

1 T838/839 General Information

This section provides a brief description of the T838/839 PA, along with detailed specifications and a list of types available.

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1.1 Introduction

The T838 & T839 are FM base station power amplifiers designed for single or multichannel operation in the 136 to 174MHz frequency range. The typical output power capabilities are as follows:

T838 -	10 to 60W
T839 -	20 to 120W.

The T838 PA comprises a single broad band RF power module whose output is filtered before being fed to the output socket.

The T839 PA comprises two broad band RF power modules whose outputs are recombined (using a quadrature hybrid combiner) and filtered before being fed to the output socket. This dual module design enables the transmitter to produce at least one quarter of its rated power if one of the modules fails.

VSWR and thermal protection is incorporated into the basic design, while monitoring and alarm signals are available for both forward and reverse power. The output power is adjustable from the front panel.

The main PCB is mounted directly on a die-cast chassis/heatsink. Extensive use is made of the latest surface mount technology. Effective RF isolation between the PA control circuitry and RF stages is achieved by internal metal shields.

Forced air cooling for the heatsink is provided on the T839 by a fan, which is activated whenever the transmitter is keyed. Thermal sensors will also activate the fan automatically if the internal temperature reaches an unacceptable level.

The T838 has a width of 60mm and occupies a single space in a Tait rack frame, which has the ability to accommodate up to seven standard modules. The T839 has a width of 120mm and occupies a double space.

1.2 Specifications

1.2.1 Introduction

The performance figures given are minimum figures, unless otherwise indicated, for equipment operating at standard room temperature (+22°C to +28°C) and standard test voltage (13.8V DC).

Ambient temperature is defined as the temperature of the air at the input to the cooling fan mounted on the heatsink, or immediately surrounding the heatsink if a fan is not fitted

Where applicable, the test methods used to obtain the following performance figures are those described in the ETS specification. Refer to [Section 1.2.3](#) for details of test standards.

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

Power Output:

T838	- Rated Power	.. 50W
	- Range Of Adjustment	.. 10 to 60W (typical)
T839	- Rated Power	.. 100W
	- Range Of Adjustment	.. 20 to 120W (typical)

Input Power .. 600 to 1000mW

Duty Cycle Rating:

T838	.. 50W continuous to +60°C ambient temperature
T839	.. 100W continuous to +60°C ambient temperature

Intermodulation (PA with output isolator) .. -70dBc or -40dBi¹ with 25dB isolation & interfering signal of -30dBc

Mismatch Capability:

Ruggedness	.. refer to your nearest Tait Dealer or Customer Service Organisation
Stability	.. 5:1 VSWR (all phase angles)

1. dBi denotes the level of the intermodulation product relative to the interfering signal.

Supply Voltage:

Operating Voltage	..	10.8 to 16V DC
Standard Test Voltage	..	13.8V DC
Polarity	..	negative earth only
Polarity Protection	..	crowbar diode

Maximum Supply Current (T838 @ 50W, T839 @ 100W):

Standby	..	50mA
Transmit - T838	..	12A (10A typical)
- T839	..	20A (17.5A typical)

Spurious Emissions:

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

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

Dimensions:

Height	..	183mm
Width - T838	..	60mm
- T839	..	120mm
Length	..	340mm

Weight:

T838	..	3.2kg
T839	..	3.4kg

1.2.3 Test Standards

Where applicable, this equipment is tested in accordance with the following standards.

1.2.3.1 European Telecommunication Standard

ETS 300 086 January 1991

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment with an internal or external RF connector intended primarily for analogue speech.

ETS 300 113 March 1996

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector.

ETS 300 219 October 1993

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment transmitting signals to initiate a specific response in the receiver.

ETS 300 279 February 1996

Radio equipment and systems; electromagnetic compatibility (EMC) standard for private land mobile radio (PMR) and ancillary equipment (speech and/or non-speech).

1.2.3.2 DTI CEPT Recommendation T/R-24-01**Annex I: 1988**

Technical characteristics and test conditions for radio equipment in the land mobile service intended primarily for analogue speech.

Annex II: 1988

Technical characteristics of radio equipment in the land mobile service with regard to quality and stability of transmission.

1.2.3.3 Telecommunications Industry Association**ANSI/TIA/EIA-603-1992**

Land mobile FM or PM communications equipment measurement and performance standards.

1.3 Product Codes

The three groups of digits in the T830 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T830 Series II product codes is not intended to suggest that any combination of features is necessarily available in any one product. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models, types and options.

Model

The Model group indicates the basic function of the product, as follows:

T83X -XX-XXXX	T835 receiver
	T836 25W transmitter
	T837 exciter
	T838 50W power amplifier
	T839 100W power amplifier

Type

The Type group uses two digits to indicate the basic RF configuration of the product.

The first digit in the Type group designates the frequency range:

T83X- X X-XXXX	'1' for 136-156MHz
	'2' for 148-174MHz

The second digit in the Type group indicates the channel spacing and is not applicable to power amplifiers:

T83X- X X-XXXX	'0' for all power amplifiers
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Options

T83X-XX- XXXX	The Options group uses four digits and/or letters to indicate any options that may be fitted to the product. This includes standard options and special options for specific customers. '0000' indicates a standard Tait product with no options fitted. The large number of options precludes listing them here.
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1.4 Standard Product Range

The following table lists the range of standard T838 and T839 types (i.e. no options fitted) available at the time this manual was published. Consult your nearest Tait Dealer or Customer Service Organisation for more information.

Output Power (W)	50		100	
Frequency Range (MHz)	136-156	148-174	136-156	148-174
PA Type: T838-	10-0000	20-0000		
PA Type: T839-			10-0000	20-0000

You can identify the PA type by checking the product code printed on a label on the rear of the heatsink ([Figure 1.1](#) in Part A shows typical labels). You can further verify the PA type by checking the placement of an SMD resistor in the table that is screen printed onto the PCB (refer to Section 5.1 for more details).