IMC-21A
Quick Installation Guide

Moxa Industrial Media Converter

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Overview

The Moxa Industrial Media Converter IMC-21A series consists of entry-level 10/100BaseT(X) to 100BaseFX media converters that provide a cost-effective solution, and are specially designed for reliable and stable operations in harsh industrial environments.

NOTE Throughout this Hardware Installation Guide, we use IMC as an abbreviation for Industrial Media Converter:
IMC = Industrial Media Converter

Package Checklist

Moxa's IMC-21A is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

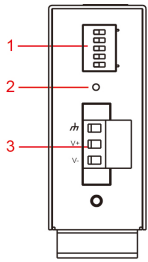
- IMC-21A media converter
- Quick installation guide (printed)
- Warranty card

Features

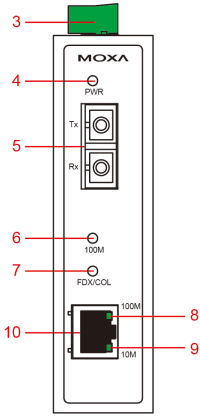
- Power inputs: 12 to 48 VDC
- The TP port's connection speed, Half/Full-duplex mode and Force/Auto mode are all DIP switch selectable
- The fiber port's Half/Full-duplex mode is DIP switch selectable
- Supports Link Fault Pass-Through (LFP)
- DIN-rail mountable
- Multimode and single-mode models with SC or ST fiber connectors are available
- Operating temperature range from -40 to 75°C (T models)

Panel Layout

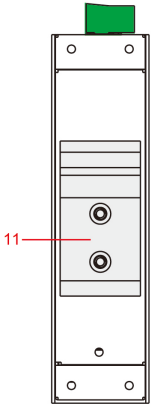
Top View



Front View



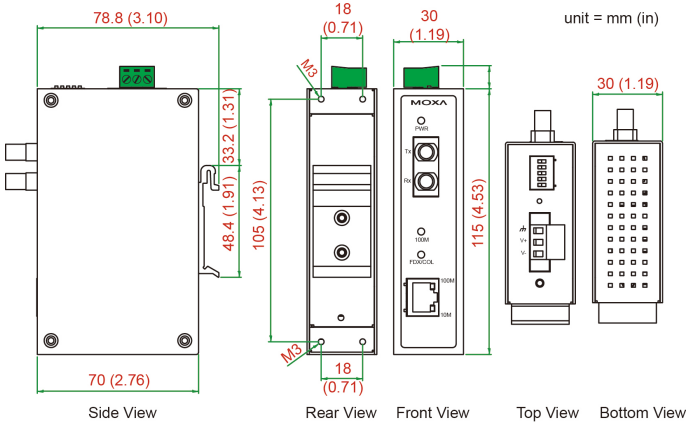
Rear View



1. DIP switch
2. Reset button
3. Terminal block for power input and grounding
4. Power input LED
5. 100BaseFX (SC/ST connector) port
6. FX port's 100 Mbps LED
7. FX port's FDX/COL LED
8. TP port's 100 Mbps LED
9. TP port's 10 Mbps LED
10. 10/100BaseT(X) port
11. DIN-rail kit

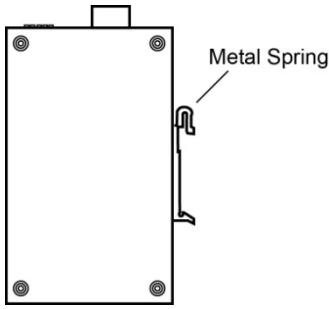
NOTE: The IMC-21A series includes the IMC-21A-M-SC, IMC-21A-M-ST, and IMC-21A-S-SC.

Mounting Dimensions



DIN-Rail Mounting

The aluminum DIN-rail attachment plate should be fixed to the back panel of the IMC-21A when you take it out of the box. If you need to reattach the DIN-rail attachment plate to the IMC-21A, make sure the stiff metal spring is situated towards the top.



Wiring Requirements

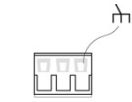
ATTENTION

Safety First!

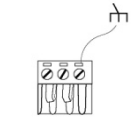
- Be sure to disconnect the power cord before installing and/or wiring your Moxa IMC.
- Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowed for each wire size.
- If the current goes above the allowed maximum, the wiring could overheat, causing serious damage to your equipment.

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
- Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- We strongly advise that you label wiring to all devices in the system.

Grounding the Moxa IMC



Top View



Front View

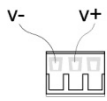
Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the rightmost connector of the 3-contact terminal block to the grounding surface before connecting the devices.

ATTENTION

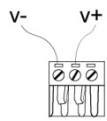
This product is intended to be mounted to a well-grounded mounting surface such as a metal panel.

Wiring the Power Inputs

The two leftmost contacts of the 3-contact terminal block connector on the IMC's top panel are used for the IMC's DC inputs. Take the following steps to wire the IMC's DC power inputs:



Top View



Front View

STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on IMC's top panel.

Communication Connections

RJ45 Ethernet Port Connection

The IMC-21A has one 10/100BaseT(X) Ethernet port located on the front panel for connecting to Ethernet-enabled devices.

Pinouts and cable wiring diagrams for both MDI (NIC-type) and MDI-X (HUB/switch-type) ports for both straight-through and crossover Ethernet cables are shown below:

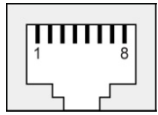
MDI Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-

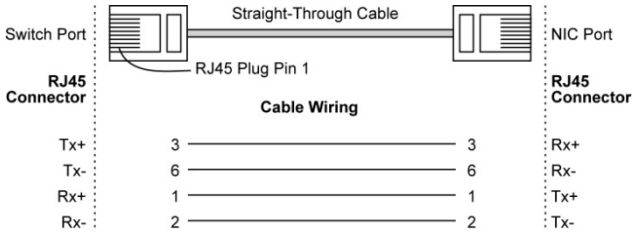
MDI-X Port Pinouts

Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

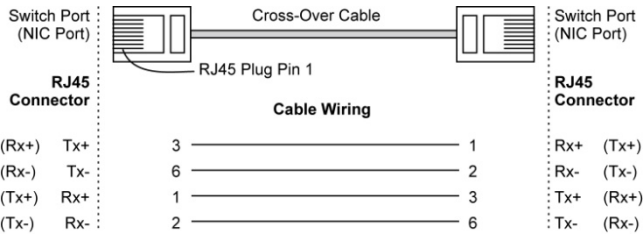
8-pin RJ45



Straight-Through Cable Wiring



CrossOver Cable Wiring

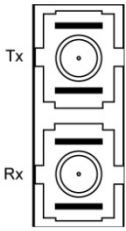


Fiber Optic Port Connection

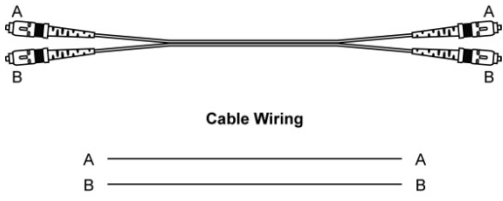
The concept behind the SC/ST port and cable is quite straightforward. Suppose you are connecting devices I and II. Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used transmit data from device II to device I, for full-duplex transmission.

All you need to remember is to connect the Tx (transmit) port of device I to the Rx (receive) port of device II, and the Rx (receive) port of device I to the Tx (transmit) port of device II. If you make your own cables, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, as shown below, or A1-to-A2 and B1-to-B2).

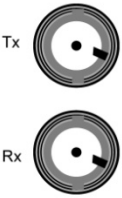
SC-Port Pinouts



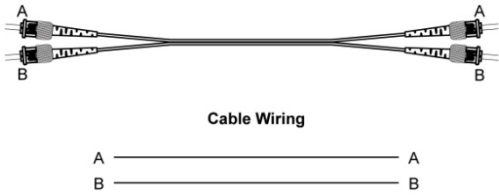
SC-Port to SC-Port Cable Wiring



ST-Port Pinouts



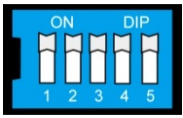
ST-Port to ST-Port Cable Wiring



ATTENTION

This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the laser beam.

DIP Switch Settings



DIP No.	Function	ON	OFF (Default setting)
1	Force Fiber Port Duplex	Half-duplex	Full-duplex
	"OFF": Forces Full-duplex on Fiber port. "ON": Forces Half-duplex on Fiber port.		
2	Link Fault Pass Through	Disable	Enable
	"OFF": Enables "Link Fault Pass Through", the link status on the TX port will inform the FX port of the same device and vice versa. "ON": Disables "Link Fault Pass Through", the link status on the TX port will not inform the FX port.		
3	Force TP Duplex	Half-duplex	Full-duplex
	(Only when Auto Negotiation (DIP 5) is disabled) "OFF": Forces Full-duplex on Ethernet port. "ON": Forces Half-duplex on Ethernet port.		
4	Force TP Speed	10Mbps	100Mbps
	(Only when Auto Negotiation (DIP 5) is disabled) "OFF": Forces 100Mbps on Ethernet port. "ON": Forces 10Mbps on Ethernet port.		
5	Auto Negotiation	Disable	Enable
	"OFF": Enables "Auto Negotiation" function; the speed and duplex states for each port link segment are automatically configured using the highest performance interoperation mode. "ON": Disables "Auto Negotiation" function; the speed and duplex states depend on the DIP 3 & 4 configuration.		

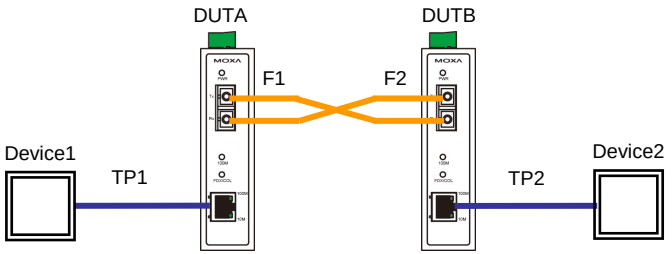
After changing the DIP switch setting, you will need to power off and then power on the IMC-21A, or use a pointed object to hold the reset button down for five seconds to activate the new setting.

LED Indicators

The front panel of the Moxa IMC contains several LED indicators. The function of each LED is described in the table below.

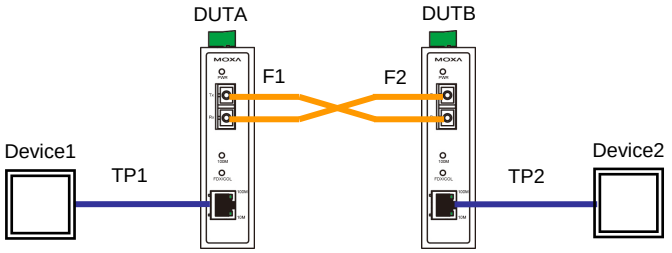
LED	Color	State	Description
PWR	AMBER	On	Power is being supplied to the power input.
		Off	Power is not being supplied to the power input.
100M (FX)	GREEN	On	FX port's 100 Mbps link is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	FX Port's 100 Mbps link is inactive.
FDX/COL (FX)	GREEN	On	100BaseFX port is transmitting in full-duplex mode.
		Blinking	A data collision has occurred.
		Off	100BaseFX port is transmitting in half-duplex mode.
100M (TP)	GREEN	On	TP port's 100 Mbps link is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	TP port's 100 Mbps link is inactive.
10M (TP)	GREEN	On	TP port's 10 Mbps link is active.
		Blinking	Data is being transmitted at 10 Mbps.
		Off	TP port's 10 Mbps link is inactive.

LFP: DIP switch is set to "LFP" mode



	Device 1 TP LED	DUTA TP LNK LED	DUTA FO LED	DUTB FO LED	DUTB TP LNK LED	Device 2 TP LED
TP1 Faulted	OFF	OFF	OFF	OFF	OFF	OFF
F1 Faulted	OFF	OFF	OFF	OFF	OFF	OFF
F2 Faulted	OFF	OFF	OFF	OFF	OFF	OFF
TP2 Faulted	OFF	OFF	OFF	OFF	OFF	OFF

LFP: DIP switch is set to "DIS" mode



	Device 1 TP LED	DUTA TP LNK LED	DUTA FO LED	DUTB FO LED	DUTB TP LNK LED	Device 2 TP LED
TP1 Faulted	OFF	OFF	ON	ON	ON	ON
F1 Faulted	ON	ON	OFF	OFF	ON	ON
F2 Faulted	ON	ON	OFF	OFF	ON	ON
TP2 Faulted	ON	ON	ON	ON	OFF	OFF

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the Moxa IMC's 10/100BaseT(X) ports to any kind of Ethernet device, regardless of the type of Ethernet cable used for the connection. This means that you can use either a *straight-through* cable or *crossover* cable to connect the IMC to Ethernet devices.

Dual Speed Functionality and Switching

The Moxa IMC's 10/100 Mbps switched RJ45 port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. All models of Moxa IMC are plug-and-play devices, so that software configuration is not required during installation or maintenance. The half-/full-duplex mode for the switched RJ45 ports is user dependent and changes (by auto-negotiation) to full- or half-duplex, depending on which transmission speed is supported by the attached device.

Autonegotiation and Speed Sensing

The IMC-21A series' RJ45 Ethernet port supports autonegotiation in 10BaseT and 100BaseT(X) modes, with operation governed by the IEEE 802.3u standard. This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps.

Autonegotiation takes place when an RJ45 cable connection is made; each time a LINK is enabled. The Moxa IMC advertises its capability for using either 10 Mbps or 100 Mbps transmission speeds, with the device at the other end of the cable expected to advertise similarly. Depending on which type of device is connected, the devices will agree to operate at either 10 Mbps or 100 Mbps.

If a Moxa IMC's RJ45 Ethernet port is connected to a non-negotiating device, it will default to 10 Mbps speed and half-duplex mode, as required by the IEEE 802.3u standard.

Specifications

Technology			
Standards	IEEE802.3, 802.3u, 802.3x		
Interface			
RJ45 Port	10/100BaseT(X)		
Fiber Port	100BaseFX (SC, ST connectors available)		
LED Indicators	Power, 10/100M (TP port), 100M (Fiber port), FDX/COL (Fiber port)		
DIP Switch	The following are DIP switch selectable: TP port's connection speed, Half-/Full-duplex mode, and Force/Auto mode Fiber connection's Half-/Full-duplex mode Link Fault Pass-Through (LFP)		
Fiber Optics			
	Multimode (100BaseFX)	Single-mode (100BaseFX)	
Distance, km	5	40	
Wavelength, nm	1300	1310	
Min. Tx Output, dBm	-20	-5	
Max. Tx Output, dBm	-14	0	
Sensitivity, dBm	-34 to -30	-36 to -32	
Power Requirements			
Input Voltage	12 to 48 VDC		
Power Consumption	M-SC: 245 mA @ 12 V 130 mA @ 24 V 70 mA @ 48 V	M-ST: 265 mA @ 12 V 135 mA @ 24 V 75 mA @ 48 V	S-SC: 255 mA @ 12 V 130 mA @ 24 V 70 mA @ 48 V
Connection	Removable 3-contact terminal block		
Overload Current Protection	1.1 A		
Reverse Polarity Protection	Present		
Physical Characteristics			
Casing	IP30 protected, metal case		
Dimensions	30 × 115 × 70 mm (1.19 x 4.53 x 2.76 in)		
Weight	170 g		
Installation	DIN-rail mounting		
Environmental Limits			
Operating Temperature	Standard models: -10 to 60°C (14 to 140°F) Wide temp. models: -40 to 75°C (-40 to 167°F)		
Storage Temperature	-40 to 75°C (-40 to 167°F)		
Ambient Relative Humidity	5 to 95% (non-condensing)		

Regulatory Approvals	
Safety	UL 60950-1
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN 61000-4-2 (ESD) Level 3 EN 61000-4-3 (RS) Level 2 EN 61000-4-4 (EFT) Level 2 EN 61000-4-5 (Surge) Level 2 EN 61000-4-6 (CS) Level 2
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Warranty	5 years

Federal Communications Commission Statement

FCC—This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.