INTRODUCTION

The new Brodersen RTU32 controller series based on a 32-bit platform provides the RTU with power and leading edge functionality. The new platform is based on a fanless industrial PC platform with WinCE 4.2 .NET operating system. It provides an open and adjustable platform with both the power and functionality required to control advanced industrial applications.

The BC RTU32 is in general based on the flexible hardware layout and design, known from the existing RTU8 and RTU870 product series. It is supplied in a robust aluminium enclosure and can be used with the wide range of Brodersen I/O expansion modules. It is kept at the modular sizes of 162 and 216mm.

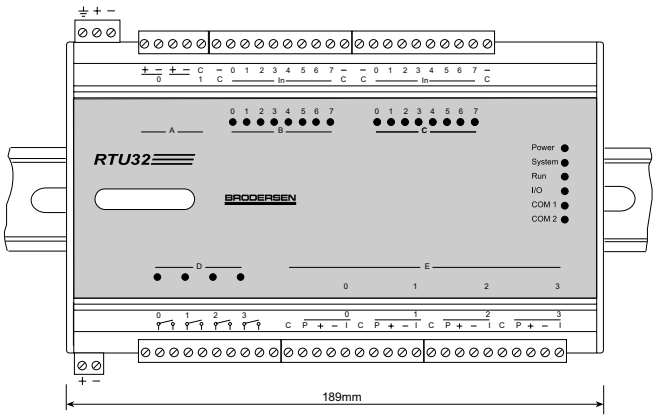
Ethernet and TCP/IP are the basic communication and data environments, however, serial communication interfaces are still an important part of the RTU32 for interfacing to various system parts.

The RTU32 is available with or without integrated I/O. Different software functionality is provided.

Features

- Powerful RTU and Industrial Controller.
- Functionality in Stand Alone or Integrated Configurations.
- Open Platform with WinCE Operating System.
- Many Communication Protocols Supported Including EN/IEC60870-5-101/104.
- Dual Ethernet and COM Interfaces.
- Integrated Powerful EN/IEC61131 Control Software.
- Global Distribution and Subscription of Event Based Time Stamped Variables.
- Robust Design for Industrial Applications.

UCN-26IO/xxx



VERSIONS/ORDERING CODES

UCN-26IO / 1 2 1 B 01 50. D1

Type
UCN — UCN

26I/O type and counts. versions:
RTU32 basic without I/O — B
16 dig. in/4 relay out./
4 analog in./4 analog out. — 26IOA

CPU Motherboard type
300MHz x 86 CPU — 1

RAM/Flash size
32MB RAM/32MB Flash — 1
64MB RAM/64MB Flash — 2

Operating System
WinCE Core version — 1
WinCE Professional version — 2

Branding
Brodersen — B

COMs options
1 x RS232 + 1 x RS232/RS485 — 01
5 x RS232 + 1 x RS232/RS485 — 02

Power supply option
5VDC incl. Ext. 230V
Power supply — 00
5VDC — 01
115-230VAC — 10
115-230VAC incl. 12V UPS
Battery/charger — 20
24-60VDC incl. 12VDC
ext. supply — 30
24-60VDC incl. 24VDC
ext. supply — 50
115-230VAC incl. 24V
UPS Battery/charger — 60

Input/output options TBD
No IO type — 0
Analogue input range:
Configurable — Dx

4-20mADC — x2
0-20mADC — x6
0-10VDC — x1

CONTENT

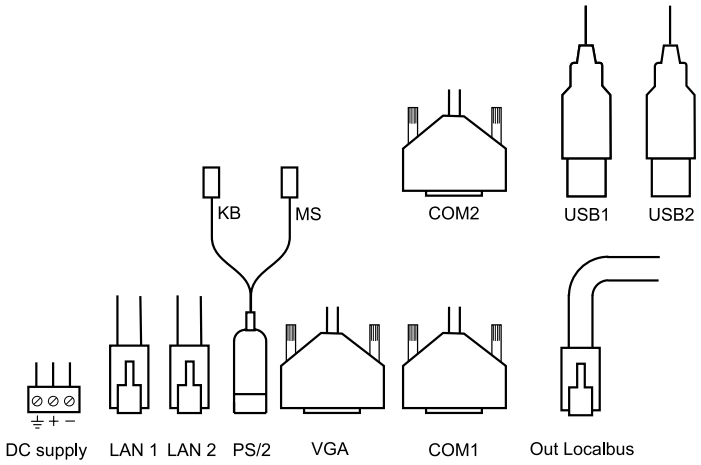
TECHNICAL DESCRIPTION

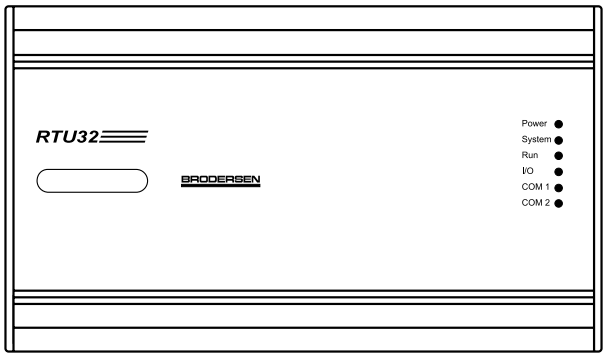
Input/output
The RTU32 basic I/O fit can include up to 32 input/output terminals. I/O options available:

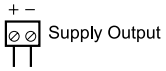
Version	UCN- 26IO
Digital inputs (10-30V DC)	16
Digital outputs (PNP o. c.)	0
Analogue inputs (Configurable)	4
Analogue outputs (0-10V, 0-20mA, -20mA)	2
Relay outputs (NO)	4

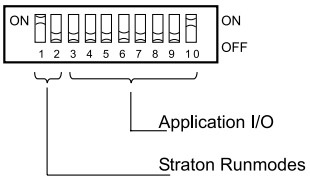
All digital I/O´s are equipped with opto-couplers. The analogue inputs have galvanic isolation between the individual channels. Solid state relays are used for multiplexing the analogue inputs. No isolation on analogue outputs.

Wiring diagram
UCN-B/xx

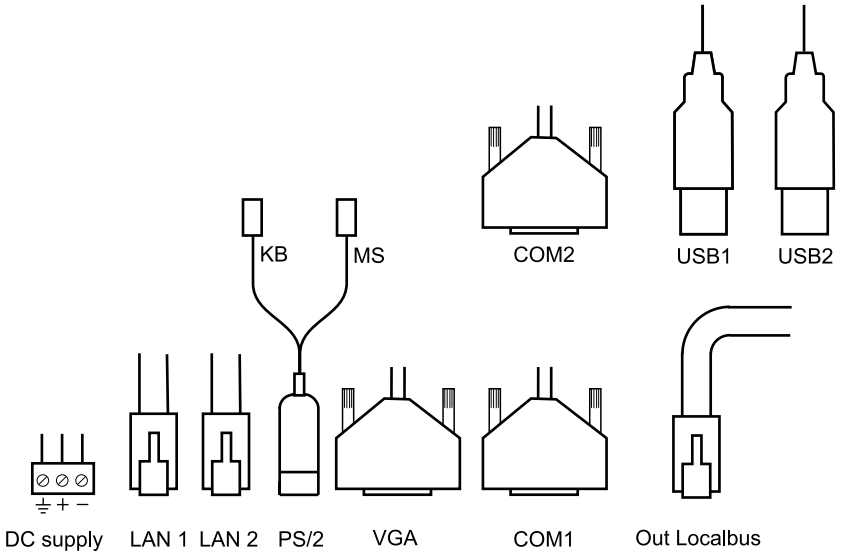


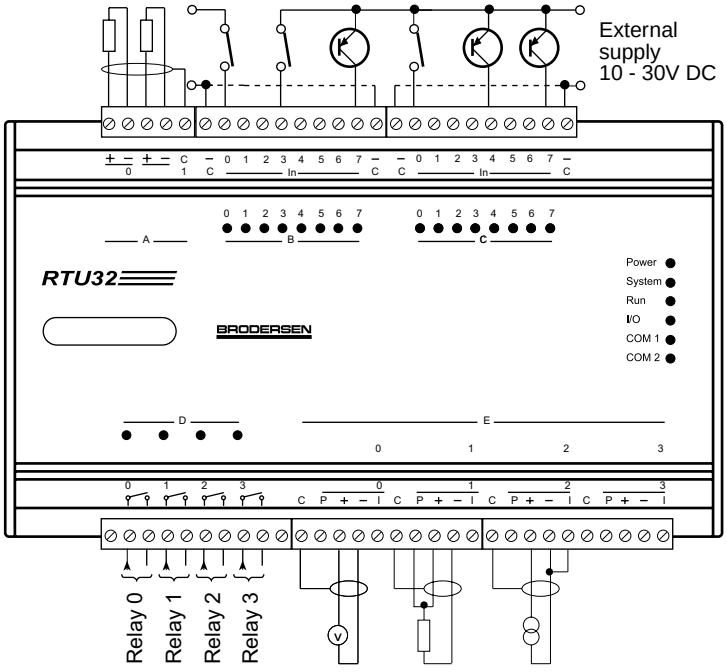


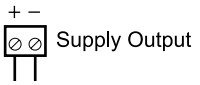


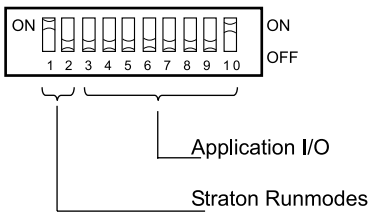


Wiring diagram
UCN-26IO/xx









TECHNICAL DESCRIPTION

General
The RTU32 offers 2 main functions:

- A powerful stand-alone RTU with I/Os to perform embedded data processing, data control, data logging and monitoring.
- A networking communicator for collecting, managing and communicating data via protocols on different physical interfaces upwards and downwards in industrial applications

The RTU32 Outstation and Industrial Controller is based on an Industrial PC platform running WinCE operating system with all the well known embedded Microsoft environment facilities. A range of industrial power supplies is integrated to support industrial supply levels and functions such as UPS. Controlled power-off features are handled by the integrated power supply. The basic IPC includes a range of communication and other interfaces. The RTU32 provides additional interfaces like LocalBus for expansion I/O and integrated I/O via the internal PC104 interface.

The RTU32 software is stored on a removable Flash. During start-up, the operating system and applications are moved to RAM where it is executed. Retained variables and system configuration settings are stored on the Flash. When power is disconnected, the latest parameters are stored on the Flash before power-down. Special power monitoring prevents loss of such data.

WinCE is the RTU32 operating system. Integrated I/O and LocalBus for external I/O connectivity are controlled in an implemented I/O database. A Straton SoftPLC VM (Virtual Machine) is ported to the WinCE real-time task. This enables the Straton SoftPLC runtime application program to be executed in the RTU32.

Using the Ethernet network for primary communication provides all the advantages of existing TCP/IP networking communication facilities (FTP, HTTP etc). Fast, reliable and secure communication are the main features and all networking components (software, routers, switches, etc.) are available. In addition, serial ports for interfacing to application specific protocols (e.g. Modbus, Fieldbus, utility and traffic proprietary protocols etc.) are available.

Configuration
RTU32 main settings, such as network settings and serial port settings, are configured via the WinCE user interface or via a WebPage.

A small user-tool to assign network settings is provided for initial set-up via the Ethernet / TCP/IP interface. This offers remote access to any RTU32 connected to a specific network segment.

I/O's and Database
The I/O database structure is designed as a multi-accessible database. The database runs in its own task providing fast and reliable I/O communication. The Straton SoftPLC has drivers to access the database both at board level where the I/O is accessed in I/O sections, and in single level where each I/O can be accessed individually according to the specific application requirement.

In addition, an API for WinCE provides access to the database from your own C++ program.

Straton SoftPLC
The Straton programming tool fully supports EN/IEC61131 and is used for making SoftPLC programs in the RTU32. The application program kernel is implemented and runs in WinCE real-time task. Straton offers complete SoftPLC functionality and supports all features needed in today's industrial environment. Straton supports programming languages such as Structured Text, Function Block, Ladder, Instruction List and Sequential Function Chart. The Straton SoftPLC supports cold restart, hot restart and on-line changes.

The Straton Workbench is used for configuration protocols, programming and debugging. It supports several tools for multi-program handling and documentation. It is also a powerful tool for complete system design and programming, providing unique functions for event based communication. The Global Binding Editor makes it possible to publish and subscribe variables in a large network with minimum communication load. The events are time stamped and can also be used directly in ZenOn SCADA HMI applications.
Programming, debugging and upload and download of application programs can be done remotely via Ethernet or RS232.

The basic drivers and protocols available for the RTU32 are:

- I/O drivers for integrated I/O and I/O Expansion.
- ModbusRTU Master and Slave.
- ModbusTCP Client and Server.
- EN/IEC60870-5-101 Master and Slave.
- EN/IEC60870-5-104 Client and Server.

In addition, the RTU32 can run ZenOn CE-runtime application which expands the number of available protocols.

I/O Drivers
The RTU32 I/O can be accessed in 2 ways, either as boards (I/O is reported in sections as they are connected physically) or as profiles (each I/O is directly addressed). I/O status is reported in a function block.

Fieldbus Configurator
With the Fieldbus Configurator Tool in Straton, the Modbus suite of protocols can be configured. It is also possible to publish or subscribe any variables in RTU32 networks or on other Straton runtime platforms and ZenOn HMI platforms.

EN/IEC60870-5-101/104
Utility protocols EN/IEC60870-5-10x provide full configuration flexibility of any inter-operability requirements. The protocol links are provided as a driver in Straton and the application layer data and protocol structures are generated in Structure Text (ST). This gives full access to set up any Interrogation and ASDU required for the application.
In addition, the protocol drivers support advanced features for gateway functions where, for example, information in monitor direction can be moved from one protocol interface to another without compromising the actual value and original time stamp.

Data Logging
A special data logging function block is available for logging event based or cyclical data to the flash file system. The data logging also supports functions for formatted log directly exportable to ZenOn HMI and SCADA software.

Modem Control / Dial-up / Dial-in
Both dial-up and dial-in functions via a PSTN, ISDN or GSM modem connected to the serial port of the RTU32 are possible when using the Straton modem function. It can be used for ModbusRTU and EN/IEC60870 serial protocols.
In addition a dial-on-demand function for TCP/IP based protocols is provided.

Real-Time / Real-Time Clock
The WinCE real-time task is used for the application program execution. Time stamps and cyclic execution are also based on the WinCE real-time clock. Time stamps are reported in milliseconds.

TECHNICAL DATA

BASIC 32-BIT SYSTEM

CPU:	AMD Geode™ GX1 300 MHz Note: Available in different CPU speeds on request.
BIOS:	AWARD 256KB Flash BIOS
System chipset:	Geode™ GX1/CS5530A
I/O chip:	W83977F-A
System memory:	One 144-pin SODIMM socket supports up to 256 MB SDRAM.
SSD:	CompactFlash Type I/II socket support up to 512MB
Watchdog timer:	Reste/IRQx; 16 sec.~127 min. and 30 sec./ step.
Expansion:	Internal PC104 interface.
MIO:	2 x EIDE (Ultra DMA 33), 2 x FDD, 1 x LPT, 1 x RS-232, 1 x RS-232/422/485, 1 x K/B & Mouse.
USB:	2 x USB 1.0 ports
Display chipset:	AMD Geode™ GX1 with integrated 2D graphics engine.
Display memory:	1/2/4 MB frame buffer using system memory.
Resolution:	
CRT mode:	1280x1024@8bbp (60Hz)
LCD/Simultaneous mode:	1024x768@16bbp (60Hz)
VGA/LCD Interf.:	PCI bus VGA/LCD interface. Support 9/12/ 18-bit TFT panels.
Ethernet chipset:	Dual Realtek RTL8139C

PHYSICAL INTERFACES

Dual Ethernet:	2 x RJ45 Ethernet interfaces, IEEE 802.3c 100Base-Tx Fast Ethernet compatible.
COMS:	1 x RS232 and 1 x RS232/RS485.
USB:	2 x USB 1.0 ports.
VGA/LCD:	PCI bus VGA/LCD interface
PS/2:	Single interface for keyboard and PS/2 mouse. Twin interface cable included.
I/O Expansion:	RJ45 LocalBus interface for Brodersen I/O Expansion modules. See industial I/O sec-

tion.

INDUSTRIAL I/O

Expansion I/O: Expansion I/O is possible via the Brodersen I/O LocalBus system to all Brodersen I/O Expansion modules. Supports up to 512 I/O. Scantime I/O default 100ms. Scantime in device driver can be configured from 5-1000ms. Fast scantime in limited number of I/Os

Integrated I/O: 26IO board integrated supports;
16 Digital inputs
4 Relay outputs
4 Analogue inputs
2 Analogue outputs.
Scantime better than 5ms.

INTEGRATED DIGITAL I/O

Inputs:

Input voltage activated:	10-30V DC.
Input voltage deactivated:	Max. 3V DC.
Input current:	12V DC: Typical 3mA. 24V DC: Typical 6mA.
Input delay:	Typical 1ms.

Indicators: One LED for each digital input (red) indicating active input.

INTEGRATED RELAY OUTPUTS

Relay outputs: 4 potential free SPST-N/O contacts.

Output voltage:	Max. 240V AC.
Output current:	Max. 1A AC (resistive).
Output delay:	Typical 5ms.

Lifetime (relay): Min. 100.000 operations at rated load.

Contact material: Gold overlay silver alloy.

Isolation (coils-contacts): 2kV AC 50Hz 1 min (IEC255-5).
4kV 1,2/50micro s. / impulse withstand (IEC255-5).

Indicators: One LED for each output (yellow) indicating active output.

INTEGRATED ANALOGUE INPUT

Inputs: 4 multiplexed analogue channels with solid state multiplexer.

Input configuration: Differential (+/ -), flying capacitor type.

Input measuring ranges: Configurable in Straton:

Resolution: 12 bit, 0-4095.

Impedance:

Voltage:	500 kOhm.
Current:	100 Ohm.

Absolute maximum ratings:

Input voltage:	±40V DC.
Input current:	±30mA DC.

Sampling interval: Min. 100 ms.

Measuring accuracy: 25°C: ±0.2% ±6LSB (typically 0.05%±3LSB).
-10°-55°C: ±0.3% ± 8LSB
(typically 0.1%± 4LSB).

Linearity: Better than ± 1LSB.

Temperature stability: Better than ± 50ppm/°C (typical).

Common mode voltage: Max. ±80V DC.

Common mode rejection ratio: Min. 60dB (typical 72dB).

Series mode rejection: Min. 30dB (50-120Hz)

Isolation: (input to input): 500V.

INTEGRATED ANALOGUE OUTPUT

Outputs: 2 sourced analogue channels.

Output ranges: 0-10V, 0-20mA, 4-20mA.

Resolution: 12 bit, 0-4095.

Absolute maximum ratings: Output voltage: 13V DC.
Output current: 25mA DC.

Sampling interval: Min. 100 ms.

Accuracy: 25°C: ±0.2% ±6LSB (typically 0.05%±3LSB).
-10°-55°C: ±0.3% ± 8LSB
(typically 0.1% ± 4LSB).

Linearity: Better than ± 1LSB.

Temperature stability: Better than ± 50ppm/°C (typical).

Isolation: (input to input): No isolation.

SOFTWARE

Operating system: WinCE 4.2 ,NET
(Version 5.0 .NET is pending).
Open platform with possibility for developing and running customer application.

EN/IEC61131 SoftPLC: Straton SoftPLC VM Embedded.

Standard drivers: Straton binding, ModbusRTU, ModbusTCP, EN/IEC60870-5-101/104.

Optional drivers: Via ZenOn several additional drivers.

SNMP Server (trap alarms)

POWER SUPPLY

Supply Voltage versions: 24-48VDC (10-60VDC).
115-230VAC (90-265VAC).
115-230VAC (90-265VAC) with UPS and battery charger.

Power consumption: Max. 40W - depenable of configuration.

Isolation: Power supply to electronics: 3750V

GENERAL

Indicators (LEDS):

Power (green):	Indicating power ON.
System (green):	Indicate system status.
Run (green):	Indicate SoftPLC program status.
I/O (green):	Indicate status of integrated and expansion I/O.
Com x (yellow):	Indicate Rx/Tx activity on the specific com port.

Ambient temperature: -10 - +60°C.

EMC: EN 50081-1/EN50082-1.

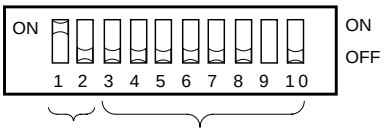
Protection: IP20.

Mounting: 35 mm DIN-rail, EN50022.

Housing: Black aluminium housing.

Dimensions:
HxWxD: 110(+connectors)x189x101 mm.

CODE SWITCH/ADDRESS SELECTOR



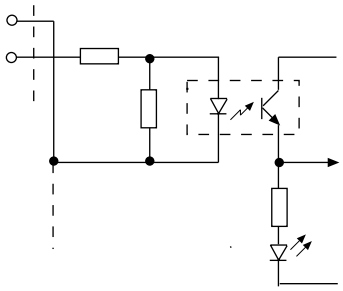
Application I/O

Straton run modes:
- SoftLogic stopped
- Run / cold restart
- Run / hot restart

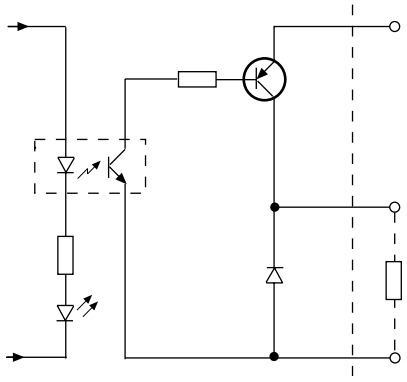
TBD

CIRCUIT CONFIGURATION (DIGITAL)

Input



Output (PNP)



CIRCUIT CONFIGURATION (ANALOGUE)