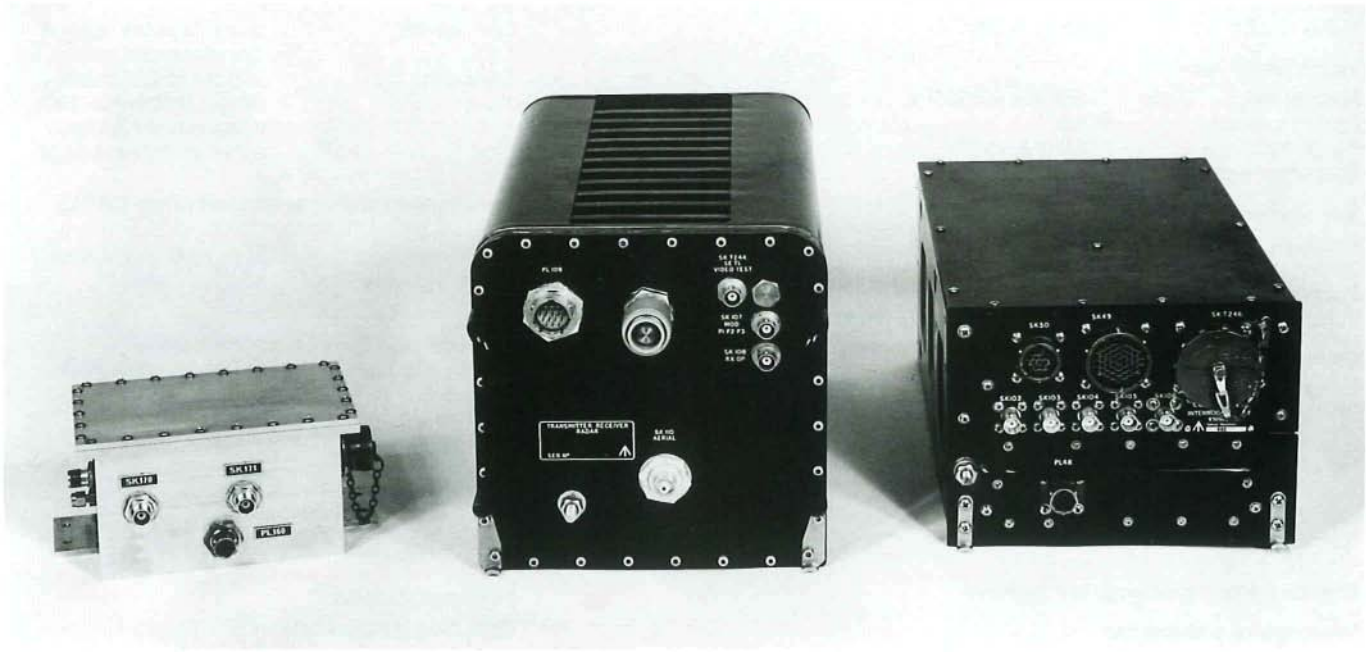
GEC-Marconi Electronic Systems

IFF Airborne Interrogator

ESD283 MkI, ESD283 MKII



- *Extensive use of S.I.C.S.*
- *Automatic test facilities*
- *Comprehensive B.I.T.E.*

These interrogator systems have been designed to meet the requirements of in-flight secondary radar interrogations.

The equipment transmits appropriately coded pulse trains to interrogate secondary radar transponders within range; receives and decodes the associated replies and generates suitable drive signals for the radar display. The bulky and temperature dependent delay lines used for encoding and decoding in current interrogators are replaced in this equipment by silicon integrated circuits using digital shift register techniques. The use of these techniques ensures that the accuracy of pulse spacing from the encoder and pulse position acceptance of the decoder are made dependent only on the frequency stability of a crystal controlled clock.

The transmitter-receiver uses pulsed oscillator techniques employing automatic frequency control and a logarithmic receiver using silicon integrated circuits. The equipment is designed to interrogate on modes 1 2 and 3/A, the pulses driving the modulator being generated by the encoder-decoder. In this unit micro-miniaturisation and silicon integrated circuits are also employed resulting in a system of high efficiency, enhanced reliability and a considerable reduction in both weight and size. Built-in test equipment is included, which provides a check of transmitted power and receiver sensitivity.

The ESD283 Mk I equipment which carries full type approval, consists of a lightweight D-band transmitter-receiver unit together with an associated encoder-decoder unit and control unit. Other units associated with the airborne system are an antenna switch and dual antenna system together with an L trace radar display.

The ESD283 Mk II equipment consists of a lightweight D-band transmitter-receiver together with an associated encoder-decoder unit, which offers the facilities of active decoding and defruiting. This equipment is designed to integrate into an airborne primary radar system and the control of the system is performed by the primary radar controller. The ESD283 Mk II system offers ISLS operation and an ISLS switch is available which enables the transmitter power to be distributed equally to two aerials and also enables the aerials to be fed alternately in phase and antiphase for ISLS operation.

ISLS switch control is achieved by multiplexing switch drive pulse and rf pulses at transmitter output. This permits the use of only one rf cable between transmitter -receiver and antenna.

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ESD283 MkI Interrogator System

Interrogator transmitter

Frequency:	1030MHz ± 0.5Mhz
Power output:	nominal 5.0KW peak
Max.duty cycle:	0.11%
Pulse length:	0.8µs ± 0.1µs

Interrogator receiver

Frequency:	1090MHz ± 0.2MHz
Dynamic range:	60dB
Bandwidth:	10MHz ± 1MHz
Tangential sensitivity:	-84dBm

Encoder-decoder

Encoder:	Modes 1, 2 and 3/A
Decoder:	4096 codes
Pulse rejection:	<0.25µs> 1.00µs
Pulse acceptance:	<0.55µs> 0.35µs

Control unit

Code selection:	4096 codes
System function:	All signals, all codes, decode
Mode selection:	OFF, STBY, M1, M2, M3/A
Gain control:	variable
Gain Selection:	manual/a.g.c.

ESD283 MkII Interrogator System

Interrogator transmitter

Frequency:	1030MHz ± 0.5MHz
Power output:	nominal 5.5kW peak, switchable to 6dB or 9dB down sector blanking also available.
Max. duty cycle:	0.11%
Pulse length:	0.8µs ± 0.1µs

Interrogator receiver

Frequency:	1090MHz ± 0.2MHz
Dynamic range:	60dB
Bandwidth:	10MHz ± 1MHz
Tangential sensitivity:	-86dBm

Encoder

P^1 - P^3 spacing:	Mode 1: 3µs + 0.1µs - 0.05µs. Mode 2: 5µs ± 0.1µs. Mode 3A: 8µs±0.1µs
P^1 - P^3 spacing:	1.0µs + 0.5µs - 0.1µs (remotely switchable)
PRF.:	0 to 400Hz

Decoder

All codes:	an output (comprising single video pulse of nominal 5V amplitude 0.5µs duration and 50W impedance) for any S.I.F. code
Passive decode:	an output (as defined above) for any selected S.I.F. reply from 4096 codes
Active decode:	available in the 'all codes' operation (serial output, header, validity and parity included in output data stream).

Defruiter

Correlation:	pulse to pulse using a 1µs increment
Validation:	2/2 out to 200 miles range. 2/3 out to 100 miles range Facility: either switchable or off

Switch electronic transmission line (SETL)

Power handling:	8kW peak pulse power
Switching speed:	>250ns at 8kW

Physical and Environmental Details (Applies to both systems unless otherwise stated)

Transmitter-receiver

Operating temperature:	-55°C to +70°C up to 60,000 ft
Weight:	11.78kg (26lb)
Dimensions:	3/4 ATR short

Encoder-decoder

Operating temperature:	-26°C to +55°C up to 36,000 ft
Weight:	5.89kg (131b)
Dimensions:	3/4 ATR short

Control Unit (Mk I only)

Operating temperature:	-26°C to +55°C up to 36,000ft
Weight:	0.79kg (1.751b)
Dimensions:	70mm x 146mm x 54mm

SETL (Mk II only)

Operating temperature:	-40°C to +70°C up to 60,000ft
Weight:	1.47kg (3.25lb)
Dimensions:	150mm x 100mm x 84mm

Associated equipment

Mounting tray for transmitter-receiver: 5841-99-194-6224 Mounting tray for encoder-decoder: 5841-99-222-3644

Special to type test equipment is available as follows:

Test set radar interrogator (1st line Mk I): 5841-99-223-7126
Test set (3rd Line Mk I): 6625-99-115-4448
Test set radar interrogator (1st Line Mk II): 5841-99-643-6266
Bench test set (2nd line Mk II): 5841-99-653-1508
Test set (3rd line Mk II):
Test set (SETL)

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Radar and Defence Systems

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

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