

## 4 T856/857 Functional Testing



**Caution:** This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to [Section 1.2](#) in Part A for more information on anti-static procedures when handling these devices.

The following test procedures will confirm that the T856/857 has been tuned and adjusted correctly and is fully operational.

**Note 1:** In this and following sections deviation settings are given first for wide bandwidth sets, followed by settings in brackets for mid bandwidth sets ( ) and narrow bandwidth sets [ ].

**Note 2:** Unless otherwise specified, the term "PGM800Win" used in this and following sections refers to version 2.00 and later of the software.

Refer to [Figure 4.4](#) and [Figure 4.5](#) for the location of the main tuning and adjustment controls, and to [Section 3.3](#) for the test equipment set-up. Refer also to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

The following topics are covered in this section.

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## 4.1 Current Consumption

Connect the T856/857 to a 13.8V power supply.

Connect an RF power meter to the T856/857 output socket.

Check that the current in the 13.8V power cable is less than 150mA.

Key the T856/857 by earthing the Tx-Key line (the carrier "On" LED should light).

**T856 Only:** Adjust RV310 (power control) to obtain 25W output power.

Check that the current is as follows:

T856	<5.5A
T857	<750mA.

## 4.2 Output Power

Connect an RF power meter with suitable attenuation to the T856/857 output socket.

Key the T856/857 by earthing the Tx-Key line.

Check that:

T856	the output power adjusts to $\geq 25\text{W}$ with RV310 (power control) turned fully clockwise
T857	the output power is $1\text{W} \pm 300\text{mW}$ .

## 4.3 Output Frequency

Connect the T856/857 output to a frequency counter via an attenuator pad:

T856	40dB pad
T857	20dB pad.

Measure the output frequency and, if necessary, adjust the TCXO (=IC700) to trim to the nominal frequency ( $\pm 100\text{Hz}$ ).

## 4.4 Timers

The transmit tail timer, transmit timeout timer and transmit lockout timer can all be set from PGM800Win. The fields for setting these are found on the system information page. These three timers operate as follows (refer also to [Figure 4.1](#)):

Timer	Function	Adjustment
Transmit Tail	Sets the tail time during which the transmitter stays keyed after the external key source has been removed.	0-5 seconds in 100ms steps <sup>a</sup>
Transmit Timeout	Sets the maximum continuous transmission time. Once the timer has timed out, the transmitter must be keyed again, unless prevented by the transmit lockout timer.	0-300 seconds <sup>b</sup> in 10 second steps
Transmit Lockout	Sets the period of time that must elapse after a timeout before the transmitter can re-transmit. Once the timer has timed out, the transmitter can be keyed again.	0-60 seconds in 10 second steps

- a. Adjustable in 20ms steps in PGM800Win version 2.12 and later.  
b. Adjustable in 20ms steps in PGM800Win version 2.12 and later.

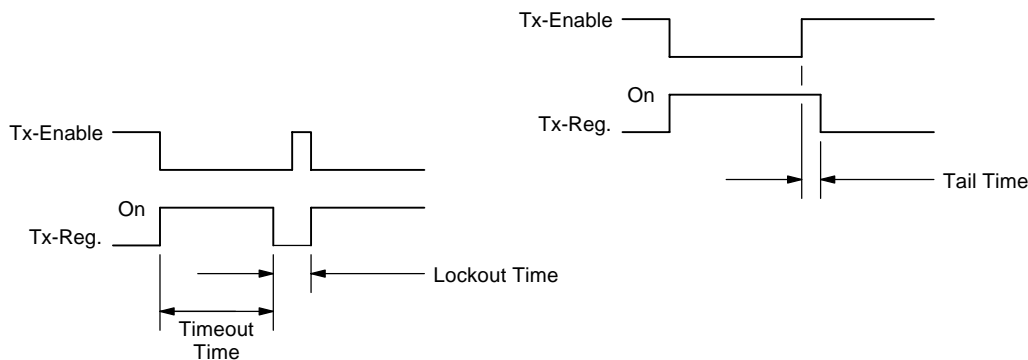


Figure 4.1 T856/857 Transmit Timers

## 4.5 Frequency Response

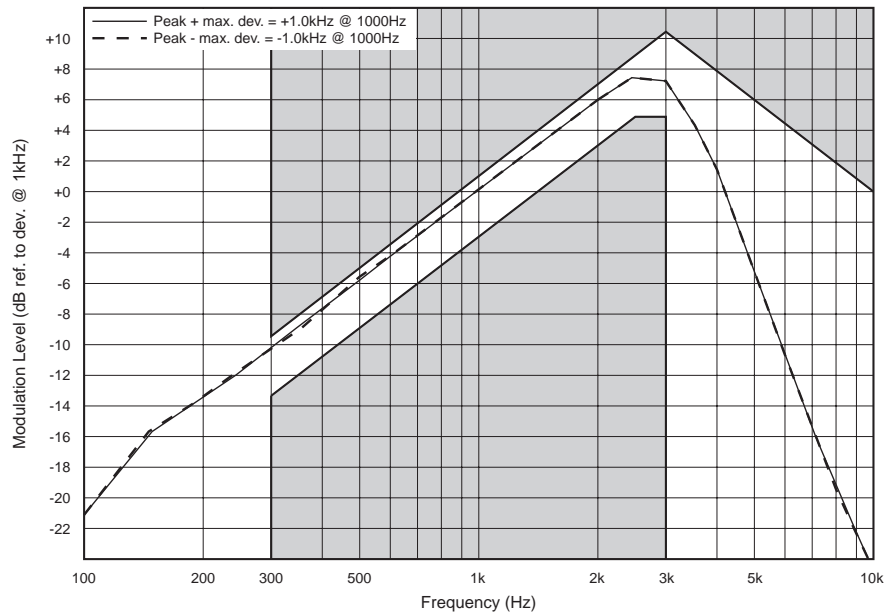
If the T856/857 has been correctly adjusted, the pre-emphasis and limiting responses should closely match those shown in [Figure 4.2](#) and [Figure 4.3](#) respectively.

**Note:** The limits shown on these graphs should not be exceeded.

- If you are using an RF test set, turn off all filters.
- Measure the pre-emphasis response as follows:
  - Reduce the line level to give  $\pm 1\text{kHz}$  ( $\pm 0.8\text{kHz}$ ) [ $\pm 0.5\text{kHz}$ ] deviation at 1kHz.
  - Sweep the modulation frequency.
  - The response should closely match that shown in [Figure 4.2](#).
- Measure the limiting response as follows:
  - Set the line level to give  $\pm 3\text{kHz}$  ( $\pm 2.4\text{kHz}$ ) [ $\pm 1.5\text{kHz}$ ] deviation at 1kHz.

Increase the line level 20dB and sweep the modulation frequency.  
The response should closely match that shown in [Figure 4.3](#).

### Wide Bandwidth

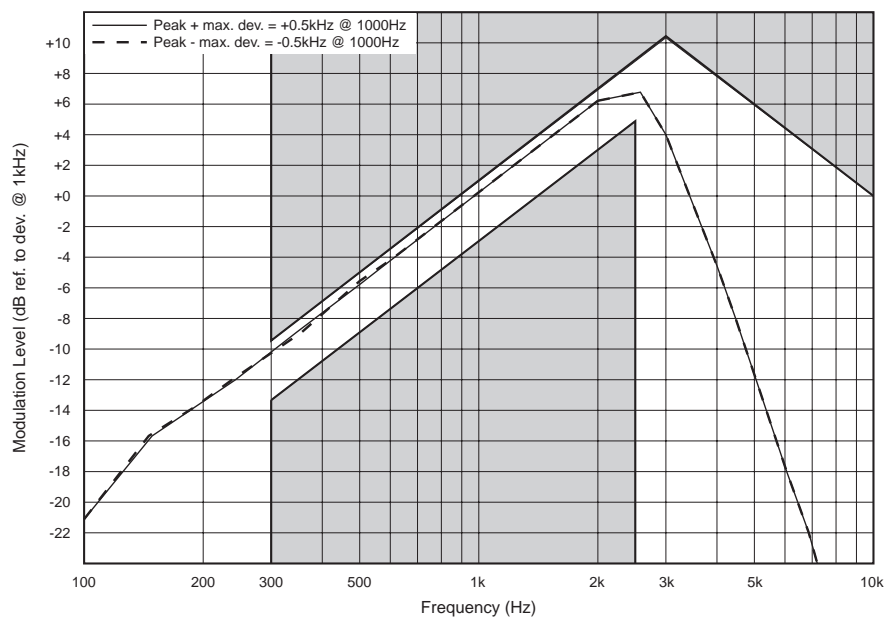


### Mid Bandwidth

The mid bandwidth graph is the same shape as the wide bandwidth graph. The deviation figures are as follows:

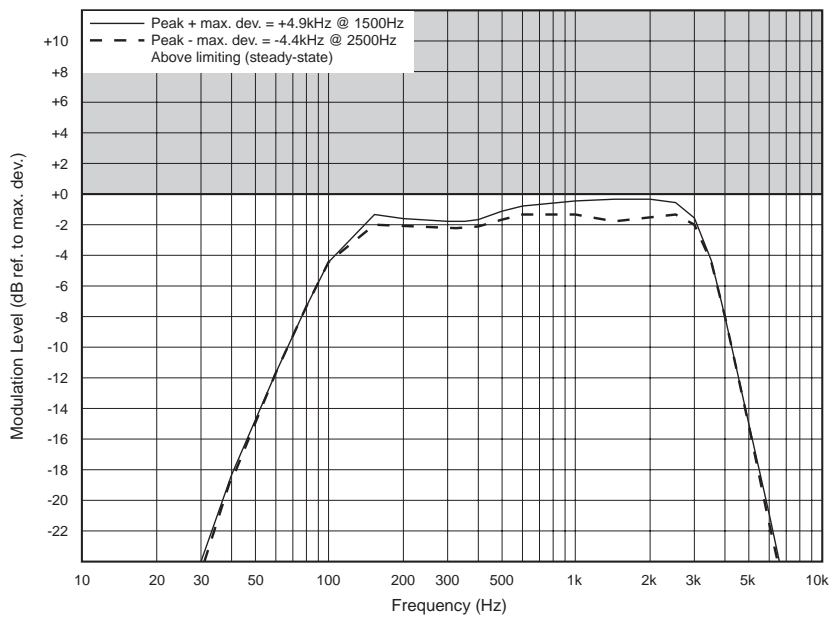
$$\begin{aligned} \text{peak + max. deviation} &= +0.8\text{kHz} \\ \text{peak - max. deviation} &= -0.8\text{kHz} \end{aligned}$$

### Narrow Bandwidth



**Figure 4.2 T856/857 Pre-emphasis Response**

**Wide Bandwidth**

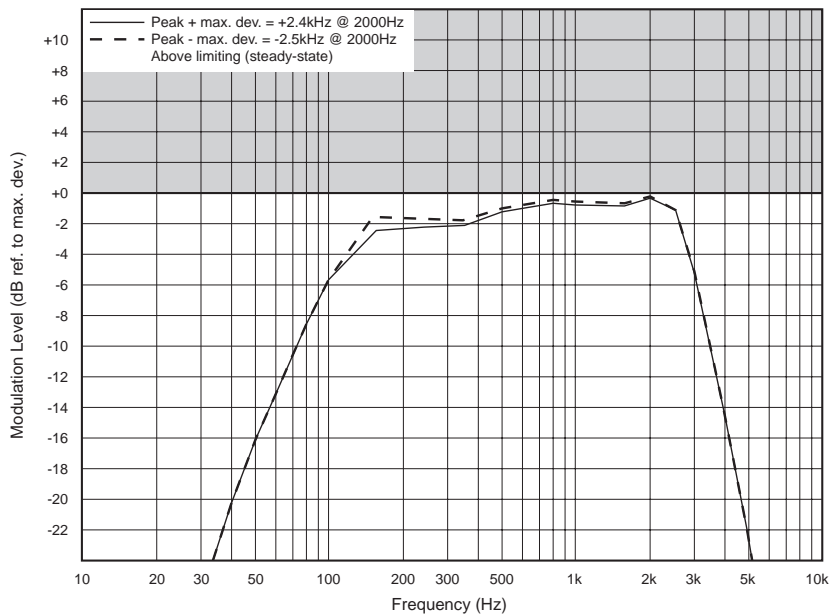


**Mid Bandwidth**

The mid bandwidth graph is the same shape as the wide bandwidth graph. The deviation figures are as follows:

- peak + max. deviation = +4kHz
- peak - max. deviation = -4kHz.

**Narrow Bandwidth**



**Figure 4.3 T856/857 Limiting Response**

## 4.6 Audio Level Input Sensitivity

- Adjust RV210 (line sensitivity) fully clockwise.
- Check that the input sensitivities are better than those specified below:

Line Input	600 ohms, $\pm 3\text{kHz}$ ( $\pm 2.4\text{kHz}$ ) [ $\pm 1.5\text{kHz}$ ] deviation at 1kHz: with compressor -50dBm without compressor -30dBm
Microphone Input	600 ohms, $\pm 3\text{kHz}$ ( $\pm 2.4\text{kHz}$ ) [ $\pm 1.5\text{kHz}$ ] deviation at 1kHz: with compressor -75dBm without compressor -55dBm
CTCSS Input	1kHz deviation at 150Hz 500mV rms

**Note:** A degraded signal to noise ratio can be expected with the compressor selected. The extent of the degradation is dependent on the audio input level.

