

# ADVANTEST TR4133 / TR4133A / TR4133B

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TR4133	TR4133A/B
100 kHz to 20 GHz; with internal mixer (100 kHz to 3.6 GHz, 10 MHz to 4 GHz, 4-12 GHz, 8-12 GHz, 12-20 GHz)	100 kHz to 20 GHz; with internal mixer (100 kHz to 3.6 GHz, 3.5-7.5 GHz, 7.2-15.2 GHz, 10.9-20 GHz)

The addition of an external mixer permits measuring frequencies up to 60 GHz. (TR4133/B only)

Preselectors : 100 kHz to 3.6 GHz; low-pass filter (TR4133/A/B)  
3.5-20 GHz; YIG tuning preselector (TR4133A/B only)

Frequency span : MULTI-BAND; displays 3.5-20 GHz in a single sweep. (TR4133A/B only)

FULL SPAN; displays a specified frequency band in a single sweep.

SPAN/DIV; 400 MHz/division to 2 kHz/division, 1-2-5 steps

ZERO SPAN; spectrum analyzer functions as a fixed tuning receiver.

Frequency span accuracy:  $\pm 5\%$  or better

## Center Frequency Readout

Resolution : 1 kHz maximum

Accuracy :  $\pm 10$  kHz x N when frequency span is 20 kHz/division or less.  
 $\pm (1$  MHz + 20% of span/division) when frequency span is 50 kHz/division or more and after calibration is completed.

N: Mixer harmonic order number

## Frequency Stability

Residual FM : 300 Hzp-p x N (with AFC ON)

1 kHzp-p x N (with AFC OFF)

Noise sidebands: -80 dBc or less with resolution bandwidth of 1 kHz (10 Hz video filter, 20 kHz apart from carrier)

### Resolution

Resolution bandwidth (3 dB bandwidth): 100 Hz to 1 MHz, 1-3 steps

Bandwidth selectivity (60 dB to 3 dB resolution bandwidth ratio):

<15:1

Resolution bandwidth accuracy:  $\pm 25\%$  or better

Resolution bandwidth selection accuracy:  $\pm 1$  dB or better

(at 20°C to 30°C)

### Amplitude Specifications

CRT display range

LOG mode (with respect to reference level): 80 dB at 10 dB/  
division

20 dB at 2 dB/  
division

LOG linearity:  $\pm 0.15$  dB/1 dB,  $\pm 1$  dB/10 dB,  $\pm 1.5$  dB/70 dB or  
less

LINEAR mode : 10 divisions

LINEAR linearity: Within  $\pm 5\%$  of full scale

### Reference Level

LOG mode : +40 dBm to -69 dBm

Reference level can be set in 10 dB steps or 1 dB  
steps at 10 dB/division, or in 1 dB steps or  
0.25 dB steps at 2 dB/division.

LOG mode display unit: dBm, dB $\mu$  or dBpW

LOG mode accuracy:  $\pm 1$  dB (for reference level of 0 to -59 dBm,  
200 MHz, 10 dB input attenuation, after  
calibration)

LINEAR mode : 20 V to 100  $\mu$ V, 1-2-5 steps

Dynamic ranges : Undistorted dynamic ranges (Secondary harmonics)

TR4133		TR4133A/B	
Measuring range	Dynamic range	Measuring range	Dynamic range
10 MHz to 3.6 GHz	70 dB or more (-30 dBm input)	10 MHz to 3.6 GHz	70 dB or more (-30 dBm input)
10 MHz to 4 GHz 4 GHz to 12 GHz 8 GHz to 12 GHz 12 GHz to 20 GHz	60 dB or more (-30 dBm input)	3.5 GHz to 7.5 GHz 7.2 GHz to 15.2 GHz 10.9 GHz to 20 GHz	100 dB or more (0 dBm input)

Frequency responses and average noise levels

TR4133

Frequency Band	N	Frequency response	Average noise level
100 kHz to 3.6 GHz	1 <sup>-</sup>	±1.0 dBmax	-118 dBm +0.8 x f (GHz) dB
10 MHz to 4 GHz	1 <sup>-</sup>	±1.0 dBmax	-108 dBm
4-12 GHz	4-8 GHz 2 <sup>-</sup>	±1.5 dBmax	-99 dBm
	4-12 GHz 2 <sup>-</sup>	±3.0 dBmax	-96 dBm
8-12 GHz	1 <sup>+</sup>	±2.0 dBmax	-103 dBm
12-20 GHz	2 <sup>+</sup>	±3.0 dBmax	-95 dBm

TR4133A/B

Frequency Band	N	Frequency response	Average noise level
100 kHz to 3.6 GHz	1 <sup>-</sup>	±1.0 dBmax	-118 dBm +0.8 x f (GHz) dB
3.5-7.5 GHz	1 <sup>-</sup>	±1.5 dBmax	-111 dBm
7.5-15.2 GHz	2 <sup>-</sup>	±2.5 dBmax	-105 dBm
10.9-20.0 GHz	3 <sup>-</sup>	±4.0 dB max	-95 dBm

Average noise levels: Resolution bandwidth 1 kHz, video filter 10 Hz,  
and input attenuator 0 dB

N : Mixer harmonic order number

Video filter : 10 kHz, 1 kHz, 100 Hz, 10 Hz, OFF

Gain compression : 1 dB or less for -10 dBm input

Residual response : -90 dBm or less (for 0 dB input attenuation)

Sweep Specifications

Sweep time : 5 ms/division to 10 s/division, 1-2-5 steps

In the auto mode, sweep time is automatically set to the optimum level through the setting of the frequency span and video filter.

Sweep time accuracy : ±15%

Trigger modes : FREE RUN, LINE, VIDEO, SINGLE

#### Input Specifications

RF input : Approx. 50  $\Omega$ , type N connector (may be changed to SMA Connector by removing the N connector)  
Maximum input level: +20 dBm, +127 dB $\mu$  or +110dBpW (input attenuator 20 dB or more) 0 Vdc  
Input attenuator: 0-50 dB, in 10 dB steps

#### CRT Display Specifications

Displays : Waveforms, set conditions, graticule  
Trace : Displays up to two traces of memory A or B and a WRITE waveform.  
WRITE : Displays the spectrum analyzer's signal response on each sweep.  
MAX. HOLD : Displays the maximum level at each point on the frequency axis since the start of the MAX. HOLD function.  
VIEW : Displays memory contents.  
B-A : Displays the contents of memory B less the contents of memory A.  
AVG : Displays average value for each sweep since the start of the function  
POSI PEAK : Displays peak signal level for each data position  
Marker display : Displays the frequency and level at the marker position.  
Frequency : 1 kHz resolution maximum  
Frequency accuracy: Center frequency accuracy +5% of span/division  
Level resolution: 0.2 dB at 10 dB/division  
0.05 dB at 2 dB/division

#### Output Specifications

Calibration output signals: -30 dBm  $\pm$ 0.5 dB, 200 MHz  $\pm$ 30 kHz  
Probe power supply:  $\pm$ 15 V, 4-pin connector  
Monitor output : Approx. 8  $\Omega$ ; can be monitored with an earphone.  
Recorder output: Only WRITE waveforms generated in analog form.  
X-axis : Approx. -5 V to +5 V, output impedance approx. 10 k $\Omega$

Y-axis : Approx. 0 to +4 V, output impedance approx. 220  $\Omega$   
Z-axis : Balancing at LOW TTL level  
Video output : Approx. 75  $\Omega$ , external CRT composite signal  
Approx. 1 V<sub>p-p</sub>  
output; for external CRT and video plotter  
IF output : Approx. 50  $\Omega$ , 210.7 MHz IF output, bandwidth  
approx. 15 MHz  
GPIB data output and remote control: Standard built-in GPIB  
permits remote control and data output.

#### General Specifications

Ambient operating conditions

Temperature : 0°C to 40°C

Relative humidity: 85% or less

Power requirements: 100 Vac  $\pm$ 10% (may be altered to 120 V  
 $\pm$ 10%, 220 V  $\pm$ 10%, or 240 V +4% -10%), 50 Hz or  
60 Hz

Approx. 200VA (TR4133)

Approx. 220VA (TR4133B)

External dimensions: Approx. 350 (W) x 221 (H) x 550 (D) mm,  
376 (W) x 249 (H) x 602 (D) mm (Includes  
protectors and a front cover)

Weight TR4133 : Approx. 26 kg

TR4133A/B: Approx. 27 kg

#### 1-4. OPTIONS AND ACCESSORIES

##### 1-4-1. Accessories

###### (1) Close-up camera equipment

Camera : M-75D

Mainframe : 5R-32

CRT bezel adapter: 40

###### (2) TR1661 external mixer

The TR1661 external mixer connects to the 1st LOCAL connector on the spectrum analyzer to expand the measured frequency range. When using this mixer, an interconnection cable A01202 and the following tapered waveguides are required: