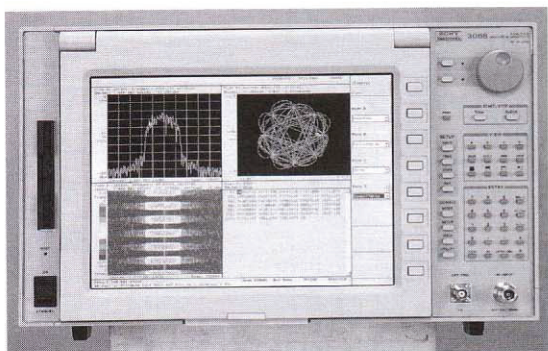


REAL-TIME SPECTRUM ANALYZERS

NEW 3066 • NEW 3086



FEATURES – BENEFITS

Seamless Acquisition for Capture of Short Duration or Intermittent Events

Analyzes in Frequency, Time and Modulation Domain

DC to 3 GHz Coverage

Frequency Event Trigger for Acquisition of Burst or Infrequently Occurring Signals

Post Capture 1000:1 Zoom Allows Analysis of Individual Signals after Wideband Capture

APPLICATIONS

1st, 2nd, and 3rd Generation Cellular/PCS R&D – Including GSM, CDMA, IS-136, PDC, W-CDMA

Signature Analysis

Spectrum Monitoring

Settling Time Measurements for Oscillators and Synthesizers

Phase Hit Capture and Measurement

Debugging of Hardware/Software Interface Problems

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1916, inside the U.S. call: 1-800-426-2200.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



The 3066 and 3086 are DC to 3 GHz real-time spectrum analyzers that allow the seamless capture of frequency spectra with spans up to 30 MHz (5 MHz – 3066). This allows the spectrum of burst signals, such as those from GSM, IS-136, PDC or partial rate CDMA mobile stations, to be easily captured and examined. Real-time spectrum analyzers take a whole different approach compared to traditional sweeping spectrum analyzers. Rather than acquiring one frequency step at a time, the real-time instrument captures a block of frequencies all at once. Because the instrument samples these full frames constantly (rather than waiting for each discrete frequency step to be measured), the signal can come or go as it pleases and the real-time spectrum analyzer will detect the change instantly.

The 12.1 in. color TFT display allows easy viewing of spectrum, waterfall displays, spectrograms and digital modulation analysis screens. Constellation and vector diagrams can be displayed as well as frequency, phase, magnitude, I and Q versus time for in-depth analysis of digitally modulated signals. Users can move a marker through the time record and analyze the modulation at any point.

In particular, signals with symbol rates up to 20.48 Msymbols/sec (3066 – 5.3 Msymbols/sec) may be analyzed during and after capture. This facilitates analysis of W-CDMA signals with chip rates up to 16.384 Mcps.

In addition, a frequency mask trigger allows the capture of randomly occurring or infrequent signals such as intermittent spurious emissions. If the user is not interested in the period between transmission bursts, the frequency mask trigger allows capture of the “burst-on” periods, thus maximizing the number of bursts that can be captured in memory for subsequent spectral, time or modulation analysis. The user can graphically define the frequency trigger mask; this allows the trigger condition to be generated by a particular event in the frequency domain irrespective of other activity within the displayed span. This is a major benefit when the trigger condition is used to capture signals arising from intermittent spurious or spectral re-growth events.

A 1000:1 zoom capability permits analysis to be performed on an individual signal in a multi-signal environment.

CHARACTERISTICS

INPUT/MEMORY MODE RELATED

Input Mode – RF, Baseband; Wideband, IQ (3086 only).

Input Connector – N type (RF, Baseband, Wideband), BNC type (IQ).

Input Impedance – 50 Ω .

VSWR (N type) – 1.5 (Reference Level ≥ -20 dBm).

Acquisition Mode – Roll, Block.

Acquisition Memory Size – 16 Mbytes.

Acquisition Memory Management – RF, Baseband Input

Memory Mode: Frequency, Dual, Zoom.

FFT Points: 1024, 256 (Frequency Mode).

FFT Window: Rectangular, Hamming, Blackman-Harris.

Block Size:

1 to 16,000 Frames (Frequency Mode, 256 pt).

1 to 4,000 Frames (Frequency Mode, 1024 pt).

1 to 2,000 Frames (Dual, Zoom Mode).

Minimum Frame Update Time:

20 μ s (Frequency Mode, 256 pt).

80 μ s (Frequency Mode, 1024 pt).

160 μ s (Dual, Zoom Mode).

Wideband, IQ Input (3086 only) –

Memory Mode: Zoom.

FFT Points: 1024.

FFT Window: Rectangular, Hamming, Blackman-Harris.

Block Size: 1 to 2,000 Frames.

Minimum Frame: 25 μ s.

FREQUENCY STANDARD RELATED

Characteristic	Description
Reference frequency	10 MHz
Initial frequency tolerance	± 0.1 ppm
Frequency stability Aging	± 0.0005 ppm/day
Temperature	± 0.002 ppm (5 to 40°C)

RF INPUT RELATED

Frequency –

Range: 10 MHz to 3 GHz.

Center Frequency Settability: 0.1 Hz.

Span: 100 Hz to 3 GHz.

Vector Span: 100 Hz to 6 MHz.

Real-time Span: 100 Hz to 5 MHz.

Number of Bins:

641 (100 Hz to 2 MHz span).

801 (5 MHz span).

481 (6 MHz span).

Span/6250 + 1 (span ≥ 10 MHz).

Spectrum Purity: -100 dBc/Hz (1 GHz CF,

200 kHz span, 0 dBm ref, 10 kHz offset).

Residual FM: 3 Hz p-p.

Amplitude –

Reference Level: -50 dBm to $+30$ dBm.

Maximum Nondestructive Input Power: $+30$ dBm.

Self Gain-Calibration Accuracy: ± 1.0 dB at

25 MHz within 5°C temperature variation.

Flatness: ± 2.0 dB (10 MHz to 3 GHz).

Input Equivalent Noise: -140 dBm/Hz.

3rd Order Distortion: -65 dBc (-10 dBfs input, at 1 GHz).

Residual Response: -70 dBfs (0 dBm ref, 5 MHz span).

Image Suppression: 70 dB.

Spurious Free Dynamic Range (1 GHz CF, 0 dBm REF, sinusoidal signal at the center, spur apart more than 10 kHz from the signal):

80 dB at 50 kHz span.

75 dB at 100 kHz span.

70 dB at 200 kHz and 500 kHz span.

65 dB at 1/2/5 MHz span.

BASEBAND INPUT RELATED

Frequency –

Range: DC to 10 MHz.

Center Frequency Settability: 0.1 Hz.

Span: 100 Hz to 10 MHz.

Vector Span: 100 Hz to 6 MHz.

Real-time Span: 100 Hz to 5 MHz.

Number of Bins:

641 (100 Hz to 2 MHz span).

801 (5 MHz and 10 MHz span).

481 (6 MHz span).

Spectrum Purity: -100 dBc/Hz (5 MHz CF,

200 kHz span, 0 dBm ref, 10 kHz offset).

Residual FM: 2 Hz p-p.

Amplitude –

Reference Level: -30 dBm to $+30$ dBm.

Maximum Nondestructive Input Power: $+30$ dBm.

Reference Level Accuracy: ± 0.5 dB at 5 MHz.

Flatness: ± 1.0 dB (1 MHz to 10 MHz).

Input Equivalent Noise: -150 dBm/Hz.

2nd Harmonic Distortion: -70 dBc (at 4.5 MHz).

DC Offset: -40 dBfs.

Residual Response: -70 dBfs (5 MHz CF, 5 MHz span, 0 dBm ref).

Alias Suppression: 65 dB.

Spurious Free Dynamic Range (5 MHz CF, 0 dBm ref, sinusoidal signal at the center, spur apart more than 10 kHz from the signal):

85 dB at 50 kHz span.

80 dB at 100 kHz span.

75 dB at 200 kHz span.

70 dB at 500 kHz span.

70 dB at 1/2/5 MHz span.

WIDEBAND INPUT RELATED (3086 ONLY)

Frequency – Range: 50 MHz to 3 GHz.

Center Frequency Settability: 0.1 Hz.

Span: 10 MHz, 20 MHz, 30 MHz.

Vector Span: 10 MHz, 20 MHz, 30 MHz.

Number of Bins:

501 (10 MHz and 20 MHz span).

751 (30 MHz span).

Amplitude –

Reference Level: -50 dBm to $+30$ dBm.

Maximum Nondestructive Input Power: $+30$ dBm.

Flatness within Span: ± 1 dB (25°C $\pm 5^\circ$ C).

Input Equivalent Noise: -140 dBm/Hz.

3rd Order Distortion: -65 dBc (-10 dBfs input, at 1 GHz).

Residual Response: -60 dBfs (0 dBm ref, 30 MHz span).

Image Suppression: 70 dB.

Spurious Free Dynamic Range (1 GHz CF, 0 dBm ref, sinusoidal signal at the center, spur apart more than 500 kHz from the signal):

65 dB at 10 MHz span.

60 dB at 20 MHz and 30 MHz span.

IQ INPUT RELATED (3086 ONLY)

Frequency –

Range: ± 15 MHz.

Span: 10 MHz, 20 MHz, 30 MHz.

Vector Span: 10 MHz, 20 MHz, 30 MHz.

Number of Bins:

501 (10 MHz and 20 MHz span).

751 (30 MHz span).

Amplitude –

Reference Level: 100 mV (amplitude of IQ signal).

Maximum Nondestructive Input Power: ± 5 V.

Flatness within Span: ± 0.5 dB (25°C $\pm 5^\circ$ C).

Residual Response: -60 dBfs (30 MHz span).

Alias Suppression: 55 dB.

Spurious free dynamic range (1 GHz CF, 0 dBm ref, sinusoidal signal at the center, spur apart more than 500 kHz from the signal):

65 dB at 10 MHz span.

60 dB at 20 MHz and 30 MHz span.

FRAME TIME RELATED

FRAME TIME (3086)

Span	1024 point	256 point
Baseband Mode:		
10 MHz	80 μ s	20 μ s
RF Mode and Baseband Mode:		
6 MHz	80 μ s	20 μ s
5 MHz	160 μ s	40 μ s
2 MHz	320 μ s	80 μ s
1 MHz	640 μ s	160 μ s
500 kHz	1280 μ s	320 μ s
200 kHz	3200 μ s	800 μ s
100 kHz	6.4 ms	1.6 ms
50 kHz	12.8 ms	3.2 ms
20 kHz	32 ms	8 ms
10 kHz	64 ms	16 ms
5 kHz	128 ms	32 ms
2 kHz	320 ms	80 ms
1 kHz	640 ms	160 ms
500 Hz	1280 ms	320 ms
200 Hz	3200 ms	800 ms
100 Hz	6400 ms	1600 ms

REAL-TIME SPECTRUM ANALYZERS

NEW 3066 • NEW 3086

Span	1024 point	256 point
Wideband/IQ Input Modes: 3086 Only		
30 MHz	25 μ s	25 μ s
20 MHz	25 μ s	25 μ s
10 MHz	50 μ s	50 μ s

TRIGGER RELATED

Trigger Mode – Auto, Normal, Quick, Delayed, Interval, Quick-interval, Timeout, Auto, Normal [RF (span \leq 6 MHz) and Baseband Input, Wideband and IQ Input (3086 only)].

Trigger Source – Internal/External.

Trigger Domain – Frequency, Time.

Trigger Position – 0 to 100%.

Frequency Trigger Mask –

Frequency Resolution: 1 bin.

Trigger Level Range: 0 dBfs to -70 dBfs.

Time Trigger Mask –

Time Resolution: 1 data point.

Trigger Level Range: 0 dBfs to -40 dBfs.

External Trigger Threshold Level – 1.6 V.

MARKER ZOOM RELATED

Marker –

Marker Type: Normal, Delta, Band-Power.

Search Function: Peak Right, Peak Left, Maximum.

Link between Views: On/Off.

Measurement Function – Noise Power, Power within Band, C/N, Adjacent Channel Power, Occupied Bandwidth.

Digital Zoom –

Zoom Ratio: 2 to 1000.

Maximum Span in the Zoom Mode: 5 MHz (RF, Baseband), 30 MHz (Wideband, IQ, 3086 only).

DIGITAL DEMODULATION RELATED

Characteristic	Description
Demodulator	
Carrier type	Continuous, Burst
Modulation format	BPSK, QPSK, pi/4 Shift DQPSK, 8PSK, OQPSK, 16QAM, 64QAM, GMSK
Measurement filter	Root Cosine
Reference filter	Cosine, Gauss
Filter parameter	alpha/BT: 0.0001 to 1, 0.0001 step
Maximum symbol rate	5.3 Msps (RF, Baseband); 20.48 Msps (Wideband, IQ; the 3086 only)
Standard setup	PDC, PHS, NADC, TETRA, GSM, CDPD, IS-95, T-53
Display format	
Vector diagram	Symbol/locus display, Frequency error measurement, Origin offset measurement
Constellation diagram	Symbol display, Frequency error measurement, Origin offset measurement
Eye diagram	I/Q/Trellis display (1 to 16 symbols)
Error vector diagram	EVM, Magnitude error, Phase error, Waveform quality (rho) measurement
Symbol table	Binary, Octal, Hexadecimal
Error measurement accuracy	
	10 frames averaged
PDC	EVM <1.2 %, Mag error <1.0 %, Phase error <0.8° (100 kHz span)
PHS	EVM <1.4 %, Mag error <1.2 %, Phase error <0.8° (1 MHz span)
GSM	EVM <1.8 %, Mag error <1.2 %, Phase error <1.0° (1 MHz span)
IS-95 reverse link	EVM <2.0 % (5 MHz span)
QPSK, 4.096 Msps, 2 GHz	EVM <2.5 % (20 MHz span)
QPSK, 16.384 Msps, 2 GHz	EVM <3.0 % (30 MHz span, 25° C \pm 5° C)

SYSTEM CONTROLLER

Pentium MMX 200 MHz, 64 Mbyte SIMM, Windows 95, PCI, ISA, TMP68301 16 MHz, 2.1 Gbyte 3.5 inch EIDE, 1.44 Mbyte floppy drive, GPIB IEEE488.1, Keyboard PC/AT (order separately), Centronics parallel port, SCSI 2.

ORDERING INFORMATION

For price information: Outside the U.S. contact your local Tektronix representative, inside the U.S. see the price list in the back of this catalog.

3086

Real-time Spectrum Analyzer.

Includes: User Manual, U.S. Power Cord, mouse.

3066

Real-time Spectrum Analyzer.

Includes: User Manual, U.S. Power Cord.

OPTIONS

Opt. 1S – Data capture software.

MEASUREMENT SERVICE OPTIONS

Opt. C3 – Three years of calibration services.

Opt. C5 – Five years of calibration services.

Opt. D1 – Test Data.

Opt. D3 – Test data (requires Opt. C3).

Opt. R3 – Three years of repair protection.

INTERNATIONAL POWER PLUGS

Opt. A1 – Universal Euro 220 V, 50 Hz.

Opt. A2 – United Kingdom 240 V, 50 Hz.

Opt. A3 – Australian 240 V, 50 Hz.

Opt. A4 – North American 240 V, 60 Hz.

Opt. A5 – Switzerland 220 V, 50 Hz.

See page 619 for description.

RECOMMENDED ACCESSORIES

PC Display Analysis Software –

3066: Order SL7PC66.

3086: Order SL7PC86.

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