P-21

https://www.gigahertz-optik.com/en-us/product/p-21/

Product tags: Dosimeter , Handheld device ,



Description

P-21 – Multi-Functional Color Touchscreen Light Meter for High-Quality Photometric and Radiometric Measurements



P-21

The P-21 optometer is a high-quality multi-purpose device designed by Gigahertz-Optik for mobile use. Its signal amplifier provides a wide dynamic range for the detectors' signal currents ranging up to 2 mA. The noise-equivalent current signal is as low as 0.1 pA. The device has eight gain ranges that can be manually or automatically selected for adjustment to match the signal levels. It overs a large color touchscreen and three manual buttons for versatile usage. The intuitive menu and the analog output and trigger make this device to the all in one solution.

Multi-Purpose Optometer offering many Different Measurement Modes



P-21 Portable Optometer

One of the characteristic properties of the P-21 optometer is the large range of measurement modes:



P-21 Optometer in combination with ISD-xxP-SP series

- **CW**: Used to measure continuous DC or AC signals at the selected integration time from 100 µs to 6 s. The reading, units of measurement and the selected wavelength as applicable for the connected detector are displayed. Manual or auto-range operation as selected.
- **CW dose**: Measure values are summed at a logging rate of one second and the value displayed as the integrated energy. The dose function can be manually run/stop or automatically run/stop at preset dose measurement times (timing based starting from 1s or a max dose level) with status display.
- **Pulse energy with analog output and trigger function**: Energy measurement of a single or pulse chain within a selected time span.
- **Pulse offset**: A preset value, such as the ambient light level, is subtracted from the I-Effective and Pulse Energy reading. User selects 'Static Offset' to subtract a constant value. 'Continuous Offset' subtracts the actual measured value before the pulse measurement starts.
- **Peak/Peak or Peak minimum or maximum**: These modes allow analysis of signal stability with the selected integration interval (e.g. flicker). The min, max or p-p values are displayed together with the CW average value. Only signals longer than the gain dependent slew-rate can be measured.
- **I-Effective luminous intensity**: Evaluation of the effective luminous intensity of flashing sources (single flash) per Schmidt-Claussen or Blondel-Rey methods.
- **CW offset**: Subtracts a constant offset value, ambient light level for example, from CW reading
- **CW minimum or maximum**: Minimum or maximum reading attained during measurement period is displayed along with the current reading
- **CW level check**: Compares the measured CW value with a stored preset upper and lower limit values
- **Analog output**: Direct analogue amplifier output.
- **Ratio (relative (%), log (db), factor)**: Measurement of the ratio between a reference value and actual measured value and displayed as relative ratio (%), log ratio/attenuation (db or dBm) or ratio factor
- **Reference**: Used in ratio measurement mode. Values can be set to 1 with selected unit (W, A, etc.), or a CW measured value or manually entered value. Ref value 1.000 mW can be used to measure attenuation in dBm.
- **Hold**: Freezes currently displayed reading
- **Datalogger**: More than 12.000 data points can be stored with a sample rate of 0.1 s to 9999.9 s.



Display with timed logger

- **Manual entry of calibration data**: For individual calibration correction factor entry
- **Default initialization**: Resets all parameters to factory default condition

Convincing Measuring Instrument Features

(Selection)

- Compact precision instrument for field service and feature packed for laboratory use
- Multifunctional color touchscreen and intuitive 3-button menu operation (pure button, mixed use as well as pure touch use allow all functions)
- Calibration data port in detector basket for easy detector replacement
- Measurement of DC, AC, single pulse and modulated radiation
- 100 µs fast sampling rate
- Adjustable integration time from 100 µs to 6 s
- Wide dynamic range of detector signal from 0.1 pA to 2 mA
- USB interface for remote control operation (additionally RS232 and RS485 available)
- Trigger In/Output via DSUB as well as Analog-Out
- S-P21 software & S-SDK-P21 software development kit available
- Adapter cable available to use P-21 (-5 connector) with P-9710 detectors (-2 connector)



Display with Range View

Bases for Photometer, Radiometer, UV-Meter, Laser-Intensity-Meter Application

For use as optometer the P-21 can be combined with all offered detector heads intended for photometric and radiometric measurements. The plugged detector head determines the photometric or radiometric measuring size as well as the spectral range of the measurement. Gigahertz-Optik offers a wide range of detector heads for various measuring tasks. The optometers' signal input amplifiers offer a very wide dynamic range, in order to adjust the devices to detectors with various sensitivities and optical radiation intensities. The calibration data of the detector heads are saved in the calibration data plug of the detector heads.



The P-21 offers a trigger input, analog output, USB, etc.

Simple and Safe Detector Exchange

Upon attachment of a detector head with a calibration data plug (-5 connector, adapter for DSUB possible) onto the P-21 optometer, its calibration data as well as the device settings are automatically applied. This ensures that improper operation that might result from exchange of measurement heads is basically ruled out.

Multi-Purpose Device and Special Version for pulsed Light Sources

The P-2110 is the multi-purpose device with fast response times optimized for versatile measurements. The P-2120 version is based on a fixed 20 ms response time for all amplifier ranges in order to strech pulses for a higher sampling of pulsed light sources.

Remote Operation and Software

The P-21 optometer can be connected to a PC via its USB interface. The device can be fully controlled with the S-P21 user software. With the optional S-SDK-P21, programming of own software or integration of the device into own software is possible. Included programming examples facilitate the start.

Specifications

General	
Short description	High-end optometer for the individual configuration as photometer, radiometer, UV-radiometer, Laser-powermeter etc. with the detector heads available.
Main features	Intuitive color touchscreen with ergonomic device housing for mobile use or remote control. Rechargable battery, USB-Interface, trigger, analog output, user software and software development kit available.
Measurement ranges	Wide dynamic current measurement range from 0.1 pA (noise equivalent signal) up to 2 mA. Eight gain ranges with manual or automatic selection. Measurement range in absolute units with given by the detector heads responsivity and calibration.
Typical applications	Measuring device for mobile use or integration into automatic processes through its USB interface. Many different detector heads are possible of different applications.
Calibration	Calibration and comparison of the current responsivity in each of the eight gain ranges.
Specification	
Display	large color Touchscreen with LED backlight which ca be switched on and off.
Detector interface	ITT (-5 & -4), adapter to 9pin DSUB available
Analog output	Output voltage corresponding to the input current and range of the signal amplifier. Connection plug: DSUB
Measured Quantity	Ampere (absolutely calibrated), light measurement units depending on the used detector head. Ratio as a percentage, logarithmic and as a factor
Signal amplifier	Transimpedance amplifier with voltage amplifier connected in series. A total of eight gain levels with both manual and automatic selection of the measurement range.
CW integration time	100 µs – 5.9999 s
Pulse integration time	10 ms – 199.99 s
Offset correction	Exceeding correction range
Parameter adjustment	Remote or using using touchscreen. Settings are permanently saved (EEPROM).
Calibration	Saved in the detector terminal (EEPROM). Tables for calibration values of the spectral responsivity values are supported. Interpolation between two wavelength points are also possible. Manual input of a calibration value via the key pad is also possible.
Key pad	3 buttons + color touchscreen

Measurement ranges	8 (2.000 mA to 0.1 pA) manual or autorange

P-2110:

range nr.	range (A/V)	range max.	slew rate (10% - 90%, normal mode for measurement)	slew rate (10% - 90%, fast mode for analog-out)	gain error / linearity error (@ 20 °C, normal mode)	gain (A/V) analog output
0	1x10-3	±2.000mA	2 ms	3 µs	<0.1%	1x10-3
1	1x10-4	±200.0 µA	2 ms	3 µs	<0.1%	1x10-4
2	1x10-5	±20.00 µA	3 ms	4 µs	<0.1%	1x10-5
3	1x10-6	±2.000 µA	3 ms	4 µs	<0.1%	1x10-6
4	1x10-7	±200.0 nA	4 ms	4 ms	<0.1%	1x10-7
5	1x10-8	±20.00 nA	4 ms	4 ms	<0.1%	1x10-8
6	1x10-9	±2.000 nA	10 ms	10 ms	<0.12%	1x10-9
7	1x10-10	±200.0 pA	10 ms	10 ms	<0.52% (for currents larger 10 pA)*	1x10-10

P-2120:

range nr.	range (A/V)	range max.	slew rate (10% - 90%, normal mode for measurement)	slew rate (10% - 90%, fast mode for analog-out)	gain error / linearity error (@ 20 °C, normal mode)	gain (A/V) analog output
0	1x10-3	±2.000mA	20 ms	3 µs	<0.1%	1x10-3
1	1x10-4	±200.0 µA	20 ms	3 µs	<0.1%	1x10-4
2	1x10-5	±20.00 µA	20 ms	4 µs	<0.1%	1x10-5
3	1x10-6	±2.000 µA	20 ms	4 µs	<0.1%	1x10-6
4	1x10-7	±200.0 nA	20 ms	4 ms	<0.1%	1x10-7
5	1x10-8	±20.00 nA	20 ms	4 ms	<0.1%	1x10-8
6	1x10-9	±2.000 nA	20 ms	10 ms	<0.12%	1x10-9
7	1x10-10	±200.0 pA	20 ms	10 ms	<0.52% (for currents larger 10 pA)*	1x10-10

* if rel. humidity >60% ±1 pA

Miscellaneous	
Interface	USB-C, RS232, RS485
Connector	USB-C (Charging, interface) DSUB (Trigger In/Output, RS232, RS485, Analog-Out) ITT (Detector)
Temperature range	Operating: (10 to 30) °C Storage: (-10 to 50) °C
Dimensions	200 mm x 105 mm x 34 mm / 400 g
Power Supply	5V DC by USB-C Rechargeable Li-Ion battery
Humidity	<80%, non-condensing
Info	Regular recalibration of the current calibration is recommended. Especially when very small measurement currents have to be measured. In the case of very high humidity, fault currents of the radiometer are possible at low measuring currents and should be taken into account.

Configurable with

Product Name	Product Image	Description	Go to product
ISD-1.6-SP-Vxx Laser Power Detector		Detector for fast, time-resolved (ns) radiant power measurement of pulsed laser diodes and LEDs	https://www.gigahertz-optik.com/en-us/product/isd-1-6-sp-vxx/
S-SDK-P21		Software Development Kit for the P-21 variants.	https://www.gigahertz-optik.com/en-us/product/s-sdk-p21/
S-P21		Application Software for P-21 Variants.	https://www.gigahertz-optik.com/en-us/product/s-p21/
ISD-5P-SP		Optical Power Meter Detector for fast, time-resolved (ns) radiant power measurement of pulsed laser diodes and LEDs	https://www.gigahertz-optik.com/en-us/product/isd-5p-sp-2/
ISD-10P-SP		Detector for fast, time-resolved (ns) radiant power measurement of pulsed laser diodes and LEDs	https://www.gigahertz-optik.com/en-us/product/isd-10p-sp/
ISS-5P-SR-FS		Integrating Sphere Source for use as Transfer Standard for Spectral Radiance in Fluorescence Spectroscopy	https://www.gigahertz-optik.com/en-us/product/iss-5p-sr-fs/
PD-11 Series		Detector head with DP-11 mount	https://www.gigahertz-optik.com/en-us/product/pd-11-serie/
MD-37 series		Detector head with M30x1 mount. Features: modular detector for use MD-37, SRT and other accessories, Si, SiLP, InGaAs, SiC, GaP photodiodes, for use with optometers and signal amplifiers	https://www.gigahertz-optik.com/en-us/product/md-37-serie/
VL-3701		Detector head for the measurement of photopic illuminance in Lux [lx]	https://www.gigahertz-optik.com/en-us/product/vl-3701/

Product Name	Product Image	Description	Go to product
VL-3702		Detector head for the measurement of photopic illuminance in Lux [lx]. Class B, f1' ≤ 6 %	https://www.gigahertz-optik.com/en-us/product/vl-3702/
VL-3707		Photometric detector for measuring very low illuminance in conjunction with the optional P-2110 Optometer.	https://www.gigahertz-optik.com/en-us/product/vl-3707/
RW-3701		Detector head for the measurement of irradiance in W/m² in the spectral range 400 nm - 500 nm (BLUE).	https://www.gigahertz-optik.com/en-us/product/rw-3701/
RW-3702		Detector head for the measurement of irradiance in W/m² in the spectral range 700 nm - 800 nm (RED).	https://www.gigahertz-optik.com/en-us/product/rw-3702/
RW-3703		Detector head for the measurement of irradiance in W/m² in the spectral range 400 nm - 800 nm (VIS).	https://www.gigahertz-optik.com/en-us/product/rw-3703/
RW-3704		Detector head for the measurement of irradiance in W/m² in the spectral range 800 nm - 1000nm (NIR).	https://www.gigahertz-optik.com/en-us/product/rw-3704/
RW-3708		Detector head for the measurement of irradiance in W/m² in the spectral range 1000 nm - 1700 nm (NIR).	https://www.gigahertz-optik.com/en-us/product/rw-3708/
UV-3718		Detector head for the measurement of high irradiance of UV-C 254 nm radiation in W/m²	https://www.gigahertz-optik.com/en-us/product/uv-3718/
UV-3725		Detector for the measurement of UV-C 254 nm irradiance in air disinfection applications	https://www.gigahertz-optik.com/en-us/product/uv-3725/
UV-3726		Detector head for the measurement of irradiance in W/m² for UV-C LEDs and low pressure mercury lamps in germicidal applications.	https://www.gigahertz-optik.com/en-us/product/uv-3726/
ISD-15-Si Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-15-si/

Product Name	Product Image	Description	Go to product
ISD-10-Si Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-10-si/
ISD-5-Si Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-5-si/
ISD-5P-Si Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-5p-si/
ISD-5P-IGA Laser Power Detector		Integrating sphere detector with InGaAs photodiode and 50 mm sphere for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-5p-iga-2/
ISD-5P-SiUV		Integrating sphere detector with UV-enhanced Si photodiode and 50 mm sphere for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-5p-siuv-2/
ISD-30 Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-30-si/
ISD-3P-Si Laser Power Detector		Integrating sphere detector for Laser power in W	https://www.gigahertz-optik.com/en-us/product/isd-3p-si/
ISD-30-VL		Integrating sphere detector for luminous flux (lm) of 2π sources. Features: 300mm dia, BaSO4 coating, 101,6mm dia port, for the usage with optometers and signal amplifiers, Calibration certificate	https://www.gigahertz-optik.com/en-us/product/isd-30-vl/
ISD-15P-VL		Integrating sphere detector for luminous flux (lm) of 2π sources	https://www.gigahertz-optik.com/en-us/product/isd-15p-vl/
PS-3701		Detector head for plant growth	https://www.gigahertz-optik.com/en-us/product/ps-3701/
PS-3702		Detector head for plant growth	https://www.gigahertz-optik.com/en-us/product/ps-3702/

Product Name	Product Image	Description	Go to product
PS-3703		Detector head for plant growth	https://www.gigahertz-optik.com/en-us/product/ps-3703/
MD-37-SU100-VL		Photometric detector head with M30x1 mount	https://www.gigahertz-optik.com/en-us/product/md-37-su100-vl/
MD-37-SU100-VLS		Scotopic detector head with M30x1 mount	https://www.gigahertz-optik.com/en-us/product/md-37-su100-vls/
RW-37 with SRT-M37-L		Detector heads to measure the irradiance in W/m² and the radiance in W/(m²sr)	https://www.gigahertz-optik.com/en-us/product/rw-37usrt-m37-l/
VL-3701 with SRT-M37-L		Detector head to measure the photopic illuminance in lx and the luminance in cd/m²	https://www.gigahertz-optik.com/en-us/product/vl-3701 with srt-m37-l/
PD-9310 with SRT-M37-L		High sensitive detector head to measure the photopic luminance in cd/m². Features: front lense for 1°, 2°, 5° or 10° viewing angle, for the usage with Optometers and amplifiers, calibration certificate	https://www.gigahertz-optik.com/en-us/product/pd-9310 with srt-m37-l/
UV-37 with SRT-M37-L-UV		Detector heads to measure the UV irradiance in W/m² and the UV-radiance in W/(m²sr)	https://www.gigahertz-optik.com/en-us/product/uv-37usrt-m37-l-uv/
RCH-012		Detector head for high intensity irradiation in blue light curing processes.	https://www.gigahertz-optik.com/en-us/product/rch-6/
RCH-014		Detector head for high intensity irradiation in UV or blue light curing processes. Features: Separate light integrator and detector with flexible fiber coupling, 400nm+436nm BLUE responsivity, wide viewing angle, for the usage with optometers and amplifiers, calibration certificate.	https://www.gigahertz-optik.com/en-us/product/rch-8/
RCH-011		Detector head for high intensity irradiation in UVA peak light curing processes.	https://www.gigahertz-optik.com/en-us/product/rch-5/

Product Name	Product Image	Description	Go to product
RCH-010		Detector head for high intensity irradiation in UV H-type light curing processes.	https://www.gigahertz-optik.com/en-us/product/rch-4/
RCH-009		Detector Head for High-Intensity Irradiation in Blue Light Curing Processes	https://www.gigahertz-optik.com/en-us/product/rch-3/
RCH-008		Detector Head for High-Intensity Irradiation in UV-A Curing Processes	https://www.gigahertz-optik.com/en-us/product/rch-008/
RCH-006		Detector head for high intensity irradiation in UV wide range curing processes	https://www.gigahertz-optik.com/en-us/product/rch-006/
RCH-116		Detector head with rigid fiber for high intensity UV and BLUE LED sources.	https://www.gigahertz-optik.com/en-us/product/rch-2/
ISD-3P-IGA Laser Power Detector		Integrating sphere detector with InGaAs photodiode and 30 mm sphere for Laser power in W.	https://www.gigahertz-optik.com/en-us/product/isd-3p-iga-2/
RCH-002		Detector Head for High-Intensity Irradiation in UVA or Blue Light Curing Processes	https://www.gigahertz-optik.com/en-us/product/rch-002/
RCH-113		Detector head for high intensity irradiation in UV or blue light curing processes	https://www.gigahertz-optik.com/en-us/product/rch-16/
RCH-112		Detector head for high intensity irradiation blue light curing processes.	https://www.gigahertz-optik.com/en-us/product/rch-15/
RCH-111		Detector head for high intensity irradiation in UVA light curing processes	https://www.gigahertz-optik.com/en-us/product/rch-14/
RCH-110		Detector head for high intensity irradiation in H-Type light curing processes	https://www.gigahertz-optik.com/en-us/product/rch-13/
RCH-109		Detector head for high intensity irradiation in blue-peak light curing processes	https://www.gigahertz-optik.com/en-us/product/rch-12/

Product Name	Product Image	Description	Go to product
RCH-108		Detector head for high intensity irradiation in UVA Peak light curing processes	https://www.gigahertz-optik.com/en-us/product/rch-11/
UV-3727		Detector for Excimer lamps at 222 nm, UV LEDs from 250 nm to 300 nm and low pressure Hg lamps at 254 nm in germicidal applications.	https://www.gigahertz-optik.com/en-us/product/uv-3727/
RCH-016		UV detector for measuring the irradiance of UV curing LEDs	https://www.gigahertz-optik.com/en-us/product/rch-016/
RCH-xxx Series		UV Detectors for measuring the UV Curing Irradiance	https://www.gigahertz-optik.com/en-us/product/rch-xxx-series/
RCH-017		NIR detector for measuring the irradiance of NIR curing LEDs	https://www.gigahertz-optik.com/en-us/product/rch-017/
RCH-117		NIR detector for measuring the irradiance of NIR curing LEDs	https://www.gigahertz-optik.com/en-us/product/rch-117/
RCH-019		UV detector for measuring the irradiance of UV curing LEDs	https://www.gigahertz-optik.com/en-us/product/rch-019/
RCH-119		UV detector for measuring the irradiance of UV curing LEDs	https://www.gigahertz-optik.com/en-us/product/rch-119/
PD-45 series		Laser power measurement head available in three different versions (Si, Ge and Thermopile) for precise laser power measurement	https://www.gigahertz-optik.com/en-us/product/pd-45-series/
PD-MSD series		Laser power head for microscope measurements available in two versions (Si and Thermopile) for precise laser power measurement	https://www.gigahertz-optik.com/en-us/product/pd-msd-series/
Silux-37xx Series		Silux detector with 37 mm housing and silux calibration for night vision and low light level illumination rating	https://www.gigahertz-optik.com/en-us/product/silux-37xx-series/
RCH-XXXs Series		RCH-XXXs Series for accurate spherical Irradiance and fluence rate measurements	https://www.gigahertz-optik.com/en-us/product/rch-xxxs/

Product Name	Product Image	Description	Go to product
RCH-XXXc Series		RCH-XXXc Series for accurate cylindrical Irradiance measurements	https://www.gigahertz-optik.com/en-us/product/rch-xxxc/
VL-37xx Series		Detector series for measuring illuminance in lux	https://www.gigahertz-optik.com/en-us/product/vl-37xx/
VL-3708		Class L Detector head for the measurement of photopic illuminance in Lux	https://www.gigahertz-optik.com/en-us/product/vl-3708/
VL-3704		Detector head for the measurement of photopic illuminance in Lux [lx]	https://www.gigahertz-optik.com/en-us/product/vl-3704/
VL-3705		Detector head for the measurement of scotopic illuminance in Lux [lx]	https://www.gigahertz-optik.com/en-us/product/vl-3705/
UV-3701		Detector head for the measurement of irradiance of UV radiation in W/m² from 315 nm - 400 nm (UV-A).	https://www.gigahertz-optik.com/en-us/product/uv-3701/
UV-3702		Detector head for the measurement of irradiance of UV radiation in W/m² from 280 nm - 315 nm (UV-B).	https://www.gigahertz-optik.com/en-us/product/uv-3702/
UV-3703		Detector head for the measurement of irradiance of UV radiation in W/m² from 250 nm - 280 nm (UV-C).	https://www.gigahertz-optik.com/en-us/product/uv-3703/
UV-3710		Detector head for the measurement of irradiance of UV radiation in W/m² in the range from 320 nm to 400 nm (UV-A).	https://www.gigahertz-optik.com/en-us/product/uv-3710/
UV-3711		Detector head for the measurement of irradiance of UV radiation in W/m² in the spectral range 280 nm - 320 nm (UV-B).	https://www.gigahertz-optik.com/en-us/product/uv-3711/

Product Name	Product Image	Description	Go to product
UV-3717		Detector head for the measurement of irradiance of UV radiation in W/m² in the spectral range from 315 nm to 400 nm with low crosstalk from radiation above 400 nm (UV-A).	https://www.gigahertz-optik.com/en-us/product/uv-3717/
UV-3719		Detector head for the measurement of irradiance of UV radiation in W/m² in the spectral range 250 nm to 400 nm	https://www.gigahertz-optik.com/en-us/product/uv-3719/
LDM-9901		Detector head to measure the photopic spot luminance in cd/m²	https://www.gigahertz-optik.com/en-us/product/ldm-9901/

Purchasing information

Article-Nr	Modell	Description
Product		
15312922	P-2110	Measurement device (standard amplifier settings), power adapter (D, USA or GB), handbook
15314859	P-2120	Measurement device for pulsed sources (20 ms response time), power adapter (D, USA or GB), handbook
Options		
	Light detectors	See "Configurable with" for all detector heads suitable with the P-9710. More information about each detector head are given at it's product page.
Software		
15314558	S-P21	User software for P21 and variants.
15314559	S-SDK-P21	Software Development Kit for the implementation of the P21 or variants into custom made software
Accessories		
15313743	P-21xx-Z02	Adapter cable for connecting measuring heads with -2 calibration data plug to the P-21 optometer.
15313742	BHO-35	Hard-top casing for the measurement device and accessories
15314557	P-21-Z01	Clip for strain relief for adapter to -2 detectors to

Contact, Calibration, Service & Support

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- Technical Consulting & Sales
- After-Sales Support
- Calibrations & Re-Calibrations (ISO/IEC 17025 Calibration Services, factory calibration, Calibration of Third-Party Products)
- Repairs & Updates
- OEM & Feasibility Consulting of Customized Solutions

Send us your inquiry or contact us by phone or e-mail. We would welcome your feedback too or review us on Google.

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