

## 2GHz Synthesized Signal Generator



### Features

- ★ Single-chip Microcomputer Controlled Modular Design
- ★ Single Loop Syth
- ★ Fine Spectral Purity
- ★ Reverse Power Protection
- ★ IEEE488 GPIB Optional
- ★ SMT Assembled, Compact Structure
- ★ Front Panel State Save / Access
- ★ High stability Oven Crystal Xtal Oscillator
- ★ High Performance / Price Ratio, High Reliability

### Application

APLAB Model 2132 covers the frequency range of 100KHz to 2GHz has a RF output range of +10 to -127dBm with minimum settable resolution of 0.1dB. It is designed for applications which require good modulation, frequency, and output level performance with better spectral purity for a low price. The 2132 is well suited for testing a wide variety of RF receivers and RF devices, such as filters, amplifiers, and mixers etc. in departments like R&D laboratories, Army workshops, Air Force, Navy, Production line, Telecom Maintenance Lab, Educational Institutes and many others.

### Specifications

#### FREQUENCY

<b>Range</b>	: 100KHz ~ 2002MHz.
<b>Resolution</b>	: 1Hz (<1004MHz) 2Hz (≥1004MHz).
<b>Stability</b>	: $3 \times 10^{-8}$ /day.
<b>Switching Speed</b>	: <150ms.
<b>INT Ref. Oscillator</b>	: 10MHz.

#### OUTPUT

<b>Range</b>	: -127dBm ~ +10dBm (<1004MHz) (Reduce for 3dB in pulse modulation option).
<b>Resolution</b>	: 0.1dB.
<b>Accuracy</b>	: ±2dB (>-115dBm and <+10dBm).

#### Flatness

: ±1dB (<1004dBm)
: ±2dB (≥1004dBm)
(+4dBm output level and >400kHz).

#### R.P.P.

: 1W (50Ω load).

#### S.W.R.

: <1.5 (<1004dBm)  
<2 (≥1004dBm)  
(carrier frequency >400kHz, level <-6dBm).

#### Impedance

: 50Ω nominal.

#### RF Leakage (rear panel not included).

: <3μV (<1000MHz, <-6dBm).

#### SPECTRAL PURITY

**Harmonics** : <-30dBc. (output level ≤+4dBm)

<b>Non-harmonics</b>	: (output level $\leq +4\text{dBm}$ , offset from carrier freq. $\geq 5\text{kHz}$ ) $< -50\text{dBc}$ ( $< 251\text{MHz}$ ) $< -60\text{dBc}$ ( $251\text{MHz} \leq \text{Freq.}$ $< 1004\text{MHz}$ ) $< -50\text{dBc}$ ( $\geq 1004\text{MHz}$ ).
<b>Sub-harmonics</b>	: (output level $\leq +4\text{dBm}$ ) $< -50\text{dBc}$ ( $< 1800\text{MHz}$ ) $< -40\text{dBc}$ ( $\geq 1800\text{MHz}$ ).
<b>SSB Phase Noise</b>	: $-110\text{dBc/Hz}$ ( $1000\text{MHz}$ ) $-104\text{dBc/Hz}$ ( $2000\text{MHz}$ ).
<b>Residual FM</b> (0.3 ~ 3kHz rms)	: $< 20\text{Hz}$ ( $< 251\text{MHz}$ ) $< 10\text{Hz}$ ( $< 502\text{MHz}$ ) $< 20\text{Hz}$ ( $< 1004\text{MHz}$ ) $< 40\text{Hz}$ ( $\geq 1004\text{MHz}$ ).
<b>AM MODULATION</b>	
<b>Radio Frequency</b>	: $\geq 1.5\text{MHz}$ .
<b>AM Depth</b>	: 0~70% (output level $\leq +4\text{dBm}$ , int. mod) 0~100% (output level $\leq +4\text{dBm}$ , ext. mod).
<b>Resolution</b>	: 0.10%.
<b>Accuracy</b>	: $\pm 7\%$ of setting $\pm 1.5\%$ . (internal 1kHz modulation rate, modulation depth $\leq 30\%$ ).
<b>Distortion</b>	: 2% (carrier $< 1004\text{MHz}$ ) 3% (carrier $\geq 1004\text{MHz}$ ) (modulation rate 1kHz, modulation depth 30%, BW : 0.3~3kHz).
<b>INT Modulation AM</b>	: 1KHz, 400Hz.
<b>EXT Modulation AM (3dB Bandwidth)</b>	: DC~25KHz.
External DC	: DC~25KHz.
External AC	: 20Hz~25KHz.
<b>Residual FM</b> (0.05~15kHz, AVG)	: $< 0.1\%$ .
<b>FM MODULATION</b>	
<b>Peak Frequency</b>	: 0 ~ 100KHz ( $< 251\text{MHz}$ )
Offset (AC FM, Rate $> 25\text{Hz}$ )	: 0 ~ 50KHz ( $< 502\text{MHz}$ ) 0 ~ 100KHz ( $< 1004\text{MHz}$ ) 0 ~ 200KHz ( $\geq 1004\text{MHz}$ ).
FM specification are not available when (radio freq. – freq. offset) $< 100\text{KHz}$ .	
<b>Resolution</b>	: 10Hz ( $\leq 10\%$ max. peak freq. offset) 100Hz ( $> 10\%$ max. peak freq. offset).
<b>Accuracy</b>	: $\pm 7.5\%$ of FM deviation $\pm 50\text{Hz}$ ( $< 1004\text{MHz}$ ). $\pm 7.5\%$ of FM deviation $\pm 100\text{Hz}$ ( $\geq 1004\text{MHz}$ ).
<b>Distortion</b>	: $< 1\%$ (peak freq. offset $> 4\text{kHz}$ , $< 1004\text{MHz}$ ). $< 1\%$ (peak freq. offset $> 8\text{KHz}$ , $\geq 1004\text{MHz}$ ).
<b>INT Modulation FM</b>	: 1KHz, 400Hz.
<b>EXT Modulation FM (3dB bandwidth)</b>	: DC ~ 50KHz.
External DC	: DC ~ 50KHz.
External AC	: 50Hz ~ 50KHz.
Mixed Modulation	: Int. Source (1kHz or 400Hz) + ext. source (ext. source $\leq 0.5\text{Vpk}$ or 0.5Vdc).

## PHASE MODULATION

<b>Max Phase Deviation</b>	: 0 ~ 10 rad ( $< 251\text{MHz}$ ) 0 ~ 5 rad ( $< 502\text{MHz}$ ) 0 ~ 10 rad ( $< 1004\text{MHz}$ ) 0 ~ 20 rad ( $\geq 1004\text{MHz}$ ).
<b>Resolution</b>	: 0.1 rad.
<b>Accuracy</b> (Internal 1KHz)	: $\pm 7.5\%$ of setting $\pm 0.05$ rad. ( $< 1004\text{MHz}$ ) $\pm 7.5\%$ of setting $\pm 1$ rad. ( $\geq 1004\text{MHz}$ )

<b>Modulation Rate</b>	: 0.1 rad.
Internal	: 1KHz or 400Hz.
External AC	: 50Hz ~ 10KHz (3dB BW).
<b>Modulation Distortion:</b> (Modulation Rate 1kHz, BW : 0.3~3kHz)	: $\pm 2\%$ (phase offset $\geq 3$ rad, $< 1004\text{MHz}$ ) $\pm 2\%$ (phase offset $\geq 6$ rad, $\geq 1004\text{MHz}$ ).

## INTERNAL MODULATION SOURCE OUTPUT

<b>Rate</b>	: 1kHz or 400Hz.
<b>Amplitude</b>	: 1Vpk.
<b>EXTERNAL MODULATION SOURCE INPUT</b>	
<b>Impedance</b>	: 600 $\Omega$ (BNC).
<b>Amplitude</b>	: 1Vpk (Full Scale Modulation). High / Low Level indicated when modulation frequency $\leq 10\text{kHz}$ .

## STANDARD FREQ. OUTPUT

<b>Frequency</b>	: 10MHz.
<b>Waveform</b>	: Sine Wave.
<b>Amplitude</b>	: $> 0.3\text{Vrms}$ (50 $\Omega$ load).
<b>Stability</b>	: $3 \times 10^{-8}$ / day.

## EXTERNAL FREQUENCY STANDARD INPUT

<b>Frequency</b>	: 5MHz, 10MHz.
<b>Amplitude</b>	: 0.3Vrms ~ 1Vrms (50 $\Omega$ load).

## PULSE MODULATION (OPTION)

<b>Rising / Falling Time</b>	: $< 15\text{ns}$ .
<b>On / Off Ratio</b>	: $> 55\text{dB}$ .
<b>Ext Modulation Signal</b>	: Pulse Repetition Rate : DC~10MHz Pulse Input Amplitude : TTL Level.

## REMOTE PROGRAMMING INTERFACE (Optional)

: IEEE488 GPIB.

## GENERAL

<b>Power Voltage</b>	: 220V $\pm 10\%$ .
<b>Power Frequency</b>	: 50Hz $\pm 5\%$ .
<b>Power Consumption</b>	: No more than 100VA.

## ENVIRONMENTAL REQUIREMENT

Comform to Group II for environment and Class 3 for transportation in Standard GB6587.

<b>Storage Temperature</b>	: $-10^{\circ}\text{C}$ ~ $+60^{\circ}\text{C}$ .
<b>Operating Temperature</b>	: $0^{\circ}\text{C}$ ~ $+40^{\circ}\text{C}$ .

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