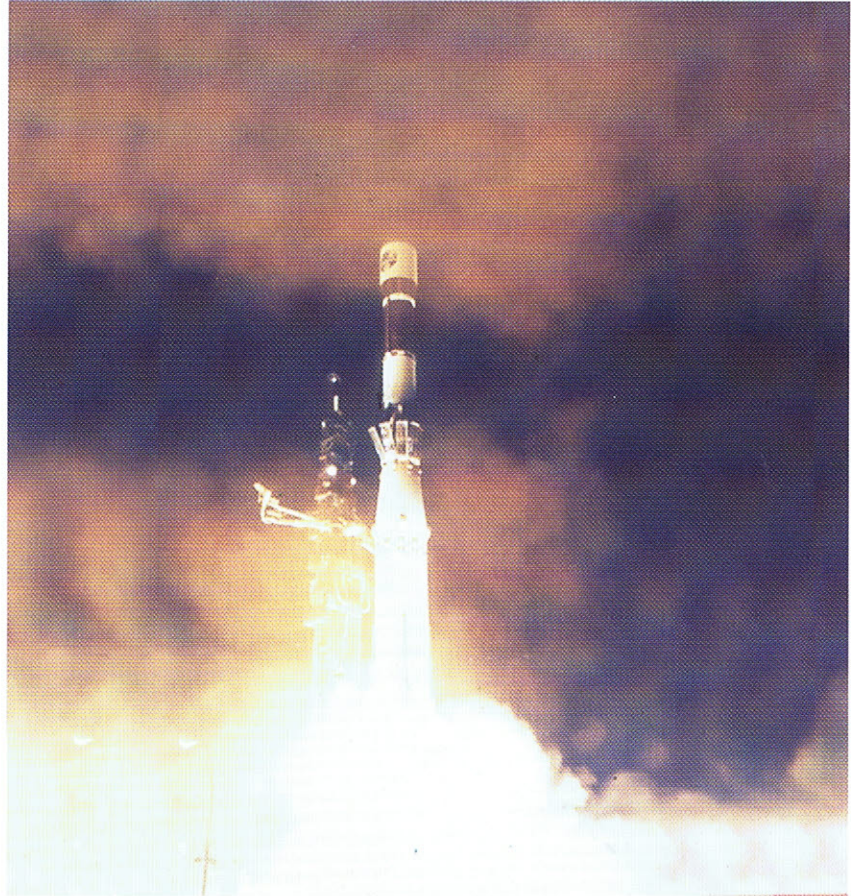


*Radar Transponder*

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*Secure Command Receiver*

TCR 603/S is a secure command receiver with built-in decoder enabling a missile to be destroyed in flight upon reception of the appropriate command. It operates in the 409-450 MHz band and is compatible with the command control equipment of the French Mediterranean, Landes and Guiana test ranges and foreign test ranges.

TCR 603/S is a dual conversion superheterodyne FM receiver (10 and 77 MHz) capable of receiving four non-simultaneous coded commands over six multiplexed sub-carriers. TCR 603/S meets the environment requirements of aircraft, missile and launcher applications.

#### ELECTRICAL CHARACTERISTICS

- Operating band: 409 to 450 MHz  $\pm$  50 kHz
  - Image rejection: 60 dB
  - Frequency of the six subcarriers per IRIG standard
- Commands containing two or more errors are not transmitted over six multiplexed subcarriers.

It provides users with the following commands:

- Destruct command: DC
- Operating or validation command: OS
- Destruct inhibit command: OFF
- Idle receiver command: not decoded.

Various receiver models are available to suit different decoder wiring configurations and to meet different command requirements (disabling of unwanted command, long time constants or short time constants for transmitting command sequences.

- Different commands codes are available (factory programmed memory)
- TCR 603/S can be used with two transmitter of identical frequencies ( $\pm$  8 kHz) and of any output power.



#### MECHANICAL CHARACTERISTICS

- Volume: 459 cm<sup>3</sup>
- Dimensions: 113.5 x 74 x 54.7 mm
- Weight: 550 g.

#### GENERAL CHARACTERISTICS

- input voltage: 24 to 30 V
- Input current: < 0.2 A
- Reverse polarity inversions
- Operating temperature range: -10°C/+70°C
- Pressure: up to 1.3 mPa (10<sup>-5</sup> mm Hg)
- Acceleration: 80 g
- Vibrations: - 20 to 45 Hz  $\pm$  8 mm peak  
- 45 to 2000 pps: 20 g peak  
- one 20-min logarithmic scan along 3 axes
- Random: 20 to 2000 pps - 30 g RMS form factor 3
- Shock: 200g for 6 ms

#### CONNECTORS TYPES

- J1: Antenna: male receptacle SUBCLIC RADIALL type R 114 553
- J2: Power supply: SOURIAU 871 204 P1B receptacle
- J3: Commands and controls: SOURIAU 871 2A 3 12 S1B receptacle.

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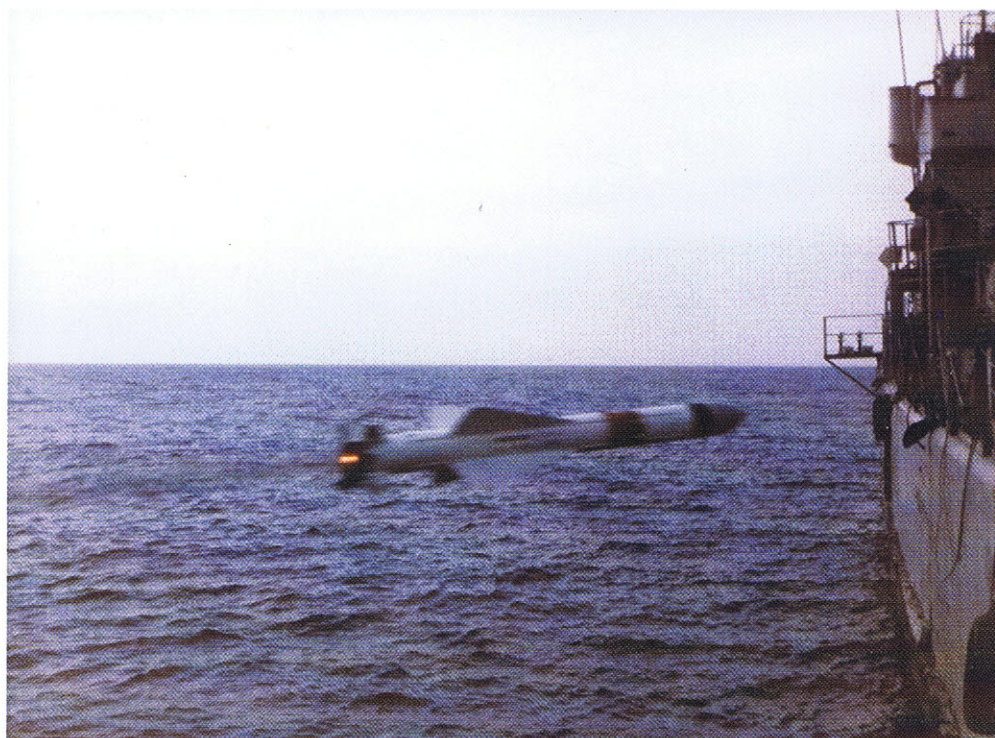
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 **SAGEM**





*Radar Transponder*

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The RR110A G-band 5400-5900 MHz radar transponder is used in conjunction with ground radars for precision tracking over more than 300 km.

It is comprised of a direct detection receiver with preamplifier, a modulator and a triode transmitter. It also features an interrogation signal decoder and a transmitter trigger input (telemetry function).

## APPLICATIONS

This miniature transpondeur has been designed to provide precise target, tactical missile or drone location in medium-range missions. Its very compact design permits an installation in small vehicles.

## GENERAL CHARACTERISTICS

RR110A meets exacting environmental requirements:

- Temperature: -40°C / +70°C
- Altitude: unlimited ( $10^3$  mbar)
- Shock: 100 g - 6 ms
- Vibration:
  - sinusoidal: 20g peak (20 to 2000 Hz)
  - random: 20g rms (20 to 2000 Hz)
- Acceleration: 80g
- High pressure: 5 bars
- EMC: conformity to specification MIL STD 461C and 462.

## SPECIFICATIONS

- Transpondeur tunable in the 5400-5900 MHz band
- Transmitter/receiver frequency separation: 50 MHz minimum, frequency crossing possible

### Reception

- Sensitivity: better than -60 dBm (-63dBm typical)
- Interrogation code: single or double pulse, pulse spacing adjustable IRIG standard
- Pulse width: adjustable
- Accepts multiple radar interrogations: signal level difference: 50 dB
- Protection by an internal limiter
- Maximum input signal: + 50 W peak



### Transmission

- Power output: 50 W peak
- Pulse repetition rate range: 10 to 2600 PPS
- Recovery time: ajustable
- Pulse width: adjustable
- Duty factor:  $2 \cdot 10^{-3}$
- Reply delay: adjustable
- Delay variation versus signal level
- VSWR of load: safe operation with VSWR at any phase.

## MECHANICAL SPECIFICATIONS

- Volume approx.: 430 cm<sup>3</sup>
- Dimensions: 128 x 82 x 48 mm
- Weight: 890 g  $\pm$  10%
- Connector types
  - J1 = antenna SMA female
  - J2 = power: Souriau 873-70-2-07P2B
  - J3 = test: Souriau 873-70-2-07P2B.

## AUXILIARY FUNCTIONS

- External trigger input
- Trigger pulse spacing
- Telemetry disable
- Outputs: receiver test, reference (with respect to enable interrogation signal).

## POWER REQUIREMENTS

- Input voltage: 24 V to 32 V
- Input current:  $\pm$  0.56 A
- Overvoltage and reverse polarity protection.

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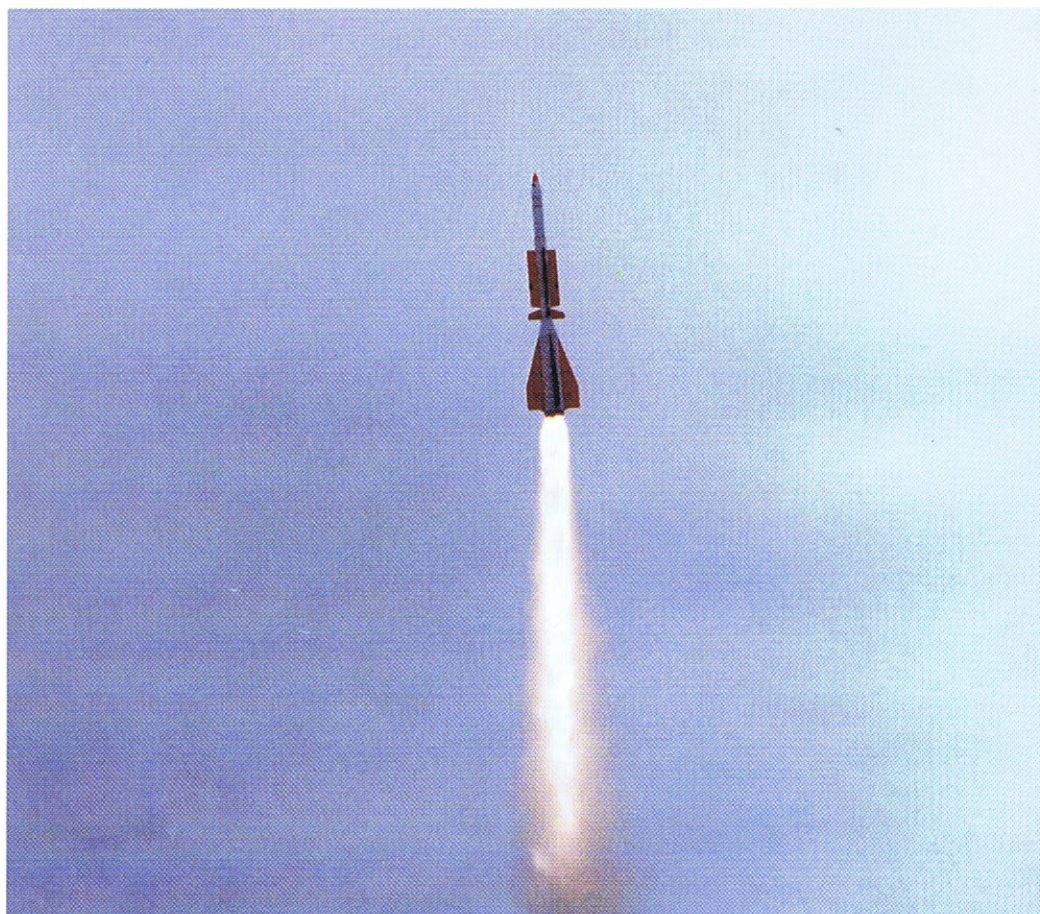
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 **SAGEM**





*Secure Command Receiver*

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TCR 320/S is a miniature secure command receiver enabling one or two missiles to be destroyed in flight.

TCR 320/S operates in the 409-450 MHz band and is compatible with the command/control equipment of the French Mediterranean, Landes and Guiana test ranges and foreign test ranges. When used in conjunction with SAGEM's RTM 320/S system, it forms an extremely compact flight test set.

Its front surface acoustic wave filter provides an excellent protection against unwanted signals.

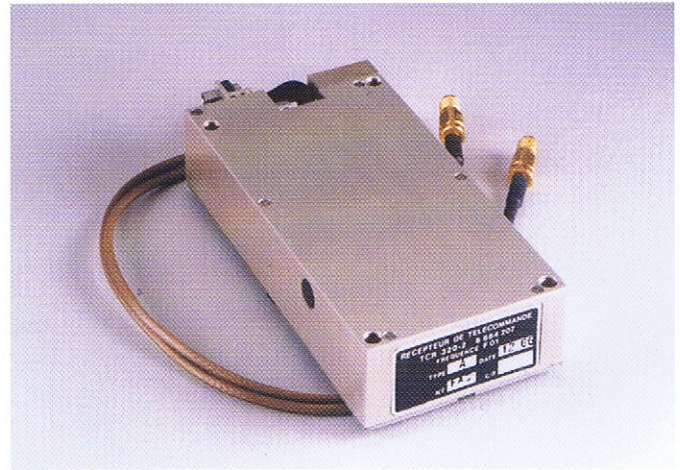
TCR 320-2/S features a built-in coupler for connection to a two elements antenna system.

### ELECTRICAL CHARACTERISTICS

- Operating band: 409-450 MHz  $\pm$  50 kHz
- Sensitivity: 95 dBm
- Two versions:
  - TCR 320-1 (single antenna)
  - TCR 320-2 (two elements phased antenna)
- Input impedance: 50  $\Omega$
- VSWR: 3 (maximum)

TCR320/S is a FM receiver capable of receiving 5 non-simultaneous commands over 6 multiplexed subcarriers. It provides users with the following commands selectable. Short-circuit protection is provided for all signal outputs:

- input voltage: 15 to 30 V
- Input current: < 0,2 A
- Reverse polarity protection.



### GENERAL CHARACTERISTICS

TCR 320/S meets the environment requirements of aircraft, missile or launcher applications.

- Operating temperature range: -40°C/+70°C
- Linear acceleration: 100 g
- Vibrations: - sine: up to 30g peak  
- random: 30g RMS
- Shock: 200g for 6 ms
- Electromagnetic compatibility (EMC): per MIL-STD 461 C/462.

### CONNECTORS TYPES

- Power: on solder posts
- Antenna(s): RADIALL 125 236 SMA cable assembly
- Command and test: MICRODOT MCM1-1553 B 2 cable assembly.

### GENERAL CHARACTERISTICS

- Volume: 153 cm<sup>3</sup>
- Dimensions: 113,4 x 56,4 x 24 mm
- Weight: 230 g.

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 **SAGEM**





*Synthesized video or Telemetry Transmitters*



This synthesized transmitter is used for transmitting telemeasurement or video signals. These signals are frequency modulated over a wide bandwidth - 10 Hz - 10 MHz. Carrier frequency can be programmed by the user step of 0,5 MHz within one of the following two frequency bands: 2188-2475 MHz or 2400-2700 MHz.

Using the SMC technology, its light weight, small size, an ruggedness allow this transmitter to be installed on board aircraft, missiles and drones.

It is protected against polarity inversion and short-circuits HF at the output.

It is equipped with a control to switch off the carrier.

### OUTPUT CHARACTERISTICS

- Bandwidth: 2180-2700 MHz in two sub-bands:
  - 2180-2480 MHz
  - 2400-2700 MHz
- External programming by the customer: yes
- Output power: 2 watts
- Load impedance: 50  $\Omega$
- Open/short protection: yes, by internal isolator

### MODULATION CHARACTERISTICS

- Modulation type: FM
- Modulation sense: positive
- Input impedance: 75  $\Omega$  (video) or 10 K $\Omega$  (telemetry)
- Modulation bandwidth: 10 Hz - 10 MHz at 3 dB points max.

### SUPPLY

- Input voltage: 28 V ;  $\pm$  4 V
- Input current: 0.85 A
- Isolation: minus to the ground
- Reverse polarity protection: yes, by diode.



### MECHANICAL SPECIFICATIONS

- Volume: 90 cm<sup>3</sup>
- Dimensions: 90 x 50 x 20 mm
- Weight: 200 g max.

### ENVIRONMENTAL SPECIFICATIONS

- Temperature: -40°C / +70°C
- Vibrations (qualification conditions):
  - Random: 20-2000 Hz, 30 g R.M.S., 3 mn/axis-3 axis
- Sinusoidal: 20-2000 Hz, 20g peak max.
- Shock: 200 g - 6 ms (1/2 sin. or triangle)
- Humidity: 95 % - 10 hours
- E.M.C.: MII - 461 - 462 - 463.

### DESIGNATION

- TM:
  - SU-BAND 2.18-2.48 GHz : TME 213T
  - SU-BAND 2.4-2.7 GHz: TME214T
- VIDEO:
  - SU-BAND 2.18-2.48 GHz : TME 213V
  - SU-BAND 2.4-2.7 GHz: TME214V.

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*Programmable frequency modulation E-band transmitter*

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This phase-locked frequency synthesized transmitter has been designed for the transmission of both high output-rate data and high-definition video signals.

The carrier frequency can be programmed by steps of 0.5 Mhz within the 2188-2475 MHz frequency band through a prewired plug or via binary codes generated by a remote-control.

This transmitter is frequency-modulated over a wide bandwidth from 10-15 MHz to 3 dB, thus enabling output rates of up to 20 Mbits/s.

The switch-off control of the carrier allows the user to avoid at any time RF interferences with other equipment, or to highly reduce consumption in the stand-by mode. Its mechanical single-block structure and the SMC technology used are so many guarantees of highly reliable operation and very stable frequency carrier for transmissions in the most severe environments.

This system is protected against polarity inversions and short-circuits at the RF output.

A pre-accentuation cell, as per CCIR 405-1 recommendation, can be integrated into the video version upon request.

#### OUTPUT CHARACTERISTICS

- Bandwidth: 2180-2480 MHz
- Frequency steps: 0,5 MHz
- External programming by the customer: yes
- Frequency stability:  $\pm 2.5.10^{-5}$
- Output power: 5 watts
- Load impedance: 50  $\Omega$
- Open/short protection: yes, by internal isolator
- Spurious level: 63 dBc.

#### SUPPLY

- Input voltage: 28 V  $\pm$  4 V
- Input current: 1.4 A
- Isolation: minus to the ground
- Reverse polarity protection: yes (by diode).

#### MECHANICAL SPECIFICATIONS

- Volume: 90 cm<sup>3</sup>
- Dimensions: 90 x 50 x 20 mm
- Weight: 200 g max.

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#### MODULATION CHARACTERISTICS

- Modulation type: F.M.
- Modulation sense: positive
- Input impedance: 75  $\Omega$  (video) or 10 K $\Omega$  (telemetry)
- Modulation bandwidth: 10 Hz - 15 MHz at 3 dB points (max.)
- Modulation sensitivity: 10 MHz/1 V ( $\pm 10\%$ ) max.
- Carrier deviation:  $\pm 5$  MHz max.
  - linearity modulation:  $\pm 2\%$
  - residual F.M.: 10 kHz R.M.S. in a 15 kHz band.

#### ENVIRONMENTAL SPECIFICATIONS

- Temperature: -40°C / +70°C
- Vibrations (qualification conditions):
  - Random: 20-2000 Hz, 30 g R.M.S., 3 mn/axis-3 axis
- Sinusoidal: 20-2000 Hz, 20 g peak max.
- Shock: 200 g - 6 ms (1/2 sin. or triangle)
- Humidity: 95 % - 10 hours
- E.M.C.: EG 13.

#### DESIGNATION

- Telemetry transmitter: TME 525 T
- Video transmitter: TME 525 V\* or VP\*\*

V\*: without preaccentuation cell

VP\*\*: with preaccentuation cell