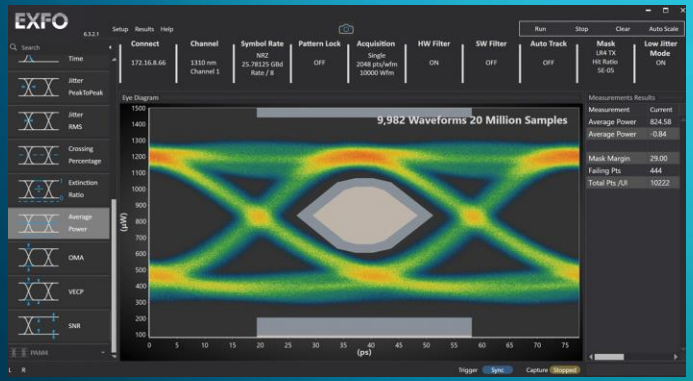
EA-4000
API USER GUIDE



EXFO

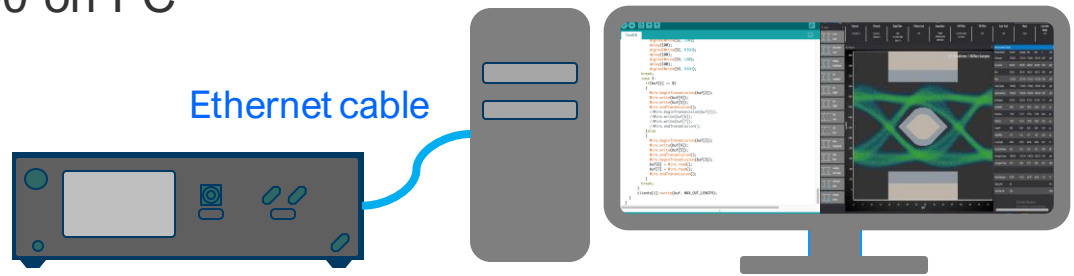
Change Log

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, please open EA7000 GUI and connect the 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 FWUpgradeNotRequired);

Return True: connected ; Return False: connect fail

IP : IP Address
FWUpgradeNotRequired :

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

API Function Description

Disconnect

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

- private static extern bool Disconnect();

Return True: connected ; Return False: connect fail

IsConnected

Check connection status.

- private static extern bool IsConnected();

Return True: Is Connected ; Return False: Disconnected

API Function Description

Configure

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

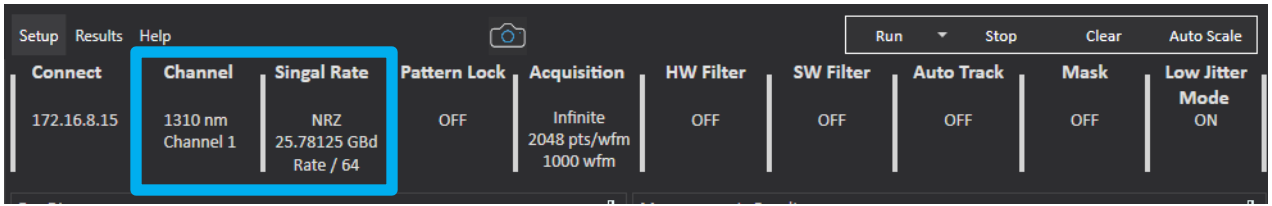
➢ private static extern bool Configure (
unsigned char chIndex, double lineRate,
int patternLength, unsigned char clkDiv);

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



API Function Description

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

API Function Description

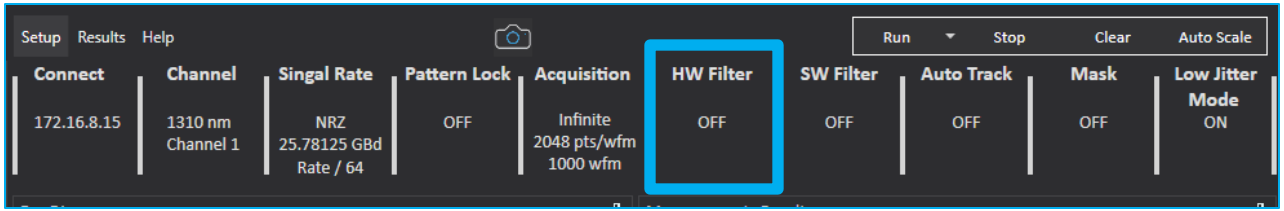
SetFilter

Set hardware filter on or off.

- private static extern bool SetFilter (byte filterSelect);

Return True: Success ; Return False: Fail

filterSelect : 1: ON, 0: OFF



API Function Description

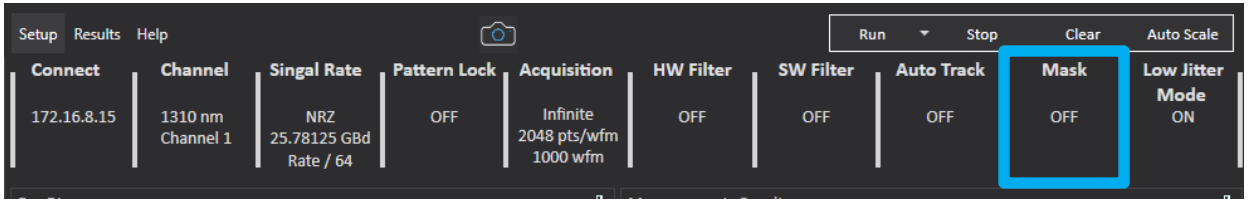
SetMask

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)



API Function Description

IsClockLocked

Check clock locking status.

- private static extern bool IsClockLocked();

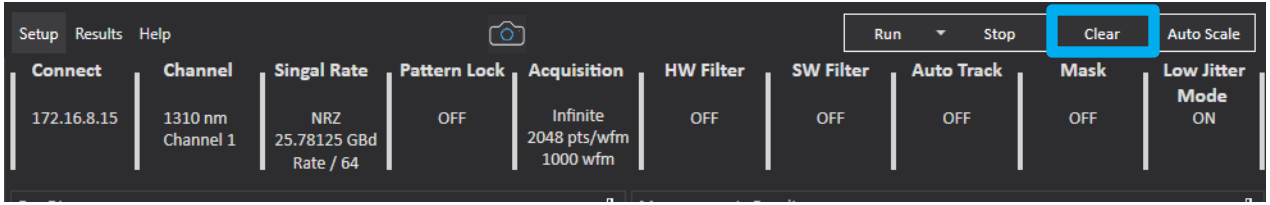
Return True: Locked ; Return False: Unlocked

ClearData

Clear eye diagram and measurement results.

- private static extern bool ClearData ();

Return True: Success ; Return False: fail



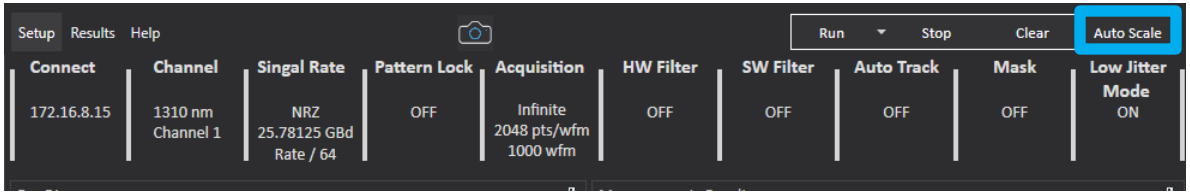
API Function Description

AutoScale

Scale eye diagram automatically.

➢ private static extern bool AutoScale();

Return True: Success ; Return False: Fail

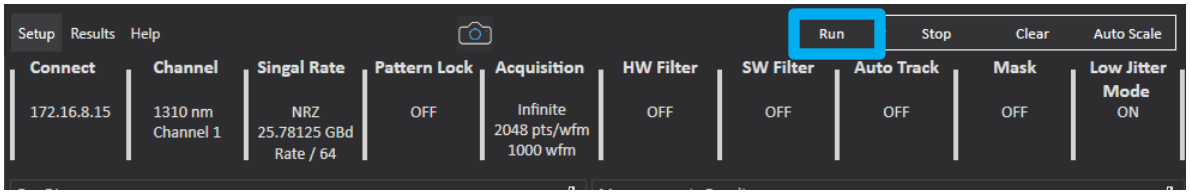


RunCapture

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

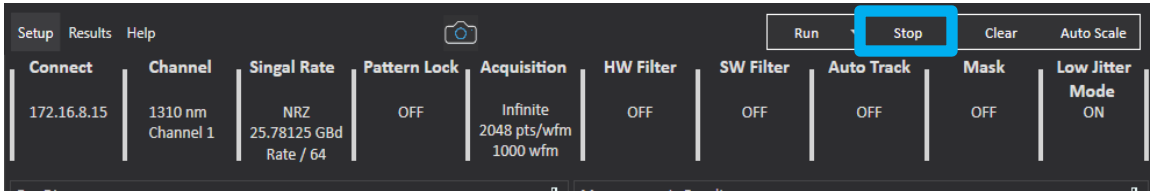
API Function Description

StopCapture

Stop running capture.

- private static extern bool StopCapture();

Return True: Success ; Return False: Fail



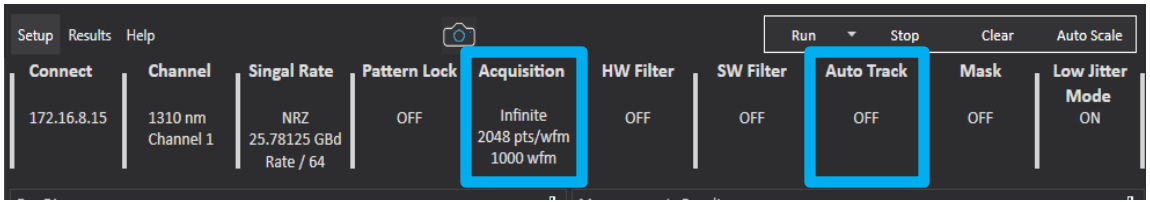
ConfigCapture

Configure EA7000 capture settings.

- private static exterprivate 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



API Function Description

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 µW
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

API Function Description

GetMeasurements

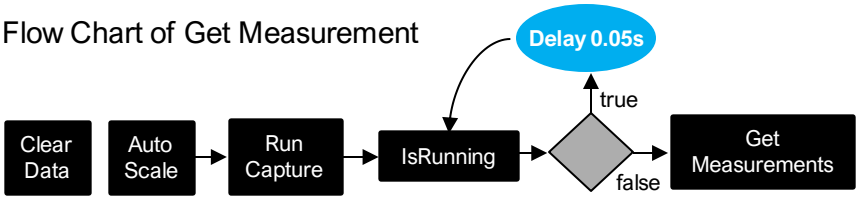
Get the measurement results.

- 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] = Failing Points

results[20] = Average Power (µW)
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

API Function Description

SavePic

Capture GUI screen and save it as PNG picture.

- private tatic extern bool SavePic (string path);

Return True: Success ; Return False: Fail

Path : Path of saving picture

AutoDCC

Compensate dark current automatically.

- private tatic 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