

# PHOX-F™

## KEY FEATURE

- ❖ Provides 10 Gb/s or 1250 MB/s transporting bandwidth for image, GPIO and RS232
- ❖ Fully support Camera Link standard for Base, Medium, Full and 10tapx8bits modes
- ❖ Operating pixel clock range from 20 to 100 MHz exceeding Camera Link standard
- ❖ Plug-and-play – no changes or programming required for camera and/or frame grabber
- ❖ Optional 2- fiber LC duplex or 1-fiber LC simplex optical interface
- ❖ Includes 4 GPIO channels (2 inputs and 2 outputs) for external trigger and control
- ❖ Includes a full duplex RS232 for remote instrument control
- ❖ Accept 10V~24V DC input power with locking mechanism for industrial applications
- ❖ Extended operating temperature range are available
- ❖ Transmission distances:
  - OM3 Multi-mode fiber – up to 300m
  - Single-mode fiber – up to 80km

## Applications

- ❖ Solar panel or glass panel inspection
- ❖ Semiconductor wafer inspection
- ❖ High speed printing inspection
- ❖ High precision surface inspection (e.g. airplane surface or automobile painting)
- ❖ Automated product inspection (e.g. food, drinking or pharmaceutical products)
- ❖ High resolution and real-time analysis for science, sports, automobile tests, and 3-D animation.
- ❖ High precision security surveillance (e.g. border control, airport)
- ❖ Traffic surveillance/control and vehicle license plate reading/recording (e.g. toll booth)
- ❖ Cameras placed in harsh environment (e.g. nuclear plant, steel mill or undersea monitoring)
- ❖ Other Machine Vision Applications

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TECHNOLOGIES

## PHOX™ Camera Link Fiber Extender

**Base/Medium/Full  
/Deca  
Configuration**

**PHOX-FM-300  
PHOX-FL-xx  
PHOX-FL-L10  
PHOX-FL-xx-Cxx**

PHOX Front View

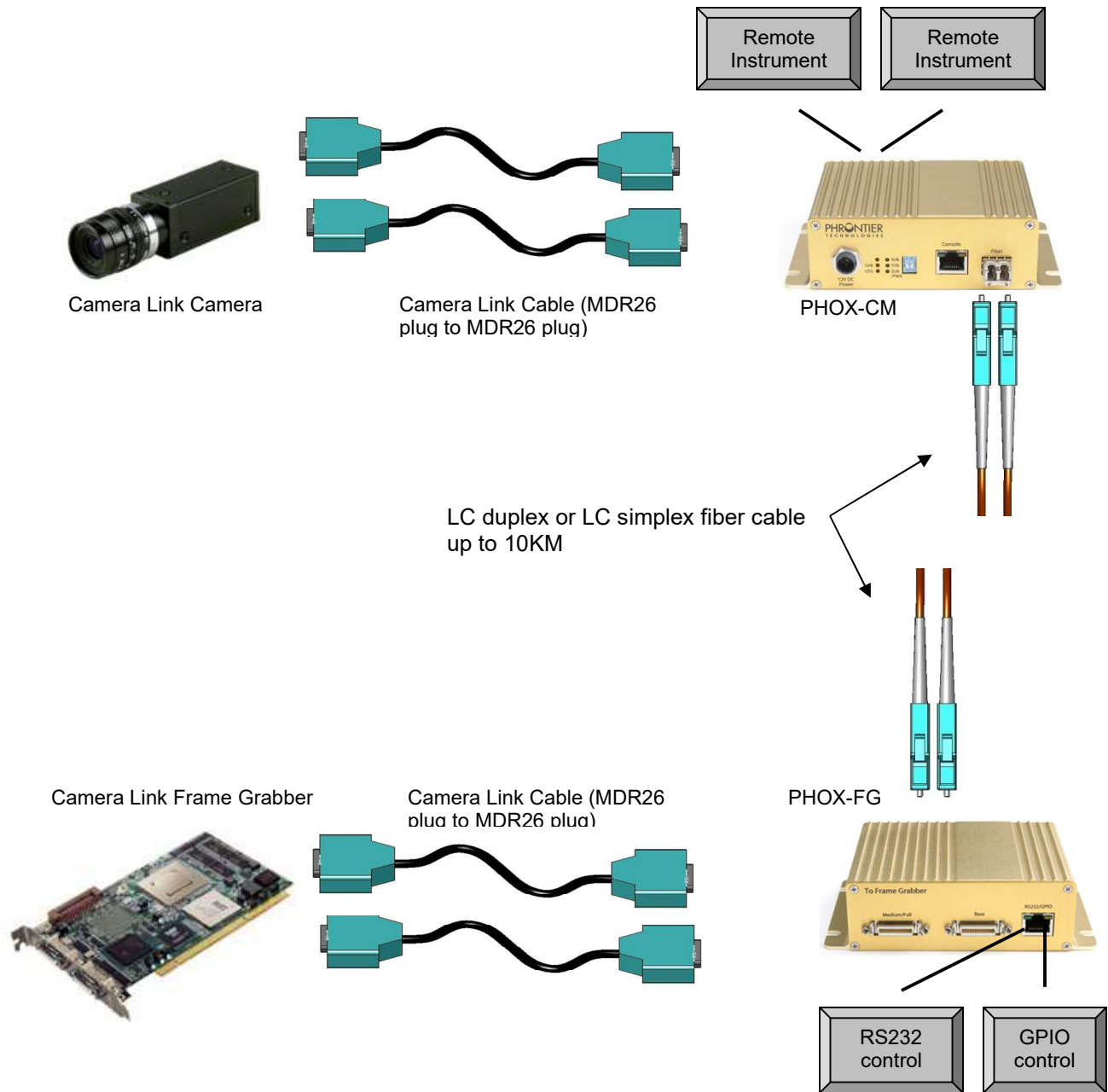


PHOX Back View



**Phrontier Technologies, LLC**  
[www.phrontier-tech.com](http://www.phrontier-tech.com)  
[sales@phrontier-tech.com](mailto:sales@phrontier-tech.com)  
Toll Free: 1-866-389-2829

## TYPICAL SET UP DIAGRAM



### Fiber Guide

- Use 62.5/125 OM1 MM fiber for <30 m
- Use 50/125 OM2 MM fiber for <80 m
- Use 50/125 OM3 MM fiber for <300 m
- Use 9/125 SM fiber for <10 km

## TECHNICAL SPECIFICATIONS

### General Specification

Operating Case Temperature	Standard	0 ~ 55 °C		
	Extended <sup>1</sup>	-40 ~ 70 °C		
Operating Humidity	20 ~ 80% (non-condensing)			
Input Voltage	DC 10 ~ 24 V			
Supply Current <sup>1</sup> @12V	CM module	0.5 Amp	FG module	0.6 Amp
Typical Power Consumption <sup>2</sup>	CM module	6 Watt	FG module	7.2 Watt
Connector Type	Switchcraft TRAPC3MX			
Approx. Weight (each module)	325 g			

Note 1: For CWDM models, the extended is only available for -20~60C due to the component limitation.

Note 2: Measured with PHOX-FM-300

### Camera Link Interface

Pixel Clock Range	20 ~ 100 MHz			
Supported Camera Modes	Base/Medium/Full/10 tapsx8 bits			
Image Data Throughput	8.4 Gbits/s or 1050 Mbytes/s			
Connector Type	MDR26 x2			
Signal latency <sup>3</sup>	Image	7.3 us		
	SerTFG	9.5 us		
	CC1~4	4.3 us		
	SerTC	4.3 us		

Note 3: The latency should be deterministic and includes jitter for the worst case.

### Additional Input/Output Interface

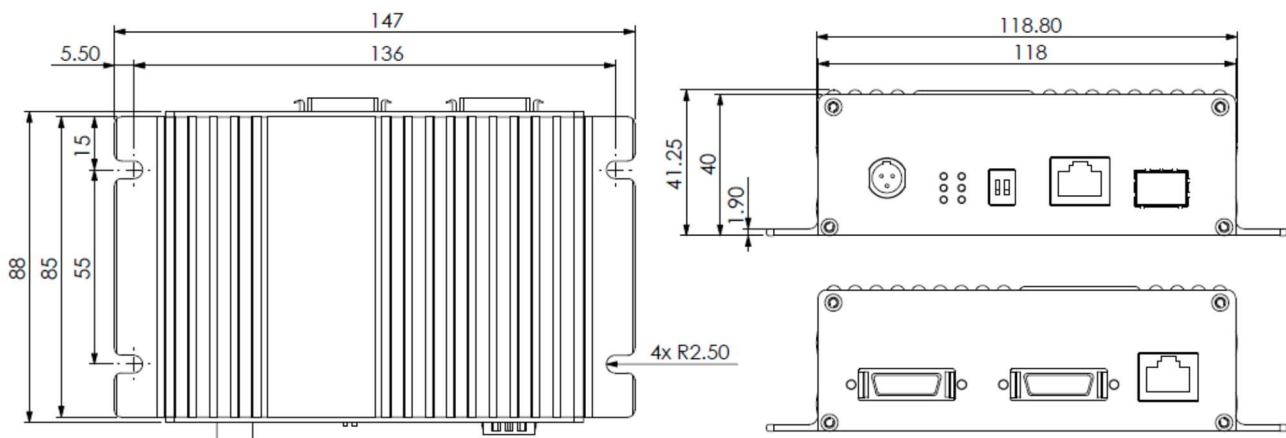
<b>GPIO Interface (optional)</b>	
Number of I/O Channels	2 input and 2 output
Operating Voltage	0~3.3V
Max. Data Rate	250 Kbps
Connector Type	RJ45
<b>RS232 Interface</b>	
Number of Data Channels	one TxD and one RxD
Operating Voltage	Input: +/- 25V, Output: +/- 6V
Max Data Rate	250 Kbps
Connector Type	RJ45

## Optical Interface

	PHOX-FM-300	PHOX-FL-10	PHOX-FL-10-Cxx*	PHOX-FL-L10
Operating Wavelength	850nm	1310nm	1270 ~ 1610 with 20nm spacing	CM: 1270 nm FG: 1330 nm
Min Optical Tx Output Power	-5 ~ -1 dBm	-8 ~ +0.5 dBm	-5 ~ 0 dBm	-8 ~ +0.5 dBm
Min Optical Rx Input Power	-11.1 dBm	-14 dBm	-15 dBm	-14 dBm
Max Optical Rx Input Power	0 dBm	+0.5 dB	+0.5 dB	+0.5 dB
Connector Type	LC duplex	LC duplex		LC simplex
Fiber Type	50/125 $\mu$ m MM fibers	9/125 $\mu$ m SM fibers		

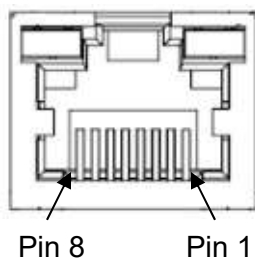
\*Other optical power options are available. See the ordering info.

## MECHANICAL INFORMATION (mm)



## RS232 and GPIO PIN ASSIGNMENT (RJ45)

Note: RS232 is connected by default. GPIO is optional and not connected in standard product. Please see ordering information to activate this option at the time of purchase.



- |              |              |
|--------------|--------------|
| 1: GPIO TX1  | 5: GND       |
| 2: GPIO TX2  | 6: RS232 RxD |
| 3: RS232 TxD | 7: GPIO RX1  |
| 4: GND       | 8: GPIO RX2  |

## ORDERING INFORMATION

Model #	Operating Temperature	Transport Distance*	Items included
PHOX-FM-300	Standard	OM1 fiber up to 30 m OM2 fiber up to 80 m OM3 fiber up to 300 m	1x PHOX camera (CM) side module 1x PHOX frame grabber (FG) side module 2x 12V international wall mount AC/DC power adapters (LC duplex fiber cable not included)
PHOX-FM-300-T	Extended		
PHOX-FL-10	Standard	Up to 10 km	
PHOX-FL-10-T	Extended		
PHOX-FL-L10	Standard	Single fiber up to 10 km	
PHOX-FL-L10-T	Extended		

Note:

\* Distance depending on fiber type and system design. 300 m is estimated based on 50/125 OM3 MM fiber and 10 km is estimated based on 9/125 SM fiber. Extra optical losses in the system will reduce the maximum transmission distance.

**CWDM models** (users need to specify wavelengths for CM and FG modules)

Model #	Optical Power Budget	Optical Wavelengths	Items Provided
<b>PHOX-FL-10-Cxx</b>	10dB	xx=27 for 1270 nm xx=29 for 1290 nm xx=31 for 1310 nm xx=33 for 1330 nm xx=35 for 1350 nm xx=37 for 1370 nm	1x PHOX camera (CM) side module  1x PHOX frame grabber (FG) side module  2x 12V international wall mount AC/DC power adapters (LC duplex fiber cable not included)
<b>PHOX-FL-14-Cxx</b>	14dB	xx=39 for 1390 nm xx=41 for 1410 nm xx=43 for 1430 nm xx=45 for 1450 nm xx=47 for 1470 nm xx=49 for 1490 nm	
<b>PHOX-FL-23-Cxx</b>	23dB	xx=51 for 1510 nm xx=53 for 1530 nm xx=55 for 1550 nm xx=57 for 1570 nm xx=59 for 1590 nm xx=61 for 1610 nm	

### GPIO option

Add -G at the end of the desired standard model numbers to activate the GPIO ports. For example: PHOX-FM-300-G and PHOX-FL-10-G.

**Accessory:**

<b>Part #</b>	<b>Description</b>
618-TRG10R-TA3FX	12V DC international wall mount AC/DC adapter with Switchcraft TA3FX
614-14T26-xx-0LC	Camera Link cable – Plug to Plug. xx = desired length in meters.
LC-LC-M-D-xxxM	LC to LC duplex 50/125 $\mu$ m OM2 MM fiber. xxx = desired length in meters.
LC-LC-G-D-xxxM	LC to LC duplex 50/125 $\mu$ m OM3 MM fiber. xxx = desired length in meters.
LC-LC-S-D-xxxM	LC to LC duplex 9/125 SM fiber. xxx = desired length in meters.
PXF-DB9RJ45-6	6 ft RJ45 plug to DB9 female cable



[www.phrontier-tech.com](http://www.phrontier-tech.com)

**sales@phrontier-tech.com**

**Toll Free: 1-866-389-2829**

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