JetCon 1301 / 1301-mw / 1301-sw

Industrial Fast Ethernet to Fiber Media Converter

CE FC RoHS

- One 10/100 TX port to One 100FX port media converter
- Dual Forwarding modes- Switching and Pure converter
- Supports 1.5KV Hi-PoT isolation protection
- Supports Auto MDI/MDI-X, Auto Negotiation
- Supports Multi-mode 2KM, Single-mode 30KM
- Auto Link Loss Forwarding(LLF) for fault detection
- Extreme Low Data Forwarding Latency- 1.6 x 10^{-6} Sec
- Dual modes for power input, AC18-27V/DC18-32V
- Aluminum case with IP-31 grade protection
- Supports single fiber transmission - WDM
- -10~70°C operating temperature for hazardous environment applications (JetCon 1301-mw/1301-sw: -40~80°C, available by request)

Overview

JetCon 1301 is a compact 1-port Fast Ethernet media converter designed to be the size of a cigarette box, which makes it the ideal model that would physically fit into a chassis with limited space, eg machinery control box and duct assembly room. It also supports switch forwarding mode with abnormal packet filtering and pure converter mode for extreme low latency requirement – Fieldbus and EtherCAT, which needs invariant forwarding latency in 64~1522 bytes packet length. For the easy maintenance and time-saving, JetCon 1301 features remote Link Loss Forwarding technology which provides remote link down signal forwarding, acknowledging link events occurred on each end of JetCon1301 to main server. To activate forwarding mode and LLF functions, simply adjust DIP switch then reset the converter, and the reconfigurations will be applied.

For the field site harsh environment installation such vibrating machinery or duct assembly room, JetCon1301 can be easily mounted directly onto DIN rail and powering with DC 18~32V, or AC 12~27V where DC input is not available. With the Ingress Protection grade 31 and rigid alloy case, JetCon1301 can survive and have excellent performance under -10~70°C temperature range, severe electromagnetic interference and outcoming vibration.

The highly MTBF- 500,000 hours, 5-year global warranty and endurable performance of JetCon 1301 series give you the reliable choices for hazardous applications.

Reliable Life Vibration & Life Shock Tests

To ensure the reliability networking devices operating in harsh environment successfully, Korenix JetCon 1301 has passed the following life vibration and life shock tests while units in operating.

- IEC 61000-2-6 life vibration
  5~100Hz/Amplitude 1mm, 0.7G/ 90Min. X.Y.Z. 6 axis
  3~50Hz/Amplitude 3.5mm, 1.0G/ 90Min. X.Y.Z. 6 axis
- IEC 61000-2-27 life shock
  50G, 11ms duration, X,Y, Z, 3 shock/axes (Total 18 shocks)

Switching Converter Mode and Pure Converter Mode

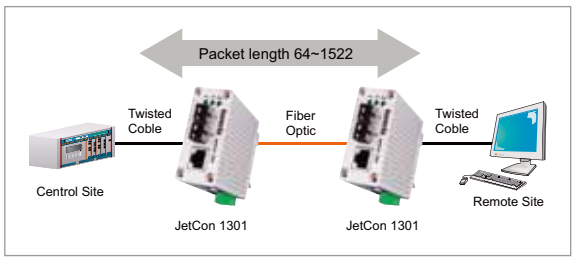
The JetCon 1301 can be used in two different modes, switching converter mode and pure converter mode. The store-and-forward technology is implemented in switching converter mode. It will filter out abnormal packets to maintain network efficiency, and support the data forwarding rate up to 148810 bps in full wire speed, packet length from 64 to 1522 bytes. In the pure converter mode, the JetCon1301 only converts signal between copper and fiber port without any packet check and operates in the speed of minimum data forwarding latency.

Traditionally, media converter is used for the signal converter between electronic and optical. Most of media converters are not capable to handle all kinds of packet sizes. One major drawback is that can't support 10/100Mbps auto negotiation and auto detection function for the cross-over or straight cable. The pure converter mode has the advantage which it supports extreme low transfer latency. Even the packet-with CRC error, and packet length is below 64 bytes. Some of special devices will need pure converter and they need it do as a dumb without any features.

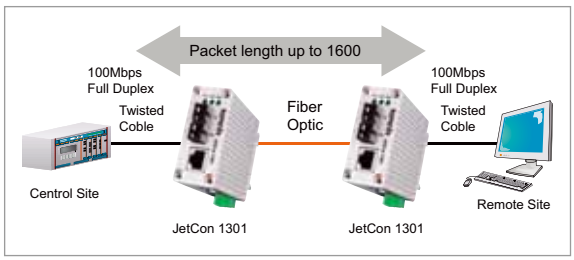
JetCon 1301 can be configured as Switching Converter or Pure Converter mode by a DIP Switch. For CSMA/CD compliance, the UTP port supports 100Mbps Full Duplex when set JetCon 1301 as pure converter. If set as 100Mbps half duplex mode, the available link distance will be 60 meters only. In the switch mode, it will not have this limitation. The link distance can be reached to 100 meters.

In pure converter mode, the JetCon1301 will operate with the minimum latency,1.6 micro second. The 2 ports of JetCon1301 is inter-connected via MII signals, therefore the internal switch MAC and packet buffer is not used and the packet length will not be limited and up to 1600bytes. The updated configuration will be available after power reset.

Configured as Switching Converter mode:



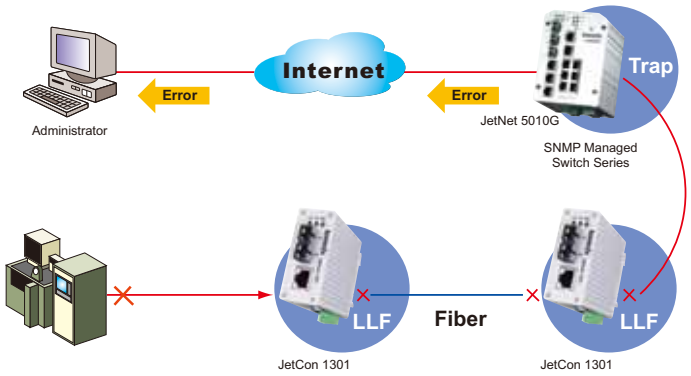
Configured as Pure Converter mode:



Link Loss Forwarding Technology

When using traditional fiber converters, users often encounter the following problem: a fiber converter acting like an ordinary unmanaged 2-port switch. When one of a fiber converter's ports fails (e.g. the TX port), the other one (e.g. FX port) would continue to receive data via the media (e.g. fiber), confusing the device on the other end of the media that the connection was still intact. But, by the time the disconnection was found, this error had caused a great amount of loss.

If a port had lost the connection for any reason, it will activate Link Loss Forwarding to shut down the other port; hence, allowing the device on the other end of the media to detect the disconnection. The administrator over the network can be informed of the disconnection immediately, and react promptly to the situation, greatly reducing loss caused by any link failures.



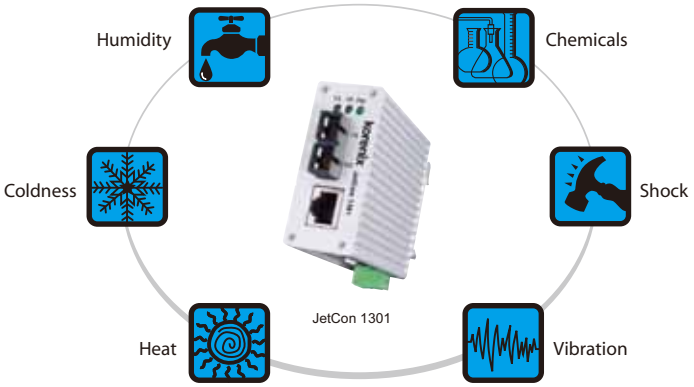
The Real Time Ethernet Solution- EtherCAT Test

JetCon 1301, an Industrial 10/100Base-TX to 100Base-FX Multi-Mode (JetCon1301-m)/ Single-Mode (JetCon1301-s) fiber converter, has been passed the system test of an open Real-Time Ethernet solution, EtherCAT. Cooperated with the test laboratory of Backhoff, Korenix sets a successful milestone to enable Real Time Ethernet-EtherCAT, the fastest "industrial Ethernet control in the world", over fiber optics.

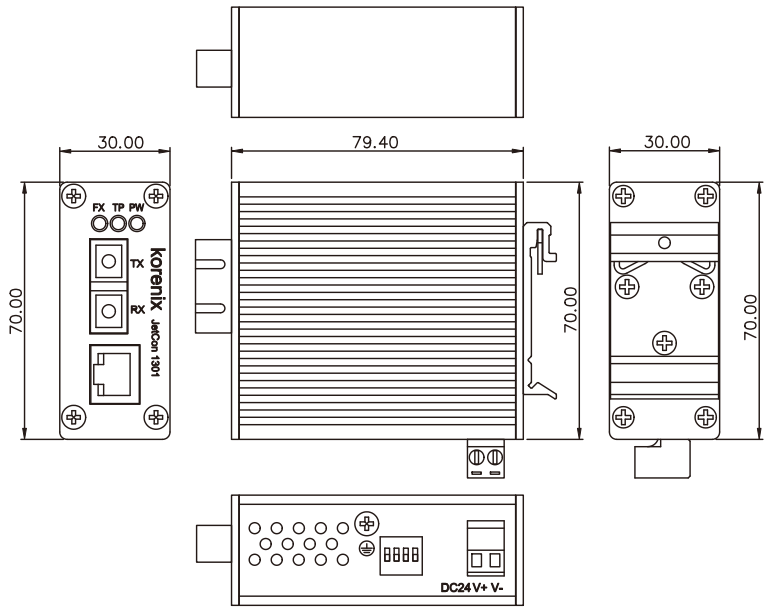
For communication tasks, not only the defined latency (cycle time) is important, but the jitter also has to be limited. During the system test, there is no noticeable Jitter between two JetCon 1301 converters connected via fiber end whereas EtherCAT devices attached to the other Ethernet end. The system has been setup and tested to meet all criterions of EtherCAT protocol. For standard Ethernet jitter, specifications of only 100 µs to 3 ms are possible.

Reliable Mechanical Design

Industrial converters are often placed in harsh environments and required to run non-stop. The quality of industrial converter is constantly being tested by rugged conditions, such as high or low temperature conditions, impact, vibration, or corrosion. To cope with demanding industrial environments, the aluminum alloy case of JetCon Industrial Converter is rigid, shock-proof, and conforms to IP-31 design. In order to prevent power lines from damage caused by falling dust particles and water drops in an industrial environment, Korenix's engineers specially designed the terminal block for power and relay at the bottom of the unit, greatly reducing failures caused by this environment.



Dimensions (Unit –mm)



Specification

Technology

Standard: IEEE802.3 10Base-T,IEEE802.3u 100Base-TX IEEE802.3u 100Base-FX,IEEE802.3x flow control and back-pressure

Packet transfer mode:

Support Switch mode and Pure Converter mode. This feature is select by DIP-switch.

The Switch mode will begin to forward the received data only after it received the frame completely, the forwarding latency depends on the packet length and the packet length support 64 to 1600Bytes. The pure converter operating algorithm is different with switch mode; it will direct transfer Ethernet signal without any frame checking

Link Lose Forward: Enabled/Disabled by DIP-Switch 1

Hi-pot Testing: Passed AC1.5KV Hi-pot tesing on port-port, power-case and port-power

Interface

Number of Ports: 1 x 10/100 Base-TX with Auto MDI/ MDI-X, Auto-Negotiation functions
1 x 100Base-FX

Connectors:

10/100 Base-TX: RJ-45
100Base-FX: Duplex SC for multi-mode or single-mode fiber
Power: 2-Pin Terminal Block

Cables:

RJ-45 connector: supports CAT-3, CAT-4, CAT-5 unshielded twisted pair or shielded twisted pair cable.
The link distance is maximum 100 meters
SC connector: supports multi-mode or single-mode optical fiber
Multi-mode fiber: 50/125um or 62.5/125um
Single-mode fiber: 8/125um, 9/125um or 10/125 um

Fiber Transceiver:

JetCon1301-m, Multi-mode: 2KM (Max.)
Wave-length: 1310nm
Min TX Power:-19dBm
Max TX Power:-14dBm
Max RX Sensitivity:-30dBm
Link budget:11dBm
JetCon1301-s, Single-mode: 30KM (Max.)
Wave-length:1310nm
Max TX Power:-8dBm
Min TX Power:-15dBm
Max RX Sensitivity:-34dBm
Link budget: 19dBm
JetCon1301-s(WDM-A), Single-mode: 30KM (Max.)
Wave-length: TX 1310nm, RX 1550nm
Max TX Power:-3dBm
Min TX Power:-9dBm
Max RX Sensitivity:-31dBm
Link budget: 22dBm
JetCon1301-s(WDM-B), Single-mode: 30KM (Max.)
Wave-length: TX 1550nm, RX 1310nm
Max TX Power:-3dBm
Min TX Power:-9dBm
Max RX Sensitivity:-31dBm
Link budget: 22dBm

Configuration DIP Switch:

DIP 1: Link loose forwarding Enable /Disable.
DIP 2: RJ-45 Auto-Negotiation/Forced 100Mbps Full Duplex
DIP 3: Fiber Full Duplex/Half Duplex
DIP 4: Switch/Pure Converter mode.

Diagnostic LED:

System: Power (Green)
RJ-45 port: Link (Green ON)/Activity (Green Blinking)
Fiber port: Link(Green ON)/Activity(Green Blinking)

Power Requirements

System Power: 2 pins terminal block for power input.
DC 24V (18~32V) with polarity reverse protection.
AC 18~27V, 47~63Hz

Power Consumption: 3.5 Watts @ DC 24V(Maximum)

Mechanical

Installation: DIN-Rail mount

Case: Aluminum metal case with IP31 grade case protection for drop-waterproof and dustproof.

Dimension:

70mm(H) x 30mm (W) x 89mm (D) (with DIN rail clip)
70mm(H) x 30mm (W) x 80mm (D) (without DIN rail clip)

Weight:

374g with package
292g without package

Environmental

Operating Temperature: -10 ~70°C
(JetCon 1301-mw/1301-sw -40~80°C)

Operating Humidity: 0% ~ 95% (non-condensing)

Storage Temperature: -40 ~ 80°C

Storage Humidity: 0%~ 95% (non-condensing)

Regulatory Approvals

Hi-Pot: AC1.5KV on port to port and port to power.

EMI: FCC Class A, CE/EN55022.

EMC immunity interface:

EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11

Shock: IEC60068-2-27

Vibration: IEC60068-2-6

Free Fall: IEC60068-2-32

MTBF: 506,819 Hours, MIL-HDBK-217F GB standard

Warranty: 5 years

Ordering Information

JetCon 1301-m Industrial Fast Ethernet to Fiber Media Converter, SC, Multi-mode/2KM

Includes:

- JetCon 1301-m
- Quick Installation Guide

JetCon 1301-s Industrial Fast Ethernet to Fiber Media Converter, SC, Single-mode/30KM

Includes:

- JetCon 1301-s
- Quick Installation Guide

JetCon 1301-s (WDM-A) Industrial Fast Ethernet to Fiber Media converter, simplex SC, Single mode 30KM WDM A Type (Tx1310/Rx1550nm)

Includes:

- JetCon 1301-s (WDM-A)
- Quick Installation Guide

JetCon 1301-s (WDM-B) Industrial Fast Ethernet to Fiber Media converter, simplex SC, Single mode 30KM WDM B Type (Tx1550/Rx1310nm)

Includes:

- JetCon 1301-s (WDM-B)
- Quick Installation Guide