

Specialist Electronics Services Ltd

Avionics Engineering

# C3DU-G

SES Control and Display Unit - Graphical



Product Design Hardware Design Software Design Mechanical Design Electronic Design

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Software Design Mechanical Design Electronic Design Product Design Hardware Design

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# SES Control and Display Units

The C3DU product range is designed for compatibility with a variety of military and commercial vehicle applications and environments and offers low cost customization to meet specific requirements. The family of products is based around a common processor module, has a selection of high performance flat panel displays and is supplied in a variety of physical enclosures. The C3DUs have a defined performance and are pre-qualified to work in the harshest of environments, including severe military EMC standards.



The SES C3DU-G is a part of the latest family of SES control and display units suitable for aerospace and armoured vehicle applications, featuring a high reliability electro-luminescent panel with night vision goggle compatibility. A user can operate the unit via front panel mounted push-buttons and toggle switches; the electrical system interfaces are dependent on configuration and can include up to three RS422/485 serial links, up to 12 discrete digital inputs/outputs, and other inputs such as CAN bus or high-speed synchronous serial interface.

Customization options are widely available for the C3DU-G. These include the number, position and types of switches on the front panel, and the legends that are associated with the hardware switches. There are a number of different types of switches available, these range from the simple push button switch to a 3 position toggle switch than can be guarded in one or more positions. The software can also be highly customised to provide a bespoke function and screen layout and of course monitor the operation of the software switches.

The C3DU-G is suitable for a wide variety of control and display applications providing a very high performance and cost effective solution to a bespoke and challenging requirement.

## C3DU-G Features

The following are some of the main features of the C3DU-G:

- Large area electroluminescent display with 160x80 pixel resolution.
- NVIS compatible and sunlight readable display.
- NVG compatible illuminated front panel with optional embedded hidden-until-lit annunciator.
- Display layout and information format fully customisable, allowing single or multiple screen functionality.
- Illuminated switch legends can be customised to suit a specific application.
- Two 16bit microprocessors with 32kb RAM and 256kb ROM. One processor is used for the control of the display and software buttons, leaving the other free to control the communications and control of the system. Both processors are programmed in ANSI-C following MISRA coding guidelines.
- In-service software configurable.
- Up to 8 software readable buttons separated by guards.
- Up to 4 software readable switches which can be configured for direct hardware link to the rear connector.
- Various electrical interfaces available as standard, including multiple RS422, CANBus and discrete I/O.
- Electromagnetic Compatibility testing to DEF STAN 59-41. Environmental testing to MIL-STD-810E.
- Power Consumption: Max 20W at 28v DC to BS3G100

## System Design Service

The C3DU-G can be supplied as a fully functional turnkey system, consisting of "Off the Shelf" hardware and fully customised software, to suit the user's requirements.

SES is experienced in developing custom display layouts and complex functionality and can provide an efficient customization service. This service relies on interaction with the customer or user to capture the essential requirements.

To aid this process of requirement capture, a set of Software Development Tools are available.



## System Integration Support

SES can supply Special-to-Type Test Equipment (STTE) to support the development of C3DU-G applications and to provide in-service support test facilities.

These STTEs take the form of a ruggedised PC equipped with an interface adapter to provide to the C3DU-G the power and signal connections required to mimic the final installation.

This allows the unit to be subjected to stand alone testing even before installation in the destination vehicle. Examples include environmental testing or even demonstration or training on the unit before installation.



## Software Development Tools

For bespoke developments SES can offer a range of software based simulation tools.

These synthetic C3DU applications mimic the display to show example screen layouts and even allow customers to design and create their own screen and menu layouts. SES can use these tools to work closely with the customer to achieve the exact screen layout and menu functionality required for the application and to ensure the software customisation achieves the required functional performance.



# C3DU-G Specification



Physical Size:	93mm(h) x 151mm(w) x 114mm(d, inc. switches)
Weight:	<1.5kg
Casing:	Aluminium Alloy (L99)
Finish:	Matt black to FED-STD 595-37038
Display Resolution:	160 x 80 pixels
Display Contrast:	100:1
Brightness:	adjustable from 3.9cd/m <sup>2</sup> to 78cd/m <sup>2</sup>
NVIS Compatible:	NVIS Yellow to MIL-L-85762A/ MIL-STD-3009 Class B
Interfaces:	3 x RS422/RS485 serial ports Up to 12 Isolated digital inputs or Volt-free digital outputs (details of configuration on request)
Processing:	Two 20MHz 16-bit microcontrollers, each with 32kByte RAM, 256kByte ROM, programmed in ANSI-C following MISRA coding guidelines
Customisation Options:	Screen layout and features Menu functionality Hardware switches Panel and legend illumination

STORAGE TEMPERATURE:	-40°C TO +85°C
OPERATING TEMPERATURE:	-40°C TO +70°C
HUMIDITY:	5% TO 95% NON-CONDENSING
OPERATING ALTITUDE LIMIT:	58,000FT. (18000M)
POWER CONSUMPTION:	<20W AT 28V D.C.
VIBRATION:	MIL-STD-810E
EMC RATING:	DEF STAN 59-41

## Specialist Electronics Services Ltd

Head Office  
Unit 25  
Craven Court  
Stanhope Road  
Camberley  
Surrey  
GU15 3BS  
United Kingdom  
Tel: +44 (0) 1276 63483  
Fax: +44 (0) 1276 63327



Northern Office  
Unit 32  
Trinity Enterprise Centre  
Furness Business Park  
Ironworks Road  
Barrow-in-Furness  
Cumbria, LA14 2PN  
United Kingdom  
Tel: +44 (0) 1229 408300  
Fax: +44 (0) 1229 408301

email: [info@sesltd.com](mailto:info@sesltd.com) • web: [www.sesltd.com](http://www.sesltd.com)