

KMAX-C

Overview

KMAX-C is the most popular KMAX model. KMAX-C has the same network impairment functions as other KMAX models but has a more limited range of network interface options and somewhat lower performance than other KMAX models, but at a lower price.

KMAX-C performance is ample for many users.

KMAX-C is powered by an Intel N5105 Celeron® processor. KMAX-C has Intel i226 2.5Gbit network interfaces.[1][2] KMAX-C contains an NVME M.2 SSD for storage, HDMI and DisplayPort video interfaces (as well as DisplayPort over USB-C.)

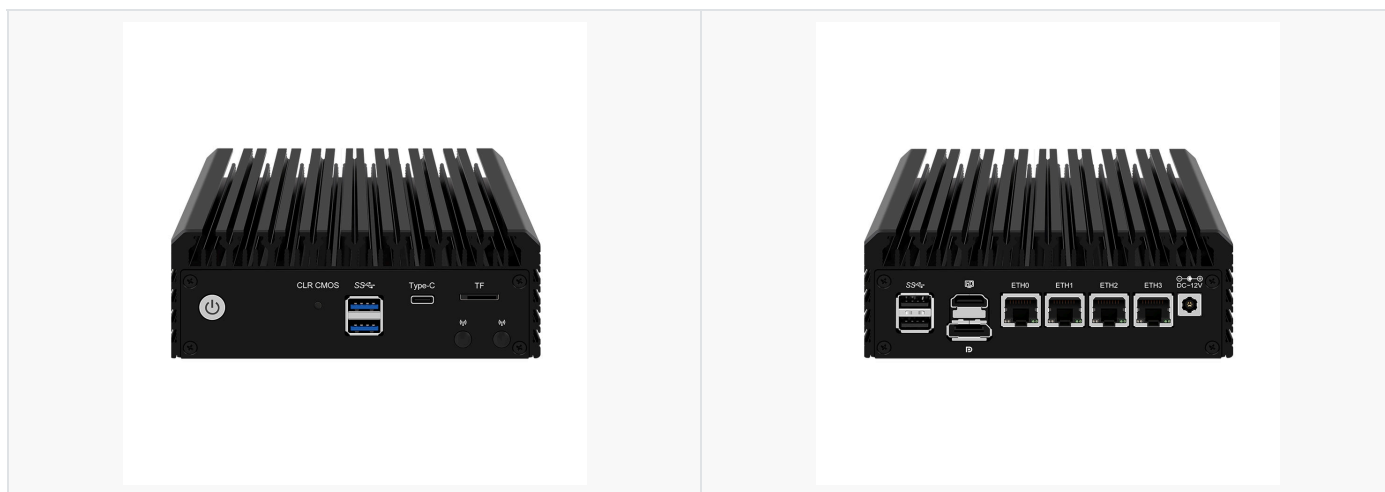
KMAX-C is reasonably portable and can be used via a locally attached keyboard, video, and mouse with no network configuration.

KMAX-C may be operated via a web graphical interface or through scripts.

KMAX-C is based on a small platform that includes the processor, memory, SSD, and four copper (RJ45) Ethernet interfaces[1][2]. KMAX-C is powered using a separate universal power supply (included.)

Except for the management interface, KMAX acts as a layer 2 device (like a bridge). Except for the management interface, no special configuration is required.

KMAX-C operates on Ethernet frames (which may contain IPv4 or IPv6 packets and higher-level protocols).



Platform Details

Hardware

- Small sized (reasonably portable)
- Dimensions: 155 mm x 135mm x 53mm (6.1"x5.31"x2.09"); Weight: 799g (1.76 lbs.)
- Shipping Weight: 2kg (4.4 lbs.)
- Universal power supply (included):
 - 110-240V 50-60Hz, IEC 60320 C8 (non-polarized) socket. (AC Out: 12V DC 5A)
- Does not contain WiFi or Bluetooth hardware
- N5105 Celeron® (or newer) processor
- 16GB (or more) main memory
- 240GB (or larger) M.2 NVME SSD

- Video ports: HDMI, DisplayPort, USB-C (with DisplayPort capability)
- USB-C, USB3.0, and USB 2.0
- Four copper/RJ45 Ethernet interfaces[1][2]
 - Intel i226
 - Operate at 10/100/1000/2500 megabits/second and support auto crossover (auto MDI/MDI-X)
 - "Jumbo" frames are supported.
 - One used for management/control
 - Two for data
 - One unused

Software

- Kernel-based impairment engine
- Multiple bands/flows
 - Default is four bands (plus a default band). More bands may be configured.
 - Bands are bi-directional and may have different settings for each direction
- Rich packet classification system to direct incoming frames and packets into the various bands. Users may establish filters to classify traffic into different bands, with different impairments applied to each direction of each band
 - IEEE 802.1Q VLAN tag
 - MPLS
 - PPPoE
 - Source and destination MAC address
 - IPv4 and IPv6 source and destination IP addresses
 - Source and destination UDP and TCP port numbers
 - Other IPv4 and IPv6 header fields
 - Generalized match expressions to more deeply evaluate frames and packets.
- NO transform impairment
- Web GUI - one or more browsers may simultaneously view and control the KMAX.
- Programmatic APIs (scripts)
- Local desktop via HDMI, DisplayPort, or USB-C. (User provides display, keyboard, and mouse.) This local desktop (launched after login) allows a local web browser to access the web GUI as well as other tools, such as Wireshark or shells to run automation scripts.
- Set up in less than fifteen minutes
 - No setup is needed if the local desktop is used.
- All impairments are highly parameterized for maximum flexibility.
- Changes of settings occur immediately, "on the fly", without restarting.
- Time-varying impairments
 - Most impairments allow the user to define various statistically shaped sub-second bursts.
 - For longer duration patterns, users may specify time-varying expressions ("waveforms") for any numeric impairment parameter. The time may range from zero to more than a day.
- Bypass modes permit A-B comparison testing.
- Packet Drop/Loss

- Packet Delay/Latency: From zero to 3600 seconds, with millisecond precision
 - Packet Jitter, with or without reordering.
 - User may specify a custom jitter distribution: Uniform, Gaussian, Pareto, or Pareto-Normal
 - Packet re-ordering: User may specify packet re-ordering patterns
 - Dam bursting (packets held for a time and then suddenly released)
- Packet Duplication, with rapid back-to-back transmission
- Packet Corruption: Specify packet-centric or bit-centric probabilities of corruption
- Rate limiting: Choose From several queue management algorithms
 - User may choose token bucket or bit clocked methods
 - User may select various queue management algorithms.
 - User may define whether protocol headers are counted or not.
 - User may select queue discipline, such as Tail Drop or RED.
- (Optional) Data Alteration: User may define (using a Python expression) how to rewrite packet contents.
- View network emulation statistics in tables and charts
- Built-in scenarios that user may invoke (and modify)
- Packet capture and replay through use of other tools on the KMAX, such as Wireshark and tcpreplay.
- Underlying operating system: FreeBSD 14.x
- Field upgradeable to new versions.

License

One-time license fee (no yearly renewal) with optional annual support option.

Support

Includes 90 days of technical support including bug fixes, upgrades, and new releases.

Hardware replacement: If a hardware problem cannot be resolved through technical support or by a replacement part easily installed by you, InterWorking Labs will provide you a new unit in approximately three business days. The shipping box containing the new unit should be used to return the damaged unit.

Origin and Provenance

KMAX-C consists of software running on a hardware platform.

Software:

The operating system is open source FreeBSD.

The KMAX application software and documentation were written by IWL in the United States.

Hardware:

The KMAX-C hardware platform is assembled in California, in the United States, using components from various countries, including, but not limited to, the following. Most of these components were acquired through intermediaries such as Amazon. KMAX-C neither uses nor includes any software that may have come with, in, or on those hardware components.

[3]

- United States
- China and Taiwan
- S. Korea

- VietNam
- Malaysia

Notes:

[1] The speeds of the network interfaces represent the bits-per-second rate at which bits are clocked onto, or off of, the network medium. The actual frame (packet) per second performance of KMAX may not be able to fully saturate that capacity, especially when the traffic load is composed of small frames.

[2] Of the four total network interfaces, one of the 2.5gbit/second interfaces is dedicated to control and management of the KMAX. Of the remaining network interfaces, only two may be used at any one time for network traffic that will be subject to impairments and emulation.

[3] Some hardware components contain embedded firmware.

Document Information:

Version: \$Id: kmax-C-product-description.md 2529 2026-09-09 19:56:46Z karl \$