



## To Convert A T856 Series II Transmitter To Low Power Operation

18th October 1999

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*For Internal Use Only: This Technical Note must not be distributed beyond Tait Customer Service Organisations without prior approval from Radio Systems Division Customer Support.*

### Applicability

This Technical Note (TN) applies to T856 Series II transmitters.

### Introduction

This TN describes how to convert a T856 Series II transmitter to operate between 1 and 7W. The conversion consists of removing Q420 and connecting Q410 to the output, thus changing the circuit to the layout shown in [Figure 5](#).

This TN replaces all previous issues of this TN. Any part that has changed from the previous issue is indicated by a vertical line in the outer margin of the page. If you have any questions about this TN or the procedures it describes, please contact your nearest Tait Dealer or Customer Service Organisation. If necessary, you can get additional technical help from Customer Support, Radio Systems Division, Tait Electronics Ltd, Christchurch, New Zealand.

### Disclaimer

The T856 design allows for wide variations in output power from the driver transistor (Q410) which the final transistor (Q420) can accept. Because the final transistor is removed in this modification, and also because of variations in batches of driver transistors, there will be limited output power control once the modifications are complete. For these reasons Radio Systems Division Customer Support cannot guarantee any particular output power specifications. Thus, although this modification is possible, it is not recommended nor supported by Customer Support. Customer Support recommends ordering this product directly from Tait Electronics Ltd, in which case the factory-built product will meet the appropriate specifications.

## Parts Required

### Low Band (400-440MHz)

2 x IPN 015-02220-03 22pF GRH-111 capacitors

### Medium Band (440-480MHz) And High Band (480-520MHz)

2 x IPN 015-02180-03 18pF GRH-111 capacitors

### Common Parts

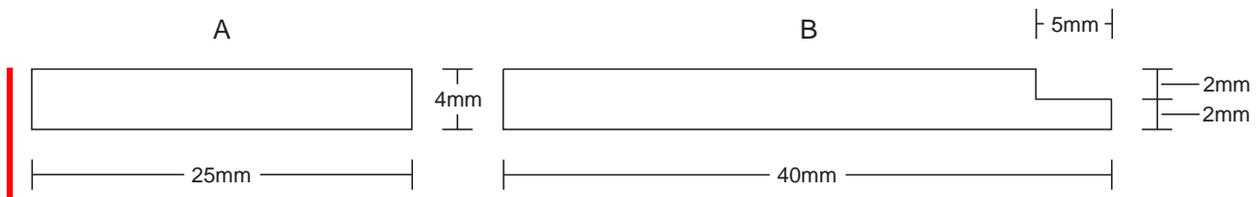
2 x IPN 030-02820-20 82Ω SRF16 resistors

2 x precut 0.1mm brass or copper strips, 25mm x 4mm (refer to [Figure 1A](#))

1 x precut 0.1mm brass or copper strip, 40mm x 4 mm (refer to [Figure 1B](#))

1 x radio type label

1 x Type Approval label



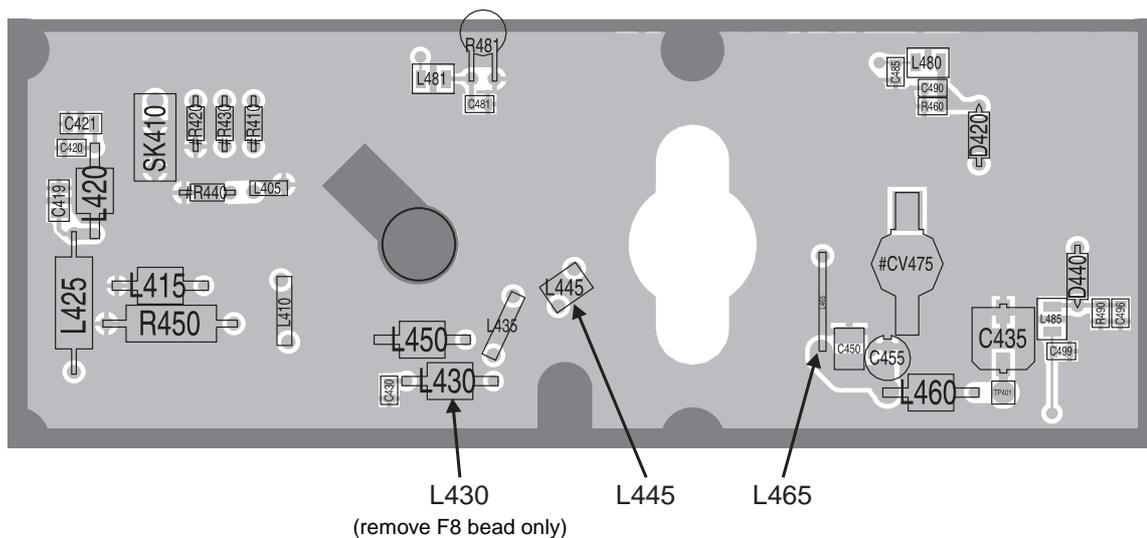
**Figure 1 Brass/Copper Strip Dimensions**

## Method

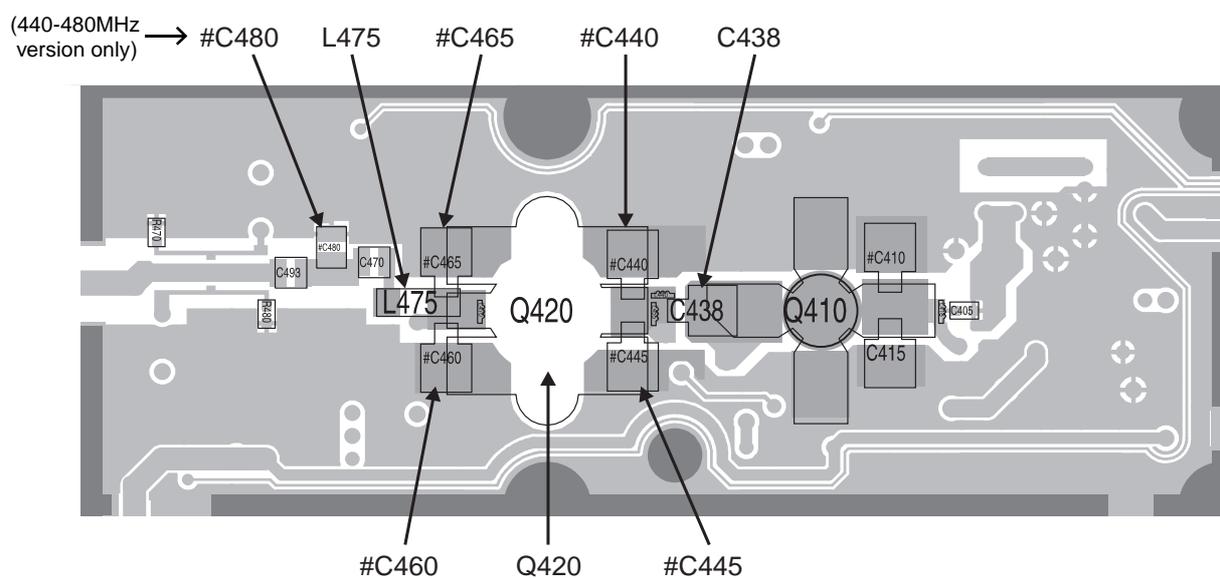
1. Remove the following components, as shown in [Figure 2](#) and [Figure 3](#) below:

top side:            remove the F8 bead from L430 (crush)  
                           L445  
                           L465

bottom side:        C438  
                           #C440  
                           #C445  
                           #C460  
                           #C465  
                           #C480 (440-480MHz version only)  
                           L475  
                           Q420



**Figure 2 Components To Be Removed - Top Side Of PCB**



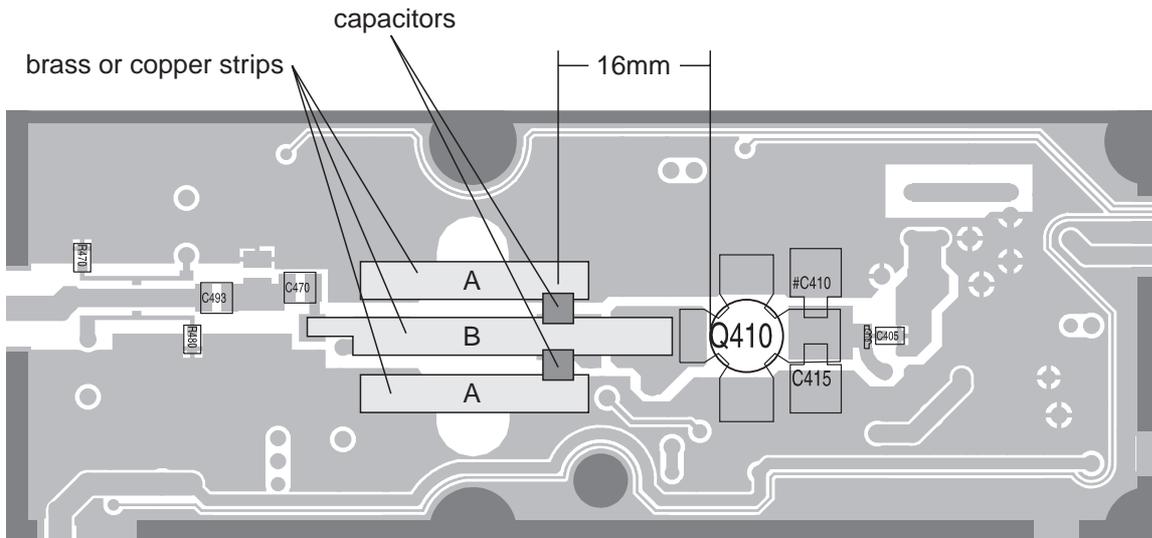
**Figure 3 Components To Be Removed - Bottom Side Of PCB**

2. Tin the prepared brass or copper strips.

Remove excess solder from the strips and from the T856 PCB where the components have been removed.

Position the strips as shown in [Figure 4](#) and solder them in place.

**Note:** Ensure that the three strips are parallel (to avoid changing the RF impedance). Also ensure that the end of strip B does not overlap the tab of Q410.



**Figure 4 Position Of Brass/Copper Strips**

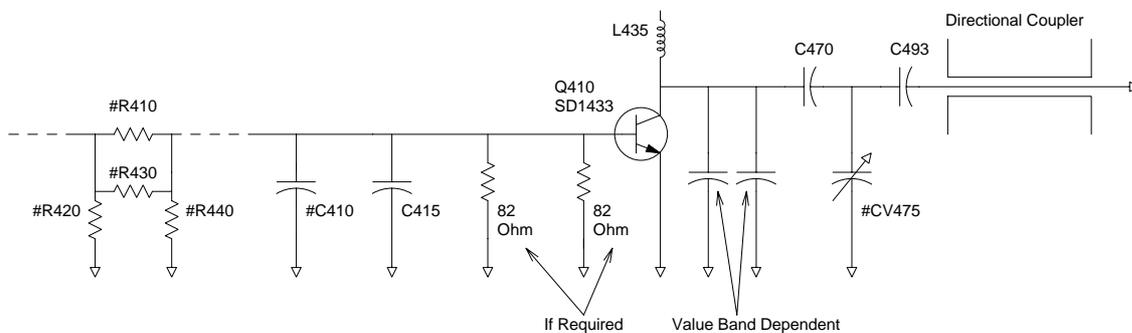
3. Select the two capacitors according to the chart below:

| Frequency  | Value | Spacing | IPN          |
|------------|-------|---------|--------------|
| 400-440MHz | 22pF  | 16mm    | 015-02220-03 |
| 440-480MHz | 18pF  | 16mm    | 015-02180-03 |
| 480-520MHz | 18pF  | 16mm    | 015-02180-03 |

Fit the capacitors to the brass or copper strips as indicated in [Figure 4](#) (16mm from Q410 to the centres of the capacitors).

4. Remove and replace the radio type and Type Approval labels.

5. When the modifications are complete the circuit will be as shown in [Figure 5](#) below:



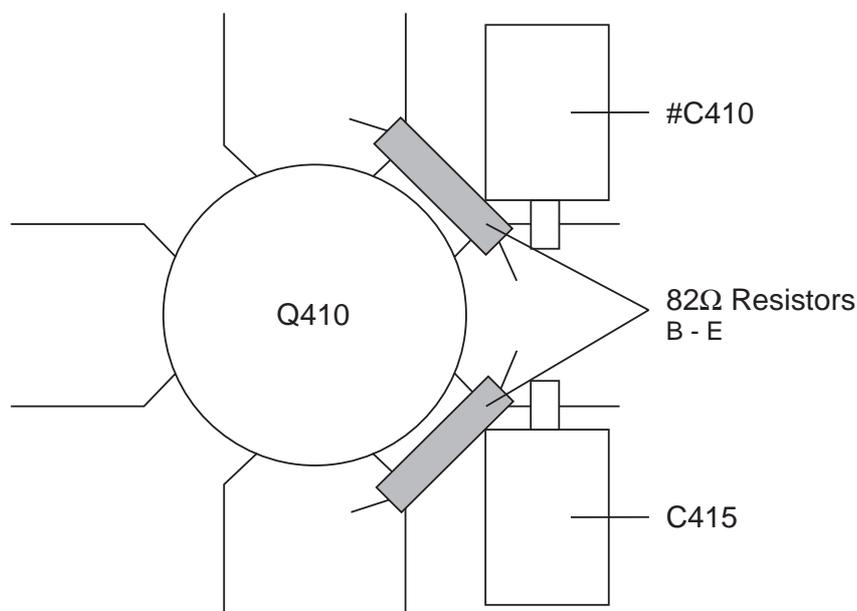
**Figure 5 Altered Circuit**

## Final Testing And Adjustment

1. If necessary, carry out the tuning and adjustment procedures described in Section 3 of the T850 Series II service manual.
2. Set RV310 (power control) fully clockwise (maximum power).
3. Adjust #CV475 (output power trim) for maximum power.
4. Measure the output power. If the output power exceeds 12W, add the two 82 $\Omega$  resistors as shown in [Figure 6](#).
5. Monitor the RF output on a spectrum analyser.

With no modulation applied, check that the transmitter output is stable and free from spurious emissions.

If there are any instabilities present, fit the two 82 $\Omega$  resistors shown in [Figure 6](#) and recheck the output power and stability.



**Figure 6** Placement Of 82 $\Omega$  Resistors

**Note:** Keep the leads as short as possible, and ensure that the resistors do not cause a short circuit.

## Test Results

|             | Frequency (MHz) | Maximum Power (W) | Supply Current at 5W |
|-------------|-----------------|-------------------|----------------------|
| Low Band    | 400             | 10.5              | 1.8A                 |
|             | 420             | 11.5              | 1.7A                 |
|             | 440             | 11.5              | 1.5A                 |
| Medium Band | 440             | 12.0              | 1.7A                 |
|             | 460             | 12.0              | 1.6A                 |
|             | 480             | 9.0               | 1.7A                 |
| High Band   | 480             | 11.5              | 1.6A                 |
|             | 500             | 9.0               | 1.7A                 |
|             | 520             | 8.0               | 1.7A                 |

## Issuing Authority

This TN was issued by: John Crossland  
RSD Documentation Manager

## Publication History

| Publication Date  | Author     |
|-------------------|------------|
| 14th July 1998    | K Wilson   |
| 18th October 1999 | D Reynolds |

## Amendment Record

| Publication Date  | Page | Amendment  |
|-------------------|------|--|
| 18th October 1999 |      | TN-510 republished to apply only to T856 Series II with new and updated procedures   |
|                   | 1    | <ul style="list-style-type: none"> <li>• "Applicability" added</li> <li>• "Introduction" changed to describe TN modifications</li> <li>• "Disclaimer" added</li> </ul>                               |
|                   | 2    | <ul style="list-style-type: none"> <li>• "Parts Required" changed match updated procedures and to more accurately describe T856 Series II</li> <li>• Series I parts removed from "Method"</li> </ul> |

| Publication Date | Page | Amendment  |
|------------------|------|--|
|                  | 3    | <ul style="list-style-type: none"><li>• Figures 2 &amp; 3 added</li><li>• “Note” added requiring accurate positioning of brass/copper strips</li></ul>   |
|                  | 4    | <ul style="list-style-type: none"><li>• Figure 4 and associated text updated to match changed capacitor location on T856 Series II PCB</li><li>• Figure 5 updated to match changed procedures and T856 Series II circuit</li></ul> |
|                  | 5    | <ul style="list-style-type: none"><li>• “Final Testing And Adjustment” added, including instructions for fitting two 82Ω resistors if required</li></ul>   |
|                  | 6    | <ul style="list-style-type: none"><li>• “Test Results” updated</li><li>• “Issuing Authority”, “Publication History” and “Amendment Record” added</li></ul>   |

