

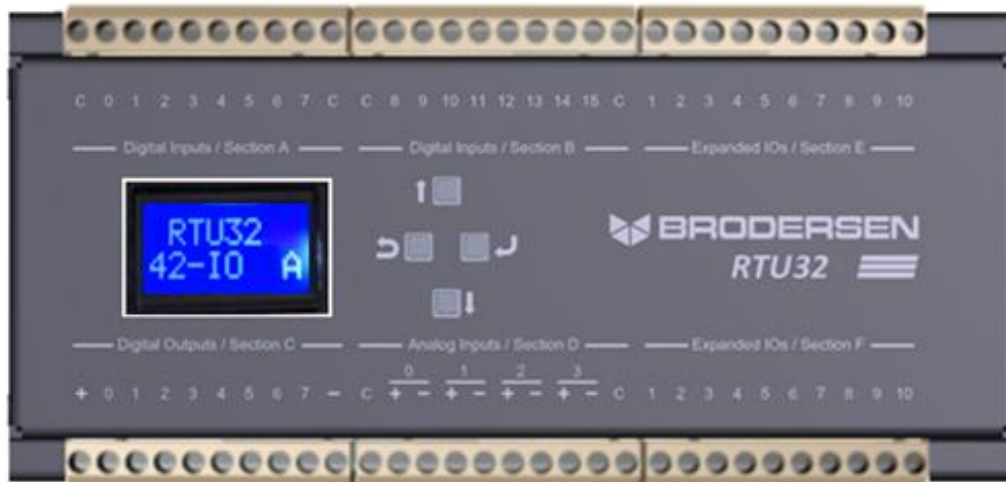
RTU32N

RTU32N Series

Data Sheet

40362 v1.03 / May. 2020





INTRODUCTION

Brodersen Next Generation RTU32N Series with advanced RTU/PLC functionality.

The RTU32N series is based on 32-bit architecture and provides the RTU/PLC with power and leading edge functionality. RTU32N provides open and adjustable platform with both the power and functionality required to control advanced industrial applications.

Physical communication interfaces include 2 x LAN 10/100MBit/s, 4 x COM ports and 2 x USB ports. The RTU32N offers support for communication devices like data radios, GSM/GPRS/3G, Wi-Fi, dial-modems etc. Making it the perfect future proof solution for new applications and for mounting in areas where there are no hardwired communication facilities.

The RTU32N supports a variety of standard and open protocols such as Modbus, IEC60870, DNP3 and IEC61850. It also includes the fast event based Binding protocol - a quick and reliable way of distributing time stamped event data between any Brodersen RTU32 series on the network.

The RTU32N has a web-based configuration interface for setup of the RTU 'personality' e.g. IP address, VPN, IO range, Slave address etc. Additional RTU functionality, including logic, messaging and logging are configured in the Brodersen WorkSuite.

The RTU32N series is available in two power supply configurations. These include 10-30VDC and 30-60VDC. An external UPS option is available using Brodersen UPS power supply module UCS-CHRxxx.

The RTU32N is available with a range of integrated I/O options – 28IO and 42IO. In addition it supports I/O expansion via the Brodersen I/O LocalBus.

FEATURE LIST

- Powerful RTU, PLC and Industrial Controller.
- Redundancy Support.
- Reliable Real Time Operating System.
- Communication Protocols Supported:
 - Full Modbus suite.
 - IEC60870-5-101/103/104 Protocol.
 - IEC61850 Client/Server w. GOOSE.
 - FULL DNP3 Suite Incl. DNP3 WITS
 - Binding - Global Distribution and Subscription of Event Based Time Stamped Variables.
- Communication Protocols can also be created as part of the logic application interface. A number of legacy and device specific protocols have been created that include:
 - Omron Host Link
 - 4RF SNMP Client
 - Radtel RDCMP
- Communication interfaces; 2 x Ethernet and 4 x COM Ports.
- Integrated I/Os and I/O Expansion via Brodersen LocalBus
- Full EN/IEC61131 PLC runtime – also used for special and flexible data manipulation.
- Includes power supply monitoring of the RTU32N supply voltage and temperature (10-30 VDC)
- Full remote management with configuration, programming and flexible distribution of all levels of software from and to RTUs on remote locations.



VERSIONS / ORDERING CODES

Order code example	UCN-42IO/1A005.91	
Type	UCN	
RTU32N		
I/O integration versions		
Basic - without I/O	A	
16DI/8DO/4AI	28IO	
20DI/8DO/8DIO/6AI	42IO	
Memory options (RAM - Flash - NVRAM)		
(128MB/128MB/128KB)	1	
(256MB/128MB/128KB)	2	
(512MB/128MB/128KB)	3	
Special options		
200-900 MHz	A	
800 MHz and Extended	B	
Temperature Range (-40 to +85 °C)		
Integrated COM (later options)		
No internal modem	0	
Power supply option		
10-30VDC	05	
30-60VDC	30	
Analog input range:		
No analog input	0x	
Voltage	8x*	
Current	9x*	
Digital input range:		
No digital input	x0	
12-24VDC unipolar	x1	

* The difference between 8x and 9x is the predefined setting of their current/voltage selection jumpers (for all AI channels):

- 8x : Configurable in different ranges of voltage input
- 9x : Configurable in different ranges of current input

Each AI channel (in both 8x and 9x) can also be changed to the other type by changing the state of their internal current/voltage selection jumpers.

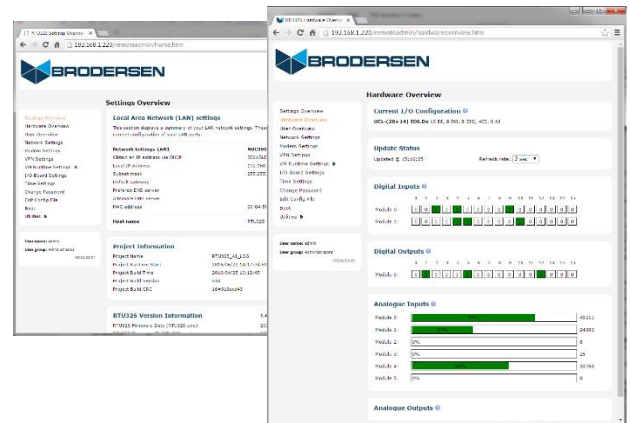
TECHNICAL DESCRIPTION

Software – General

RTU32N Real Time Operating System offers access and support to a wide range of standard network protocols - TCP/IP, UDP, HTML, FTP, SNMP and SMTP. It allows priorities for fast PLC runtime execution and parallel multiple communications task handling.

Software – Basic Setup and Configuration

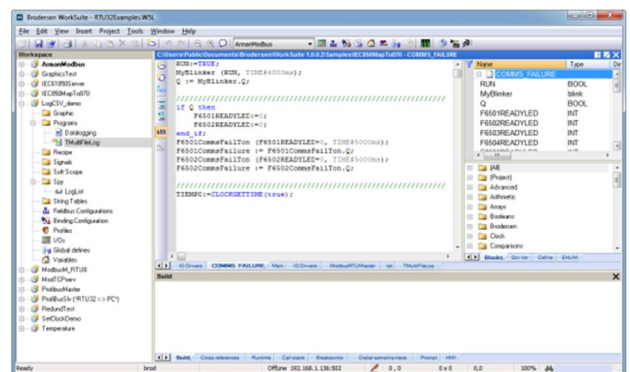
Basic configuration of the RTU32N is via an Internet Browser connected to the integrated WebServer. Configuration includes settings for IP network communications, I/O configuration and SNMP (time synchronization via Simple Network Management Protocol) etc.



The configuration also defines settings for the Brodersen 3G/GPRS modem when connected to the RTU's USB interface - including APN and user authentication setup.

Full remote configuration and complete RTU software update are possible via all communication interfaces.

Software – RTU Logic Configuration and Programming



The RTU's logic 'engine' is setup and programmed using the Brodersen WorkSuite. This IEC61131 application



development environment supports all 5 languages: ST, FB, SFC, LD and IL.

WorkSuite allows creation and management of applications that provide the RTU with PLC runtime functionality. WorkSuite is a very flexible and powerful tool to use in your application development. It includes features such as:

- Fieldbus and profile editor for simple and fast driver setup.
- Definition of variables from simple Booleans to advanced Arrays and Structures.
- Freeform program language mix, full conversion features and program prioritizing.
- Full Simulation and debugging functions.
- Large library of ready to use functions.
- Create your own User Defined Function Blocks in a PLC language or C.

Full remote programming is possible via all RTU communication interfaces.

Brodersen also provide tools and wizards to simplify and decrease the total time of application development. These tools include a complete IEC60870 Driver Configuration Tool (IEC60870CONFIG) enabling setup of an IEC60870 driver in an Excel sheet in less than 30 minutes.

Software – Communication Drivers/Protocols

RTU32N support a range of standard drivers/protocols;

- IEC60870-5-101 Master/Slave.
- IEC60870-5-103 Master.
- IEC60870-5-104 Client/Server.
- IEC61850 Client
- IEC61850 Server incl. GOOSE
- Modbus-RTU Master and Slave.
- Modbus-TCP Client and Server.
- Modbus-ASCII Drivers.
- DNP3 Client/Server & Master/Slave
- DNP3 WITS Slave
- SNMP Agent
- DF1 Master
- EtherNet/IP
- Binding protocol for fast RTU to RTU communication.
- I/O drivers for integrated I/O and LocalBus I/O Expansion

Software – I/O Drivers

The RTU32N supports dedicated I/O LocalBus drivers for Brodersen integrated and Expansion I/O modules.

I/O Drivers includes direct I/O board definitions and variable profile assignment definitions.

Modem Control / Dial-up / Dial-in

Dial-up and dial-in functions are supported by the RTU32N. These are used for PSTN or GSM modems connected to the serial port/s of the RTU32N. They can be used for any serial communication e.g. Modbus-RTU, DNP3 and IEC60870 serial protocols.

Real-Time / Real-Time Clock

RTU32N Real-time operating system is used for the application program execution. Time stamps and cyclic execution are also based on internal real-time clock. Time stamps are reported in milliseconds resolution. The RTU32N support clock synchronization via PTP, NTP, SNTP and utility protocols.

COM communication for Null-Modem, Radio and Leased Line modems

The RTU32N has implemented extended necessary data communication features for communication of Modbus-RTU, DNP3 and IEC60870-5-101 over serial modems and converters. The features cover detailed handshake control with timing of RTS and CTS.

3G / GPRS Modem controlled directly by RTU32N

The RTU32N supports external UCM-94 3G/GPRS modem connected directly via USB Interface. Software is available to handle automatic connection to a defined APN. Additional logic functions allow control and monitoring of the modem connection.

Power supply options

The RTU32N offers the following power supply input options; 10-30VDC and 30-60VDC. If battery backed UPS functionality is required, Brodersen recommend the UCS-CHRxxx UPS power supplies. All power supply options provide IO Expansion bus power for up to 600mA@12VDC.



Other interfaces

The RTU32N has two USB ports for interfacing with the Brodersen 3G Modem, Ethernet converters, WIFI dongles external memory etc.

I/O CONFIGURATIONS

The RTU32N supports a wide range of integrated IO configurations as well as the range of Brodersen external IO Expansion modules via the LocalBus RJ45 connector.

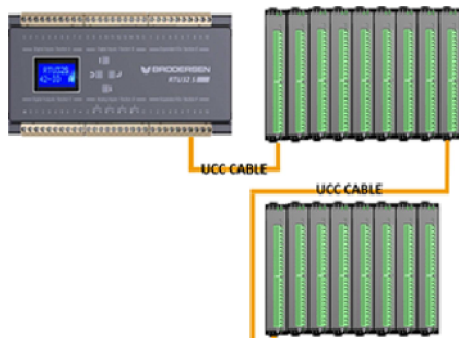
The RTU32N can also be used with 3rd party distributed I/O via any of the supported drivers – e.g. Modbus-TCP or Ethernet I/P.

Integrated I/O options

The RTU32N is available in standard I/O configurations including 28IO and 42IO. The RTU32N can be expanded to support a larger number of I/O and supports up to 12x I/O expansion modules.

I/O Expansion

The RTU32N can be used with all existing LB2 and UCL type Brodersen I/O Expansion modules. No programming or configuration is required – the RTU32N supports automatic I/O configuration of Brodersen I/O Expansion modules.



LB2 type I/O modules



UCL type I/O modules

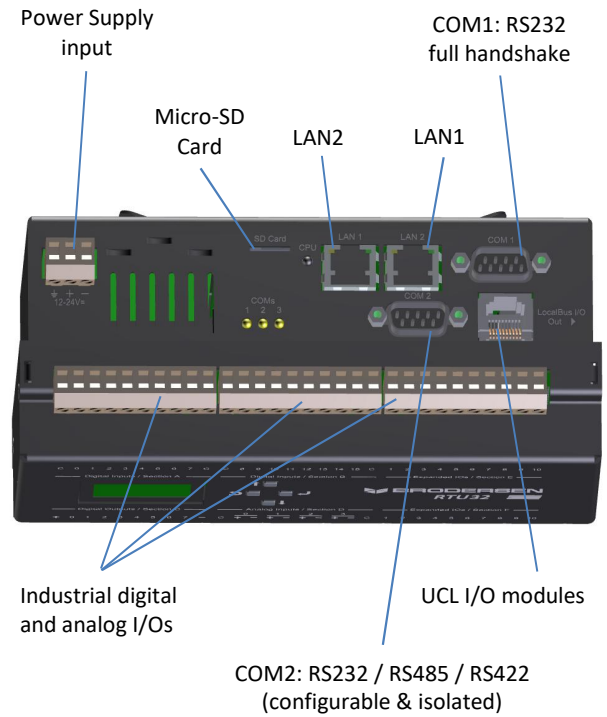
The LocalBus interface includes both the reliable and well proven IO communication bus and power supply for I/O Expansion modules.

OPTIONAL I/O CONFIGURATIONS

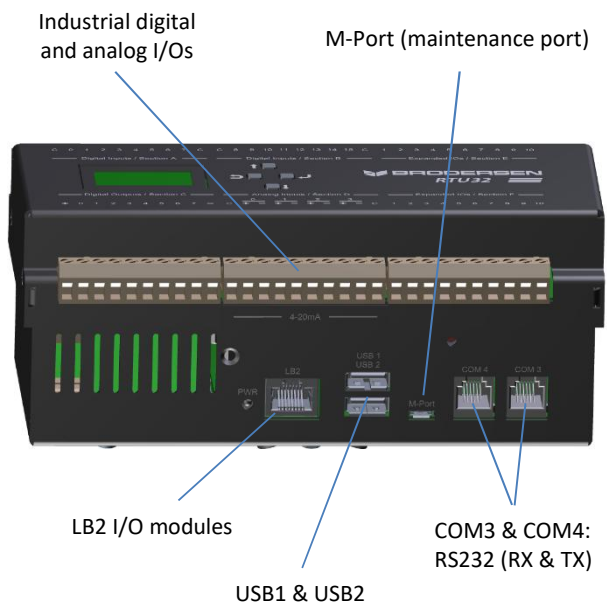
The RTU32N Series offers flexible I/O combinations for higher quantity orders.

INTERFACE OVERVIEW

Top view



Bottom view



**TECHNICAL SPECIFICATIONS****HARDWARE – BASICS**

CPU:	Type: ARM Cortex™-A7 Name: NXP/Freescale i.MX6UL Clock: 528-696MHz
Memory:	RAM: 128- 512MB SDRAM DDR3L NAND Flash: 128MB NVRAM: 128KB Micro-SD Card – removable
RTC:	High accuracy Real-Time-Clock with super capacitor backup power RTC accuracy: 20 ppm.
Interfaces:	LAN1 & LAN2: 10/100Mbps RJ45 COM1: RS232, full HW handshake and up to 115.200 baud, D-sub male 9 pin, non- isolated. COM2: Isolated RS232 / RS485 / RS422 (configurable), up to 115.200 baud, D- sub male 9 pin. COM3 & COM4: RS232, simple RX/TX, up to 115.200 baud, RJ11, non-isolated. USB1 & USB2: USB 2.0. LocalBus 1: for support up to 12 UCL-xx I/O Modules, RJ45. LocalBus 2: for support up to 32 new I/O Modules, RJ45. M-Port: maintenance port, micro-USB connector (using for maintenance and debugging purposes).

RTU32N PLC RUNTIME**PLC Runtime performance:**

Minimum cycle time:	0.5 msec
Typical cycle time:	1 msec
Scan time internal I/O:	0.5msec
Scan time LB2 I/O:	0.5 msec
Scan old type UCL I/O:	Min. 50msec
Maximum PLC variables:	license based

INTEGRATED INDUSTRIAL I/O VERSIONS**28IO**

16 x opto-isolated digital inputs, 10-30VDC
8 x opto-isolated HSS digital outputs, 10-30VDC
4 x isolated analog Inputs, multi-range, voltage/current
(eg.0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA)

42IO

16 x isolated digital inputs, 10-30VDC
8 x isolated HSS digital outputs, 10-30VDC
6 x isolated analog Inputs, multi-range, voltage/current
(eg.0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA)
4 x isolated digital/counter inputs, 5-30VDC, up to 2 KHz
8 x isolated configurable digital I/Os, 10-30VDC.

LocalBus I/O interface for I/O Expansion

Supports all Brodersen UCL I/O Expansion modules.

INTEGRATED DIGITAL INPUT/OUTPUT**Digital inputs:**

Input voltage activated:	10-30VDC
Input voltage deactivated:	Min. 3VDC
Input current (typical):	12V DC: 3mA 24V DC: 6mA
Input delay (typical):	1ms
Isolation:	2KV AC (opto-isolated)

Note: Default standard digital inputs are unipolar 10-30VDC. Digital inputs can optionally be delivered in ranges such as 24-48VDC, 40-70VDC – in unipolar or bipolar configuration.

Fast digital / 32-bit Counter Inputs (on 42IO version)

Input voltage activated:	5-30VDC
Input voltage deactivated:	Min. 3VDC
Input frequency:	up to 5 KHz
Input current (typical):	12V DC: 4mA 24V DC: 8.4mA
Isolation:	2KV AC (Opto-isolated)

Digital outputs:

External voltage:	10 - 30V DC
Output switch type:	Smart high side switch (28IO and 42IO versions) or PNP transistor (16DIO version)
Current per output:	0.5A (max)
Output delay:	1ms (max.)
On resistance:	160mΩ (typ.)
Output leakage current:	7μA (max. in off state)
Output peak current:	1.5A (typ.)



Protections: Short-circuit, overload, over temperature, over voltage, wrong connections
Isolation: 2KV AC (Opto-isolated)

INTEGRATED ANALOG INPUT

Type: Differential configurable analogue inputs, channel to channel isolated

Input ranges:
- Voltage mode: 0 to 10V, 0 to 5V, -5V to +5V, -10V to +10V
- Current mode: 0 to 20mA, -20mA to +20mA, 4mA to 20mA

Mode selection: By on-board jumpers for each channel (jumper set/on: current mode, remove jumper: voltage mode)

Input impedance:
- Voltage mode: More than 1M Ω
- Current mode: 125 Ohm \pm 0.1%

Effective resolution: 16 bit
ADC resolution: 24 bit
Update time: 30ms (for all channels)

Accuracy (at 25°C): \pm 0.1%
Nonlinearity: \pm 0.001%
Temperature drift: \pm 25ppm/°C

Isolation:
- Input to electronics: At least 350V
- Channel to channel: At least 350V

Common mode voltage: Max. \pm 80V DC
CMRR: Min. 80dB
Digital Low-pass filter: Yes (Configurable)

Power Frequency noise rejection:
- Default: 50Hz
- Option: 60Hz (set by manufacturer)

Absolute maximum ratings:
- Voltage: \pm 40V DC
- Current: \pm 40mA

POWER SUPPLY

Nominal input voltage:
- Type 05: 12-24VDC
- Type 30: 24-48VDC

Absolute maximum input range:
- Type 05: 10 - 30V DC
- Type 30: 20-60VDC

Input frequency:
- Types 05 and 30: DC

Power consumption:
- Type 05: 4W (Typ.), 10W (Max.)
- Type 30: 5W (Typ.), 14W (Max.)

Isolation (for all types): 3750 VDC

Indicators:**LED Indicators:**

CPU: On = CPU ok
COM1: Indicating Rx/Tx activity on COM1.
COM2: Indicating Rx/Tx activity on COM2.
COM3: Indicating Rx/Tx activity on COM3.

LCD Display (and Keys):

The LCD Display has a backlight that shuts down after 1 minute of inactivity and allows both auto scroll and manual viewing modes. In auto scroll mode the I/O and RTU status values are displayed in turn for ~1 second eg. DI 0-7, DI 8-15, AI 0, AI 1...



Example Display

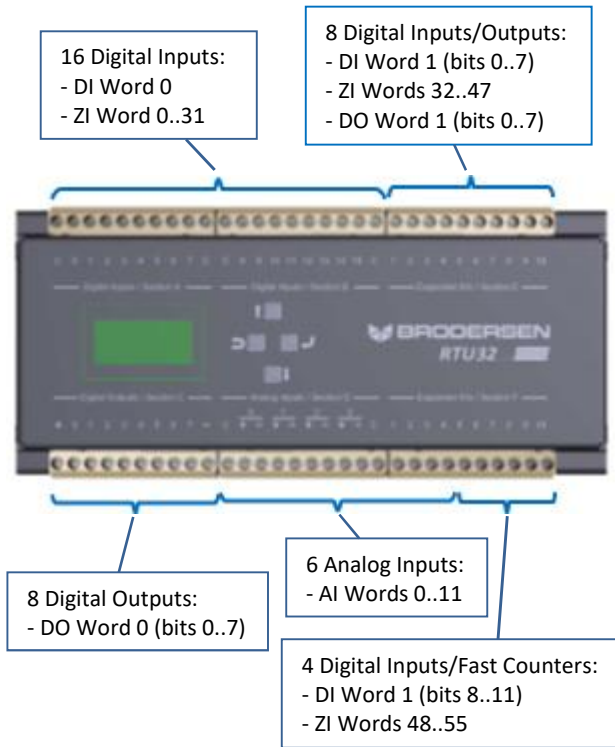


Display Controls

In Manual mode the user can scroll through the displays using the UP, DOWN, ENTER and ESCAPE buttons.



I/O Addressing:



DI Words:

- DI Word 0: Digital Inputs 0..15
- DI Word 1 (bits 0..7): Digital Inputs 16..23
- DI Word 1 (bits 8..11): Digital Inputs 24..27

ZI Words:

- ZI Words 0..1: Counter Input 0 (32-bit)
- ZI Words 2..3: Counter Input 1 (32-bit)
- ...
- ZI Words 54..55: Counter Input 27 (32-bit)

DO Words:

- DO Word 0 (bits 0..7): Digital Outputs 0..7
- DO Word 0 (bits 8..15): Digital Outputs 8..15

AI Words:

- AI Word 0: Analog Input 0 Value (16-bit)
- AI Word 1: Analog Input 0 Status
- AI Word 2: Analog Input 1 Value (16-bit)
- AI Word 3: Analog Input 1 Status
- ...
- AI Word 10: Analog Input 5 Value (16-bit)
- AI Word 11: Analog Input 5 Status

Analog Input Status Word:

- 0: OK
- 1: Underflow
- 2: Overflow
- 3: Invalid data
- 4: Disabled
- 5..65535: Reserved

GENERAL

Protection:	IP20
Mounting:	DIN rail (EN50022) or Wall mounting (via optional mounting kit)
Housing:	Black corrosion protected aluminum housing
Dimensions (WxHxD):	
- Basic version:	178x80x80mm
Weight:	0.8kg (Approx.)

Standards and compatibility – environmental

Ambient temperature:

Operation:	
- Standard:	-20 - +60°C
- Extended version:	-40 - +70°C
Storage:	-40 - +85°C

EMC/LVD:

- IEC61000-3-2:2000
- IEC61000-3-3:1995+A1
- EN55022:1998 Class A
- EN55024:1998+A1+A2
- EN61000-6-2:2005 (with reference to EN61000-4-2:1995, EN61000-4-3:2002, EN61000-4-4:2004, EN61000-4-5:1995, EN61000-4-6:2007, EN61000-4-8:1993, EN61000-4-11:2004)
- IEC60950-1:2003 Safety requirements for electrical equipment for measurement and control

Climatic:

Dry heat:	IEC 60068-2-2, Test Bd, Temp. +55°C, Duration 8h
Cold:	IEC 60068-2-1, Test Ad, Temp. -10°C, Duration 8h
Damp heat:	IEC 60068-2-3, Test Ca, Temp. 40°C, RH 95%, Duration 8h

Mechanical:

Vibration:	IEC 60068-2-6, Test Fc (sinusoidal), Freq. 10-150Hz, Amp.4g, 5 sweeps in 3 orthogonal axes
Shock:	IEC 60068-2-27 (half sine), Acc. 15g, Pulse time 11 msec, 3 x 6 shocks

