

# Pulse Pattern Generator/ Error Detector AP9950/AP9951

- *Compact, light weight and high performance*
- *High quality output waveform (PPG)*
- *Multi-bit rate:*
  - 40G mode: 36Gbit/s to 43.5Gbit/s*
  - 10G mode: 9Gbit/s to 10.875Gbit/s*
- *Capable for various measurement applications*



# AP9950 Pulse Pattern Generator

Operation Mode	40G mode (40G PRBS output with ITU-T recommendations)	
	10G mode	MUX/DEMUX mode (1/4 phase shifted 10G signal x 4ch output)
		Multi channel mode (10G x 4ch independent output)
<b>Clock Generator Part</b>		
Internal Clock	Frequency setup range	39.5G to 43.5GHz
	Resolution	1 kHz
	Offset	-50 to +50ppm (1ppm step)
External Synchronous Clock Input	Input frequency range	1/4, 1/16, 1/64 and 1/256 clock of bit rate (10G mode: 1/1, 1/4, 1/16 and 1/64 clock of bit rate)
	Input level	0.4 to 1.5Vpp, 50 ohm
	Connector	2.9mm compatible plug
<b>Pattern Generator Part</b>		
Clock Input	Input frequency range	18GHz to 21.75GHz
	Input level	0.4 to 1.2Vpp, 50 ohm
	Connector	2.9mm compatible plug
<b>40G Mode Interface</b>		
Data Output	Output Level	Differential (Data/Data bar) 2Vpp typ. Fixed AC coupled, 50 ohm
	Offset	-2.0 to +2.0V (0.1V step)
	Pattern jitter	1.5ps rms (typ.)
	Rise time	10ps typ. (20-80%)
	Connector	1.85mm compatible plug
Clock Output	Output level	2.5Vpp typ., 50 ohm (Option: Level adjust function)
	Phase adjust	50ps or more (0.5ps step)
	Connector	1.85mm compatible plug
1/2 Clock Output	Output level	2.5Vpp typ., 50 ohm (Option: Level adjust function)
	Phase adjust	100ps or more (1ps step)
	Connector	2.9mm compatible plug
<b>10G Mode Interface</b>		
Data Output	Output level	VH = 0V ± 0.1V, VL = -1V ± 0.25V, >0.65Vpp, 50 ohm
	Phase condition	CLOCK down is the cross point of DATA Tolerance: ± 20ps or less
	Connector	2.9mm compatible plug
Clock Output	Output level	VH = 0V ± 0.1V, VL = -1V ± 0.25V, >0.65Vpp, 50 ohm
	Connector	2.9mm compatible plug
<b>Trigger Output</b>		
1/4 Clock	Output level	0V ± 0.2V/ -1V ± 0.2V, 50 ohm
	Connector	2.9mm compatible plug
Selectable	Output level	0V ± 0.2V/ -1V ± 0.2V, 50 ohm
	Signal type	1/64 clock, 1/256 clock and pattern
	Connector	SMA compatible jack
Output Control	Manual: ON/OFF function for Data and Clock output GATE IN: Signal down of Data output	
Error Addition	NIST, ISO, IEC, ANSI, NCSL, MIL-STD by <a href="http://www.raeservices.com">www.raeservices.com</a>	Mode Single, rate (1E-3, 1E-4, 1E-5, 1E-6, 1E-7, 1E-8, 1E-9)

## AP9951 Error Detector

Operation Mode	40G mode (40G PRBS measurement with ITU-T recommendations)	
	10G mode	MUX/DEMUX mode (1/4 phase shifted 10G signal x 4ch measurement)
		Multi-channel mode (10G x 4ch independent measurement)
<b>40G Interface</b>		
Data Input	Input level	0.25Vpp or more, -0.2 to -0.75V, DC coupled, 50 ohm
	Threshold level adjust	-0.2 to -0.75V (0.01V step)
	Connector	1.85mm compatible plug
1/2 Clock Input	Input frequency range	18G to 21.75GHz
	Input level	AC 0.5 to 1.2Vpp, 50 ohm
	Phase adjust	100ps or more (1ps step)
	Connector	2.9mm compatible plug
<b>10G Interface</b>		
Data Input	Input level	VH = $0V \pm 0.2V$ , VL = $-1V \pm 0.2V$ , >0.5Vpp, 50 ohm
	Threshold level adjust	-0.2 to -0.75V (0.01V step)
	Phase condition	CLOCK rise is the center of DATA
	Phase margin	$\pm 15ps$ or more
	Connector	2.9mm compatible plug
Clock Input	Input frequency range	9G to 10.875GHz
	Input level	VH = $0V \pm 0.2V$ , VL = $-1V \pm 0.2V$ , >0.5Vpp, 50 ohm
	Phase adjust	100ps or more
	Connector	2.9mm compatible plug
Measurement Function	Measurement mode	Manual, Single (1 sec. to 10 days)
	Result display	Current and 100ms, 1s, 10s
	Measurement Item	Error Count, Error Rate, Sync Loss
	Burst measurement	Available ("GATE IN" input)
Display	Item	Bit rate

### Option

For AP9950			
Level adjust function for 40G clock output	Level adjust range	0.65 to 2.5Vpp (1dB step)	
Level adjust function for 1/2 clock output	Level adjust range	0.65 to 2.5Vpp (1dB step)	
For AP9951			
Pre-amplitude for Data input	Gain	6dB typ., AC coupled	
	Connector	1.85mm compatible plug	

To receive a calibration and/or repair quote-RMA from R.A.E. Services Inc.  
Click here>> [www.raeservices.com/services/quote.htm](http://www.raeservices.com/services/quote.htm)



# AP9950 PPG/AP9951 ED

Transmit/ Receive Pattern	PRBS *1)	2 <sup>7</sup> -1, 2 <sup>9</sup> -1, 2 <sup>10</sup> -1, 2 <sup>11</sup> -1, 2 <sup>15</sup> -1, 2 <sup>23</sup> -1, 2 <sup>31</sup> -1 Mark ratio: 1/2, 1/4, 1/8, 1/2(Invert), 3/4, 7/8																	
	Program *1)	Program length: 1 to 8M bits 1 to 512 bits:1 bit step, 513 bits or more:512 bits step																	
	SDH frame *1)	Payload:Program 256 bytes PRBS:2 <sup>9</sup> -1, 2 <sup>10</sup> -1, 2 <sup>11</sup> -1, 2 <sup>15</sup> -1, 2 <sup>23</sup> -1, 2 <sup>31</sup> -1 Scramble ON/OFF <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align:center;">Full Programming</td> <td style="width:50%; text-align:center;">Program Pattern or PRBS</td> </tr> <tr> <td style="text-align:center;">SOH</td> <td style="text-align:center;">PAYLOAD</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	Full Programming	Program Pattern or PRBS	SOH	PAYLOAD													
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CID *1)	0/1 length:0 to 66,816 bytes (STM256 mode: 1 byte step) 0 to 16,704 bytes (STM64 mode: 1 byte step) Payload: 2 <sup>7</sup> -1, 2 <sup>9</sup> -1, 2 <sup>10</sup> -1, 2 <sup>11</sup> -1, 2 <sup>15</sup> -1, 2 <sup>23</sup> -1, 2 <sup>31</sup> -1 <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; text-align:center;">SOH</td> <td style="width:33%; text-align:center;">0/1 Cont.</td> <td style="width:33%; text-align:center;">PRBS</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	SOH	0/1 Cont.	PRBS															
SOH	0/1 Cont.	PRBS																	
Remote Control	LAN(100/10BASE-T) (GP-IB is available by an converter )																		
Dimensions and mass	Size Weight	Approx. 425 (W) x 221 (H) x 500 (D) mm (AP9950/AP9951) Approx. 26kg ( AP9950)? Approx. 23Kg (AP9951)																	
Power requirement	AC 100 to 240V, 50/60Hz																		

Note \*1: In 40G mode, these patterns are available when mark ratio is 1/2.

Note) Specifications are subject to change without notice.

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