

PCM FLIGHT TERMINATION RECEIVER

■
**Robust design for
missiles and remote
targets**

■
**Six simultaneous
command channels
available**

■
**Ruggedised for
extreme missile
environment**

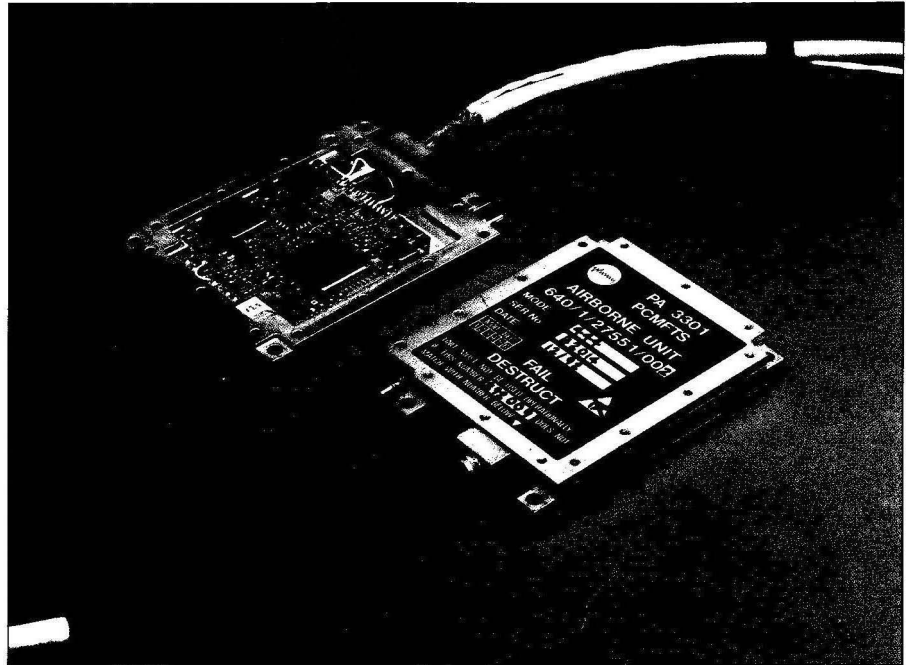
■
**All solid state,
hybrid construction**

■
**Pulse coded
modulation format**

■
**Lightweight,
245 gms (0.541lb)**

■
**Small size,
45cc (2.75 cu in)**

■
Telemetry interface



PA3301 PCM Receiver

In response to UK Ministry of Defence (MoD) requirements, GEC-Marconi Defence Systems, Electronic Systems Division (GMDS-ESD) have developed the PA3301 Pulse Code Modulation (PCM) Flight Termination Receiver (FTR). The PA3301 is robust, competitively priced and is designed to provide an attractive alternative to the larger and heavier receivers currently in service. The chosen PCM format reflects UK MoD requirements for multiple vehicle command (such as salvo firing) and high resistance to interference. The PA3301 significantly enhances the safe break-up of missiles and remote targets on Trial Ranges.

The airborne FTR, used together with the ground based transmitter and the PA3305 PCM Transmission Controller, forms part of a high integrity Flight Termination System. The Receiver can be situated either inside a missile or attached externally to the skin. It accepts a constant stream of data from the ground station; the data is either constant 'prohibit' signals or 'fire' signals when termination is necessary.

Flight Termination is implemented when missiles violate established safety criteria or exceed pre-established Range limits. GMDS-ESD also provide a Ground Test Set, the PA3306, and a Transmission Controller, PA3305. The PA3306 Ground Test Set is used to confirm the operation of the PA3301 Receiver prior to flight or for revalidation purposes. Its role is to monitor the outputs of the Receiver and measure responses to an RF input signal.

The Transmission Controller, PA3305, is an integral part of the Range's command system and it encodes the signals for transmission to the airborne Receiver. It also monitors its own operation, checks the integrity of the transmitted signal and reports faults to the Range Safety Control Officer. The PA3305, with a suitable interface, allows a Trials Range ground station that can independently control up to six airborne units simultaneously.

PA 3301

Electronic Systems Division

(A Division of GEC-Marconi Defence Systems Limited)

PCM FLIGHT TERMINATION GROUND TEST SET

■
**Checks all functions of
Airborne Flight
Termination Unit
(PA3301)**

■
**Provides electronically
isolated power supplies
for the Airborne Unit
under test**

■
**Menu driven test
operations**

■
**Alphanumeric dot matrix
display shows test menus
and test results**

■
**Buffered test
points/connectors
available at the front
panel for ease to access**

■
**Serial port enables
communication with
Ground Test Set via a
CCITX24 or RS232C
interface**

■
**Ruggedised for ease of
transport**

PA 3306



PA3306 PCM Ground Test Set

The PA3306 Ground Test Set provides a facility to comprehensively check all functions of the PA3301 PCM Flight Termination Receiver Unit prior to flight or for revalidation purposes. Check-out of an airborne Receiver Unit command circuitry is accomplished by monitoring responses to an internally generated FSK modulated RF signal. Data content and other characteristics of the signal are automatically selected by the test routine and could be either an airborne Flight Termination Receiver Unit data word or a pseudo-random data stream.

The PA3306 provides a stabilised, electrically isolated power source for the airborne Receiver Unit under test and monitors voltage and current parameters of DC signals required by the airborne Receiver Unit. Test operations are menu driven and manually controlled by a keypad. Test results are displayed via LED indicators and as messages on an alphanumeric dot matrix display.

LED indicators monitor logic levels of telemetry signals and show the status of the PA3306, airborne Transmitter Unit and airborne Receiver Unit power supply.

Although intended to be operated in a fixed laboratory environment, the PA3306 is ruggedised to enable easy transportation.

PCM FLIGHT TERMINATION TRANSMISSION CONTROLLER



PA3305 PCM Transmission Controller

The PA3305 Transmission Controller is an integral part of the Range's command system and encodes the signals for transmission to the airborne Receiver Unit. It also monitors its own operation, checks the integrity of the transmitted signal and reports faults back to the Range Safety Control via a series of alarms. In complexity, the PA3305 may be considered as a sub-set of the PA3306 Ground Test Set in that the PA3306 includes the PA3305 features.

The PA3305 Transmission Controller provides the interface between the ground station's Executive Controller, which takes the Trial Safety Officer's instruction, and the transmitter(s) which

radiate commands to the airborne vehicle. One PA3305 is associated with each transmitter and data flow between the two is made via RS422 balanced lines.

A ground station can employ either one or two transmitter sites, two being used to combat signal fading and gaps in coverage down to very low levels as required, for example, for sea skimming missiles.

For Range safety purposes, the PA3305 also repeats back to the Executive Controller the control inputs so that they can be cross-checked. It also verifies, via a monitor receiver, that the transmitted signal is the true command; any differences or loss of integrity will raise an alarm.

Generates the serial PCM commands formats

Generates PROHIBIT or FIRE commands for each of up to six airborne Receiver Units

Monitors and verifies the transmitted data

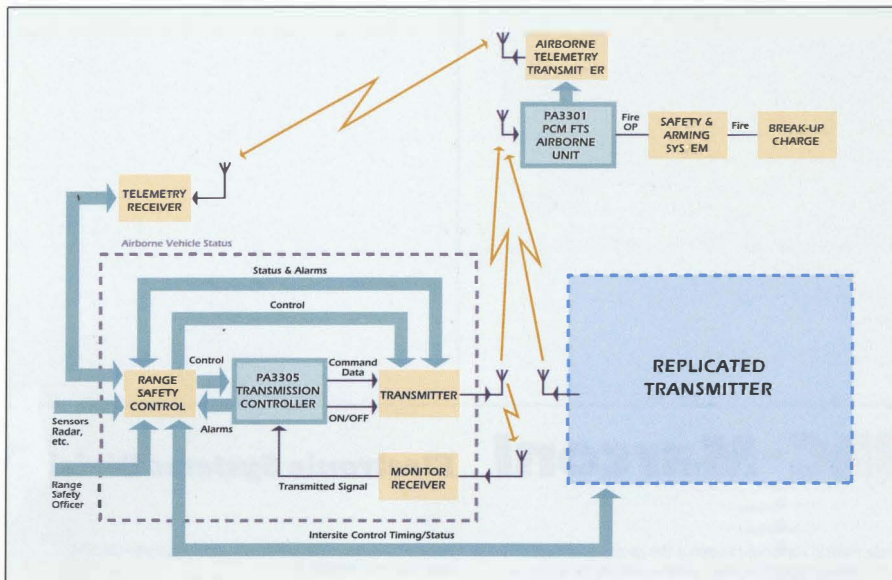
Generates self test modes

Provides tamper-proof operation:

- (a) Remotely controlled via electrical interfaces
- (b) No accessible manual controls
- (c) Status indicators for quick confidence checks

Provides UHF link on/off control

Provides emergency TRANSMISSION STOP' control



PCM overall system operation

PA 3305

Technical Data

PA3301

Flight Termination Receiver

PCM Modulation	NRZ Binary FSK
Carrier Frequency range	400MHz to 450MHz
IF Bandwidth	38KHz
Dynamic Range	110db without performance degradation
Command Channels	6
Command states	PROHIBIT or FIRE
Operational Mode	FAIL DESTRUCT or FAIL INERT
"FIRE" Interface	POWER FET
Weight	245gms (0.54lb)
Volume 45cc	(72mm x 59mm x 10.5mm) (2.83in x 2.32in x 0.41in)
Vibration	0.6g ² /Hz (50 to 4500 Hz)
Shock (Operational)	100g for 8 m.sec
Acceleration	100g linear, in any direction
Safety	1 in 10 ⁶ FAIL DESTRUCT
Shelf Life	5 YEARS MINIMUM (0°C to 30°C AMBIENT)

PA3306

Flight Termination Ground Test Set

Size	476mm wide x 190mm high x 370mm deep (18.7in x 7.5in x 14.6in)
Weight	19kg max (41.9lbs)

Environmental Data

Operating Temperature Range: +15°C to +40°C in a fixed ground laboratory environment

Electrical Power Requirements

Voltage 240V, 50Hz, Single Phase

Power Consumption Not exceeding 200W

Stabilised Power Supply

Power requirements for the airborne Receiver Unit under test are provided by an integral stabilised power supply.

PA3305

Flight Termination Transmission Controller

Rack mounted in standard 19in rack (482mm), 375mm (14.76in) deep including front panel handles, 130mm (5.12in) high.

Power Dissipation 40W max (176 to 264V AC)

Weight 8kg (17.6lbs)

Temperature 0°C to +50°C operating
-20°C to +70°C storage

Humidity 95% non-condensing

Shock 25mm (0.98in) drop of any one edge onto a hard wooden surface

Vibration Vibration profile as per MIL-STD-810D for 20min

MTBF Greater than 21,000 hours