



MOD745-OEM

Compact Digital Delay Generator

FEATURES

- Four high resolution delay channels
 - 0.25 ps resolution
 - < 25 ps RMS jitter (external trigger)
 - 5 ps RMS jitter (@ short delay)
 - 20 seconds delay range
- Option: Four auxiliary delay channels
 - 1.25 ns resolution
 - 20 seconds delay range
- Output up to 5 V, 1 ns rise time under 50 Ω
- Trigger sources: External, two Internal timers or Software
- Triggers rates: Single, repetitive, burst with gate and trigger prescaler features
- Compact packaging
- All parameters may be controlled via Ethernet or Internet or USB



APPLICATIONS

- Embedded OEM application
- ATE application
- System laser timing control
- Laser Pulse Picking
- Components test
- Instrument triggering
- Synchronization with selectable external clock frequency - Mode locked

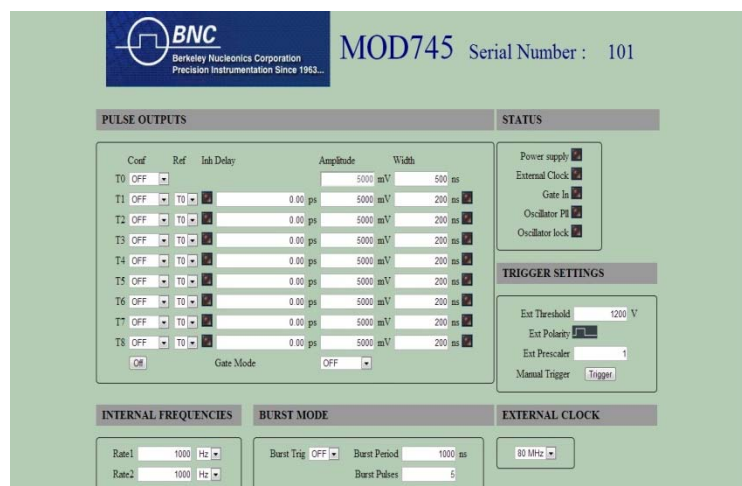
DESCRIPTION

The MOD745-OEM is a compact digital delay generator intended for use in embedded OEM applications. The delay generator provides four independent delay channels (T1 to T4). The delay resolution is 0.25 ps, and external trigger to channel jitter is less than 25 ps rms. MCX outputs deliver up to 5 V, 1 ns rise time, under 50 Ω . Amplitude and width are adjustable on each output pulse.

A T0 output pulse is also available. It gives a time reference for each generated delayed output. The device can be triggered by different ways: either with an external trigger via a MCX input or with 2 internal timers or with a software command trigger, each one with repetitive, single shot and burst trigger rates.

The MOD745-OEM also provides (as an option) four auxiliary delays channels T5 to T8. The delay resolution is 1.25 ns and trigger to channel jitter is less than 50 ps rms.

All the MOD745-OEM parameters can be controlled via Ethernet, Internet (Web page) or USB.



Mod745-OEM Web page

Control Panel Web page:

This web page, from an embedded Web server, provides a simple method to configure settings for each channel (delay, output amplitude, output width, trigger source, trigger mode), and to control operation and status of the instrument.

The configuration information of the instrument are stored and saved in the unit (Up to 4 different sets of unit configuration can be stored/recalled).

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SPECIFICATIONS

Delay (Channel T1 to T4)

Number	4 independent
Range	0 to 20 seconds
Resolution	0.25 ps
RMS Jitter	25 ps + delay x 10^{-7} (external trigger to any output) 5 ps for short delay (channel to channel)
Accuracy	< 250 ps + delay x 10^{-7}
Time base	0.5 ppm stability

Trigger source

Internal	Two tunable Timers in Hz or ns 1 Hz to 1 MHz, 1Hz resolution 1 μ s to 4 seconds, 5ns resolution
External	Repetition rate < 1 MHz Trigger Precaler: 1 to $2^{16}-1$ Trigger level: from 0.1 to 5 V / 50 Ω Trigger slope: Positive or negative Minimum trigger delay < 60 ns
Software	Command (From interface control)

Trigger mode

Burst specs.	Pulse number: 2 to $2^{16}-1$ Pulse Period: 1 μ s to 1 s in 5 ns step
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Output T0

5 V / 50 Ω , 200 ns to 10 μ s width

Output T1 to T4

Amplitude	2 to 5 V, 0.1 V resolution / 50 Ω
Width	100 ns to 10 μ s, 5 ns resolution
Rise / fall time	< 1 ns / 3 ns
Connector	MCX on board

Gate input

Threshold	1.5 V
2 settings:	Global or individual channel
Gate source	Active high, Rep rate < 100 kHz

External time base (CLK IN)

Frequency	10 MHz (up to 100 MHz as an option)
Min level	-3 dBm
Shape	Sine wave or square
Threshold	0 V, internal load, AC

Clock output

Frequency	10 MHz
Level	+/- 1 V under 50 Ω
Shape	square

Store/Recall Set

Up to 4 sets of parameters can be stored or recalled via Ethernet or USB

General specifications

Size	176 x 128 x 35 mm
Power	<25 W (+12 V: 0.6 A, +5 V: 3 A)

Interface control

Ethernet, Internet (web page)
or USB (serial link at 112 Kbit/s)

Option 1: 4 auxiliary delay channels (T5 to T8)

Delay

Number:	4 independents
Range:	0 to 20 seconds
Resolution:	1.25 ns
Jitter	< 50 ps RMS + delay x 10^{-7} (external trigger to any output)
Accuracy:	1 ns + delay x 10^{-7}

Output

Amplitude:	2 V to 5 V (common tuning)/ 50 Ω
Width:	100 ns to 10 ms
Rise and fall time	< 5 ns

Option 2: External Time base up to 100 MHz
(request when ordering from factory)

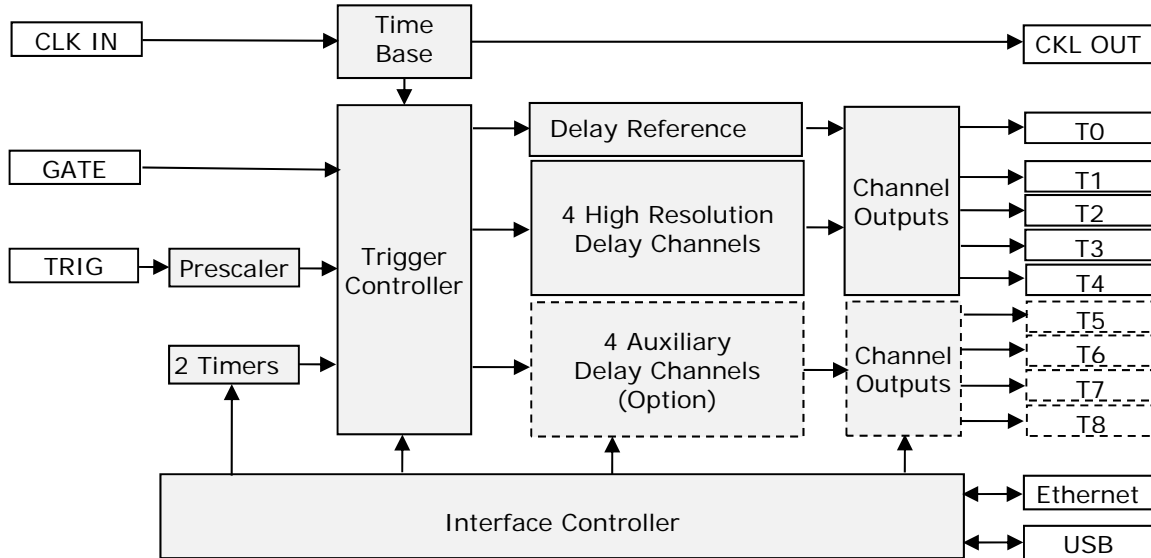
Option 3: Narrow Output pulse on T1 and T3 down to 10 ns; Adjustable in width and delay with 0.25 ps resolution

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OPERATING OVERVIEW

Block diagram



Time base

Time base is provided from internal clock reference or an external 10 MHz clock (CLK IN). As an option, the external clock can be up to 100 MHz. Time base is available on the CLK OUT connector.

Delay channel

They are four independent delay channels. The delay from the selected trigger source is adjustable up to 20 seconds in 0.25 ps increments.

Jitter: The following chart indicates typical RMS jitter at various delays:

Internal Trigger Mode	External Trigger Mode
Delays < 100ns : 2 picosecond	Delays < 100ns : 15 picoseconds
Delays > 100ns : 15 picosecond + time base	Delays > 100ns : 25 picosecond + time base

Triggering

The MOD745-OEM offers users several option for triggering Delay channels:

- Externally trigger on the positive or negative slope of your trigger signal and select level from 0.1 to 5.0 V. The trigger prescaler value applied to the external trigger goes from 1 to $2^{16}-1$.
 - Two internal Timer triggers are adjustable from 0.25 Hz to 1 MHz in 1 Hz increments.
 - Software trigger from remote command.
- Trigger rates can be repetitive or single.

Channel Outputs

Channel Output pulse can be independently adjustable in level and width. The outputs are designed to drive external 50 Ω load.

Burst mode can be set with pulse number = 1 to $2^{16}-1$ and pulse period = 1000 ns to 1 second.

Gate mode can be set to global or individual channel.

T0 Output pulse is a time reference and marks zero delay.

Interface Control

All parameters may be remotely controlled over Ethernet Network (or USB interface)

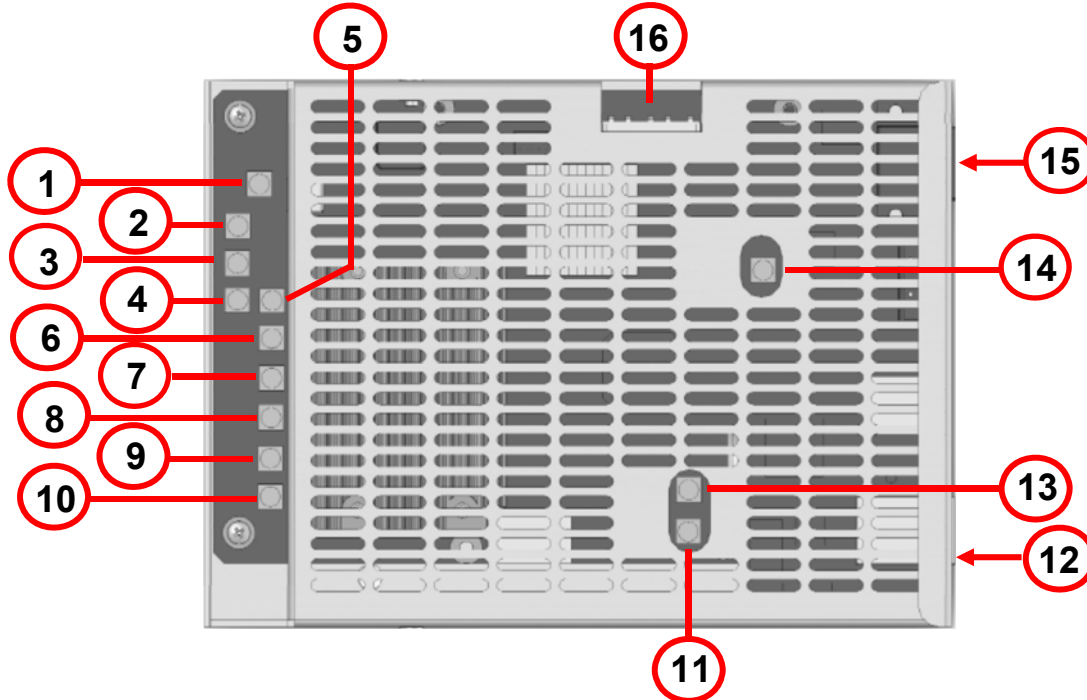
Model 745-OEM has an embedded Ethernet control interface software. This allows all parameters to be controlled by any PC with a browser. You will need only to enter the unit's IP address into the browser. The browser will automatically open a virtual control panel on PC.

“Narrow pulse option” allows the device to provide a pulse down to <10 ns width, on the output T1 and T3. The value of the width is adjustable in a step of 0.25 ps. The “narrow pulse” on T1 Output is obtained by mixing (AND function) T2 and T1 delay channel.

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INPUTS / OUTPUTS



Top view of the generator

Connectors, switch, Indicators

Connectors			
1	Trigger Input: MCX connector	9	T1 Output: MCX connector
2	T5 Output: MCX connector	10	T0 Output: MCX connector
3	T6 Output: MCX connector	11	Clock Input: MCX connector
4	T7 Output: MCX connector	12	Ethernet connection: RJ45 connector
5	T8 Output: MCX connector	13	Clock Out: MCX connector
6	T4 Output: MCX connector	14	Gate Input: MCX connector
7	T3 Output: MCX connector	15	USB interface: micro USB connector
8	T2 Output: MCX connector	16	Power input: AMP connector

ORDERING INFORMATION

Model	Description
MOD745-OEM	Base version: 4 high resolution delay channels
MOD745-OEM-8C	Option 1: Adds 4 Auxiliary channels
MOD745-OEM-NP	Option 3: Narrow Pulses on T1 and T3

ACCESSORIES (modules to provide specific output pulse shape)

Model	Description
GFT101	Electrical to optical Pulse Converter
GFT400	500 ps, 2 V under 50 Ω Pulse Generator
GFT500	200 ps, 4- 9 V under 50 Ω Step Generator
GFT632	32 - 70 V, 3ns rise time under 50 Ω Pulse Generator