BNC Model 630 & 632 — Function and Arbitrary Waveform Generator

The Model 630/632 Arbitrary Waveform Function Generator represents the finest single source for signal generation to date. Combining the latest DSP and DSS technologies, the Model 630/632 offers a number of operating modes, providing a versatile, cost-effective signal source. You will find the Model 630/632 is the best value and most capable instrument for any bench.

Arbitrary Waveform Function Generator, Sweep Function Generator, Pulse, VCO, AM, FM, Ø Modulation, FSK and Burst Modes are all accessed quickly and easily from the front panel keypad. The Model 630/632 has a user-defined waveform capability that eliminates the phase shifts, added data points and dropped data points. In traditional designs, data points are either repeated or dropped when the number of data points and the desired output frequency do not match exactly with the internal timing. In addition, the dropped or repeated data points are not necessarily the same ones each time the arbitrary waveform is constructed. In the traditional designs, the sampling of data points results in phase shifts when the sampling clock rate and the total points in the waveform are not exactly matched. The Model 630/632 is a "true arb" with fully synchronized outputs.

- ▼ *No phase jitter or dropped points*
- ▼ *Recreate "real-world" signals*
- ▼ *More standard waveforms*
- ▼ *Simulates normal and aberrant situations*
- ▼ *More operating modes*
- ▼ *"The best of both worlds"– EDN*

The Model 630/632 represents a major breakthrough in signal generation and analysis. This versatile instrument has capabilities that allow the engineer to use it in a broad range of applications that include communications, radio, telephony, analog/digital circuit design and test.

The Model 630/632 is much more than a signal generator. Never before has so much versatility, capability and performance been packed into a single low-cost instrument. Its architecture is based on the latest advances in DSP and DDS technology which not only ensures calibrated and drift-free performance, but also gives the engineer signal analysis functions such as DTMF Detection and Power Level Measurement. The capabilities of the Model 630/632 can continually be enhanced and expanded by downloading software upgrades to internal Flash memory.

The Model 630/632 delivers clean, fully synthesized, DC to 21.5 MHz/31.5 MHz modulated or unmodulated waveforms with 0.01Hz frequency resolution. User-friendly features include a large, easy-to-read illuminated LCD display which allows the user to see all modulation parameters simultaneously and a full numeric keypad and encoder which provide direct editing of each parameter. No confusing submenus!

Control Panel

Freehand Waveform

Amplitude Modulation Waveform

Arbitrary Waveform Function Generator The Arbitrary Waveform Function Generator allows you to design custom waveforms on your personal computer and download them to the Model 630/632 which generates them in real-time. The Arbitrary Waveform Generator system is also used to generate pulse waveforms with an adjustable duty cycle and a suite of pre-stored Function Generator waveforms. Arbitrary waveforms may either be designed with a graphical Windows®-based design tool or be generated point-by-point in a variety of data formats from your own application software. A floppy diskette with a data generator program, example waveforms, and a downloader utility are included with this option.

Arbitrary Waveform Generation Design custom waveforms on your PC and download for generation 40 MS/s max update rate 12 bit resolution, 32K buffer. Arbitrary waveforms may be designed with a graphical Windows®-based design tool, which is available for free download from www.bkprecision.com.

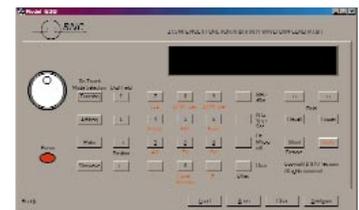*Function Generator* Generate Triangle, Ramp, Sinewave and others.

Pulse Generator Digital waveforms with an adjustable duty cycle.

High Stability Timebase Guarantee ±5 ppm frequency over 32˚ to 104˚F (0 to 40°C) range.

Modes
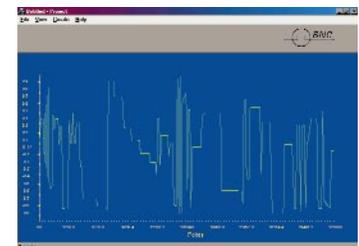
Basic Sine/Square Wave	Internal/ External BPSK	Power Measurement
Linear/Log Sweep (Free Run or Triggered)	Internal/ External FSK (Ext FSK to 3MHz)	Dualtone Generation
Internal/ External AM	Burst (Int/Ext trigger)	Arbitrary Waveform
Internal/ External FM	Internal/ External SSB	Function Generator
Internal/ External PM	DTMF Detection	Pulse Generator

Specifications subject to change without notice

STANDARD FEATURES
DC offset capability
TTL/CMOS sync output available in all modes
RS232 remote control (Easy to use) Code examples included.
External logic input for gating or output signal and triggering.
Easy software updates via Flash memory.
Configuration save/restore: 10 complete front panel setups.

MAIN OUTPUT	
Frequency:	DC to 21.5 MHz/31.5 MHz steps, 0.01 Hz
Level:	4 mVp-p to 10.000 Vp-p, 1mV steps (into 50 Ω) or -44 dBm to +24 dBm, 0.1 dBm steps (into 50 Ω)
Level Accuracy:	±1%
Sinewave Distortion:	<1%
Flatness:	± 0.2 dB (DC-21.5 MHz/31.5 MHz) Level 5V @50Ω
DC offset:	0V to ±6 V, 1 mV steps (into 50 Ω)
Output impedance:	50 Ω
Freq. accuracy:	±10 ppm (.001%)
Phase Noise:	< -55 dBc in a 30 kHz band
Spectral Purity:	DC to 100 kHz: > -50 dBc
100 KHz to 1 MHz:	> -45 dBc
1 MHz to 12 MHz:	> -40 dBc
12 MHz to 21.5 MHz/31.5 MHz:	> -35 dBc

SYNC OUTPUT	
Amplitude:	0V to +5V (TTL/CMOS comp.)
Fall Time:	3 ns.
Rise Time:	< 8 ns. 10% to 90%
Output current:	±24 mA.

RS232 PORT
Asynchronous, no parity, 1 start bit, 1 stop bit.
Baud rate: Adjustable, 300 bps to 115,200 bps.
Remote operation from a terminal or host computer.

EXTERNAL MODULATION INPUT	
Maximum full scale input:	±5 V (10 Vp-p)
Input Impedance:	30 kΩ

EXT. TRIGGER/GATING/FSK/BPSK INPUT	
Input impedance:	80 kΩ
Max. input level:	±10V
Max. gating freq:	3 MHz

EXT. ARB CLOCK INPUT	
Input level:	TTL/CMOS
Max. clock freq:	40 MHz

OPERATING MODES
The carrier frequency for all modulation modes is 0 Hz to 21.5 MHz/31.5 MHz, 0.01 Hz steps
All internal modulation frequencies are synthesized and are accurate to 0.01%.

BASIC SINEWAVE (CW) MODE	
Output frequency:	0 Hz to 21.5 MHz/31.5 MHz, 0.01 Hz steps

FREQUENCY MODULATION (FM) MODE
Int. modulation freq: 0 Hz to 10 kHz, 1 Hz steps
Ext. modulation freq: DC to 35 kHz
Peak frequency deviation:0 Hz to ±5.0 MHz, 1 Hz steps

PHASE MODULATION (PM) MODE
Int. modulation freq: 0 Hz to 10 kHz, 1 Hz steps
Ext. modulation freq: DC to 35 kHz
Peak phase deviation: 0 to ±180°, 1° steps

SWEEP MODE
Start/Stop freq: 0 Hz to 21.5MHz/31.5 MHz, .01 Hz steps
Linear or Log sweep. Up or Down sweep direction
Continuous or Int/Ext Triggered sweep
Sweep time: 1 ms to 60 sec. 1 ms steps.

VOLTAGE CONTROLLED OSCILLATOR MODE
Endpoint frequencies: 0 Hz to 21.5 MHz/31.5 MHz, 0.01 Hz steps
Control input range: -5.0V to +5.0V
Control signal bandwidth: DC to 35 kHz

BURST MODE
Continuous or Triggered from Front Panel, RS232, or Ext. TTL
On Time: 1 mS to 99.999 Sec, 1 mS steps
Off Time: 0 mS to 99.999 Sec, 1 mS steps

DUAL TONE MULTI FREQUENCY (DTMF) GENERATE MODE
Dialing digits generated: 0 to 9, #, *, A, B, C, D
Duration: 1 mS to 10.000 Sec, 1 mS steps
Delay: 0 mS to 10.000 Sec, 1 mS steps

CUSTOM DUAL TONE GENERATE MODE
Tone 1, Tone 2 Frequency: DC to 10.000 kHz, 1 Hz steps
Phase Offset: 0 deg. to 359 deg., 1 deg. steps
Output ON time: Cont. or 1 ms to 10.000 sec, 1 ms steps
Output OFF time: 0 ms to 10.000 sec, 1 ms step.

AMPLITUDE MODULATION (AM) MODE
Int. modulation freq: 0 Hz to 10 KHz, 1 Hz steps
Ext. modulation freq: DC to 35 kHz
Percentage modulation: Variable 0% to 100%, 1% steps

SINGLE SIDEBAND (SSB) MODE
Int. modulation freq: 0 Hz to 1.0 MHz, 1 Hz steps
Ext. modulation freq: DC to 8500 Hz
Upper or Lower Sideband selectable

FREQUENCY SHIFT KEYING (FSK) MODE
Int. modulation freq: 0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq: 0 Hz to 3 MHz
Mark/Space freqs: 0 Hz to 21.5 MHz/31.5 MHz, 0.01 Hz steps

DATA MODULATION MODE
Baud Rate: 0 Hz to 130 kHz, 1 Hz steps
Message length: 1 to 960 bits. Nonvolatile storage: 10 locations
Mark/Space frequencies: 0 Hz to 21.5 MHz/31.5 MHz, 0.01 Hz steps

POWER & VOLTAGE MEASUREMENT MODE
Input signal level: ±5 V max. (10Vp-p)
Input signal bandwidth: DC to 50 kHz
Power calc. impedance: Variable from 1 to 999 Ω

BINARY PHASE SHIFT KEYING (BPSK) MODE
Int. modulation freq: 0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq: 0 Hz to 10 kHz

DUAL TONE MULTI FREQUENCY (DTMF) DETECT MODE
DTMF digits detected: 0 to 9, #, *, A, B, C, D
Detection range: 10 Vp-p max., 20 mVp-p min.
Detection time: 100 ms

ARBITRARY WAVEFORM GENERATOR MODE
Vertical Resolution: 12 bits
Sample Rate: Variable from 0Hz to 40 Msamples/Sec. in .1 Hz steps
Sample Buffer Depth: 32,768 data points
Data Formats Supported: Floating Point, Decimal, Hexadecimal, Integer, Binary, Digital, CSV and PRN formats
Nonvolatile waveform storage: 1 location, 32,768 points

FUNCTION GENERATOR MODE	
Waveforms:	Pos. Ramp, Neg. Ramp, Triangle, Pos. Exponential, Inverted Pos. Exponential, Neg. Exponential, Inverted Neg. Exponential, Random (noise), Sinewave
Repetition Rate:	0 Hz to 2 MHz in 1 Hz steps, all functions
Run Mode:	Continuous or Internal/External Triggered

PULSE GENERATOR MODE	
Frequency:	0 Hz to 2 MHz in 1 Hz steps
Duty Cycle:	Variable 0% to 100% in 1% steps
Run mode:	Continuous or Intl/Ext Triggered
Output:	Variable in amplitude and offset, A TTL/CMOS output is simultaneously provided.

GENERAL	
Power:	100-240 VAC 47-63 Hz, 30W, 3 prong IEC conn.
Display:	2 line by 40 character, LCD, backlit.
Weight:	Approx. 3.5 lbs. (1.6 kg)
Dimensions (H x W x L):	5.5 x 11.75 x 10.375" (140 x 298 x 264mm)
Operating Temperature:	32° to 104°F (0° to 40°C) ambient.
Stored instrument setups:	10, including 1 power-up state

Specifications subject to change without notice

BNC Berkeley Nucleonics Corporation

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