

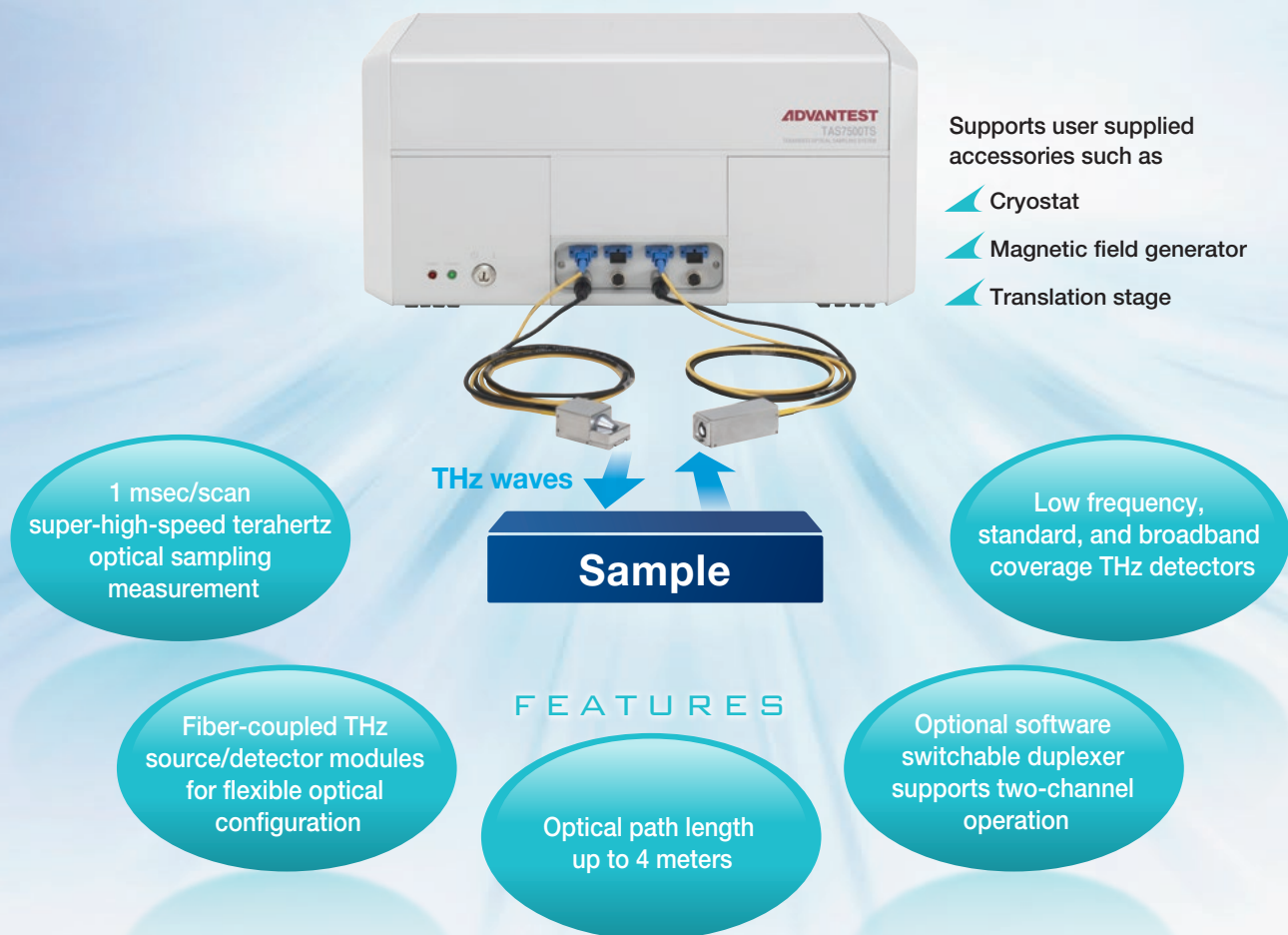
Terahertz Wave Spectroscopy and Analysis Platform

Full Coverage of Applications From R&D to Industrial Testing

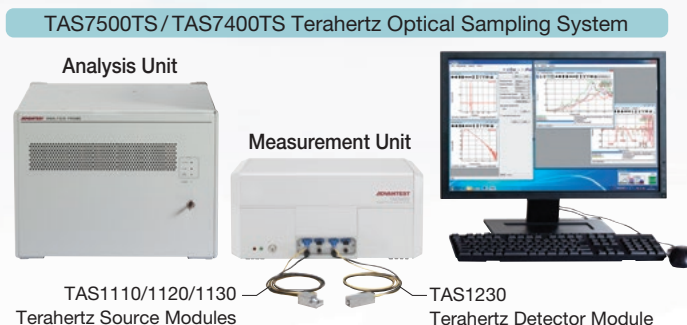


Optimal for a wide range of terahertz research and applications

The TAS7500TS Terahertz Wave Spectroscopy and Analysis Platform consists of an optical fiber laser module and a data acquisition unit. Flexible source selection and source/detector placement allow the user to build customized configurations



Basic Configuration

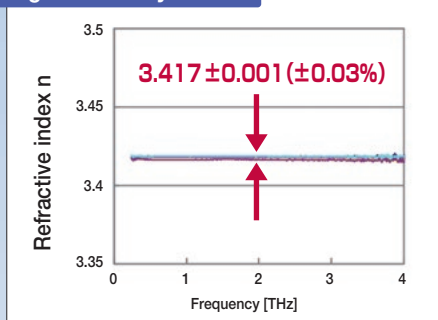


► TAS7500TS/TAS7400TS : Superior Performance

Excellent Reproducibility

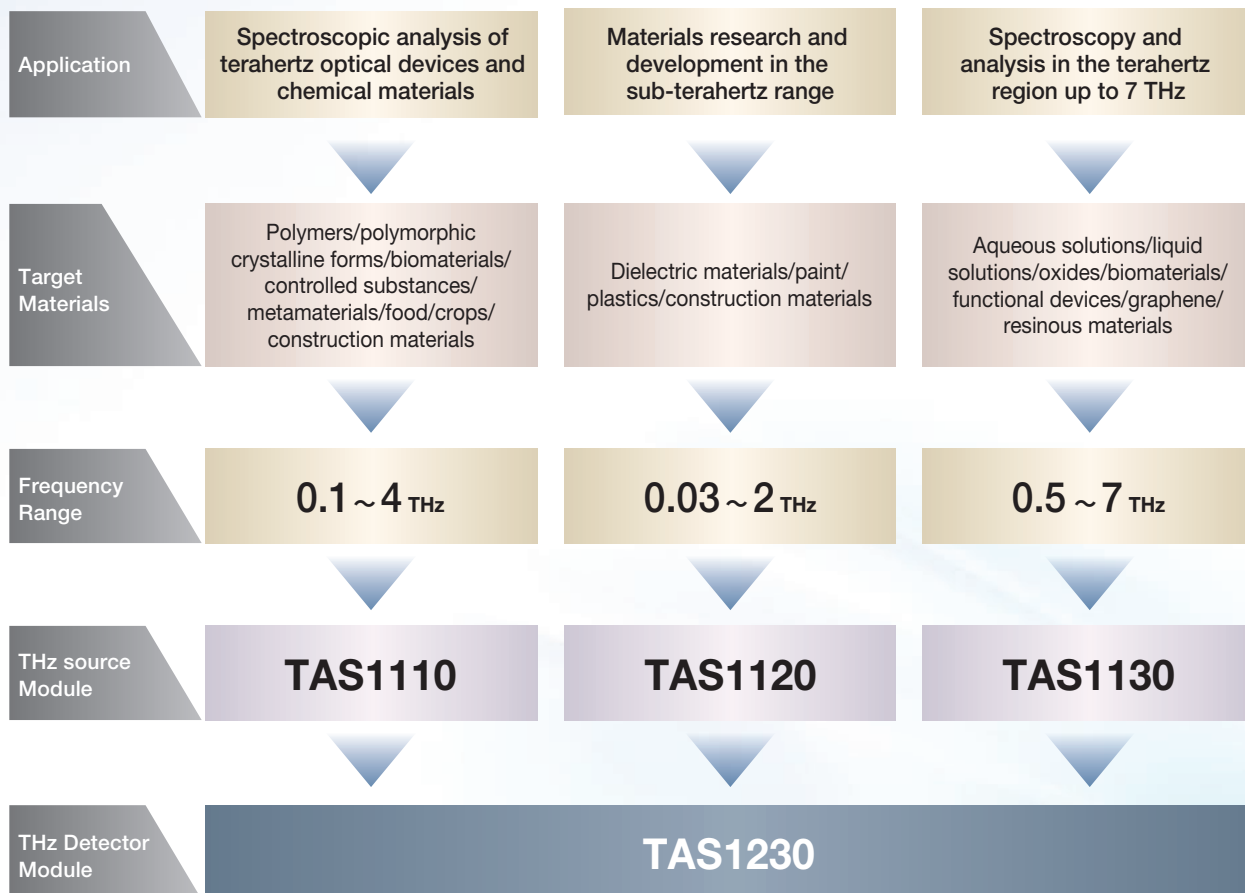
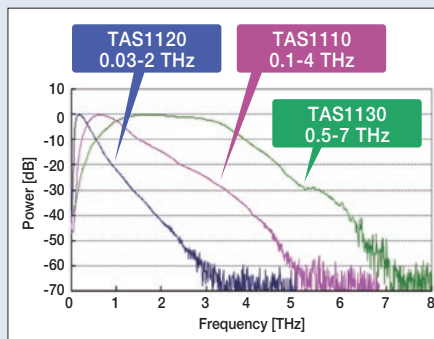
Advantest's proprietary low-jitter fiber laser and analog signal analysis technology enable superior refractive index (phase) measurement repeatability of within $\pm 0.03\%$.

High resistivity Silicon



Broadband Terahertz Spectroscopy

In addition to standard type TAS1110, two specialized source modules - the low frequency type TAS1120 and the broadband type TAS1130 - expand the bandwidth coverage of the platform to serve a broad array of applications.



Terahertz Optical Sampling System

▶ **TAS7500TS** 1 ms/scan

▶ **TAS7400TS** 200 ms/scan

FEATURES

- The system uses two channels of ultra short pulse lasers (1550 nm) with either biased output (for THz generation) or signal input (for THz detection). Advantest's unique optical sampling method, utilizing phase-modulated dual-laser-synchronized control technology without a mechanical optical delay line, enables extremely high speed terahertz spectroscopy.
- The basic configuration has a single channel input and output, and an optional second channel with software controlled duplexer can be added.
- Spectroscopic functionality is implemented by connecting optional fiber-coupled THz source and detector modules.
- Ethernet remote control option enables support for remote programming of THz measurement and analysis functions and peripheral equipment.



TAS7500TS

Terahertz Source Modules

▶ **TAS1110**

Standard: 0.1~4 THz

▶ **TAS1120**

Low frequency type: 0.03~2 THz

▶ **TAS1130**

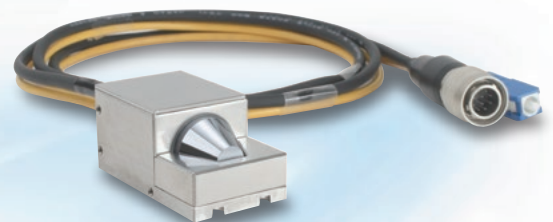
Broadband type: 0.5~7 THz

FEATURES

- Easy to use all-in-one THz source modules complete with a fiber pigtailed compact housing.
- TAS1110 and TAS1120 consist of a photoconductive antenna and a hyper-hemispherical silicon lens. Current monitor and thermistor on the built-in bias circuit deliver stable output intensity regardless of environmental temperature changes.
- TAS1130 is a Cherenkov THz source module that utilizes non-linear optical crystal LiNbO₃ waveguides.

Usage:

- Broadband THz source for THz spectroscopy and spatial mapping
- Difference frequency THz generation
- THz frequency comb generation



TAS1130

Terahertz Detector Module

▶ **TAS1230**

FEATURES

- Easy to use all-in-one photoconductive THz detector complete with hyper-hemispherical silicon lens and fiber pigtailed compact housing.
- THz waves are sampled by introducing 1550 nm ultra short laser pulses.
- Built-in trans-impedance (current-voltage transfer) amplifier with 500 kHz bandwidth simplifies implementation.

Usage:

- THz wave generation for time domain spectroscopy (TDS), etc.

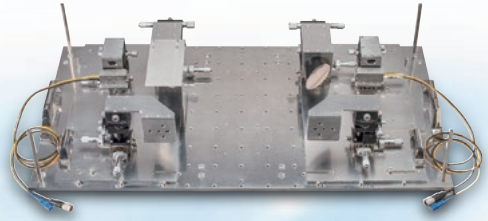


TAS1230

► External Optical Bench Unit Option

- Precision optical bench for easy alignment of external transmission experiments.
- Acrylic cover is provided for dry air purge.
- The optical working distance is designed to accommodate a variety of sample holders.

*Custom designs can be supplied upon request.

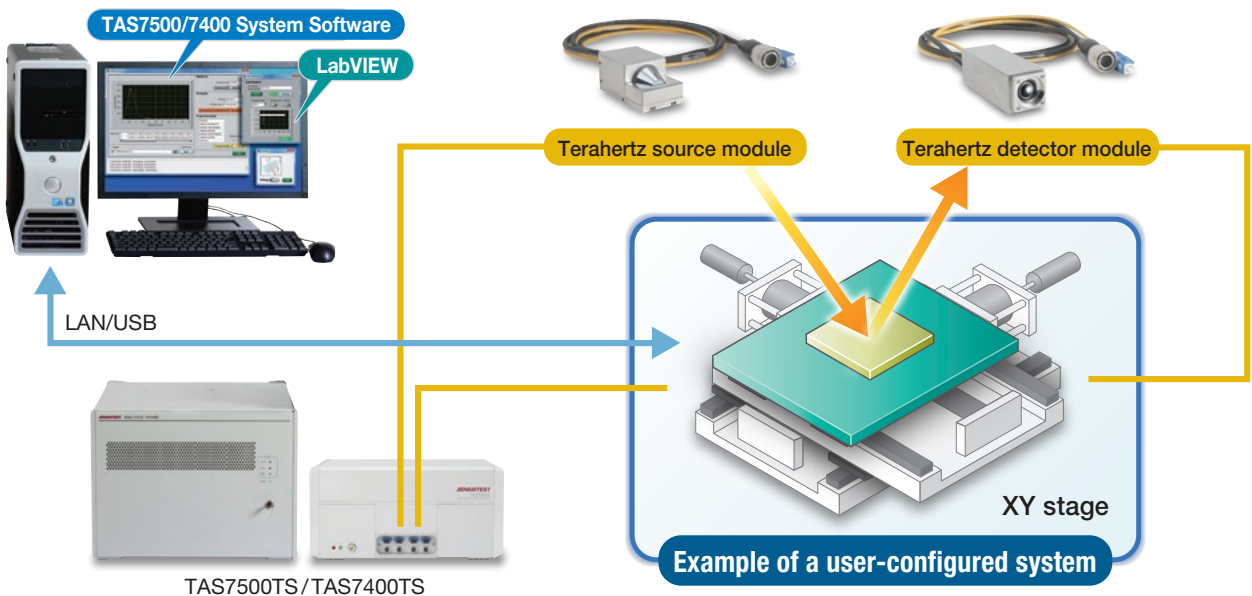


► Remote Programming Option

This option enables measurement and data analysis via a remote application programming interface operating in the Windows environment which supports Visual Basic, Excel VBA, C#, and LabVIEW programming languages.

Sample programs are provided for each language, enabling users to set up links with peripheral equipment.

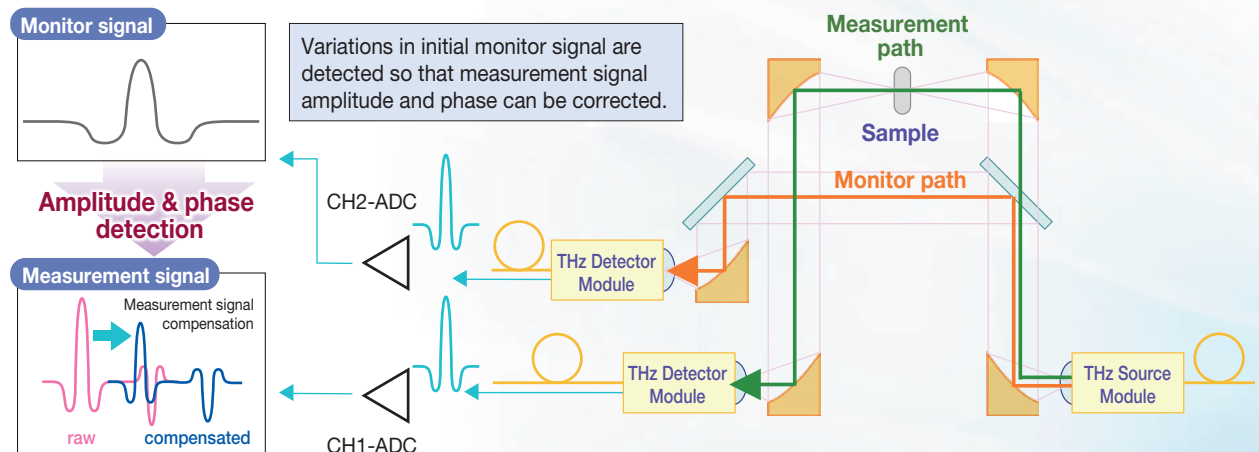
Calculation libraries are provided for remote data analysis.



► Dual Channel Monitoring Option

Supports highly stable measurement for long measurement times.

Dual beam path architecture enables highly stable measurement over long periods. By using this option, the system can monitor the amplitude and phase fluctuation during the measurement using the second detector and compensates automatically.



► Specifications

■ TAS7500TS/TAS7400TS Terahertz Optical Sampling System

Items		Specification				
		TAS7500TS			TAS7400TS	
System configuration		Dual ultra-short pulsed optical fiber laser (for THz generation and detection) measurement unit, analysis unit, controller & analysis PC				
Excitation laser	Center wavelength	1550 nm				
	Output power	≥ 20 mW (Option: Max. ≥50 mW)* ¹				
	Pulse width	≤ 50 fs (Using 1.5 m fiber)* ¹				
	Repetition rate	50 MHz ± 200 Hz				
	Optical output port	THz generation: 1 port, THz detection: 1 port (can be optionally increased to 2 of each)				
Measurement specifications	Measurement method	Terahertz optical sampling method (phase modulation method)				
	Time resolution	2 fs				
	Frequency resolution	3.8 GHz	7.6 GHz	61.0 GHz	1.9 GHz	7.6 GHz
	Scan range	262 ps	131 ps	16 ps	524 ps	131 ps
	Throughput	16 ms/scan	8 ms/scan	1 ms/scan	200 ms/scan	
	Frequency accuracy	±10 GHz* ¹				
General specifications	Usage environment	Temperature range: +10℃ to +30℃ Relative humidity: 80% or less (no condensation)				
	Storage environment	Temperature range: -10℃ to +50℃ Relative humidity: 80% or less (no condensation)				
	Power	AC100V(100-120)/200V(220-240)±10%, 50/60 Hz, 250VA (not including analysis PC)				
	Size/Weight	Analysis unit: 430 (W) × 540 (D) × 330 (H) mm / Analysis unit: 30 kg or less Measurement unit: 430 (W) × 240 (D) × 220 (H) mm / Measurement unit: 14 kg or less				

*1: At temperatures of: 23°C \pm 5°C

■ TAS1110/1120/1130 Terahertz Source Module

Items	Specification			Notes
	TAS1110 (Standard)	TAS1120 (Low frequency Type)	TAS1130 (Broadband type)	
Generation method	Photoconductive antenna		Cherenkov type THz wave generation using LiNbO ₃ waveguide	
Frequency range	0.1 to 4 THz*2	0.03 to 2 THz*2	0.5 to 7 THz*2	Input power: 20 mW (TAS1110 / TAS1120) 50 mW (TAS1130) Laser pulse width: 50 fs
Input optical fiber connector	ϕ 3 mm 1550 nm Polarization maintaining fiber			Length: 1.5 m
Size	55 mm \times 20 mm \times 20 mm		43 mm \times 24 mm \times 21 mm	Without fiber pigtail

*2: When using the TAS1230 detector module to measure samples with the TAS7500TS at 7.6 GHz

■ TAS1230 Terahertz Detector Module

Items	Specification	Notes
Detection method	Photoconductive antenna	
Bandwidth (SNR=1)	0.1~4 THz (Generator: TAS1110)	Input power: 20 mW Laser pulse width: 50 fs
	0.5~7 Hz (Generator: TAS1130)	
Dynamic range (Peak level)	≥ 60 dB (Generator: TAS1110) ≥ 57 dB (Generator: TAS1130)	
TIA sensitivity	9.7×10^6 V/A	
TIA bandwidth	500 kHz	-3 dB bandwidth
Input optical fiber connector	ϕ 3 mm 1550 nm Polarization maintaining fiber	Length: 1.5 m
Size	55 mm \times 20 mm \times 20 mm	Without fiber pigtail

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