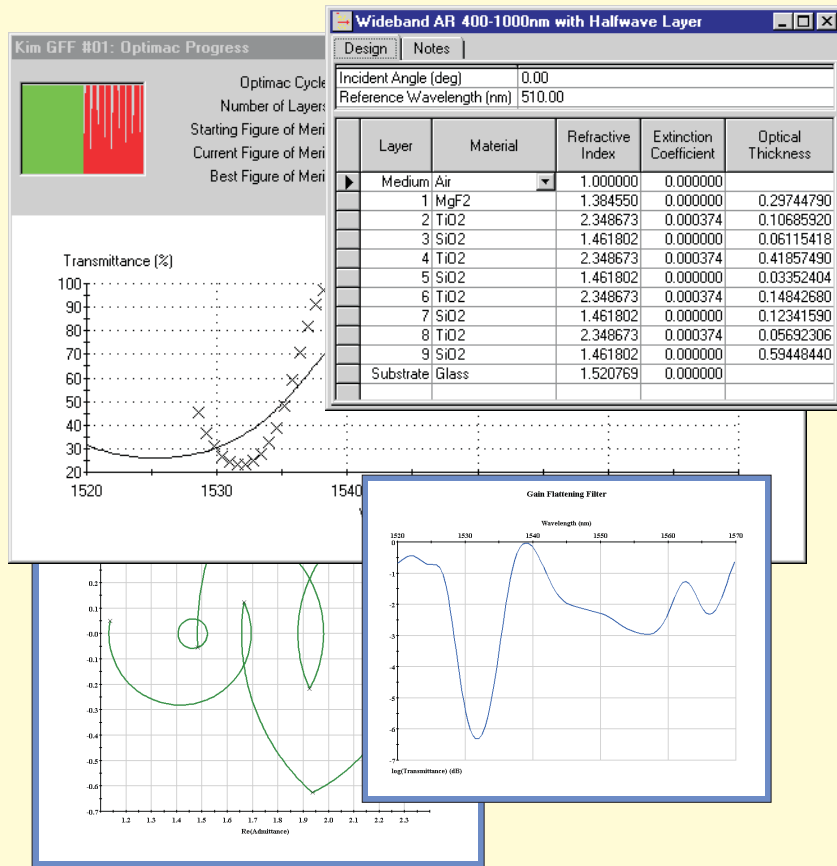


The Essential Macleod

Comprehensive Thin Film Design and Analysis Software



Including...

- Easy to use Windows Interface
- Comprehensive Performance Calculations
- User Defined Units
- Full DWDM Design Capabilities
- Design Refinement and Synthesis
- Adjustable Packing Density
- Index Refinement
- n and k Derivation
- Color Calculations
- Materials Management
- Stacks of Coated Substrates
- Non-Parallel Coatings
- Ultrafast Parameters
- Adaptive Plotting
- Cone and Bandwidth
- Design and Analysis Tools
- Full Support Service
- HTML & Hardcover Manuals
- Export Designs to ZEMAX

& With Optional Enhancements

- Simulator
- Monitorlink
- Function
- Runsheet
- vStack
- DWDM Assistant

The Essential Macleod runs under any Microsoft Windows operating system and has a true Multiple Document Interface. It provides all that is essential for optical coating design and evaluation, handling a wide range of performance parameters from ultrafast to color. It can synthesize designs from scratch or refine existing ones, investigate errors and extract optical constants of film materials for use in designs.

Material behavior is not always ideal even depending on the particular coating machine. Many different databases of material optical constants can therefore be maintained. Further, in each layer of a design, packing density can be specified as different from unity. In the Simplex refinement technique packing density may even be treated as a variable, useful for reverse engineering or simply for refinement in terms of refractive index.

Easy, intuitive editing of designs, plots, tables and materials is provided.

Units can often be a problem for users but not in the Essential Macleod where virtually any consistent set of units for the independent variables may be used. Electron volts or gigahertz or wavenumbers for frequency and ångströms or nanometres or microns, even microinches, for wavelength are possible. Changing from one system to another is simple.

A number of important tools ranging from the admittance diagram to electric field distribution are provided. Circle diagrams, Herpin equivalents, nonpolarizing edge filter design and optimum potential transmittance are also provided.

Function Enhancement

Manipulating the results of thin film calculations can be exceedingly tedious. For example, the response of a coating illuminated by a 5000K black body compares the integral of performance times black body output with the integral of the black body alone. The bewildering array of color coordinate systems leads to still greater complexity. Five of these are built into the Essential Macleod but there are many others. An enormously large number of

manipulations of the normal reflectance, transmittance, or phase results is often required. Spreadsheets are not the answer because they do not easily handle interpolation and also have difficulty processing differing numbers of data sets, but Function does all that completely automatically. Operations in a simple macro language (editor and syntax checker built-in) allow identical calculations to be repeated over and over again.

Runsheet Enhancement

This is a facility for planning coating production that consists of a machine configuration editor and a run sheet generator. A machine configuration stores details of a coating machine, its sources and their tooling factors, and its monitoring systems. With the run sheet generator, the

user can plan the monitoring of a coating design for a given machine configuration. Both optical and crystal monitoring are included as well as advanced features such as dynamic tooling factors and system bandwidth.

Monitorlink Enhancement

Monitorlink provides extra software for connecting Runsheet to a deposition controller. A stand-alone program communicates directly with the controller and an

extension to Runsheet gives it the ability to generate and edit deposition programs.

Simulator Enhancement

How difficult is it to make a given filter? Simulator helps to answer that question. Tolerance assessment in optical coating production is a real problem. There is no good, universal, analytical technique. Errors, a simple tool in the Core Essential Macleod, assumes independent random thickness errors in all layers and can quickly show that independent control demands impossible accuracies in many coatings that can actually be constructed using other methods. In fact, tolerances and effects of errors depend strongly on the control technique. Simulator solves the tolerancing problem by extending the Monte

Carlo approach of Errors into a realistic model of the control process. Using a control plan created by Runsheet, Simulator models the control of deposition, introducing both random and systematic effects such as noise on the signal, tooling factor variation, packing density errors, and so on, and shows the effect that these parameters have on the final simulated production coatings. Simulator answers much more than simple monitoring questions. All kinds of other parameters associated with the coating system can be translated into the parameters of the model and their effect examined.

vStack Enhancement

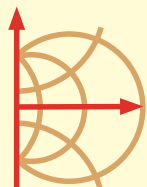
Want to optimize a set of non-parallel coatings for a set of overall requirements? Need to check the performance of a coated prism? vStack is a tool for the calculation and optimization of such systems. vStack also calculates the effect of skewed light beams in these systems. When the beam is skewed, some light originally with p-polarization

will emerge from the system with s-polarization, and some originally s-polarized light will emerge with p-polarization. We call this *polarization leakage*. vStack calculates the magnitude of this leakage and provides a Delta value for the leakage component.

DWDM Assistant

The DWDM Assistant takes the pain and tedium out of the process for the design of multiple-cavity filters, particularly those intended for Dense Wavelength Division Multiplexing. The DWDM Assistant takes a desired specification and produces a set of candidate designs using the method of symmetrical periods. The properties of the candidate designs are displayed and sorted in a number of user-specified ways, such as total layer thickness, deposition time, and ripple performance.

The symmetrical period technique used by the DWDM Assistant is enhanced by a ripple optimization algorithm that adds structures composed only of quarterwave layers to reduce the ripple in the passband. In general, a number of designs will satisfy the given requirements for a filter, but the DWDM Assistant makes it possible to examine thoroughly and rank candidate designs according to critical criteria.



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