FXCORE MX88

User Manual

Long-Distance KVM Fiber Optic Matrix Switch

8X8 KVM Fiber Optic Matrix Switch
Delivers KVM Operations,
Uncompressed HD Signal Routing

Smart-AVI
SMART AUDIO VIDEO INNOVATION

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WHAT'S IN THE FXCORE MX88 Multi-mode Model BOX?

PART NO.	QTY.	DESCRIPTION
FXCM-MX0808S	1	FXCore Fiber Optic Multimode 8x8 KVM Matrix Switch
CCPWR06	1	6' Power Plug Cable
EN-QKVM-EAR-P	2	Mounting Brackets
CCRS232MF06	1	RS-232 Cable Male to Female
	1	Quick Start Guide

WHAT'S IN THE FXCORE MX88 Single-mode Model BOX?

PART NO.	QTY.	DESCRIPTION
FXCS-MX0808S	1	FXCore Fiber Optic Singlemode 8x8 KVM Matrix Switch
CCPWR06	1	6' Power Plug Cable
EN-QKVM-EAR-P	2	Mounting Brackets
CCRS232MF06	1	RS-232 Cable Male to Female
	1	Quick Start Guide

INTRODUCTION

The FXCORE-MX88 from SmartAVI is a reliable, secure, long-distance signal router that operates on fiber optic cables, allowing for safe and efficient DVI AV (Audio and Video) operation. In critical environments where security and speed are essential, the FXCORE MX88 enables users to control AV connectivity with 1080p HD video, audio, and RS-232.

With eight inputs and eight outputs (8x8 configuration), the FXCORE-MX88 routes uncompressed signals for KVM functions, including 1080p HD video, 7.1 digital audio, USB keyboard, USB mouse and RS-232. Manufactured in the USA.

FEATURES
- Available in Multi-mode and Single-mode models
- Device-to-Matrix routing distance of 15 miles with the single-mode model, 30 miles from device to device
- Device-to-Matrix routing distance of 1,400 feet with the multi-mode model, 2,800 feet from device to device
- Top Signal Quality at Maximum Extension in multi-mode
- Fiber Plug Type LC
- Compatible with all operating systems

APPLICATIONS
- Military/Government Operations
- Medical Campuses
- Academic Institutions
- Industrial Work Areas
- Home Theater Integration
- Digital Signage Deployment
- Airports and Air Traffic Control
- Information Kiosks/Displays
- Film/Recording Studios
- Security Control Centers
- Concerts and Other Multimedia Venues
- Convention Centers
- Sports Arenas and Public Facilities

What is the difference between Multi-mode and Single mode Fiber?

Multi-mode:
Uses larger diameters allowing for high bandwidth over medium distances. Because of the multiple light paths or signals there is a higher chance of distortion or overlap of light signals over longer distances. Device-to-Matrix routing distance of 1,400 feet in multi-mode, 2,800 feet from device to device.

OM3 & OM4 Cables:
Laser Optimized Multimode Cables, Color is normally Aqua, Core size 50um, Data rate 10GB @ 850nm
OM3, up to 300 meters (984 feet)
OM4, up to 500 meters (1640 feet)

Single-mode:
Uses a narrower diameter that virtually eliminates distortion or signal overlap because there is only 1 signal. This provides the least signal attenuation and provides transmission over much longer distances than Multi-mode. Device-to-Matrix routing distance of 15 miles in single-mode, 30 miles from device to device.

<u>Transmitters and Receivers are not included with the FXCORE MX88 fiber optic matrix switch.
They must be ordered separately.</u>

ORDERING INFO:

FDX-3000-MX   **Multimode** Fiber Extender Up to 1400ft. DVI-D, Stereo Audio, USB 1.1, RS-232,
                     Includes: [FDX-TX3000-MX, FDX-RX3000-MX, 2 X (PS5VD4A)]

FDX-3500-MX   **Singlemode** Fiber Extender Up to 15km DVI-D, Stereo Audio, USB 1.1, RS-232,
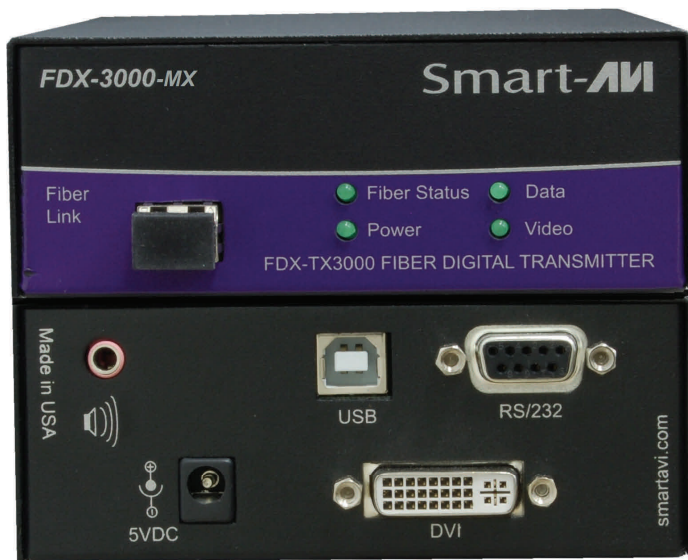   Includes: [FDX-TX3500-MX, FDX-RX3500-MX, 2 X (PS5VD4A)]
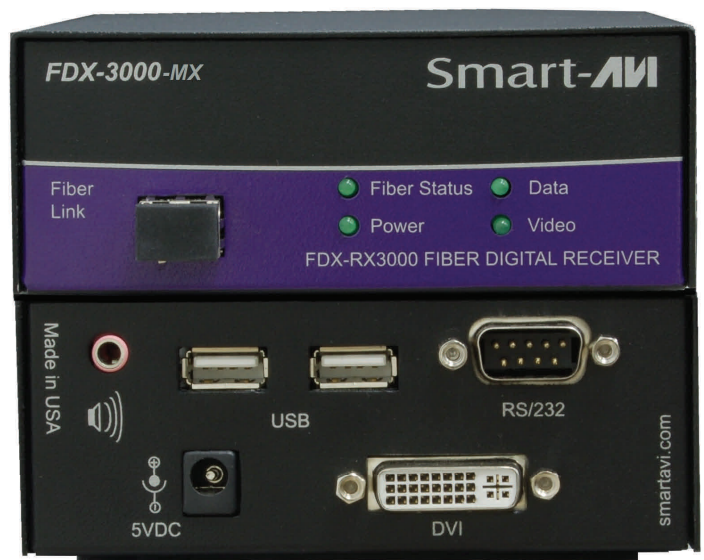

Figure 4-1
FDX-TX3000-MX
Shown

Figure 4-2
FDX-RX3000-MX
Shown

TECHNICAL SPECIFICATIONS

OPTICAL	
Input Connector	Full Duplex multimode LC (Connecting to TX and RX units requires LC to LC connectors.)
Type	8 multimode full duplex LC fiber optic inputs and outputs
Wavelength	850nm, VCSEL Class 1 AEL Laser
Operating Distance Multi-mode	730 ft. @ Multimode 62.5/125 μm MMF—OM3 Cable 1400 ft. @ Multimode 50/125 μm MMF—OM4 Cable
Operating Distance Single-mode	Up to 15 miles, 30 miles transmitter (Computer) to receiver (Keyboard, Mouse, Display) with FXCORE MX88 in the middle
Connector Compliance	FC-PI 200-M5-SN-I and 200-M6-SN-I 2.125 GBd FC-PI 100-M5-SN-I, FC-PI 100-M6-SN-I, FC-PH2 100-M5-SN and FC-PH2 100-M6-SN-I 1.0625 GBd
Receiver Sensitivity	-21 dB Max
TX Output	Optical Power (Average) -10dBm
RX Input	Optical modulation amplitude (min) -17dBm
Channel Routing	8x8 Non blocking
Control	RS232 9600bps

OTHER	
Power	110V/220V internal power supply 40W
Video	Format: DVI-D Single Link Maximum Pixel Clock: 165 MHz Resolution: Up to 1080p
Audio Compatibility	Signal Type - Stereo Audio Bandwidth - 15MHz, 0dB Impedance - 10K Ohm
USB	USB keyboard mouse with full emulation
RS-232	Speed: Up to 115 Kbps
General	Operating Temp.: 0-55 °C (32-131°F) Storage Temp.: -20-85 °C (-4-185 °F) Humidity: Up to 95%
Dimensions	17" W x 10.8" D x 1.8" H

HARDWARE INSTALLATION

FXCORE MX88

Figure 5-1

1. Turn off all input and output devices and displays.
2. Connect DVI-D and USB-A to B cables from up to 8 input devices to the FDX-3000-MX Transmitters.
3. Optionally connect Audio cables from up to 8 input devices to the FDX-3000-MX Transmitters.
4. Optionally connect RS-232 cables from up to 8 input devices to the FDX-3000-MX Transmitters.
5. Connect DVI-D cables from up to 8 displays to the FDX-3000-MX Receivers.
6. Connect a USB keyboard and USB mouse to the FDX-3000-MX Receivers.
7. Optionally connect Audio cables from up to 8 Audio speakers to the FDX-3000-MX Receivers.
8. Optionally connect up to 8 RS-232 devices to the FDX-3000-MX Receivers.
9. Connect Duplex Fiber Optic cables from each Transmitter to the INPUT ports of the FXCORE MX88.
10. Connect Duplex Fiber Optic cables from each Receiver to the OUTPUT ports of the FXCORE MX88.
11. Power on the Transmitters, Receivers, displays, input and output devices, and the FXCORE MX88.

Displays connected to a receiver will need a password entered.
Each receiver will need to have a USB keyboard connected to enter the password.
The default password is 123.

FDX-3000-MX Transmitter and Receiver (Not Included)

Figure 5-2

NAVIGATING THE ON SCREEN DISPLAY (OSD)

To access the OSD menu, use the keyboard attached to the FDX-3000-MX Receiver and press the Hot Keys Ctrl+Ctrl+'o'. The OSD menu will display all of the inputs in a list. Commands can be performed in the OSD menu through the use of the keys outlined on the bottom of the menu.

The commands include:
Ctrl+Ctrl+'o' (Activate the OSD Menu)
F3 Disconnect
F4 Refresh
F5 CTRL (Control)
F6 View
F8 EDID (Learn EDID)
F9 Logoff
+/- Opacity (Makes the OSD Menu more or less transparent)
ESC+ESC (Exit OSD Menu)

Use the up and down arrow keys to navigate through the selections in the menu and press the respective key to perform that command. You are not able to control a device while on the OSD menu. To exit the OSD menu press the keys Esc+Esc on the keyboard.
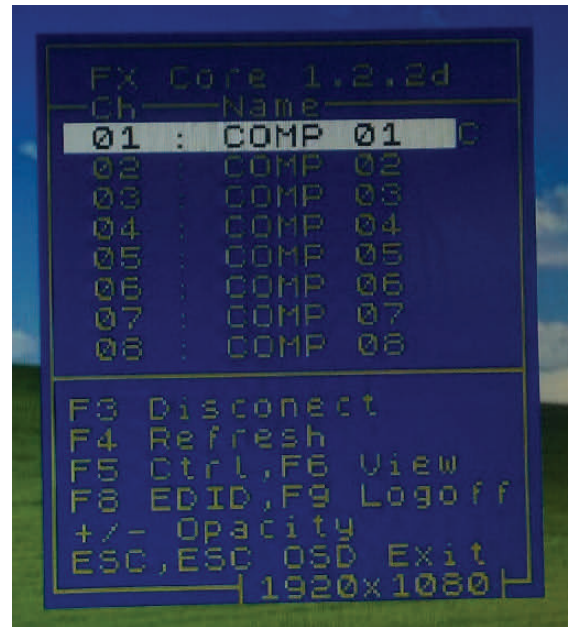

Figure 6-1

EDID Learning

To learn the EDID of a monitor,
1. Connect a USB Keyboard and Mouse to the receiver connected to that monitor.
2. Enter OSD on that monitor using the Hot Keys Ctrl+Ctrl+'o'.
3. On the OSD menu, navigate to the desired device and enter "Control Mode" by pressing F5.
4. While in control mode, press F8 "EDID". Learning the EDID should only take a few seconds.
5. Afterwards, exit OSD mode by pressing ESC+ESC and the EDID will have been learned.

Controlling a remote computer

1. Connect a USB Keyboard and Mouse to the receiver connected to your monitor. The receiver must be connected to the transmitter connected to the computer you want to control via the FXCORE.
2. Enter OSD on that monitor using the Hot Keys Ctrl+Ctrl+'o'.
3. Press the up and down arrow keys to highlight the computer you want to control.
4. Press F5 "CTRL" to select the computer.
5. Press ESC+ESC to exit the OSD menu.
6. Your keyboard and mouse are now connected to the selected computer.
If your display is viewing a different computer than the one you want control of, when you hit F5 on the selected computer, your display will switch to that computer.

Change Display from one computer to another

Press Ctrl+Ctrl+'o' to activate the OSD menu.
Press the up or down arrows to highlight the computer output you want to view.
Press F6 to display that systems output on the display.
Press ESC+ESC to exit the OSD menu.

RS-232 CONTROL

You can control the FXCORE from a PC via RS-232 using a terminal client software such as PuTTY. Check the RS-232 connectors on your PC serial port or your USB to RS-232 adaptor and the FXCORE to determine the cable needed. Use a terminal client software such as PuTTY to connect to the FXCORE. Make sure the standard communication mode is **9600bps,N,8,1.** Below is a guide including the command syntax to use when controlling the system through the Command mode using a Terminal.

How to properly create an RS-232 connection between a PC and the FXCORE.

Establish a connection to the FXCORE

1. Connect a straight through male-to-female RS-232 cable (not included) to the RS-232 connector on the PC.

2. Connect the other end of the cable to the RS-232 port of the FXCORE.
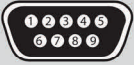
3. Power on the device.

CONNECTOR	PIN	NAME	DESCRIPTION
DB9 MALE - RECEIVE	2	RxD	Receive Data on DB9 Male
	3	TxD	Transmit Data on DB9 Male
	5	SGND	Ground
DB9 FEMALE - TRANSMIT	2	TxD	Transmit Data on DB9 Female
	3	RxD	Receive Data on DB9 Female
	5	SGND	Ground

Figure 7-1

Setting up the Terminal Application

1. Open your terminal software on the PC. (or use the terminal client of your choice)
2. Use the default settings to create a connection to the device: *9600*, *8*, *N*, *1*.
3. Be sure that Flow Control is *None*.
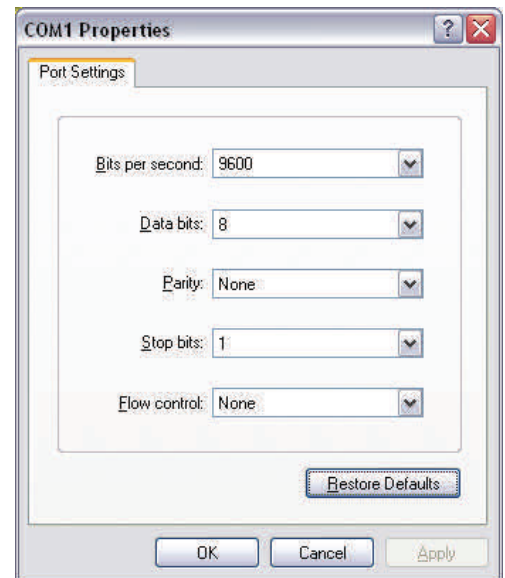4. The output of the device will be the same as the PC.

Figure 7-2

RS-232 INTEGRATION WITH THIRD PARTY SOFTWARE

Command Mode.
These commands should be supported in both Command Mode (CM) and Debug Mode.

nn = frame address #00 to #FF (default = 00)
cc = Input, computer #01 to n (max 08)
uu = Output, user #01 to n (max 08)
<CR> = Carriage Return (ENTER)

Function	Description	Protocol
Control Port	View and control an input from an output assigned to it	\\FnnCccuu<CR>
Disable Control Port	Disable the control port cross-point	\\FnnCccuuD<CR>
Broadcast Port	Broadcast video and audio to all outputs with C or V permission,	\\FnnBcc{uu}<CR>
Disable Broadcast Port	Disable the broadcast port cross-point	\\FnnBD<CR>
View Port	View an input from an output assigned to it (cross-point). Video and audio only.	\\FnnVccuu<CR>
Disable View Port	Disable the view port cross-point	\\FnnVccuuD<CR>
Output Enable	Enable an output.	\\FnnOuu<CR>
Output Disable	Disable an output	\\FnnOuuD<CR>
Query	Displays the current cross-points of the matrix.	\\FnnQ<CR>
Reboot Matrix	Reboots the matrix. All settings should remain the same.	\\FnnR<CR>
New Frame Address	Set new frame address to the unit	\\FnnAnn<CR>
Debug Mode	Enter Debug mode for advanced features. *	\\FnnD<CR>
Help	Display help screen	\\Fnn?<CR> \\FnnHELP<CR>

*   To enter Debug Mode:
        Passwords are case sensitive.
        Default Username: Admin
        Default Password: Pass

Debug Mode

Enter command \\F**nn**D<CR> from Command mode.
The username and password are case sensitive.
<u>Default USERNAME: Admin</u>
<u>Default Password: Pass</u>

Commands for Debug mode only:

Function	Description	Protocol
Password	Sets the passwords for users and Admin	\\F**nn**W**uu**<CR>
Name	Sets the name for computers and Admin	\\F**nn**N**uu**<CR>
Permissions	Review and Set permissions	\\F**nn**P{**ccuup**}<CR>
Restore Factory Settings	Restore factory settings. Do not restore default Admin's name/password.	\\F**nn**F<CR>
Help	Display help screen	\\F**nn**?<CR> \\F**nn**HELP<CR>
Exit	Exit from CLI mode to CM	\\F**nn**EXIT<CR>

Permissions as follows:
C - Control - user can control and view this PC.
V - View - user can view only, can not control this PC.
D - Disabled - access to this PC is disabled for this user.

To review all permissions use as follow:
\\FnnP<CR>
 p = permission C, V or D

Help command
For the Help command, a list of commands will display in the terminal. Following the syntax in this menu will allow you to navigate through the Debug Mode.

Default factory settings
1. Permissions: All Users have C, V, and B permissions
2. Default Frame address is 00 (\\F00)
3. <u>Default admin's name and password: Admin, Pass</u>
4. <u>Default user's (RX's) password is 123, same for all.</u>
5. Default names for Computers (TXes) Computer 01, Computer 02' ...
6. Default matrix interconnection is 1-1, 2-2, ... , 8-8.

LIMITED WARRANTY STATEMENT

A.   Extent of limited warranty

Smart-AVI Technologies, Inc. warrants to the end-user customers that the Smart-AVI product specified above will be free from defects in materials and workmanship for the duration of 1 year, which duration begins on the date of purchase by the customer. Customer is responsible for maintaining proof of date of purchase.

Smart-AVI limited warranty covers only those defects which arise as a result of normal use of the product, and do not apply to any:
>   a. Improper or inadequate maintenance or modifications
>   b. Operations outside product specifications
>   c. Mechanical abuse and exposure to severe conditions

If Smart-AVI receives, during applicable warranty period, a notice of defect, Smart-AVI will at its discretion replace or repair defective product. If Smart-AVI is unable to replace or repair defective product covered by the Smart-AVI warranty within reasonable period of time, Smart-AVI shall refund the cost of the product.

Smart-AVI shall have no obligation to repair, replace or refund unit until customer returns defective product to Smart-AVI.

Any replacement product could be new or like new, provided that it has functionality at least equal to that of the product being replaced.

Smart-AVI limited warranty is valid in any country where the covered product is distributed by Smart-AVI.

B.   Limitations of warranty

To the extant allowed by local law, neither Smart-AVI nor its third party suppliers make any other warranty or condition of any kind whether expressed or implied with respect to the Smart-AVI product, and specifically disclaim implied warranties or conditions of merchantability, satisfactory quality, and fitness for a particular purpose.

C.   Limitations of liability

   To the extent allowed by local law the remedies provided in this warranty statement are the   customers sole and exclusive remedies.

To the extant allowed by local law, except for the obligations specifically set forth in this warranty statement, in no event will Smart-AVI or its third party suppliers be liable for direct, indirect, special, incidental, or consequential damages whether based on contract, tort or any other legal theory and whether advised of the possibility of such damages.

D.   Local law

   To the extent that this warranty statement is inconsistent with local law, this warranty
   statement shall be considered modified to be consistent with such law.

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Designed and Manufactured in the USA

800.AVI.2131
Tel: (818) 503-6200 Fax: (818) 503-6208
11651 Vanowen St. North Hollywood, CA 91605
SmartAVI.com