PTS PRECISION TEST SYSTEMS

PTS1220 Synthesized Spectrum Analyzer

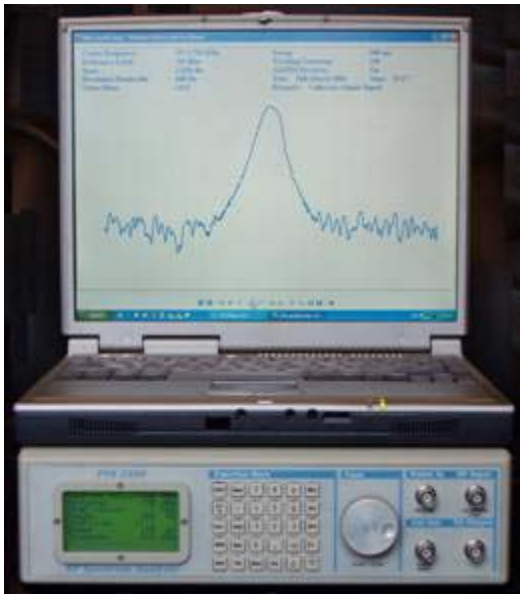
General Description

The PTS1220 is a high quality synthesized Spectrum Analyzer module designed for use in the laboratory or out in the field. This spectrum analyzer covers the frequency range of 10 kHz to 1.2 GHz, but is usable from 5 kHz to 1.4 GHz. The PTS1220 can either be used with an oscilloscope or computer for its display. If an oscilloscope is to be used, the oscilloscope is set to the X-Y mode and the PTS1220 is connected using the X,Y,Z (horizontal, vertical and intensity modulation) inputs of the oscilloscope. When a computer is used, the PTS1220 connects to the computer using the RS232 and USB input ports.

Key Features

- 10 kHz to 1.2 GHz frequency range.
- Synthesized operation. Accurate center frequency setting.
- Direct digital synthesis. Tune center frequency in 10 Hz increments.
- Six resolution bandwidths from 1 MHz down to 300 Hz
- Tracking Generator option, ideal for testing filters.
- Signal Generator option with AM and FM modulation.
- AM/FM receiver option. Listen to signals off-air.
- 100 Watt RF input capability option.
- Links with computer or oscilloscope.
- Software available to drive PTS1220 from computer and record waveforms on computer.

PTS1220 used with laptop computer



PTS1220 used with oscilloscope

Synthesized Operation

The PTS1220 spectrum analyzer uses direct digital synthesis to accurately display the centre frequency. This means the centre frequency can simply be entered via the keyboard or set with a rotary encoder to a resolution of 10 Hz (100 Hz above 1 GHz).

Keyboard or Rotary Knob Control

Parameters such as Center Frequency, Reference Level, Span, Resolution Bandwidth etc can easily be changed either by entering the parameter via the 30 button keyboard or by using the rotary encoder. The rotary encoder allows fast, easy, changing of parameters and arrow keys select what digit is to be changed. For example, when changing the center frequency with the rotary encoder, the arrow keys are used so that the rotary encoder increments in either 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz, 10 MHz or 100 MHz increments. Most parameters are set in a similar fashion.

Very Large Amplitude Range

The PTS1220 spectrum analyzer has built in attenuators and pre amplifiers to allow signals to be measured over a 180 dB range. The standard unit measures signals from +23 dBm to - 130 dBm. Option 04 extends this range from +50 dBm (100 watts) to - 130 dBm, an amazing 180 dB of measurement range!

Six Resolution Bandwidths and Seventeen Spans gives great Flexibility

The PTS1220 spectrum analyzer has resolution bandwidths of 1 MHz, 300 kHz, 100 kHz, 25 kHz, 3 kHz and 300 Hz. Spans from 120 MHz per division all the way down to 1 kHz per division and zero span, allows signals to be displayed exactly the way you want. No spectrum analyzer in this price range has a 300 Hz resolution bandwidth. This not only allows very low amplitudes to be measured, but also Bessel Function displays can be easily seen. Very accurate measurement (< 1 % error) of FM deviation can also be made.

Best Phase Noise in its Class

Phase noise if often overlooked, but is one of the most important features of a spectrum analyzer. The PTS1220 synthesized spectrum analyzer has the best phase noise in its class. Typical phase noise is -90 dBc/Hz at a 10 kHz offset and -80 dBc at a 2 kHz offset. Residual FM is < 50 Hz.

Optional Internal tracking Generator is also a Signal Generator with AM and FM Modulation!

Tracking Generator

Option 01 is an internally fitted 10 kHz to 1.2 GHz Tracking Generator. The tracking generator allows filters or duplexers to be measured with sweeps from 1 kHz per division all the way up to 120 MHz per division. Option 05 adds a directional coupler. Return loss measurements can be made on antennas or any circuit that is connected to the coupler port. This effectively makes the PTS1220 into a simple Network Analyzer, at a fraction of the price.

Signal Generator

On top of this the tracking generator also functions as a signal generator. Set the span to 0 kHz and the tracking generator becomes a signal generator. The output level can be adjusted from -10 dBm to -100 dBm in 1 dB steps. Option 02 adds AM and FM modulation to the signal generator. AM modulation up to 96% and FM deviation up to 200 kHz make the signal generator really useful.

AM / FM Receiver with Modulation Meter Capability

Option 03 ads an AM and FM receiver with built in loudspeaker. This option is great for listening to signals off air. Interfering signals can now be easily identified by simply enabling the receiver. AM and FM modulation can be accurately measured using the computer or oscilloscope display.

100 Watt High Power RF Input

Option 04 adds a 30 dB internally fitted attenuator. This allows up to 100 watts of RF power to be applied to the spectrum analyzer. Thus transmitter spurious can now be easily and accurately measured.

High Quality of Construction

The PTS1220 is made to the highest standards. All RF circuits are housed in aluminum encloses which have been milled out of solid pieces of aluminum. These modules sit on a steel base plate with a motherboard connecting all the modules. This motherboard uses standard IDC,D sub and SMB connectors, which offer better reliability. Fault finding becomes easy, as each circuit is housed in individual aluminum modules, making module replacement simply. This greatly speeds up servicing.

PTS1220 Specifications @ 23 °C			
Specification Parameter	**Special Condition**	**Specification**	**Comments**
Center Frequency		10 kHz to 1200 MHz	Usable 5 kHz 1400 MHz
Center Freq. Display Accuracy	Span 1 kHz	± (3 ppm + 50% Span)	Span is quoted as kHz/div.
Center Frequency Resolution	10 kHz to 999.9999 MHz	10 Hz Steps	100 Hz > 1 GHz
Reference Oscillator	Unit set to Internal Ref	10 MHz ± 3 ppm	High stability options
Frequency Span		1 kHz to 120 MHz	17 spans in total
Resolution Bandwidth		300 Hz to 1 MHz	6 in total
RF Input Impedance		50 ohm	
Amplitude Measurement Range		+23 dBm to -130 dBm	
RF and IF Attenuators		RF 0 - 50 dB. IF 0 - 10 dB	
Reference Level Accuracy		± 2 dB	
Dynamic Range on screen		75 dB	
Vertical linearity error		< 1 dB	Over 70 dB range
Frequency Response		± 2 dB	5 kHz to 1200 MHz
Phase Noise	Span at 10 kHz/div	-90 dBc/Hz	

Residual FM	Span @ 1 kHz / div	< 50 Hz p-p	Audio 300 - 3400 Hz
Residual Responses	Input terminated in 50 Ω	< -90 dBm	3 MHz to 1200 MHz
Second Harmonic Distortion	Input Level -30 dBm max.	-65 dBc to -70 dBc	Frequency Related
Third Order Intermod Distortion	Input Level -40 dBm max.	-70 dBc	Two signals >1 MHz apart
Other Input Related Spurious	Input Level -30 dBm	-60 dBc	
Cal Output Frequency		100 MHz	
Cal Output Level Accuracy		-30 dBm ± 1 dB	
Option 01: Tracking Generator			
Tracking Generator Frequency		10 kHz to 1200 MHz	Usable from 5 kHz
Frequency Setting Resolution	0 to 999.9999 MHz	10 Hz	100 Hz > 1 GHz
Output Level		-10 dBm to -100 dBm	Settable in 1 dB steps
Harmonic Output		-25 dBc	
Non Harmonic Spurious		-40 dBc	
Option 02: AM / FM Modulation (needs option 01 installed)			
AM Audio Level Required	Rear In BNC Connector	55 mV rms	For 100% AM Mod Depth
AM Mod Distortion	1 kHz into rear in BNC	< 3% @ 1 kHz	At 0 to 80% AM Mod
AM Frequency Response	Rear In BNC Connector	200 Hz to > 25 kHz	± 3 dB
FM Modulation	Rear In BNC Connector	0 to 250 kHz	
FM Frequency Response	Rear In BNC Connector	10 Hz to 80 kHz	± 3 dB.
Option 03: AM / FM Receiver (needs option 01 installed)			
FM Receiver Sensitivity	Span set to 0 kHz / div	-95 dBm	For 20 dB SINAD
AM Receiver Sensitivity	Span set to 0 kHz / div	-85 dBm	
Demodulation		AM: 0 to 95% FM: 0 to 230 kHz	
AM Freq Response		100 Hz to >25 kHz	± 3 dB
FM Freq Response		10 Hz to 25 kHz	± 3 dB. Usable to < 2 Hz.
Residual AM		< 0.5% rms	300 to 3400 Hz bandwidth
Residual FM		< 50 Hz rms	300 to 3400 Hz bandwidth
Audio Filters		Wide, Bandpass, Low	
Option 04: High Level Input Port			
RF-In Port Input Power		100 watts max	Power for 20 secs max
General			
Operating Temperature		0 °C to +40 °C	
Dimensions of PTS1220 Module		440 x 300 x 85 (mm)	Weight = 11 kg
Power Supply		115 or 230 VAC	Selectable on rear panel

Precision Test Systems			
Head Office - UK	**South Africa**	**USA**	**Represented locally by:**
Precision Test Systems LTD 40 Holkham Avenue, South Woodham Ferrers Essex, CM3 7AU, England Tel: +44 (0) 845 052 0920 Email: uksales@ptsyst.com Web: www.ptsyst.com	Precision Test Systems cc 183 Edison Crescent Hennops Park X7 Pretoria, South Africa Tel: +27 (0) 12 653 5848 Email: sasales@ptsyst.com Web: www.ptsyst.com	Precision Test Systems Suite # 981 14781 Memorial Dr. Houston, TX 77079 Tel/Fax: 1-888-876-4804 Email: usasales@ptsyst.com Web: www.ptsyst.com	