

**TN0018**

**Fiber optic cable for Pyramid products**

## Transmitters and receivers

Pyramid products use fiber optics for communications and transport of digital signals. Fiber optics are attractive for several reasons:

- Perfect electromagnetic immunity
- Able to transport signals over long distances
- Able to transport signals over high voltage gaps

The connectors are ST bayonet type which are integrated the transmitter and receiver electronics. When connecting the cable take care to align the key with the slot before pushing home and twisting to lock the bayonet. Do not use excessive force.



Data rate for use in communication channels is 10 Mb/sec, and the Pyramid loop controllers allow up to 14 devices to share a single port in a loop configuration. For high data rate systems, the population of the loops is usually limited to one, so the network becomes a hub and spoke topology. The wavelength is 650 nm which is in the visible red part of the spectrum. This makes commissioning and service work more straightforward compared to other systems which use infra-red light.

Transmitters	HFBR-1515 (light gray case). Metal body connector available on some products.
Receivers	HFBR-2515 (dark gray case). Metal body connector available on some products.

## Fiber optic cable

The cable core is 200/230  $\mu\text{m}$  step index hard-clad silica fiber with NA 0.37 and attenuation  $\leq 8$  dB per km, manufactured by OFS Inc., part number CF01493-10. Cable with smaller aperture or higher attenuation should not be used. The HCS fiber has good radiation hardness and allows cable lengths of up to 500 m. Minimum long-term bend radius is 16 mm. The outer jacket in plenum or riser grades is 2.2 mm od, suitable for a crimped ST connector.

Cable assemblies are available from Pyramid as simplex or duplex cables. Simplex cables are appropriate for connections between devices in a communication loop or for transporting individual digital bits. Duplex cables are convenient and tidier for point-to-point connections (single devices on a “loop”).

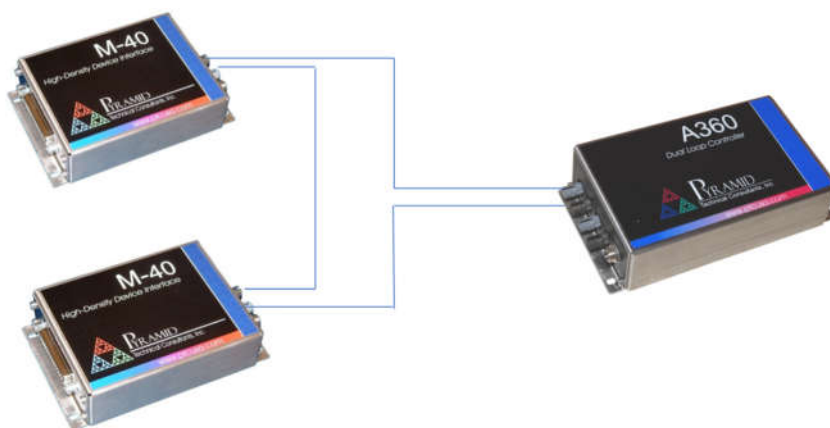
Simplex fiber



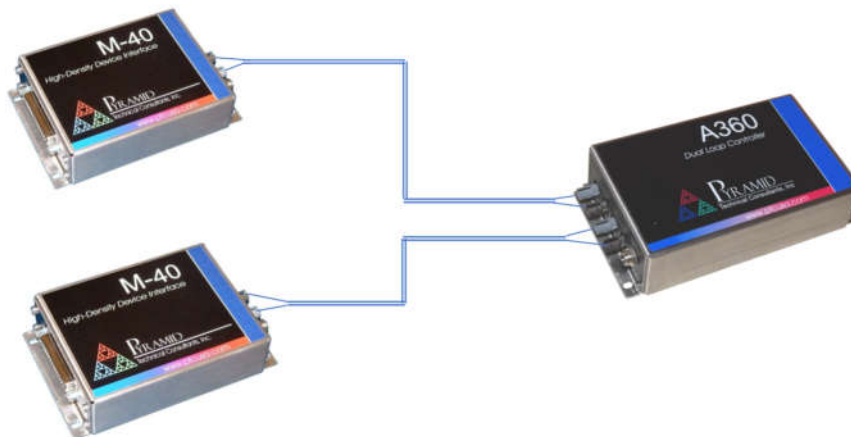
Duplex fiber (zipcord)



Two devices on one loop using simplex cable



Two devices on two loops using duplex cable



## Cable termination

Cables can be bought ready terminated to required lengths, or terminated in situ. When pulling pre-terminated cables through ducting or trays, take care to protect the terminations from being stressed. ST terminations and a manual cleaving and crimping kit are available from Pyramid or direct from OFS. The kit comes with full instructions. We recommend a few trial terminations before first committing to important cables. Leave a little excess length in case re-termination is needed.

Completed cables can be tested for attenuation loss using a dedicated tester, or by checking the reliability of data transmission between Pyramid devices.

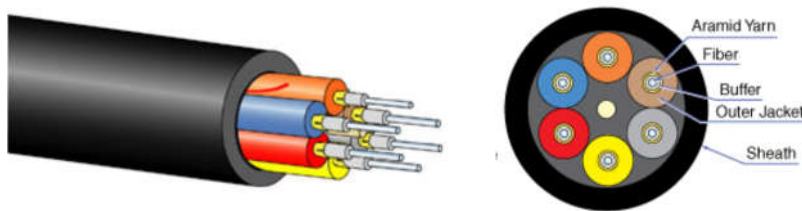
### Pyramid fiber optic cable assembly order codes

<b>CAB-ST-HCS-xx-ST</b>	Simplex fiber optic cable xx feet long, ST bayonet terminated
<b>CAB-2ST-HCSD-xx-2ST</b>	Duplex fiber optic cable xx feet long, ST bayonet terminated

Divide by 3.281 for length in m.

### Industrial and outdoor rated cable

Multiple fibers protected by an outer jacket are available for additional robustness. OFS supplies cable such as the one shown with six individual fibers inside a 10 mm od outer jacket, rated for more difficult environments. The individual fibers have 2.5 mm od so the ST terminations should be selected accordingly.



### Other cable assembly suppliers

Cable and cable assemblies are available from Industrial Fiber Optics, Inc.

<https://www.i-fiberoptics.com/>

<https://www.i-fiberoptics.com/patchcords.php?id=15>

### OFS part codes

CF01493-10	Fiber HCS step index 200/230 $\mu$ m with ETFE buffer (bare fiber)
BC03597-10-BL	Fiber simplex with jacket 2.2 mm od, plenum rated
BC04340	Fiber duplex zipcord with jacket 2.2 mm od, plenum rated
BC04265-10	Fiber simplex with jacket 2.2 mm od, riser rated
BC04307	Fiber duplex zipcord with jacket 2.2 mm od, riser rated
BC04791-10	Fiber dual with protective outer jacket 7.5 mm od, riser rated
BC04791-12	Fiber quad with protective outer jacket 7.5 mm od, riser rated

# Technical Note

AC01285-10	Fiber multiple, six 2.5 mm od fibers, 10 mm od, industrial and outdoor rated
BP05065-12	ST connector for 200/230 $\mu\text{m}$ , 2.2 mm od fiber
BP05065-13	ST connector for 200/230 $\mu\text{m}$ , 2.5 mm od fiber
	ST connector white boot for tx connection qty 1 (Pyramid <b>CONN-ST-HCS-WH</b> ) ST connector white boot for tx connection qty 25 (Pyramid <b>CONN-ST-HCS-WH25</b> )
	ST connector black boot for rx connection qty 1 (Pyramid <b>CONN-ST-HCS-BL</b> ) ST connector black boot for rx connection qty 25 (Pyramid <b>CONN-ST-HCS-BL25</b> )
DT03732-32	Termination kit, 200 $\mu\text{m}$ , ST (Pyramid <b>TOOL-ST-HCS</b> )
DT03732-06	Replacement diamond cleave tool for termination kit (Pyramid <b>TOOL-ST-HCS-SP01</b> )
CP01229-02	Replacement stripping tool for termination kit
P10188-03	Insertion loss test kit (attenuation tester) 200 $\mu\text{m}$ fiber, ST connectors