

DG3000 SERIES/ DG4000 / TD3000 series Digital Pattern Generator user manual







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Chapter 1 Installation





ODC 12V

- **2**USB 3.0 Type B for computer
- OTrigger In
- **1** Trigger Out
- BReference Clock In
- GReference Clock Out

Flat Cable Installations

Push in: Hold the pod to face the slot of the master unit. Push the pod evenly into the slot until you hear the sound of click. Then, installation is completed.

Pull out: Use two fingers to simultaneously press the two connecting rods inside the slot, respectively, and the pod will pop out.



NOTE: For the convenience of describing the usage of DG flat cables, we need to define the meanings of some words, which is only used in this manual.

Considering the most of DG flat cables has two pairs of flat cable tip, each tip has 8 channels. Thus, we use these words to mention which pairs of flat cables we are talking with.

- 1. Tip Group 1: Ch.0 to Ch.15.
- 2. Tip Group 2: Ch.16 to Ch.31.

DG4000 series

DG4K-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series
•	•

The DG4K-pod flat cable can be used in any slot. It has 4 DG4K-pod flat cable tips,

each of which has 8 signal output channels.

Usage: The DG4K-pod flat cable is able to output the square waveform, which can be used to simulate the digital signal.





EV4K-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series
•	•

The EV4K-pod flat cable can be used in any slot. It has 4 tips, 2 tips are DG4K-pod flat cable tip; 2 tips are EV4K-pod flat cable tip.

Usage: The usage of DG4K-pod flat cable is described above. The EV4K-pod flat cable tip can take the signal from outside to trig the DG to send out the square waveform. To our design, DG will be trigged if the input signal is 'high'.



OE4K-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series		
•	•		

The OE4K-pod flat cable can be used in any slot. It has 2 OE4K-pod flat cable tips,

each tip has 8 channels for Hi-Z output.

Usage: In standard DG4K-pod flat cable, user can only set all the channels in tip group 1 or tip group 2 to Hi-Z. Instead, while using OE4K-pod flat cable, user can set the channels to Hi-Z respectively in both tips.





LVDS-pod Flat Cable (Option)

Supported Model:

DG3000 Series	DG4000 Series		
	•		

The LVDS-pod flat cable can be used in any slot. It has 2 LVDS-pod flat cable tips, each of which has 8 signal output channels.

Usage: The LVDS-pod flat cable is similar to the DG/DG4K-pod flat cable, both can output the square waveform. But LVDS-pod flat cable will output differential signal for the need of LVDS.



DG3000 SERIES series

DG-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series
•	•

The DG-pod flat cable can be used in any slot. It has 4 DG-pod flat cable tips, each of which has 8 signal output channels.



Usage: The DG-pod flat cable is able to output the square waveform, which can be used to simulate the digital signal.



Event-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series
•	•

The Event-pod flat cable can be used in any slot. It has 4 tips, 2 tips are DG-pod flat cable tip; 2 tips are Event-pod flat cable tip.

Usage: The usage of DG-pod flat cable is mentioned above. The Event-pod flat cable tip can take the signal from outside to trig the DG to send out the square waveform.

To our design, DG will be trigged if the input signal is 'high'.





OE-pod Flat Cable

Supported Model:

DG3000 Series	DG4000 Series
•	•

The OE-pod flat cable can be used in any slot. It has 3 tips, 2 tips are DG-pod flat

cable tip;1 tip is OE-pod flat cable tip, which has 8 channels for Hi-Z output. **Usage:** In standard DG-pod flat cable, user can only set all the channels in tip group 1 or tip group 2 to Hi-Z. Instead, while using OE-pod flat cable, user can set the channels in the OE-tip to Hi-Z respectively.



TD3000 series

18.5cm lead cable

※ Only provide by TD3000 series

TD3000 has 16 channels for data output; 1 channel for clock out (CKO); 1 channel for clock in (CKI) and 3 channels for event input (Ev0~2).





Software installation

NOTE: Since 2024, we will not provide x86(32 bit) software, only x64(64 bit) software. Whoever needs x86 software, please contact us.

Please visit the official website of Acute Technology Inc., go to the Download page->Software, and then select *[Digital Pattern Generator] Data Generator / TravelData* to download the Data Generator. After completion of installation, the "start icon" of Data Generator will appear on the desktop and the program set. You can select either one to start TD3000 Series /DG3000 Series /DG4000 Series (

SDK

We provide SDK for user to control DG software. Please check the sample codes in the DG_installPack/DG/SDK or DG_installPack/DG/Protocol SDK; Or contact us with e-mail.

Specifications

DG4000 series

Model			DG4064B	DG4096B	DG4128B
Power		Power	12V Power Adapter		
		Source			
		Static Power	9W	12W	18W
		Consumption			
		Max Power	24W	30W	36W
		Consumption			
Hardware Interface			USB 3.0		
Slot/Pod(1 Slot	Avaliabel Slot	S	2	3	4
for 1 Pod) Avaliable Data		a Output	48	80	112 ^{*2}
	Channels (DO	64K pods)			
	Standard pod	(s):	1/1/1/0	2/1/1/0	3/1/1/0



	DG4K/OE4K/	EV4K/LVDS ^{*1}			
	Avaliable DG4K pod		32ch@300Mbps,		
	Channels @		16ch@600Mbps, 8ch@1.2Gbps,		
	Max.		4ch@2.4G	bps	
	Internal	LVDS pod	16ch@300	Mbps,	
	Clock		16ch@600	Mbps, 8ch@)1.2Gbps,
			4ch@2.4G	bps	
		OE4K/EV4K	16ch@300	Mbps, 8ch@)600Mbps,
		pod	4ch@1.2G	bps, 2ch@2	.4Gbps
DG4K-tip (Output	Max. Output [Data Rate	700Mbps (350MHz)	
ch, for	Min. Output V	oltage at	0.9Vpp @	<= 40Mbps,	1.2Vpp @
DG4K/EV4K-pod)	different data	rates	<= 400Mbp	os, 1.5Vpp @)) <=
			500Mbps, 3	3.3Vpp @ <	= 700Mbps
	Output Voltag	e Range	0.9Vpp ~ 5.0Vpp		
	Rising Time		300ps @ 3.3V		
	Impedance		CMOS with 20Ω		
	Fan out		20mA/ch		
OE4K-tip (Output	Max. Output Data Rate		700Mbps (350MHz)	
ch, for OE4K-pod)	Min. Output Voltage at		0.9Vpp @	<= 40Mbps,	1.2Vpp @
	different data rates		<= 400Mbps, 1.5Vpp @ <=		
			500Mbps, 3.3Vpp @ <= 700Mbps		
	Output Voltag	e Range	0.9Vpp ~ 5.0Vpp		
	Rising Time		300ps @ 3.3V		
	Impedance		CMOS with 20Ω		
	Fan out		20mA/ch		
LVDS-tip (Output	t Max. Output Data Rate		1.2Gbps (6	00MHz)	
cn, for LVDS-pod)	Output Voltage		±350mV*5		
EV4K-tip (Input	Channel (LA/Clk In)		16 / 1		
ch, for	Max. Frequency		200MHz		
EV4K-pod) ^{*3}	Threshold		-0.5V ~ 4.	5V @ 0.1V	Resolution



	Input Voltage	+15V DC +	AC peak(M	ax)	
(Non-destructive)					
			1MO 5pE		
Sopoitivity					
	Sensitivity	~300mV			
Internal Clock	Range	1Hz ~ 2.4G	Hz ^{*4} (Period	ld: 1s ∼	
Generation		416ps)			
	Resolution	6 digits, Mi	n. 1Hz		
External Clock	Range	<= 200MHz	<u> </u>		
Generation					
Memory per Chann	el	256Mb			
Phase Tunning Del	ayed	Depend on	Internal Clo	ck, Min.	
		416ps			
Temperature Opera	ating / Storage	5°C~45°C	5°C~45°C (41°F~113°F) / -10°C		
		~65 ℃ (14°F~149°F)			
Event	Internal	Hot Key			
External (Channel / Mode /		16 / Logic A	AND OR / -0	.5V ~ 4.5V	
	Threshold)				
Software Feature	Language	English / Tranditional Chinese /			
		Simplified 0	Chinese		
	Data Pattern File Format	DGW / DGV / VCD / CSV			
	Regular Waveform	Sync. Counter, Asnyc. Counter,			
	Generator	I2C, MIPI I3C, REFE, PMBus,			
		PWM, SPI			
	Flow Control	Loop / Jump / Hold / Wait For			
		Event			
Accessories (Gripper / Flying Lead Cable)		80 / 10	120 / 14	160 / 18	
Device Dimension		(L)270mm x (W)175mm x			
		(H)55mm			
Weight Device / Ac	800g / 1850g				

¹ DG: Single Ended; OE: Output Enable; EV: Event; LVDS: Low Voltage Differential

Signal



² Only a half channels are available for the D slot

³ A half EV pod's channels (EV4K-tip) are inputs, the other half channels (DG-4K tip)

are DG outputs

⁴ Max. 6 digits value adjustment

 5 The DUT (Device Under Test) inputs must be terminated by the 100 Ω termination

resistor.

DG3000 series

Model			DG3064B	DG3096B DG3128B				
	Power S	Source		12V Power adapted	er			
Power	Static Po Dissipat	ower ion	9W	12W	18W			
	Max. Po Dissipat	wer ion	24W	30W	36W			
Hardware Inte	erface			USB 3.0				
Number of Ou	utput Chan	nels	48	80	112			
Memory	Total Me	emory Size		32Gb				
Merriory	Pattern	Depth		256Mb/ch				
Data Rate				400Mbps (Max.)				
	Internal	Range		1Hz ~ 400MHz				
Operation	пцетта	Resolution		6 digits				
Clock	External	Clock Range	<200MHz					
	External	Input Channels	1 Channel (TTL3.3V)					
Data Flow Co	ontrol		Loop, Jump, Hold, Wait for Event					
Deried litter	Clock Cha	annel	< 200ps					
Period Jiller	Data Cha	nnel	< 200ps					
	Internal		Hot Key					
Event		Channels		16				
Eveni	External	Mode	L	ogic AND / Logic (OR			
		Threshold	-0.5V ~ 4.5V					
Phase	Channels		All					
Tuning Delayed	Time		> 300Mbps : No, < 300Mbps : 8 Phases from 0 to 1UI					
Temperatur e	Operating	J/Storage	5°C~45°C (41°F~113°F) / -10°C~65°C (14°F~149 °F)					
	Language	es	English / Tradit	tional Chinese / Si	mplified Chinese			
Software Features	Save & Lo Waveform	oad า	Yes					
	Regular V	Vaveform	Synchronous / Asynchronous Counter, I2C, MIPI					



	Generato	r	I3C, MIPI RFFE, PMBus, SPI/SIPI,					
	Waveforn Interface	n Editing	Waveform Drawing/Script File					
Device Dimension	LxWxH	l (mm³)		270 x 175 x 55				
Weight	Device / A	Accessories		800g / 1850g				
	DG-pod / OE-pod	Event-pod /	1/1/1	2/1/1	3/1/1			
Flat Cable	Flying lea DG (DG) / Event) /OE	id cable: Event (DG, E (DG, OE)	4 / 2, 2 / 2, 1	8 / 2, 2 / 2, 1	12 / 2, 2 / 2, 1			
	Grippers		80	120	160			
	Channels	;		32 for DG / 24 for	OE			
	Data Rate	Э		400Mbps (Max.)			
	VoL			0V				
	VoH min. Flat Cable	for DG-pod e	0.8Vpp @ <= 50Mbps, 1.2Vpp @ <= 300Mbps, 1.5Vpp @ <= 400Mbps					
DG-pod Flat	VoH min. Flat Cable	for OE-pod e	1.1Vpp @ <= 50Mbps, 1.3Vpp @ <= 300Mbps, 1.5Vpp @ <= 400Mbps					
Cable/	VoH max	-	5.0V					
Cable	Min. Pulse	Width	2.5 ns					
	Impedanc	ce	CMOS with 20 Ohms					
	Fan Out		20mA/ch					
	Output	DG-pod Flat Cable	2 Group O.E. (16ch/O.E. * 2 = 32ch) ^{*1}					
	Enable	OE-pod Flat Cable	1 Group	O.E. + 8ch Indepe (16ch+8ch=24ch	endent O.E.) ^{*2}			
	Channels			16 (DG) + 16 (Eve	ent)			
	Frequenc	;y	200MHz (Max.)					
	Operation	1	-1V~8V @ 0.1V Resolution					
Event-pod Flat Cable	Input Volt (Non-des	age tructive)	±15V DC+AC peak (Max.)					
	Minimum	Pulse Width		2.5 ns				
	Sensitivit	y		~300mV				
	Impedance	ce		1M 5p				

¹OE Bus: Controls the output of a group of buses with a width of 16 channels each.

²OE Channel: Controls a single channel



TD3000 series

Model			TD3008E	TD3216B				
	Power Sc	ource		USI	З 3.0			
Power	Static Pov Dissipatic	wer on	2.5W					
	Max. Power Dissipation		4.5W					
Hardware In	terface			USI	З 3.0			
Number of C	Output Cha	nnels	8		1	6		
Memory	Total Men	nory Size	4Mb	16	Mb	4Gb		
Merriory	Pattern D	epth	512Kb/ch	1Mt	o/ch	256Mb/ch		
Data Rate			100Mbps (Max.)		200Mbp	s (Max.)		
	Internal	Range	1Hz ~ 100MHz		1Hz ~ 2	200MHz		
Operation	Internal	Resolution		6 d	ligits			
Clock Svstem	External	Clock Range	<100MHz		<200	MHz		
- ,	External	Input Channels	1 Channel (TTL3.3V)					
Data Flow Control			Loop, Jump, Hold, Wait for Event					
Dariad littar	Clock C	hannel	< 200ps					
	Data Ch	annel	< 200ps					
Temperatur e	Operatir	ng/Storage	5℃~45℃ (41°F~113°F) / -10℃~65℃ (14°F~149°F)					
	Langua	ges	English / Traditional Chinese / Simplified Chinese					
0 - #	Save & Wavefor	Load m	Yes					
Features	Regular Generat	Waveform or	Synchronous / Asynchronous Counter, I ² C, MIPI I3C, MIPI RFFE, PMBus, PWM, SPI,					
	Wavefor Interface	m Editing	Waveform Drawing/Script File					
Device Dimension	L x W x	H (mm³)		123 x	76 x 21			
Weight				68	30g			
Lead Cable Event / GND / N	(Data / CLK-IN .C.)	N/CLK-OUT/	A 40-pin le	ad cable	(16 / 1 / 1	/ 3 / 18 / 1)		
Grippers			20		4	0		
	Channels		8 with OE		16 with OE			
Data	Data Rate	e	100Mbps (Max.)		200Mbp	s (Max.)		
Output	Group		1 (ch0~7 & CKO)	2 (c	h0~7 & C	KO, ch8~15)		
	VoH min.		0.8Vpp @ <= 15Mbps 0.8Vpp @ <= 15Mbps,					



			1Vpp @ <= 100Mbps	1Vpp @ <= 100Mbps, 1.1Vpp @ <= 200Mbps			
	VoH max		4.5V				
	VoL		()V			
	Min. Pulse	Width	10 ns	5 ns			
	Impedance	e	CMOS wit	th 20 Ohms			
	Fan Out		20mA/ch	@ 50 Mbps			
	Output Er	nable	All ch	annels			
	Internal		Hot Key				
		Channels	3				
		Mode	Logic AND / Logic OR				
		Threshold	-4V ~ +6V				
Event		Frequency	200MHz (Max.)				
Input		Operation	-10\	/~10V			
	External	Non Destructive	±30V DC, 12Vpp A	C (Non-destructive)			
		Min. Pulse Width	5	ns			
		Sensitivity	1.	.5V			
		Impedance	200KΩ 7pF				



Chapter 2 Operation

👼 Acute Data Generator (Version:2.0.52) \times Н Ø C_p 1 🜏 English. Open File Save File Save All Option H/W Configuration Utility 5 DGW/TDW Operation Mode Working Frequency VCD 1x 200.000000 + Mbps ┍ ▼ 50.000ns x1 Conventional format (112 Channels) Protocol TXT Bus Protocol Select Verilog - Value Change Dump (*.VCD) File 12C MIPI I3C 💌 😑 🗹 Repeat Count **MIPI RFFE** PMBus Label Channel SPI/SIPI General **PWM** 3 ЛГ Waveform Editor 🛛 🗸 Output Level 🔹 🕨 Run 🕨 Repeat 💌 Adv. Settings 🖨 time(s) Channel settings in Empty Slot 4 Connected SN: DGB41280005 (DG4128B - USB 3.0) Status: Standby

It will show as the following after executing software.

Tool Bar

 Open File ∶ Open *.DGP file.

Save File : Save *.DGP file (current protocol settings).

Save All:Save *.DGP file (current all protocol settings).

Languages: Display language. You can select English, Traditional Chinese, or

Simplified Chinese

Option : System environment settings. Here you can set the working directory,

the label

height and hot key.

Utility : / Protocol / General: / Gener



Waveform Editor



Open New page on Waveform Editor:Switch to the Waveform Editor, you can

draw

waveform by manual.

1 Convert current plugin settings (waveform) to Waveform Editor (Single).

Convert current plugin settings (waveform) to Waveform Editor (Repetitive).

4

Output Level : Adjust the output voltage.

6

- Operation Mode: Set the Convention format (x1, x2, x4, x8), which will influence the final output frequency.
- Working Frequency: set the device working frequency, maximum is 300Mbps.

※ Ex. Output frequency = 150Mbps × x4 Conventional format = 600Mbps = 300MHz



DG4000 series : Set DG4K / EV4K / OE4K / LVDS / DG / EVENT / OE POD

output/input voltage.

👼 H/W Configuratio	n				×		
Operating Mode		Probe Configu	uration (Maximum Available C	channels: 128)			
Tin	Working Enguancy Multiple Easter 1 x		/				
	Available Channel Number: 96		С	D	DC Tin with Group controlled Output Enable		
	Command Availability: Every points Crown controlled Output Enable: Supported		•	P	OE Tip with individual Output Enable Event Tip for input		
	Group controlled output Enable. Supported		A	В	LVDS Tip for differential output		
Clock Mode	Internal						
CIUCK MODE	internal •		DO #K BOD		Quick Setup		
Maddan Francisco			DG4K-POD	Output Level: 3.30 V			
working Frequency	(10ps - 300mbps, resolution: 6 digits)	SIOTA 😈	DG 16 - 23 DG 24 - 31	Output Level: 3.30 V			
			DG POD		_		
	1 X 200.000000 Mbps = 200Mbps	Slot B 👔 🖡	DG 0 - 7 DG 8 - 15	Output Level: 3.30 V			
			DG 16 - 23 DG 24 - 31	Output Level: 3.30 V			
Device Memory		. Г	OE4K-POD				
	10 M points (3.91%)	Slot C 🕧	OE 0 - 7	Output Level: 3.30 V			
-		Ľ	OE 8 - 15	Output Level: 3.30 V			
			EV4K-POD	Output Level: 3 30 V			
		Slot D 🕡	EV 0 - 7 EV 8 - 15	Threshold: 1.60 V			
					■ VOK ¥ Cancel		
					Quick Setup		
	DG4K-POD						
		ut Loval:	2 20 V				
SlotA 🚺		ut Level.	5.50 V				
	DG 16 - 23 DG 24 - 31 Outp	ut Level:					
	DG POD				_		
Slot B	DG 0 - 7 DG 8 - 15 Outp	ut Level:	3.30 V				
	DG 16 - 23 DG 24 - 31 Outp	ut Level:	3.30 V				
	OF4K-POD						
Slot C 👔	OE 0 - 7 N/A Outp	ut Level:	3.30 V				
	OE 8 - 15 N/A Outp	ut Level:	3.30 V				
					-		
	EV4K-POD						
	DG 0 - 7 DG 8 - 15 Outo	ut Level:	3 30 V				
SIOLD 🚺				_			
	EV 0 - 7 EV 8 - 15 Thre	shold: 1.(60 V				



DG3000 series : Set DG4K / EV4K / OE4K / DG / EVENT / OE POD output/input

voltage.

B H/W Configuration				×
Operating Mode Probe Timestamped format (96 Channels)	be Config	uration (Maximum Available Ch	annels: 128)	
Working Frequency Multiple Factor: 1 x Available Channel Number: 96		с	D	DG Tip with Group controlled Output Enable
Command Availability: Every points Group controlled Output Enable: Supported		A	B	OE Tip with individual Output Enable Event Tip for input LVDS Tip for differential output
Clock Mode Internal 💌				Quick Setup
Working Frequency (1bps - 300Mbps, resolution: 6 digits) SlotA	A 🚺	DG4K-POD DG 0 - 7 DG 8 - 15 DG 16 - 23 DG 24 - 31	Output Level: 3.30 V Output Level: 3.30 V	
1 x 200.000000 Mbps = 200Mbps interval 5ns Slot B	в 🚺	OE4K-POD OE 0 - 7 N/A OE 8 - 15 N/A	Output Level: 3.30 V Output Level: 3.30 V	
Device Memory 10 M points (3.91%) Slot C	c 🚺	DG POD DG 0-7 DG 8-15 DG 16-23 DG 24-31	Output Level: 3.30 V Output Level: 3.30 V	
Siot D	D 🚺	EV4K-POD DG 0 - 7 DG 8 - 15 EV 0 - 7 EV 8 - 15	Output Level: 3.30 V Threshold: 1.60 V	- 1
				V OK 🗙 Cancel

Operating Mode :

Operating Mode	
	Timestamped format (96 Channels)
	Timestamped format (96 Channels)
	x1 Conventional format (112 Channels)
	x2 Conventional format (56 Channels)
	x4 Conventional format (28 Channels)
	x8 Conventional format (14 Channels)

Timestamped format (96 Channels):

Enable the repeat count function, the maximum output rate is 300 Mbps.

x1 Conventional format (112 Channels):

Disable the repeat count function, the maximum output rate is 300 Mbps.

x2 Conventional format (56 Channels):

Enable the x2 base frequency, the maximum output rate is 600 Mbps.

x4 Conventional format (28 Channels):

Enable the x4 base frequency, the maximum output rate is 1.2 Gbps.

x8 Conventional format (14 Channels):

Enable the x8 base frequency, the maximum output rate is 2.4 Gbps.

TD3000 series : Set CH0~CH15/Ev0-2/CKO/CKI output/input voltage.



7 H/W Configuration	×
	Probe Configuration (Maximum Available Channels: 16)
Clock Mode Internal]
Working Frequency (1bps - 200Mbps, resolution: 6 digits)	0 1 2 3 4 5 6 7 CKO 8 9 10 11 12 13 14 15 Ain Ev1 CKI
200.000000 Mbps 🔻 = 200Mbps	
interval 5ns	·
	Quick Setup
Device Memory 10 M points (3.91%)	Ch 0 - 7 / CK 0 Output Level: 3.30 V
1	Ch 8 - 15 Output Level: 3.30 V
	Input Channels Ev0-2/CK1 Output Level: 1.60 V
	✓ OK X Cancel

Clock Mode : select Internal / Clk-In (MCX port) / CLK (I) or CKI.

- Internal: select the internal clock.
- **Clk-In (MCX port):** select the Clk-In of MCX port to input the external clock signal.

DG3000 Series/4000 Series Clk-In (MCX port)

3 4 O O Trig-In Trig-Out		Cik-In Cik-Out	
	100000		

TD3K Clk-In (MCX port)



This specification is TTL3.3V, the input voltage must be higher than 2.4V (identified as 1), DG3000 Series / DG4000 Series / TD3000 Series can work normally in External Clock mode, and the maximum input frequency is 200 MHz.



CLK (I):

DG4000 Series CLK(I)



The input voltage is adjustable, and the input voltage range is $-0.5V \sim 4.5V$. TD3000 Series CKI

-										r							<u>-</u>		
0	1	2	3	4	5	6	7	CKO	8	9	10	11	12	13	14	15	Ain	Ev1	скі
G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	Ev0	Ev2

The input voltage is adjustable, and the input voltage range is $-5V \sim 5V$.

Run : Output the waveform once.

Repeat: Output the waveform 1~∞ times..



3Utility

DGW/DGV

This function can output the waveform from the waveform file of DG3000 Series

/DG4000 Series /TD3000 series (*.DGW/*.TDW/*.DGV).

VCD

This function can output the waveform from Value Change Dump (*.VCD).



I2C



Channel : Select SCK/SDA channel.

212C Addressing : Select 7-bit Addressing/8-bit Addressing (include R/W in

Address)/10-bit Addressing.

●I2C Speed (bit/s) : Range: 10 bps ~ 50 Mbps.

④I2C Data(Hex) :



Sample : Generate I2C data.

Clear : Clear I2C data.

€I2C data format :

Aw/Ar: I2C Address Write / Address Read.

D: I2C data.

MIPI 13C

Each I2C data is separated by a comma (,) and each row ends with a semicolon (;).

GACK/NACK: Simulate the slave behavior, but only available while the "Disable

Hi-Z" being checked in Advance Setting.

B Acute Data Generator (Version:2.0.52)			- (- X
Open File Save File Save All		0	English	∩ ↓ Option
Utility DGW / TDW VCD Protocol TXT View Protocol I2C MIPI ISC MIPI RFFE PHIBUS SPI/SIPI SPI/SIPI	Channel 1 SCL A0 0 SDA A18 0	I3C Frame	5 Next Action Frame BoardC Directe Privat I2C Mess	Sample ast ed sage
			Packet RESTAL CCC Com Addres DATA	RT mand ss
Waveform Editor	Speed and Timing Setup OD Speed 400.00 + KHz + PP Speed 1.00 + MHz + Timing Setup Enable Multiple Freq. 4		HDR HDR RES HDR D/ HDR TS HDR TS HDR C HDR E Clear All P	TART ATA SP SL RC KIT attern 6
Channel settings in Empty Slot Connected (SN: DGB41280005 (DG4128B - U	SB 3.0) (Status: Standby)	Adv. Settings 🛛 🗍 V Output Level Output Level 📀 Run 🕑 I	Repeat ∞	time(s)

Channel: Set SCL/SDA channel.

2Speed Setup: Set the speed.

③Timing Setup: Detail timing setting.



👼 Timing Parar	meters			×
12C Timing P	auiromonto Whon Communi	acting With IOC	Logoor Devices (Unit pr	
ISC TITILITY RE			Legacy Devices (Onit. Its	"
tSU_STA	600.00	tHD_STA	600.00	
tLOW	1250.00	tHIGH	1250.00	
tSU_DAT	625.00	tHD_DAT	625.00	
tSU_STO	600.00]		
- I3C Open Dra	in Timing Parameters (Unit: n	s)		
tLOW_OD	1250.00	tHIGH	1250.00	
tSU_OD	625.00	,]		
tCAS	40.00	tCBP	20.00	
-I3C Push-Pull	Timing Parameters for SDR I	Mode (Unit: ns)		
tLOW	1250.00	tHIGH	1250.00	
tSCO	40.00]		
tSU_PP	625.00	tHD_PP	5.00	
tCASr	20.00	tCBSr	20.00	
			ок Х	Cancel

④Enable Multiple Frequency: Enable multiple frequency function while being checked.

SNext Action/Sample: Add some I3C template.

OClear All Pattern: Clear all appended template.

MIPI RFFE

Acute Data Generator (Version:2.0.52)									-	o x
Open File Save File Save All								0	Englis	h, 🧠
CDW/TDW DGW/TDW VCD ProtocolTXT C]mm(Protocol	Channel 1 SCLK A0 SDATA A16	MIPI RFFE Settings COMMAND SEQUENCES Register 0 Write	3	T						
I2C				PARITY	4					
MIPTISC		Slave Address(SA)	A	Auto 🜲						
PMBus		Register Address	0	Auto 🜲						
General		Upper Register Address	0	Auto 🤤						
PWM		Lower Register Address	0	Auto 😂						
		Byte Count(BC)	0	Auto 🗘						
		Data0	7	Auto 韋						
		DATA(LSB)	0	Auto 拿	_					
		Register Mask	0	Auto 🤤	6					
		Page Address	0	Auto 🤤	🕂 Data Data1	-15(p)]	
		MID			SCLK Duty Cy	cle(%)	Samples			
		MID1 MID0 P	arity Auto 😂		50 🗢		Non			
		Clock Count) Du	ration 130	00 ns	- 6	+7	7 Append 🛉 I	nsert	
		Packets								
		Duty Cycle MI	D1/0(P) S	A(P)	COMMAND	BC(P)	ADDRESS(P)	MASK	D/ ^	Move Up
	Speed	1 50%	A	Reg	pister 0 Write	-		- 1	7(1) M	ove Down
Waveform Editor	U	2 50% -	A	Reg	gister 0 Write	-	-	- 1	7(1)	9
	20.00 🕂 M Hz 👻	•								
Channel settings in Empty Slot			A	dv. Settings	utp	ut Level O	utput Level 📀	Run 🕑 F	Repeat 👓	😫 time(s)
Connected SN: DGB41280005 (DG4128B - US	B 3.0) Status: Standby									

●Channel : Set SCLK/SDATA channel.

Speed : The maximum speed is 100 MHz.



3MIPI-RFFE COMMAND SEQUENCES

- 1. REGISTER 0 WRITE
- 2. REGISTER WRITE/READ
- 3. EXTENDED REGISTER WRITE/READ
- 4. EXTENDED REGISTER WRITE/READ LONG
- 5. INTERRUPT SUMMARY AND IDENTIFICATION
- 6. MASKED WRITE
- 7. MASTER OWNERSHIP
- 8. MASTER WRITE/READ
- 9. MASTER CONTEXT TRANSFER WRITE/READ

OPARITY : It will generate the parity automatically when select AUTO and become

red color when select invalid parity.

GDATA : Append data when the quantity > 1 byte.



ODuration : Set the Idle time, the minimum idle time is 5 ns, 0 means no idle time.

Append : Append a new packet in the list.

Solution: Insert a new packet after the selection.

Move up/ Move Down/ Delete Selected : Move up/move down/delete the selection.



PMBus

👼 Acute Data Generator (Version:2.0.52))				-	o x
Open File Save File Save All					🔇 Englis	h 🗸 🐁 Option
✓ SUtility DGW / TDW VCD Protocol TXT ✓ Bon Protocol I2C MIPI I3C MIPI RFFE PMBus SPI/SIPI ✓ General PWM	Channel SCK SDA A16 Channel A0 Channel A0 Channel A0 Channel A0 Channel SDA A0 Channel A0 Channel SDA A16 Channel A0 Channel SDA A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel A16 Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Chann	PMBus Settings Packet Types G Packet Setting Device Count Address 1 00h V Address 2 00h V Address 3 00h V Address 4 00h V Bus Idle Time E PMBus Pattern ADDR	3 roup Command Protocology 1 Command 1 D0 00h v 00h Command 2 00h v 00h Command 3 00h v 00h Command 4 00h v 00h Command 4 00h v 00h Command 4 00h v 00h	Image: solution of the second state	Disable PEC D2 D3 00h ▼ 00h 5 ◆ Append SK ▲ Move E	▼ ▼ ▼ ▼ ● ● ● Insert
	100.00 🔹 K Hz 🗸				Delete S	elected
Channel settings in Empty Slot	Adv. Settin	ings 👖 V Ou	tput Level Output Leve	el 🜔 Run 🤇	▶ Repeat ∞	主 time(s)
Connected (SIV. DGB41280005 (DG4128	Status: Stand	by				, iii

Channel : Select SCK/SDA channel.

2PMBus Speed : Set PMBus protocol speed, its range is 1 KHz ~ 100 MHz.

BPMBus Settings :

Packet Types: Select PMBus packet, each packet has different frames, it will

show these frames on the following section.

4 Bus Idle Time : Set the Idle time, the minimum idle time is 5 ns, 0 means no idle time.

SAppend : Append a new packet in the list.

6 Insert : Insert a new packet after the selection.

Move up/ Move Down/ Delete Selected : Move up/move down/delete the selection.



SPI/SIPI					
👼 Acute Data Generator (Version:2.0.52)					– 🗆 X
Open File Save File Save All				0	English 🔩 🔩
VCD Protocol TXT VCD Protocol TXT MIPI I3C MIPI I3C MIPI RFFE PMBus SPVSIPI VCC General PWM Waveform Editor	Type 1 4 Wire-SPI Channel 2 /CS(/SSC) A0 SCK A1 SDI A2 SDO A16 Word Size (4~40) 3 8 bit(s) SPI/SIPI Speed 4 100.00 K K	 ▼ ↓ ↓	SPI/SIPI Data Settings 5 SPI Data (Hex, e.g. 1A2B 3C) 1A2B 3C 4D 5E 6F SIPI Clock Number 12 SIPI Load from file (Bin/Txt): → CS Le SDI(Write)-Latency-SDO(Read) Write Length 0 Write Length 0 7 Frame Guard Time 0 7 Data Patterns 0 7 Data Patterns 0 1 1A2B 3C 4D 5E 6F 70 80 3 1A2B 3C 4D 5E 6F 70 80 3 1A2B 3C 4D 5E 6F 70 80 1 1A2B 3C 4D 5E 6F 70 80 1 1 Convert to Loop when idle time >= 10	Data (Hex) F64 ngth (for Bin/Txt F Latency () (Bits) ns = Overwrite () BUS IDLE 1 ms 1 ms 1 ms 1 ms 1 ms	ile) 16 V Byte(s) 6 7 Append Insert Move Up Move Up Move Down 8 Delete Selected
Channel settings in Empty Slot Connected SN: DGB41280005 (DG4128B - US	3B 3.0) Status: Standby		Adv. Settings IV Output Level Output Level	🕨 Run 🌔 R	≷epeat <mark>∞ time(s)</mark>

●Type: 4 Wire-SPI, 3 Wire-SPI, 3 Wire-SPI (Unused Chip

Slave), 2 Wire-SPI (Unused Chip Slave) and SIPI included.

Channel : Select Chip Select/SCK/SDI/SDO channel.

\textcircled{B} Word Size: Select the word size, its range is 4 ~ 40 bits.

GSPI/SIPI Speed : Set SPI/SIPI protocol speed, its range is 1Kbp ~ 100Mbps.

GSPI/SIPI Data Settings

- SPI Data: Only hex format supported.
- SIPI Clock/Data: SIPI clock number and SIPI data.
- Load from file: The bin/txt file format supported, selecting the type before loading file.
- SDI(Write)-Latency-SDO(Read): Set SDI-Latency-SDO mode, the parameters are as the following:
 - 1. Write Length: Write character width.
 - 2. Read Length: Read character width.
 - 3. Latency: Latency width.
 - 4. Frame Guard Time: Interval time.
- Bus Idle Time : Set the Idle time, the minimum idle time is 5 ns, 0 means no idle



time.

GAppend : Append a new packet in the list.

Insert ∶ Insert a new packet after the selection.

3 Move up/ Move Down/ Delete Selected : Move up/move down/delete the selection.

OVerwrite: Overwrite the selected data with the new SPI data.

General

PWM

acute Data Generator (Version:2.0.52)			- 0 ×
Open File Save File Save All			😵 English 🗸 🐁
Open File Save File Save All Utility DGW/TDW VCD Protocol TXT Protocol TZC MIPI I3C MIPI RFFE PMBus SPI/SIPI General PWM	Channel 1 PWM Channel A0 2 Duty 2 Duty Cycle 50.0 \div % 1 % Duty Step (2 MHz Max. Freq.) 0.1 % Duty Step (200 KHz Max. Freq.) Speed 3	PWM Patterns Channel Puend	English Option
Waveform Editor	1.00 [★] K Hz ↓	•	Þ
Connected SN: DGB41280005 (DG4128B - U	Adv. Settings	V Output Level Output Level Dutput Level	Pepeat ∞

1PWM Channel: set the PWM channel.

2 Duty Cycle: set the PWM Duty Cycle •

Speed: set the PWM speed, Range: 100 Hz ~ 2 MHz.

• Append: append the settings in the PWM pattern list.

Solution Move Down/ Delete Selected: Move up/move down/delete the selection.



₩aveform Editor

😹 Acute DG Waveform Editor (Version: 2.0.52) - [Unitilied] — 🗆 X
DG_Function NP Report Court 0
Repeat Repeat Count 0 CH-00 A0 0
CH-02 A2 0 S(55) 275ns
4 E(75) 375ns D(20) 100ns
Label Channel Value
Connected [SN: DGB41280005 (DG4128B - USB 3.0)] [Standby] 5
Tool Bar
New Page : Empty the waveform.
Open File : Open the *.dgw/*.dgv/*.tdw file.
Save File : Save the settings and waveform as a *.dgw/*.dgv file.
Dundo 🖸
C Redo
Шъ
Drag Waveform : Switch the mouse operation to the drag mode.
Auto : Switch the mouse operation to the auto mode
Conv : Conv the selected waveform to the clipboard
Cut : Cut the colored waveform to the clinhoard
Teste · Paste the waveform from the clipboard to the selected area.
Edit Command : Insert a command to the selected position.
EMD
Model to the selected commands.



👼 Command Settings	? ×
Command:	Command Resource:0/32000
NP: No Operation	~
	V OK X Cancel

- 1. No Operation (NP): No commands (default).
- 2. Loop Count (LC): Set the loop count, its range is 1~ 8,388,607.
- Loop to New Address (LP) : Set a limited count to output the waveform with LC.

Output the waveform 5 times:

	💾 🍤 (2 🍋	0 6	oo ि I P → A I I I I I I I I I I I I I I I I I I	🍇 🛛 »	
		7	7	27 31	47	
DG_Functio		NP	LC	5	LP 11	4
Repeat	Repeat Count	0			• • • • • • • • • • • • • • • • • • • •	
CH-00	A7:A0	13		01/02/03/04/05/06/07/08/09/04/0B/0C/0D/0E/0F/10/11/12/13/14/15/16/17/18/19/1A/1B/1C/1D/1E/1F	}	
N, N,						~
Label	Channel	Value				Þ
Connected	SN: 21519 (DG3	3064B - USB 3.0	0)] [Standby			

4. Jump to New Address (JP) : Jump to a new address to output the waveform repeatedly.

Output the waveform repeatedly until press the Stop button.

	💾 🍤 (2 🍋	9	💼 🦝 💼 🏴 🚟 片 🕁 HiZ IIV PATH < Working Frequency: 1Kbps 🔩 🔹
		(9	288
DG_Functio		NP		JP 10
Repeat	Repeat Count	0		
CH-00	A7:A0	10		01/02/03/04/05/06/07/08/09/0A/0B/0C/0D/0E/0F/10/11/12/13/14/15/16/17/18/19/1A/1B/1C/1D/1E/1F
<u>M</u>				
Label	Channel	Value	•	
Connected	SN: 21519 (DG3	064B - USB 3.	0) [Standby

 Wait Event (WE): Set an event command, support the Event 0~2 / Keyboard Event / Event Invert.

Event 0~2 means that Event-tip (DG3000 Series) channel 0~2 or Ev0~2 (TD3000



Series) channel.

The event occurred when these channels received a pulse.

6. Keyboard Event means the Space (default) or Enter key from the computer keyboard.

The event occurred when the Space or Enter key was pressed.

Event Invert means that invert the event waveform.

👼 Command Settings	?	\times
	Command Resource:0	/8000
Command:		
WE: Wait Event		-
 Event Invert Event 0 Event 1 Event 2 Event 0 or Event 1 Event 0 or Event 2 Event 1 or Event 2 Event 0 or Event 1 or Event 2 Keyboard Event 		
	VOK XCa	ancel

7. Hold Count (HD): Set the count of the waveform, its range is 1~ 8,388,607.

The width of the pulse is 5 ns, it will become 25 ns when insert a HD 5 command.

📄 🦀 💾	1 5 2		, 🖑		🏑 💼	EMD Rep		ւ Շ	HiZ	data XXX		»
			0	1	1	1				1	6	
DG_Function		NP				HD 5						^
Repeat	Repeat Count	0										
CH-00	A0	1										
N, N,							<					
Label	Channel	Value	4									Þ
Connected SN	: 21519 (DG3064	B - USB	3.0)	Standby								

These 2 functions are only provided for by DG3000 Series/DG4000 series:

Edit Repeat Count : Insert a Repeat Count command.

Perent Over the Repeat Count : Delete the Repeat Count command.



The width of the pulse is 5 ns, it will become 25 ns when insert a Repeat Count =

ο.												
🗎 🖆 💾	50	>		o 🗈 i 🏴	L HiZ	iny data CC XX	Wor Men	rking Frequenc nory: 10MB	cy: 200Mbps	\$ _ (2	
			1 1			i .		1				18
DG_Function		NP		JP 0								<u></u>
Repeat	Repeat Count	5	ŧ	j								
CH-00	A0	1										
						< <u>"</u> >						V
Label	Channel	Value	•									Þ
Connected SN: 2	1519 (DG3064B - U	JSB 3.0)	Standby									

High-Draw high (1) waveform.

Low-Draw low (0) waveform.

High Impedance – Draw the high impedance waveform.

It is 16 channels for a group when use the DG-tip to set the high impedance, e.g.

set channel 0 as high impedance and channel $1 \sim 15$ will be at high impedance,

too.

Channels of OE-tip or TD3000 series can be set the high impedance each by each.



Edit Data : Generate the patterns that value/step counter/clock or bit/baud

rate data.



Hardware Settings : Set the working frequency, device memory and output level/threshold.

Environment settings : Set the path of working directory and hot key about

the

event.



Run : Output the waveform.

Run again : Output the waveform again.





Stop: Stop the waveform output.

Channel

Label : Show the channels.

 (\mathbf{V}) add new channel label, (\mathbf{V}) delete the selected channels label.

Selected the label and click the left button of mouse.

Phase Delay only works at DG3000 Series/DG4000 series and the data rate must be set less than or equal to 300Mbps.



Click the right button of mouse.

DG_Function			NP		
Repeat		Repeat Count	0		
CH-00		A0	0		
CH-01	S Un	do Label Change	•		
CH-02			;	_	
CH-03	DDA 41	d Label d Parallel Bus			
CH-04	Ado	d All Labels			
CH-05	N Del	lete Label			
CH-06	Del	lete All Labels			
CH-07	🛣 Co	mbine Selected I	abels		
Bus-15:08	De	compose Select	ed Label		

Channel : Show the channel number.

Value : Show the channel value at the position of the cursor.

Waveform Scale Area

Black color value of the left side : Show the start address of the selected range.

Black color value of the right side: Show the end address of the selected range.



Black color value in the range of waveform area: Show the address at the position cursor clicked.

Gray color value in the range of waveform area: Show the address at the position cursor stamped.



Zoom in/out the waveform by scrolling the mouse wheel to make the waveform.

Drag the waveform by press the button of the following:



Select an area to edit the waveform:

	Working Frequency: 200Mbps Memory: 44.517MB
2726178	28716786
	<u> </u>
<u></u>	
¥	
	S-(27261706) 126-200mc
	5.(27201700) 130.309HIS
	E.(28540786) 142.734ms
	D:(1285000) 6.425ms

Press the right click in the waveform area.



G Device Status

Show the device connection status/serial number/interface.



Chapter 3 Technical support

Contact information

Acute website : <u>http://www.acute.com.tw</u> E-Mail : <u>service@acute.com.tw</u> Tel: +886-2-29993275 Fax: +886-2-29993276

If Demo SN: DG3128B (Demo) shows up in the Demo mode during the execution of

software,

please try the following steps to solve the issue:

(1) Install the latest version of the software, please go to the official website of Acute Technology Inc. - Download - Software, and then select the Data Generator to download and install.

(2) Please use the original USB3.0 Cable in the kit.

(3) Go to the device manager and check the driver status.

Please connect the device USB cable to the computer and then go to the system device

manager to check whether the Acute USB 3.0 (Travel) Data Generator shows up.

Please go to the Acute Website - Download - Software, download the USB3.0 driver

and follow the troubleshoot manual in the package to reinstall the driver.



E Computer Management	_		×						
<u>F</u> ile <u>A</u> ction <u>V</u> iew <u>H</u> elp									
> 📮 Portable Devices			^						
> 🖻 Print queues									
> 🔲 Processors									
> Software devices									
Sound, video and game controllers									
> 🅍 Storage controllers									
> ኪ System devices									
 Universal Serial Bus controllers 									
Acute USB 3.0 Travel Data Generator									
🏺 Generic USB Hub									
🏺 Generic USB Hub									
🏺 Generic USB Hub									
Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26									
Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D									
Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)									

(4) Remove all flat cables and re-plug the USB3.0 Cable or restart the computer to check

whether the driver appears.

(5) After the above steps are taken but the problem is still there, please contact us.



Appendix 1 Flat Cable pin defined & Dimension

DG4000 series

DG4K-pod Flat Cable

DG4K-pod flat cable tip pin defined

The following figure shows the definition of the four single-ended flat cable tips of the

DG4K-pod flat cable.





EV4K-pod Flat Cable

EV4K-pod flat cable tip pin defined

EV4K-pod flat cable has 2 single-ended DG4K-pod flat cable tips and 2 single-ended EV4K-pod flat cable tips, the following figure shows the definition of EV4K-pod flat cable tip.





OE4K-pod Flat Cable

OE4K-pod flat cable tip pin defined

OE4K-pod flat cable has 2 single-ended DG4K-pod flat cable tips and 1 single-ended OE4K-pod flat cable tip, the following figure shows the definition of OE4K-pod flat cable tip.



LVDS-pod Flat Cable (Option)

LVDS-pod flat cable tip pin defined

LVDS-pod flat cable has two single-ended LVDS-pod flat cable tip, the following figure shows the LVDS-pod flat cable pin definition.





DG3000 series

DG-pod Flat Cable

DG-pod flat cable tip pin defined

The following diagram defines the four single-ended flat cable tip pins of the DG-pod flat cable.





Event-pod Flat Cable

Event-pod flat cable tip pin defined

Event-pod flat cable has 2 single-ended DG-pod flat cable tips and 2 single-ended Event-pod flat cable tips, the following diagram defines the Event-pod flat cable tip.



OE-pod Flat Cable

OE-pod flat cable tip pin defined

The OE-pod flat cable has two single-ended DG-pod flat cable tips and one single-ended OE-pod flat cable tip, the following diagram defines the OE-pod flat cable tip.







Flat Cable Tip Dimension

Mates with: 2.54mm box header or pin header



20-pin Data Generator: Flat Cable tip = Pin Socket , Pitch=2.54 , Unit : mm.



Appendix 2 Use text editor tool to edit vector file(dgv)

File Content

INPUT DG_CM DG_PA Clk:0 Reset Write Check DataA DG_OE INTER //FRE VOLTA 2.5,3 PATTE	S D:-2, RA:-1, :1, :2, :3, .[70] [70] [70] 0:120; VAL 12: QUENCY GE .3,3.3 //DG_CI RN *	:158, :2316, 5ns; 8)MHz; ,3.3,3.3 MD, DG_PA	,3.3, <u>3</u> ARA, C	3.3,1.6; lk, Rese	t, W	rit	e, Dat	aA, Data	B, DG_OEO	
0	NP NP LC NP	0 0 5 0	0 1 0 1	0 0 0 0	0 0 0 0	1 0 0 0	00h 00h 00h 00h	00h 00h 00h 00h	0 0 0 0	//LC 5
- 41	NP NP LC NP NP NP NP	0 0 0 0 0 0	0 1 0 1 0 1 0	0 0 0 0 0 0	1 0 0 0 0	0 0 0 0 0	55h 55h 55h 55h 55h 55h 55h	00h 00h 00h 00h 00h 00h 00h	0 0 0 0 0	//LC 3
: A1	와 관정 관련 전 다. 정 관련 가 관 관 가 가 가 가 가 가 가 가 가 가 가 가 가 가 가	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			00h 01h 02h 03h 05h 06h 08h 08h 08h 00h 00h 00h 00h 00h 00h 00	FFh FEDh FEDh F8Dh F8Dh F8Dh F70h F50h F50h F50h F50h F00h 000h 000h 00	000000000000000000000000000000000000000	//Loop to A1 //Loop to A0 //Jump to Start

There are 4 parts to form a DGV file contents, they are <u>INPUTS</u>, <u>INTERVAL</u> or <u>FREQUENCY</u>, CLOCK_MODE, <u>VOLTAGE</u>, <u>PATTERN</u>.



INPUTS: a key word to input the signals.

DG_CMD:-2, DG_PARA:-1,

These 2 items must be reserved and the channel number is fixed, -2 and -1. They are data generator instructions and parameters, the DG instructions are shown as following:

NP(No Operation)

LC(Set Loop Count) :parameter: 1 ~ 2 ^ 23 - 1(count).
LP(Loop) / JP(Jump) :the parameter of JP & LP is a label or address.
WE(WaitEvent) :parameter 0: Keyboard Event, 1: EV0, 2:EV1, 3:EV2, 4:EV0 or EV1,

5: EV0 or EV2, 6: EV1 or EV2, 7: EV0 or EV1 or EV2, 8 = reverse the

result of parameter = 0, 9 = reverse the result of parameter 1....

 $RP(Repeat) : parameter 1 \sim 2^{23} - 1(count).$

Each signal is separated by "," and signal name and channel number is separated by ":".

Clk:0 : set the label name "Clk" and channel number is channel 0.

DataA[7..0]:15..8 : set the label name "DataA[7..0]" and channel number is channel 8~15,

it's a data bus, 8..15, from LSB to MSB.

Set delay x/8 clock when type "#x", x = 0 ~ 7, assuming that the working frequency = 125 MHz, it means that a clock cycle is 8 ns, x = 5, it will delay 5 ns.

DG_OE0:120, DG_OE1:121, ... ,DG_OE6:126 :

it also a reserved signal to set output enable or disable, 120 ~ 126 for DG 3000 series; 16 ~31 for TD 3000 series.

DG_OEx = 0, Ouput Enable ; DG_OEx = 1, Output Disable.

DG_OE0 include CH0~CH15 (DG 3000); CH0 (TD 3000),



DG_OE1 include CH16~CH31 (DG 3000); CH1 (TD 3000) DG_OE2

INTERVAL

FREQUENCY: only select INTERVAL or FREQUENCY mode, the range of frequency is

100Hz~400MHz (DG 3000), 100Hz~200MHz(TD3116B/3216B),

100Hz~100MHz(TD3008E).

CLOCK_MODE: select internal clock or external clock to output the waveform.

Internal Clock → CLOCK_MODE Internal; External Clock → CLOCK MODE Clk-In or CKI;

VOLTAGE: there are 8 voltage values, each for the output voltage of 8 or 16 channels, 1st

voltage value is for CH0~CH7 /CH0~CH15 (TD 3000/DG 3000), 2nd voltage value for CH8~CH15/ CH16~CH31/ (TD 3000/DG 3000)...

3rd / 8th voltage value is the threshold of Event Pod (TD 3000/DG 3000).

The range of voltage value is $0.8 \sim 5.0$ (DG 3000 series); $0.8 \sim 4.5$ (TD 3000 series).

The range of threshold value is -1.0 ~ 8.0 (DG 3000 series); -5.0 ~ 5.0 (TD 3000 series).

<u>PATTERN</u>: it's a waveform area; a row is a clock sample. ":Start" or ":A0" means a label,

they are jump(JP) points.



Note: The software provides a text vector file format check function. If the text vector file format is incorrect, then the software will display an error message and tell which line is incorrect.

File format invalid (Ln. 13)! INPUTS DG_CMD:-2, DG_PARA:-1, SPTCS:0, SPTCS:10, SPTCK:1, MOSI:2, MISO:3, TESTM:4, TRISGER:5, CH-06:6, CH-07:7; FREQUENCY 10000000Hz; CLOCK MOD Internal; // Invalid keyword VOLTAGE 3.3,3.3,1.6,3.3,3.3,3.3,3.3,3.3,3.3; PATTERN NP 0 1 0 0 1 NP 0 0 1 0 0										
File format invalid (Ln. 13) ! INPUTS Image: Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspa	📅 Error			\times						
INPUTS DG_CMD:-2, DG_PARA:-1, SPICS:0, SPICLK:1, MOSI:2, MISO:3, TESTM:4, TRIGGER:5, CH-06:6, CH-07:7; FREQUENCY 10000000Hz; CLOCK MOD Internal; // Invalid keyword VOLTAGE 3.3,3.3,1.6,3.3,3.3,3.3,3.3,3.3; PATTERN NP 0 1 0 1 0 0 1 NP 0 1 0 1 0 1 NP 0 0 0 0 NP 0 0 NP 0 0 NP 0 0 NP 0 0 NP	8	File format i	invalid (Ln.	13)! OK						
LOCA MOD Internal; 77 Invalid Reyword VOLTAGE $3.3, 3.3, 1.6, 3.3, 3.3, 3.3, 3.3;$ PATTERN NP 0 1 0 0 1 NP 0 1 0 0 0 1 NP 0 0 1 0 0 1	NPUTS G_CMD:- G_PARA: PICS:0, PICLK:1 OSI:2, ISO:3, ESTM:4, RIGGER: H-06:6, H-07:7; REQUENC	2, -1, , 5, <u>7 100000</u>	100Hz;							
3.3,3.3,1.6,3.3,3.3,3.3,3.3; PATTERN NP 0 1 0 0 0 1 NP 0 1 0 1 0 0 1 NP 0 1 0 1 0 0 0 1 NP 0 1 0 1 0 0 0 1 NP 0 1 0 1 0 0 1 1 NP 0 0 1 0 0 0 1 1 NP 0 0 1 0 0 0 1 1 NP 0 0 1 0 0 0 1 NP 0 0 1 0 0 0 1 NP 0 0 1 0 0 0 1 NP 0 0 0 0 0 1 1 NP 0 0 0 0 0 1 1	DUCK MU	D Intern	al; // .	invalid i	(eyword					
PATTERN Image: Second seco	.3,3.3.	1.6,3.3.	3.3,3.3	,3.3,3.3						
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