27 Priors Way, Coggeshall Industrial Estate, Coggeshall, Essex, CO6 1TW Tel: 01376 562004 FAX: 01376 562215
Email: sales@sjelectronics.co.uk

SJ Electronics - Electronic Test Equipment, Tektronix Oscilloscopes, Digital Oscilloscope, Fluke ScopeMeter Multimeters, Function Generator, Bench Power Supplies, Test and Measurement, Instek, Megger, Hameg, Pico, TTi, LEM, Rohde & Schwarz

SJELECTRONICS

THE BEST IN ELECTRONIC TEST & MEASUREMENT EQUIPMENT FROM ONE SPECIALIST DISTRIBUTOR

300 Series Universal Waveform Generators

Designed to handle exacting real world signal simulation

Both the 301 and the 302 are high performance waveform generators that can be used as either complex arbitrary waveform generators or extremely high-speed function generators, with up to 12 bits of vertical resolution.

In the 302, both channels share a common precision sample clock, and both channels are triggered from the same source. This ensures that channel-to-channel timing is tightly synchronized. Precise control over channel-to-channel phase offset is achieved by allowing control over channel start phase with a resolution down to as small as 1 waveform point. This enables extremely accurate timing or phase dependencies to be studied, such as those found in high-speed digital communication systems.

- 1 or 2 channel 300 MS/s waveform generators
- 4 million points or 16 million points waveform memory per channel
- Synthesized function generator to 150 MHz
- Waveform linking, looping and sequencing
- Precisely controlled inter-channel phase relationships
- Triggered, gated and burst modes
- Amplitude modulation
- Windows based soft front panel for PC
- GPIB interface

Configuration

No. of Channels	Model 301 - 1 channel Model 302 - 2 channels (For Model 301, ignore references in the following specifications to 2nd channel)
Main Output	Programmable - level output channels
Auxiliary I & Q Outputs	Fixed-level, ± 1v

Sample clock

Internal	**Range:** 100 MS/s to 300 MS/s **Resolution:** 7 digits **Accuracy:** Same as reference **Stability:** Same as reference **Reference:** (0.0001% (1 ppm TCXO) initial tolerance over a 19°C to 29°C temperature range; 1 ppm/°C below 19°C and above 29°C; 1 ppm/year aging rate
External	Front panel BNC, 100 KHz to 300 MHz

Operating modes

Normal	Continuous waveform is generated
Triggered	Each input cycle generates single output cycle
Internal	An internal timer repeatedly generates a single output cycle
Gated	External signal enables generator. First output cycle synchronous with the active slope of the triggering signal.
External Burst	Preset number of up to 1M cycles stimulated by an internal, external, or manual trigger.
Internal Burst	An internal timer repeatedly generates a burst of up to 1M counted output cycles.
Trigger Source	**Internal** **Internal:** Internal programmable rate generator **Period:** From 20 µs to 1000s **Accuracy:** (1% + 1µs) **External** **Input:** Front panel BNC **Frequency:** DC to 15 MHz **Software** IEEE 488.2 command
System Delay	**Trigger to waveform output:** 1 Sample Clock+150 ns

Standard Waveforms

Sine	**Frequency Range:** 100 µHz to 150 MHz
Triangle	**Frequency Range:** 100 µHz to 5 MHz
Square	**Frequency Range:** 100 µHz to 150 MHz **Adjustable Parameters:** Duty cycle, 1% to 99%
Pulse/Ramp	**Frequency Range:** 10 mHz to 5 MHz **Adjustable Parameters:** Delay: 0% to 99.9% of period Rise Time: 0% to 99.9% of period High Time: 0% to 99.9% of period Fall Time: 0% to 99.9% of period
Sinc (Sine(x)/x)	**Frequency Range:** 10 mHz to 5 MHz **Adjustable Parameters:** 4 to 100 cycles
Gaussian Pulse	**Frequency Range:** 10 mHz to 5 MHz **Adjustable Parameters:** Time Constant 10 to 200
Exponential Decaying/Rising Pulse	**Frequency Range:** 10 mHz to 5 MHz **Adjustable Parameters:** Time Constant -100 to 100
DC	**Range:** ± 100% of amplitude

Arbitrary waveforms

Waveform Memory	4 Meg points standard 16 Meg points optional
Memory Segmentation	**Number of Segments:** 1 to 4096 **Min Segment Size:** 16 points **Vertical Resolution:** 12 bits (4096 points)
Sinewave Total Harmonic	0.5%

Distortion	(at 4096 vertical points and sampling rate of 300 MHz)
Harmonic Signals Below the Carrier Level	>40 dBc to 37.5 MHz (at 4096 vertical points)

Sequenced arbitrary waveforms

Operation	Permits division of the memory into smaller segments. Segments may be linked, and repeated in order to generate extremely long waveforms: **Sequencer steps:** From 1 to 4096 **Segment loops:** From 1 to 1 Meg **Segment Duration:** Minimum 1 µs for more than one loop
Automatic Sequence Advance	No triggers required to step from one segment to the next. Sequence is repeated continuously through a pre-programmed sequence table.
Stepped Sequence Advance	Current segment is sampled continuously, external trigger advances to next segment. Control input is TRIG IN connector.
Single Sequence Advance	Current segment is sampled to the end of the segment then idles. Next trigger advances to next segment. Control input is TRIG IN.
Advance Source	**Internal** Internal programmable rate generator **Period:** From 20 µs to 1000 s **Accuracy:** 1% + 1 µs) **External** **Input:** Front Panel Trigger input **Frequency:** DC to 15 MHz **Software** IEEE 488.2 command

Sequenced Sequences

Operation	Sequences may be linked in a multi-sequence table to generate extremely long sequences.
Number of Sequenced Sequences	16 (dependant on total number of segments)
Selectable	GPIB or RS232 command selects an active sequence
Stepped	Current sequence is sampled continuously, external trigger advances to next sequence. Control input is TRIG IN connector.
Advance Source	**Internal** Internal programmable rate generator **Period:** From 20 µs to 1000s **External** **Input:** Front Panel Trigger input **Frequency:** DC to 15 MHz **Software** IEEE 488.2 command

Outputs (Channels A & B)

Connector	Front panel BNC
Stand-by	Output Off or Normal
Impedance	50Ω ± 1%
Amplitude Range	10 mV to 5 Vp-p, into 50Ω
Resolution	3.5 digits
Accuracy (1 KHz)	±(1% + 25 mV), 1.000 V to 5 Vp-p ±(1% + 5 mV), 100 mV to 999.9 mVp-p ±(1% + 2 mV), 10 mV to 99.99 mVp-p
Offset	**Range:** 0 to 2.495 V **Resolution:** 5 mV **Accuracy:** ±(2%+10 mV)
Filters	150 MHz, Elliptic 7 pole 70 MHz, Elliptic 7 pole
Square Wave, Pulse	**Rise/Fall time:** <2.5 ns, 10% to 90% of amplitude **Aberrations:** <5%

Inter-Channel Control

Phase Offset	**Range in Degrees:** 0 to 360º **Range in Waveform Points:** 0 to waveform length **Range Setting Resolution:** Coarse: 8 points Fine: 1 point to 128k points, 8 points above 128k Accuracy: [Resolution + (3/wave_period) x 360],(wave_period in ns) Initial Skew: <±2 ns
Inter-Channel Dependency	**Separate control:** Amplitude, offset, standard, user waveforms, amplitude modulation **Common Control:** Sample clock, frequency, trigger modes, user waveform size, user waveform divider, sequence table, SYNC output

Auxiliary Outputs (I & Q)

AUX Output	**Operation:** Outputs the same waveform as the main output. **Connector:** Front panel BNC **Impedance:** 50Ω ±1% **Level:** 1V typical into 50Ω
SYNC Output	**Connector:** Front panel BNC **Stand-by:** SYNC Off or Normal **Impedance:** 50Ω ± 1% **Validators:** BIT, LCOM, PULSE **Position:** Point 0 to n, programmable **Width Control:** From 1% to 99%, programmable when placed in pulse validator mode

Inputs

Amplitude Modulation (AM)	**Modulation Input:** Front panel BNC **Impedance:** 1 MΩ 5% **Max Input Voltage:** ± 12V **Sensitivity:** 0V to -2V (2 Vp-p) to produce 100% modulation 0V to -4V (4 Vp-p) to produce 200% modulation
Source	**Source:** External **Modulation Range:** 0 to 200%

	Bandwidth: DC to 1 MHz
TRIG Input	**Connector:** Front panel BNC **Impedance:** 10 KΩ ± 5% **Threshold Range:** Programmable from -10V to + 10V **Threshold Resolution:** 50 mV **Sensitivity:** 0.2 Vp-p **Max Input Voltage:** 10 Vrms, 1 KHz to DC (12 V dc above 1 KHz) **Min Pulse Width:** 20 ns **Slope:** Positive or negative going edge, programmable
External Sample Clock Input	**Connector:** Front panel BNC **Impedance:** 50Ω AC coupled **Range:** 100 KHz to 300 MHz **Sensitivity:** 200 mV rms

General

GPIB Information	**GPIB Revision:** IEEE-488.2 **SCPI Revision:** 1993.0
RS232 Information	**Connector:** Rear panel 9-pin D type, male **Protocol:** SCPI + checksum **SCPI Revision:** 1993.0
Front Panel Indicator LED's	**Power On:** Green - Mains power on **Output On:** Green - Output on / off (Separate for each channel) **Remote:** Red - GPIB remote command
Power Requirements	**Mains Input:** 85V to 265 VAC, 48-63 Hz **Max Total Module Power:** <150W
EMC and Safety Certification	CE marked
Dimensions (W x H x D)	19" x 5.25" x 16" 483 mm x 133mm x 406mm
Weight	9 Kg
Operating temperature	0°C - 50°C
Humidity (non-condensing) *	11°C - 30°C 95% +5% 31°C - 40°C 75% +5% 41°C - 50°C 45% +5%

*Specifications apply at 18-28°C after one hour warm-up, at maximum output into 50°

S J ELECTRONICS
POWER • TEST & MEASUREMENT
0800 583 44 55
Tel: +44 1536 416 200
Fax: 0800 583 55 66
sales@sjelectronics.co.uk
www.sjelectronics.co.uk