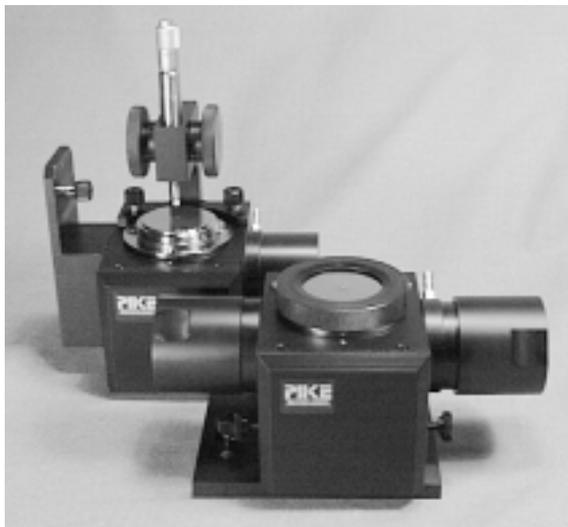


## Single Reflection MIRacle™ - as close to “universal” sampling as one can get

Attenuated Total Reflectance (ATR) measurements have gained wide acceptance in analytical laboratories employing FTIR spectrometry. These techniques greatly simplify sample preparation, and in many cases, make mixing of Nujol smears and pressing of KBr pellets obsolete. Yet, traditional, multi-reflection ATR crystals still could be inconvenient when analyzing certain samples. The main disadvantages include the relatively large sampling area which needs to be in good contact with the sample, cleaning problems and fragility - especially that of KRS-5. MIRacle, a single-reflection HATR is a new internal reflectance accessory which addresses many of the above problems. The sampling plate configuration features a small round crystal enabling the reliable analysis of small sample volumes (5ml and higher). Solid materials can be put in good physical contact with the crystal, yielding high quality, reproducible spectra. The accessory can also be equipped with a flow-through cell attachment and a temperature controlled module. The availability of these components opens new application opportunities for performing real-time FTIR measurements on flowing sample streams and studies of various samples at elevated temperatures.



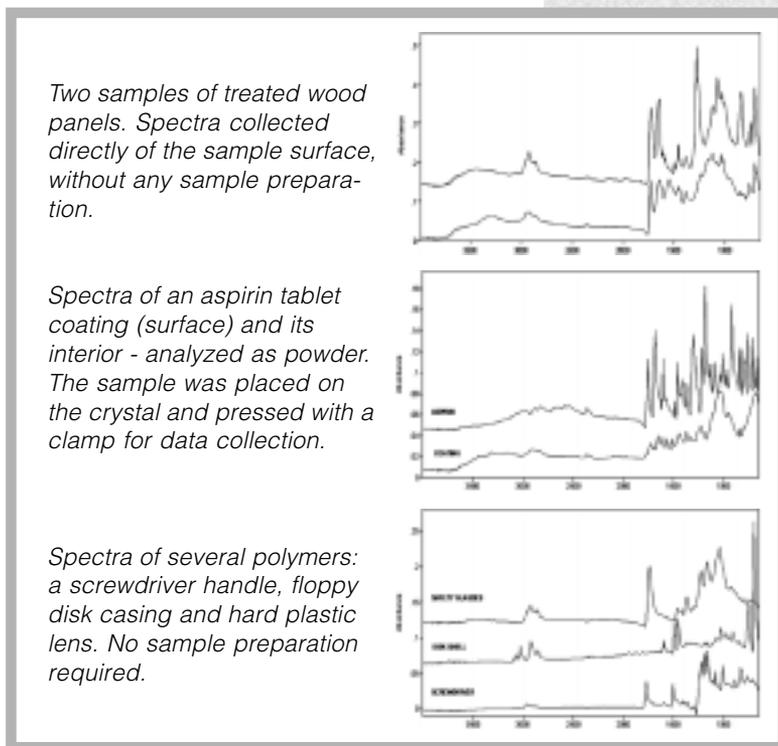
**MIRacle** is the first Single Reflection Horizontal Attenuated Reflectance Accessory (HATR) which combines the functionality of other single reflection products with the economy and flexibility of standard, multi-reflection horizontal ATRs. This accessory offers several unique features including: choice of crystal materials - important for experiments requiring different spectral ranges; single crystal plate design for analysis of solid and liquid samples - an approach which lowers the cost of the accessory for those customers who have to deal with many types of samples.

The accessory is an economical solution for users who want the flexibility of a single reflectance HATR

to analyze standard samples at reasonable cost.

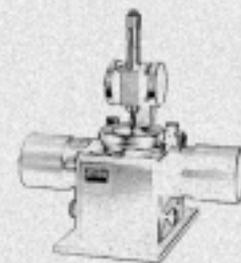
The MIRacle is equipped with a micrometer-controlled compression clamp, volatiles cover and purge attachments, the latter allowing operation in a water vapor and carbon dioxide free environment.

- ◆ **High optical throughput providing excellent sensitivity for analyses of a wide range of samples**



- ◆ **Economical, single crystal configuration for solid, semi-liquid and liquid samples**
- ◆ **Pinned-in-place, removable crystal plate for ease of clean-up and alignment-free placement**
- ◆ **ZnSe, AMTIR, Germanium, Silicon and Diamond (see Diamond MIRacle) crystal options**
- ◆ **Standard set of sample holding devices**
- ◆ **Standard purge attachments for elimination of water vapor and CO<sub>2</sub> interferences**

MIRacle - Single Reflection Horizontal ATR uses a “building-block” principle. The accessory consists of the universal optical base which can be fitted with a wide selection of sampling plates equipped with different crystal materials. These crystal plates are kinematically mounted to eliminate the need for alignment and can be exchanged in a matter of seconds. The side of the plate features threads for a mounting ring designed to accept multiple sampling attachments.



**PIKE TECHNOLOGIES**  
2919 Commerce Park Drive  
Madison, WI 53719  
Tel: 608-274-2721  
Fax: 608-274-0103  
E-mail: sales@piketech.com  
Web: www.piketech.com

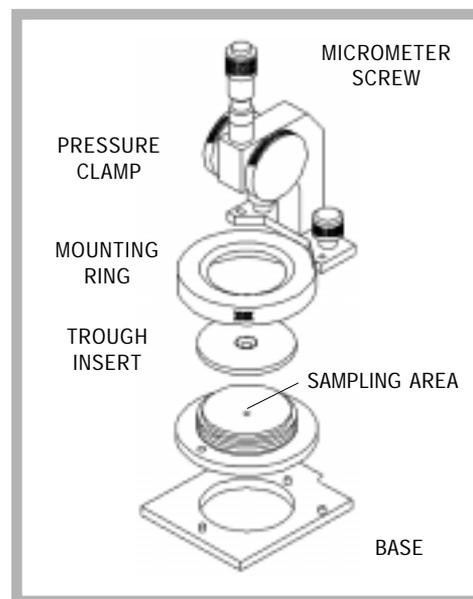


The micrometer controlled clamp, used for the analysis of solid samples and some powders, mounts on the back of the base module. The micrometer screw allows precise control of the pressure applied to the sample by a spring loaded plunger. The clamp can be easily removed when MIRacle is used for analysis of liquid samples.



*Heating Module (with Temperature Controller) and Flow-Through cell attachment.*

A detailed drawing of the MIRacle sampling stage showing the crystal plate location and mounting of the trough plate is shown at the top of the next column.



With all the advantages of the single-reflection HATR, it is important to remember that this accessory is not a complete answer to all sampling needs. The technique works best for the analysis of highly absorbing substances (e.g. polymers, rubber, paint, fibers, etc.). For that reason, the traditional multi-reflection HATR may be still necessary to analyze samples which do not absorb enough energy with a single reflection of the IR beam.

## INSTRUMENT CODE XX

Analect	60
Bio-Rad	10
GRAMS based	11
WinIR PRO based	12
Bomem Arid Zone	80
MB Series	81
Bruker	50
Horiba	35
Jasco	55
300/600	56
400 special/vac	57
Jeol	45
Winspec 50	46
Mattson	20
Genesis	21
Infinity AR 60	22
Midac	30
Nicolet	40
Model 205	41
Impact	43
Magna Series	44
Avatar	47
Perkin-Elmer	70
Model 2000	71
GX Series	71
Model 1600	72
Paragon	73
BX/RX Series	73
Spectrum One	74
Shimadzu	15

## ORDERING INFORMATION

Part Number      Description

**Complete Systems** - the complete system includes micrometer controlled compression clamp, volatiles cover and purge tubes.

<b>025-11XX</b>	<b>MIRacle - Single Reflection HATR with ZnSe Crystal</b>
<b>025-13XX</b>	<b>MIRacle - Single Reflection HATR with Ge Crystal</b>
<b>025-14XX</b>	<b>MIRacle - Single Reflection HATR with AMTIR Crystal</b>
<b>025-15XX</b>	<b>MIRacle - Single Reflection HATR with Si Crystal</b>

### Crystal Plates

025-2010	Single Reflection HATR Universal Plate, ZnSe Crystal
025-2050	Single Reflection HATR Universal Plate, Ge Crystal
025-2070	Single Reflection HATR Universal Plate, AMTIR Crystal
025-2090	Single Reflection HATR Universal Plate, Si Crystal

### Other

025-19XX	MIRacle - Single Reflection HATR, Base Assembly (crystal plate not included)
025-3050	Micrometer controlled Sample Clamp
025-3051	Volatiles Cover
025-3052	Powder Press Tip
025-3053	Press Tips Assortment
025-5010	Water Jacket - fits all crystal plates (liquid circulator not included)
025-5011	Heating Module (Temperature Controller required) - fits all crystal plates
025-5012	Flow-through Attachment
025-3070	Assortment of Samples (for demonstration of sampling Techniques)