Time Electronics

7029 and 7031 Function Generator Modules

Precision DDS function generators that offer high quality sine and square waves up to 25MHz (7029) and 50MHz (7031). Further features include noise generation, complex waveshapes, true pulse generator mode with variable rise and fall times, and 128K word arbitrary waveforms.

Extensive internal and external modulation capabilities include AM, FM, PM, PWM & FSK using any waveshape including noise.

Full remote control facilities are available using USB connection on the rear of the CalBench console. Arbitrary waveforms can be saved and loaded via a front mounted USB flash drive socket.

Features:

- ***0.001mHz to 25MHz (7029) / 50MHz (7031); 1µHz resolution***
- ***True pulse generator with variable delay and variable rise/fall***
- ***Arbitrary waveforms of up to 128K points at up to 125MS/s***
- ***Standard waveforms: sine, square, ramp, pulse, sin(x)/x, noise, exponential & logarithmic***
- ***Waveform storage using USB flash drives***
- ***Large graphic LCD with simultaneous text & waveform display***
- ***Comprehensive internal & external digital modulations including AM, FM, PM, PWM & FSK***
- ***Waveform Manager Plus for Windows software included***
- ***Programmable via USB interface at rear of CalBench console***

7029 and 7031 Features

FEATURES IN DETAIL

Higher Waveform Frequencies

Exceptional frequency precision

The frequency of these waveforms can be set with up to 14 digits or one micro hertz of resolution. The DDS based frequency generation system uses a TCXO timebase oscillator with a stability of 1ppm.

Waveform Quality

The 7031 and 7029 generate high purity sine waves with low harmonic distortion and low phase noise. Square waves have a rise time of below 8ns (13ns on 7029) and low overshoot. Variable symmetry can be used up to 25MHz.

Triangle and Ramp

High quality triangle and variable symmetry ramp waveforms are available up to 500kHz (7031) or 250kHz (7029).
These waveforms are also available at higher frequencies via the arbitrary function but without symmetry adjustment and with reduced waveform quality as the frequency increases.

VLF generation

The high resolution of the DDS system means that very low frequencies can be set. For example, a frequency of around 1mHz could be set with a resolution of 0.1% and a stability of 1ppm.

Full Pulse Generator capabilities

Both models incorporate a pulse generator mode which provides wide range pulse width and delay independent of period. Rise and fall times (edge speeds) are also fully variable.

Wide-range repetition rate

On the 7031, the pulse period can be set between 80ns and 2000 secs. (0.5mHz to 12.5MHz) with a resolution of 14 digits or 1μHz. On the 7029, the minimum pulse period is 160ns (6.25MHz).

Fully variable pulse Width and Delay

Pulse width and pulse delay can be independently set to a resolution of 10ns. Minimum pulse width is 20ns and duty cycles can be as low as one in two billion.)

Independently variable Rise and Fall

The generators offer very fast edge speeds of better than 8ns on the 7031 or 13ns on the 7029, but the edges can be slowed down to simulate slower pulses. Rise and fall times are independently variable in the range 5ns to 40us (10ns to 40us on the 7029), or can be linked so that both edge speeds are the same.

Trigger, Burst and Gate

As with all other waveforms, pulses can be triggered from an external trigger input (or manual trigger, the internal trigger generator or a Bus command). Burst mode creates a burst of between one and a million pulses in response to each active edge of the trigger. Gated cause pulses to be generated only when the gate signal is true. The gate source can be external or internal exactly as the trigger signal.

Arbitrary Waveforms

Both generators offer DDS generated arbitrary waveforms capability. A number of standard waveforms are included, and up to four user defined arbitrary waveforms can be stored in the instrument at any one time.

14 bits, 128k words, 125MS/s

Waveforms have a vertical resolution of 14 bits (16,384 amplitude levels). Waveforms can be created using between 2 and 131,072 points (128k). The sampling rate is 125MHz and DDS techniques are used to provide any repetition rate between 1uHz and 10MHz (7031) or 6MHz (7029) with up to 14 digits of frequency resolution.

Internal and External Waveform Storage

Up to four user defined waveforms totalling up to 256k words can be stored within the permanent internal memory of the instrument. However, a front mounted USB port enables external Flash memory storage of up to 1000 waveforms of any size. This memory stick also provides a quick and convenient method for transferring waveform files to and from a PC. It can also be used for storing instrument set-ups.

Pre-built Complex Waveforms

Commonly used complex waveforms are provided both built-in to the instrument and for loading into the user defined waveform space. These include sin(x)/x, exponential rise and fall, logarithmic rise and fall, gaussian, lorentz, haversine and cardiac waveforms.

Waveform Creation & Editing

Arbitrary waveforms can be created and edited using the simple tools built into the instrument. However, complex waveforms require an external PC based editor. Both instruments are supplied with Waveform Manager Plus for Windows which provides the most comprehensive set of waveform tools available including a mathematical expression editor, freehand drawing, waveform libraries, and import of waveforms using the Clip Board.

7029 and 7031 Features

FEATURES IN DETAIL

USB Flash Drive Interface

Both instruments incorporate a front mounted USB socket for connection of flash memory disk drives which can store up to 1,000 waveforms and 1,000 setups.

Unlimited Waveform Storage

These drives can be used both to store waveforms permanently and to transfer waveforms from or to a PC. Arbitrary waveform storage within the instrument is limited to four waveforms. Each flash drive can store up to 1000 waveforms which can be accessed using the instruments file handling utilities.

Storage of Instrument Set-ups

Up to nine complete set-ups of the instrument can be stored within its own non-volatile memory. Up to 1000 further set-ups can be stored on each flash drive.

Digital Modulation, Internal & External

Both generators offer a comprehensive set of digitally based modulations. The internal modulation source can use any of the standard or arbitrary waveforms currently within the generator (including noise) thus removing the need for an external modulation source. A modulating frequency between 1μHz and 20kHz can be specified. An external modulation input enables any external waveform source to be used when required. The external bandwidth is DC to 20kHz.

AM, FM and PM

Sine, square, ramp or arbitrary waveforms can be modulated using amplitude, frequency or phase modulation. Amplitude depth is variable from 0.0% to 120.0%, frequency deviation from zero to Fmax/2, and phase deviation from -360.0 to +360.0 degrees.

PWM

Pulse width modulation is available for the pulse function using any standard or arbitrary waveform including noise. Pulse width deviation is variable between 0% and 100%.

FSK

Frequency shift keying between any two frequencies is available for sine, square, ramp or arbitrary waveforms using the internal trigger generator or an external trigger signal. The internal trigger generator is variable between 2mHz and 1MHz with nine digit resolution.

Sweep and Burst

Sweep, Burst and Gated modes of operation are available using either an external trigger signal or the internal trigger generator.

Wide range Frequency Sweep

Phase continuous sweep is available for all standard and arbitrary waveforms except for pulse. The sweep range is from 1μHz through to the maximum for the chosen carrier waveform. Start and stop frequencies can be set independently. The sweep can be linear or logarithmic, triggered or continuous with a period between 1ms and 500s. The sweep trigger can be manual or internal from the trigger generator or external from the trigger socket or from a remote interface command. A marker is provided that outputs an edge synchronous with any frequency point within the sweep.

Triggered Burst

In Burst mode, each active edge of the trigger will produce one burst of the waveform. The number of cycles in a burst can be set between 1 & 1,048,575 (or infinite). The burst starts and ends at a waveform phase angle settable between -360.0 to +360.0 degrees.

Trigger signal

The trigger signal can be manual from the front panel key, internal from the internal trigger generator, external from the trigger-in socket, or remote via a bus command. The trigger-in socket has a nominal TTL threshold and can be set to +ve edge or -ve edge triggering. The minimum trigger pulse width is 50ns. The internal trigger generator is variable between 2mHz and 1MHz with 9 digit resolution.

Gated

In Gated mode the waveform runs only when the gate signal is true. The start point of the waveform is settable from -360.0 to +360.0 degrees and a the last cycle is completed after the gate signal goes false. All of the options available for triggering are available for gating. The trigger-in socket can be set as high or low for true.

Noise Generation

Both models can generate gaussian white noise to a -3dB bandwidth of 20MHz. The noise generation algorithm achieves a high crest factor (peak to rms ratio) of 5.27.

Adding Noise to a waveform

Noise can be added to any waveform except pulse. The amount of noise added can be specified as 0% to 50% of the amplitude of the carrier waveform.

Modulating with Noise

Noise can be used as the modulating waveform for AM, FM, PM or PWM modulations using any of the carrier waveforms allowable for that modulation type.

7029 and 7031 Features

FEATURES IN DETAIL

Locking to Other Sources
Both the models include external reference and phase locking as standard.

External Frequency Reference
The generators use a high quality TCXO crystal as the internal frequency reference providing 1ppm accuracy and stability.
If a higher accuracy or stability is required, an external 10MHz reference signal (from an off-air standard for example) can be applied to the Ref. Clock input.

Phase Locking Two Generators (or more)
Two generators can be synchronised together to provide outputs at the same frequency (or at harmonics) and with a phase difference. The amplitude and phase of these outputs can also be modulated providing the capability to perform QAM and QPSK respectively. Any waveform other than pulse can be used, and the phase difference is adjustable between -360.0 and +360.0 to a resolution of 0.1 degrees. Skew is better than 5ns. It is also possible to synchronise more than two generators but the resulting precision is not specified.

Full Remote Control
All functions of the generators can be controlled from the USB interface. Arbitrary waveform data can also be loaded. An IVI driver for Windows is supplied. As well as the rear mounted USB device interface connector, a front mounted USB Host interface connector allows USB Flash memory to be connected.

High Waveform Quality
The high waveform quality with its low aberrations is available over a wide amplitude range of 20mV to 20V pk-pk emf (10mV to 10V into 50 W). DC offset is provided independently of waveform attenuation so, for example, a waveform amplitude of millivolts can be combined with a dc level of volts.

Intelligent Amplitude Display
Amplitudes can be displayed as peak to peak or as RMS values, with the rms being correctly calculated for the waveform shape. RMS values can alternatively be specified in dBm. If preferred values can be entered in terms of high level and low level instead of amplitude and offset. The amplitudes are shown relative to the selected load impedance which is 50W (or High-Z) by default, but can be selected as any impedance between 1W and 10kW.

Multi-function Sync Output
The Sync output provides a logic level signal that can perform a number of functions for synchronisation with external equipment:

Normal Waveform Sync	Modulation Sync
Burst Sync	Sweep Sync (with sweep marker)
Trigger Signal Out	Phase Lock (for 2nd generator)

The signal type can be selected manually or automatically dependent upon the function in use.

Waveform Manager Plus
Waveform Manager Plus is a Windows based application for creation, editing and management of arbitrary waveforms using a PC. It incorporates a complete suite of tools for waveform creation and editing including standard waveforms, mathematical expressions and freehand drawing. Virtually any waveform can be created using combinations of these tools.

Mathematical Expression Editor
The sophisticated mathematical expression editor allows geometric, logarithmic and pulse functions to be combined to create exact representations of complex signals. Different expressions can be used for different sections of a waveform and can be combined with imported waveforms or drawn waveforms where mathematical representation is not possible.

Import of Other Waveforms
The program offers direct import from .csv files, the most commonly used format for graphical description. Additionally a Clipboard import function supports any waveform that can be described by a set of Y-axis data points regardless of their format.
Any instrument or waveform generating program that can create a list of Y values can therefore be accommodated. This is a highly flexible method which can be used to create arbitrary generator waveforms from signals captured by instruments such as oscilloscopes and network analysers, or from software such as MathCad.

High Resolution LCD
The 3.6” diagonal panel uses 256 x 112 pixels and provides a large amount of simultaneous information. System connection information is shown on the top line. Below that is a general status screen showing five major parameters. These parameters change depending upon the function being used. Below the status information is the main editing line which shows the parameter currently under control.

Representative Waveform Display
The area the to right of the status section shows a representation of the current waveform. This is more than just a fixed display for each waveform, it is calculated from the waveform parameters and gives a live indication when values such as symmetry, rise time or pulse width are changed. Even user defined arbitrary waveforms are shown (subject to the limitations of the display resolution). Modulation waveforms & representations of the modulated carrier are shown simultaneously. Burst count waveforms are shown graphically.

Soft Key Control
Six soft keys below the display provide access and control of the parameters for each function. All numeric parameters can be set directly from the numeric keypad, or can be changed using the spin wheel. Period entry can be chosen instead of frequency, and amplitude and offset can be changed to Hi and Lo levels. Frequencies can be entered in any units from uHz to MHz, periods from ns to seconds, and amplitudes in mV or V, rms or pk-pk, or in dBm. The currently selected waveform and major functions are also indicated by illumination of the respective keys.

7029 & 7031 Specifications

TECHNICAL SPECIFICATIONS

WAVEFORMS

Sine

Frequency Range: 1μHz to 50MHz (7029 - 1μHz to 25MHz)
Frequency Resolution: 1μHz, 14 digits
Output Level: 10mVp-p to 10Vp-p into 50Ohms
Amplitude Flatness (Relative to 1kHz): <100kHz 0.1dB, <5MHz 0.15dB, <20MHz 0.3dB, <50MHz 0.5dB

Harmonic Distortion:	<1 Vp-p	≥ 1Vp-p
DC to 20kHz	-65dBc	-65dBc
20kHz to 100kHz	-60dBc	-60dBc
100kHz to 1MHz	-45dBc	-45dBc
1MHz to 25MHz	-40dBc	-35dBc
25MHz to 50MHz	-40dBc	-28dBc

Non-Harmonic Spurii: <–60dBc to 1MHz, <–60dBc + 6dB/octave 1MHz to 50MHz
Phase Noise (10kHz offset): -115dBc/Hz, typical

Square

Frequency Range: 1μHz to 50MHz (7029 - 1μHz to 25MHz)
Frequency Resolution: 1μHz, 14 digits
Output Level: 10mVp-p to 10Vp-p into 50Ohms
Rise and Fall Times: <8ns (7029 - <13ns)
Overshoot: <5%
Variable Duty Cycle: 20% to 80% to 10MHz, 0.1% resolution, 40% to 60% to 25 MHz, 0.1% resolution, 50% (fixed) above 25MHz
Asymmetry (@ 50% duty): 1% of period + 5ns
Jitter (RMS): 0.5ns + 100 ppm of period

Ramp and Triangle

Frequency Range: 1μHz to 500kHz (7029 - 1μHz to 250kHz)
Frequency Resolution: 1μHz, 12 digits
Output Level: 10mVp-p to 10Vp-p into 50Ohms
Linearity Error: <0.1% to 30 kHz
Variable Symmetry: 0.0 % to 100.0 %, 0.1% resolution. Single key operation of 50% (Triangle)
Note the triangle and sawtooth waveforms are also available from the arbitrary waveform menu enabling repetition rates of up to 10MHz/6MHz. Waveform quality will deteriorate at higher frequencies however.

Pulse

Frequency Range: 500μHz to 12.5MHz (7029 - 500 μHz to 6.25MHz)
Frequency Resolution: 1μHz , 14 digits
Output Level: 10mVp-p to 10Vp-p into 50Ohms
Overshoot: <5%
Jitter: 300ps + 0.01% of period
Rise/Fall Times: Rise and Fall times can be independently varied or can be varied together simultaneously.
Range: <8ns to 40μs (7029 - <13ns to 40μs)
Resolution: 0.1ns for rise/fall time ≤100ns; 1ns for rise/fall >100ns and ≤2μs; 10ns for rise/fall >2μs and ≤40μs)
Width Range: 20ns to 2000s (20ns minimum for period ≤40s) (200 ns minimum for period >40s and ≤400s) (2μs minimum for period >400s)
Width Resolution: 10ns (for period ≤40s),100ns (for period >40s and ≤400s),1μs (for period >400s)
Delay Range: 0ns to 2000s
Delay Resolution: 10ns (for period ≤40s),100ns (for period >40s and ≤400s),1μs (for period >400s)

Arbitrary

In built arbitrary waveforms (Sinc, Exponential Rise, Logarithmic Rise, DC, Positive and Negative Ramps and Square). Additional waveforms are supplied on disc (Cardiac, Gaussian, Exponential Fall, Logarithmic Fall). Up to 4 additional or user defined waveforms may be stored in non-volatile memory. Waveforms can be defined by downloading of waveform data via USB memory stick, remote interfaces, or editing via the modules front panel.
Waveform Size: 2 points to 131072 points (128k).
Waveform Memory Size: Up to 4 waveforms of up to 64k points, or 2 waveforms of up to 128k points, (or 2 of 64k points plus 1 of 128k points).
External Waveform Storage: up to 1,000 waveforms per USB memory stick
Vertical Resolution: 14 bits
Frequency Range: 1μHz to 10MHz (7029 - 1μHz to 6MHz)
Frequency Resolution: 1μHz , 14 digits
Output Level: 10mVp-p to 10Vpp into 50Ohms
Sampling rate: 125MS/s
Output Filter: Selects between 50MHz Elliptic or 20MHz Bessel filter depending on the waveform.

Arbitrary Waveform Creation and Editing

Both generators are supplied with Waveform Manager Plus. This Windows based software provides a sophisticated tool set for the creation, editing and management of arbitrary waveforms. The waveforms can be transferred to the generator either using a USB memory stick, or by the digital interfaces.

Noise

Gaussian White Noise: Noise can be added to any carrier waveform (except pulse, square and noise itself) note however that noise can be added to the square wave available in the arbitrary menu. The amount of noise added can be specified as 0% to 50% of the amplitude of the carrier waveform. Noise can also be used as modulating waveform.
Bandwidth (-3dB): 20MHz typical.
Noise crest factor (Vp/Vrms): 5.27
Output Level: 10mVp-p to 10Vpp into 50 Ohms

Internal Frequency Reference

Oscillator Ageing Rate: 1ppm first year
Temperature Stability: <1ppm over the specified temperature range

7029 & 7031 Specifications

TECHNICAL SPECIFICATIONS

MODULATION

AM

Carrier Waveforms: Sine, Square, Ramp, Arb
Modulation Source: Internal/External
Internal Modulating Waveforms: Sine, Square, Up Ramp, Down Ramp, Triangle, Noise, DC, Sinc, Exponential Rise, Logarithmic Rise and User Defined Arbs
Internal Modulating Frequency: 1μHz to 20kHz, 1μHz resolution
Amplitude Depth: 0.0% to 120.0%, 0.1% resolution

FM

Carrier Waveforms: Sine, Square, Ramp, Arb
Modulation Source: Internal/External
Internal Modulating Waveforms: Sine, Square, Up Ramp, Down Ramp, Triangle, Noise, DC, Sinc, Exponential Rise, Logarithmic Rise and User Defined Arbs
Internal Modulating Frequency: 1μHz to 20kHz, 1μHz resolution
Frequency Deviation: DC to Fmax/2, 1μHz resolution

PM

Carrier Waveforms: Sine, Square, Ramp, Arb
Modulation Source: Internal/External
Internal Modulating Waveforms: Sine, Square, Up Ramp, Down Ramp, Triangle, Noise, DC, Sinc, Exponential Rise, Logarithmic Rise and User Defined Arbs
Internal Modulating Frequency: 1μHz to 20kHz, 1μHz resolution
Phase Deviation: -360.0 to +360.0 degrees, 0.1 degree resolution

PWM

Carrier Waveforms: Pulse
Modulation Source: Internal/External
Internal Modulating Waveforms: Sine, Square, Up Ramp, Down Ramp, Triangle, Noise, DC, Sinc, Exponential Rise, Logarithmic Rise and User Defined Arbs
Internal Modulating Frequency: 1μHz to 20kHz, 1μHz resolution
Pulse Width Deviation: 0% to 100% of pulse width, resolution same as of pulse width

FSK

Carrier Waveforms: Sine, Square, Ramp, Arb
Source: Internal/External (via TRIG IN)

Internal Modulation: 50% duty cycle square (2mHz to 100kHz)

Triggered Burst

Each active edge of the trigger signal will produce one burst of the waveform.
Carrier Waveforms: Sine, Square, Ramp, Arb, Pulse
Maximum Carrier Frequency: 10MHz (finite cycles), 50MHz (infinite), subject to carrier waveform.
Number of Cycles: 1 to 1,048,575 and infinite.
Trigger Repetition Rate: 2mHz to 1MHz internal dc to 1MHz external.
Trigger Signal Source: Internal from keyboard or trigger generator. External from TRIG IN or remote interface.
Trigger Start/Stop Phase: -360.0 to +360.0 degrees, 0.1 degree resolution, subject to carrier waveform

Gated

Waveform will run while the Gate signal is true and stop while false.
Carrier Waveforms: Sine, Square, Ramp, Arb, Pulse, Noise
Maximum Carrier Frequency: 10 MHz, subject to carrier waveform
Trigger Repetition Rate: 2mHz to 1MHz internaldc to 1MHz external.
Gate Signal Source: Internal from keyboard or trigger generator. External from TRIG IN or remote interface.
Gate Start/Stop Phase: -360.0 to +360.0 degrees, 0.1 degree resolution, subject to carrier waveform

Sweep

Frequency sweep capability is provided for both standard and arbitrary waveforms.
Carrier Waveforms: All standard and arbitrary except pulse.
Sweep Mode: Linear or logarithmic, triggered or continuous.
Sweep Direction: Up, down, up/down or down/up.
Sweep Range: From 1μHz to 50MHz, subject to carrier waveform. Phase continuous. Independent setting of the start and stop frequency.
Sweep Time: 1ms to 500s (6 digit resolution).
Marker: Variable during sweep.
Sweep Trigger Source: The sweep may be free run or triggered from the following sources: Internal from keyboard or trigger generator. Externally from TRIG IN input or remote interface.

Trigger Generator

Internal source 2mHz to 1MHz square wave adjustable in 1us steps, 9 digit resolution. Available for external use from the SYNC OUT socket.

7029 & 7031 Specifications

TECHNICAL SPECIFICATIONS

OUTPUTS

Main Output
Output Impedance: 50Ohms
Amplitude: 20mV to 20Vp-p open circuit (10mV to 10Vp-p into 50Ohms). Amplitude can be specified open circuit (hi Z) or into an assumed load of 1Ohm to 10kOhm in Vpk-pk, Vrms or dBm.
Amplitude Accuracy: 2% ±1mV at 1kHz into 50Ohm.OhmW.
DC Offset Accuracy: Typically 3% ±10mV.
Resolution: 3 digits or 1mV for both Amplitude and DC Offset.

Sync Out
Multifunction output user definable or automatically selected to be any of the following:
Carrier Waveform Sync: Sine/Ramp/Pulse - A square wave with 50% duty cycle at the waveform frequency.
Square - A square wave with same duty cycle as the main output at the waveform frequency.
Arbs - A square wave with 50% duty cycle at the waveform frequency. The sync is a TTL high when the first point of the waveform is output. Noise - No sync associated with noise.
Modulation Sync: AM/FM/PM/PWM A square wave with 50% duty cycle referenced to the internal modulation waveform when modulation source is internal, or a square wave referenced to the carrier waveform when modulation source is external. No sync is associated with noise as the modulation source.
FSK - A square wave referenced to the trigger rate. The sync is a TTL high when hop frequency is the output frequency and TTL low when carrier frequency is the output frequency for positive slope and vice versa for negative slope.
Burst Sync: A square wave that is a TTL high when the burst begins and a TTL low when burst is completed.
Trigger: Selects the current trigger signal. Useful for synchronizing burst or gated signals.
Sweep Sync: Marker Off - A square wave that is a TTL low from the midpoint of the sweep and a TTL high from the end of the sweep. Marker On - A square wave that is a TTL low from the marker frequency and a TTL high from the end of the sweep.
Output Signal Level: Logic level nominally 3V.

Ref Clock Output
Buffered version of the 10MHz clock currently in use (internal or external)
Output Level: Nominally 3V logic level from 50Ohm.

INPUTS

Trig In
Frequency Range: DC - 1MHz.
Signal Range: Threshold nominally TTL level; maximum input ±10V.
Minimum Pulse Width: 50ns
Polarity: Selectable as high/rising edge or low/falling edge.
Input Impedance: 10kOhm

External Modulation Input (for AM, FM, PM, PWM)
Voltage Range: ± 5V full scale
Input Impedance: 5kOhm typical
Bandwidth: DC to 20kHz

Ref Clock Input
Input for an external 10MHz reference clock
Voltage Range: 1Vpp – 5Vpp
Maximum Voltage: +5V
Minimum Voltage: -1V

Phase synchronising two generators
Two generators can be synchronised together to provide outputs at the same frequency (or harmonics) and with a phase difference. The amplitude and phase of these outputs can also be modulated providing the capability to perform QAM and QPSK respectively. It is also possible to synchronise more than two generators but results are not guaranteed.
Carrier Waveforms: Sine, Square, Ramp, Pulse, Arb
Phase: Range -360.0 to +360.0 degrees
Resolution 0.1 degree
Accuracy < ±5ns

GENERAL

Display: Monochrome Graphics Display - pixel format: 112 X 256 Matrix

Interface: Standard USB 2.0 hardware connection. Implemented as virtual-COM port.

USB Flash Drive: For waveform and setup storage/recall.

Data Entry: Keyboard selection of mode, waveform etc.; value entry direct by numeric keys or by rotary control.

Stored Settings: Up to 9 complete instrument set-ups may be stored and recalled from non-volatile memory.

Module Width: 295mm (primary console fitting only)

Ordering Information: **7029: 25MHz Function/Arbitrary/Pulse Generator**
7031: 50MHz Function/Arbitrary/Pulse Generator

Specifications apply for the temperature range 18°C to 28°C after 30 minutes warm-up, at maximum output into 50 Ohms unless otherwise stated. Due to continuous development Time Electronics reserves the right to change specifications without prior notice.

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