Overview of the Model 1600 1

Your Perkin-Elmer Model 1600 FT-IR spectrophotometer (Figure 1-1) is a bench-top instrument which provides, in one self-contained unit, all the following features:

- an electronics system based on the highly reliable Motorola 68010 CPU. The system includes 16K of battery-backed memory, so that the instrument retains your custom methods and parameter settings when power is turned off.

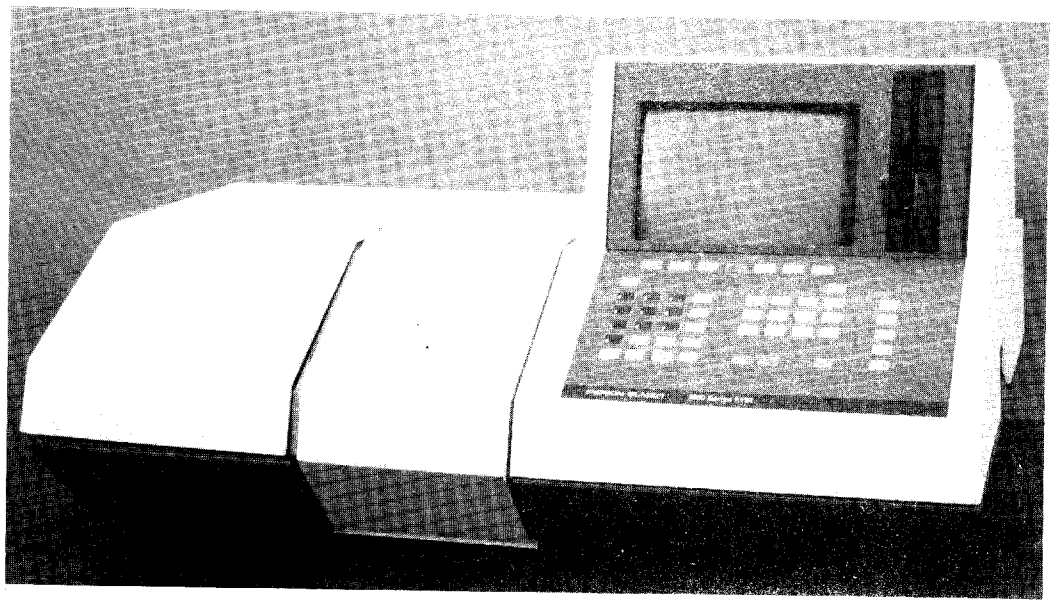

Figure 1-1. The Perkin-Elmer Model 1600 Spectrophotometer

- an optical system which gives the excellent performance expected of FT-IR instruments. The Model 1600 will give you rapid data acquisition over a total range of 7800 to 100 cm^{-1}, with 4 cm^{-1} resolution (2 cm^{-1} optional) and good signal-to-noise. It should seldom, if ever, need alignment.

- a single-beam, purgeable sample compartment. The Model 1600 can operate in single beam ratio, single beam, or interferogram mode.

- a dedicated keyboard for controlling the instrument and interacting with the software.

- a high-resolution screen (512 pixels horizontal by 256 pixels vertical) for display of both results and instrument-status information.

- software with extensive graphics and data processing capability, based on Perkin-Elmer's CDS-3 Infrared Data System.

- extensive built-in diagnostic software, enabling you to trace the cause of malfunctions yourself.

THE OPTICAL SYSTEM

The Model 1600 gives you consistent, reliable performance in single beam, single beam ratio, or interferogram mode. This reliability is achieved by having few moving or adjustable parts, and by extensive insulation of the optical system from the effects of heat, humidity, and vibration.

Stability of the Optical System Components

The optical bench "floats" on vibration-proof mounting pads, which protect the optical system as a whole from bench shocks. The entire optical system is purged and hermetically sealed at the factory. A supply of desiccant placed within the system removes any water vapor and carbon dioxide that may enter.

Rigid insulating material encloses the infrared source (see Figure 1-2), a heated wire. This insulation reduces vulnerability to shocks as well as convection of heat. Brass heat sinks below the source and a baffle around it further increase the thermal stability.

The moving mirror in the interferometer has a single scan speed. The swinging-arm interferometer has only one moving part; counterbalancing makes it nearly immune to shocks.

KBr windows separate the sample compartment from the purged optical system. You can purge the sample compartment with dry nitrogen.

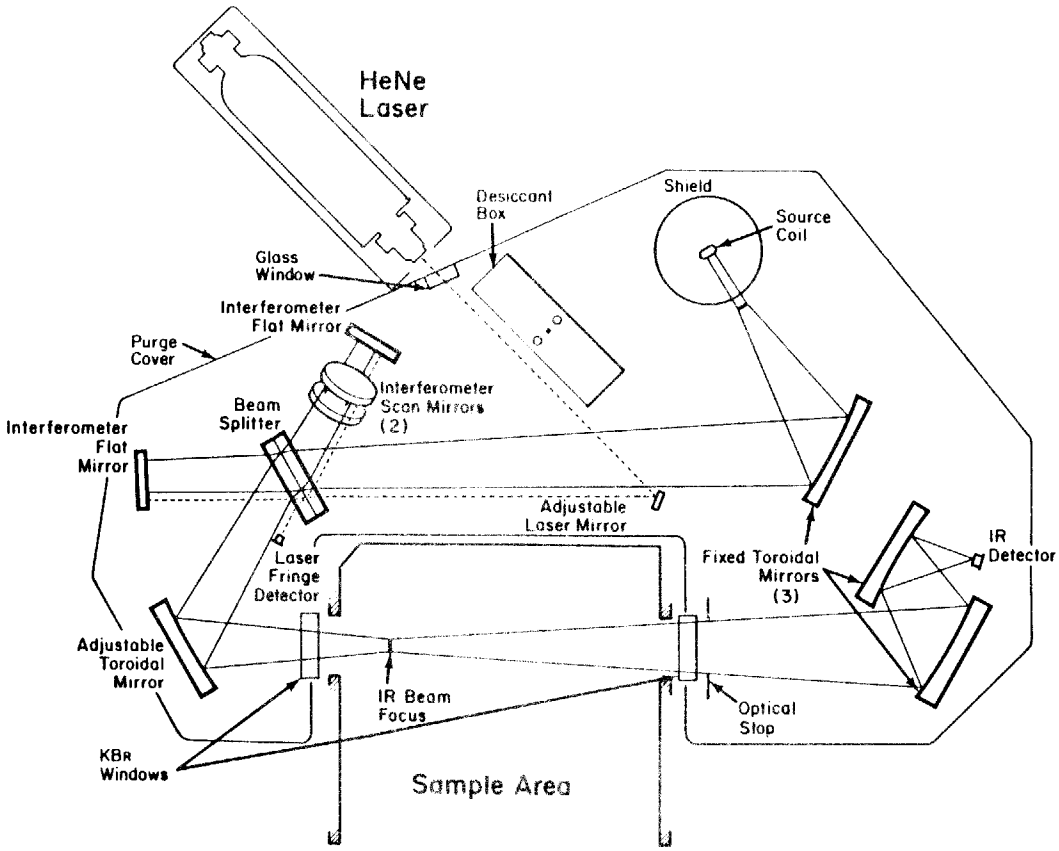

Figure 1-2. The Model 1600 Optical System

The Optical Path

Figure 1-2 illustrates the optical path of the Model 1600. The IR beam begins at the source coil. A fixed toroidal mirror collimates the beam from the source and directs it to the interferometer.

The beam from a helium neon laser follows the IR beam through the interferometer. (As shown in Figure 1-2, the laser itself is outside the purged area, to minimize heat.) The system uses the laser beam to track the distance the moving mirror travels (optical path difference) and to determine when to take a data point.

A toroidal mirror sends the beam from the interferometer into the sample compartment. This mirror is the only adjustable mirror in the system. When aligned, it compensates for the combined tolerances of all the fixed mirrors.

From the sample compartment, the beam travels through an optical stop, to the thermally-stable lithium tantalate detector, or the optional DTGS detector.

MODEL 1600 SOFTWARE

The Model 1600 software combines simplicity and ease of operation with a wide variety of data collection, display, and data processing options. Using Model 1600 software you will be able to:

- acquire spectral data;
- display spectra on the screen and manipulate them;
- process data from spectra;
- store data on disk, if you have the optional floppy disk drive in your Model 1600;
- use the optional printer and plotter to print reports and displays;
- automate your operations, using the "Method" facility.

With all its versatility, the Model 1600 software is straightforward and easy to use:

- When you turn on the instrument, all parameters will be set as they were when you turned it off. If you have a consistent operating mode, you do not need to set the parameters at every power-up.
- Wherever possible, the system saves you time by placing default entries in the command fields. These are the entries the software judges you are most likely to want; however, you always have the option of changing them.
- You can enter many of the Model 1600 commands by pressing a single soft key, without pressing an "Execute" key to confirm the command. These "action" soft keys are labelled in inverse video.
- Command parameters that you will seldom change do not appear every time you use the command. They are placed in the separate "Setup" facility, so that the command itself requires a minimum of keystrokes for entry.