic circuit (random-logic IC) for controlling information including the time and date.

By adjusting the polarizer for the liquid crystal to change the angle of polarization by 90 degrees compared to the normal liquid crystal panel angle, the auto-dating liquid-crystal panel's numbers and other displayed information were illuminated with white light (i.e., the light passed through them). The mechanism thus worked by having the built-in lamp shine in response to the shutter, so that the light would pass through the display section, whose information would thereby be burned to the film. A different idea considered in the early stages of development entailed stamping the information to film using light captured by a module fitted to the camera lens. In the end, though, the rear-cover-mounted module design won out because of the desirability of creating a versatile module that could be used with cameras from any manufacturer.

Also, in order to get a clear time stamp, various materials, production methods, and design schemes were used to build a host of prototypes to improve upon the 10:1 contrast then used in liquid-crystal displays. The result of this research was the development of an STN-type liquid crystal using the guest host (dichroic dye) technique, which yielded a contrast of 200:1. A nickel mask was also employed to improve opacity and thus sharpen the contours of the characters.

This module truly represented a fusion of Epson* technologies: its display was manufactured by the Displays Operations Division; its IC was manufactured by the Semiconductor Operations Division; and, its quartz oscillator was manufactured by the Quartz Device Operations Division. Furthermore, the introduction of a production line fully automated from assembly to final inspection, and which applied the automated assembly line from watch production, resulted in a high degree of cost-competitiveness.

Background

In the latter half of 1979, Epson embarked upon a project to apply a clock function to other products, with a particular eye toward the growing camera market. At the time, there were already cameras on the market that could date-stamp film. They required, however, that the user manually adjust a date ring on the camera every day before taking pictures. This inconvenience meant that not all cameras included the date-stamping feature. Still, many people desired this capability, on the basis that the memorial value of photographs would be enhanced by knowing when they were taken. Epson responded to this demand by undertaking the development of a technique for taking advantage of clock functionality to determine time and date, then burning these to film. The entire development cycle, from conception to prototype, took one and a half years, and resulted in the commercialization of the world's first auto-dating module.

Impact

The world's first camera with a built-in auto-dating module driven by an LCD quartz-digital clock elicited an enormous response from the market. Subsequently, nearly all camera manufacturers adopted this auto-dating module, with the result that Epson's auto-dating module exceeded a remarkable 95% market share at its peak, becoming in the process the de facto standard in its product class. Moreover, as an outgrowth of this data module business, the sale of display modules using panels, ICs, and highly-density packaging technologies blossomed as a business in its own right. In the first half of the 1990s, mobile phones emerged as one new application for these products. This business line represents the genesis of Epson's current-day business in LCD modules for mobile phones.

It is a proud achievement for Epson that, in their twenty-three years on the market, Epson sold a total of 160 million of these units.

*Then known as Suwa Seikosha Co., Ltd.