

S3DR-CE

SES Solid State Data Recorder
- Compact Extended

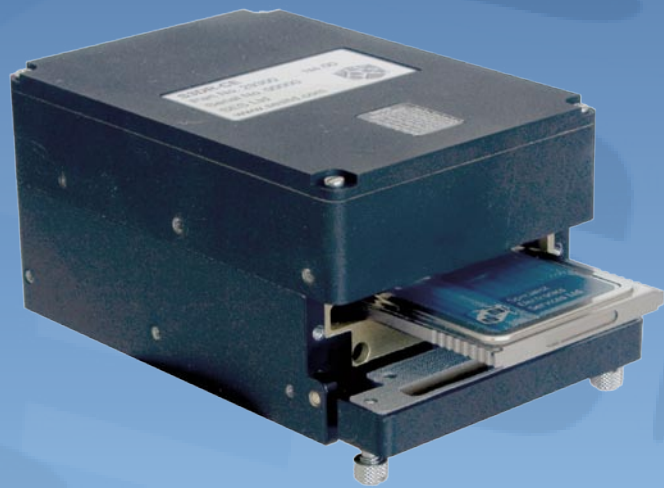


Product Design Hardware Design Software Design Mechanical Design Electronic Design

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S3DR-CE



SES Solid State Data
Recorder - Compact Extended

SES Solid State Data Recorders

The S3DR product family is a low cost, high performance, rugged solution to the processing and data recording needs of environmentally challenging embedded system, such as those found in aerospace, defence, naval and safety-related or high performance industrial applications.

The S3DR product family is designed with flexibility and expandability in mind. S3DR-CE (Compact Extended) is a specialisation of the more generic product family providing communications, data acquisition and data recording functions where space and mass are at a premium. The unit features a high-speed solid state memory recording function, that is able to write data to memory media from multiple monitored interfaces at combined speeds of up to 60 Mbits (7.5 Mbytes) per second.

The S3DR-CE supports PCMCIA style high capacity solid state cartridges (with max storage capacity 16GByte).

Power
28V DC Nominal
12V Tolerant
BS3G100 and MIL-Std-704E

Standard:
4x RS422/485 Rx, 4x RS232 Rx
2x CAN bus (MilCAN Capable)
1x IRIG B Timecode Input
2x ARINC429 Rx
4x 10-bit A/D voice or other analogue input at up to 48Ksps)
8x Discrete I/O (TTL) or 4x Opto-isolated I/O
2x IRIG106 PCM (high speed serial - up to 5Mbit/sec)

Options:
1x, 2x or 4x MIL-STD 1553B Dual Redundant (BM function)
14x ARINC429 Rx
8x Audio
2x Video MPEG2 Encoder with 4x Channel Audio
8x or 16x 16-bit A/D Converter

Solid State Memory Slot
A protected enclosure holds an industry standard ATA Flash RAM Drive (Current Max. 16Gb)

Solid State Data Recorder - Compact Extended

Operation
-40°C to +85°C
Storage
-55°C to +90°C

Compact
125x85x67mm
< 0.8kg

Front Panel Status Indicators

Supported by REVEAL
SES Data Retrieval and Management Tool

The S3DR-CE is extremely configurable through the presence of an onboard embedded computer and flexible FPGA, allowing application specific data gathering regimes and various I/O options to be accommodated, the S3DR-CE is also designed for serious expansion allowing multiple data acquisition and communications options, which can either be configured in a distributed or integrated architecture.

The S3DR-CE can be used as a data recorder or for data uploading applications.

Typical applications of S3DR-CE include use as a mission recorder, flight test recorder, Quick Access Recorder, engine test data acquisition unit or incident investigation recorder. Typical configurations can be specified focusing on Audio, Video, Data bus, Ethernet or Vibration monitoring.

Ultimate Expansion

S3DR-CE is built around a highly distributed data acquisition and recording architecture, utilising a high-speed deterministic data communication bus, the S3DR-CE product can be configured as multiple remote data acquisition and communication modules that provide data to a single recording function.

The recording function is built from the SES miniature S3DR-C recorder, the smallest high speed recorder in the world. The recording, communications and data acquisition architecture supports system implementations that are built from single self-contained miniature units, or multiple distributed nodes connected to a central recording and control function.

Total recording bandwidth on the data bus is 60Mbit/s which can be made up of data from a selection of core interfaces and additional optional interfaces. The core interface functions include those available on the S3DR-C recorder, and these are:

- 4x RS422/485 Rx, 4x RS232 Rx
- 2x CAN bus (MilCAN Capable)
- 1x IRIG B Timecode Input
- 2x ARINC429 Rx
- 4x 10-bit A/D (voice or other analogue input at up to 48Ksps)
- 8x Discrete I/O (TTL) or 4x Opto-isolated I/O
- 2x IRIG106 PCM (high speed serial – up to 5Mbit/sec)

In addition, 8 channels of 16-bit A/D (nominal, 14-bit min. effective) can be included in this group of interfaces. One of the following optional interfaces can also be selected:

- 1 or 2x MIL-STD 1553B Dual Redundant (BM function)
- 14x ARINC 429 Rx
- 8x Audio
- 2x Video MPEG2 Encoder with 4x Channel Audio

Alternatively, the S3DR-CE can be configured to record 16 channels of 16-bit A/D with signal conditioning, such as strain gauge and thermocouple inputs, as well as core interfaces.

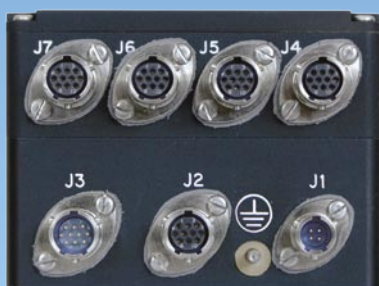
Connectors and Power

Up to seven circular military connectors (power, signals and serial data) sealed against sand, dust and fluids, of which four may be BNC or TRIAX types.

Wide input range power supply (11-32V, 10 Watt at 28V nom.) tested to BS3G100 and Mil-Std 704F, providing all power conditioning for internal supplies. (Power requirements depend on fitted expansion module fitted)

Hot-swappable solid state removable memory module (PCMCIA ATA Flash format).

Can be configured to start from power-on, from discrete input or from an external trigger.



REVEAL

REVEAL is a partner product to the S3DR-CE data recorder. It allows the user to extract and manipulate data from a removable memory cartridge and prepare the cartridge for reuse by the S3DR-CE. REVEAL is an application for Microsoft Windows that provides a wealth of features for extracting, interpreting, visualising and analysing data captured using an SES data recorder. Key feature of the tool include:

- Convert data to a variety of formats to allow analysis with domain specific tools
- Interpret data to demultiplex or decommutate a data stream into its constituent parameters
- Archive data to hard disk, CD or DVD for later analysis or long term storage
- Visualisation of audio and video data, supporting real-time and fast-time playback
- Declassification of S3DR data storage media
- Annotation of recorded data with supplementary data, for example Form 725

The REVEAL architecture allows for easy customisation of the application to suit specific requirements, for example; the introduction of a new plug-in to output data in a different format, or the automation of repeated processing functions.



CASE STUDY S3DR-CE with Video, Audio, Data Acquisition and Databus

One popular configuration of S3DR-CE is as a mission recorder supporting video and databus capture. For this configuration, (SES Part No. 30500) the recorder provides:

- 2x MPEG2 Video with full D1 Resolution and constant or variable video bit rate, from 378Kbps up to 15Mbps
- 4x Audio
- 2x ARINC429 Rx
- 2x Discrete Inputs
- 4x 10-bit Analogue Inputs (up to 48Ksps)
- 1x 16Gbyte Solid State Cartridge (up to 8 hours DVD quality video)

When used with the REVEAL data visualisation tool, captured video, audio, analogue channels and data bus traffic are displayed in a synchronised manner on multiple display screens of a Windows XP analysis workstation. Data can be statically viewed or replayed in real-time or fast-time. Finally data can be archived or exported to further tools for more in-depth analysis.



S3DR-CE Specification



Size:	125mm(d) x 85mm(w) x 65mm(h) (excluding connectors)
Weight:	< 0.8kg
Case Construction:	Aluminium Alloy Casing
Standard Interfaces:	4x RS422/485 Rx, 4x RS232 Rx 2x CAN bus (MilCAN Capable) IRIG B Timecode Input 2x ARINC429 Rx 4x 10-bit A/D (voice or other analogue input at up to 48Ksps) 8x Discrete I/O (TTL) or 4x Opto-isolated I/O 2x IRIG106 PCM (high speed serial – up to 5Mbit/sec)
Selectable Interfaces:	1x, 2x or 4x MIL-STD 1553B Dual Redundant (BM function) 14x ARINC429 Rx 8x Audio 2x Video MPEG2 Encoder with 4 Channel Audio 8x or 16x A/D (Up to 48Ksps per channel)
Recording Memory Media:	PCMCIA Card (Types I and II)
Max Recording Rate:	60 Mbit/s (from all sources)
Power Requirements:	28V, 10W (Nominal)

OPERATING TEMPERATURE:	-40°C to 85°C
STORAGE TEMPERATURE:	-55°C to 90°C
TEMP/HUMIDITY:	Tested to MIL-STD-810F method 507.4
EMC:	Tested to Def-Stan 59-41 Part 3 DCE01, DCE02, DCE03, DRE01, DRE02, DCS01, DCS02, DCS03, DRS01, DRS02
VIBRATION:	Tested to MIL-STD-810F method 514.5 Procedure I (Category 12 - Jet Aircraft)
NORMAL ACCELERATION:	±25g in all axes for 10s
SHOCK ACCELERATION:	Normal working with 3 impacts, ±40g peak in all axes 11m/s, terminal peak sawtooth
MAGNETIC INFLUENCE:	BS3G100 Part 2, Section 2
ALTITUDE:	Up to 50,000ft
INGRESS:	Tested to MIL-STD-810F Method 506.4 Proc III

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