Application Note – Alpha NIR External Sync Command

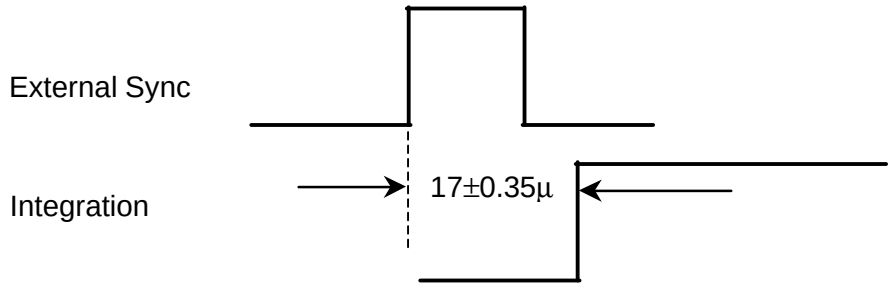
The EXT_SYNC command is used to put the camera into External Sync Mode. When the camera is in External Sync Mode, integration and digital data output is initiated by the ext_sync input pin. A rising edge on the ext_sync pin will cause the camera to begin integration 17±0.35µs later, and begin to output the previous frame's data on the digital port. Note that there is a one-frame pipeline delay for the output data since the camera operates in the Integrate-While-Read mode, integrating the signal for the current frame while simultaneously reading out the previously integrated frame.

The purpose of External Sync Mode is to precisely (within 350ns) control the start of integration for synchronization to an external event, or to synchronize multiple cameras. The ext_sync signal must remain high for greater than 100ns to be recognized as a valid rising edge. The ext_sync signal must be low for a minimum of 100ns before rising.

Integration modes "Normal" and "Special Short" are the *only* supported modes when using the external sync; "Extended" and "Manual" modes are *not* supported.

If the External Sync is used in a periodic sequence, the period must be greater than 33.47ms (29.87 Hz frame rate max). There is no maximum period. Periods less than the specified limit will result in the camera ignoring ext_sync inputs.

When the camera is not in External Sync mode, the ext_sync input is unused.



The External Sync signal is connected through pin 4 on the camera auxiliary I/O connector. The signals on this interface connector are all 3volt CMOS levels. The maximum cable length for signals using this interface connector should be limited to less than 3 meters. A number of digital signal grounds are included as return paths for each digital input/output. The digital signal grounds should be connected together at the receiver, however, for best noise performance, the digital signal grounds should be isolated from the input power return (IOPWRRTN). See Table 1 for the Alpha NIR camera auxiliary I/O connector signal positions. Contact the factory for detailed digital data timing information. The backshell of the auxiliary I/O connector is connected to the camera chassis.

The auxiliary I/O connector and mating part numbers are given below.

Auxiliary I/O connector:	3M part number 10226-1210VE
Solder cup mate:	3M part number, 10126-3000VE
Board mount mate:	3M part number, 10126-5212VC
IDC cable mate:	3M part number, 10126-6000EC

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pin #	signal name	description
1	N/A	Do not connect
2	Tx[3V]	RS-232 transmit, 3 volt levels
3	Rx[3V]	RS-232 receive, 3 volt levels
4	SyncFrame	Frame synchronization input, 3 volt level
5	SyncClock	Pixel synchronization input, 3 volt level
6	Data Frame	Frame synchronization output, 3 volt level
7	Data Valid	Data valid output, 3 volt level
8	Data Clock	Pixel clock output, 3 volt level
9	Data0	Real-time digital data output, bit 0
10	Data1	Real-time digital data output, bit 1
11	Data2	Real-time digital data output, bit 2
12	Data3	Real-time digital data output, bit 3
13	IOPWR	Camera input power, 6 volt nominal
14	N/A	Do not connect
15	Dgnd	ground, return for Tx
16	Dgnd	ground, return for Rx
17	Dgnd	ground, return for SyncFrame
18	Dgnd	ground, return for SyncClock
19	Dgnd	ground, return for Data Frame
20	Dgnd	ground, return for Data Valid
21	Dgnd	ground, return for Data Clock
22	Dgnd	ground, return for Data output bit 0
23	Dgnd	ground, return for Data output bit 1
24	Dgnd	ground, return for Data output bit 2
25	Dgnd	ground, return for Data output bit 3
26	IOPWRRTN	Camera power return

Table 1 – Auxiliary I/O Connector