Fiber Optic Cables for DHD MADI Modules

General Information

All the below mentioned fiber optical cables can be used for wiring DHD systems, depending on the MADI port type (multi mode or single mode). Please decide, which cable is the most suitable in your case or ask a network specialist for help if you are unsure about the cable type.

In cases when a structured building cabling system is used, the cable type may be already installed or decided before the studio installation begins. In this case you need to select the appropriate multi mode or single mode module.

As a rule of thumb you may use multi mode cables up to 500m and single mode cables up to 15km. DHD can not guarantee this values, because it is mainly dependent of the cable type, the quality of cable and connector installation and the number and quality of connectors and patches in between. Only a professional measurement of the optical power loss of the entire cable including all connectors and patches can proof the quality. Use this measurement result and the receiver/transmitter specifications below to calculate the remaining optical power budget.

The baud rate of a MADI signal is 125MBaud. To learn more about MADI please refer to "Serial Multichannel Audio Digital Interface (MADI) AES10-2003" published by Audio Engineering Society, Inc.

Fibre optic cables are supplied by several manufacturers, for example HITRONIC® fibre optic cables from the manufacturer Lapp Kabel. Please refer to the cable manufacturers data sheets for any technical details and specifications.

The following fiber optical cables can be used to interconnect the MADI ports of DHD systems among each other and with third party devices.

Multi Mode Modules and Cable Types

connector style: SC duplex, black plastic housing on module side

Module	Device	MADI Ports
RM220-951	RM2200D	one MADI port (RX and TX)
RM330-421	RM3200D	one MADI port (RX and TX)
RM420-421S	RM4200D	one MADI port (RX and TX)
RM420-422S	RM4200D	two MADI ports (RX and TX)
52-5411A	52/MB/CR	one MADI port (RX and TX)
52-5413A	52/MB/CR	one MADI port (RX and TX)
52-5422A	52/MB/CR	two MADI ports (RX and TX)
52-5424A	52/MB/CR	two MADI ports (RX and TX)
52-6120A	52/XR	two MADI ports (RX and TX)

Please refer to the appropriate lists of modules and documentation for any product details. DHD uses the word MADI port for a MADI receiver (RX) and a MADI transmitter (TX). In principal the receiver and transmitter are independent from each other, but they are combined within one SC duplex connector, using two independent optical fibers.

Use one of the following multi mode cable types for these modules:

Fiber	Fiber Type	Core Diameter in µm	Cladding Diameter in µm	Typical Fiber Diameter in µm	Typical Damping Coefficient in dB/km	Typical Bandwidth for 1 km in MHz	Typical Numerical Aperture
G 50/125 - OM2	multi mode graded index	50	125	250	≤ 0.9 at 1300nm	≥ 800 at 1300nm	0.2
G 50/125 - OM3	multi mode graded index	50	125	250	≤ 0.9 at 1300nm	≥ 500 at 1300nm	0.2
G 62.5/125	multi mode graded index	62.5	125	250	≤ 1.0 at 1300nm	≥ 500 at 1300nm	0.27

The OM3 fiber allows data rates up to 10 GB/s, the OM2 fiber is designed for networks with data rates up to 1 GB/s - both are sufficient for the operation of MADI devices with a much lower data rate of 125MBaud.

Multi Mode Fiber Optical Receiver/Transmitter, Data sheet abstract

Type: Avagotech (manufacturer) AFBR-5803Z or similar on all DHD multi mode modules. Please refer to the manufacturer data sheet for further details or specifications.

Transmitter Section:

Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Units**
Output Optical Power 62.5/125 µm, Numerical Aperture = 0.275 Fiber	P_O	-20			dBm avg.
Output Optical Power 50/125 µm, Numerical Aperture = 0.20 Fiber	P_O	-23.5			dBm avg.
Center Wavelength	λ_C	1270	1308	1380	nm

Receiver Section:

Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Units**
Input Optical Power Minimum at Window Edge	$P_{IN\ Min.}$ (W)		-33.9		dBm avg.
Input Optical Power Maximum (check if using none DHD TX equipment)	$P_{IN\ Max.}$	-14			dBm avg.

Single Mode Modules and Cable Types

connector style: SC duplex, blue plastic housing on module side

Module	Device	MADI Ports
RM220-957	RM2200D	one MADI port (RX and TX)
RM420-425S	RM4200D	one MADI port (RX and TX)
RM420-426S	RM4200D	two MADI ports (RX and TX)
52-5415A	52/MB/CR	one MADI port (RX and TX)
52-5425A	52/MB/CR	two MADI ports (RX and TX)
52-6125A	52/XR	two MADI ports (RX and TX)

Please refer to the appropriate lists of modules and documentation for any product details. DHD uses the word MADI port for a MADI receiver (RX) and a MADI transmitter (TX). In principal the receiver and transmitter are independent from each other, but they are combined within one SC duplex connector, using two independent optical fibers.

Use the following single mode cable type for these modules:

Fiber	Fiber Type	Core Diameter in µm	Cladding Diameter in µm	Typical Fiber Diameter in µm	Typical Damping Coefficient in dB/km
E 9/125	mono mode / single mode graded index	9	125	250	≤ 0.36 at 1310nm

Single Mode Fiber Optical Receiver/Transmitter, Data sheet abstract

Type: Avagotech (manufacturer) AFCT-5805DZ or similar on all DHD single mode modules. Please refer to the manufacturer data sheet for further details or specifications.

Transmitter Section:

Parameter	Symbol	Minimum	Maximum	Units
Output Center Wavelength	λ_{CE}	1261	1360	
Average Optical Output Power	P_O	-15		dBm

Receiver Section:

Parameter	Minimum	Maximum	Units
Receiver Sensitivity		-31	dBm
Maximum Input Power (check if using none DHD TX equipment)	-7		dBm