

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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FINISAR CORPORATION

Petitioner

v.

THOMAS SWAN & CO. LTD.

Patent Owner

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*Inter Partes* Review Case No. Unassigned

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**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 7,145,710  
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. §§ 42.1-.80, 42.100-.123**

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U.S. Patent and Trademark Office  
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**I. INTRODUCTION**

Petitioner Finisar Corporation (“Finisar”) requests *inter partes* review of all claims of U.S. Patent No. 7,145,710 (“the ’710 patent”) (Ex. 1001), assigned on its face to patent to Thomas Swan & Co. Ltd. (“Thomas Swan”). The claims of the ’710 patent are generally directed to “optical devices” that use a spatial light modulator (“SLM”) comprising a two-dimensional array of pixels or “phase modulating elements” to control the direction of incident light beams. The technology claimed in the ’710 patent has applications in fiber optic communications. The original patent application that led to the issuance of the ’710 patent was filed in the United Kingdom on September 3, 2001.

As explained further below, the named inventor on the ’710 patent, Melanie J. Holmes, improperly claimed as her own subject matter that was previously developed and published by her former colleagues at the University of Cambridge (“Cambridge”). For about a decade prior to the filing of the priority application in 2001, students and researchers at Cambridge, working in Professor William Crossland’s Photonics & Sensors group, had investigated and published research relating to the use of liquid crystal SLMs for performing all kinds of optical functions for use in optical communication and other applications. This work is well documented and described in numerous publications emanating from Dr. Crossland’s group in the 1990s. See Ex. 1016, [http://www-g.eng.cam.ac.uk/photonics\\_sensors/](http://www-g.eng.cam.ac.uk/photonics_sensors/)

people/bill-crossland.htm (“Bill Crossland held the position of Group Leader of the Photonics & Sensors Group . . . from 1992 . . . until his retirement at the end of September 2009. . . He is generally regarded as the founding father of liquid crystal over silicon (LCOS) technologies.”) and Ex. 1017, [http://www-g.eng.cam.ac.uk/photronics\\_sensors/publications/index.htm](http://www-g.eng.cam.ac.uk/photronics_sensors/publications/index.htm) (providing an exemplary listing of publications from the Photonics & Sensors group).

In the years prior to the filing of the U.K. priority application, Dr. Holmes collaborated with Cambridge on the development and use of liquid crystal SLMs for optical beam routing and other applications. The collaboration began in at least 1995 (Ex. 1012) [article entitled “Low Crosstalk Devices for Wavelength-Routed Networks,” by M.J. Holmes, W. Crossland et al., IEE Colloquium on Guided Wave Optical Signal Processing, IEE Dig. No. 95-128 London, UK] and continued through at least 2001 (Ex. 1013) [article entitled “Holographic Optical Switching: The ‘ROSES’ Demonstrator,” by W.A. Crossland, K.L. Tan, M.J. Holmes et al., Journal of Lightwave Technology, Vol. 18, No. 12, Dec. 2000, at 1845-54]. During this time, there was one student that worked in Prof. Crossland’s group, Stephen T. Warr that conducted research relating to liquid crystal SLMs for use in optical routing that culminated in a Ph.D. dissertation published by Cambridge. This dissertation forms the basis for several grounds in this petition, either alone as an anticipation reference, or in combination with other art for obviousness grounds. Another United States

patent application filed by Prof. Crossland (U.S. Patent App. 2001/0050787, “Crossland ’787”) forms the basis for two more grounds in this petition. Each of the references relied on are prior art under either § 102(b) or § 102(e). A further Crossland reference, M. Johansson, W. Crossland, *et al.*, “Computer-controlled, adaptive beam steering, implemented in a FLC-SLM free-space optical switch” is another Cambridge reference relevant to the implementation of “correcting the initial hologram” (claim 6) and the use of an optical sensor (claim 12).

As explained further below, it is apparent that Dr. Holmes claimed as her own the work of Dr. Warr and Prof. Crossland after learning about their research through her collaboration with Cambridge. A review of the publication history of the Cambridge group preceding leading Dr. Holmes’s U.K. priority application makes clear that the researchers in the group worked closely together—sometimes even in the same laboratories using the same devices—and openly shared their ideas with each other. In addition, these researches frequently cite each other’s work in their publications. Thus, by the time of Dr. Holmes filed her U.K. priority application, a person having ordinary skill in the art (“PHOSITA”<sup>1</sup>) would have understood that the inventions claimed by Dr. Holmes in the ’710 patent were either anticipated (sometimes by many years) or rendered obvious by the work of others at Cambridge.

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<sup>1</sup> All references to the knowledge or understanding of a PHOSITA are as of September 3, 2001 unless otherwise specified.

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