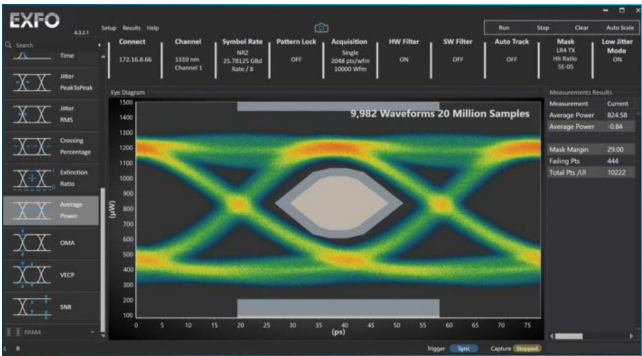




EXFO EA-4000 API Sampling Oscilloscope User Guide

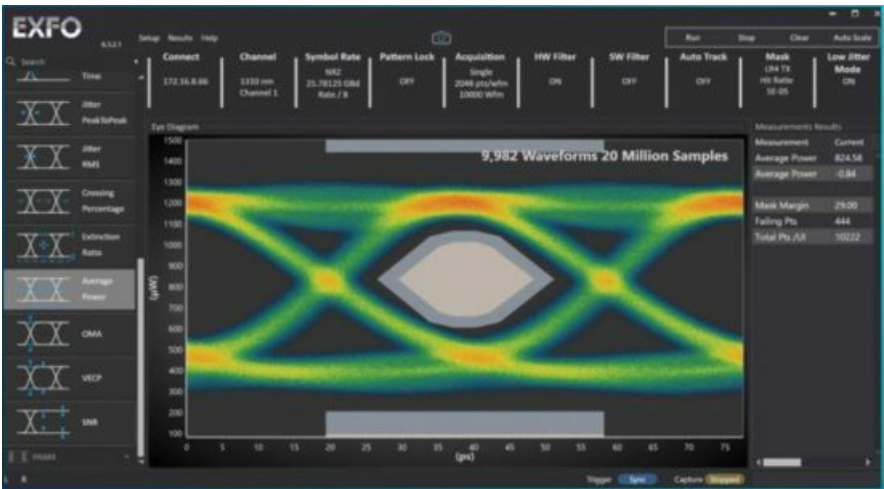
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Change Log

Version	Content	Date
6.2.2.0	• Modify Configure parameters • Add ConfigureAdv function • Modify SetMask function • Add OMA, VECP, SNR measurement items	2019/12/12
6.3.3.2	• Reformat for better reading • Modify parts of the function description • Modify EnableMeasurement index • Add SavePic function • Add AutoDCC function	2020/08/31

API Function Description

Setup for API to control EA7000 on PC

Before API to control EA7000,



Connect

The first step to control EA7000 is using Connect function to connect EA7000 with PC. private static extern bool Connect (string IP, ref bool FW Upgrade Not Required);

Return True: connected ; Return False: connect fail

IP : IP Address

FW Upgrade Not Required .

- True : Need to upgrade FW. Please use GUI for upgrade.
- False: FW is up to date. No need FW upgrade.

Disconnect

Please use Disconnect function, before you stop or close your program.

private static extern bool Disconnect();

Return True: connected ; Return False: connect fail

Is Connected

Check connection status.

private static extern bool Is Connected();

Return True: Is Connected ; Return False: Disconnected

Configure

Configure EA7000 settings. After calling **Configure** function, please call **ClearData** function.

```
> private static extern bool Configure (
    unsigned char chIndex, double lineRate,
    int patternLength, unsigned char clkDiv);
```

Return True: Success ; Return False: Fail

chIndex : Channel Index is one HEX byte 0xAB

- A = 0 [Electrical] 1 [Optical 850 nm] 2 [Optical 1310 nm] 3 [Optical 1550 nm]
- B = 1 [Optical] 2 [Electrical]

ex : Electrical index = 0x02, Optical 850 index = 0x11, 1310 index = 0x21, 1550 index = 0x31

lineRate : Line Rate ex: 25.78125, 26.5625, etc.

patternLength : Default is Eye Mode (1)

clkDiv : 8, 16, 32, 64, 80, and 128



Advanced Configure

You can use **ConfigureAdv** to do more detail Setting. After calling **ConfigureAdv** function please call **ClearData** function first.

```
> private static extern bool ConfigureAdv (
    byte chIndex, double lineRate, int patternLength,
    byte clkDiv, byte thresholdHigh, byte thresholdMid,
    byte thresholdLow, byte eyeBoundaryLeft,
    byte eyeBoundaryRight, byte jitterRange);
```

Return True: Success ; Return False: Fail

chIndex : Channel Index is one HEX byte 0xAB

- A = 0 [Electrical] 1 [Optical 850 nm] 2 [Optical 1310 nm] 3 [Optical 1550 nm]
- B = 1 [Optical] 2 [Electrical]

ex : Electrical index = 0x02, Optical 850 index = 0x11, 1310 index = 0x21, 1550 index = 0x31

lineRate : Line Rate ex: 25.78125, 26.5625, etc.

patternLength : Default is Eye Mode (1)

clkDiv : 8, 16, 32, 64, 80, and 128

thresholdHigh : default setting 80 for 80%

thresholdMid : default setting 50 for 50%

thresholdLow : default setting 20 for 20%

eyeBoundaryLeft : default setting 40 for 40%

eyeBoundaryRight : default setting 60 for 60%

jitterRange : default setting 3

Set Filter

Set hardware filter on or off.

➤ `private static extern bool SetFilter ( byte filterSelect );`

Return True: Success ; Return False: Fail

filterSelect : 1: ON, 0: OFF



SetMask

Set mask margin parameters.

➤ `private static extern bool SetMask ( byte maskSelect, int failingCount, double failingRatio );`

Return True: Success ; Return False: Fail

maskSelect :

0: OFF

1: 4WDM Rx

2: ER4 TX

3: LR4 TX

4: SR4 TX

5: SR4 RX

6: CLR4

7: CLR4 FEC

8: CWDM4 TX

9: CWDM4 RX

10: PSM4 RX

11: SWDM4 RX

12: 32GFC MM

13: 32GFC SM

14: EDR Cable IN

15: EDR Cable Out

failingCount : Failing Count (-1 = Disabled)

failingRatio : Failing Ratio (Is Cative if failingCount = -1)



IsClockLocked

Check clock locking status.

➤ `private static extern bool IsClockLocked();`

Return True: Locked ; Return False: Unlocked

ClearData

Clear eye diagram and measurement results.

➤ `private static extern bool ClearData ();`

Return True: Success ; Return False: fail



AutoScale

Scale eye diagram automatically.

➤ `private static extern bool AutoScale();`

Return True: Success ; Return False: Fail



RunCapture

Start to capture signal.

➤ `private static extern bool RunCapture();`

Return True: Success ; Return False: Fail



IsRunning

Check capture status, when return true the EA7000 is still running capture.

➤ `private static extern bool IsRunning ();`

Return True: Running ; Return False: Stop

StopCapture

Stop running capture.

➤ `private static extern bool StopCapture();`

Return True: Success ; Return False: Fail



ConfigCapture

Configure EA7000 capture settings.

➤ `private static extern bool ConfigCapture ( byte type, int numberOfPoints, bool clearData, bool autoTrack);`

Return True: Success ; Return False: Fail

type : 0:Infinite, 1: Repetitive, 2: Single
numberOfPoints : Number of point, default 0x40000
clearData : Clear Data before capture
autoTrack : Auto Track low frequency phase swing



EnableMeasurements

Enable measurement items.

➤ `private static extern bool EnableMeasurements ( byte[] enable);`

Return True: Success ; Return False: Fail

Enable : please define enable[] length to 40

Enable : set 1 ; Disable : set 0

results[0] = One level
results[1] = Zero level
results[2] = Min
results[3] = Max
results[4] = Peak To Peak
results[5] = Eye Amplitude
results[6] = Eye Height
results[7] = Eye Width
results[8] = Rise Time
results[9] = Fall Time
results[10] = Jitter PP
results[11] = Jitter RMS
results[12] = Crossing %
results[13] = Extinction Ratio
results[14] = AOP μ W
results[15] = AOP dB
results[16] = OMA
results[17] = VECP
results[18] = SNR
results[19] = Reserved

results[20] = Reserved
results[21] = Reserved
results[22] = Reserved
results[23] = Reserved
results[24] = Reserved
results[25] = Reserved
results[26] = Reserved
results[27] = Reserved
results[28] = Reserved
results[29] = Reserved
results[30] = Reserved
results[31] = Reserved
results[32] = Reserved
results[33] = Reserved
results[34] = Reserved
results[35] = Reserved
results[36] = Reserved
results[37] = Reserved
results[38] = Reserved
results[39] = Reserved

GetMeasurements

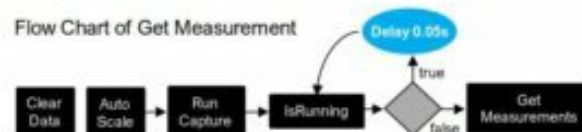
Get the measurement results.

➤ `private static extern bool GetMeasurements (double[] results);`

Return True: Success ; Return False: Fail

Results : Please define results[] length 40 to get all result

Flow Chart of Get Measurement



results[0] = One level
results[1] = Zero level
results[2] = Min
results[3] = Max
results[4] = Peak To Peak
results[5] = Eye Amplitude
results[6] = Eye Height
results[7] = Eye Width
results[8] = Rise Time
results[9] = Fall Time
results[10] = Jitter PP
results[11] = Jitter RMS
results[12] = Reserved
results[13] = Eye Height Top
results[14] = Eye Height Base
results[15] = Reserved
results[16] = Crossing %
results[17] = Extinction Ratio
results[18] = max Mask Margin
results[19] = Falling Points

results[20] = Average Power (μ W)
results[21] = Average Power (dBm)
results[22] = OMA
results[23] = VECP
results[24] = SNR
results[25] = Reserved
results[26] = Reserved
results[27] = Reserved
results[28] = Reserved
results[29] = Reserved
results[30] = Reserved
results[31] = Reserved
results[32] = Reserved
results[33] = Reserved
results[34] = Reserved
results[35] = Reserved
results[36] = Reserved
results[37] = Reserved
results[38] = Reserved
results[39] = Reserved

SavePic

Capture GUI screen and save it as PNG picture.

➤ `private static extern bool SavePic (string path);`

Return True: Success ; Return False: Fail

Path : Path of saving picture

AutoDCC

Compensate dark current automatically.

➤ `private static extern bool AutoDCC (string result);`

Return True: Success ; Return False: Fail

Result :

- 0 : Error Connection
- 1 : Successful
- 2 : Please disconnect the optical source
- 3 : Please make sure to have a valid Clock Input



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Documents / Resources



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EA-4000 API Sampling Oscilloscope, EA-4000, API Sampling Oscilloscope, Sampling Oscilloscope, Oscilloscope