1 T826/827 General Information

This section provides a brief description of the T826 transmitter and T827 exciter, along with detailed specifications and a list of types available.

The following topics are covered in this section.

1.1 Introduction

The T826 is a synthesised, microprocessor controlled FM base station transmitter designed for single or multichannel operation in the 66 to 88MHz frequency range[1] with a standard power output of 25W. The RF section of the transmitter comprises a frequency synthesiser which provides 125mW 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 T826 in case operating temperatures exceed acceptable levels.

The T827 is a synthesised, microprocessor controlled FM base station exciter designed for single or multichannel operation in the 66 to 88MHz frequency range[1]. With a standard power output of only 1W, the exciter is designed for use with the T828 50W power amplifier. The RF section of the exciter comprises a frequency synthesiser which provides 125mW of frequency modulated RF drive to a two stage, wide band output amplifier.

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, and then back into the remaining audio circuitry in almost any combination. All audio processor options are link selectable.

The synthesiser frequency is programmed via the serial communications port. Eight channel select lines are accessible via an optional D-range connector (D-range 2 - T800-03-0000) at the rear of the set.

All components except those of the VCO 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.

The front panel controls include line sensitivity, microphone socket and carrier switch. This switch turns on the carrier (unmodulated) as an aid to servicing.

The T826 and T827 are both 60mm wide and each occupies a single space in a Tait rack frame, which has the ability to accommodate up to seven standard modules.

1. Although capable of operating over the 66-88MHz frequency range, the T826 and T827 have an 8MHz switching range (see Section 1.2.3 and Section 3.1).

1.2 Specifications

1.2.1 Introduction

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

Where applicable, the test methods used to obtain the following performance figures are those described in the EIA and ETS specifications. However, there are several parameters for which performance according to the CEPT specification is given. Refer to Section 1.2.6 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.

The terms "wide bandwidth" and "narrow bandwidth" used in this and following sections are defined in the following table.

	Channel Spacing	Modulation 100% Deviation	Receiver IF Bandwidth
Wide Bandwidth	25kHz	±5.0kHz	15.0kHz
Narrow Bandwidth	12.5kHz	±2.5kHz	7.5kHz

1.2.2 General

Number Of Channels .. 128 (standard)[1]

Supply Voltage:

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

Supply Current:

Transmit	- T826	.. 4.5A (typical)
	- T827	.. 650mA
Standby		.. 160mA (typical)

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

1. Additional channels may be factory programmed. Contact your nearest Tait Dealer or Customer Service Organisation.

Dimensions:

Height	.. 183mm
Width	.. 60mm
Length	.. 322mm

Weight .. 2.1kg

Time-Out Timer (optional) .. 0 to 5 minutes[1] adjustable in 10 second steps

Tail Timer .. 0 to 5 seconds adjustable in 100ms[2] steps

Transmit Key Time .. <30ms

Transmit Lockout Timer .. 0 to 1 minute adjustable in 10 second steps

1.2.3 RF Section

Frequency Range .. 66-88MHz (refer to Section 1.4 and Section 1.5)

Modulation Type .. FM

Frequency Increment .. 5 or 6.25kHz

Switching Range .. 8MHz (i.e. ±4MHz from the centre frequency)

Load Impedance .. 50 ohms

Frequency Stability (see also Section 1.4 and Section 1.5) .. ±2.5ppm, -30°C to +60°C

Adjacent Channel Power (full deviation):

Wide Bandwidth (WB) (±25kHz/15kHz B/W)	.. -70dBc
Narrow Bandwidth (NB) (±12.5kHz/7.5kHz B/W)	.. -60dBc

Transmitter Switching .. complies with ETS 300 113

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

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

1. Adjustable from 0 to 10 minutes in PGM800Win version 2.12 and later.
2. Adjustable in 20ms steps in PGM800Win version 2.12 and later.

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

T826 Mismatch Capability:

Ruggedness	.. refer to your nearest Tait Dealer or Customer Service Organisation
Stability	.. 3:1 VSWR (all phase angles)

Radiated Spurious Emissions:

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

Conducted Spurious Emissions: (T826 Only)

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

Power Output:

T826 - Rated Power	.. 25W
- Range Of Adjustment	.. 5-25W
T827	.. 1W ±300mW

Duty Cycle (T826 Only)	.. 100% @ 25W at +25°C .. 30% @ 25W at +60°C .. 100% @ 10W at +60°C

1.2.4 Audio Processor

1.2.4.1 Inputs

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

1.2.4.2 Modulation Characteristics

Frequency Response (below limiting)	.. flat or pre-emphasised (optional)
Line And Microphone Inputs:	
Pre-emphasised Response-	
Bandwidth	.. 300Hz to 3kHz (WB)
	.. 300Hz to 2.55kHz (NB)
Below Limiting	.. 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% max.
Hum And Noise:	
Wide Bandwidth	.. -55dB (300Hz to 3kHz [EIA]) typical
Narrow Bandwidth	.. -50dB (CEPT)
Compressor (optional):	
Attack Time	.. 10ms
Decay Time	.. 800ms
Range	.. 50dB

1.2.4.3 CTCSS

Standard Tones	.. all 37 EIA group A, B and C tones plus 13 commonly used tones
Frequency Error (from EIA tones)	.. 0.08% max.
Generated Tone Distortion	.. 1.2% max.
Generated Tone Flatness	.. flat across 67 to 250.3Hz to within 1dB
Modulation Level	.. adjustable
Modulated Distortion	.. <5%

1.2.5 Microcontroller

Auxiliary Ports:

Open Drain Type	.. capable of sinking 2.25mA via 2k2Ω
V_{ds} max.	.. 5V

1.2.6 Test Standards

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

1.2.6.1 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).

1.2.6.2 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.

1.2.6.3 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 T820 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T820 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:

T82X-XX-XXXX
T825 receiver
T826 25W transmitter
T827 exciter
T828 50W 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:

T82X-**X**X-XXXX '1' for 66-88MHz

The second digit in the Type group indicates the channel spacing:

T82X-X**X**-XXXX '0' for wide bandwidth (25kHz)
'5' for narrow bandwidth (12.5kHz)

Options

T82X-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.

1.4 T826 Standard Product Range

The following table lists the range of standard T826 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.

Frequency Range (MHz)		66-88	
Deviation (kHz)		2.5	5
TCXO[a]	±2.5ppm -30°C to +60°C	•	•
Transmitter Type: T826-		15-0000	10-0000

a. A TCXO with a stability of ±1ppm (0°C to +60°C) is available to suit specific requirements. Contact your nearest authorised Tait Dealer or Customer Service Organisation for further details.

You can identify the transmitter type by checking the product code printed on a label on the rear of the chassis (Figure 1.1 in Part A shows typical labels). You can further verify the transmitter type by checking the placement of an SMD resistor in the table that is screen printed onto the PCB (refer to Section 6.1 for more details).

1.5 T827 Standard Product Range

The following table lists the range of standard T827 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.

Frequency Range (MHz)		66-88	
Deviation (kHz)		2.5	5
TCXO[a]	±2.5ppm -30°C to +60°C	•	•
Transmitter Type: T827-		15-0000	10-0000

a. A TCXO with a stability of ±1ppm (0°C to +60°C) is available to suit specific requirements. Contact your nearest authorised Tait Dealer or Customer Service Organisation for further details.

You can identify the exciter type by checking the product code printed on a label on the rear of the chassis (Figure 1.1 in Part A shows typical labels). You can further verify the exciter type by checking the placement of an SMD resistor in the table that is screen printed onto the PCB (refer to Section 6.1 for more details).

