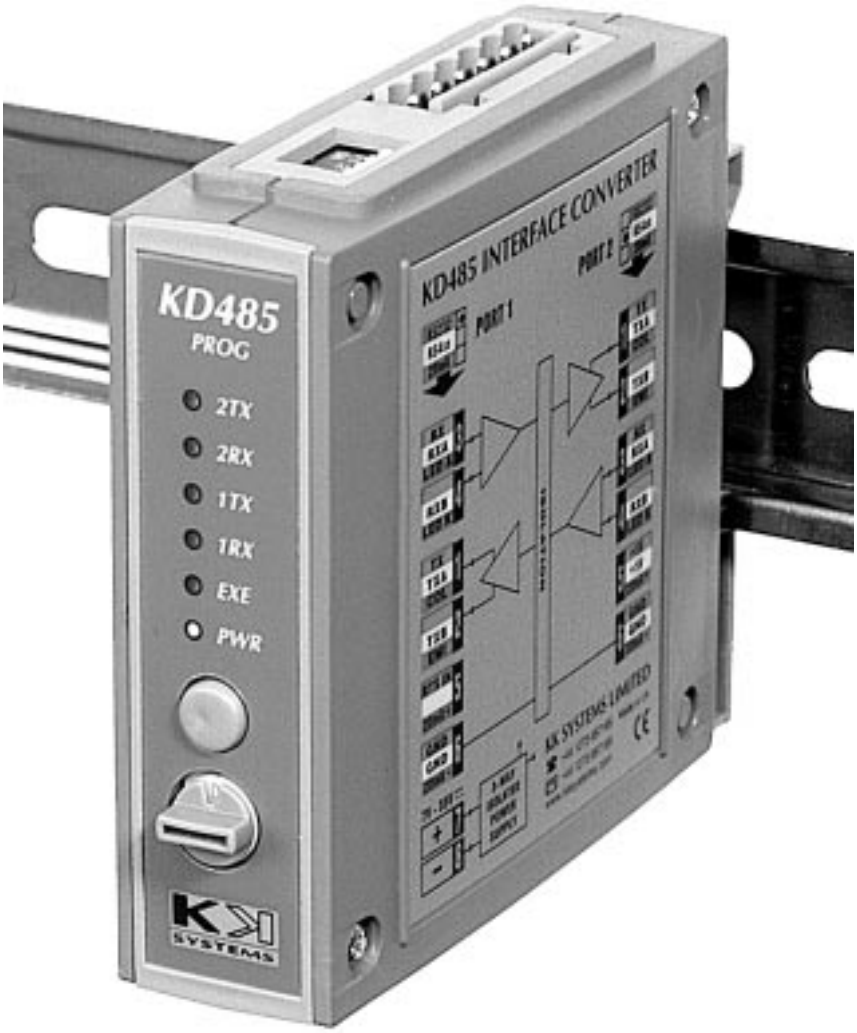
KK SYSTEMS LTD



NEW

20mA version

KD485 - STD
KD485 - ADE
KD485 - PROG

KD485 Universal Isolated Interface Converter

- ✔ Two RS232/422/485/20mA ports
- ✔ 7V to 35V DC powered
- ✔ Three-way isolated – avoids ground loops
- ✔ Automatic Driver Enable on RS485
- ✔ Data flow indicator LEDs
- ✔ 30-115200 baud, low-emissions drivers
- ✔ Removable screw terminals
- ✔ User-programmable model – ANSI C

The KD485™ is a multi-purpose isolated RS232/422/485/20mA interface converter with intelligent data processing options.

Three standard product versions cover most industrial interface and protocol conversion applications.

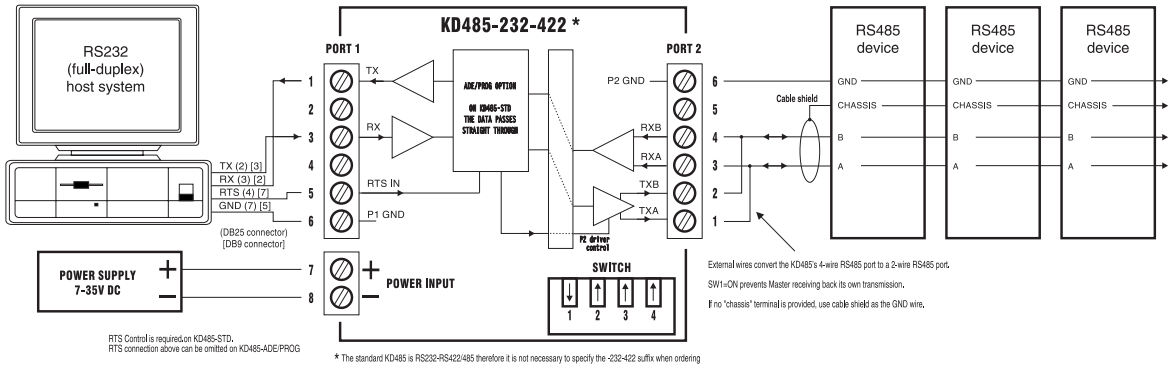
A MODBUS RTU comms library is available for rapid MODBUS protocol converter development.

Overview

The KD485 is a multi-purpose interface converter designed to satisfy a wide range of industrial datacomms requirements.

One common application is the connection of multi-dropped RS485 devices to an RS232 system. Most currently available converters require the RS232 device to control its RTS signal to enable/disable the RS485 driver, but some RS232 systems do not have this capability. The KD485-ADE avoids RTS control:

RS232 to 2-wire RS485 (half-duplex, multidrop) conversion



Another application is a multi-drop connection of non-addressable RS232/422/20mA devices, to enable them to be conveniently polled from a single RS485 Master device. The KD485-ADE can act as an "addressable adapter".

Many projects involve the interconnection of equipment which is mutually incompatible. The KD485-PROG can be programmed – in ANSI C – to convert virtually any async industrial automation protocol into any other.

Three Standard Versions

The KD485 is available in three stock versions which share the following **common features**:

- DIN-rail enclosure with removable screw terminals; fits 35mm symmetric rails
- DC power input in the range +7V to +35V; uses a high efficiency switching power supply
- Two serial ports: Port 1 and Port 2; isolated from each other and from the power supply
- Port 1 is RS232; Port 2 is RS422/485 as standard
- Either port can be supplied as RS232, RS422/485 or 20mA loop
- Controlled slew rate drivers on RS422/485 ports – no terminators needed for cables shorter than 300m
- Internal pull-up/pull-down resistors on RS422/485 ports ensure that RS485 bus floats to a valid state when not driven

KD485-STD

This entry-level product has no CPU. It is an interface converter/isolator only and is baud rate and character format independent.

Its main application is RS232/422/485/20mA isolated interface conversion. It can also drive a 2-wire RS485 bus if the RS232 host provides RTS control (RTS=HIGH when sending, LOW when receiving).

KD485-ADE

As the KD485-STD; also inserts a CPU (with two serial ports) into the data path. Several standard application programs ("Modes") are provided in a built-in ROM:

Mode 0: emulates KD485-STD; also offers baud rate and character format conversion.

Mode 1: as above, plus Auto Driver Enable. The Port 2 RS485 driver is auto controlled according to Port 1 RX data; a similar function can also be enabled on Port 1 to form a *bidirectional* "ADE" converter.

Mode 2: RS485 Addressable Adapter. This makes possible to connect non-addressable devices to a 2/4-wire RS485 bus, through which they can be polled by a single Master. Devices which emit data continuously are also supported. The RS485 address and an optional lead-in byte are fully configurable.

The KD485-ADE can be configured with any "dumb" terminal, a PC or a hand-held terminal such as a Psion Organiser. PC-based configuration programs for DOS and Windows are included.

KD485-PROG

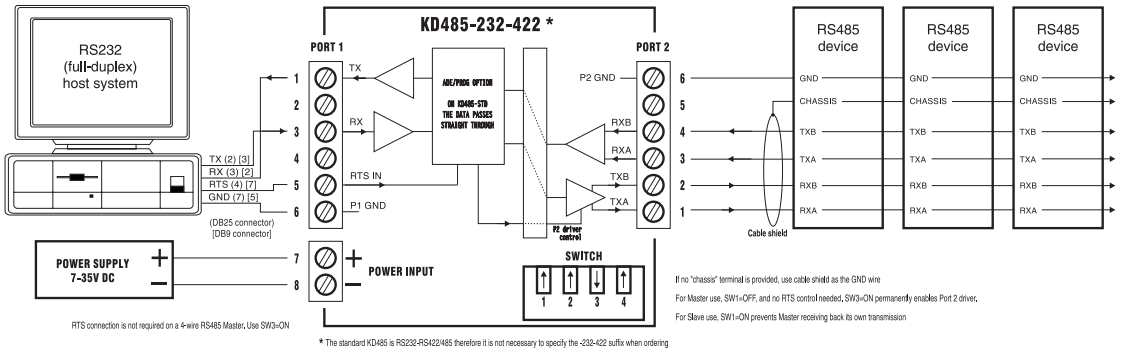
This fully programmable version has all KD485-ADE features, plus a large EEPROM and a means of uploading user-written programs into it.

Programs can be written in ANSI C, assembler and other languages, and are uploaded to the KD485-PROG with a supplied PC-based terminal emulator program.

KD485-STD Applications

- RS232-RS422 full-duplex interface conversion; driver is always enabled
- RS232–RS485 (4-wire) conversion, driver may be left permanently enabled on Master – see diagram:
- RS232–RS485 (2-wire) conversion where RS232 host supplies RTS control
- Full duplex RS232/RS422/20mA isolation, available in any combination of these port types

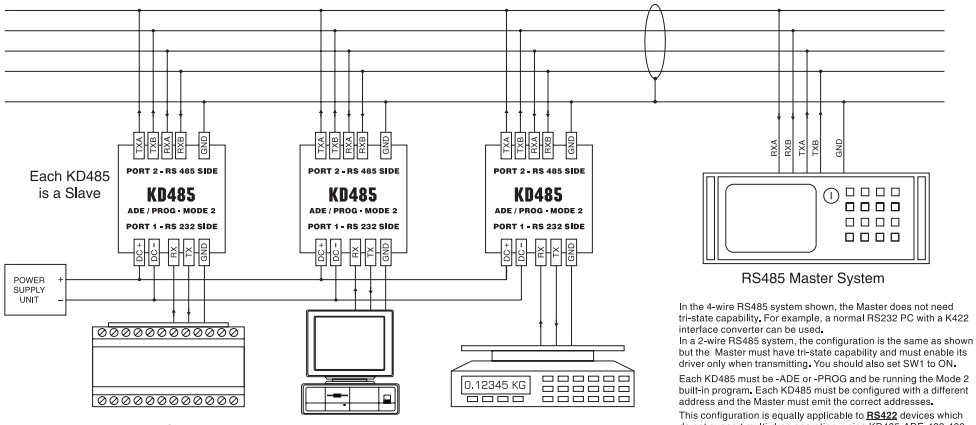
RS232 to 4-wire RS485 (half-duplex, multidrop) conversion



KD485-ADE Applications

- RS232/422/20mA to RS485 (2-wire) where host cannot supply RTS control; see also diagram on previous page
- RS485 Addressable Adapter for multi-dropping non-addressable RS232/422/20mA devices; see diagram:
- RS232/422/20mA full-duplex baud rate and character format conversion with data buffering
- KD485-ADE-422-422: connects 2/4-wire devices to a 2/4-wire 485 bus; both ports can tri-state

KD485-ADE/PROG as an Addressable Adapter (Mode 2 program)



RS232 devices with no built-in addressing or multi-drop support

In the 4-wire RS485 system shown, the Master does not need tri-state capability. For example, a normal RS232 PC with a K422 interface converter can be used.
In a 2-wire RS485 system, the configuration is the same as shown but the Master must have tri-state capability and must enable its driver only when transmitting. You should also set SW1 to ON.

Each KD485 must be -ADE or -PROG and be running the Mode 2 built-in program. Each KD485 must be configured with a different address and the Master must emit the correct addresses.

This configuration is equally applicable to RS422 devices which do not support multi-drop operation, using KD485-ADE-422-422.

KD485-PROG Applications

The KD485-PROG does everything the -ADE does. In addition, it is **user-programmable in ANSI C**. The user program (up to 32k code + 16k data) is uploaded in Intel hex using any terminal emulator capable of ASCII upload. Features include:

- Fast 16-bit microcontroller – H8/300 running at 14.75MHz
- Fully queued I/O: 2k RX and 1k TX queues per port, with selectable xon/xoff handshakes; easy to use C I/O support
- Part of the extended runtime library is in ROM - keeps user programs compact and fast
- Easy tri-state driver control for RS485 multi-drop apps
- Eight 1ms-resolution timers, 0–65535ms
- A hardware watchdog timer for additional ruggedness
- Any part of the 32k EEPROM is also user-writeable
- A high quality optimising cross-compiler is available
- Documentation and usage examples for every function
- Optional real time clock

Assembler programming and direct hardware access are rarely if ever required. Programming the KD485 is far easier than trying to achieve reliable comms on a PC-based system.

For value-added resellers, program security is ensured by the program upload being one-way only. Each unit also has a unique program-readable serial number.

The KD485-PROG has a 16-position user program readable front panel rotary hex switch.

A MODBUS RTU (Slave) library is available for rapid MODBUS protocol converter development.

Configuration

The KD485-STD requires no configuration. The -ADE and -PROG use a front panel switch to set port 1 into a configuration mode where various configuration and test functions are accessible via a command-line user interface. These include a Test Slave Device command which interrogates any RS485 Slave and returns response, in ASCII or hex. Alternatively, a supplied Windows-based configuration program with pull-down menus can be used:

Ordering Information

Standard products (RS232 to RS422/485):

KD485-STD, KD485-ADE, KD485-PROG
User manual included. KD485-ADE and KD485-PROG include a 3.5" diskette.

Specials (RS232/RS422/485/20mA):

As above, plus a suffix denoting port types for Port 1 and 2. The two ports can be populated in any combination of RS232, RS422/485 or 20mA. Preferred versions use Port 1 for RS232, and Port 2 for RS422/485/20mA; for example:
KD485-ADE-232-20MA
KD485-ADE-422-20MA
KD485-ADE-422-422
KD485-ADE-232-232
etc.
KD485-ADE-20MA-232 is not preferred and is functionally identical to KD485-ADE-232-20MA.

Accessories:

KD485 ANSI C Compiler (H8/300)
MODBUS RTU SLAVE Library for KD485-PROG
RJ-11 RS232/RS422 Configuration Cable
RS232-RS422 converter, for configuring units with RS422/485 on Port 1 (various converters available, or use KD485-STD)

Specification

Ports:	Two asynchronous ports, TX & RX signals only. XON/XOFF selectable.
Port parameters:	KD485-STD: 0 to 115200 baud, all character formats. KD485-ADE/PROG: 30-115200 baud, n/e/o parity, 7/8 data bits, 1/2 stop bits. 20mA Loop ports: 30-19200 baud (preliminary information).
Interface Options:	Standard product: port 1 is RS232; port 2 is RS422/485. Any combination of RS232, RS422/485 or 20mA loop can be supplied.
RS232:	Receiver threshold +1.5V typ. Receiver Rin 5kΩ typ. TX o/p ±8V typ (3k load).
RS422/485:	Receiver threshold 200mV typ (differential). Receiver Rin 12kΩ min. TX o/p 0 to +5V (no DC load); +2 to +3V (120Ω ohm load).
20mA loop:	Input: LED, nominal drop 2V Output: o/coll. transistor, Vce(sat) < 2V 20mA current source: accuracy ±20%; no-load voltage approximately equal to KD485 supply voltage + 4V.
Power supply:	+7V to +35V DC. +12V DC suggested. +7V to +26V DC if two 20mA Loop ports are fitted. Input power approx. constant at 1-2 watts (startup current 300-600mA) depending on model. At startup, the supply voltage must reach 7V in <1 sec.
Isolation:	64V PK, tested at >1000V AC RMS, 1 second.
Environmental:	Operating temperature 0 to +50C. Storage temperature -25C to +70C. Relative humidity (operating and storage) 0 to 90%, non-condensing.
Ventilation:	Rail-mounted KD485 must have a 50mm gap above and below.
EMC compliance:	Emissions EN50081-2 (94), immunity EN50082-2 (95).
Dimensions:	29mm (W) x 113mm (H) x 100mm (L) approx. in rail-mounted position, including screw terminals.

Other Products

A wide range of interface converters and protocol converters is available, with customisation options.

Designed and Manufactured by:

KK SYSTEMS LIMITED

P.O. Box 2770, Poynings
Brighton, Sussex, BN45 7AD
Great Britain

☎ +44 (0) 1273 857185
fax +44 (0) 1273 857186
e-mail info@kksystems.com
www http://www.kksystems.com