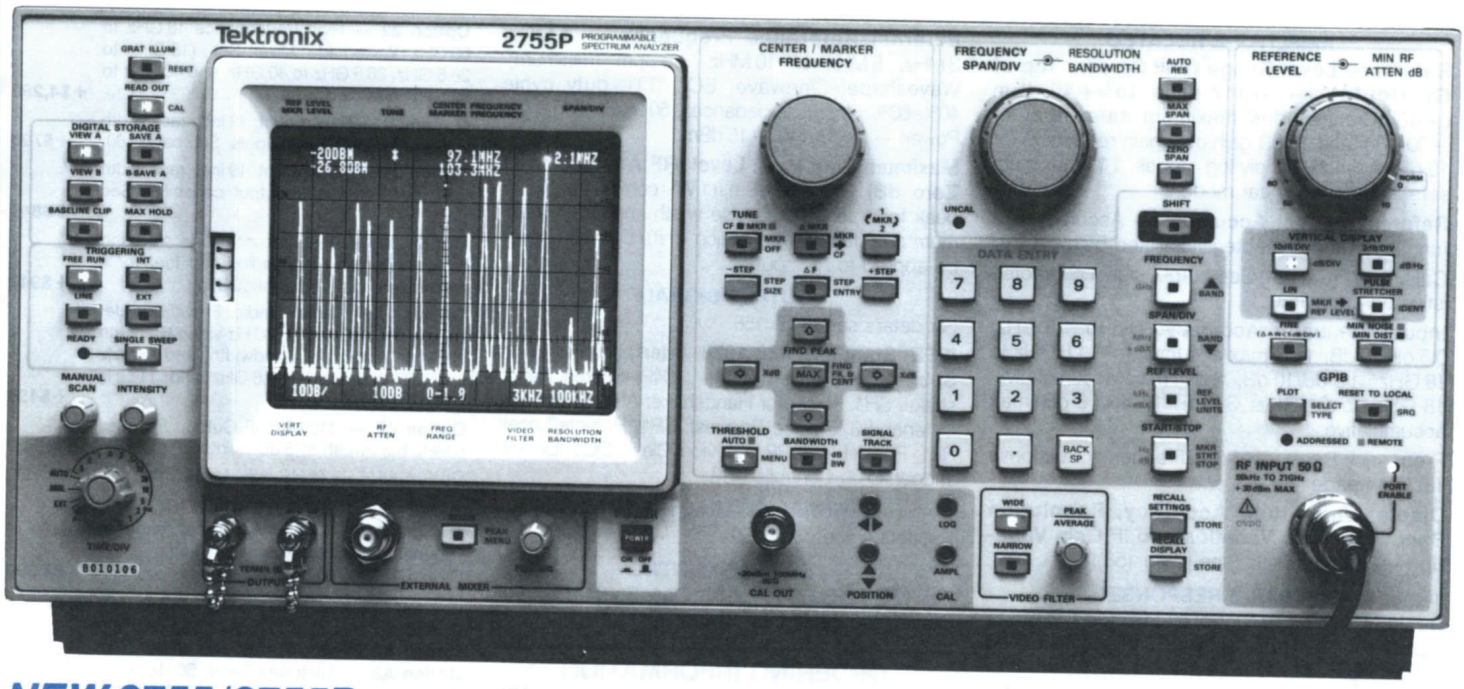
TEK 50 kHz to 325 GHz SPECTRUM ANALYZERS



NEW 2755/2755P

GPIB IEEE-488

The 2755P complies with IEEE Standard 488-1978, and with Tektronix *Standard Codes and Formats*.

Lab Performance Packaged for Engineering and Manufacturing Productivity

50 kHz to 21 GHz Coverage in Coax and to 325 GHz Using Tek Waveguide Mixers

Marker and Center Frequency Accuracy of One Part in 10^5

Built-In Marker Intelligence
—Exclusive Occupied Bandwidth Mode
—Menu-Selectable Signal Processing
—Signal Search Functions
—Noise Normalization to 1 Hz
—Alternate Reference Units

Large, Easy-to-Use Controls

Nonvolatile Memory for Up to Nine Waveforms and Nine Front Panel Displays

Direct Keypad Entry of Control Parameters

Direct Plot Capability (All Versions)

GPIB/Fully Programmable (2755P)

Optional Preselector

Now There is a Tek Spectrum Analyzer Especially for the Laboratory

The Tektronix 2755 is a benchtop instrument that combines cost-effective lab performance and ease of use, with a new dimension in spectrum analyzer processing intelligence. Packaged for enhanced engineering productivity, it reduces operator interface requirements and risk of human error. You'll make measurements faster and more accurately than ever before. All with the high standard of Tektronix quality and reliability.

Decision-Making Power at the Touch of a Button

Tek exclusives include signal processing intelligence that can discriminate and sort among continuous wave (CW), pulse and spurious signals. Hands-off convenience for measuring the bandwidth of filters, amplifiers and channelized spectrum occupancy is provided by Tek's new BANDWIDTH mode. For a summary of signal processing functions, see page 160.

Tedious, time-consuming calculations are eliminated with automatic noise normalization to 1 Hz and alternate reference units such as dBm, dBmV, dBμV and dBV.

Feature for feature, the 2755 is optimized for straightforward operation and outstanding ease of use—from the ergonomically designed front panel and larger controls to direct keypad entry of important control factors.

Millimeter Wave Capability

Using Tek's high performance waveguide mixers, you get calibrated amplitude and frequency coverage from 18 GHz to 325 GHz. Real signals are determined in two sweeps with Tek's accurate millimeter wave identification mode. No costly L.O. amp is needed—just some simple connections and you're ready to measure.

Use as a Systems Component

The 2755P is the GPIB-programmable version of the 2755. Featuring Tek *Codes and Formats*, programming easy to implement with English-like commands. With TekSPANS® software you can use the 2755P with popular controllers including the IBM PC and PC compatibles.

As an option, you can also rackmount the 2755 for use in the manufacturing or test environment not requiring instrument mobility.

CHARACTERISTICS

The following characteristics apply after a 30 minute warm-up period unless otherwise noted.

FREQUENCY RELATED

Frequency Range — 50 kHz to 21 GHz coaxial input; 50 kHz to 325 GHz external mixer input (amplitude specified from 18 GHz to 325 GHz with Tektronix WM 490 Series Waveguide Mixers).

Center and Marker Frequency Accuracy*[1] — Phase Locked: ±[20%D + (Fx10^{-5})] Hz Bands 1 and 5–12 with span/div ≤200 kHz, and Bands 2–4 with span/div ≤100 kHz. Unlocked: ±[20%D + (Fx10^{-5}) + 15 NkHz].
Where: D=Span/div or Res BW, whichever is greater.
F=Center or Marker Frequency
N=Harmonic Mixing Number

Delta Marker Frequency Accuracy — 1% of total span.

Center Frequency Drift (After 1 Hour Warm-Up) — Phase Locked: ≤50 Hz per minute of sweep time corrected at least every 30 seconds. Bands 1 and 5–12 with span/div ≤200 kHz, and bands 2–4 with span/div ≤100 kHz. Unlocked: ≤(5 kHz) N per minute of sweep time.

Frequency Readout Resolution — ≤10% span/div to 1 kHz minimum. (100 Hz in Delta Marker Mode).

Residual FM — Phase Locked: ≤(10 +2N) Hz p-p in 20 ms, Bands 1 and 5–12 with span/div ≤200 kHz, and Bands 2–4 with span/div ≤100 kHz. Unlocked: ≤(7 kHz) N p-p in 20 ms.

Noise Sidebands

dBc/Hz	Offset From Carrier
≤−95	3 kHz
≤−105	30 kHz
≤−115	300 kHz

Resolution Filters — 100 Hz to 1 MHz (6 dB bandwidth ±20%) in decade steps. Shape factor ≤7.5: 1 (60 dB/6 dB).

Video Filter Range — 0.3 Hz to 30 kHz (coupled to resolution filter by front panel pushbuttons).

Frequency Span/Division — 0 Hz (zero span pushbutton or data entry keypad); 200 Hz to 10 GHz (in a 1-2-5 sequence) via span/div knob; 200 Hz to 15 GHz (to two significant digits) via keypad or start/stop data entry, or marker start/stop; full band via MAX SPAN pushbutton (12 bands). Accuracy ±5% of selected span/div.

AMPLITUDE RELATED

Vertical Display Modes — 10 dB, 2 dB and linear via pushbutton; any integer from 1 to 15 dB/div via Data Entry keypad.

[1] Over the operating temperature extremes of 0°C to +50°C, 1.5 x 10^{-5}.

Display Dynamic Range — 80 dB log mode; 8 divisions linear.

Reference Level Range — Log Mode: −117 to +40 dBm, +30 dBm maximum input level; −130 to +27 dBV, +17 dBV maximum input level; −70 to +87 dBmV, +77 dBmV maximum input level; −10 to +147 dBμV, +137 dBμV maximum input level. Linear Mode: 39.6 nV/div to 2.8 V/div, 1 W maximum input level.

Reference Level Steps — 10 dB coarse, 1 dB fine in 10 dB log; 1 dB coarse, 0.25 dB fine in 2 dB log. 1-2-5 sequence coarse, 1 dB equivalent fine in linear; coarse step=log/div, fine is 1 dB for 5 dB/div or greater, 0.25 dB for 4 dB/div or less set via Data Entry keypad.

Reference Level Accuracy — Accuracy is dependent on a combination of RF Attenuator Accuracy, IF Gain Accuracy, Resolution Bandwidth, Display Mode, Calibrator Accuracy, Frequency Band, Frequency Response and Temperature Change (±0.15 dB/°C maximum).

Frequency Response and Sensitivity — Refer to Table 1, page 162.

Display Amplitude Accuracy — ±1.0 dB/10 dB to a maximum of ±2 dB over 80 dB (10 dB Log); ±0.4 dB/2 dB to a maximum of ±1.0 dB over 16 dB (2 dB Log); ±5% of full scale in linear mode.

RF Attenuator Range — 0 to 60 dB in 10 dB steps.

Attenuator Accuracy — Dc to 1.8 GHz: 0.5 dB/10 dB, 1 dB maximum cumulative error over 60 dB. 1.8 to 18 GHz: 1.5 dB/10 dB, 3 dB maximum cumulative error over 60 dB. 18 to 21 GHz: 3 dB/10 dB, 6 dB maximum cumulative error over 60 dB.

Resolution Bandwidth Gain Variation — ±0.4 dB (after CAL with respect to 1 MHz filter).

IF Gain Range — 87 dB increase; 10 dB decrease in MIN NOISE; 10 dB and 1 dB steps.

IF Gain Accuracy — ⩽0.2 dB/dB to maximum of 0.5 dB/9 dB except at the decade transitions: −19 to −20 dBm, −29 to −30 dBm; −39 to −40 dBm, −49 to −50 dBm, −59 to −60 dBm. An additional ⩽0.5 dB for a maximum cumulative error of 1 dB over 10 dB; ±2 dB maximum deviation over the 97 dB range.

Marker/s Accuracy — Equal to Reference Level Accuracy plus Display Amplitude Accuracy.

Third Order Intermodulation Distortion — ⩽−70 dBc for CW signal (MIN Distortion Mode) Any two on-screen signals within any frequency span (50 kHz to 21 GHz); ⩽−100 dBc for signals spaced ⩾100 MHz for preselector bands (Option 01 only).

Harmonic Distortion — ⩽−60 dBc for a −40 dBm input 50 kHz to 21 GHz in MIN Distortion mode. Not discernible above the noise (typically −100 dBc) for preselected bands (Option 01 only).

LO Emissions — ⩽−10 dBm. Option 01: ⩽−70 dBm.

Spurious Responses (Residual) — ⩽−100 dBm.

INPUT SIGNAL

RF Input — Type "N" female 50 Ω nominal impedance. Refer to page 160 for 75 Ω input (Option 07) characteristics.

Maximum Safe Input — +30 dBm CW with ⩾20 dB attenuation; +13 dBm CW with 0 dB attenuation; 0 V dc. Option 01: +30 dBm (1 W) CW; 75 W peak, 1 μs Pulse width, 0.001 duty; 0 dB attenuation. Do not apply dc.

1 dB Gain Compression — ⩾−18 dBm in MIN Distortion Mode.

VSWR

Frequency	10 dB Attenuation	(Typical) 0 dB Attenuation
50 kHz to 2.5 GHz	1.3:1 Max; 1.2:1 Typical	1.9:1
2.5 to 6.0 GHz	1.7:1 Max; 1.5:1 Typical	1.9:1
6.0 to 18 GHz	2.3:1 Max; 1.9:1 Typical	2.3:1
18 to 21 GHz	3.5:1 Max; 2.7:1 Typical	3.0:1

Measured at ±3 MHz of preselector peak for Option 01.

OUTPUT SIGNAL

Calibrator (Cal Out) — −20 dBm ±0.3 dB at 100 MHz ±1.0 kHz

1st and 2nd LO — Provides access to the output of the respective local oscillators (1st LO + 7.5 dBm minimum to a maximum of +15 dBm, 2nd LO −22 dBm minimum to maximum of +15 dBm). These ports must be terminated in 50 Ω at all times.

Vertical Out — Provides 0.5 V ±5% of signal/div of video above and below the centerline.

Horizontal Out — Provides 0.5 V either side of center. Full range −2.5 V to +2.5 V ±10%.

Pen Lift — TTL, 5 V nominal to lift pen.

IF Out — Output of the 10 MHz IF. Level is approximately −5 dBm for a full screen signal at −30 dBm input reference level. Nominal impedance 50 Ω.

IEEE Standard 488-1978 Interface Function Subsets Implemented — **2755P**: SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1 and CØ. **2755** (Direct Plot only): SH1, AHØ, T3, LØ, SRØ, RLØ, PPØ, DTØ and CØ.

GENERAL CHARACTERISTICS

Sweep Time — 20 μs to 5 s/div (10 s/div in auto) in 1-2-5 sequence.

CRT Readout — Displays: Reference level, center frequency, frequency range, vertical display mode, frequency span/div, resolution bandwidth, RF attenuation and video filter.

CRT — 8 x 10 cm, P31 Phosphor.

Power — 210 W max with all options, at 115 V and 60 Hz.

Input Voltage — 90 to 132 V ac or 180 to 250 V ac, 48 to 440 Hz.

Configuration — (Bench/Rackmount) 27 kg (60 lb), 177.8 mm x 431.8 mm x 609.6 mm (7 in x 17 in x 24 in).

ENVIRONMENTAL

Per MIL-T-28800C Type III, Class 5, Style E.

Temperature — Operating: 0°C to +50°C. Nonoperating: −40°C to +75°C.

Altitude — Operating: 10,000 feet. Nonoperating: 40,000 feet.

Humidity — 95% below +30°C; 75% above +30°C; 45% above +40°C.

Electromagnetic Compatibility — Meets MIL-STD-461B requirements, operating from 48 Hz to 440 Hz power sources with the exceptions shown below.

Conducted Emissions: CE01, 15 dB relaxation for first 10 harmonics of power line frequency; CE03 (Narrowband), full limits; CE03 (Broadband), 15 dB relaxation from 15 kHz to 50 kHz.

Conducted Susceptibility: CS01, full limits; CS02, full limits; CS06, full limits.

Radiated Emissions: RE01, 10 dB relaxation for first 10 harmonics of power line frequency, and exceptioned from 30 kHz to 36 kHz; RE02, full limits.

Radiated Susceptibility: RS01, full limits; RS02-1, full limits; RS02-2, to 5 amps only; RS03, up to 1 GHz only.

ORDERING INFORMATION

2755 Spectrum Analyzer **$27,800**

Includes: 50 Ω coax cable, N to N connector, 6 ft (012-0114-00); 50 Ω coax cable, BNC to BNC connector, 18 in (012-0076-00); service manual Vol. 1 (070-6032-00); service manual Vol. 2 (070-6033-00); operator's manual (070-6031-00); N male to BNC female adaptor; 2 Fast-Blo, 4A fuses; power cord (161-0104-00); power cord clamp (343-0170-00); CRT amber light filter (378-0115-01); gray CRT light filter (378-0115-02); CRT mesh filter (378-0887-00).

2755P Programmable Spectrum Analyzer **$32,800**

Includes: Same as 2755 plus programmer's manual (070-6034-00).

OPTIONS

Option 01 — Adds preselection for the 1.7 GHz to 21 GHz band and limiter for 1st mixer below 1.8 GHz. **+$3,995**

Option 07 — 75 Ω dBmV input and calibration in addition to 50 Ω dBm input and calibration. **Includes:** BNC male to female adaptor connector (013-0126-00); 42 inch BNC to BNC connector, 75 Ω coax cable (012-0074-00). **+$750**

Option 08 — Deletes external mixer capability. Frequency range limited to 50 kHz to 21 GHz. (Not combinable with Options 07, 21, 22) **−$1,750**

Option 21 — High Performance 18 to 40 GHz Waveguide Mixer Set includes two mixers (18 to 26.5 GHz, and 26.5 GHz to 40 GHz). **Includes:** Diplexer assembly (015-0385-00); BNC to SMA adaptor (015-0388-00); semirigid cable (015-1055-00); SMA to SMA cable (012-0649-00). **+$2,525**

Option 22 — High Performance 18 to 60 GHz Waveguide Mixer Set includes three mixers (18 to 26.5 GHz, 26.5 to 40 GHz, 40 to 60 GHz). **Includes:** Same as Option 21. **+$4,250**

Option 30 — Rackmount 19 in rack width. **Includes:** Rack slides (351-0623-00). **+$250**

Option 31 — Rackmount 19 in rack width with rear panel input/output capability (no front panel inputs). **Includes:** Same as Option 30. **+$450**

Option 39 — Non-Lithium (Silver) batteries for battery-powered memory. **+$50**

Option 41 — Digital Microwave Radio Enhancement. Including: 1) Wider bandwidth preselector for better signal symmetry in digital radio bands. 2) Narrow video filter (approximate 1/3000th resolution bandwidth). 3) Improved frequency span/div accuracy at 5 MHz/div span. **+$450**

Option 42 — Replaces MARKER/VIDEO input port on the rear panel with a 110 MHz IF output port which provides a signal with a 3 dB bandwidth ⩾5 MHz and makes the 2755 suitable for broadband, swept-receiver measurements. **+$1,500**

Option 45 — (2755P) MATE/CIIL language. **+$4,975**

Option 52*[1] — North American 220 V configuration with standard power cord. Fuses are replaced with 2 A slo-blo.

OPTIONAL ACCESSORIES

External Waveguide Mixers —

(18 to 26.5 GHz) Order WM 490K	$1,250
(26.5 to 40 GHz) Order WM 490A	$1,250
(33 to 50 GHz) Order WM 490Q	$1,450
(40 to 60 GHz) Order WM 490U	$1,720
(50 to 75 GHz) Order WM 490V	$1,950
(60 to 90 GHz) Order WM 490E	$2,120
(75 to 110 GHz) Order WM 490W	$2,175
(90 to 140 GHz) Order WM 490F	$2,330
(110 to 170 GHz) Order WM 490D	$3,250
(140 to 220 GHz) Order WM 490G	$3,325

Tapered Transition — Used with WM 490G, 220 to 325 GHz. Order 119-1728-00 **$1,200**

Microwave Comb Generator — TM 500 Series compatible. Order 067-0885-00 **$1,800**

1405 TV Sideband Analyzer Adaptor — 525/60 markers (Opt 02 required for 275X & 49X). **$5,780**

TR 503 Tracking Generator — 100 kHz to 1.8 GHz. **$6,620**

[1] To order, contact your local Tektronix Sales Office.