

1 T856/857 General Information

This section provides a brief description of the T856 transmitter and T857 exciter, along with detailed specifications and a list of types available.

The following topics are covered in this section.

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1.1 Introduction

The T856 is a synthesised, FM base station transmitter for single or multichannel operation in the 400 to 520MHz frequency range with a standard power output of 25W. The RF section of the transmitter comprises a frequency synthesiser which provides 100mW of frequency modulated RF drive to a two stage, wide band output driver followed by a 25W power amplifier.

A thermal shutdown feature is provided in the T856 should operating temperatures exceed acceptable levels.

The T857 is a synthesised, FM base station exciter for single or multichannel operation in the 400 to 520MHz frequency range. With a standard power output of only 1W, the exciter is designed for use with either the T858 50W or T859 100W power amplifier. The RF section of the exciter comprises a frequency synthesiser which provides 100mW of frequency modulated RF drive to a two stage, wide band output amplifier.

The synthesiser frequency is programmed via an EPROM which is attached to a separate plug-in memory PCB. A DIP switch on the memory PCB allows fast single channel selection from a multichannel programmed EPROM, but for true multichannel capability the EPROM must be addressed separately via an additional D-range connector at the rear of the set.

A wide selection of audio characteristics may be obtained from the audio processor. Optional circuit blocks are an audio compressor and a pre-emphasis stage. They can be bypassed or linked to one or both audio inputs (line or mic), and then back into the remaining audio circuitry in almost any combination. All audio processor options are link selectable.

All components except those of the VCO and memory PCBs are mounted on a single PCB. This is secured to a die-cast chassis which is divided into compartments to individually shield each section of circuitry. Access to both sides of the main circuit board is obtained by removing each of the chassis lids. There is provision within the chassis to mount small option PCBs.

1.2 Specifications

1.2.1 Introduction

The performance figures given are minimum figures, unless otherwise indicated, for equipment tuned with the maximum switching band and operating at standard room temperature (+22°C to +28°C).

Where applicable, the test methods used to obtain the following performance figures are those described in the EIA specification. However, there are several parameters for which performance according to the CEPT specification is given.

Details of test methods and the conditions which apply for Type Approval testing in all countries can be obtained from Tait Electronics Ltd.

1.2.2 General

Frequency Range .. 400-520MHz (refer to Section 1.3)

Modulation Type .. direct FM

Frequency Increment .. 6.25 or 12.5kHz

Switching Range .. 8MHz

Number Of Channels:

Standard	.. 1
Optional	.. 8
Internally Selectable	.. 128

Supply Voltage:

Operating Voltage	.. 10.8 to 16V DC
Standard Test Voltage	.. 13.8V DC
Polarity	.. negative earth only
Polarity Protection	.. diode
Keying Supply (if required)	.. -50V DC

Supply Current:

Transmit - T856	.. 5A (typical)
- T857	.. 750mA
Standby	.. 120mA

Load Impedance .. 50 ohms

Operating Temperature Range .. -30°C to +60°C

Frequency Stability:

Standard Version	..	± 2.5 ppm, -30°C to $+60^{\circ}\text{C}$
High Stability Version	..	± 2 ppm, -10°C to $+60^{\circ}\text{C}$
Very High Stability Option	..	± 1 ppm, 0°C to $+60^{\circ}\text{C}$

Dimensions:

Height	..	191mm
Width	..	60mm
Length	- T856	.. 322mm
	- T857	.. 316mm

Weight .. 2.1kg

Time-Out Timer (optional) .. 1 to 4 minutes (adjustable)

Tail Timer .. 5ms to 4 seconds (adjustable)

Transmit Key Time:

Standard	..	<25ms
Short	..	<2ms

Duty Cycle (T856 Only) .. 100% @ 25W at $+25^{\circ}\text{C}$
 .. 25% @ 25W at $+60^{\circ}\text{C}$
 .. 100% @ 10W at $+40^{\circ}\text{C}$

1.2.3 RF Section**Adjacent Channel Power (full deviation):**

Wide Band (± 25 kHz/15kHz B/W)	..	-75dBc
Narrow Band (± 12.5 kHz/7.5kHz B/W)	..	-65dBc

**Transmitter Side Band Noise:
(no modulation, 15kHz bandwidth)**

At ± 25 kHz	..	-95dBc
At ± 1 MHz	..	-105dBc

Radiated Spurious Emissions**T856 Early Issue PCBs:**

Transmit	..	-36dBm to 1GHz -30dBm to 4GHz
Standby	..	-57dBm to 1GHz -47dBm to 4GHz

T856 Issue -03 & Later PCBs

Transmit	..	-36dBm to 1GHz -30dBm to 4GHz -54dBm between 470 and 862MHz -54dBm between 10.7 and 12.75GHz
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Standby .. -57dBm to 1GHz
 -47dBm to 4GHz

T857:

Transmit .. -36dBm to 1GHz
 -30dBm to 4GHz
 Standby .. -57dBm to 1GHz
 -47dBm to 4GHz

Conducted Spurious Emissions**T856 Early Issue PCBs:**

Transmit .. -36dBm to 1GHz
 -30dBm to 4GHz
 Standby .. -57dBm to 1GHz
 -47dBm to 4GHz

T856 Issue -03 & Later PCBs:

Transmit .. -36dBm to 1GHz
 -30dBm to 4GHz
 -54dBm between 470 and 862MHz
 -54dBm between 10.7 and 12.75GHz
 Standby .. -57dBm to 1GHz
 -47dBm to 4GHz

Power Output:

T856 - Rated Power .. 25W
 - Range Of Adjustment .. 5-25W
 T857 .. 1W ±300mW

1.2.4 Audio Processor

Inputs Available .. line, microphone and CTCSS

Line Input:

Impedance .. 600 ohms (balanced)
 Sensitivity (60% modulation @ 1kHz)-
 With Compressor .. -50dBm
 Without Compressor .. -30dBm

Microphone Input:

Impedance .. 600 ohms
 Sensitivity (60% modulation @ 1kHz)-
 With Compressor .. -70dBm
 Without Compressor .. -50dBm

Modulation Characteristics

Frequency Response (below limiting)	.. flat or pre-emphasised (optional)
Line And Microphone Inputs:	
Pre-emphasised Response- Bandwidth Below Limiting	.. 300Hz to 3kHz .. within +1, -3dB of a 6dB/octave pre-emphasis characteristic
Flat Response	.. within +1, -2dB of output at 1kHz
Above Limiting Response	.. within +1, -2dB of a flat response (ref. 1kHz)
Distortion	.. 2%
Hum And Noise:	
Narrow Band	
- T856	.. -50dB (CEPT)
- T857	.. -45dB (CEPT)
Wide Band	.. -55dB (300Hz to 3kHz [EIA]) typical
Compressor (optional):	
Attack Time	.. 10ms
Decay Time	.. 800ms
Range	.. 50dB
CTCSS Input:	
Bandwidth	.. 65 to 250Hz
Response	.. within ± 1 dB of a flat response (ref. 150Hz)

1.3 T856 Product Codes

Frequency Range (MHz)		400-440							
Deviation (kHz)		2.5		4		5		10	
TCXO	$\pm 2.5\text{ppm}$ -30°C to $+60^{\circ}\text{C}$			•	•			•	
	$\pm 2\text{ppm}$ -10°C to $+60^{\circ}\text{C}$	•							
	$\pm 1\text{ppm}$ 0°C to $+60^{\circ}\text{C}$		•				•		
Transmitter Type: T856-		15	17	13	10	12	14		

Frequency Range (MHz)		440-480							
Deviation (kHz)		2.5		4		5		10	
TCXO	$\pm 2.5\text{ppm}$ -30°C to $+60^{\circ}\text{C}$			•	•			•	
	$\pm 2\text{ppm}$ -10°C to $+60^{\circ}\text{C}$	•							
	$\pm 1\text{ppm}$ 0°C to $+60^{\circ}\text{C}$		•				•		
Transmitter Type: T856-		25	27	23	20	22	24		

Frequency Range (MHz)		480-512		480-520			
Deviation (kHz)		2.5		5		10	
TCXO	$\pm 2.5\text{ppm}$ -30°C to $+60^{\circ}\text{C}$			•		•	
	$\pm 2\text{ppm}$ -10°C to $+60^{\circ}\text{C}$	•					
	$\pm 1\text{ppm}$ 0°C to $+60^{\circ}\text{C}$		•		•		
Transmitter Type: T856-		35	37	30	32	34	

1.4 T857 Product Codes

Frequency Range (MHz)		400-440			
Deviation (kHz)		2.5	4	5	
TCXO	$\pm 2.5\text{ppm } -30^{\circ}\text{C to } +60^{\circ}\text{C}$			•	•
	$\pm 2\text{ppm } -10^{\circ}\text{C to } +60^{\circ}\text{C}$	•			
	$\pm 1\text{ppm } 0^{\circ}\text{C to } +60^{\circ}\text{C}$		•		
Exciter Type: T857-		15	17	13	10

Frequency Range (MHz)		440-480				
Deviation (kHz)		2.5	4	5		
TCXO	$\pm 2.5\text{ppm } -30^{\circ}\text{C to } +60^{\circ}\text{C}$			•	•	
	$\pm 2\text{ppm } -10^{\circ}\text{C to } +60^{\circ}\text{C}$	•				
	$\pm 1\text{ppm } 0^{\circ}\text{C to } +60^{\circ}\text{C}$		•			•
Exciter Type: T857-		25	27	23	20	22

Frequency Range (MHz)		480-512	480-520		
Deviation (kHz)		2.5	5		
TCXO	$\pm 2.5\text{ppm } -30^{\circ}\text{C to } +60^{\circ}\text{C}$			•	
	$\pm 2\text{ppm } -10^{\circ}\text{C to } +60^{\circ}\text{C}$	•			
	$\pm 1\text{ppm } 0^{\circ}\text{C to } +60^{\circ}\text{C}$		•		
Exciter Type: T857-		35	37	30	

