SCAPS scanner application software

USC USC Options DSD

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SCAPS

Product Overview

Our hardware and software product range covers all features for various kinds of scanner applications.

SAM is our powerful programming library.

The laser marking software SAMLight provides the functionality for many industrial applications as well as for job shops.

Different software and hardware options are available for enhanced features.

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The USB Scanner Controllers USC-1, USC-2 and USC-3 are SAM compatible hardware modules to drive a 2- or 3-axis laser scanner system.

Flash option for building flexible and fast standalone systems is available.

The Digital Servo Driver DSD can be used for realizing highly integrated and powerful scanning solutions.



USC Extended

Several extension boards are available for advanced features and diagnostics.

Extension Boards

UEB-1 - USC Extension Board The USC Extension Board decouples the stepper and digital signals of USC-2 or USC-3 cards. Single or dual power supply is possible.

SEB-1 - Scanner Extension Board

The Scanner Extension Board enables a single USC-2 or USC-3 to drive 3 synchronized 2D scanners using one laser source.

AEB-2 - Analog Extension Board

The Analog Extension Board converts digital XY2-100 signals into analog positioning signals as required by conventional analog scan heads.

Diagnostic Boards

DB-37 Diagnostic Board

The Diagnostic Board is a breakout board for the 37 pin connector of all USC cards. The board provides LEDs and pin connectors to measure laser, 8 bit digital, analog output, opto-insulated I/O, MOTF and RS-232 signals. DIP switches allow to set opto-insulated inputs.

USC Test Board

The USC Test Board is a breakout board for Extension, Stepper and Head2 connectors of USC-2 or USC-3 cards. The board provides LEDs and pin connectors to measure digital I/O, stepper I/O, MOTF, analog input, RS-232 and Head2 signals. DIP switches allow to set digital and stepper inputs.





SEB-1



AEB-2



DB-37



USC Test Board

USC Options

Advanced hardware options for USC-2 and USC-3 cards.

MOTF

Each USC card can compensate scanner signals for moving targets based on encoder signals. Movements in planar or angular direction can be compensated. In simulated MarkingOnTheFly (MOTF) mode for constant target speed, no encoder signal is required. The best performance of MOTF is achieved when working in Flash mode.





Flash

USC-2 and USC-3 cards are capable of running as a standalone (Flash) system without PC. This mode allows an optimized performance even with MOTF applications.

- dynamic entities e.g. date/time objects, serial numbers, barcodes (DataMatrix, QR code etc.) or text strings
- job upload via Ethernet, USB or FTP server
- Flash Control Interface (FCI) for remote control and automatization
- FCI available via RS-232 or Ethernet (Telnet)
- hardware controlled job selection via Flash JobIOSelect mode (without FCI)
- G-code interpretation for creating jobs
- grayscale and b&w bitmap marking with real-time exchange via FTP
- Redpointer control

Multiple Heads

MultiCard

With the Flash feature MultiCard, SAMLight can control up to 16 USC cards. Each card can operate independently in Flash mode.

Head2 / Head3

The option Head2 enables the second scan head connector. One card controls two synchronized 3D scanners and one laser. Using the SEB-1 three 2D scanners can be used.



With the option FlatLense, an optical Z-axis can be controlled for field flattening. No F-Theta lens is necessary.



USC System Integration





DSD Overview

The DSD is a hardware module for building up digital driver based scanning systems.

DSD – the Digital Servo Driver

The DSD replaces the analog control board in a conventional scan head. It provides digital control of two galvanometer scanners with analog position detection. This symbiosis of analog and digital technology allows well-proven analog technology to be equipped for the future due to new, digital possibilities. Despite its compact size, complex mathematical problems are solved in real time by efficient algorithms, which turns the DSD into a perfect tool for innovative solutions.

DSD General

- one DSD can drive two galvos (X and Y) or one electrical lens (Z)
- support of different galvo types
- compact size

DSD Features

DSD-2-A Features

by Model Prediction

overshoot protection

- bidirectional XY-SCAPS interface allows advanced features
- XY2-100 compatible mode available (optional)
- protection mechanisms
- support of USC-3 Flash mode (standalone)

intuitive Graphical User Interface (GUI)
digital control interface XY-SCAPS
auto-tuning of galvos or electrical lenses

distance and higher positional accuracy

switch between different tuning parametersDSD recorder for display of real scanner positions

optimized scanning performance with improved spot

Smart Laser Control compensates burn-in effects due to speed variation with adjustment of the laser power
error detection with optional laser suppression
real-time check of scan head performance

• fast marking speed with up to 1000 characters per second



System Overview DSD and USC-3



Symbiosis of Analog and Digital Components



Marking without and with Smart Laser Control



Marking Result without and with Model Prediction

DSD Hardware

DSD versions for controlling analog galvos or an electrical lens are available. The DSD hardware consists of the calculation unit mounted on a hardware specific interface board.

DSC-2-D - the Digital Servo Controller

- dual-core ARM processor with 256 MB DDR3 memory
- 4 GB microSD memory
- very compact size: total dimension about [63 x 35 x 10] mm



DSD-2-A – the Digital Servo Driver Analog

- uses DSC-2-S as calculation unit
- analog 16 bit position input
- bidirectional XY-SCAPS interface
- support of different galvo types
- two galvos (X and Y) can be connected
- supply voltage ±15 V DC
- supply current 2 A (per channel)
- total dimension about [90 x 50 x 35] mm



DSD-2-O - the Digital Servo Driver Optical lens

- uses DSC-2-D as calculation unit
- control of an electrical lens of Optotune Switzerland AG
- bidirectional XY-SCAPS or XY2-100 interface (optional)
- lens heater control unit
- integrated optical feedback control
- allows very fast real 3D marking
- one electrical lens (Z) can be connected
- USB connector for tuning if using XY2-100 interface
- supply voltage +24 V DC
- supply current 2 A
- flexible mounting opportunities
- total dimension about [90 x 66 x 35] mm



USC Cards

USC-1, USC-2 and USC-3 - the USB Scanner Controllers

The USC cards are SAM compatible hardware modules for driving a 2- or 3-axis laser scanner system. Due to their compact size of 95 x 100 mm and I/O capabilities, the USC cards are easy to integrate and allow to control a complete machinery via a single communication line. All USC cards calculate the laser and scanner signals in real time. With the Flash mode (optional), flexible embedded solutions can be implemented. Short execution cycle times make the USC cards perfectly suitable for high performance applications. Every USC card supports almost all types of laser and scan head.



Power			
5 V, 1.6 A	\checkmark	\checkmark	\checkmark
Connection			
USB 2.0	\checkmark	~	~
Ethernet	-	100 Mbit/s	1000 Mbit/s
Laser Control			
8 bit digital port	1	1	1
opto-insulated outputs	3	3	3
analog outputs, 2.5 V – 10 V	2 x 8 bit resolution	2 x 12 bit resolution	2 x 12 bit resolution
max. laser frequency	2 MHz	2 MHz	4 MHz
hardware bitmap marking	_	up to 800 kHz	up to 800 kHz
Scanner Control			
XY2-100 interface	\checkmark	\checkmark	\checkmark
XY-SCAPS interface	-	-	\checkmark
Head2	-	\checkmark	\checkmark
External Control			
RS-232 interface	\checkmark	~	~
MOTF channels	1	2	2
opto-insulated inputs/outputs	6/6	6/6	6/6
digi-inputs/outputs (TTL)	_	10/10	10/10
integrated stepper controller	_		
analog inputs $0 V - 10 V$	_	2	2
		2	2
Standalone (Flash)			
memory	-	1 GB flash	4 GB microSD
RAM	-	64 MB DDR	256 MB DDR3
CPU	-	dual-core embedded	dual-core embedded
			dual-core ARM



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