

# 1 T858/859 General Information

This section provides a brief description of the T858 & T859 power amplifiers, both with and without RF power modules, along with detailed specifications and a list of types available. [Figure 1.1](#) shows how to identify whether your PA was built with or without RF power modules.

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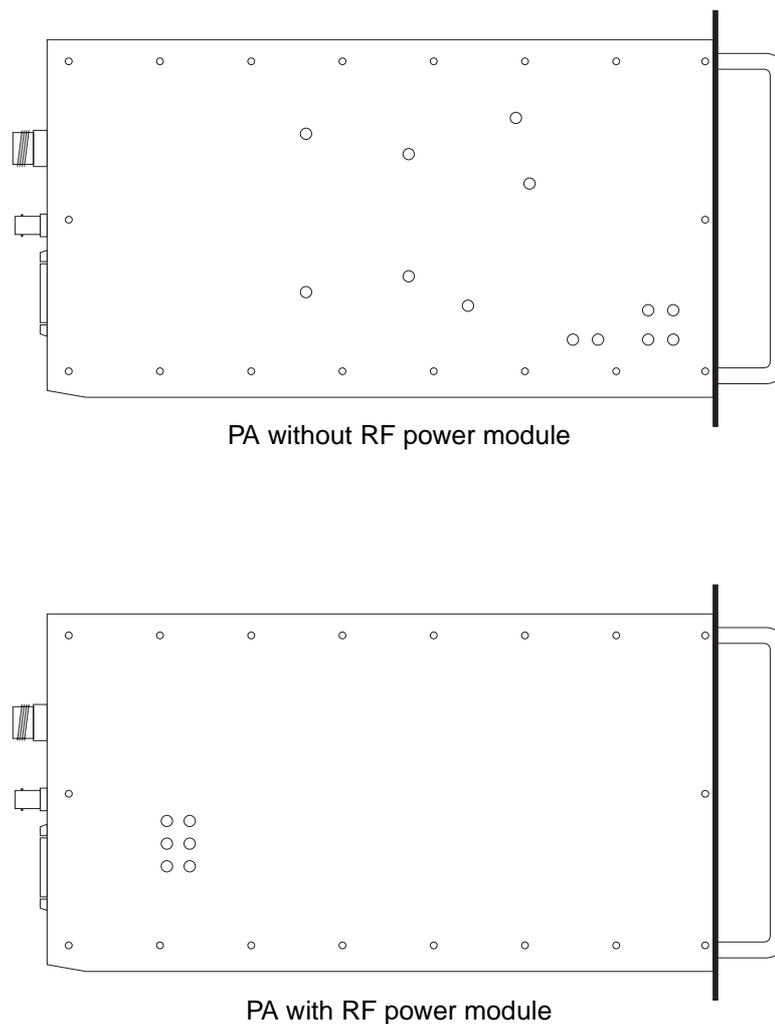
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## 1.1 Identifying T858/859 PAs With Or Without RF Power Modules

The newer design T858/859 PAs use both RF power modules and RF power transistors, whereas the older design T858/859 PAs used RF power transistors only.

If the side cover is still fitted to your PA, you can quickly identify which type you have by checking the number of access holes in the side cover. As shown in [Figure 1.1](#) below, the older design PAs have numerous holes spread over the side cover, whereas the newer design PAs have only six in a group near the rear of the chassis.



**Figure 1.1** Identifying T858/859 PAs With Or Without RF Power Modules



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## 1.2 Introduction

The T858 and T859 are FM base station power amplifiers designed for single or multichannel operation in the 400 to 520MHz frequency range. The output power capabilities are as follows:

T858 -	10 to 60W
T859 -	20 to 110W.

The older design T858/859 PAs (without RF power modules) comprise a broad band, three stage drive amplifier whose output is split to drive two separate output stages. The outputs from these final stages are then recombined and filtered before being fed to the output socket. This type of balanced output stage offers two advantages over single ended types:

- improved intermodulation performance in the presence of high signal levels from adjacent transmitters;
- enhanced reliability: if one of the two output stages fails, the transmitter can still produce one quarter of its rated power.

The newer design T858 PA (with RF power module) comprises a broad band, two stage drive amplifier whose output is filtered before being fed to the output connector.

The newer design T859 PA (with RF power module) comprises a broad band, two stage drive amplifier whose output is split to drive two separate output stages. The outputs from these final stages are then recombined and filtered before being fed to the output socket. This type of balanced output stage offers two advantages over single ended types:

- improved intermodulation performance in the presence of high signal levels from adjacent transmitters;
- enhanced reliability: if one of the two output stages fails, the transmitter can still produce one quarter of its rated power.

VSWR and thermal protection are incorporated into the basic design of all T858/859 PAs, 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 in the newer design T858/859 PAs is achieved by internal metal shields.

Forced air cooling for the heatsink is provided on the T859 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 T858 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 T859 has a width of 120mm and occupies a double space.

## 1.3 Specifications

### 1.3.1 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 1.3.3](#) 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.

### 1.3.2 General

Power Output:

T858	- Rated Power	.. 50W
	- Range Of Adjustment	.. 10 to 60W (typical)

T859	- Rated Power	.. 100W
	- Range Of Adjustment	.. 20 to 110W (typical)

Input Power	.. 700 to 1300mW
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Duty Cycle Rating:

T858	.. 50W continuous to +60°C ambient temperature
	.. 60W continuous to +40°C ambient temperature
T859	.. 100W continuous to +60°C ambient temperature

Intermodulation (PA with output isolator)	.. -70dBc or -40dBi <sup>1</sup> with 25dB isolation & interfering signal of -30dBc
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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 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 (T858 @ 50W, T859 @ 100W):

Standby	..	50mA
Transmit - T858 without power module	..	11A
- T858 with power module	..	12A (11A typical)
- T859 without power module	..	22A
- T859 with power module	..	23A (21A 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	- T858	.. 60mm
	- T859	.. 120mm
Length	..	340mm

## Weight:

T858	..	3.1kg
T859	..	3.5kg

### 1.3.3 Test Standards

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

#### 1.3.3.1 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).

**1.3.3.2 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.

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

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

## 1.4 Product Codes

The three groups of digits in the T850 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T850 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:

<b>T85X</b> -XX-XXXX	T855 receiver
	T856 25W transmitter
	T857 exciter
	T858 50W power amplifier
	T859 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:

T85X- <b>X</b> -XXXX	'1' for 400-440MHz
	'2' for 440-480MHz
	'3' for 480-520MHz

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

T85X-XX- <b>X</b> -XXXX	'0' for all power amplifiers
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### Options

T85X-XX- <b>XXXX</b>	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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## 1.5 Standard Product Range

The following table lists the range of standard T858 and T859 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)	400-440	440-480	480-520	400-440	440-480	480-520
PA Type: T858-	10-0000	20-0000	30-0000			
PA Type: T859-				10-0000	20-0000	30-0000

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).