



**Spark Holland introduces  
DBS Autosampler™**

A revolution in  
Dried Blood Spot (DBS) Sampling

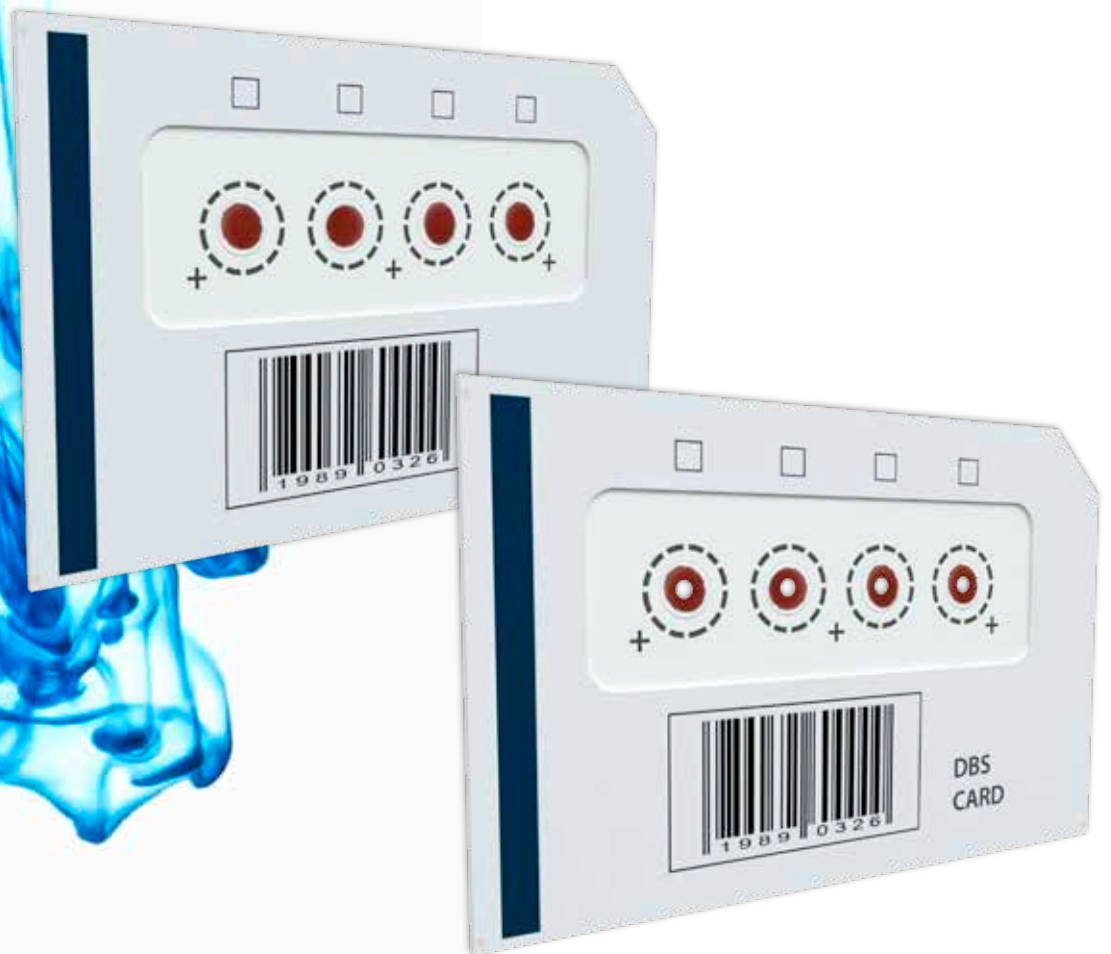
BETTER **SAMPLE** CARE

# Spark Holland introduces DBS Autosampler™

A revolution in  
Dried Blood Spot Sampling

## The DBS Autosampler™

Farewell to Punching!  
Using a leak-tight clamp, dried blood spots or dried matrix spots are directly desorbed as a liquid sample for analysis. Enables a completely automated workflow for DBS analysis.




## On the spot sampling

Dried blood spot (DBS) sampling is an emerging technology for bioanalysis, offering easy, convenient cost effective sample collection, transport and storage. It also offers the possibility for patients who require regular monitoring to take their own blood samples in the comfort of their own home, saving patient stress, transport costs, clinic resources and provides a convenient sampling option in remote locations where medical facilities are not readily available.

DBS or Dried Matrix sampling is particularly useful in the clinical and pharmaceutical laboratory, typically requiring only a 5-15  $\mu$ L blood sample.

However, all the convenience of DBS disappears if you have a complex, labor-intensive process converting the DBS sample to a liquid sample for analysis!

Our revolutionary DBS Autosampler™ maintains the integrity of the sample through automation, offering more efficient, cost effective DBS sample processing.



**Jack Guthree at home  
with automated  
on the spot sampling**

**Introducing our revolutionary  
DBS Autosampler™**

# Introducing our revolutionary **DBS Autosampler™**

Our new DBS Autosampler™ maintains the integrity of the sample by automation. A small footprint enables the DBS Autosampler™ to slot into even the smallest lab space. A standard robotic card feeder and full software control and interface can link into any workflow automation. An optimized workflow solution!

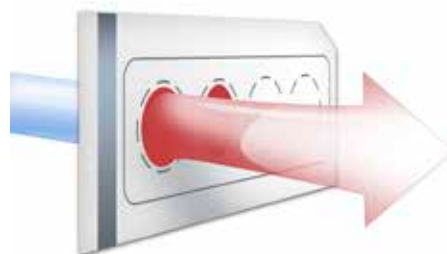
- Unique Flow-through desorption (FTD™) technology for sample prep and optional on-line coupling to (SPE)(LC)-MS/MS
- Option for mounting different clamp sizes for the desorption of different sized spots
  - Partial spot or full spot desorption
- Intelligent camera and image analysis software for
  - accurate spot recognition and positioning
  - "no card" detection and detection of previously sampled spots
  - barcode identification for 1D and 2D barcodes
  - storage, tracking and tracing of sample information
  - sample card information storage
- Automated internal standard addition (AISA™)
- HotCap™ heated capillary for better desorption
- Wash flow path with solvents and/or HotCap™
- Sparklink™ 5 software control and interface
- Standard 96 DBS card capacity
  - 4 sample spots per card allows possibility of 384 samples
- Excellent sensitivity with a variety of analytes
- Good precision, linearity and accuracy with a variety of analytes
- Total assay cycle time for DBS-SPE-LC-MS analysis within 3 minutes



## Patented technology

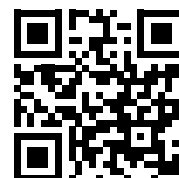
Innovative patented Flow-through desorption (FTD™)\* technology provides direct elution of DBS from cards, offering not only consistent quality while eliminating the inconsistency of tedious manual disc punching or costly robotics, but also allowing the option of on-line clean-up and analyte separation by SPE prior to analysis in an automated workflow. Effortless automation of the entire workflow for DBS analysis in minutes, providing maximum

sensitivity without any manual intervention. The DBS Autosampler™ from Spark sets a new standard for analysis!



[www.onthespotsampling.com](http://www.onthespotsampling.com)

- **No disc punching**
- **Simple, automated process**
- **Potential for many applications**



\* US patent no. US 8586382 B2



## Extended sample capacity

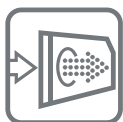
### Flexible Card Feed

Expandable capacity – from a single card, to a 96 card feeder. 4 sample spots per card allows the possibility of 384 samples for analysis in a single run.



## On the spot sample preparation

Spark has always led the way in the innovative integration of sample prep into on-line analysis. Innovative features and our unique patented technology to ensure the integrity of your DBS samples is maintained for whatever analytical technique you choose.



### Flow-Through Desorption

#### FTD™ – Flow-through Desorption

No manual intervention required with our innovative patented technology. Direct elution of DBS from cards enables optional on-line clean-up and analyte separation by SPE prior to analysis in an automated workflow. Replaceable clamp head sizes of 2, 4, 6 or 8 mm clamp and seal filter paper cards up to pressures of about 200 bar (up to 100 bar for the 8 mm clamp). Desorption solvent is delivered by a high pressure dispenser (HPD™).

that it not only provides accurate positioning of DBS cards in the high pressure clamp for direct, flow-through desorption of bloodspots; but also offers sample barcode identification for 1D or 2D barcodes, full or partial spot desorption options and full image capture for sample information storage, tracking and traceability.



### Intelligent Vision Camera

#### IVC™ – Intelligent Vision Camera

Accurate spot positioning and sample traceability is vital for accuracy. Our camera has been designed so



### Automated Internal Standard Addition

#### AISA™ – Automated Internal Standard Addition

Accurate automated internal standard addition using a loop injection method. A specified volume of internal standard is loaded in a loop using an integrated mini pump. The internal standard is then added to the sample during desorption of a blood spot using a high pressure dispenser (HPD™).



### Heated Capillary

#### HotCap™ – individual heating of solvents

HotCap™ is an optional heated capillary that rapidly heats solvents to improve desorption and sample recovery.

# Connecting to the world

## Sparklink™ 5 control

For comprehensive control of the extensive capabilities of the DBS Autosampler™ Spark has developed the Sparklink™ 5 control software package. The software package consists of the main Sparklink™ controller and the DBS Autosampler™ driver software. The software provides maximum use of the functionality in any order of events and to customize your own methods. Methods are linked to samples in a run table for automated processing of sample batches. Software synchronization and hard-wired I/O enable communication with other software and hardware to create full control for your entire analytical system.

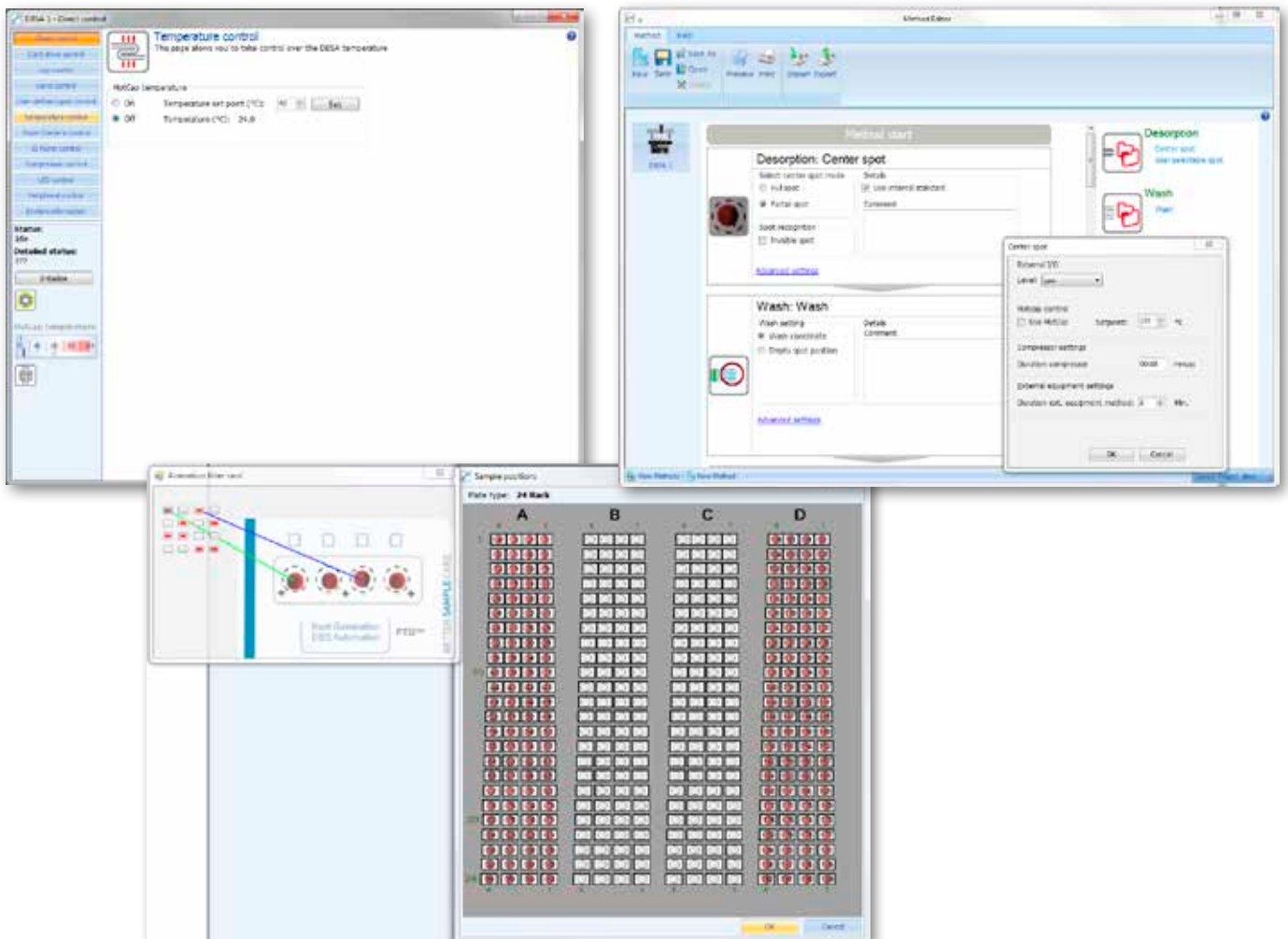
Manual control mode allows full choice and customization of parameters such as clamp size, sample position, full or partial spot, card feed, valve, temperature, camera and internal standard.

Once all parameters have been selected, the run table can be viewed prior to the run.

### Drivers for third party software packages / OEM solutions

Using the Spark communication protocol, Sparklink™ control can be integrated into most third party software packages. Spark has extensive experience with integrating instrument control into the software packages of our OEM customers, and has assisted in the

creation of a number of drivers for our instruments in commercially available software products for system control and data acquisition. Please consult us for your workflow solution!





Method - SparkLine

Project: Method: Kuratba Queue: Wait Control: Logviewer: Help

View: Stop: Start: Run: Pause: Refresh: Print: Import: Export: Open: Result File: EUSA

Method Result File Sample ID Control Filter used Spot position

Method	Result File	Sample ID	Control	Filter used	Spot position
default decrp	Data01	001	A	01	01
default decrp	Data02	002	A	01	02
default decrp	Data03	003	A	01	03
default decrp	Data04	004	A	01	04
default decrp	Data05	005	A	02	01
default decrp	Data06	006	A	02	02
default decrp	Data07	007	A	02	03
default decrp	Data08	008	A	02	04
default decrp	Data09	009	A	03	01
default decrp	Data10	010	A	03	02
default decrp	Data11	011	A	03	03
default decrp	Data12	012	A	03	04
default decrp	Data13	013	A	04	01
default decrp	Data14	014	A	04	02
default decrp	Data15	015	A	04	03
default decrp	Data16	016	A	04	04
default decrp	Data17	017	A	05	01
default decrp	Data18	018	A	05	02
default decrp	Data19	019	A	05	03
default decrp	Data20	020	A	05	04
default decrp	Data21	021	A	06	01
default decrp	Data22	022	A	06	02
default decrp	Data23	023	A	06	03
default decrp	Data24	024	A	06	04
default decrp	Data25	025	A	07	01
default decrp	Data26	026	A	07	02
default decrp	Data27	027	A	07	03
default decrp	Data28	028	A	07	04
default decrp	Data29	029	A	08	01
default decrp	Data30	030	A	08	02
default decrp	Data31	031	A	08	03
default decrp	Data32	032	A	08	04
default decrp	Data33	033	A	09	01
default decrp	Data34	034	A	09	02
default decrp	Data35	035	A	09	03
default decrp	Data36	036	A	09	04
default decrp	Data37	037	A	10	01
default decrp	Data38	038	A	10	02
default decrp	Data39	039	A	10	03
default decrp	Data40	040	A	10	04

View Runtable View Runtable Runtable Queue

Method - SparkLine

Queue - SparkLine

Project: Method: Kuratba Queue: Wait Control: Logviewer: Help

View: Stop: Start: Run: Pause: Refresh: Print: Import: Export: Open: Result File: EUSA

Method Result File Sample ID Control Filter used Spot position

Method	Result File	Sample ID	Control	Filter used	Spot position
default decrp	Data01-201	201	A	01	01
default decrp	Data02-201	202	A	01	02
default decrp	Data03-201	203	A	01	03
default decrp	Data04-201	204	A	01	04
default decrp	Data05	205	A	02	01
default decrp	Data06	206	A	02	02
default decrp	Data07	207	A	02	03
default decrp	Data08	208	A	02	04
default decrp	Data09	209	A	03	01
default decrp	Data10	210	A	03	02
default decrp	Data11	211	A	03	03
default decrp	Data12	212	A	03	04
default decrp	Data13	213	A	04	01
default decrp	Data14	214	A	04	02
default decrp	Data15	215	A	04	03
default decrp	Data16	216	A	04	04
default decrp	Data17	217	A	05	01
default decrp	Data18	218	A	05	02
default decrp	Data19	219	A	05	03
default decrp	Data20	220	A	05	04
default decrp	Data21	221	A	06	01
default decrp	Data22	222	A	06	02
default decrp	Data23	223	A	06	03
default decrp	Data24	224	A	06	04
default decrp	Data25	225	A	07	01
default decrp	Data26	226	A	07	02
default decrp	Data27	227	A	07	03
default decrp	Data28	228	A	07	04
default decrp	Data29	229	A	08	01
default decrp	Data30	230	A	08	02
default decrp	Data31	231	A	08	03
default decrp	Data32	232	A	08	04
default decrp	Data33	233	A	09	01
default decrp	Data34	234	A	09	02
default decrp	Data35	235	A	09	03
default decrp	Data36	236	A	09	04
default decrp	Data37	237	A	10	01
default decrp	Data38	238	A	10	02
default decrp	Data39	239	A	10	03
default decrp	Data40	240	A	10	04
default decrp	Data41	241	A	11	01
default decrp	Data42	242	A	11	02
default decrp	Data43	243	A	11	03
default decrp	Data44	244	A	11	04

View Runtable View Runtable Runtable Queue

Instrument Status

DSSA1

Status: Running

default decrp 20141217 13010 AD01 010.jpg

default decrp 20141217 13013 AD01 020.jpg



## OEM Solutions

Spark Holland has over 30 years' experience in HPLC and UHPLC instrument innovation, specializing in the field of autosampling, on-line solid phase extraction and, more recently, on-line dried blood spot (DBS) analysis. Our innovative products have always led the way in injection technology, sample preparation integration and flexibility of operation. Combined with high quality engineering and manufacturing, Spark Holland is a leading OEM supplier of front-end UHPLC and on-line solid phase extraction instruments, working according to ISO 13485 and, when required, delivering CE-IVD compliant modules for use in clinical systems.

**Interested in seeing more? Interested in OEM?**

**Contact us now!**

[sales@sparkholland.com](mailto:sales@sparkholland.com)

[www.sparkholland.com](http://www.sparkholland.com)



# DBS Autosampler™ specifications

General specifications	
Flow-through desorption concept (FTD™)	Leak-tight clamp heads provide direct elution of DBS from cards without punching discs.
Desorption methods	Partial spot, full spot.
Clamp heads	Replaceable. Sizes (2 mm, 4 mm, 6 mm and 8 mm available). SS316. Leak-tight up to 200 bar for 2 mm, 4 mm and 6 mm clamp heads. Leak-tight up to 100 bar for 8 mm clamp head. Programmable clamping force 300 – 3000 N.
Sample capacity	4 spot Whatman or PerkinElmer type DBS card in a cassette format, with an extended capacity of up to 96 DBS cards, or 384 samples.
Intelligent Vision Camera (IVC™)	Camera designed to provide <ul style="list-style-type: none"> <li>- missing card detection</li> <li>- accurate positioning of DBS cards in the clamp</li> <li>- 1D and 2D sample barcode identification</li> <li>- full or partial spot desorption options</li> <li>- full image capture for sample information storage, tracking and traceability.</li> </ul>
Internal standard loop	20 ul.
IS pump	Internal standard pump max. 95 µL/sec.
Compressor	To dry fluid lines and clamp heads after desorption and wash.
Clamp positioning precision	0.2 mm.
Injection valve	SS stator and PEEK rotor seal, bore 0.25 mm, 1/16" connection ports, except port 4 (1/32" connection port).
Valve switching time	<100 msec.
Reproducibility desorption	RSD ≤ 1%; Due to paper quality larger values are typically obtained.
Reproducibility internal standard	RSD ≤ 1%.
Cycle time, typical using HPD™	150 sec including desorption and wash.
Cycle time, from card retrieval to ready to desorb	20 sec.
Wetted parts in sample flow path	SS316, PTFE, PEEK.
Wetted parts in dispenser and wash lines	Tefzel, Teflon, PEEK, Kelf, Glass.

Safety and compliancy	
Regulatory compliance	CE, RoHS, FCC, ICES-01.
Safety standards applied	IEC61010-1, IEC61010-2-081 and IEC61010-2-010.
EMC standards applied	IEC61326-1, CISPR11, 47 CFR part 15.
Installation class	II.
Certification	UL and CSA approved.
Pollution degree	2.
Spark Quality System	ISO 9001 certified and ISO 13485 certified.
Clamp illumination LED	White LED with on/off control.
Door sensor	Door open status.

## Electrical

Power requirements	100 – 240 Volt AC +/- 10%. 50/60 Hz.
Fuses	2 x 2.5 AT, 250V, 1500A breaking capacity, IEC 60127-2, UL recognized.
Power consumption	200 VA.

## Environment

Operating environment	Indoor use only.
Sound pressure level	LAeq <70 dB.
Operating temperature	10 °C to 40 °C.
Operating humidity	20 to 80% RH.
Operating altitude	up to 2000 m.
Transport and storage temperature	-30 °C to +60 °C.
Transport and storage humidity	Max. 85% RH.

## Physical

Max load on top cover	50 kg.
Dimensions Standard DBSA Module Standard DBSA Module + XYZ Card Handler Robot	(Width x Depth x Height). 330 mm x 540 mm x 120 mm. 535 mm x 540 mm x 698 mm.
Free area around the instrument	Minimum free distance of 5 cm from obstacles at the rear side.
Weight Standard DBSA Module Standard DBSA Module + XYZ Card Handler Robot	15 kg. 32 kg.

## Instrument control

Graphical User Interface	SparkLink™ or third party instrument control software using SparkLink™ communication protocol, including DBS Autosampler™ driver.
PC interface	To be used with the SparkLink™ protocol: Serial, RS232 Sub-D connector Ethernet, RJ45 USB, type B.  To be used for the Vision Camera: USB, type B.
Card handler	To be used for the connection with the card handler: Serial, RS232 Sub-D connector.
Outputs	5 programmable relay outputs. 1 programmable TTL output.  Programmable as: Inject marker, Auxiliary or Alarm, Relays are NO and NC connectable.  Outputs can be used for hardware synchronization.
Inputs	4 TTL inputs for OEM applications. Inputs can be used for hardware synchronization.

HotCap™	
Temperature range	40 – 100 °C. Hardwired temperature limiter, temperature measured at the HotCap™.
Increments	1 °C.
Accuracy	+/- 2 °C.
Speed	34 sec from 25 °C to 75 °C at 1ml/min using water.

## Ordering information

DBS Autosampler™	
DBS Autosampler™ with 2 mm clampheads	SP411.102
DBS Autosampler™ with 4 mm clampheads	SP411.104
DBS Autosampler™ with 6 mm clampheads	SP411.106
DBS Autosampler™ with 8 mm clampheads	SP411.108
<p><b>The DBS Autosampler™ order numbers come standard with these items:</b></p> <ul style="list-style-type: none"> <li>- HotCap™</li> <li>- XYZ sampler</li> <li>- DBS Module</li> <li>- DBS Module Shipkit</li> <li>- XYZ Card Handler Kit</li> <li>- Connection plate DBS Autosampler Module and the XYZ sampler</li> <li>- Card rack carrier for 4 card racks</li> <li>- 4 # card racks</li> <li>- Card gripper</li> <li>- Sparklink™ Software</li> <li>- IS bottle holder</li> </ul>	

All products are for Research Use Only (RUO), unless specifically labeled otherwise.



**For more information:**



Now interactively explore for yourself all the animated features of the DBS Autosampler™ at [www.onthespotssampling.com](http://www.onthespotssampling.com)

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Specifications are subject to change

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