USB Controller for Mini-X-OEM

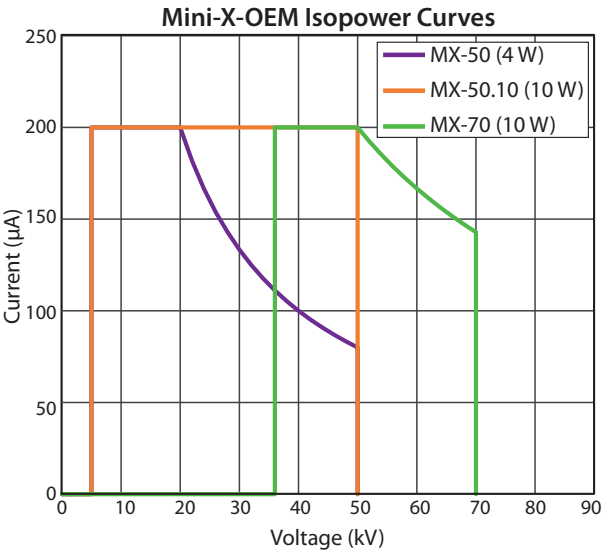
MX50, MX50.10 and MX70

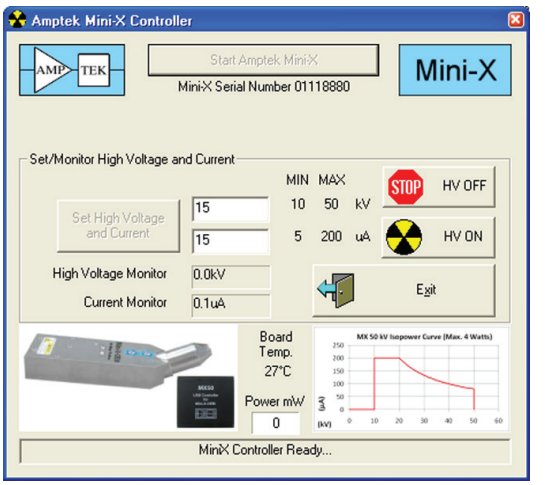
The MX-50 family of products are controllers designed to interface with miniature X-ray tube and HVPS modules, including Amptek's Mini-X-OEM. The MX-50 family has a USB interface to produce the voltages to control the voltage and current in the X-ray tube. Software running on the PC controls the tube. The MX-50 also includes a safety interlock circuit and controls for a warning light.

The MX-50 products differ from the Amptek Mini-X. The Mini-X is a single, integrated module with both the X-ray tube/HVPS and the USB interface module.

There are three different variants of the MX-50 currently available. These differ in the allowable range of control voltages for voltage, current, and power and match the specification of modules supplied by Newton Scientific. The MX-50 is suitable for the 50 kV, 4 W monoblock. The MX-50.10 is suitable for the 50 kV, 10 W monoblock. The MX-70 is suitable for the 70 kV, 10 W monoblock unit.

The Mini-X-OEM is a precision x-ray generator designed for applications that require small size and low power consumption.





Mini-X OEM Controller Software Interface Allows User to Set and Monitor Voltage and Current

USB Controller for Mini-X-OEM

PIN Configuration

PIN	NAME	MX-50	MX50.10	MX-70
PIN 1	V+	12 VDC	12 VDC	12 VDC
PIN 2	V+	12 VDC	12 VDC	12 VDC
PIN 3	Ground			
PIN 4	Ground			
PIN 5	Tube I Control Input	0.1 - 4 V = 5 - 200 µA	0.1 - 4 V = 5 - 200 µA	0 - 3 V = 0 - 150 µA
PIN 6	Tube HV Control Input	0.4 - 4 V = 5 - 50 kV	0.4 - 4 V = 5 - 50 kV	1.8 - 3.5 V = 35 - 70 kV
PIN 7	Filament Ready (0-5V)	Low=Not Ready, High=Ready	Low=Not Ready, High=Ready	Low=Not Ready, High=Ready
PIN 8	Tube Enable Input (0-5V)	Low = Off, High = Enable	Low = Off, High = Enable	Low = Off, High = Enable
PIN 9	Tube HV Monitor Output	0.4 - 4 V = 5 - 50 kV	0.4 - 4 V = 5 - 50 kV	1.8 - 3.5 V = 35 - 70 kV
PIN 10	Tube I Monitor Output	0.1 - 4 V = 5 - 200 µA	0.1 - 4 V = 5 - 200 µA	0 - 3 V = 0 - 150 µA
	Power	4 W	10 W	10 W

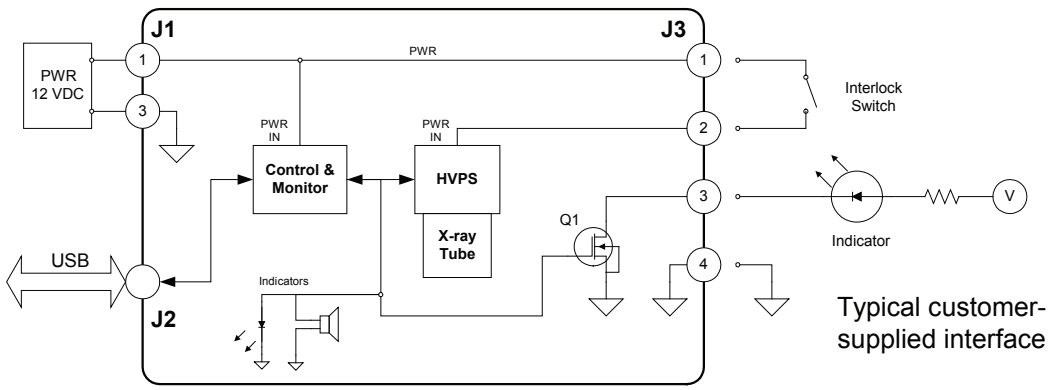
Interface

Power Consumption	Up to 20 W
Input Voltage	12 VDC (AC adapter included)
Control	USB, mini-USB connector (cable included)
Setting Time	Typical < 1 s
Weight	360 g
Humidity	30 to 90% non condensing
Operating Temperature	-10 °C to +50 °C
Storage Temperature	-25 °C to +60 °C

Interlock

The MX products have a user controlled hardware Interlock Connector so that the user can interface with their external safety mechanisms in order to prevent accidental exposure. This interlock must be shorted (enabled) in order for the Mini-X to produce X-rays. This is most commonly implemented as a shutter or cover that, when opened, disables the interlock and stops the generation of X-rays. When the tube is producing X-rays and the interlock is disabled, the tube will go into a reset mode. It is therefore necessary to restart the tube through software. Re-enabling the interlock after disabling it will not resume the production of X-rays. The interlock connector also permits the user to implement an external indicator to show when the tube is in use.

The figure below is a block diagram illustrating use of the Interlock Connector. As shown in the figure, power is supplied to the high voltage power supply (HVPS) via a connection between pins 1 and 2 of the Interlock Connector. If the connection between these pins is interrupted, there is no power to the HVPS and so the tube turns off. In addition, this latches a bit in the monitor circuit, which must be reset via a USB command. When a connection is restored between pins 1 and 2, although power is restored to the HVPS, the unit is not turned on until this command is received. The MX contains a speaker and an LED, both of which indicate that the X-ray tube is turned on. The LED is visible next to the Interlock Connector on the package.



OEM's #1 Choice

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