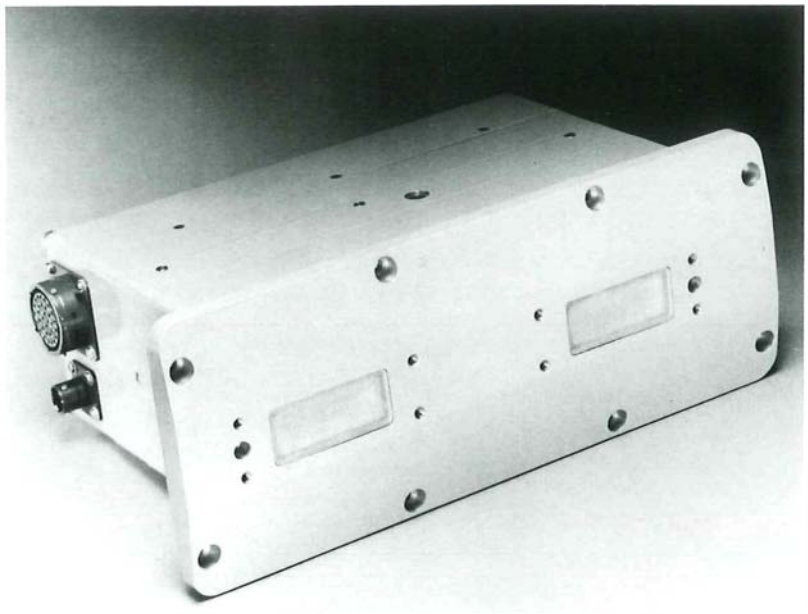
GEC-Marconi Electronic Systems

Radar Altimeter

ESD5000 Series



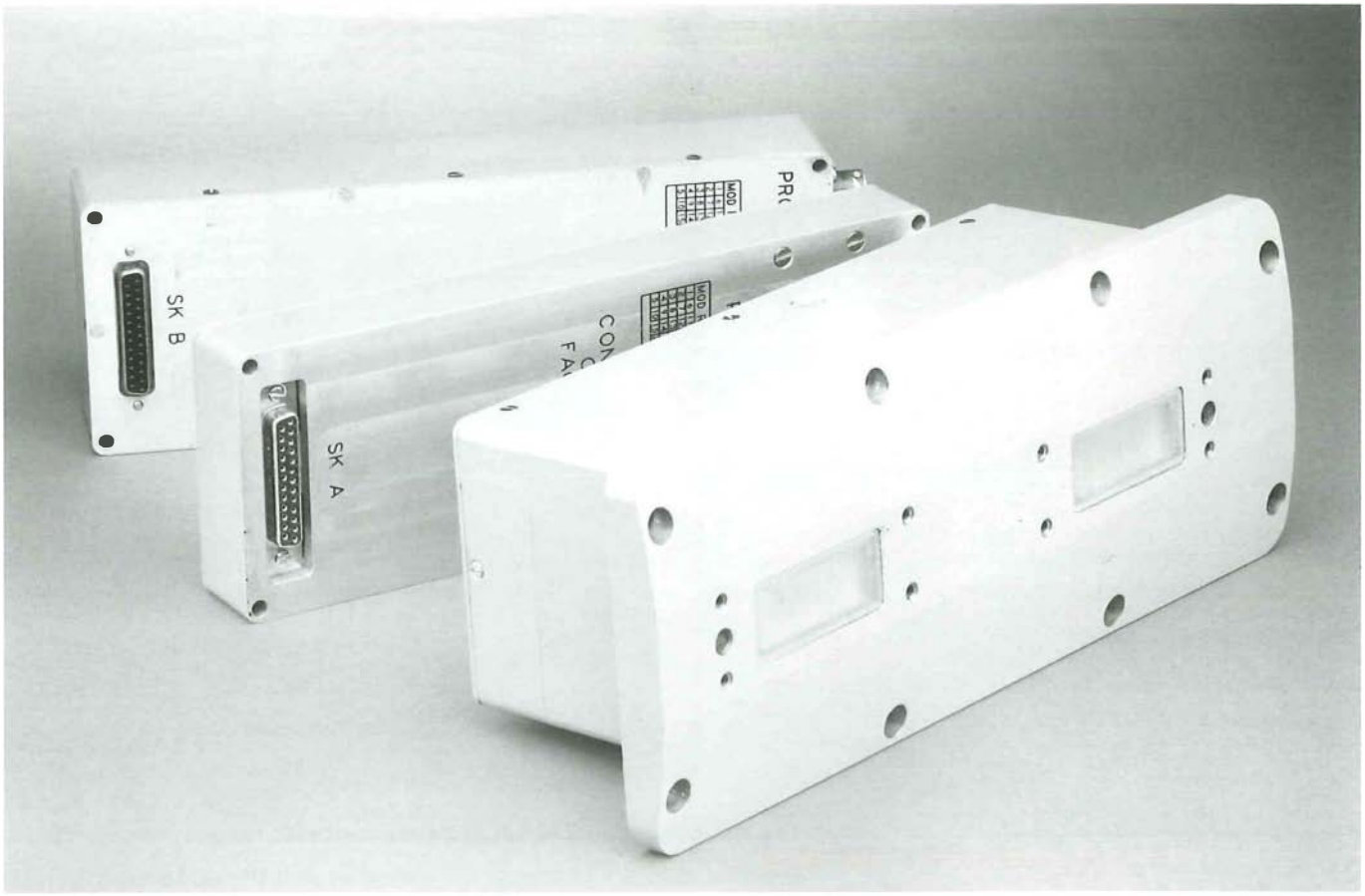
- *Operates in J-Band (US Ku-Band)*
- *Single box unit includes antenna*
- *No RF Feeders*
- *Superior accuracy and resolution 0 to 5000 feet*
- *Excellent hover performance*
- *Superior stealth performance*
- *Analogue and data bus outputs*
- *Adaptable design for specific requirements*
- *Compatible with terrain navigation systems*
- *Low cost of ownership and installation*

The ESD5000 series radar altimeters provide height data on the shortest distance between the altimeter and the underlying terrain for heights from 0 to 5000 feet.

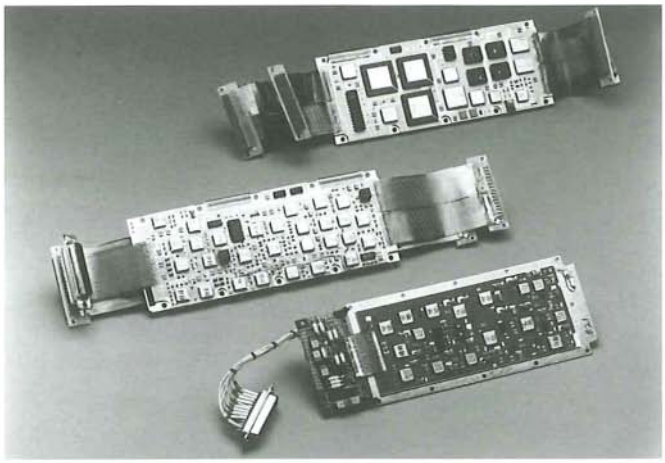
The altimeter uses a dual leading edge tracker to ensure tracking of the nearest object. Continuous automatic monitoring of the system ensures high reliability with accurate height indication down to 0 altitude.

The ESD5000 series radar altimeter operates in mid J-Band (US Ku-Band) using microwave Field Effect Transistor (FET) technology. Software controlled signal processing techniques are used to enable reliable performance to be achieved to 5000 feet with a transmitter power of only 1 Watt. Surface mount technology is used to give a low volume, high reliability package which includes the antenna.

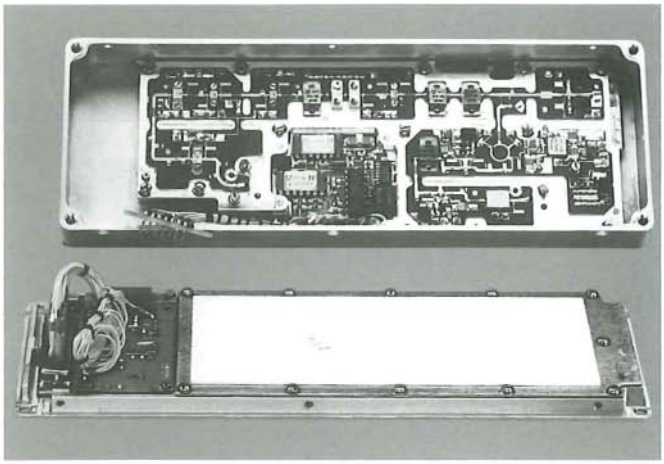
GEC-Marconi



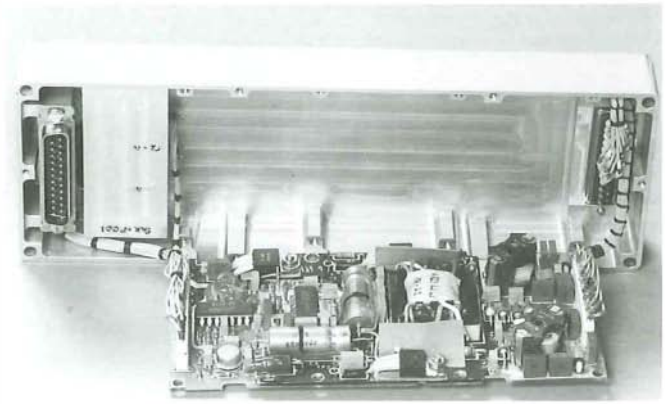
ESD5000 showing the signal processor, power supply and microwave modules



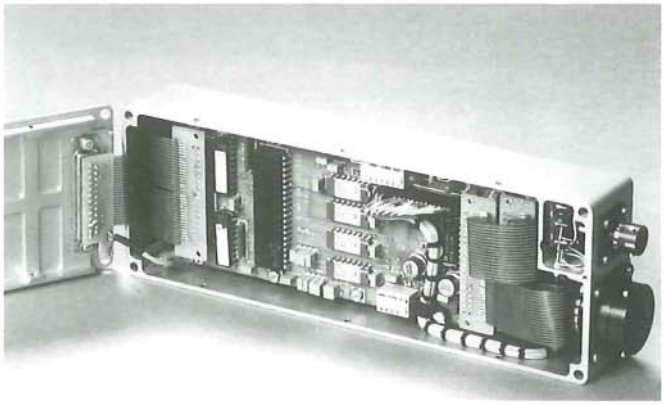
ESD5000 Surface Mount Device (SMD) assemblies



ESD55000 Microwave module



ESD5000 Power supply module



ESD5000 Signal processor module

Advantages of J-Band

- High antenna isolation
- One box system includes antenna
- Only one fuselage cut-out required
- No RF feeders
- Predictable installed performance
- No fading during low altitude hover
- Tracks top of snow and ice covered terrain
- Tracks terrain culture if required (tree tops, pylons, etc.)
- Low probability of ECM Intercept

Terrain reference navigation (TRN)

J-Band is ideally suited to TRN and the ESD5000 series radar altimeter can provide:

- Terrain culture mapping for landmarks (signal strength data)
- Terrain fine grain mapping (true clearance height data)
- Terrain contour (fine grain detail removed)

Advantages of pulsed systems

- Track nearest object
- No averaging over the radar footprint
- Minimal slant range errors
- No height errors due to doppler shift
- Low average power

ESD5000 Construction

- Modular construction - three independent replaceable modules
- Ease of maintenance and logistic support
- High reliability surface mount device (SMD) assemblies

ESD5000 Interfaces

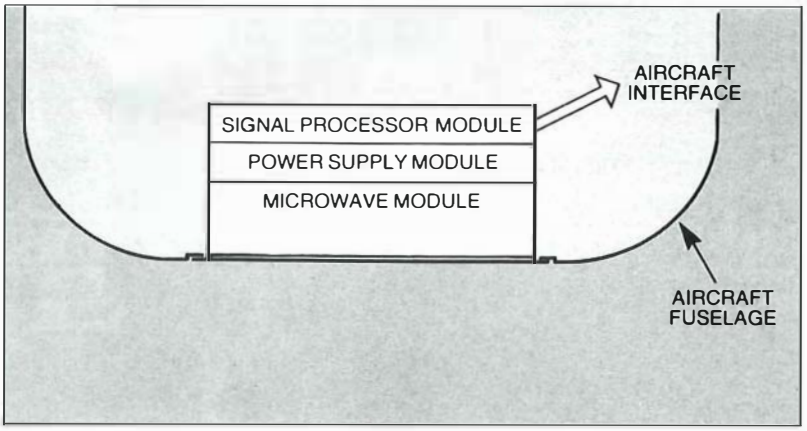
Additional facilities currently available include:

The output interface is contained on one printed circuit board (PCB) within the signal processor module. For different interface only this one PCB is replaced. Interfaces which can be implemented include:

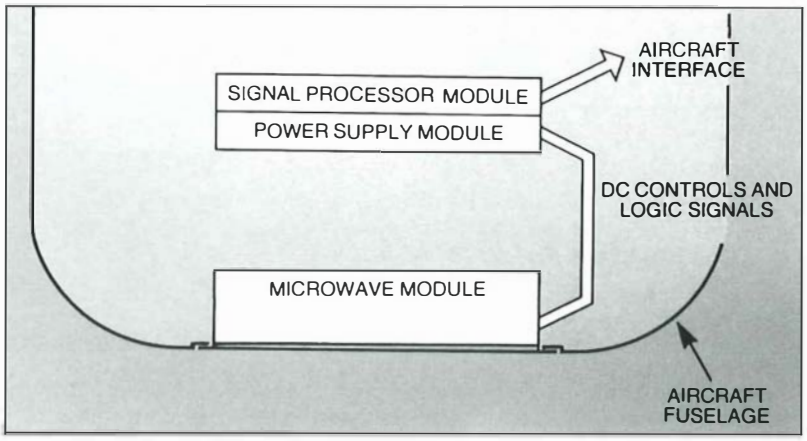
- RS422/RS232
- MIL-STD-1553B/STANAG 3838
- With the flexibility of software control, many special functions can be added including radio silence and height blanking for helicopter underslung loads
- Full analogue compatibility with standard indicators
- Analogue outputs for autopilots
- Blanking pulse output for use with ESM
- Discrete I/O for 'push-to-test', altitude warnings and special functions
- ARINC 429

ESD5000 Stealth performance

- Power management reduces transmitter (Tx) power to minimum required for accurate tracking



One-box installation



Split Line Replacement Unit Installation

- Typical radiated power is 100mW peak (0.15mW average) at 300 feet altitude
- 40dB antenna forward radiation suppression
- 300 metres predicted detection range
- Resistant to all types of jamming

ESD5000 Trials performance

- The ESD5000 series radar altimeters flight trials have confirmed:
- Accuracy against kinetheodolites
- Operation to 5000 feet over all terrains
- 100% track maintained during low altitude hover over worst case terrains
- Pitch and roll performance exceeds specification
- Measures true clearance heights
- Track capability when overflying steep cliffs
- Unaffected by aircraft radars and radios
- Ease of installation

ESD5000 Installation

- One-box fuselage mounted system
- Can be installed as two low profile units with no RF feeders
- No installation adjustments
- Multiple altimeter installations

ESD5000 Reliability and Flight Safety

- 5000 hours MTBF
- 98% BITE coverage
- >99% coverage of flight safety failures
- RTCA-DO-178A software

Specification summary

(Average terrain)

Height Range

0 to 5000 ft options

(can be extended)

Warm-Up

2 seconds including operational readiness test

Accuracy

±(2+2%h)ft

Pitch/Roll

40° roll 40° pitch to 2000 ft

30° roll 30° pitch 2000 to 5000 ft

Extended with multiple altimeter installations

Track Rate

1500ft/sec ascent

2000ft/sec descent

Search Rate

6000 ft/sec

Power Input

Nominal 28V DC to MIL-STD-704D

Maximum consumption 26W max.

Transmitter frequency

Mid J-Band (Navigation Aids Band)

15.65 GHz

Peak transmitter power

0.01W to 1W peak (power management)

Temperature range

-40°C to +70°C standard

-55°C to +90°C optional

MTBF

5000 hours

Dimensions

(Excluding flange & connectors)

Length:	218mm (8.6ins)
Depth:	76mm (3.0ins)
Height:	138.6mm (5.5ins)

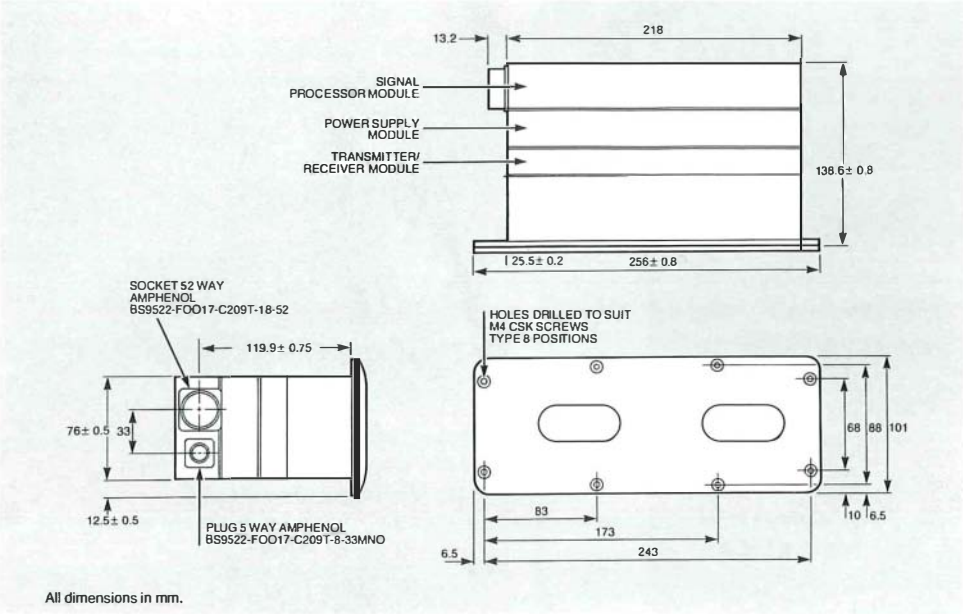
Weight

3.2kg (7.2lbs) max.

Qualification

MIL-STD-810D

MIL-STD-461B



GEC-Marconi

Radar and Defence Systems

ESD5000 Series
Radar Altimeter

Electronic Systems Division
Browns Lane, The Airport, Portsmouth, Hampshire, PO3 5PH.
Telex: 869442 MARDEF G
Tel: (+44) 01705 226000 Fax: (+44) 01705 226001
e-mail: charles.andrews@gecm.com

USA
GEC-Marconi Office, 1111 Jefferson Davis Highway, Crystal Gateway North, Suite 800, Arlington, Virginia 22202, USA Tel: 1(703) 4166582 Fax: 1(703) 4160135

ESD Publication No. ESD/065.08.96