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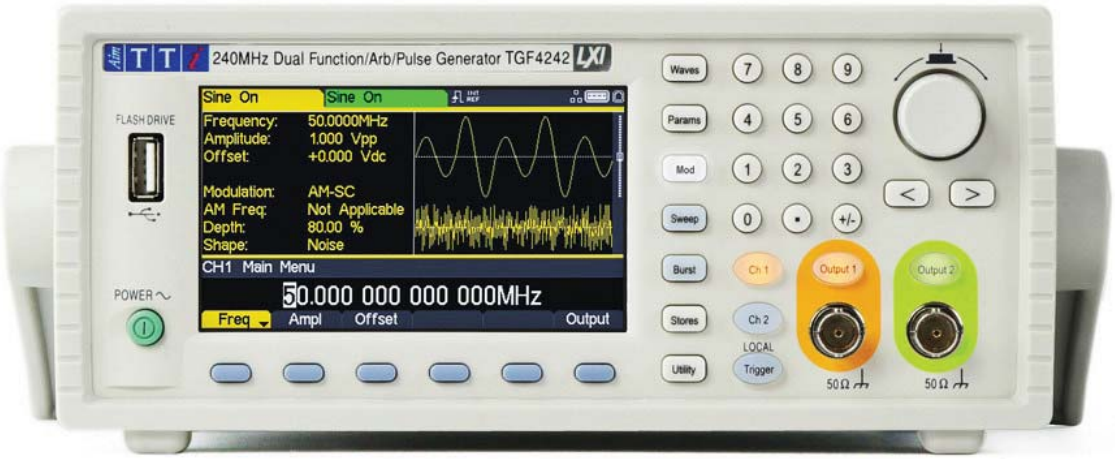
QUICK START GUIDE



TGF4000 SERIES

40MHz, 80MHz, 160MHz & 240MHz

Dual Channel Arbitrary Function Generators

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The latest revisions of this manual, device drivers and software tools can be downloaded from:
http://www.aimtti.com/support

1. INTRODUCTION

The TGF4000 Series of Arbitrary Function Generators

This manual covers all four TGF4000 dual channel generators. Where there are differences in the specification, the limits for the TGF4042 & TGF4082 are shown in square brackets [ ] after the TGF4162 & TGF4242 limits.

These programmable function/arbitrary generators use direct digital synthesis techniques to provide high performance and extensive facilities in a compact instrument. They generate a wide variety of waveforms with high resolution and accuracy.

Sine waves are produced with low distortion to 160MHz/240MHz [40MHz/80MHz]. Square waves have fast rise and fall times at up to 100MHz [25MHz]. Linear ramp waves are produced to 5MHz. Ramp and square waves also have variable symmetry.

The instruments generate high resolution, low jitter, variable edge time pulses to 100MHz [25MHz] with variable period, pulse width, pulse delay, pulse edges and amplitude. Complex custom waveforms can be generated with 16-bit [14-bit] resolution and a sampling rate of 800MSa/s [400MSa/s]. Up to four waveforms can be stored in internal memory. Waveforms can also be generated by the supplied Waveform Manager Plus V4.13 Windows application and downloaded to the instrument via USB, LAN or optional GPIB interfaces or via a USB flash drive.

Front panel operation is straightforward and user friendly with all major parameters shown at all times on the large, bright, colour LCD. All major functions can be accessed with a single key or two. The knob or numeric keypad can be used to adjust frequency, amplitude, offset, and other parameters. Voltage values can be entered directly in Vpp or as high and low levels. Timing parameters can be entered in Hertz (Hz) or seconds.

Internal AM, FM, PM, ASK, FSK, BPSK, SUM* and PWM modulation make it easy to modulate waveforms without the need for a separate modulation source. Linear and logarithmic sweeps are also built in, with sweep rates selectable from 1 µs to 500s. Burst mode operation allows for a user-selected number of cycles at each trigger event.

LAN and USB interfaces are standard and there is full compliance to 1.5 LXI Device Specification 2016.

The instruments use a high stability temperature compensated internal oscillator and the external frequency reference input lets you synchronize to an external 10 MHz frequency standard for even greater accuracy.

*TGF4162 & TGF4242 only

About this Guide

This Quick Start guide is for bench-top use of the TGF4000 Series comprising the TGF4042,TGF4082, TGF4162 and TGF4242 dual channel generators. A full Instruction Manual (English only) is also provided on the Aim-TTi website that includes comprehensive explanations of all functions and additional information on remote control, calibration, and the detailed technical specifications.

2. SAFETY

General

This generator is a Safety Class I instrument according to IEC classification and has been designed to meet the requirements of EN61010–1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use). It is an Installation Category II instrument intended for operation from a normal single phase supply.

This instrument has been tested in accordance with EN61010–1 and has been supplied in a safe condition. This instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the instrument in a safe condition.

This instrument has been designed for indoor use in a Pollution Degree 2 environment in the temperature range 5°C to 40°C, 20% – 80% RH (non–condensing). It may occasionally be subjected to temperatures between +5° and –10°C without degradation of its safety. Do not operate while condensation is present.

Use of this instrument in a manner not specified by these instructions may impair the safety protection provided. Do not operate the instrument outside its rated supply voltages or environmental range.

WARNING! THIS INSTRUMENT MUST BE EARTHED

Any interruption of the mains earth conductor inside or outside the instrument will make the instrument dangerous. Intentional interruption is prohibited. The protective action must not be negated by the use of an extension cord without a protective conductor.

When the instrument is connected to its supply, terminals may be live and opening the covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts. The apparatus shall be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance or repair. Any adjustment, maintenance and repair of the opened instrument under voltage shall be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved.

If the instrument is clearly defective, has been subject to mechanical damage, excessive moisture or chemical corrosion the safety protection may be impaired and the apparatus should be withdrawn from use and returned for checking and repair.

Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short–circuiting of fuse holders is prohibited.

This instrument uses a Lithium button cell for non–volatile memory battery back–up; typical life is 5 years. In the event of replacement becoming necessary, replace only with a cell of the correct type, i.e. 3V Li/$Mn0_2$ 20mm button cell type 2032. Exhausted cells must be disposed of carefully in accordance with local regulations; do not cut open, incinerate, expose to temperatures above 60°C or attempt to recharge.

Do not wet the instrument when cleaning it and in particular use only a soft dry cloth to clean the LCD window.

Symbols

The following symbols are used on the instrument and in this manual:

Caution –refer to the accompanying documentation, incorrect operation may damage the instrument.

Terminal connected to chassis ground.

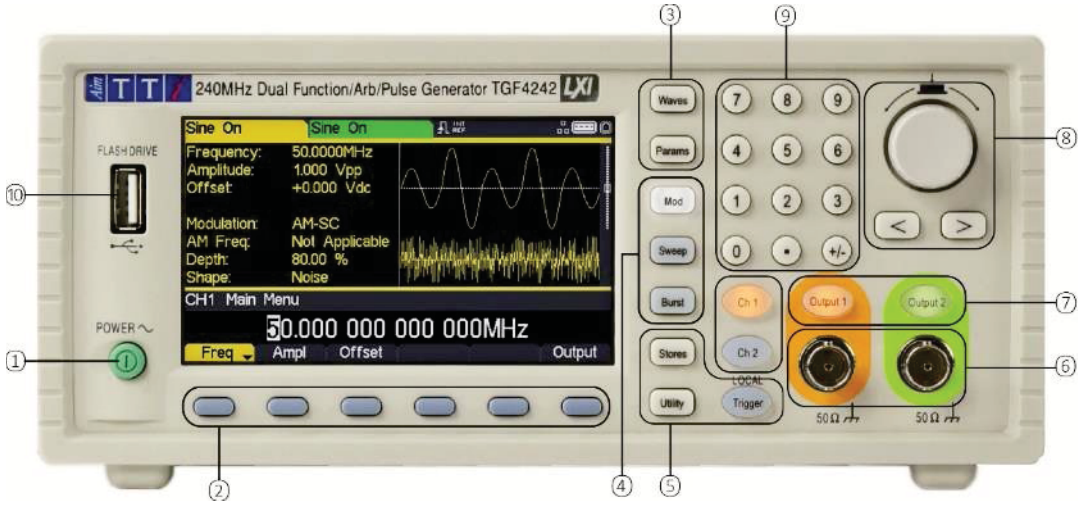
Mains supply OFF.

Mains supply ON.

Alternating current.

3. OPERATIONAL PRINCIPLES

Front Panel Layout

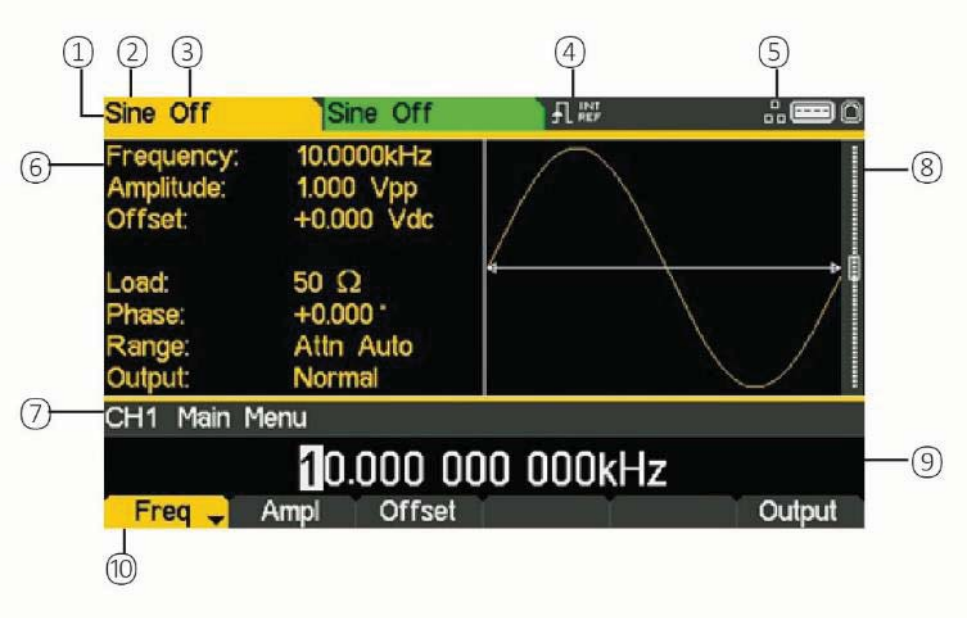


Ref.	Short Description	Function
1	Power Switch	Switches instrument on or off. *Safety Note:* To fully disconnect from the AC supply, unplug the mains cord from the back of the instrument or switch off at the AC supply outlet; make sure that the means of disconnection is readily accessible.
2	Soft-keys	Performs the function shown on the LCD soft-key label above.
3	Waveform Keys	Selects the main waveform type (carrier waveform) as active. (Sine, Square, Ramp, Pulse, Noise/PBRS or Arb.)
4	Waveform Modification Menus	Opens menus for setting parameters for Modulation, Sweep and Burst
5	Other Menus	Selects menus for internal and external file storage, instrument utilities, and trigger conditions.
6	Main Sockets	Main output sockets. Channel 2 can also be configured to output Channel 1 sync from its MAIN OUT 2 socket.
7	Output Keys	Switch the selected MAIN OUT on or off.
8	Cursor Keys and Spin Wheel	Used to change numeric parameter values digit by digit. Used to select items within some menus.
9	Numeric Keypad	Used to enter numeric parameter values directly.
10	USB Flash Drive	USB Host connector for USB Flash drive storage.

Rear Panel Layout

Ref.	Short Description	Function
1	Modulation Input	Input for external modulation of main waveforms.
2	Reference In / AC coupled frequency counter	Input for external 10MHz reference clock and AC coupled external frequency measurement.
3	Reference Out	Output for internal 10MHz reference clock.
4	Trigger Input / DC coupled frequency counter	Input for external triggering of main waveforms and DC coupled external frequency measurement
5	LAN connection	Designed to meet LXI Core 2011.Remote control is possible using the TCP/IP Socket protocol.
6	USB connection	Accepts a standard USB cable.
7	GPIB connection (optional)	IEEE-488 The default GPIB address is 5.

Screen Layout



Ref.	Short Description	Function
1	Channel Indicator	Shows currently selected channel
2	Main Waveform type	Shows current carrier waveform
3	Output State	Shows main output On or Off
4	External Clock Indicator	Shows status of external clock (if applied)
5	LAN Status Indicator	Shows status of LAN (Ethernet) connection.
6	Parameters Box	Shows main parameters for waveform.
7	Menu Description	Shows the currently selected editing menu.
8	Graph Box	Shows a graphical representation of the selected waveform.
9	Edit Box	Shows the current parameter that can be edited
10	Soft-key Labels	Shows the current functions for the six keys below.

4. GETTING STARTED

In order to familiarise the user with some of the basic functionalities of the instrument, a number of set-up examples are shown in this guide.

It is recommended that all users should carry out the first four examples:

- Setting-up a Sine Wave Signal
- Setting-up a Square Wave Clock Signal
- Setting-up a Pulse Waveform
- Setting-up more Output Options

A number of further set-up examples are provided that assume some familiarity with the instrument:

- Setting-up an arbitrary wave signal
- Setting-up an AM modulated Sine Waveform
- PRBS (TGF4162 & TGF4242)
- Frequency Modulation of a Sine Waveform
- Pulse Width Modulated Waveform (PWM)
- Amplitude shift keying (ASK)
- Frequency Sweep of a Sine Wave
- Generating a Triggered Burst
- Coupling the Frequency of Both Channels
- Frequency counter

For more detailed information on all functionality- see the full Instruction Manual.

Initial Conditions

Before setting up the instrument for any of the examples, it should be returned to default conditions. To do this follow these steps:

- Press the hard key marked **Utility**
- Press the soft-key labelled System
- Press the soft-key labelled Default (display will show Restore Factory Default?)
- Press the soft-key labelled Yes

This sets the main waveform to Sine (10kHz, 1V pk-pk) and cancels any modulations, sweep, or burst triggering or gating.

NOTE

The instrument can be set to remember its latest settings on power-off and restore them at power-on. This is set from the **Utility** > System menu and the PwrOn soft-key. This setting will be lost when the instrument is restored to default conditions as described above.

5. BASIC SET-UP EXAMPLES

Setting-up a Sine Wave Signal

Requirement

Output a continuous sine wave signal with 40MHz frequency and an amplitude of 6 volts pk-pk from MAIN OUT 1.

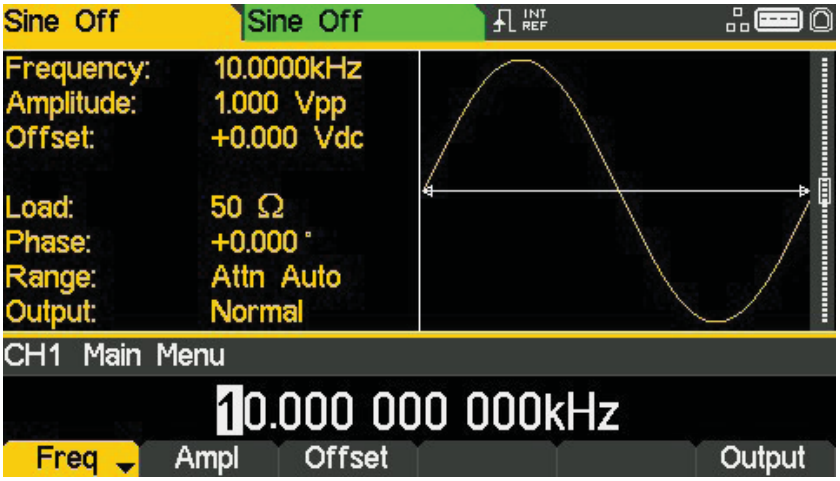
Starting Conditions

Before starting, reset the instrument to defaults as described in section 4 Getting Started

Open Waveform Menu - Sine

- Press the hard key marked **Waves**

- Press the soft key labelled Sine

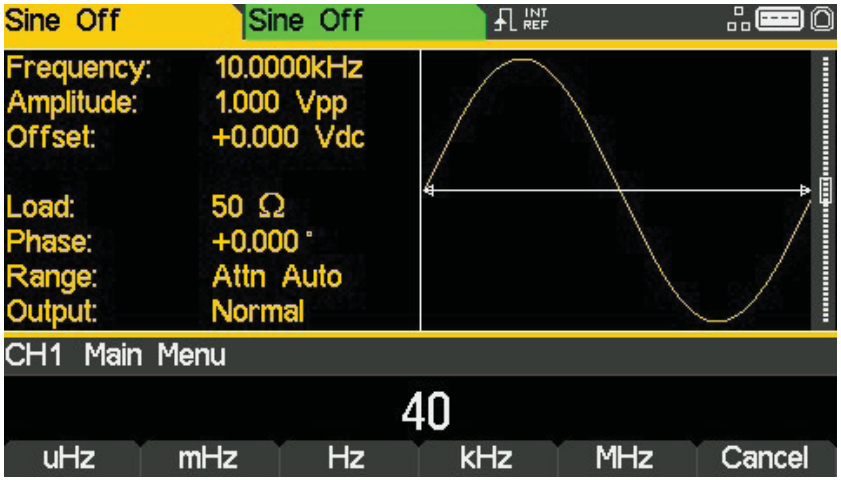


Set the Frequency

The soft key labelled Freq will be highlighted- the current frequency appears in the edit box.

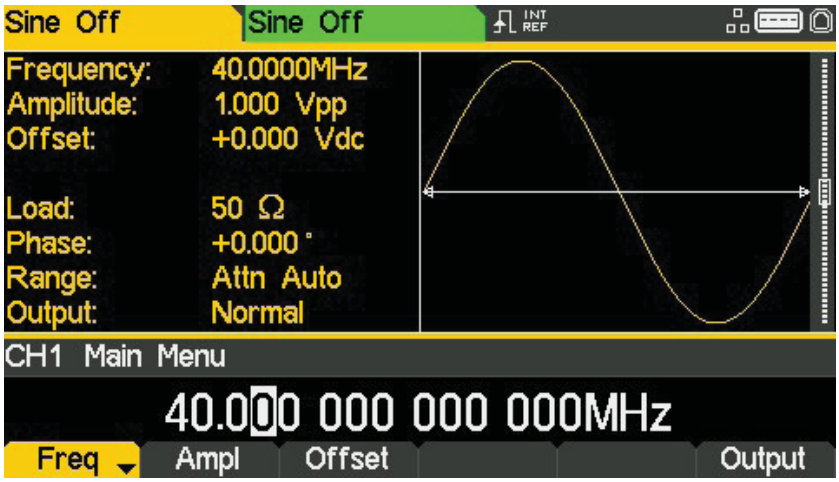
Pressing this soft-key repeatedly changes its function between Frequency and Period.

- Use the numeric keypad to enter a new frequency. Press the numbers **4** **0**



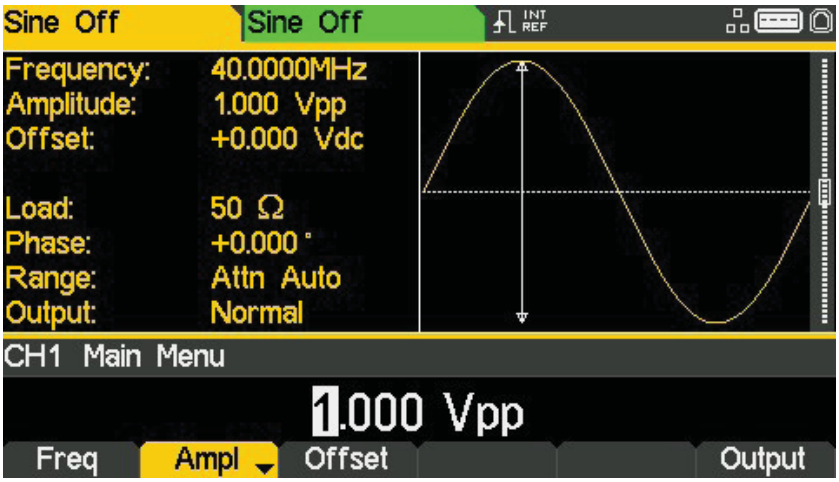
As soon as a number is entered, the soft-keys change to show units of frequency.

- Press the soft-key labelled MHz to confirm a frequency of 40MHz.



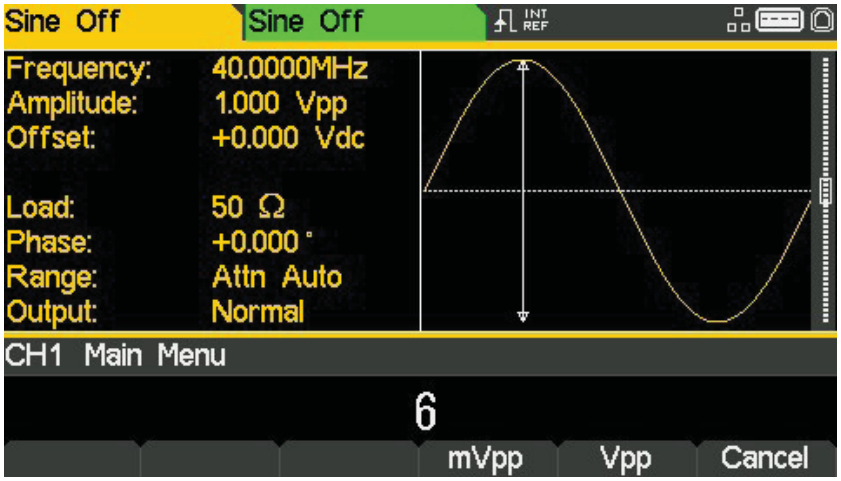
Set the Amplitude

- Press the soft key labelled Ampl



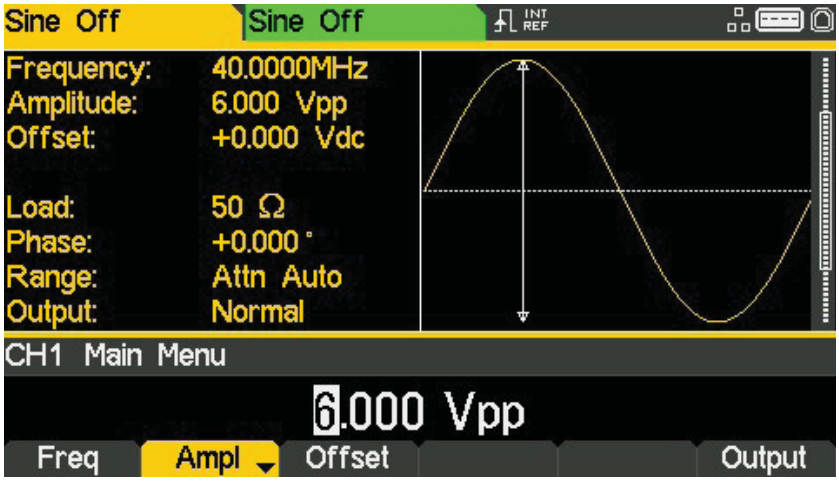
Successive presses of the Ampl soft-key changes the Ampl and Offset key labels to HiLvl (high level) and LoLvl (low level) and vice versa.

- Use the numeric keypad to enter a new amplitude. Press the number **6**



As soon as a number is entered, the soft-keys change to show units of voltage.

- Press the soft-key labelled Vpp to confirm a pk-pk amplitude of 6.0 volts.



Turn the Output On

- Press **Output 1** key to turn the channel 1 output On.

The Output 1 key illuminates orange to indicate the on state.

Setting-up a Square Wave Clock Signal

Requirement

Output a continuous square wave clock signal with 20MHz frequency, 50% duty cycle and a high level of 3.3V and a low level of 0.0 volts from MAIN OUT 1.

Starting Conditions

Before starting, reset the instrument to defaults as described in section 4 Getting Started

Open Waveform Menu - Square

- Press the hard key marked **Waves**

- Press the soft-key labelled Square.

+

Set the Frequency

The soft key labelled Freq will be highlighted- the current frequency appears in the edit box.

Pressing this soft-key repeatedly changes its function between Frequency and Period.

- Use the numeric keypad to enter a new frequency. Press the numbers **2 0**

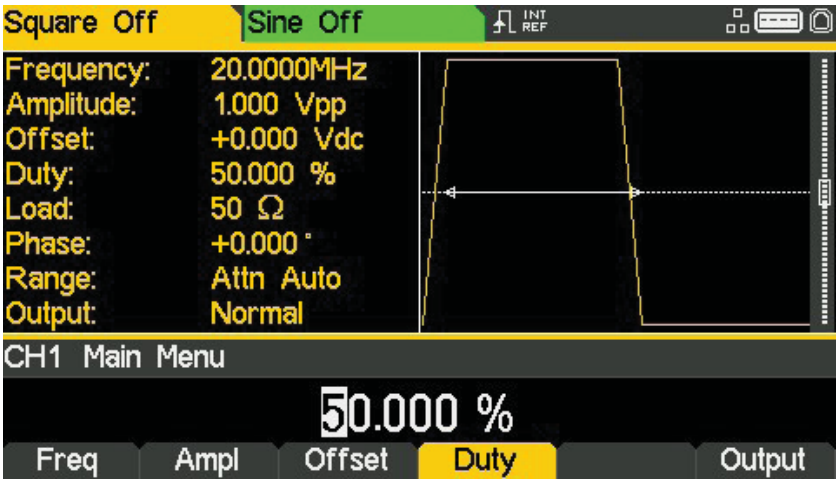
As soon as a number is entered, the soft-keys change to show units of frequency.

- Press the soft-key labelled MHz to confirm a frequency of 20MHz.

The graph box changes to show the rise time on the edges which is now significant.

Confirm the Duty Cycle

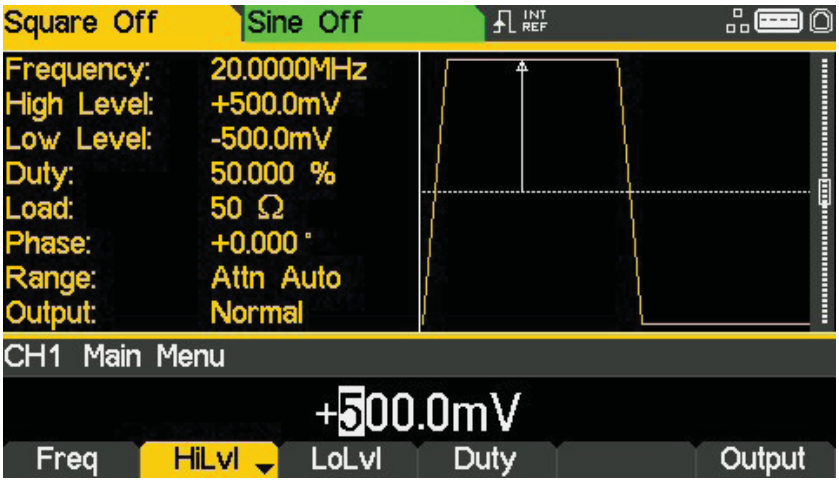
- Press the soft-key labelled Duty - the current duty cycle appears in the edit box.



The duty cycle is already set at 50%, but could be changed here if required.

Set the High and Low Levels

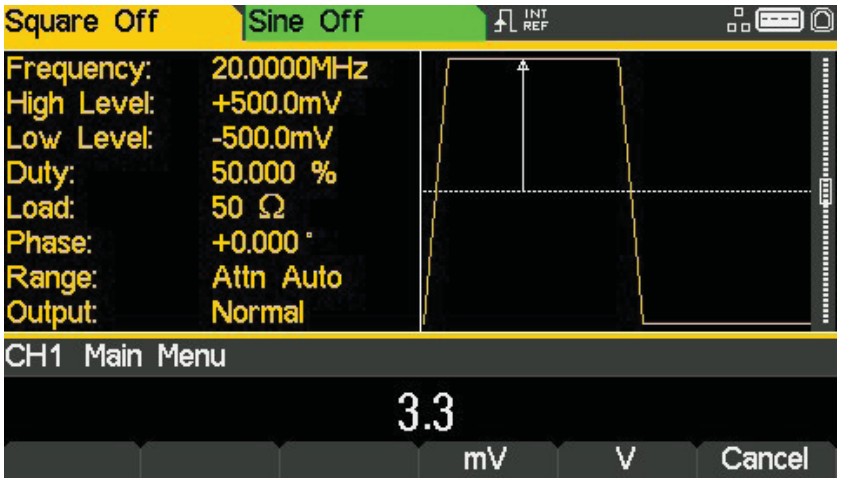
- Press the soft-key labelled Ampl - the key label changes to HiLvl and the current high level voltage appears in the edit box.



Successive presses of the Ampl soft-key changes the Ampl and Offset key labels to HiLvl (high level) and LoLvl (low level) and vice versa.

When the soft-key is labelled HiLvl - the current high level voltage appears in the edit box.

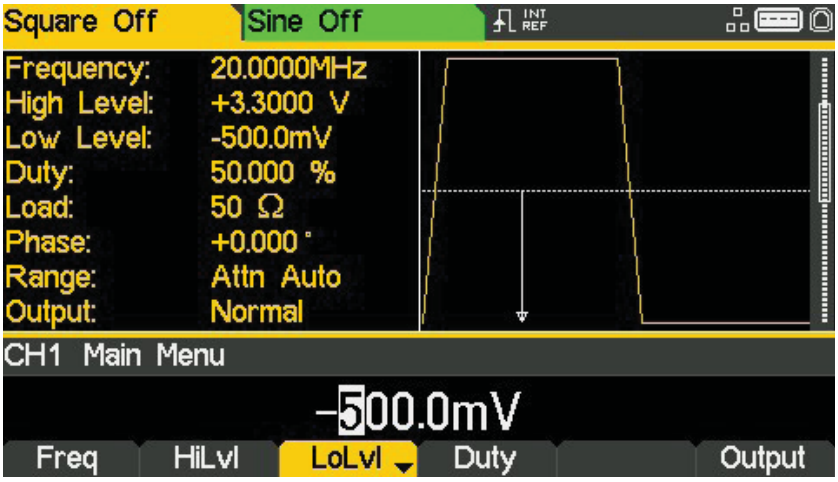
- Use the numeric keypad to enter a new level. Press the numbers 3 . 3



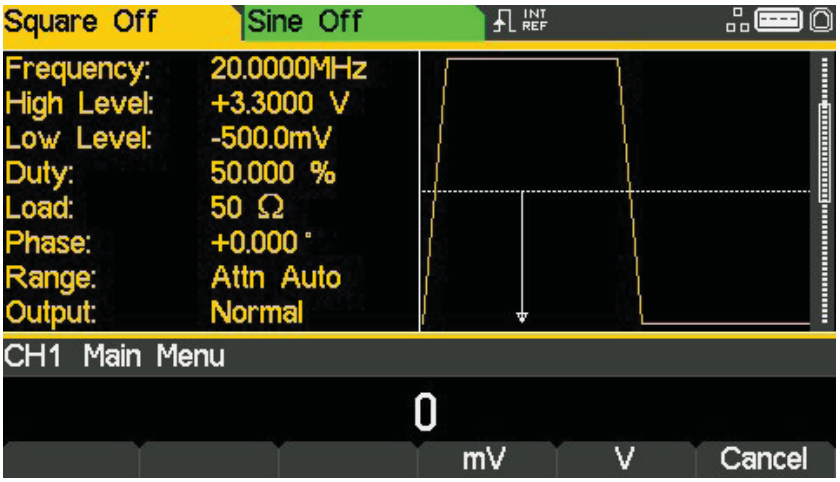
As soon as a number is entered, the soft-keys change to show units of voltage.

- Press the soft-key labelled V to confirm a high level of 3.3 volts.

- Press the soft-key labelled LoLvl - the current low level voltage appears in the edit box.



- Use the numeric keypad to enter a new level. Press 0



- Press the soft-key labelled V to confirm a low level of 0.0 volts.

Turn the Output On

- Press **Output 1** key to turn the channel 1 output On.

The Output 1 key illuminates orange to indicate the on state

Making live changes to any numeric parameter (e.g. Frequency)

Numeric parameters can be changed by using the cursor keys and spin wheel as an alternative to the numeric keypad.

- Press the hard key marked **Waves**
- Press the soft-key labelled Square.
- Press the soft-key labelled Freq – the current frequency value of 20.0MHz is displayed
- Press the Cursor hard keys to move the edit highlight to the second digit.
- Use the spin wheel to change the value – the frequency is changed immediately.

NOTE

Press to activate/ deactivate the spin wheel.

Setting-up a Pulse Waveform

Requirement

Output a continuous pulse signal with 100ns period, 30ns pulse width, 20ns edge times and a high level of 2.7V and a low level of-0.6 volts from MAIN OUT 1.

Starting Conditions

Before starting, reset the instrument to defaults as described in section 4 Getting Started

Open Waveform Menu - Pulse

- Press the hard key marked **Waves**

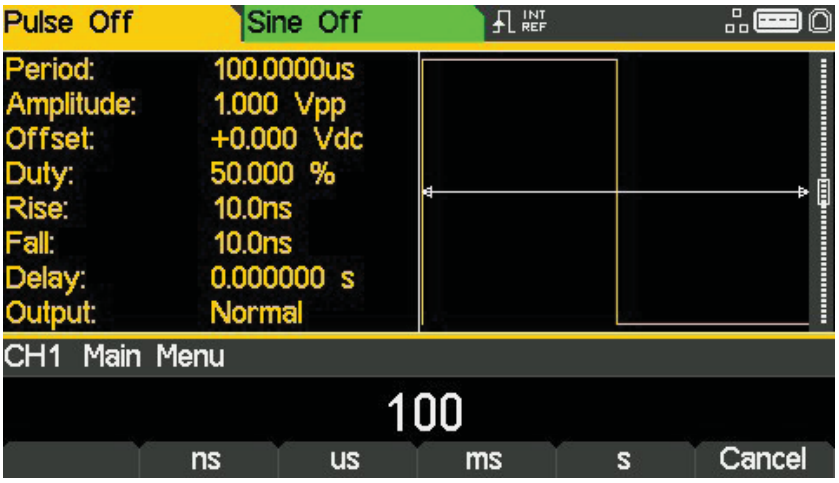
- Press the soft-key labelled Pulse.

Set the Period

- Press the soft-key labelled PlsFrq so that it changes to PlsPer- the current period appears in the edit box.

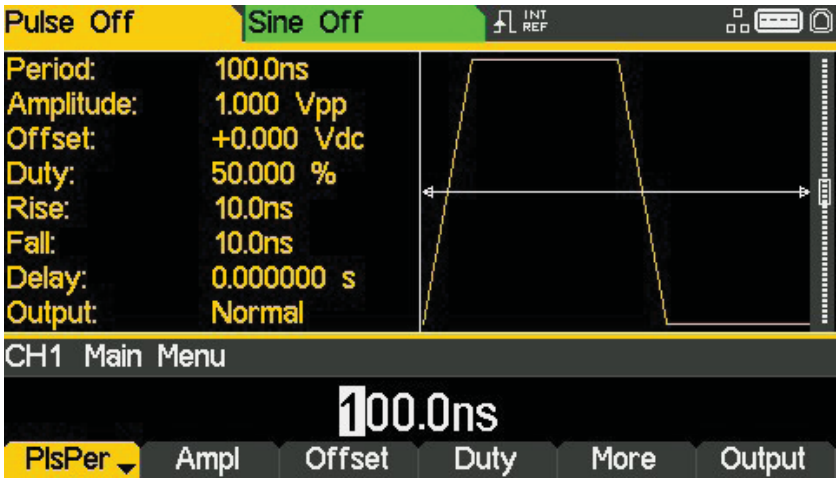
Pressing this soft-key repeatedly changes its function between Frequency and Period.

- Use the numeric keypad to enter a new period. Press the numbers 1 0 0



As soon as a number is entered, the soft-keys change to show units of time.

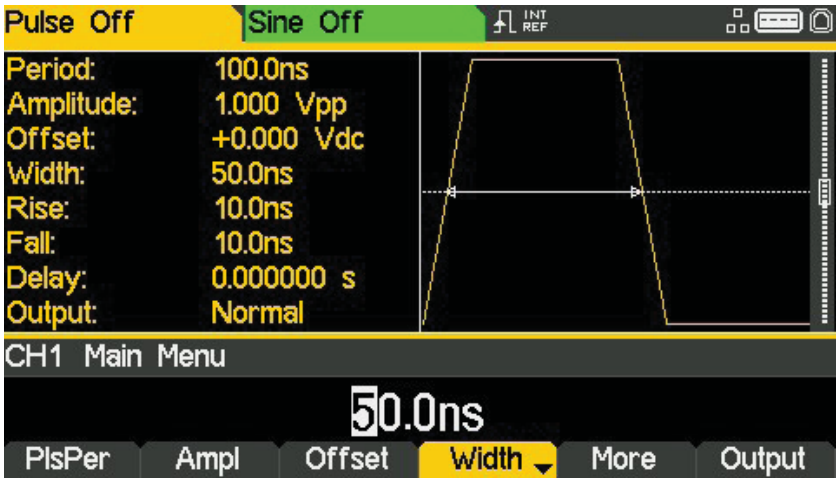
- Press the soft-key labelled ns to confirm a period of 100ns.



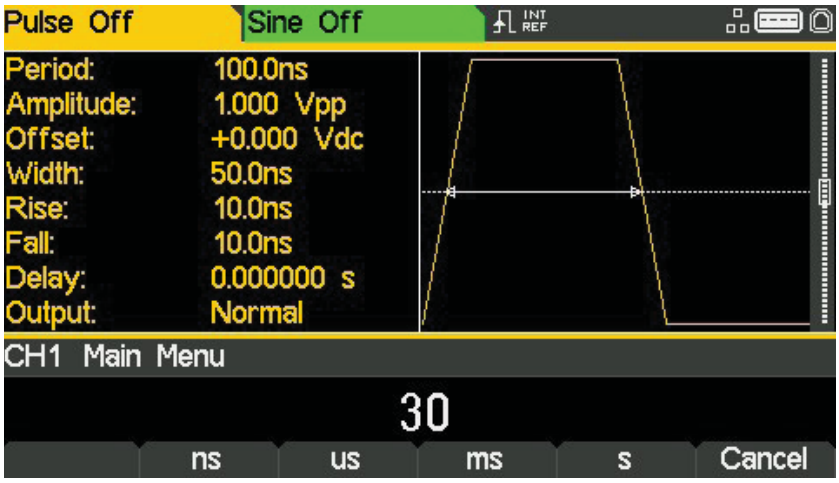
The graph box changes to show a representation of the pulse and edge times.

Set the Pulse Width

- Press the soft-key labelled Duty - the key label changes to Width and displays the width as a time

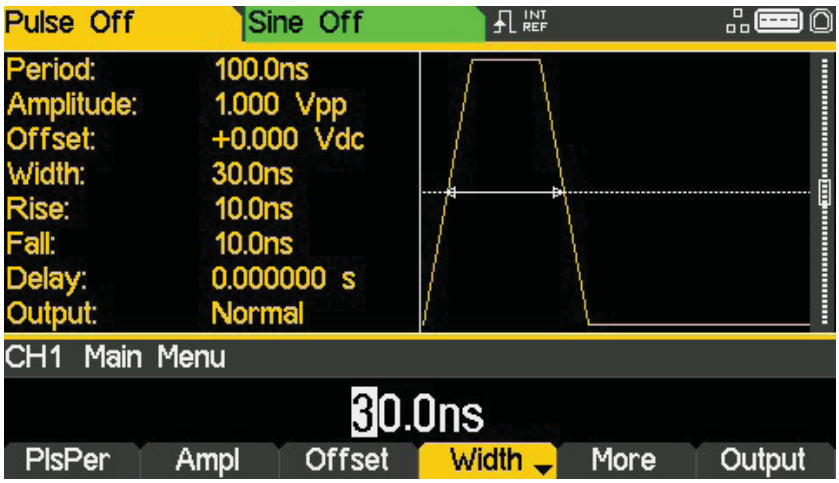


- Use the numeric keypad to enter a new width. Press the numbers 3 0.



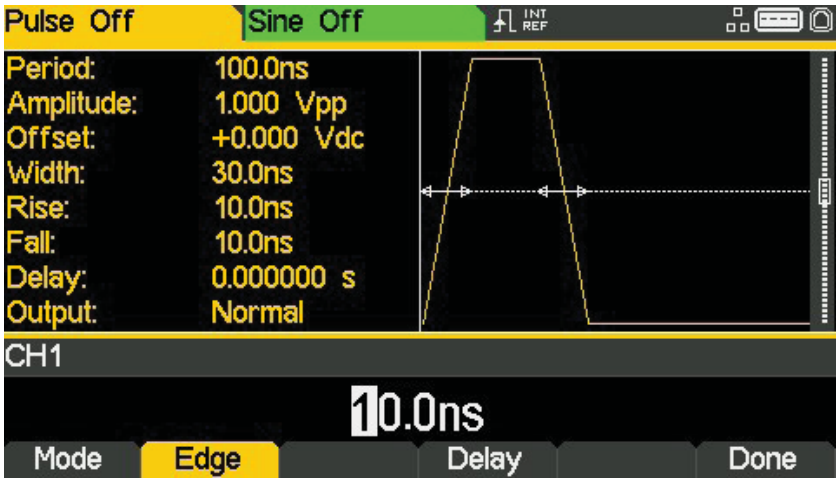
As soon as a number is entered, the soft-keys change to show units of time.

- Press the soft-key labelled ns to confirm a width of 30ns.

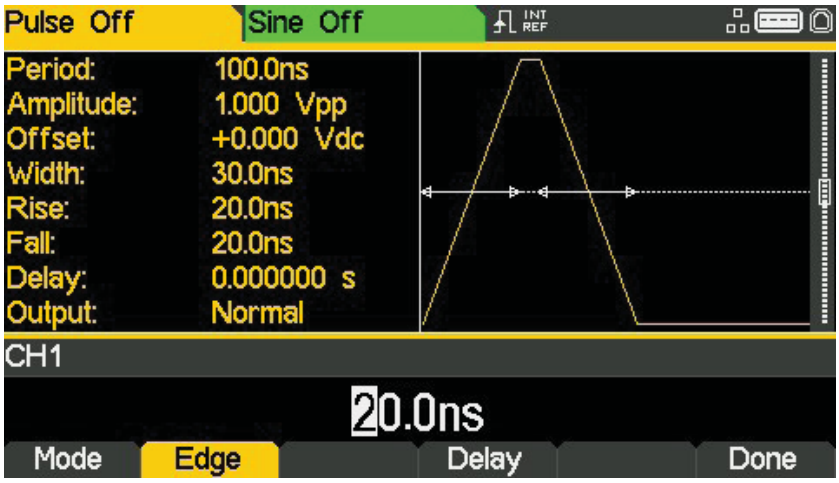


Set the Pulse Edge Times

- Press the soft-key labelled More
- Press the soft-key labelled Edge



- Use the cursor keys to select the digit representing units of 10ns
- Use the spin wheel to change the value to 20.0ns

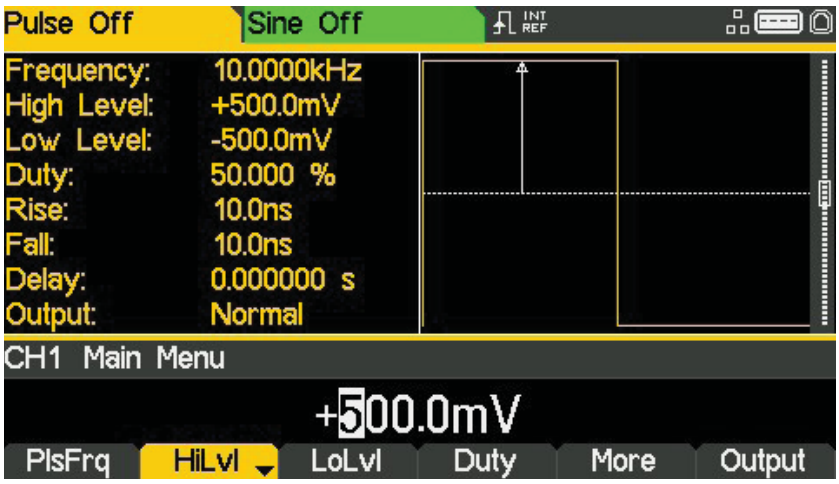


The value could have been entered using the numeric keypad if preferred.

- Press the soft-key labelled Done

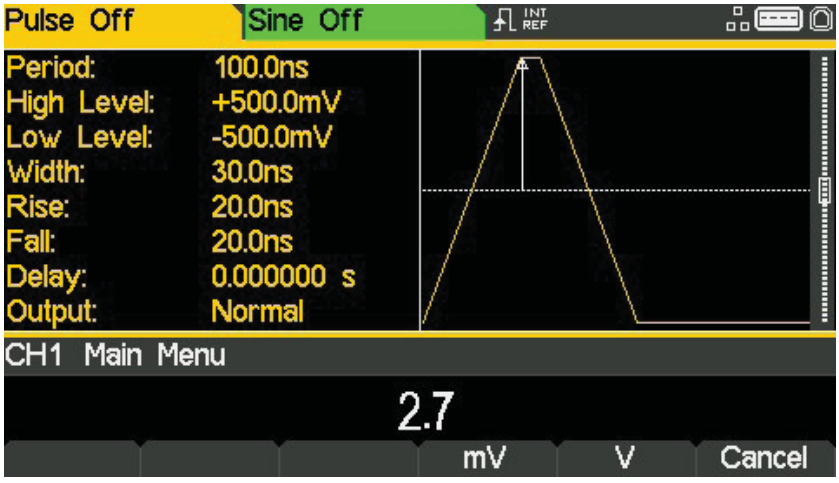
Set the High and Low Levels

- Press the soft-key labelled Ampl - the key label changes to HiLvl and the current high level voltage appears in the edit box



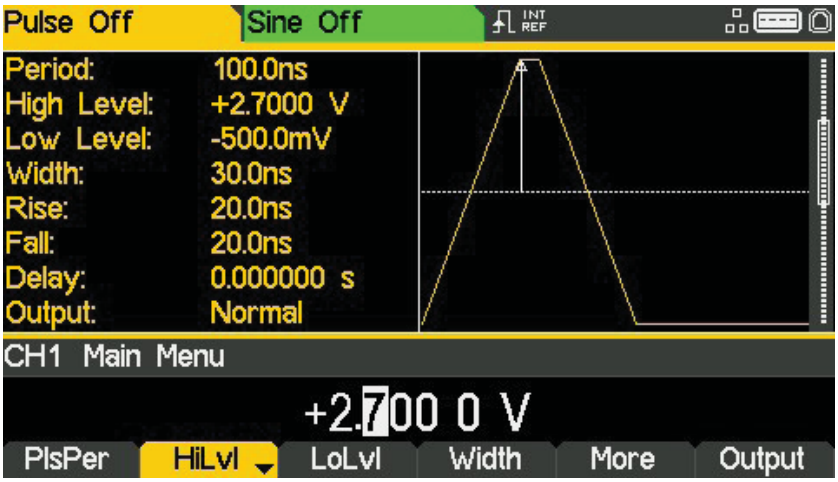
Successive presses of the Ampl soft-key changes the Ampl and Offset key labels to HiLvl (high level) and LoLvl (low level) and vice versa.

- Use the numeric keypad to enter a new level. Press the numbers 2.7.

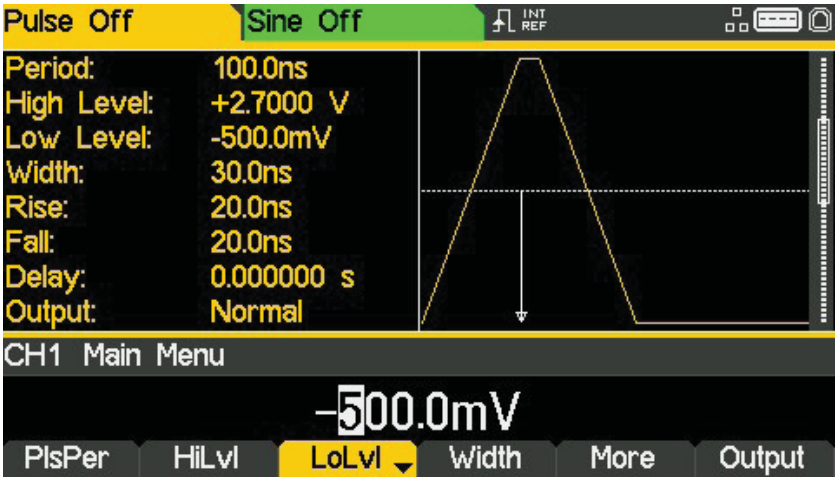


As soon as a number is entered, the soft-keys change to show units of voltage.

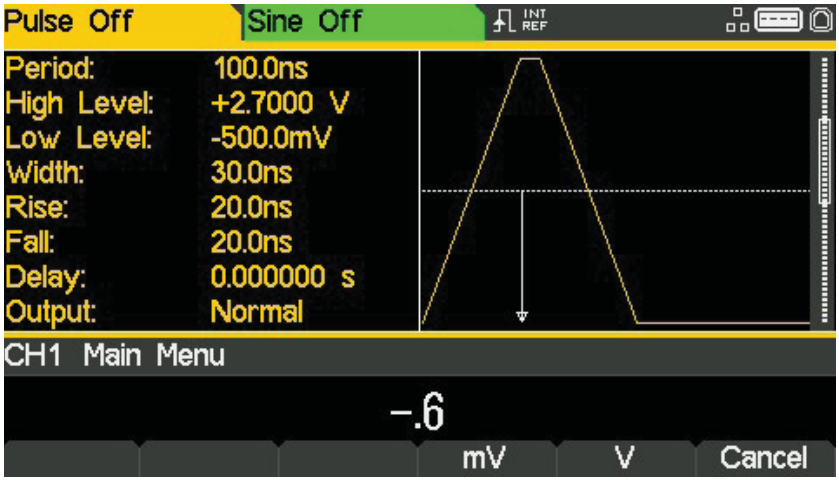
- Press the soft-key labelled V to confirm a high level of 2.7 volts.



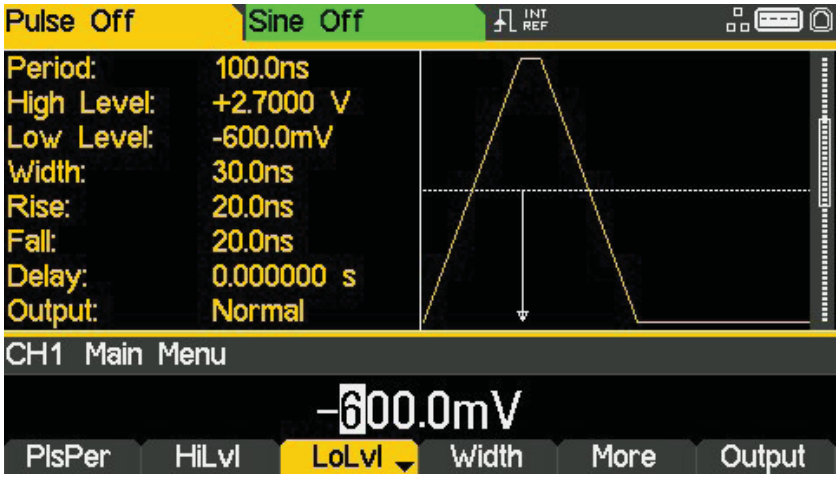
- Press the soft-key labelled LoLvl- the current low level voltage appears in the edit box.



- Use the numeric keypad to enter a new level. Press - . 6



- Press the soft-key labelled V to confirm a low level of-600 mV.



Turn the Output On

- Press **Output1** key to turn the channel 1 output On.

The Output 1 key illuminates orange to indicate the on state

Setting-up more Output Options

Requirement

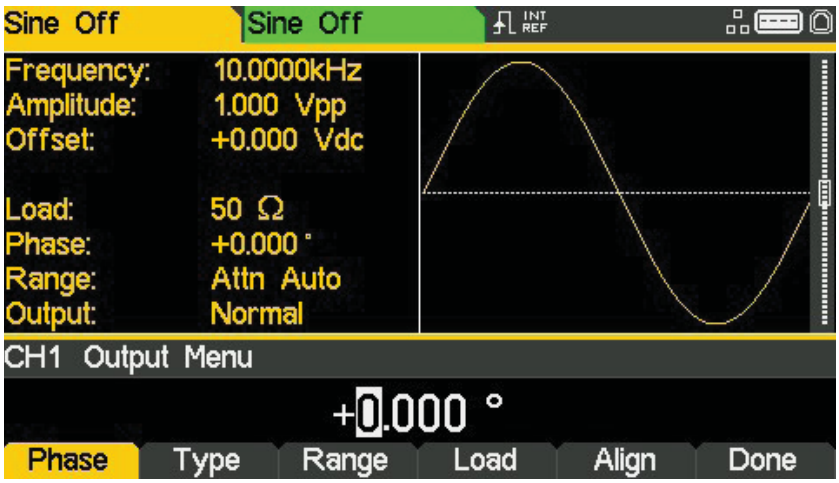
In the earlier set-up examples it was shown how the output menu is used to set the output level (amplitude plus offset or high level plus low level) and turn the output on or off. This example demonstrates the setting of output phase, output polarity, load impedance and voltage auto-range.

Starting Conditions

Before starting, reset the instrument to defaults as described in section 4 Getting Started

Open the Output Menu

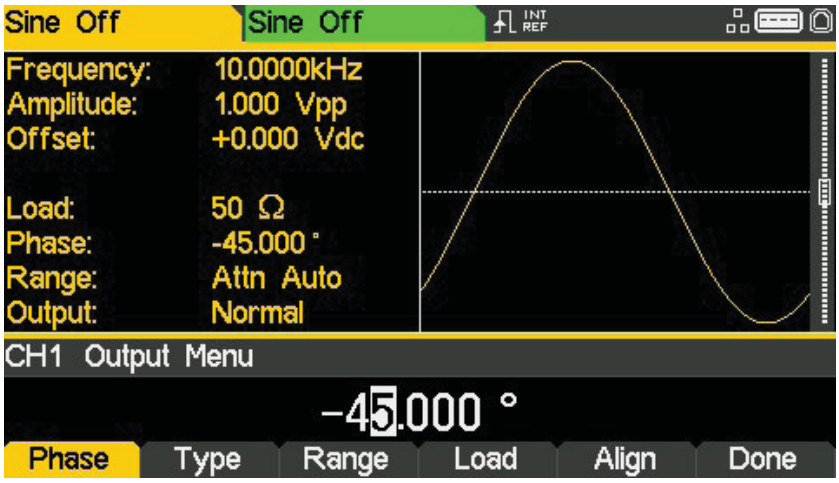
- Press the soft-key marked **Output**



Change the Output Phase

The soft-key labelled Phase will be selected as default.

- Enter a phase of -45 degree.

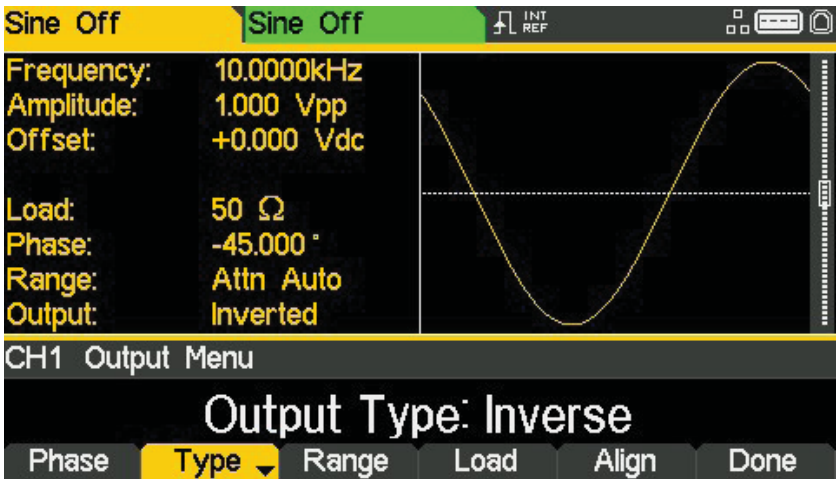


The set phase angle is the point in the waveform period which is coincident with the Sync or trigger edge, i.e. it is the point in the period at which the waveform starts. Hence a negative phase setting advances, and a positive phase setting delays the waveform relative to the Sync or trigger; the waveform in the graph box changes to show this.

The Align soft-key is used to re-align phase when making frequency changes.

Change the Output Polarity

- Press the soft-key labelled Type to invert the output polarity.



Successive presses of the type key alternates between normal and inverted.

Change the Load Impedance

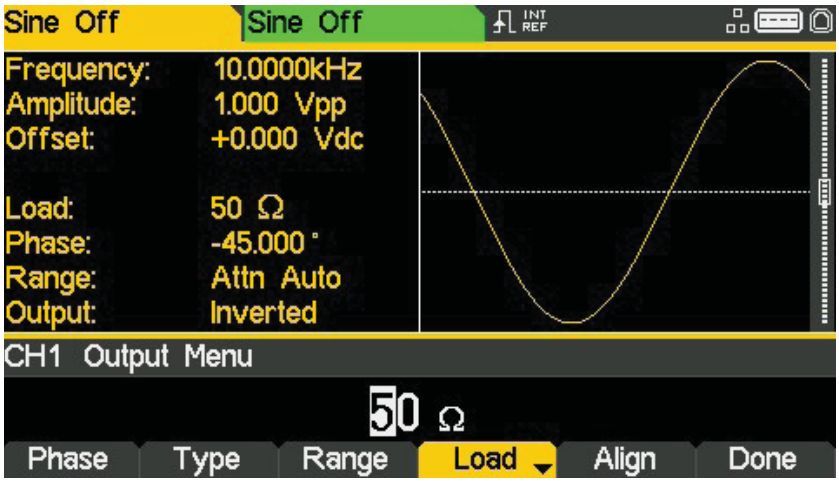
- Press the soft-key labelled Load
- Press the soft-key labelled Load again to change the load impedance to High-z (high impedance).

The default load impedance is 50 Ohms, but that this could be changed to any impedance between 50 and 10,000 Ohms. Levels are calculated based upon this impedance.

Successive presses of the Load key alternates between a numeric value and High-z.

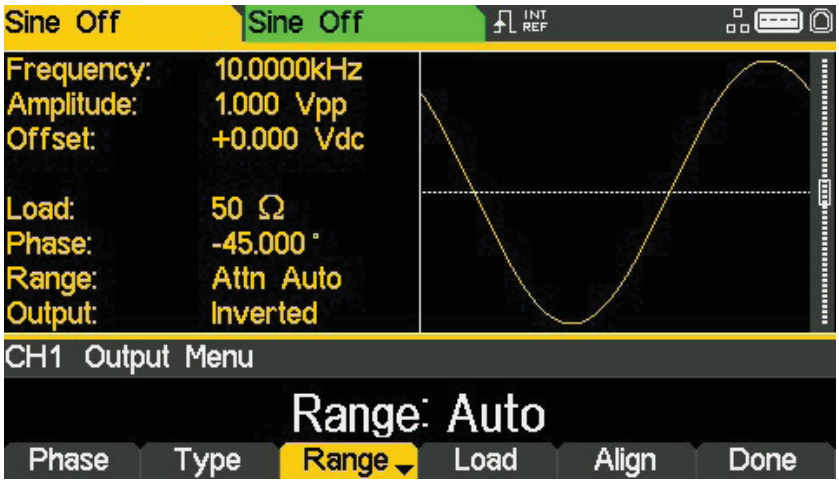
Note that the amplitude readout increases to 2 volts pk-pk.

- Press the soft-key labelled Load to return the load impedance to 50 Ohms.

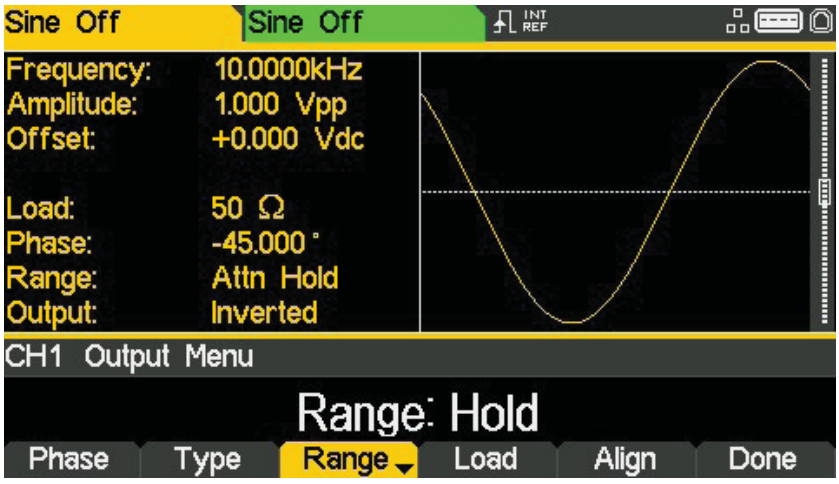


Changing the Range

- Press the soft-key labelled Range



- Press the soft-key labelled Range again to change the range from Auto to Hold.



Auto mode auto-ranges in 6dB attenuator steps (i.e. 'range' maximums of 10Vpp, 5Vpp, 2.5Vpp, etc., into 50Ω), with the amplitude range limited to 6dB to maintain waveform quality.

Selecting Hold mode disables auto-ranging; the attenuator setting is fixed and the amplitude range is no longer limited.

With range set to Auto the amplitude and attenuators will switch automatically and optimal performance will be realised. With range set to Hold a fixed attenuator setting is used for all amplitude settings.

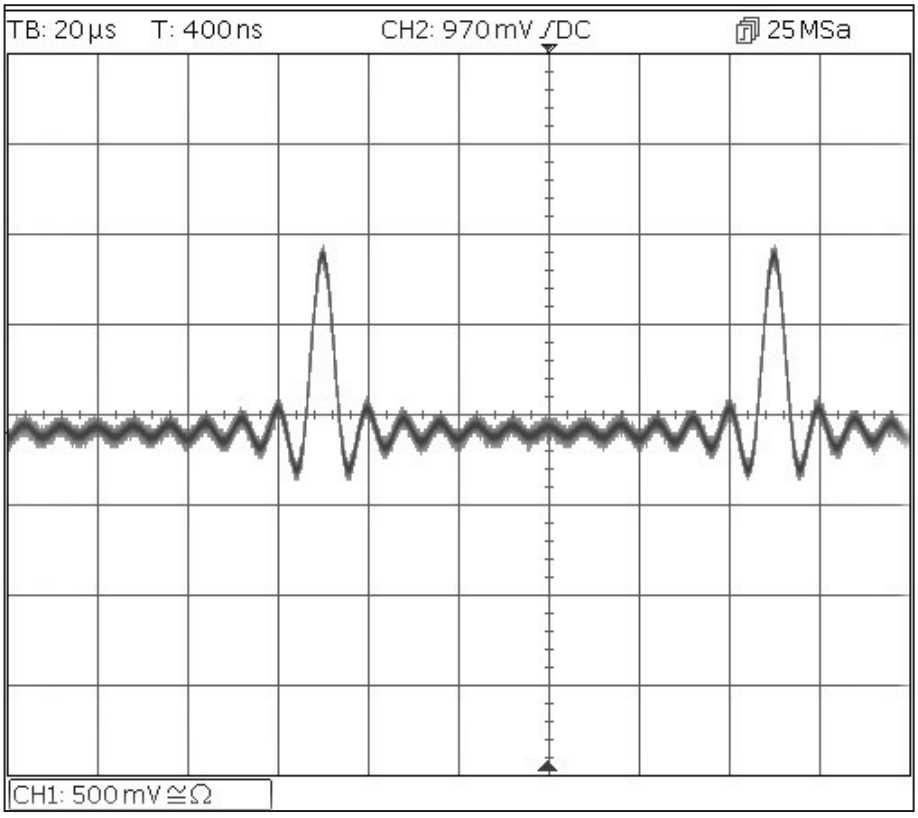
6. EXPLORING THE GENERATOR CAPABILITIES

In the following examples only the parameter settings are described, together with the related key names. The resultant output waveforms are shown, along with the sync or trigger waveform where relevant. Output amplitude and offset settings are examples only and need not be followed.

Setting-up an arbitrary wave signal

Start with the instrument returned to Default Settings.

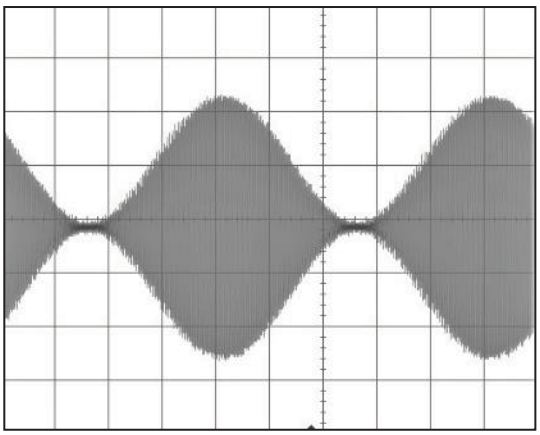
MENU	**HARD KEY NAME**	
Waveform	Waves	
MENU	**Soft-key Name**	
Arbitrary waveform	Arb	
Parameter	**Soft-key Name**	**Setting**
Wave selection	Waves	Sinc
Frequency	-	10kHz
Amplitude	Ampl	2V
Offset	Offset	5mVdc
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Setting-up an AM modulated Sine Waveform

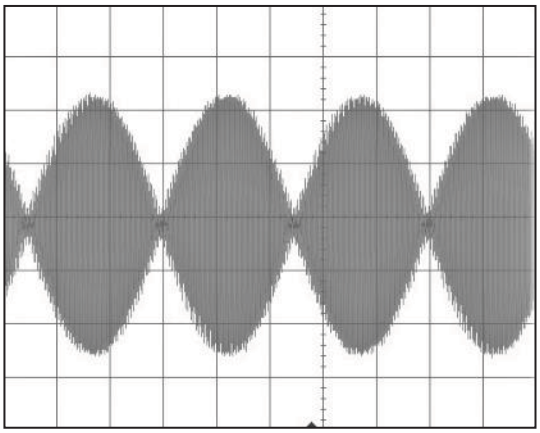
Start with the instrument returned to Default Settings. .

Parameter	**Soft-key Name**	**Setting**
Frequency	-	10MHz
MENU	**HARD KEY NAME**	
Modulation	Mod	
Parameter	**Soft-key Name**	**Setting**
Frequency	-	100kHz
Depth	Depth	100%
Source	Source	Internal
Shape	Shape	Sine
Modulation state	On/Off	On
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Change the modulation to AM-SC

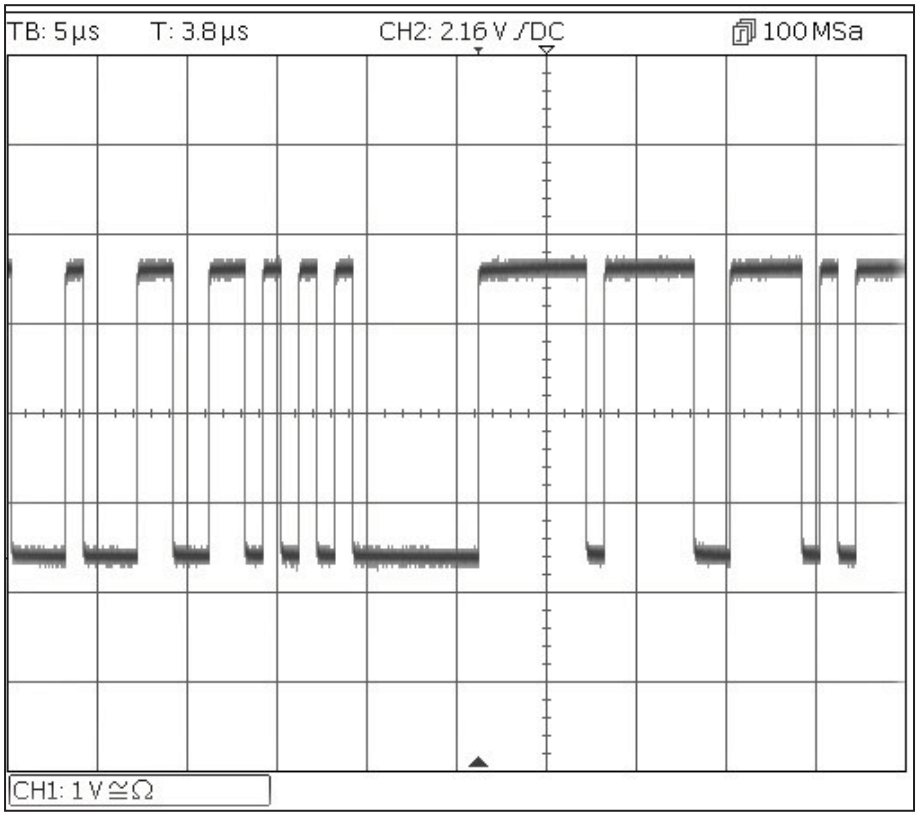
Parameter	**Soft-key Name**	**Setting**
Type	Type > AM	AM-SC



PRBS

Start with the instrument returned to Default Settings.

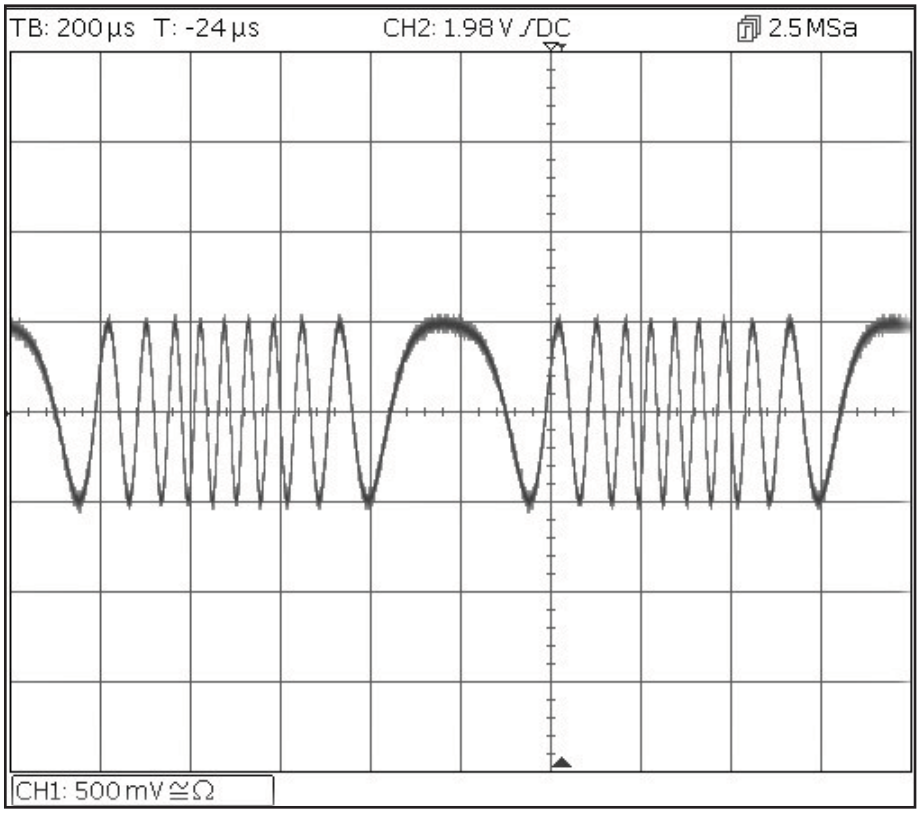
MENU	**HARD KEY NAME**	
Waveform	Waves	
Menu	**Soft-key name**	**Setting**
Noise/PRBS	Noise	
Source	Source	PBRS
Parameter	**Soft-key Name**	**Setting**
Bit Rate	BitRate	1Mbps
Amplitude	Ampl	3.3V
Offset	Offset	1.65V
PRBS Type	Type	PN7
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Frequency Modulation of a Sine Waveform

Start with the instrument returned to Default Settings.

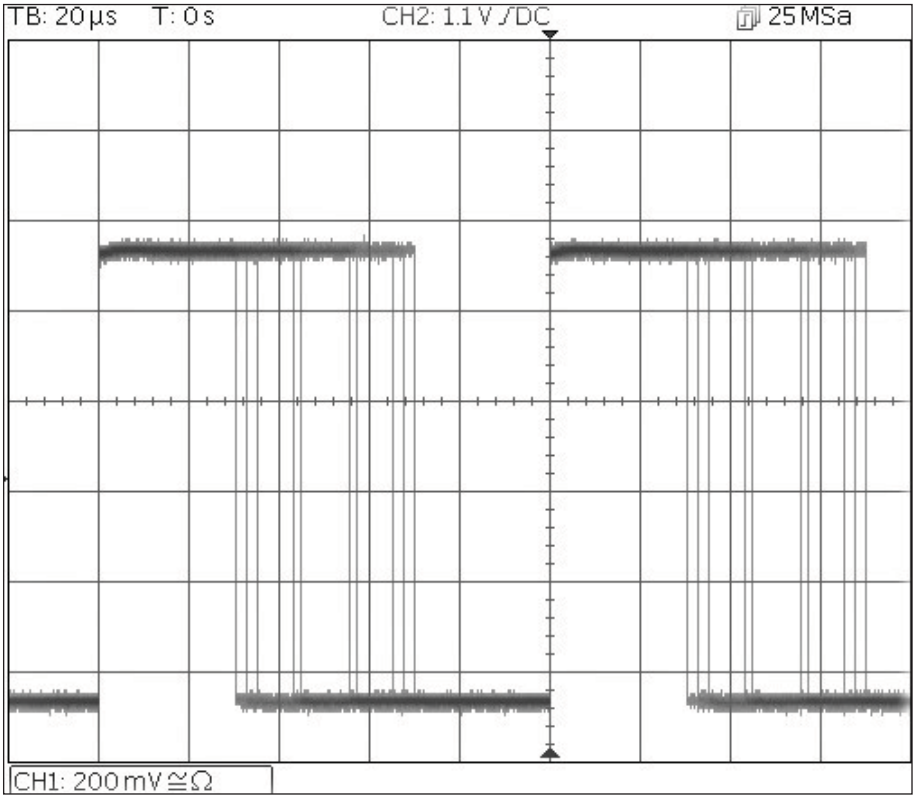
MENU	**HARD KEY NAME**	
Modulation	Mod	
Parameter	**Soft-key Name**	**Setting**
Modulation State	On/Off	On
Modulation Type	Type	FM
Modulation Frequency	-	1kHz
Deviation	Deviatn	9kHz
MENU	**HARD KEY NAME**	
Sine	Params	
Parameter	**Soft-key Name**	**Setting**
Amplitude	Ampl	1.0V
Offset	Offset	0.0V
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Pulse Width Modulated Waveform (PWM)

Start with the instrument returned to Default Settings.

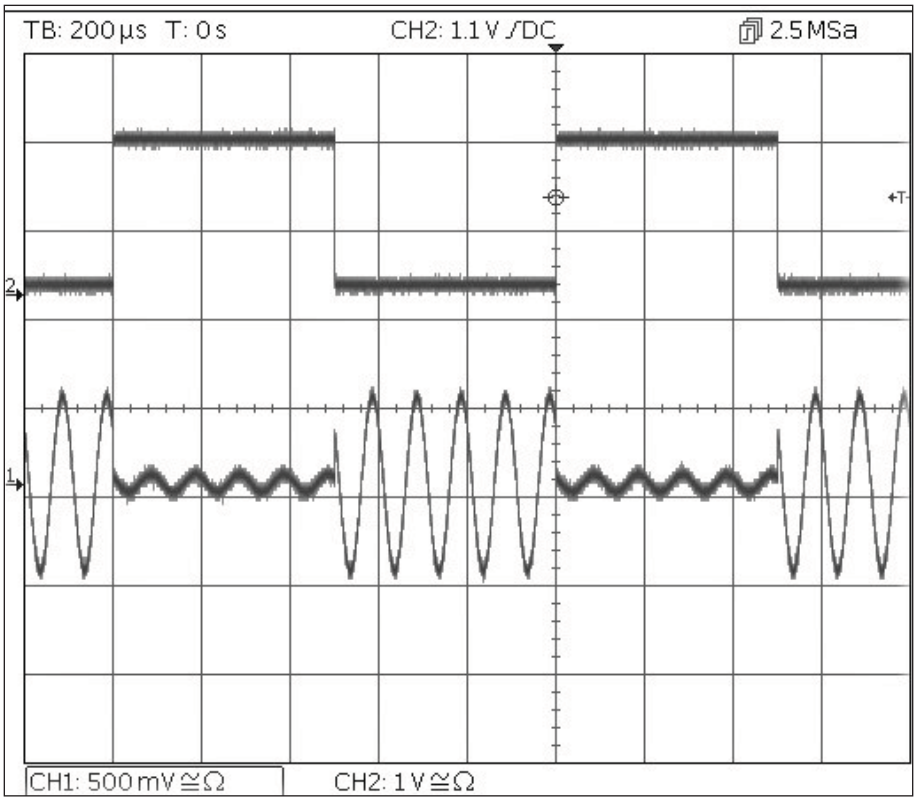
MENU	**HARD KEY NAME**	
Waveform	Waves	
Parameter	**Soft-key Name**	**Setting**
Pulse	Pulse	
MENU	**HARD KEY NAME**	
Modulation	Mod	
Parameter	**Soft-key Name**	**Setting**
Modulation State	On/Off	On
Modulation Type	Type	PWM
Modulation Frequency	-	1kHz
Deviation	Dev %	40%
MENU	**HARD KEY NAME**	
Pulse	Params	
Parameter	**Soft-key Name**	**Setting**
Amplitude	Ampl	1.0V
Offset	Offset	0.0V
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Amplitude shift keying (ASK)

Start with the instrument returned to Default Settings.

MENU	**HARD KEY NAME**	
Modulation	Mod	
Parameter	**Soft-key Name**	**Setting**
Modulation State	On/Off	On
Modulation type	Type	ASK
Modulation Source	Source	Internal
Hop Amplitude	HpAmpl	100mV
Switching Rate	Rate	1kHz
Hop Polarity	HopPol	Positive
MENU	**HARD KEY NAME**	
Sine	Params	
Parameter	**Soft-key Name**	**Setting**
Amplitude	Ampl	1.0V
Offset	Offset	0.0V
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On

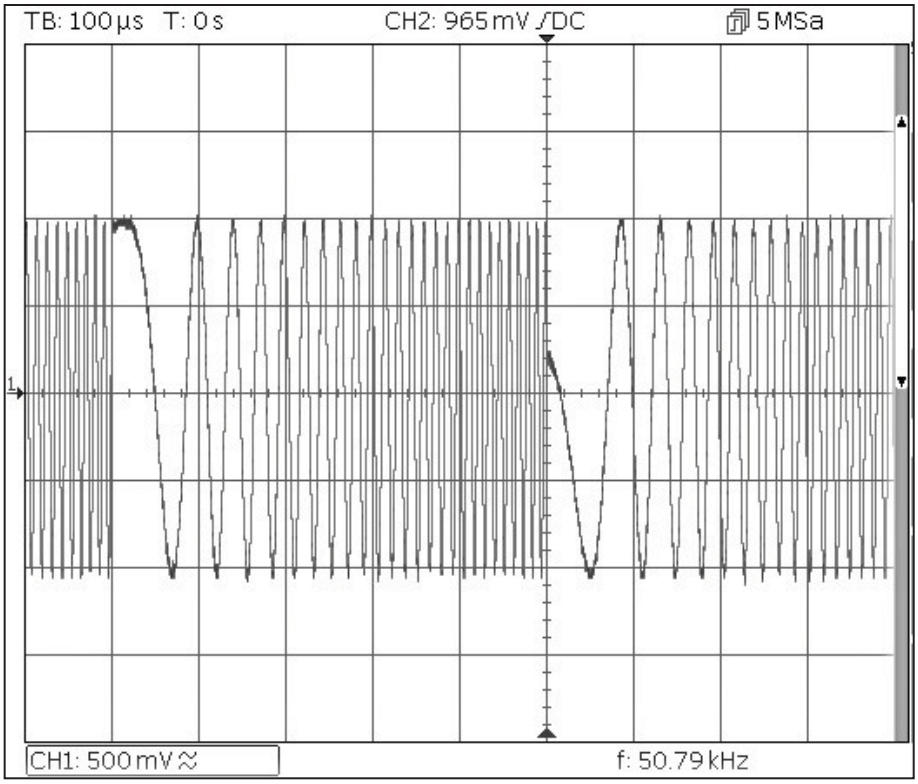


Note that the second trace is the output from the main Output 2 socket when Channel 2 is synchronised which follows the modulating waveform signal.

Frequency Sweep of a Sine Wave

Start with the instrument returned to Default Settings.

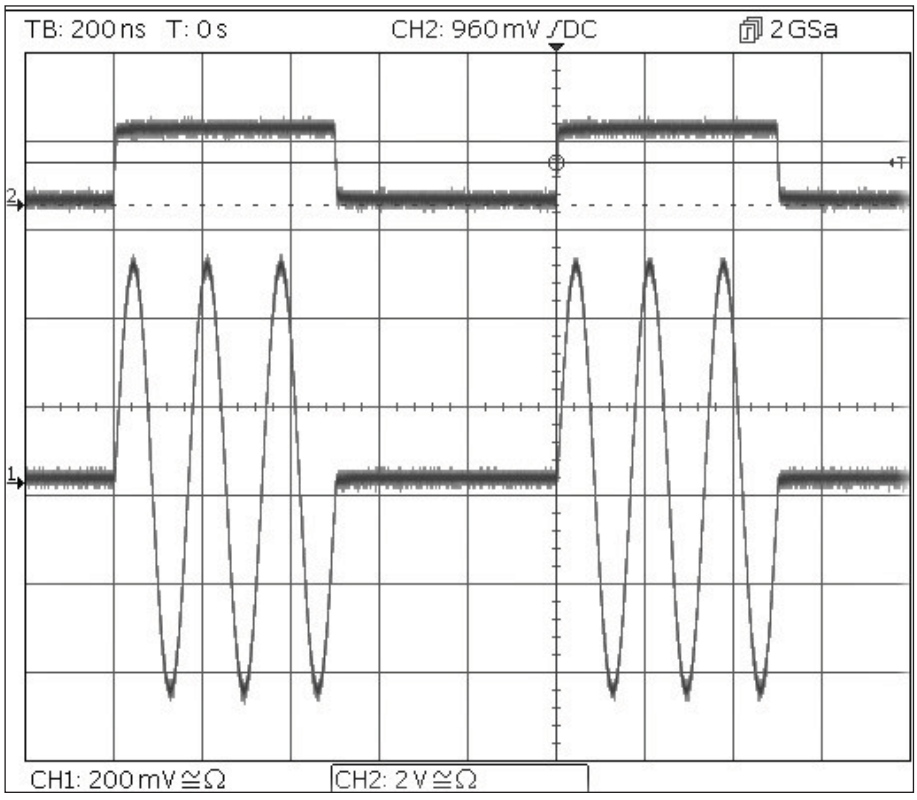
MENU	**HARD KEY NAME**	
Sweep	Sweep	
Parameter	**Soft-key Name**	**Setting**
Sweep State	On/Off	On
Stop Frequency	Freq > Stop	100kHz
MENU	**HARD KEY NAME**	
Sine	Params	
Parameter	**Soft-key Name**	**Setting**
Amplitude	Ampl	1.0V
Offset	Offset	0.0V
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On



Generating a Triggered Burst

Start with the instrument returned to Default Settings.

Parameter	**Soft-key Name**	**Setting**
Frequency	-	6MHz
MENU	**HARD KEY NAME**	
Burst	Burst	
Parameter	**Soft-key Name**	**Setting**
Burst State	On/Off	On
Burst Count	Count	3
Trigger Source	SetTrg > Source > Int	Internal Trigger
Trigger Period	SetTrg > Period	5ms
MENU	**HARD KEY NAME**	
Sine	Params	
Parameter	**Soft-key Name**	**Setting**
Amplitude	Ampl	1.0V
Offset	Offset	0.0V
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output1	On

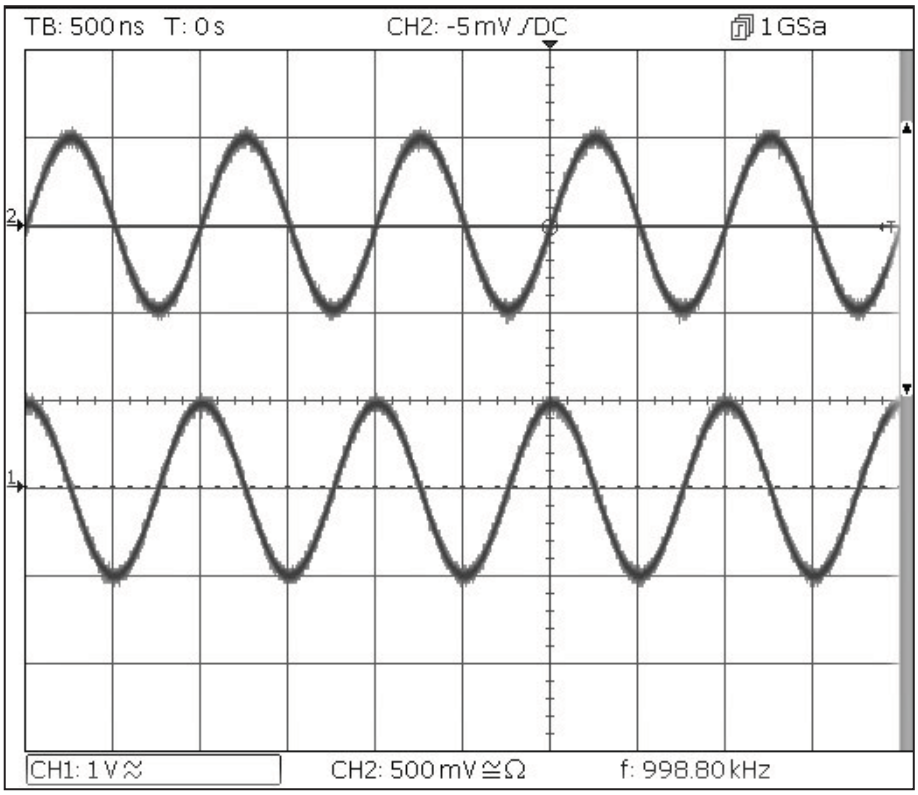


Note that the second trace is the output from the Main Output 2 socket when Channel 2 is synchronised which follows the trigger input signal.

Coupling the Frequency of Both Channels

Start with the instrument returned to Default Settings.

MENU	**HARD KEY NAME**	
Utility	Utility	
Parameter	**Soft-key Name**	**Setting**
Frequencies	Dual Ch > Freq	Coupled
Parameter	**HARD KEY NAME**	**Setting**
Output State	Output 1	On
Output State	Output 2	On
MENU	**HARD KEY NAME**	
Sine	Params	
Parameter	**Soft-key Name**	**Setting**
Phase Shift	Output > Phase > Done	90 degrees
Frequency	Freq	1MHz

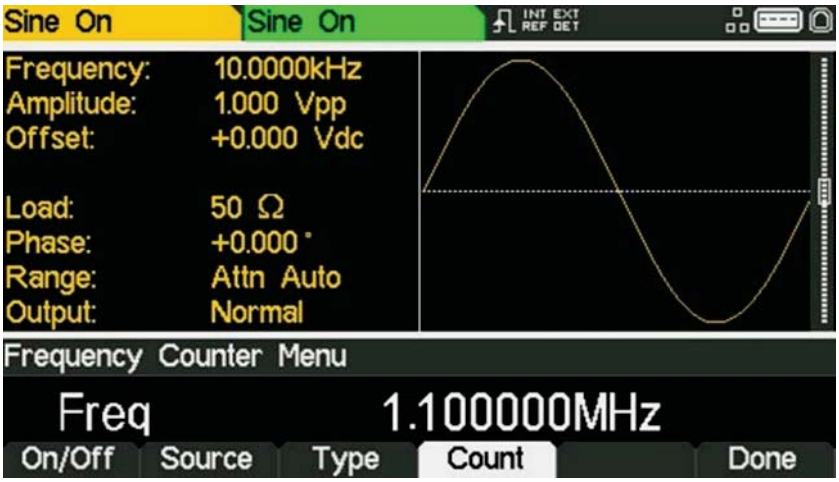


Note that, when channel 1 is set to 1MHz, channel 2 is also set to 1MHz.
The 90 degree phase shift between the channels can be seen.

Frequency counter

Start with the instrument returned to Default Settings.

MENU	**HARD KEY NAME**	
Utility	Utility	
Parameter	**Soft-key Name**	**Setting**
Counter	Instr > FrCntr > On/Off	Counter enabled
Source	Source	TRIG IN- DC coupled
Type	Freq	Frequency
Measurement	Count	



The Edit Box shows the current measurement. With no input signal at the selected input, the counter displays 'No signal' until an adequate input signal is applied. When an adequate input signal is applied, the counter constantly measures and displays the reading in the Edit Box.

7. MAINTENANCE

The Manufacturers or their agents overseas will provide a repair service for any unit developing a fault. Where owners wish to undertake their own maintenance work, this should only be done by skilled personnel in conjunction with the service guide which may be obtained directly from the Manufacturers or their agents overseas.

Cleaning

If the instrument requires cleaning use a cloth that is only lightly dampened with water or a mild detergent.

WARNING! TO AVOID ELECTRIC SHOCK, OR DAMAGE TO THE INSTRUMENT, NEVER ALLOW WATER TO GET INSIDE THE CASE. TO AVOID DAMAGE TO THE CASE NEVER CLEAN WITH SOLVENTS.

7. SPECIFICATION

MODEL:		TGF4042	TGF4082	TGF4162	TGF4242
Waveforms					
Standard waveforms:		Sine, Square, Ramp (Variable Symmetry), Triangle (50% Ramp symmetry), Positive Ramp (100% Ramp symmetry), Negative Ramp (0% Ramp symmetry), Pulse, Noise (Gaussian), DC, Sin(x)/x, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Cardiac, Gaussian, Lorentz, D-Lorentz and 4 User Defined Arbitrary Waveforms. Dozens of useful pre-built arbitrary waveforms are also supplied on the website: www.aimtti.com			
		-		PRBS	
Sine					
Frequency range:		1µHz to 40MHz	1µHz to 80MHz	1µHz to 160MHz	1µHz to 240MHz
Frequency resolution:		1µHz, 14 digits		1µHz, 15 digits	
Output level (into 50Ω):		10mVp-p to 10Vp			
	≤50MHz		10mVp-p to 10Vp-p		
	≤80MHz		10mVp-p to 5Vp-p	10mVp-p to 10Vp-p	10mVp-p to 10Vp-p
	≤120MHz			10mVp-p to 5Vp-p	10mVp-p to 5Vp-p
	≤240MHz			10mVp-p to 2.5Vp-p	10mVp-p to 2.5Vp-p
Amplitude flatness (1Vp-p relative to 10 kHz):	≤10MHz	±0.1dB			
	≤100MHz	±0.2dB			
	≤160MHz	±0.6dB			
	≤240MHz	±1.0dB			
Harmonic distortion (1Vp-p)	≤10MHz	-65dBc			
	≤50MHz	-50dBc			
	≤80MHz	-40dBc			
	≤130MHz	-35dBc			
	≤240MHz	-28dBc			
Total harmonic distortion DC to 20kHz (typical):		0.05%			
Non-harmonic spurii:		-65dBc			
Phase noise (10MHz, 1Vp-p, 10kHz offset):		-113dBc/Hz			
Square					
Frequency range:		1µHz to 25MHz		1µHz to 100MHz	
Frequency resolution:		1µHz, 14 digits		1µHz, 15 digits	
Output level (into 50Ω):	≤50MHz	10mVp-p to 10Vp-p		10mVp-p to 10Vp-p	
	≤100MHz			10mVp-p to 4Vp-p	
Duty cycle:		0.001% to 99.999%, 0.001% resolution			
Rise and fall times (typical):	≤ 4p-p	10ns, fixed		3ns, fixed	
	≥ 4p-p			5ns, fixed	
Aberrations (typical):		±5% of amplitude			
Jitter (RMS):		<30ps (cycle to cycle)			
Ramp					
Frequency range:		1µHz to 5MHz			
Frequency resolution:		1µHz, 13 digits			
Output level (into 50Ω):		10mVp-p to 10Vp-p			
Linearity error:		<0.1% to 100kHz		<0.1% to 200kHz	
Variable symmetry:		0.00% to 100.00%, 0.01% resolution			
Pulse					
Frequency range:		1mHz to 25MHz		1mHz to 100MHz	
Frequency Resolution:		1mHz, 11 digits		1mHz, 12 digits	
Output level (into 50Ω):	≤ 50MHz	10mVp-p to 10Vp–p		10mVp-p to 10Vp–p	
	≤ 100MHz			10mVp-p to 4Vp-p	
Aberrations (Typical):		±5% of amplitude (for transition time 10ns) ±3% of amplitude (for transition time 20ns) <±2% of amplitude (for transition time > 40ns)		±5% of amplitude (for transition time 5ns) ±3% of amplitude (for transition time 10ns) <±2% of amplitude (for transition time > 20ns)	

7 - Specification

MODEL:		TGF4042	TGF4082	TGF4162	TGF4242
Jitter RMS:		<30ps (cycle to cycle)			
Rise and Fall Times:	Range: ≤ 4Vp-p	8ns to 799.999999984s (10% to 90%)		3ns to 799.999999989s (10% to 90%)	
	Range: > 4Vp-p			5ns to 799.999999989s (10% to 90%)	
	Resolution:	100ps			
	Accuracy:	±500ps ±0.01% of period			
	Rise and Fall times can be independently varied or can be varied together simultaneously.				
Width:	Range: ≤ 4Vp-p	20ns to 999.999999980s		5ns to 999.999999995s	
	Range: > 4Vp-p			10ns to 999.999999990s	
	Resolution:	100ps			
	Accuracy:	±200ps ±0.01% of period			
Duty:		0.001% to 99.999%, 0.01% resolution			
Delay:	Range:	0ns to 999.99999996s		0ns to 999.99999998s	
	Resolution:	100ps			
	Accuracy:	±200ps ±0.01% of period			
	Delay can be entered as absolute delay or phase.				
Arbitrary					
In built arbitrary waveforms (Sin(x)/x, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Cardiac, Gaussian, Lorentz and D-Lorentz). Up to 4 user-defined waveforms may be stored in non-volatile memory. Waveforms can be defined by downloading of waveform data via remote interfaces or from the instrument's front panel.					
Waveform Memory Size:		8192 points			
Vertical Resolution:		14 bits		16 bits	
Frequency Range:	In built	1µHz to 2MHz		1µHz to 4MHz	
	User defined	1µHz to 40MHz		1µHz to 80MHz	
Frequency Resolution:	In built	1µHz, 13 digits			
	User defined	1µHz, 14 digits			
Output Level (into 50Ω):		10mVp-p to 10Vp-p			
Sampling rate:		400Msa/s		800MSa/s	
Point to Point Jitter (Typical):		2.5ns		1.25ns	
Rise and Fall Times:		<8ns		<5ns for 100MHz filter <8ns for 62.5MHz filter	
Effective Analogue Bandwidth (-3dB):		50MHz		62.5MHz, 100MHz, User Selectable	
Noise					
Gaussian White Noise: Noise can also be used as modulating waveform.					
Bandwidth (-3dB):		50MHz		100MHz	
Noise crest factor (Vp/Vrms):		6.4		5.16	
Output Level (into 50Ω):		10mVp-p to 10Vpp			
PRBS (TGF4162 & TGF4242 only)					
Bit Rate		-		1µbps to 100Mbps, 1µbps resolution	
Sequence Length:		-		2m – 1, where m = 7, 9, 11, 15, 20, 23, 29 or 31	
Rise and Fall Times (Typical):	≤ 4Vp-p	-		3ns, Fixed	
	> 4Vp-p	-		5ns, Fixed	
Output Level:		-		10mVp-p to 10Vpp into 50Ω	
Harmonic Output (TGF4162 & TGF4242 only)					
Harmonic waveforms can be defined and stored in user-defined arbitrary waveform locations.					
Frequency Range:		-		1µHz to 80MHz	
Frequency Resolution:		-		1µHz, 14 digits	
Harmonic Order:		-		1 to 50, Up to 16 different harmonics order can be defined	
Harmonic Amplitude:		-		0.0% to 100.0% of output amplitude, 0.1% resolution	
Harmonic Phase:		-		-360.0 to +360.0 degrees, 0.1 degree resolution	
Output level (into 50Ω):		-		10mVp-p to 10Vp-p	

Internal frequency reference	
Internal Modulating Frequency:	<± 1ppm
Amplitude Depth:	<± 1ppm first year
Internal Modulating Frequency:	<1ppm over the specified temperature range

7 - Specification

MODEL:	TGF4042	TGF4082	TGF4162	TGF4242
Modulation				
AM (Amplitude Modulation) Normal & Suppressed Carrier				
Carrier Waveforms:	Sine, Square, Ramp, Pulse, Noise, Arb			
	-		PRBS	
Maximum Carrier Frequency:	25MHz, subject to carrier waveform		50MHz, subject to carrier waveform.	
Modulation Source:	Internal/External			
Internal Modulating Waveforms:	Sine, Square, Positive Ramp, Negative Ramp, Triangle, Gaussian Noise, DC, Sinc, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Gaussian, Lorentz, D-Lorentz, Cardiac and User Defined Arbs			
	-		PRBS-PN7, PN9, PN11, PN15, PN20, PN23, PN29, PN31	
Internal Modulating Frequency:	1µHz to 10MHz, 1µHz resolution			
Amplitude Depth:	0.00% to 100.00%, 0.01% resolution			
FM (frequency modulation)				
Carrier Waveforms:	Sine, Square, Ramp, Arb			
Modulation Source:	Internal/External			
Internal Modulating Waveforms:	Sine, Square, Positive Ramp, Negative Ramp, Triangle, Gaussian Noise, DC, Sinc, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Gaussian, Lorentz, D-Lorentz, Cardiac and User Defined Arbs.			
	-		PRBS-PN7, PN9, PN11, PN15, PN20, PN23, PN29, PN31	
Internal Modulating Frequency:	1µHz to 10MHz, 1µHz resolution			
Frequency Deviation:	DC to Fmax/2, 1µHz resolution			
PM (phase modulation)				
Carrier Waveforms:	Sine, Square, Ramp, Arb			
Modulation Source:	Internal/External			
Internal Modulating Waveforms:	Sine, Square, Positive Ramp, Negative Ramp, Triangle, Gaussian Noise, DC, Sinc, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Gaussian, Lorentz, D-Lorentz, Cardiac and User Defined Arbs.			
	-		PRBS-PN7, PN9, PN11, PN15, PN20, PN23, PN29, PN31	
Internal Modulating Frequency:	1µHz to 10MHz, 1µHz resolution			
Phase Deviation:	-360.000 to +360.000 degrees, 0.001 degree resolution			
ASK (Amplitude Shift Keying)				
Carrier Waveforms:	Sine, Square, Ramp, Pulse, Noise, Arb			
	-		PRBS	
Maximum Carrier Frequency:	25MHz, subject to carrier waveform.		50MHz, subject to carrier waveform.	
Source:	Internal/External (via TRIG IN)			
Internal Modulation:	2mHz to 10MHz (50% duty cycle square)			
FSK (Frequency Shift Keying)				
Carrier Waveforms:	Sine, Square, Ramp, Arb			
Source:	Internal/External (via TRIG IN)			
Internal Modulation:	2mHz to 10MHz (50% duty cycle square)			
BPSK (Binary Phase Shift Keying)				
Carrier Waveforms:	Sine, Square, Ramp, Arb			
Modulation Source:	Internal/External (via TRIG IN)			
Internal Modulation:	2mHz to 10MHz (50% duty cycle square)			
PWM (Pulse Width Modulation)				
Carrier Waveforms:	Pulse			
Modulation Source:	Internal/External			
Internal Modulating Waveforms:	Sine, Square, Positive Ramp, Negative Ramp, Triangle, Gaussian Noise, DC, Sinc, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Gaussian, Lorentz, D-Lorentz, Cardiac, and User Defined Arbs			
	-		PRBS-PN7, PN9, PN11, PN15, PN20, PN23, PN29, PN31	
Internal Modulating Frequency:	1µHz to 10MHz, 1µHz resolution			
Pulse Width Deviation:	0% to 100% of pulse width, 0.01% resolution			

7 - Specification

MODEL:	TGF4042	TGF4082	TGF4162	TGF4242
SUM (Additive Modulation) (TGF4162 & TGF4242 only)				
Carrier Waveforms:	-		Sine, Square, Ramp, Pulse, Noise, PRBS, Arb	
Maximum Carrier Frequency:	-		50MHz, subject to carrier waveform.	
Modulation Source:	-		Internal/External	
Internal Modulating Waveforms:	-		Sine, Square, Positive Ramp, Negative Ramp, Triangle, Gaussian Noise, DC, Sinc, Exponential Rise, Exponential Fall, Logarithmic Rise, Logarithmic Fall, Haversine, Gaussian, Lorentz, D-Lorentz, Cardiac, PRBS-PN7, PN9, PN11, PN15, PN20, PN23, PN29, PN31 and User Defined Arbs.	
Internal Modulating Frequency:	-		1µHz to 10MHz, 1µHz resolution	
Ratio:	-		0% to 100%, 0.01% resolution	

Triggered Burst			
Each active edge of the trigger signal will produce one burst of the waveform.			
Carrier Waveforms:		Sine, Square, Ramp, Pulse, Arb: A fixed number of cycles, specified as number of cycles are generated at every trigger event. Noise: Noise is reset to its start condition at every trigger event. Allows generating same random noise sequence.	
		-	PRBS: A fixed number of bits, specified as number of cycles are generated at every trigger event
Maximum Carrier Frequency:		25MHz (finite cycles), Fmax(infinite), subject to carrier waveform.	50MHz (finite cycles), Fmax(infinite), subject to carrier waveform.
Number of Cycles:		1 to 2147483647 and infinite.	
Trigger Repetition Rate:	Internal	2mHz to 25MHz	2mHz to 50MHz
	External	DC to 1MHz	
Trigger Signal Source:	Internal	from keyboard or trigger generator.	
	External	from TRIG IN or remote interface.	
Trigger Start/Stop Phase:		-360.000 to +360.000 degrees, 0.001 degree resolution. Phase off-set cannot be set for Noise and PRBS waveforms.	

Gated			
Waveform will run while the Gate signal is true and stop while false.			
Carrier Waveforms:		Sine, Square, Ramp, Pulse, Noise, Arb	
		-	PRBS
Maximum Carrier Frequency:		25MHz, subject to carrier waveform.	50MHz, subject to carrier waveform.
Trigger Repetition Rate:	Internal	2mHz to 25MHz	2mHz to 50MHz
	External	DC to 1MHz	
Gate Signal Source:	Internal	from keyboard or trigger generator.	
	External	from TRIG IN or remote interface.	
Gate Start/Stop Phase:		-360.000 to +360.000 degrees, 0.001 degree resolution. Phase offset cannot be set for Noise and PRBS waveforms	

Sweep	
Frequency sweep capability is provided for both standard and arbitrary waveforms	
Carrier Waveforms:	Sine, Square, Ramp, Arb
Sweep Mode:	Linear or logarithmic, triggered or continuous.
Sweep Direction:	Up or Down
Sweep Range:	From 1µHz to Fmax. Phase continuous. Independent setting of the start and stop frequency.
Sweep Time:	1µs to 500s (9 digit resolution).
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. External trigger repetition rate: DC to 1MHz

7 - Specification

MODEL:	TGF4042	TGF4082	TGF4162	TGF4242
Trigger Generator				
Internal Source Rate or Frequency:	20ns to 500s or 2mHz to 50MHz square waves adjustable in 10ns steps.		40ns to 500s or 2mHz to 25MHz square waves adjustable in 10ns steps.	
Resolution:	10ns, 11 digits			
Each channel has its own trigger generator. Channel 1 trigger is available for external use from the MAIN OUT 2 socket when Channel 2 is configured to output Channel 1 sync waveform and sync source is set to trigger.				

Dual-channel operations	
Tracking	
Independent (Off):	The channels are independent of each other.
Equal:	The two channels are identical and behave identically.
Coupling	
Frequency coupling:	The frequencies of the two channels can be coupled. Changing the frequency of one channel changes the frequencies of both channels.
Amplitude (and DC Offset) coupling:	Amplitude (and DC offset) of the two channels can be coupled. Changing the amplitude and offset on one channel changes the amplitude and offset of both channels.
Output coupling:	Output On/Off can be coupled. Switching the output On/Off on one channel switches the output On/Off of both channels.
Characteristics	
Relative phase:	-360.000 to 360.000 degrees, 0.001 degree resolution (Phase offset cannot be set for Noise)
Channel to channel Skew (typical):	<1ns (when performing identical operations)
Crosstalk (typical):	<-80db

External Frequency Measurement		
Function:		Frequency, Period, Positive Width, Negative Width, Duty Cycle
Frequency Range:	AC coupled	3Hz to >125MHz
	DC coupled	100mHz to >125MHz
Source:	AC coupled	REF / COUNT (AC) IN
	DC coupled	TRIG / COUNT (DC) IN
Frequency Resolution:		Up to 7 digits displayed.
Measurement Time:		Automatic
Input Range and Sensitivity:	AC coupled	≤50MHz 100mVpp - 5Vpp >50MHz 250mVpp - 5Vpp Maximum input ±10V
	DC coupled	Threshold typically 1.2V; Sensitivity 100mVpp (≤50MHz), 250mVpp (<50MHz) maximum input +5V, -1V
Hysteresis:	Input hysteresis voltage	10mV
Accuracy:		±1 digit ± time base accuracy.
Time base Accuracy:		<± 1ppm initial settling error, <± 1ppm oscillator ageing rate in the first year, <1ppm over the specified temperature range

7 - Specification

MODEL:		TGF4042	TGF4082	TGF4162	TGF4242
Outputs					
Main Outputs					
Output Impedance:		50Ω			
Amplitude (Sine):		20mVp-p to 20Vp-p open circuit, 10mVp-p to 10Vp-p into 50Ω			
	≤ 50MHz		20mVp-p to 20Vp-p open circuit, 10mVp-p to 10Vp-p into 50Ω		
	≤ 80MHz		20mVp-p to 10Vp-p open circuit, 10mVp-p to 5Vp-p into 50Ω	20mVp-p to 20Vp-p open circuit, 10mVp-p to 10Vp-p into 50Ω	
	≤ 120MHz			20mVp-p to 10Vp-p open circuit, 10mVp-p to 5Vp-p into 50Ω	
	≤ 240MHz				20mVp-p to 5Vp-p open circuit, 10mVp-p to 2.5Vp-p into 50Ω
Amplitude (Pulse):		20mVp-p to 20Vp-p open circuit, 10mVp-p to 10Vp-p into 50Ω			
	≤ 50MHz			20mVp-p to 20Vp-p open circuit, 10mVp-p to 10Vp-p into 50Ω	
	≤ 100MHz			20mVp-p to 8Vp-p open circuit, 10mVp-p to 4Vp-p into 50Ω	
Amplitude can be specified open circuit (hi Z) or into an assumed load of 1Ω to 10kΩ in Vpp					
Amplitude Accuracy:		1.5% ±5mV at 1kHz into 50Ω			
DC Offset Range:		±10V. DC offset plus signal peak limited to ±10V from 50Ω.			
DC Offset Accuracy:		Typically 1% ±50mV.			
Resolution:		3 digits or 1mV for both Amplitude and DC Offset.			
Sync Output					
Channel 2 can be configured to output Channel 1 sync from its MAIN OUT 2 socket. Sync is a multi-function output which is automatically selected to be any of the following. Alternatively, the user can choose Sync to always be carrier referenced, to output the currently used trigger signal or turn it off.					
Carrier Waveform Sync:	Sine / Square / Ramp / Pulse / Arbs	≤ 28.125MHz A square wave with 50% duty cycle at the waveform frequency. ≤ 80MHz A sine wave at the waveform frequency.		≤ 62.5MHz A square wave with 50% duty cycle at the waveform frequency. ≤ 240MHz A sine wave at the waveform frequency.	
	Pattern	A positive pulse which is 1 bit rate wide at the beginning of the sequence			
	Noise	No sync associated with noise.			
Modulation Sync:	AM/FM/PM/SUM/ 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 and DC waveforms as the modulation source.			
	ASK	A square wave referenced to the trigger rate. The sync is a TTL high when hop amplitude is the output amplitude and TTL low when carrier amplitude is the output amplitude for positive slope and vice versa for negative slope.			
	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.			
	BPSK	A square wave referenced to the trigger rate. The sync is a TTL high when the hop phase is the output phase and TTL low when carrier phase is the output phase for positive slope and vice versa for negative slope.			
Sweep Sync:		A square wave that is a TTL high from the beginning of the sweep and a TTL low from the midpoint of the sweep			
Burst Sync:	Internal Trigger	A square wave with 50% duty cycle at the trigger frequency.			
	External Trigger	A square wave with same duty cycle and frequency as the external source.			
	Manual Trigger	A positive pulse which is approximately 18us wide at the beginning of the event.			
Trigger:		Selects the current trigger signal			
Output Signal Level:		Logic level nominally 3V			
Output Impedance:		50Ω			

7 - Specification

MODEL:	TGF4042	TGF4082	TGF4162	TGF4242
Ref Clock Output				
Buffered version of the 10MHz clock currently in use (internal or external)				
Output Level:	Nominally 3V logic level from 50Ω.			

Inputs		
Trigger / Count (DC) Input		
For ASK, FSK, BPSK, triggered sweep, gated burst, triggered burst and DC coupled external frequency measurement.		
Frequency Range:	Trigger Input	DC – 1MHz
	Counter Input	100mHz to >125MHz
Signal Range:		Threshold typically 1.2V; Sensitivity 100mVpp (≤50MHz), 250mVpp (>50MHz) Maximum input +5V / -1V.
Minimum Pulse Width (Trigger Input):		50ns
Polarity (Trigger Input):		Selectable as high/rising edge or low/falling edge.
Input Impedance:		10kΩ
External Modulation Input		
For AM, FM, PM, SUM and PWM		
Voltage Range:		± 2.5V full scale
Input Impedance:		5kΩ typical
Bandwidth:		DC to 5MHz
Ref Clock / Count (AC) Input		
Input for an external 10MHz reference clock and AC coupled external frequency measurement.		
Voltage Range:		≤50MHz 100mVpp – 5Vpp >50MHz 250mVpp – 5Vpp
Maximum Voltage:		+10V
Minimum Voltage:		-10V

Interfaces	
Full digital remote control facilities are available through LAN, USB and optional GPIB interfaces.	
LAN Interface	Ethernet 100/10base – T hardware connection. 1.5 LXI Device Specification 2016
USB Interface	Standard USB 2.0 hardware connection. Implemented as virtual-COM port.
USB Flash Drive	For waveform and set-up storage/recall.
GPIB (optional)	Conforming with IEEE488.1 and IEEE488.2

General	
Display:	4.3 inch (10.9 cm) transflective backlit TFT LCD, 480 x 272 pixels, 262144 colours, adjustable brightness and contrast.
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 internal memory.
Size:	Bench Top: 97mm height; 250mm width; 295mm depth Rack mount: 86.5mm (2U) height; 213.5mm (½–rack) width; 269mm depth
Weight:	3.2kg
Power:	100-240VAC ±10% 50/60Hz ; 100-120VAC ±10% 400Hz ; 60VA max. Installation Category II.
Operating Range:	+5°C to 40°C, 20–80% RH.
Storage Range:	–20°C to + 60°C.
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 2.
Options:	19 inch rack mounting kit.
Safety & EMC:	Complies with EN61010–1 & EN61326-1. For details, request the EU Declaration of Conformity for this instrument via http://www.aimtti.com/support (serial no. needed).

For details, request the EU Declaration of Conformity for this instrument via http://www.aimtti.com/support (serial no. needed).
General specifications apply for the temperature range 5°C to 40°C.
Accuracy specifications apply for the temperature range 18°C to 28°C after 30 minutes warm-up, at maximum output into 50Ω.
Typical specifications are determined by design and are not guaranteed.

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