

T820 Series II

Base Station Equipment

66-88MHz

Tuning & Adjustment Manual

July 2000

M820-00-2TA



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About This Manual

Scope

This manual contains general, technical, tuning and adjustment information on T820 Series II 25W and 50W base stations which comprise the following equipment:

25W base station	T825 receiver T826 25W transmitter
50W base station	T825 receiver T827 exciter T828 50W power amplifier

PCB Information

PCB information is provided for all current issue PCBs, as well as all previous issue PCBs manufactured in production quantities, and is grouped according to PCB. Thus, you will find the parts list, grid reference index (if necessary), PCB layouts and circuit diagram(s) for each individual PCB grouped together.

Errors

If you find an error in this manual, or have a suggestion on how it might be improved, please do not hesitate to contact Customer Support, Tait Electronics Ltd, Christchurch, New Zealand (full contact details are on page 2).

Updating Equipment And Manuals

In the interests of improving performance, reliability or servicing, Tait Electronics Ltd reserve the right to update their equipment and/or manuals without prior notice.

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You can order additional copies of this manual from your nearest Tait Dealer or Customer Service Organisation. When ordering, make sure you quote the correct Tait product code ("M" number). Note that only the latest issue of the manual will be available for order.

Table Of Contents

This manual is divided into five parts as listed below, with each part being further subdivided into sections. There is a detailed table of contents at the start of each part and/or section.

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B	T825 Receiver
C	T826 Transmitter & T827 Exciter
D	T828 Power Amplifier
E	T820 VCO PCB Information

Part A Introduction To Servicing

This part of the manual is divided into the sections listed below. These sections provide some general and advisory information on servicing procedures, and a brief history of PGM800Win programming software.

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1 General

1.1 Additional Technical Information

If you have any questions about this manual or the equipment 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 (full contact details are on page 2).

When requesting information, please quote either the manual product code (e.g. M820-00-200), or the equipment product code and serial number which are printed on a label on the back of the product (as shown in Figure 1.1).

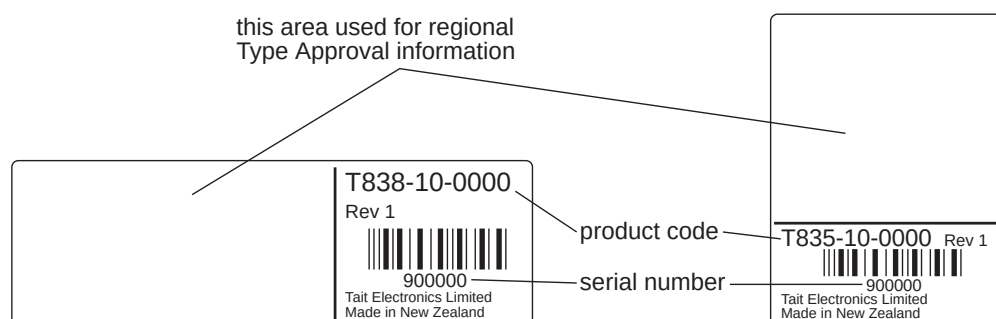


Figure 1.1 Typical Product Code & Serial Number Labels

If you require information about a particular PCB, please quote the full PCB internal part number (IPN) which is screen printed onto the top side of the board (refer to the appropriate PCB Information section in this manual for more details).



1.2 Caution: CMOS Devices

This equipment contains CMOS Devices which are susceptible to damage from static charges. Care when handling these devices is essential. For correct handling procedures refer to the manufacturers' data books, e.g. Philips data books covering CMOS devices, or Motorola CMOS data books, Section 5 'Handling', etc.

An anti-static bench kit (refer to Figure 1.2) is available from Tait Electronics Ltd under the following product codes:

- KS0001 - 1 conductive rubber bench mat
- 1 earth lead to connect the mat to ground
- KS0004 - 1 wrist strap.

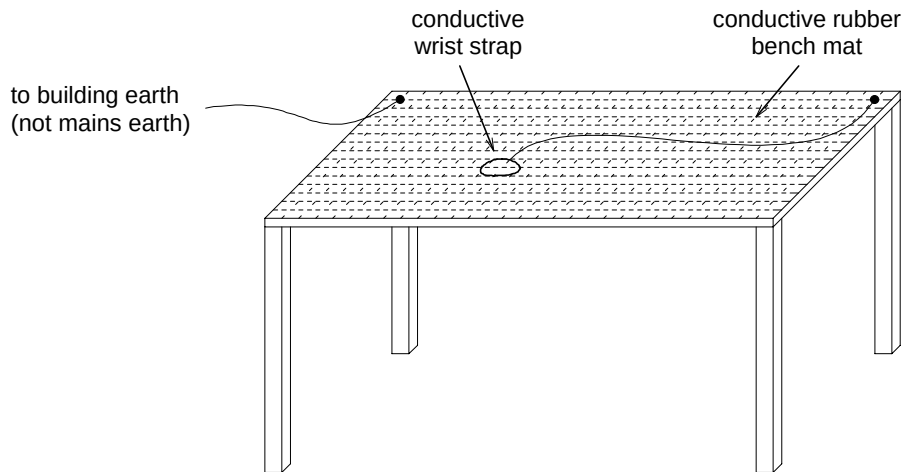


Figure 1.2 Typical Anti-static Bench Set-up



1.3 **Caution: Aerial Load**

The equipment has been designed to operate safely under a wide range of aerial loading conditions. However, we strongly recommend that the transmitter should always be operated with a suitable load to prevent damage to the transmitter output power stage.



1.4 **Caution: Beryllium Oxide & Power Transistors**

The RF power transistors in current use all contain some beryllium oxide. This substance, while perfectly harmless in its normal solid form, can become a severe health hazard when it has been reduced to dust. For this reason the RF power transistors should not be broken open, mutilated, filed, machined, or physically damaged in any way that can produce dust particles.

2 Mechanical

2.1 Torx Recess Head Screws

Torx recess head screws are becoming the standard screw head type in all T800 Series II equipment, with Pozidriv and Philips recess head screws being used in fewer applications.

The Torx recess head has the advantage of improved screwdriver tip location, reducing the chances of screw head damage caused by the driver tip rotating within the recess. In addition, using a ball-tip Torx screwdriver allows you to drive a Torx head screw with the driver on a slight angle, which can be useful in situations where access is restricted.

It is important that you use the correct Torx screwdriver tip:

M3 screws - T10
M4 screws - T20.

Figure 2.1 below shows a typical Torx recess head screw (actual hardware may differ slightly from this illustration due to variations in manufacturing techniques).

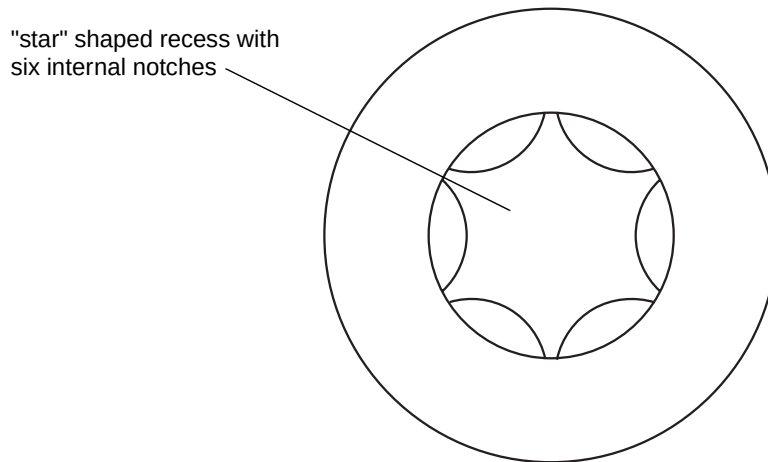


Figure 2.1 Torx Screw Identification

2.2 Pozidriv & Philips Recess Head Screws

Pozidriv and Philips recess head screws will continue to be used in T800 Series II equipment in a few special applications. It is important that you use the correct type and size screwdriver for each screw type to avoid damaging the screw head.

It is particularly important that you do not use Philips screwdrivers on Pozidriv screw heads as the tapered driving flutes of the Philips screwdriver do not engage correctly with the parallel-sided slots in the Pozidriv screw head. This can result in considerable damage to the screw head if the screwdriver tip turns inside the recess.

Note: If you find you need excessive downwards pressure to keep the screwdriver tip in the Pozidriv screw head, you are probably using the wrong type and/or size screwdriver.

Figure 2.2 below shows the main differences between typical Pozidriv and Philips screw heads and screwdriver tips (actual hardware may differ slightly from these illustrations due to variations in manufacturing techniques).

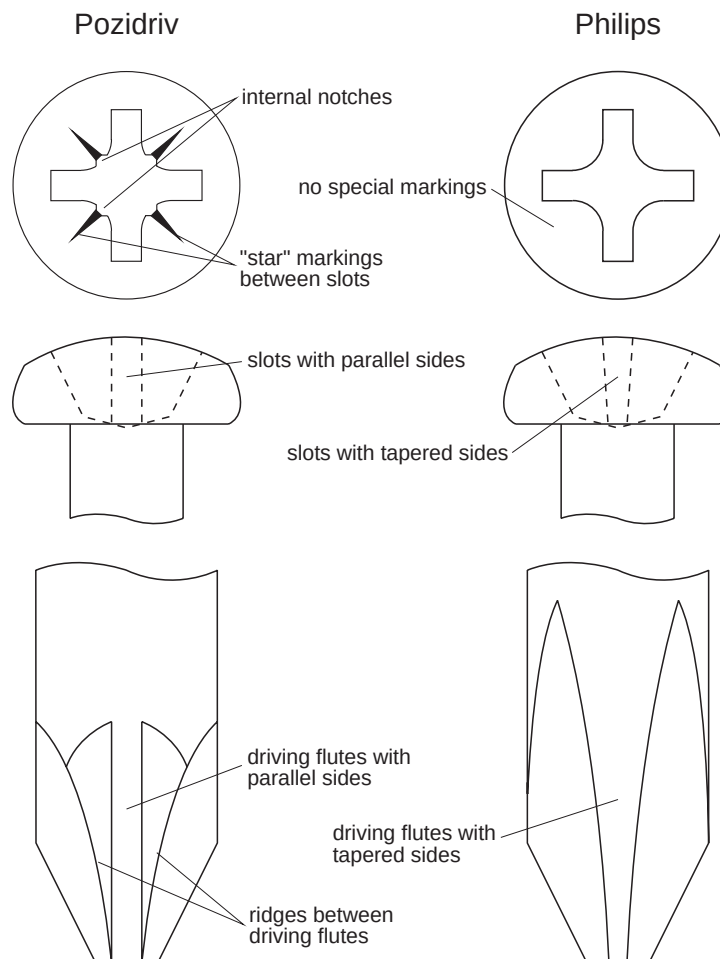


Figure 2.2 Pozidriv & Philips Screw & Screwdriver Identification

2.3 Disassembly/Reassembly

2.3.1 Receivers/Exciters/Transmitters

To carry out alignment or change option links, you need to remove only the top cover, i.e. the one adjacent to the front panel handle and on the opposite side to the main D-range connector (D-range 1/PL100).

You need to remove the bottom cover to:

- access transmitter RF power transistors and many SMD components
- change solder blob links
- fit test leads to circuit block access points.

2.3.2 Power Amplifiers

You should carry out the tuning and power output level setting procedures with the cover on.

2.4 Cover Screw Torques

Receivers/Exciters/Transmitters	.. 1.36Nm/12in.lbf.
Power Amplifiers	.. 0.9Nm/8in.lbf.

2.5 Chassis & Cover Compatibility

The chassis and covers used in T800 Series II modules incorporate a number of design changes to improve Electro-Magnetic Compatibility (EMC) performance. It is important that only the new-design covers are fitted to the new chassis to ensure correct mechanical fit and continued compliance with appropriate EMC Type Approval regulations.

Figure 2.3 below shows some of the main features which can be used to identify the new-design chassis and covers.

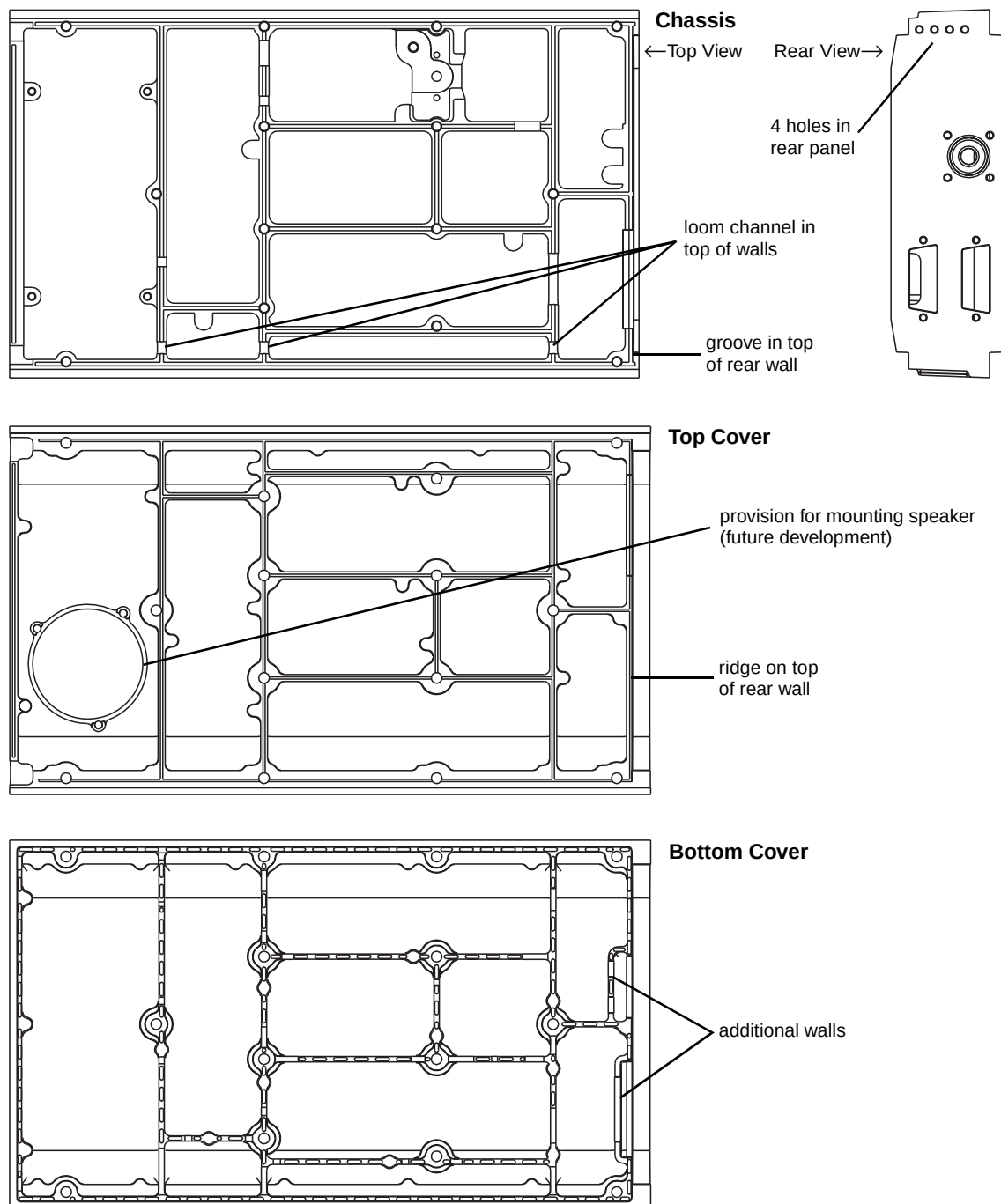


Figure 2.3 Identification Of New-Design Chassis & Covers

3 Component Replacement

3.1 Leaded Components

Whenever you are doing any work on the PCB that involves removing or fitting components, you must take care not to damage the copper tracks. The two satisfactory methods of removing components from plated-through hole (PTH) PCBs are detailed below.

Note: The first method requires the use of a desoldering station, e.g. Philips SBC 314 or Pace MBT-100E.

3.1.1 Desoldering Iron Method

Place the tip over the lead and, as the solder starts to melt, move the tip in a circular motion.

Start the suction and continue the movement until 3 or 4 circles have been completed.

Remove the tip while continuing suction to ensure that all solder is removed from the joint, then stop the suction.

Before pulling the lead out, ensure it is not stuck to the plating.

If the lead is still not free, resolder the joint and try again.

Note: The desoldering iron does not usually have enough heat to desolder leads from the ground plane. Additional heat may be applied by holding a soldering iron on the tip of the desoldering iron (this may require some additional help).

3.1.2 Component Cutting Method

Cut the leads on the component side of the PCB.

Heat the solder joint *sufficiently* to allow *easy* removal of the lead by drawing it out from the component side: do *not* use undue force.

Fill the hole with solder and then clear with solderwick.

3.2 Surface Mount Devices

**Caution:**

Surface mount devices (SMDs) require special storage, handling, removal and replacement techniques. This equipment should be serviced only by an approved Tait Dealer or Customer Service Organisation equipped with the necessary facilities. Repairs attempted with incorrect equipment or by untrained personnel may result in permanent damage. If in doubt, contact your nearest Tait Dealer or Customer Service Organisation.

3.3 Cased Mica Capacitors

Cased mica capacitors can be removed by heating the top with a heavy-duty soldering iron and gently lifting the capacitor off the PCB with a solder-resistant spike or equivalent.

4 Software History

28/06/96

PGM800Win Version 1.0

18/08/97

PGM800Win Version 2.00

4.1 PGM800Win V1.0

PGM800Win V1.0 is different in concept from DOS versions of PGM800 in that it is Windows¹ based. It also includes many new and improved features over DOS versions of PGM800.

The major changes are outlined below:

- The Windows™ environment makes data entry and editing significantly easier.
- PGM800Win includes several new radio models which are not programmable with DOS versions of PGM800.
- Out of range frequencies will result in warning messages and will not be accepted for entry into the standard library module. User defined modules can be created, however, allowing variation from the standard library module.
- Channel numbers default to 0-127 to match the EPROM memory locations. However, the user can change this setting so that the channel numbers run from 1-128 to suit his/her particular needs.

Note: The data files produced by BASEPROG V1.0 and all DOS versions of PGM800 are still compatible with PGM800Win V1.0.

4.2 PGM800Win V2.00

PGM800Win V2.00 is an upgraded and expanded version of PGM800Win V1.0. It has been developed specifically for T800 Series II base stations, but retains the ability to program Series I equipment.

The major changes are outlined below:

- PGM800Win V2.0 will program T800 Series II base station modules via serial communications.
- Deviation and reference modulation settings are written automatically to the radio.

1. Windows is a registered trademark of the Microsoft Corporation.

- Extra information that is not stored in the radio (but which is still relevant to the radio) can be saved to a file on disk (e.g. note field, auxiliary pin names, etc.).

Note: The data files produced by BASEPROG V1.0, all DOS versions of PGM800, and PGM800Win V1.0 are still compatible with PGM800Win V2.00.

Part B T825 Receiver

This part of the manual is divided into six sections, as listed below. There is a detailed table of contents at the start of each section.

Section	Title
1	General Information
2	Circuit Operation
3	Initial Tuning & Adjustment
4	Functional Testing (not available for Tuning & Adjustment manual)
5	Fault Finding (not available for Tuning & Adjustment manual)
6	PCB Information

1 T825 General Information

This section provides a brief description of the T825 receiver, along with detailed specifications and a list of types available.

The following topics are covered in this section.

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1.1 Introduction

The T825 is a high performance microprocessor controlled FM base station receiver designed for single or multichannel operation in the 66 to 88MHz frequency range¹.

The receiver is a dual conversion superhet with a synthesised local oscillator. The first IF is 10.7MHz, allowing exceptionally high spurious signal rejection to be achieved in the receiver front end. The second IF section (455kHz) combines amplitude limiting, detection and RSSI within a single integrated circuit. This IC also drives a noise level detector for gating the audio output. RSSI can also be used to drive a carrier mute for audio output gating (link selectable).

The audio section output can be adjusted to deliver >+10dBm to a 600 ohm balanced output, and 1W to a local monitor speaker. A flat or de-emphasised audio response is 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 on the VCO board 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 PCB is obtained by removing each of the two chassis covers. There is provision within the chassis to mount small option PCBs.

The front panel controls include gating sensitivity, line level, monitor volume and a monitor mute switch.

The T825 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.

1. Although capable of operating over the 66-88MHz frequency range, the T825 has a 2MHz 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

Sensitivity and distortion figures are stated for both de-emphasised and flat audio responses under standard operating conditions. Note that the sensitivity and distortion figures will be degraded when flat audio is selected.

	Link PL210	Link PL220
De-emphasised Audio	1-2	2-3
Flat Audio	2-3	1-2

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
Supply Current:	
Standby	.. 350mA
Full Audio	.. 750mA
Operating Temperature Range	.. -30°C to +60°C
Dimensions:	
Height	.. 183mm
Width	.. 60mm
Length	.. 322mm
Weight	.. 2.13kg

1.2.3 RF Section

Frequency Range	.. 66-88MHz
Type	.. dual conversion superheterodyne
Frequency Increment	.. 5 or 6.25kHz
Switching Range	.. 2MHz (i.e. ± 1 MHz from the centre frequency)
Input Impedance	.. 50 ohms
Frequency Stability (see also Section 1.4)	.. ± 2.5 ppm, -30°C to +60°C (± 1 ppm available for special applications)
Signal Strength Indicator (RSSI)	.. -115dBm to -70dBm, 3.5 to 6.5V at approx. 15dB/V

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

IF Amplifiers:

Frequencies	.. 10.7MHz and 455kHz
Bandwidths-	
Narrow Bandwidth (NB)	.. 7.5kHz
Wide Bandwidth (WB)	.. 15kHz

Sensitivity (De-emphasised Response):

Single Channel	.. -117dBm
Bandsread (12dB Sinad)	.. -115dBm (across switching range)

Sensitivity (Flat Response):

Single Channel	.. -111dBm
Bandsread (12dB Sinad)	.. -109dBm (across switching range)

Signal+Noise To Noise Ratio (Typical):

	<u>De-emphasised</u>	<u>Flat</u>
RF Level -107dBm (CEPT)	.. 30dB (WB) 25dB (NB)	25dB (WB) 20dB (NB)
RF Level -83dBm (CEPT)	.. 50dB (NB)	45dB (NB)
RF Level -57dBm (EIA)	.. 55dB (WB)	52dB (WB)

Selectivity:

Narrow Bandwidth (± 12.5 kHz)	.. 90dB (CEPT)
Wide Bandwidth (± 25 kHz)	.. 95dB (EIA)

Offset Selectivity (Canada only)	.. 20dB
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Spurious Response Attenuation	.. 100dB EIA (typical)
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Intermodulation Response Attenuation:

Narrow Bandwidth	.. 80dB CEPT (typical)
Wide Bandwidth	.. 85dB EIA (typical)

Blocking	.. 100dB
----------	----------

Co-channel Rejection	.. 6dB
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Amplitude Characteristic	.. 3dB
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Spurious Emissions:

Conducted	.. -90dBm to 4GHz
Radiated	.. -57dBm to 1GHz -47dBm to 4GHz

1.2.4 Audio Section

1.2.4.1 General

Outputs Available	..	line and monitor
Frequency Response	..	flat or de-emphasised (750µs) (link selectable)
Flat Response:		
Bandwidth	..	67 to 3400Hz
Response	..	within +1, -2dB of output level at 1kHz
De-emphasised Response:		
Bandwidth	..	300 to 3400Hz
Response	..	within +1, -3dB of a 6dB/octave de-emphasis characteristic (ref. 1kHz)
Line Output:		
Power	..	adjustable to >+10dBm
Load Impedance	..	600 ohms
Distortion (@ -70dBm signal level):		
		<u>De-emphasised</u> <u>Flat</u>
Wide Bandwidth	..	≤2% ≤2%
Narrow Bandwidth	..	≤2% ≤4%
Monitor Output:		
Power	..	1W
Speaker Impedance	..	4 ohms
Distortion	..	≤3%
(@ -70dBm signal level, links set to de-emphasis)		

1.2.4.2 CTCSS

Linkable High Pass Filter:		
Bandwidth	..	350 to 3400Hz
Response	..	within +1, -3dB of level at 1kHz
Hum And Noise	..	30dB min. at 250.3Hz
(1kHz at 60% system deviation		35dB typical (67 to 240Hz)
CTCSS at 10% system deviation)		
Tone Detect:		
Tone Squelch Opening	..	better than 6dB sinad 3dB sinad at 250.3Hz (typical) 4dB sinad at 100Hz (typical)
Tone Detect Bandwidth	..	±2.1Hz accept (typical) ±3.0Hz reject (typical)
Response Time	..	150ms open and close (typical)

1.2.4.3 Mute Operation

Systems Available .. noise mute and carrier mute

Noise Mute:

Operating Range	.. 6-20dB sinad
Hysteresis	.. 1.5 to 6dB
Threshold	.. adjustable to -105dBm
Opening Time	.. 20ms
Closing Time	.. 50ms

Carrier Mute (Optional):

Operating Range	.. -115 to -80dBm
Hysteresis	.. 2 to 10dB
Opening Time	.. 5ms
Closing Time	.. 50ms

Note: The opening and closing times given above are for the standard set-up (SL210 linked and SL220 not linked - refer to Section 3.8).

1.2.5 Microcontroller

Auxiliary Ports:

Open Drain Type	.. capable of sinking 2.25mA via 2k2 Ω
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:

<u>T82</u>X -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- <u>X</u> X-XXXX	'1' for 66-88MHz
------------------------------	------------------

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

T82X-XX- <u>X</u> XXXX	'0' for wide bandwidth (25kHz)
	'5' for narrow bandwidth (12.5kHz)

Options

T82X-XX- <u>XXXX</u>	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 T825 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) ^a		66-88	
IF Bandwidth (kHz)		7.5	15
TCXO ^b	±2.5ppm -30°C to +60°C	●	●
Receiver Type: T825-		15-0000	10-0000

- a. Selectable by solder links - refer to Section 3.7.
- b. 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 receiver 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 receiver 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).

2 T825 Circuit Operation

This section provides a basic description of the circuit operation of the T825 receiver.

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

Refer 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.

Section	Title	Page
2.1	Introduction	2.3
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2.3	Mixer	2.5
2.4	IF Circuitry	2.5
2.5	Noise Mute (Squelch)	2.6
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2.7	Audio Processor	2.7
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Figure	Title	Page
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2.2	T825 Front End, IF and Mute Block Diagram	2.4
2.3	T825 Audio Processor Block Diagram	2.7
2.4	T825 Power Supply And Regulators Block Diagram	2.8
2.5	T825 Microcontroller Block Diagram	2.9
2.6	T825 Synthesiser Block Diagram	2.10

2.1 Introduction

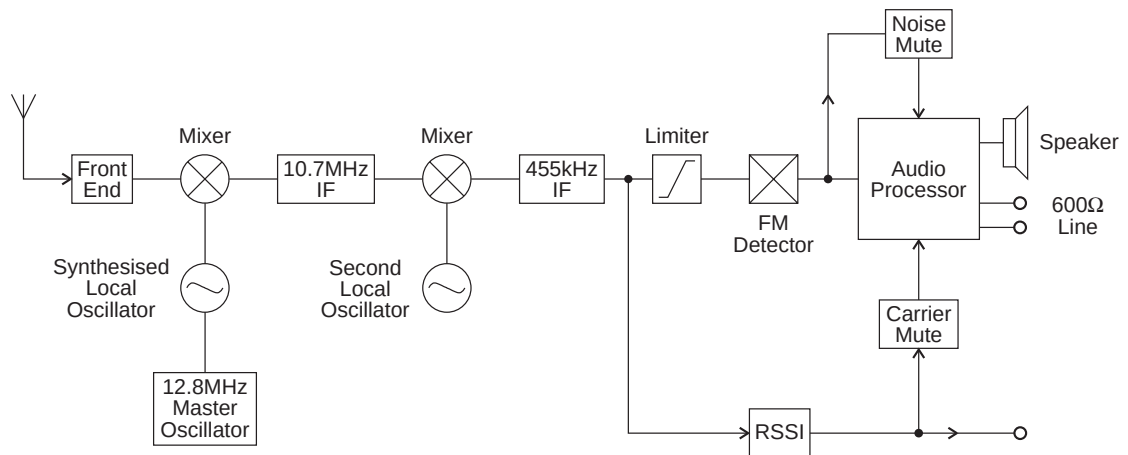


Figure 2.1 T825 High Level Block Diagram

The T825 receiver consists of a number of distinct stages:

- front end
- mixer
- synthesised local oscillator
- IF
- audio processor
- mute (squelch)
- regulator circuits
- received signal strength indicator (RSSI).

These stages are clearly identifiable in Figure 2.1. Refer to the circuit diagrams in Section 6 for further detail.

2.2 Receiver Front End

(Refer to the front end, IF section and audio processor circuit diagrams (sheets 4, 3 and 2 respectively) in Section 6.)

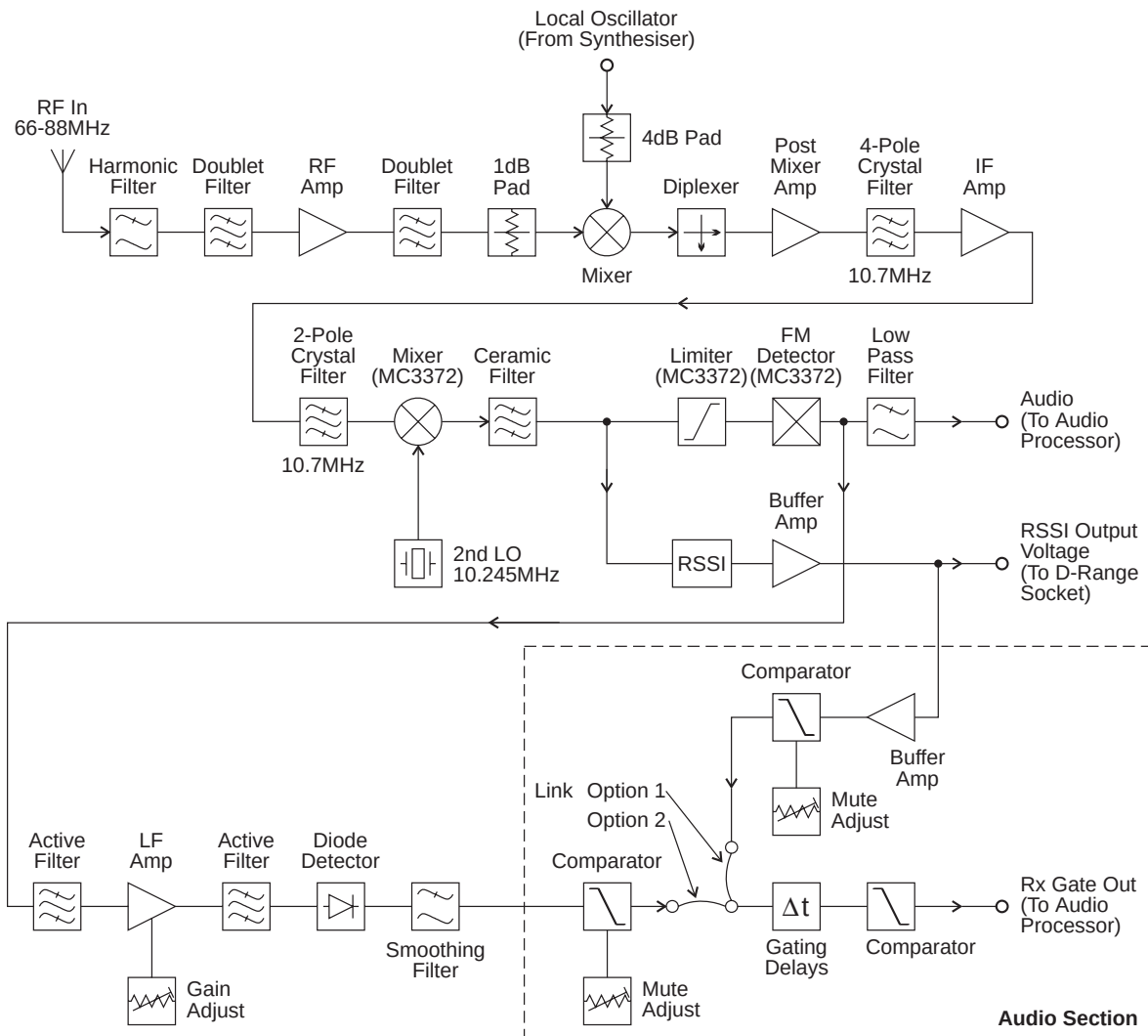


Figure 2.2 T825 Front End, IF and Mute Block Diagram

The incoming signal from the N-type antenna socket is fed through a 7-pole, low pass filter with a cut frequency of approximately 100MHz. This low loss filter (typically less than 0.5dB insertion loss over 66-88MHz) provides excellent immunity to interference from high frequency signals.

The signal is then further filtered, using a notched doublet (L410, L409) which provides exceptional image rejection, before being amplified by approximately 12dB (Q400). The signal is then passed through a further doublet (L403, L402) before being presented to the mixer via an attenuator pad (1dB for narrow bandwidth, 0dB for wide bandwidth).

Each sub-block within the front end has been designed with 50 ohm terminations for ease of testing and fault finding.

2.3 Mixer

(Refer to the front end circuit diagram (sheet 4) in Section 6 and Figure 2.2.)

IC410 is a high level mixer requiring a local oscillator (LO) drive level of +17dBm (nominal). The voltage controlled oscillator (VCO) generates a level of +22dBm (typical) and this is fed to the mixer via a 4dB attenuator pad. A diplexer terminates the IF port of the mixer in a good 50 ohms, thus preventing unnecessary intermodulation distortion.

2.4 IF Circuitry

(Refer to the IF section circuit diagram (sheet 3) in Section 6 and Figure 2.2.)

Losses in the mixer are made up for in a tuned, common gate, post mixer amplifier (Q302). Several stages of amplification and filtering are employed in the IF circuitry. The first crystal filter is a 4-pole device (&XF300 and &XF301) which is matched into 50 ohms on both its input and output ports. This stage is followed by a two-stage amplifier (designed as a 50 ohm block) and second crystal filter (2 pole, &XF302), after which the signal is mixed down to 455kHz with the second local oscillator (10.245MHz) by IC330.

The 455kHz signal is filtered using a six-pole ceramic filter (&XF304) before being limited and detected.

The second IF mixer, limiter, detector and RSSI is in a 16-pin IC (IC330). Quadrature detection is employed, using L330, and the recovered audio on pin 9 of IC330 is typically 1.0V p-p for 60% system deviation.

2.5 Noise Mute (Squelch)

(Refer to the audio processor and IF section circuit diagrams (sheets 2 and 3 respectively) in Section 6 and Figure 2.2.)

The noise mute operates on the detected noise outside the audio bandwidth. An operational amplifier in IC340 is used as an active band pass filter centred on 70kHz to filter out audio components. The noise spectrum is then further amplified in a variable gain, operational amplifier (IC340), followed by another active band pass filter. The noise is then rectified (D330) and filtered to produce a DC voltage proportional to the noise amplitude. The lowest average DC voltage corresponds to a high RF signal strength and the highest DC voltage corresponds to no signal at the RF input.

The rectified noise voltage is compared with a threshold voltage set up on RV230, the front panel "Gating Sensitivity" potentiometer. Hysteresis is introduced by the feedback resistor (R267) to prevent the received message from being chopped when the average noise voltage is close to the threshold. R281 and R280 determine the mute opening and closing times and, in combination with solder links SL210 and SL220, provide three time delay options (SL210 is linked as standard - refer to Section 3.8). The mute control signal at pin 1 of IC270 is used to disable the speaker and line audio outputs. The speaker output can be separately enabled for test purposes by operating the front panel mute disable switch, SW201.

2.6 Carrier Mute

(Refer to the audio processor and IF section circuit diagrams (sheets 2 and 3 respectively) in Section 6 and Figure 2.2.)

A high level carrier mute facility is also available. The RSSI (refer to Section 2.12) provides a DC voltage proportional to the signal strength. This voltage is compared with a preset level, set up on RV235, and may be linked into the mute timing circuit using PL250. PL250 selects either the noise mute or the carrier mute. From this point both the noise and carrier mute circuits operate in the same manner, using common circuitry.

2.7 Audio Processor

(Refer to the audio processor circuit diagram (sheet 2) in Section 6.)

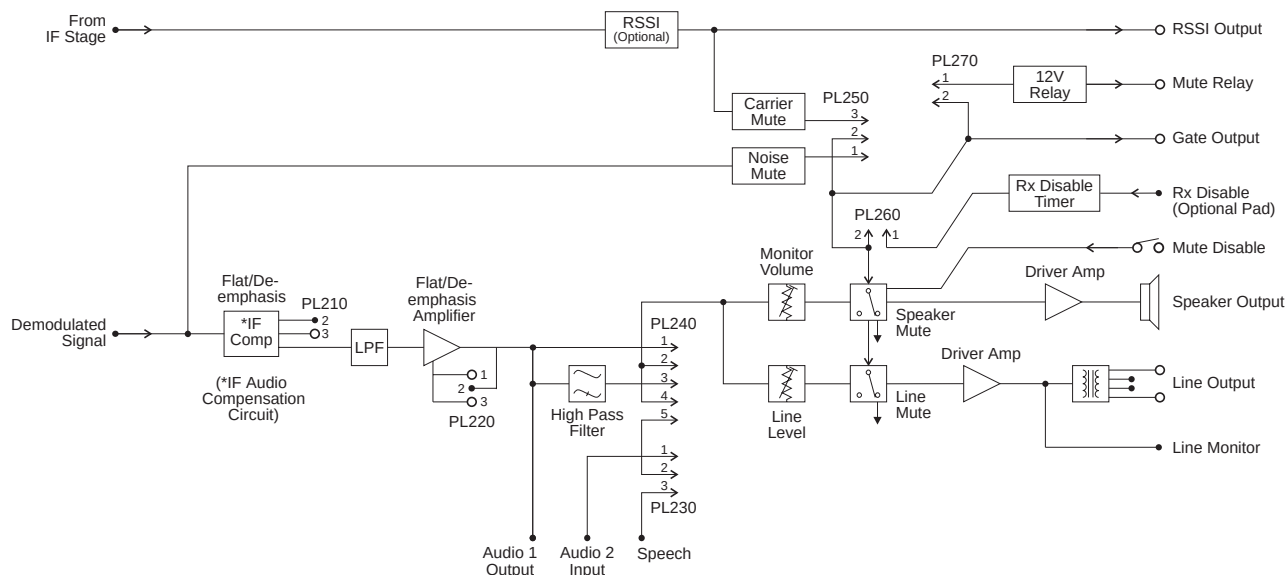


Figure 2.3 T825 Audio Processor Block Diagram

The recovered audio on pin 9 of IC330 is passed through a frequency compensation network and a third order elliptic active filter (IC210) to give the required response. Linking (PL220 & PL210) is available to give either a flat or de-emphasised audio response, with de-emphasis giving a 6dB/octave roll off. The output of IC210 is split to provide separate paths for the speaker and line outputs. The "Audio 1", Audio 2" and "Speech" lines allow access to the receiver's audio path for external signalling purposes (refer to Section 3.5).

The signals are passed to audio drive amplifiers IC240 and IC260. Under muted conditions the inputs of these amplifiers are shunted to ground via transistors Q230 and Q290 respectively. The audio output of IC240 has a DC component which is removed by C249, and this then drives a speaker directly. The output of IC260 is fed into a line transformer to provide a balanced 2-wire or 4-wire, 600 ohm output.

The speaker volume is set using the front panel "Monitor Volume" knob (RV205) and the line level is set using the recessed "Line Level" potentiometer (RV210).

The red front panel "Gate" LED (D250) indicates the status of the mute circuit. When a signal above the mute threshold is received, the LED is illuminated. The "Monitor Mute" switch (SW201) on the front panel opens the mute, allowing continuous monitoring of the audio signal (on = audio muted; off = audio unmuted).

The mute control line is available on pads 234 and 231 ("RX GATE OUT") for control of external circuitry. A high (9V) indicates that the audio is disabled and a low (0V) indicates that a signal above the mute threshold level is being received.

The audio can also be disabled using the "RX-DISABLE" inputs, pads 225 or 228, having connected the "RX-DISABLE" link between pins 1 & 2 of PL260. An adjustable time delay (RV220) is provided on these lines. In order to disable the audio, either pad must be pulled to 0V.

An undedicated relay is provided (RL210) for transmitter keying or other functions and this can be operated from the mute line by linking pins 1 & 2 of PL270.

2.8 Power Supply And Regulators

(Refer to the regulators circuit diagram (sheet 6) in Section 6.)

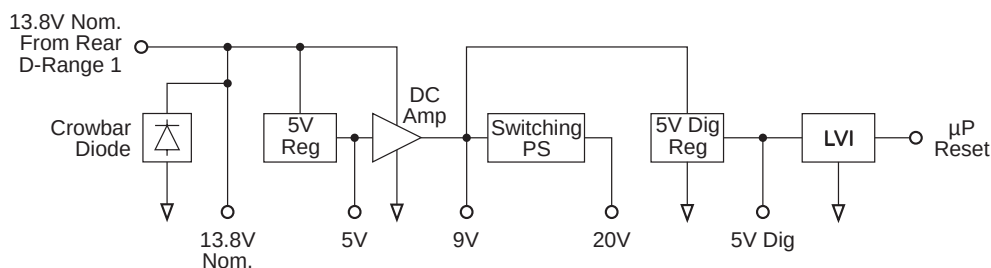


Figure 2.4 *T825 Power Supply And Regulators Block Diagram*

The T825 is designed to operate off a 10.8-16V DC supply (13.8V nominal). A 5.3V regulator (IC630) runs directly from the 13.8V rail, driving much of the synthesiser circuitry. It is also used as the reference for a DC amplifier (IC640, Q630 & Q620) which provides a medium current capability 9V supply.

A switching power supply, based on Q670 and Q660, runs off the 9V supply and provides a low current capability +20V supply. This is used to drive the synthesiser loop filter (IC740), giving a VCO control voltage of up to 20V.

The 13.8V supply drives both output audio amplifiers without additional regulation. A separate 5V regulator (IC610) drives the microprocessor and associated digital circuitry. The output of this regulator is monitored by the Low Voltage Interrupt (LVI) circuit (IC650).

A crowbar diode is fitted for protection against connection to a power supply of incorrect polarity. It also provides transient overvoltage protection.

Note: A fuse must be fitted in the power supply line for the diode to provide effective protection.

2.9 Microcontroller

(Refer to the microcontroller circuit diagram (sheet 8) in Section 6.)

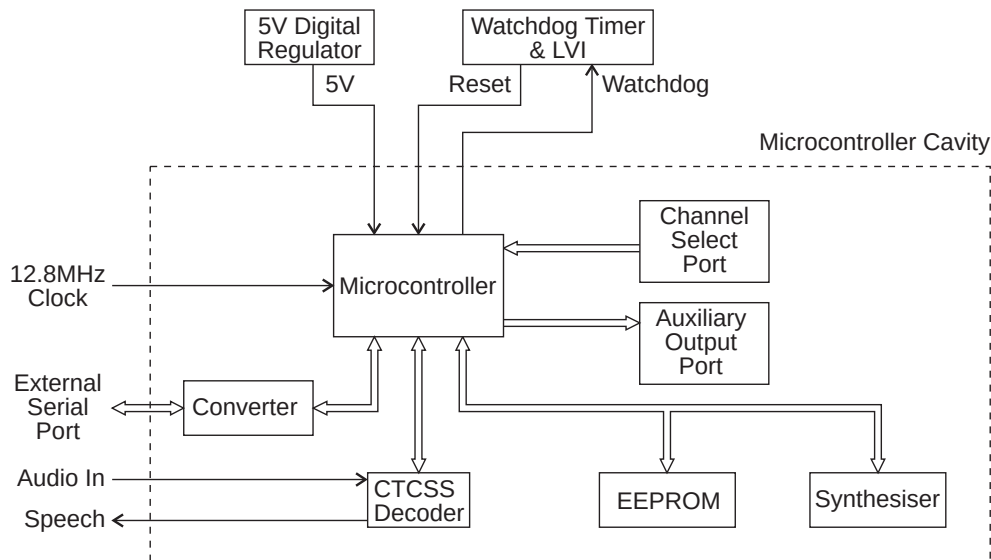


Figure 2.5 T825 Microcontroller Block Diagram

Overall system control of the T825 is accomplished by the use of a member of the 80C51 family of microcontrollers (IC810) which runs from internal ROM and RAM. Four ports are available for input/output functions.

Non-volatile data storage is achieved by serial communication with a 16kBit EEPROM (IC820). This serial bus is also used by the microcontroller to program the synthesiser (IC740).

The main tasks of the microcontroller are as follows:

- program the synthesiser;
- interface with the PGM800Win programming software at 9600 baud via the serial communication lines on D-range 1 (PL100) & D-range 2;
- monitor channel change inputs from D-range 2;
- generate timing waveforms for CTCSS detection;
- coordinate and implement timing control of the receiver;
- control the front panel "Supply" LED.

2.10 Synthesised Local Oscillator

(Refer to the synthesiser circuit diagram (sheet 7) in Section 6 and the VCO circuit diagram in Part E.)

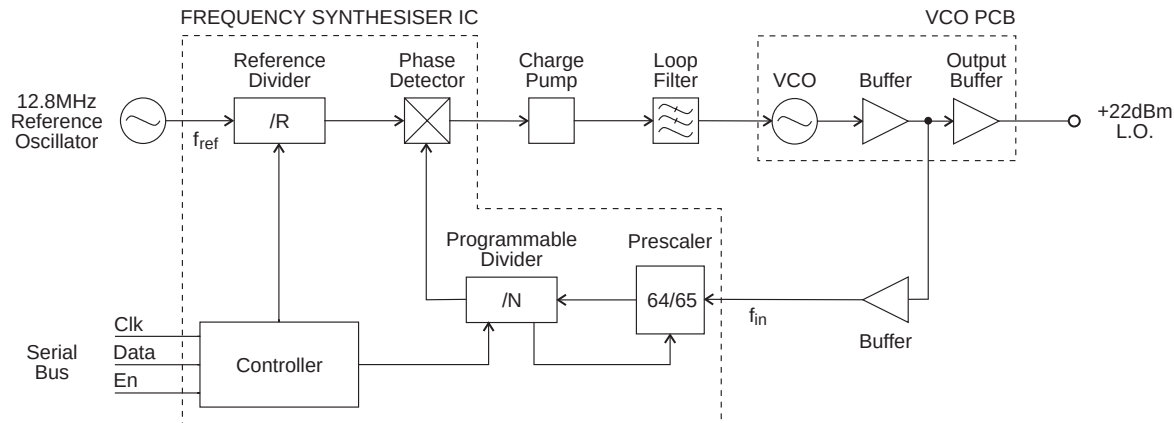


Figure 2.6 T825 Synthesiser Block Diagram

The synthesiser (IC740) employs a phase-locked loop (PLL) to lock a voltage controlled oscillator (VCO) to a given reference frequency. The synthesiser receives the divider information from the control microprocessor via a 3-wire serial bus (clock, data, enable). When the data has been latched in, the synthesiser processes the incoming signals from the VCO buffer (f_{in}) and the reference oscillator (f_{ref}).

A reference oscillator at 12.8MHz (=IC700) is buffered (IC710) and divided down to 6.25kHz or 5kHz within the synthesiser IC (IC740).

A buffered output of the VCO is divided with a prescaler and programmable divider which is incorporated into the synthesiser chip (IC740). This signal is compared with the reference signal at the phase detector (also part of the synthesiser chip). The phase detector outputs drive a balanced charge pump circuit (Q760, Q770, Q775, Q780, Q785) and active loop filter (IC750, Q790) which produces a DC voltage between 0V and 20V to tune the VCO. This VCO control line is further filtered (R510, C505) to attenuate noise and other spurious signals. Note that the VCO frequency increases with increasing control voltage.

2.11 VCO

(Refer to the VCO circuit diagram in Part E.)

The VCO transistor (Q1) operates in a common source configuration, with an LC tank circuit coupled between its gate and drain to provide the feedback necessary for oscillation. The VCO control voltage from the loop filter (IC750) is applied to the varicaps (D1-D6) to facilitate tuning within a 2MHz band of frequencies. A trimcap (&VC1-RX) is used for coarse tuning of the VCO. The output from the oscillator circuit drives a cascode amplifier stage (Q2, Q3) which supplies +10dBm (typically) to a further stage of amplification, Q5. This is the final amplifier on the VCO PCB, and delivers +22dBm (typically) to the receiver mixer input pad.

A low level "sniff" is taken from the input to Q5 and used to drive the divider buffer for the synthesiser (IC740).

The VCO operates at the actual frequency required by the first mixer, i.e. there are no multiplier stages.

The VCO frequency spans from 76.7-98.7MHz and is tuned to 10.7MHz above the desired receive frequency (high side injection) to produce a 10.7MHz IF signal at the output of the mixer.

2.12 Received Signal Strength Indicator (RSSI)

(Refer to the IF section circuit diagram (sheet 3) in Section 6.)

The RSSI provides a DC voltage proportional to the signal level at the receiver input and is an on-chip function of IC330. RSSI level adjustment, temperature compensation and buffering is provided by IC332 and IC333. The RSSI voltage is available at D-range 1 (PL100 pin 5).

The RSSI also provides the capability for high level signal strength muting, which may be selected on PL250 (refer to Section 3.5). The mute threshold may be set between -115dBm and -70dBm at RV235.

3 T825 Initial Tuning & Adjustment



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 section describes both short and full tuning and adjustment procedures and provides information on:

- channel programming
- selecting the required audio links
- synthesiser alignment
- receiver front end and IF alignment
- noise and carrier level mute adjustment
- setting the line and monitor output levels
- setting up the RSSI.

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

Refer 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.

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3.4	Short Tuning Procedure	3.5
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3.4.5	Line Amplifier Output	3.6
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3.7	Alignment Of Receiver Front End And IF	3.10
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Figure	Title	Page
3.1	T825 Test Equipment Set-up For Short Tuning Procedure	3.4
3.2	T825 Test Equipment Set-up For Full Tuning & Adjustment Procedure	3.4

3.1 Introduction

When you receive your T825 receiver it will be run up and working on a particular frequency (the "default channel")¹. If you want to switch to a frequency that is within the 2MHz switching range (i.e. ± 1 MHz from the factory programmed frequency), you should only need to reprogram the receiver with the PGM800Win software (refer to the PGM800Win programming kit and Section 3.2 below).

However, if you want to switch to a frequency outside the 2MHz switching range, you will have to reprogram and re-tune the receiver to ensure correct operation. In this case you should carry out the short tuning procedure described in Section 3.4.

If you have carried out repairs or other major adjustments, you must carry out the full tuning and adjustment procedure described in this section (except for Section 3.4).

3.2 Channel Programming

You can program up to 128 channel frequencies into the receiver's EEPROM memory (IC820) by using the PGM800Win software package and an IBMTM PC. You can also use PGM800Win to select the receiver's current operating frequency (or "default channel").

If the receiver is installed in a rack frame, you can program it via the programming port in the speaker panel. However, you can also program the receiver before it is installed in a rack frame as follows:

- by using a T800-01-0010 calibration test unit;
- via D-range 1;
- via D-range 2 (standard T800-03-0000 auxiliary D-range only);
- via SK805 (internal Micromatch connector).

If you do not use the T800-01-0010, you will have to connect the PC to the receiver via a module programming interface (such as the T800-01-0004).

For a full description of the channel programming procedure, refer to the PGM800Win programming software user's manual.

Note: When an auxiliary D-range kit (D-range 2 - T800-03-0000) is fitted, you can also select a channel with an external switch, such as the DIP switch on the rack frame backplane PCB. Refer to Part C in the T800 Series Ancillary Equipment Service Manual (M800-00-101 or later issue) or consult your nearest Tait Dealer or Customer Service Organisation for further details.

1. Use the "Read Module" function in PGM800Win to find out what the default channel is.

3.3 Test Equipment Required

You will need the following test equipment:

- computer with PGM800Win installed
 - T800 programming kit
 - module programming interface (e.g. T800-01-0004 - optional)
 - 13.8V power supply
 - digital multimeter
 - audio signal generator
 - RF signal generator
 - audio voltmeter
 - sinad meter
 - oscilloscope
 - distortion meter
 - T800-01-0010 calibration test unit (optional)
 - 4Ω speaker (not needed if the calibration test unit is used)
- } or RF test set (optional)
- } not needed for short tuning procedure

Figure 3.1 and Figure 3.2 show typical test equipment set-ups (with and without a T800-01-0010 calibration test unit).

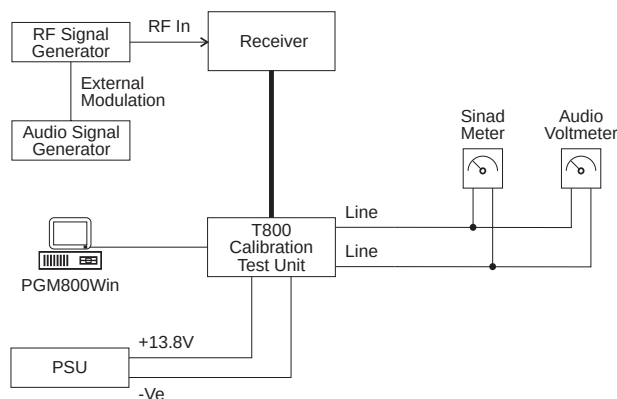


Figure 3.1 T825 Test Equipment Set-up For Short Tuning Procedure

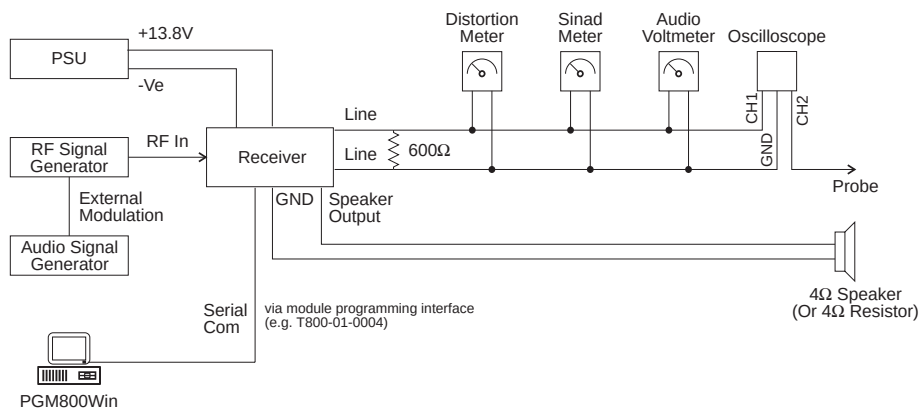


Figure 3.2 T825 Test Equipment Set-up For Full Tuning & Adjustment Procedure

3.4 Short Tuning Procedure

Use this procedure only if you want to reprogram the receiver to a frequency outside the 2MHz switching range and do not intend to carry out any other major adjustments or repairs.

3.4.1 Introduction

Reprogram the operating frequency as described in the PGM800Win programming kit (refer to Section 3.2).

Remove the top cover (nearest the handle).

Set up the test equipment as described in Section 3.3.

Set the links in the audio processor section as required (refer to Section 3.5).

3.4.2 Synthesiser Alignment

- Connect a high impedance voltmeter to PL4-1 or the junction of L1 & R1 in the VCO (this measures the synthesiser loop voltage).
- **Single Channel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V.
- **Multichannel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V on the middle channel.
If there is no middle channel, tune &VC1-RX so that the channels are symmetrically placed around a loop voltage of 9V.
All channels should lie within the upper and lower limits of 13V and 5V respectively.
Do not attempt to program channels with a greater frequency separation than the specified switching range of 2MHz.

3.4.3 Front End Alignment

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

Note 2: For multichannel operation align the receiver on a frequency in the middle of the required band.

Set RV230 (front panel gating sensitivity) fully clockwise.

Inject a strong on-channel RF signal with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz into the antenna socket and adjust front end doublets L410, L409, L403 & L402 to give best sinad.

Continually decrease the RF level to maintain 12dB sinad.

Readjust L410, L409, L403 & L402 to give best sinad.

With PL210 and PL220 connected for de-emphasised audio response, the receiver sensitivity should be better than -117dBm , assuming that the audio levels are not being overdriven (refer to Section 3.4.5).

3.4.4 Mute Adjustment

Carry out the one of the following sets of instructions according to the mute option you have selected.

3.4.4.1 Noise Mute

Connect pins 1 & 2 of PL250 to enable the noise mute.

Set the RF level to -105dBm with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz .

Set RV230 (front panel gating sensitivity) fully anticlockwise.

Adjust RV331 (noise mute gain) fully anticlockwise to close the mute (if necessary turn off the RF signal and then turn it on again).

Rotate RV331 clockwise until the mute just opens.

Reset the signal generator for the required opening sinad and adjust RV230 clockwise until the mute just opens.

3.4.4.2 Carrier Level Mute

Connect pins 2 & 3 of PL250 to enable the carrier mute and disable the noise mute.

Apply an on-channel signal from the RF generator at the required mute opening level with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz .

Adjust RV235 (carrier mute) clockwise to close the mute (if necessary, momentarily turn off the RF), then slowly adjust it anticlockwise until the mute just opens. The mute should now open at this preset level.

3.4.5 Line Amplifier Output

Apply an on-channel signal from the RF generator at a level of -70dBm with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz .

Adjust RV210 (front panel line level) to set the line level to the required output level.

3.4.6 CTCSS

3.4.6.1 Decoder Operation

Program a CTCSS tone on the default channel using PGM800Win.

Set the RF signal generator output to -70dBm.

Modulate the generator with both:

- a 1kHz tone at $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$];
- and a CTCSS tone at the programmed frequency at $\pm 500\text{Hz}$ deviation [$\pm 300\text{Hz}$].

Check that the receiver gate opens and the front panel "Gate" LED is on.

3.4.6.2 Opening Sinad

Ensure a CTCSS tone is present (as described in Section 3.4.6.1).

Adjust RV230 (front panel gating sensitivity) fully clockwise.

Reduce the RF signal level to -110dBm.

Observe the sinad meter and reduce the RF level until the receiver mute closes.

Slowly increase the signal level until the receiver mute just opens and stays open.

With PL240 pins 1 & 2 linked (high pass filter bypassed), check that the sinad is less than 6dB.

Reset the signal generator for the required opening sinad, adjust RV230 fully anti-clockwise, then clockwise until the mute just opens.

3.4.6.3 High Pass Filter

Ensure a CTCSS tone is present (as described in Section 3.4.6.1).

Set the audio processor links as follows:

Plug	Link	Function
PL210	1 - 2	de-emphasised response
PL220	2 - 3	
PL230	2 - 3	audio from internal CTCSS speech filter
PL240	4 - 5	audio input via PL230 or I/O pad

Reset the RF signal generator output to -70dBm and note the line level (measurement A).

Reduce the 1kHz generator to zero output and measure the line level again (measurement B).

Check that measurement B is at least 30dB below measurement A.

3.4.7 RSSI (If Used)

Align the receiver as instructed in Section 3.6 and Section 3.7.

Apply an on-channel signal from the RF generator at a level of -100dBm with ± 3 kHz deviation [± 1.5 kHz] at 1kHz.

Adjust RV330 (RSSI level) to give 4.5V RSSI output on pin 5 of D-range 1 (PL100) when measured with a high impedance DMM.

3.5 Audio Processor Links

3.5.1 General

Use the following table to set up the audio processor to the configuration you require. You should set the audio processor links before carrying out the receiver alignment. The factory settings are shown in brackets [].

Plug	Link	Function
PL210	[1 - 2] 2 - 3	de-emphasised response flat response
PL220	1 - 2 [2 - 3]	flat response de-emphasised response
PL230 ^a	1 - 2 [2 - 3] 3 - 4	audio input via AUDIO-2 pad audio from internal CTCSS speech filter audio input via I/O pad P250
PL240 ^a	1 - 2 [2 - 3] or 3 - 4 4 - 5	bypass high pass filter 300Hz high pass filter in circuit audio input via PL230 or I/O pad
PL250	[1 - 2] 2 - 3	noise mute carrier mute
PL260	1 - 2 [2 - 3]	RX-DISABLE link not connected

Plug	Link	Function
PL270	[1 - 2] 2 - 3	relay link not connected

- a. Refer to Section 3.5.2 for further details.

3.5.2 Audio Processor Linking Details For CTCSS

You must connect the audio processor links correctly according to the CTCSS option used, as shown in the table below.

CTCSS Option	PL230	PL240
standard, no CTCSS	2 - 3	2 - 3
received CTCSS + speech passed to line output	3 - 4	1 - 2
high pass filtered speech, internal CTCSS detection	2 - 3	4 - 5
external CTCSS detection	1 - 2	4 - 5

The conditions stated in the above table are defined as follows:

- standard, no CTCSS
 - no CTCSS or other sub-audio signalling used
 - audio bandwidth 300Hz to 3kHz
 - hum & noise -55dB
- received CTCSS tone + speech to line output
 - tone and speech transmitted down 600 ohm line
 - audio bandwidth 10Hz to 3kHz
 - hum & noise -45dB
- high pass filtered speech + internal CTCSS detection
 - 400Hz to 3kHz
 - hum & noise -30dB with 250.3Hz tone present
- external CTCSS detection
 - decoding performed through the receiver (but externally)
 - speech injected back into receiver via "AUDIO-2" and sent down 600 ohm line

Note 1: AUDIO-2 is available on D-range 1 (PL100) pin 7 via the link resistor R160. Although PL100 pin 7 is already assigned to SERIAL-COM, this can be disabled by removing R808.

Note 2: External CTCSS units can connect in series with the audio chain via AUDIO-1 and AUDIO-2.

3.6 Synthesiser Alignment

- Ensure that the receiver has been programmed with the required frequencies using PGM800Win software.
- Connect a high impedance voltmeter to PL4-1 or the junction of L1 & R1 in the VCO (this measures the synthesiser loop voltage).
- **Single Channel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V.
- **Multichannel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V on the middle channel.
If there is no middle channel, tune &VC1-RX so that the channels are symmetrically placed around a loop voltage of 9V.
All channels should lie within the upper and lower limits of 13V and 5V respectively.
Do not attempt to program channels with a greater frequency separation than the specified switching range of 2MHz.
- The TCXO (=IC700) output frequency should be trimmed when the IF is tuned - refer to Section 3.7.

3.7 Alignment Of Receiver Front End And IF

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

Note 2: Before carrying out this alignment procedure, check that the solder links in the receiver front end are set as described in the following table:

Frequency Range	Linked	Not Linked
66-76MHz	#SL400 #SL402 #SL403 #SL405	#SL401 #SL404
76-88MHz	#SL401 #SL404	#SL400 #SL402 #SL403 #SL405

Align the synthesiser as instructed in Section 3.6. For multichannel operation align the receiver on a frequency in the middle of the required band.

Set RV230 (front panel gating sensitivity) fully clockwise.

Inject a strong on-channel RF signal with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz into the antenna socket and adjust front end doublets L410, L409, L403 & L402 to give best sinad.

Continually decrease the RF level to maintain 12dB sinad.

Tune quad coil L330 for maximum audio level.

While maintaining a low level unmodulated RF input to the receiver, loosely couple into the first IF an additional high level signal at 10.7MHz - you will hear a beat note.

Trim the synthesiser TCXO (=IC700) for zero beat.

Note: If a second oscillator is not available, you can connect a frequency counter to IC710 pin 6 (i.e. after the TCXO buffer) via an oscilloscope probe to measure the TCXO frequency directly (12.8MHz). At this point the voltage level is approximately 4V p-p.

Readjust L410, L409, L403 & L402 to give best sinad.

Change the RF signal level to -70dBm and modulate with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz .

Connect plugs PL210 and PL220 to give a flat audio response (refer to Section 3.5).

Adjust quad coil L330 and CV300 for minimum audio distortion.

Check that the distortion reading is:

wide bandwidth	$\leq 2\%$
narrow bandwidth	$\leq 4\%$

If required, reconnect plugs PL210 and PL220 to give a de-emphasised audio response and check that the distortion reading is $\leq 2\%$ (both bandwidths).

Reduce the RF level until 12dB sinad is reached. The receiver sensitivity should be better than -117dBm (de-emphasised) or -111dBm (flat), assuming that the audio levels are not being overdriven (refer to Section 3.11).

3.8 Gating Delay

Two solder links (SL210 & SL220) are provided on the top of the PCB to allow three gate delay time options, as shown in the table below.

SL210	SL220	Closing Delay
linked	not linked	<50ms*
not linked	linked	<25ms
not linked	not linked	<20ms

*Factory setting.

3.9 Noise Mute Adjustment

Connect pins 1 & 2 of PL250 to enable the noise mute.

Align the receiver as instructed in Section 3.6 and Section 3.7.

Set the RF level to -105dBm with ± 3 kHz deviation [± 1.5 kHz] at 1kHz.

Set RV230 (front panel gating sensitivity) fully anticlockwise.

Adjust RV331 (noise mute gain) fully anticlockwise to close the mute (if necessary turn off the RF signal and then turn it on again).

Rotate RV331 clockwise until the mute just opens.

Reset the signal generator for the required opening sinad and adjust RV230 clockwise until the mute just opens.

3.10 Carrier Level Mute

Connect pins 2 & 3 of PL250 to enable the carrier mute and disable the noise mute.

Apply an on-channel signal from the RF generator at the required mute opening level with ± 3 kHz deviation [± 1.5 kHz] at 1kHz.

Adjust RV235 (carrier mute) clockwise to close the mute (if necessary, momentarily turn off the RF), then slowly adjust it anticlockwise until the mute just opens. The mute should now open at this preset level.

3.11 Audio Processor

3.11.1 Line Amplifier Output

Apply an on-channel signal from the RF generator at a level of -70dBm with $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$] at 1kHz.

Adjust RV210 (front panel line level) to give an output of +10dBm on the 600 ohm line.

Check for any clipping or distortion on the oscilloscope.

Set the line level to the required output level.

3.11.2 Monitor Amplifier Output (Speaker Output)

Adjust RV205 (front panel monitor volume) to give an output of 2V rms into a 4 ohm resistive load.

Check for any clipping or distortion on the oscilloscope.

Switch to a 4 ohm speaker and adjust RV205 to the required level.

3.12 CTCSS

3.12.1 Decoder Operation

Program a CTCSS tone on the default channel using PGM800Win.

Set the RF signal generator output to -70dBm.

Modulate the generator with both:

- a 1kHz tone at $\pm 3\text{kHz}$ deviation [$\pm 1.5\text{kHz}$];
- and a CTCSS tone at the programmed frequency at $\pm 500\text{Hz}$ deviation [$\pm 300\text{Hz}$].

Check that the receiver gate opens and the front panel "Gate" LED is on.

3.12.2 Opening Sinad

Ensure a CTCSS tone is present (as described in Section 3.12.1).

Adjust RV230 (front panel gating sensitivity) fully clockwise.

Reduce the RF signal level to -110dBm.

Observe the sinad meter and reduce the RF level until the receiver mute closes.

Slowly increase the signal level until the receiver mute just opens and stays open.

With PL240 pins 1 & 2 linked (high pass filter bypassed), check that the sinad is less than 6dB.

Reset the signal generator for the required opening sinad, adjust RV230 fully anti-clockwise, then clockwise until the mute just opens.

3.12.3 High Pass Filter

Ensure a CTCSS tone is present (as described in Section 3.12.1).

Set the audio processor links as follows:

Plug	Link	Function
PL210	1 - 2	de-emphasised response
PL230	2 - 3	audio from internal CTCSS speech filter
PL240	4 - 5	audio input via PL230 or I/O pad

Reset the RF signal generator output to -70dBm and note the line level (measurement A).

Reduce the 1kHz generator to zero output and measure the line level again (measurement B).

Check that measurement B is at least 30dB below measurement A.

3.13 RSSI

Align the receiver as instructed in Section 3.6 and Section 3.7.

Apply an on-channel signal from the RF generator at a level of -100dBm with ± 3 kHz deviation [± 1.5 kHz] at 1kHz.

Adjust RV320 (RSSI level) to give 4.5V RSSI output on pin 5 of D-range 1 (PL100) when measured with a high impedance DMM.

6 T825 PCB Information

**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.

This section provides the following information on the T825 receiver:

- parts lists
- grid reference index
- PCB layouts
- circuit diagrams.

Section	Title	IPN	Page
6.1	Introduction		6.1.3
6.2	T825 Receiver PCB	220-01446-03	6.2.1

6.1 Introduction

Product Type Identification

You can identify the receiver type by checking the product code printed on a label on the rear of the chassis (product codes are explained in Section 1.3 in this Part of the manual, and Figure 1.1 in Part A shows typical labels). You can further verify the receiver type by checking the placement of an SMD resistor in the table that is screen printed onto the top side of the PCB, similar to the example drawn below. In this example, the resistor indicates that the product was built as a T825-10-XXXX.

■ ■ 825- ■ ■ 825- ■ ■ 825- PRODUCT TYPE	PRODUCT TYPE	
	■ ■ 825-10	■ ■ 825-
	■ ■ 825-	■ ■ 825-
	■ ■ 825-15	■ ■ 825-

Note: The only function of this resistor is to indicate the product type. It has no effect on the circuitry or operation of the receiver.

PCB Identification

All PCBs are identified by a unique 10 digit “internal part number” (IPN), e.g. 220-12345-00, which is screen printed onto the PCB (usually on the top side), as shown in the example below:



The last 2 digits of this number define the issue status, which starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are “internal part numbers” (IPNs). We can process your spare parts orders more efficiently and accurately if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:

circuit reference - lists components in alphanumeric order

Ref	Var	IPN	Description
C126		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C127		020-09220-01	CAP ELECT RADL 220M 16V 10X12.5MM
C128		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C129		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
&C130	10	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	15	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
&C130	20	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	25	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C131		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C132		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C133		015-05470-08	CAP CER 1206 CHIP 47N 10% X7R 50V

variant column - indicates that this is a variant component which is fitted only to the product type listed

description - gives a brief description of the component

Internal Part Number - order the component by this number

The mechanical and miscellaneous section lists the variant and common parts in IPN order.

Parts List Amendments

At the front of the parts list is the Parts List Amendments box (an example of which is shown below). This box contains a list of component changes which took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order. The number in brackets at the end of each entry refers to the Tait internal Change Order document.

IPN of new component

Change Order number

Parts List Amendments	
R306	Changed from 180Ω to 560Ω (036-13560-00) to increase sensitivity (71003).

circuit reference or IPN

description of change

Variant Components

A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term “variant” is also used to describe components unplaced in one product. Variant components have a character prefix, such as “&”, “=” or “#”, before the circuit reference (e.g. &R100).

The table below explains the variant prefixes used in T800 Series II products:

If the variant prefix is . . .	the component will. . .
&	change according to channel spacing
=	change according to frequency stability
#	change according to frequency range
%	change or be placed/unplaced for special applications
*	be unplaced in one product (where two products share the same PCB)

Grid Reference Index

This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:

Device	PCB	Circuit
C126	2:A6	2-R7
C127	1:A8	2-P4
C128	2:B7	2-P2
C129	2:C12	2-E3
&C130	2:D8	2-B8
C131	2:C9	2-H6
C132	2:D8	2-B8
C133	2:D6	2-E1

components listed in alphanumeric order

PCB layout reference
circuit diagram reference

component location on the sheet

sheet number

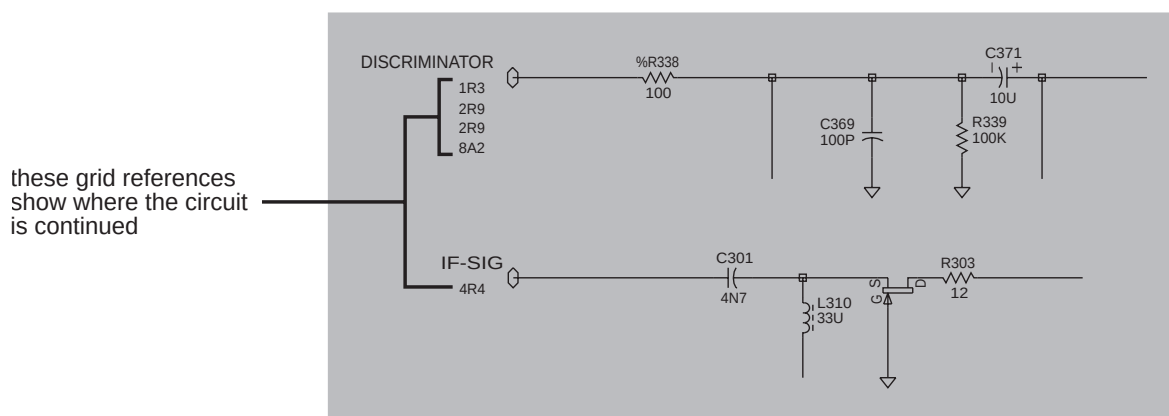
component location on the layer

layer number -
1 = top side layer
2 = bottom side layer

Using CAD Circuit Diagrams

Reading a CAD circuit diagram is similar to reading a road map, in that both have an alphanumeric border. The circuit diagrams in this manual use letters to represent the horizontal axis, and numbers for the vertical axis. These circuit diagram “grid references” are useful in following a circuit that is spread over two or more sheets.

When a line representing part of the circuitry is discontinued, a reference will be given at the end of the line to indicate where the rest of the circuitry is located, as shown below. The first digit refers to the sheet number and the last two characters refer to the location on that sheet of the continuation of the circuit (e.g. 1R3).



6.2 T825 Receiver PCB

This section contains the following information.

IPN	Section	Page
220-01446-03	Parts List	6.2.3
	Mechanical & Miscellaneous Parts	6.2.9
	Grid Reference Index	6.2.11
	PCB Layout - Top Side	6.2.15
	PCB Layout - Bottom Side	6.2.16
	Receiver Overview Diagram	6.2.17
	Audio Processor Circuit Diagram	6.2.18
	IF Section Circuit Diagram	6.2.19
	Front End Circuit Diagram	6.2.20
	VCO Section Circuit Diagram	6.2.21
	Regulators Circuit Diagram	6.2.22
	Synthesiser Circuit Diagram	6.2.23
	Microcontroller Circuit Diagram	6.2.24
	Harmonic Filter Circuit Diagram	6.2.25

T825 Parts List (IPN 220-01446-03)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A number in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The miscellaneous and mechanical section lists the variant and common parts in IPN order. Where possible, a number in the legend column indicates their position in the mechanical assembly drawing.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Parts List Amendments - Continued

This page is provided for entering future amendments to the parts list.

Ref	Var	IPN	Description	Ref	Var	IPN	Description
C201		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C348		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C203		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C349		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C205		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C350		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C207		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	C351		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C209		016-08470-03	CAP SMD ELEC 47mF 20% 25v 8.3m	C352		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C210		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C353		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C211		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C354		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C212		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C355		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C213		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C357		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C215		015-21220-01	CAP CER 0805 2P2+-1/4P NPO 50V	C358		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C217		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C359		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C219		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C360		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C221		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C361		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C222		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C362		014-08100-00	CAP TANT CHIP 10M 16VW +20%
C223		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C363		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C225		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C364		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C227		015-23100-01	CAP CER 0805 100P 5% NPO 50V	C365		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C229		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C366		014-08100-00	CAP TANT CHIP 10M 16VW +20%
C231		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C367		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C233		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C400		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C235		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C401		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C237		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C402		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C238		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C403		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C239		016-09100-05	CAP SMD ELECT 100U 25V 20%	C404		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C240A		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C405		015-23470-08	CAP CER 0805 470P 10% X7R 50V
C240B		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C408		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C240C		016-09220-01	CAP SMD ELECT 220U 35V 20%	C409		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C249		016-09470-01	LJCAP ELECT 470U 20% SMD	C410		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C251		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C411		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C253		016-09100-05	CAP SMD ELECT 100U 25V 20%	C412		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C255		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C416		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C257		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C417		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C259		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C418		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C260A		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C419		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C260B		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C420		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C260C		016-09220-01	CAP SMD ELECT 220U 35V 20%	C424		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C261		016-09100-05	CAP SMD ELECT 100U 25V 20%	C425		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C262		016-09100-05	CAP SMD ELECT 100U 25V 20%	C426		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C264		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C427		015-05470-08	CAP CER 1206 47N 10% X7R 50V
C266		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C428		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C268		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C432		015-22820-01	CAP CER 0805 82P 5% NPO 50V
C270		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C433		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C272		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C434		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C273		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C435		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C274		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C436		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C276		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C440		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C278		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C441		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C280		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C442		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C286		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C443		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C300		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C444		015-22270-01	CAP CER 0805 27P 5% NPO 50V
CV300		028-01500-01	CAP TRM 1.5/5P NPO TOP ADJ	C448		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C301		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C449		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C302		015-22560-01	CAP CER 0805 56P 5% NPO 50V	C450		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C303		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C505		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C304		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C515		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C305		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C530		014-08220-01	(L)CAP TANT 22UF10V276MSER
C306		015-22390-01	CAP CER 0805 39P 5% NPO 50V	C535		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C307		015-23120-01	CAP CER 0805 120P 5% NPO 50V	C610A		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C308		015-23100-01	CAP CER 0805 100P 5% NPO 50V	C610B		014-09100-00	CAP TANT SMD 100U 16V 20%
&C309	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C611A		014-09100-00	CAP TANT SMD 100U 16V 20%
&C309	15	015-22220-01	CAP CER 0805 22P 5% NPO 50V	C611B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C310	10	015-21180-01	CAP CER 0805 1P8+-1/4P NPO 50V	C623		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C310	15	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C625		020-09470-07	CAPEL470M16V20%V 8*20 3.5L.ESR
&C311	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
&C311	15	015-22220-01	CAP CER 0805 22P 5% NPO 50V	C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C312		015-23100-01	CAP CER 0805 100P 5% NPO 50V	C630		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C313		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C631A		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C314		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C631B		014-08100-03	CAP TANT SMD 10U 35V 20%
C315		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C637		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C316		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C640		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C317		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C650		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C318	10	015-23120-01	CAP CER 0805 120P 5% NPO 50V	C651		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C318	15	015-23100-01	CAP CER 0805 100P 5% NPO 50V	C658		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C319	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C660		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C319	15	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C665		014-08100-03	CAP TANT SMD 10U 35V 20%
C320		015-22270-01	CAP CER 0805 27P 5% NPO 50V	C670		014-07330-10	CAP TANT SMD 3U3 35V 10%
C321		015-23330-08	CAP CER 0805 330P 10% X7R 50V	C673		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
&C325	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V	C677		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
&C325	15	015-22270-01	CAP CER 0805 27P 5% NPO 50V	C681		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C326	10	015-22220-01	CAP CER 0805 22P 5% NPO 50V	C684		014-08100-03	CAP TANT SMD 10U 35V 20%
C327		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C687		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C329		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C690		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C330		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C693		014-08100-03	CAP TANT SMD 10U 35V 20%
C331		015-22560-01	CAP CER 0805 56P 5% NPO 50V	C700		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C332		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C702		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C333		014-07470-03	L) CAP TANT SMD 4U7 35V 20%	C703		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C334		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C705		015-21820-02	LJCAP 0805 8P2 15 NPO 50V
C335		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C707		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C336		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C708		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C337		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C709		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
C338		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C710A		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
C339		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V	C710B		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C340		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C710C		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C341		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C711		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C342		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C712		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C343		015-22560-01	CAP CER 0805 56P 5% NPO 50V	C713		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C344		015-22560-01	CAP CER 0805 56P 5% NPO 50V	C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C345		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V

Ref	Var	IPN	Description	Ref	Var	IPN	Description
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V	IC630		002-12523-17	(S)IC LM317L REG TO-252 0.5A
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP
C741A		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	=IC700	10	539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
C742A		015-26100-08	CAP CER 0805 100N 10% X7R 50V	=IC700	15	539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC710		002-74900-04	S) IC SMD 74HC04D 6X INV BUFFD
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V	IC740		002-14519-10	S) IC MC145191F SMD SYNTH
C745		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
C750		014-08100-03	CAP TANT SMD 10U 35V 20%	IC820		002-12416-00	S)IC SMD AT24C16N-10SC EEPROM
C757		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC830		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C759		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC840		002-10040-53	S)MC14053B SMD BREAK B4 MAKE
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC850		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C762		014-08220-01	(L)CAP TANT 22UF10V276MSER				
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L230		057-10100-60	IND SHLD 100UH SMD 600MA
C765		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L300		056-10102-12	IND SMD 1u2 1812CS 5%
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L301		056-10802-12	IND SMD 8u2 1812CS 5%
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L302		056-10105-12	IND SMD 1u5 1812CS 5%
C770		014-08220-01	(L)CAP TANT 22UF10V276MSER	&L303	10	056-10102-12	IND SMD 1u2 1812CS 5%
C772		014-08220-01	(L)CAP TANT 22UF10V276MSER	&L303	15	056-10105-12	IND SMD 1u5 1812CS 5%
C774		022-07100-05	CAP METAL PPS 1U 20% 63V 5MM	&L304	10	056-10010-12	IND SMD 10uH 1812CS 5%
C776		015-25330-08	CAP CER 0805 CHIP 33NF	&L304	15	056-10802-12	IND SMD 8u2 1812CS 5%
C782		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	&L305	10	056-10010-12	IND SMD 10uH 1812CS 5%
C784		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	&L305	15	056-10802-12	IND SMD 8u2 1812CS 5%
C786		015-26100-08	CAP CER 0805 100N 10% X7R 50V	&L306	10	056-10102-12	IND SMD 1u2 1812CS 5%
C788		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	&L306	15	056-10105-12	IND SMD 1u5 1812CS 5%
C790		015-23100-01	CAP CER 0805 100P 5% NPO 50V	&L307	10	056-10102-12	IND SMD 1u2 1812CS 5%
C792		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	&L307	15	056-10105-12	IND SMD 1u5 1812CS 5%
C793		015-24100-08	CAP CER 0805 1N 10% X7R 50V	&L308	10	056-10010-12	IND SMD 10uH 1812CS 5%
C810		015-25100-08	CAP CER 0805 10N 10% X7R 50V	&L308	15	056-10802-12	IND SMD 8u2 1812CS 5%
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V	&L309	10	056-10010-12	IND SMD 10uH 1812CS 5%
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V	&L310	10	056-10802-12	IND SMD 8u2 1812CS 5%
C814		015-24100-08	CAP CER 0805 1N 10% X7R 50V	&L325	15	056-10010-12	IND SMD 10uH 1812CS 5%
C815		015-05100-07	CAP 1206 CHIP NPO 10nF 25V	L330		050-15119-75	COIL SMD 455KHz IF 5119-T075
C816		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L400		056-10001-10	IND SMD 1uH 1206CS 5%
C818		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L401		056-10001-10	IND SMD 1uH 1206CS 5%
C819		015-22330-01	CAP CER 0805 33P 5% NPO 50V	L402		050-00016-54	COIL 654 10 CAN T720
C820		015-23220-01	CAP CER 0805 220P 5% NPO 50V	L403		050-00016-54	COIL 654 10 CAN T720
C822		015-25220-08	CAP CER 0805 22N 10% X7R 50V	L404		056-14150-02	(L) IND SMD 1.5UH
C824		015-25470-08	CAP CER 0805 47N 10% X7R 50V	L405		056-14150-02	(L) IND SMD 1.5UH
C826		015-05100-07	CAP 1206 CHIP NPO 10nF 25V	L406		056-10105-12	IND SMD 1u5 1812CS 5%
C828		015-05100-07	CAP 1206 CHIP NPO 10nF 25V	L409		050-00016-54	COIL 654 10 CAN T720
C830		015-25470-08	CAP CER 0805 47N 10% X7R 50V	L410		050-00016-54	COIL 654 10 CAN T720
C832		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	L750		056-10330-02	(L) IND SMD 330NH
C833		015-25220-08	CAP CER 0805 22N 10% X7R 50V	L900		056-10121-00	IND SMD 120NH 1812SMS 5%
C834		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L901		056-10121-00	IND SMD 120NH 1812SMS 5%
C836		015-05100-07	CAP 1206 CHIP NPO 10nF 25V	L902		056-10121-00	IND SMD 120NH 1812SMS 5%
C837		015-05100-07	CAP 1206 CHIP NPO 10nF 25V				
C838		015-05100-07	CAP 1206 CHIP NPO 10nF 25V	PL100		070-01001-00	D-RANGE 15 WAY COMPL T800
C840		015-25470-08	CAP CER 0805 47N 10% X7R 50V	PL200		240-10000-16	HEADER 4W PCB MTG SMD
C842		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	PL210		240-10000-16	HEADER 4W PCB MTG SMD
C844		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	PL220		240-10000-16	HEADER 4W PCB MTG SMD
C846		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	PL230		240-10000-16	HEADER 4W PCB MTG SMD
C848		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	PL240		240-10005-00	HEADER 5W PCB MTG SMD
C850		015-25470-08	CAP CER 0805 47N 10% X7R 50V	PL250		240-10000-16	HEADER 4W PCB MTG SMD
C873		015-25220-08	CAP CER 0805 22N 10% X7R 50V	PL260		240-10000-16	HEADER 4W PCB MTG SMD
C876		014-09100-00	CAP TANT SMD 100U 16V 20%	PL270		240-10000-16	HEADER 4W PCB MTG SMD
C879		014-08100-00	CAP TANT CHIP 10M 16VW +-20%				
C900		015-22330-01	CAP CER 0805 33P 5% NPO 50V	Q210		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C901		015-22680-01	CAP CER 0805 68P 5% NPO 50V	Q220		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C902		015-22680-01	CAP CER 0805 68P 5% NPO 50V	Q230		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C903		015-22330-01	CAP CER 0805 33P 5% NPO 50V	Q240		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
%D111A 10		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3	Q245		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
%D111A 15		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3	Q250		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D220		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23	Q255		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D230		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q260		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D240		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q270		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
D250		008-00014-79	S)LED 3MM RED WITH WIRE	Q280		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D260		001-10084-33	S)DIODE ZENSMD BZX84C3V3 SOT23	Q290		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D270		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q300		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D280		008-00014-80	S)LED 3MM GREEN WITH WIRE	Q301		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D285		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM	Q302		000-10003-10	S) XSTR SMD BfJ310 JFET UHF
D289		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM	Q303		000-10095-10	S) XSTR SMD BR951 NPN UHF
D290		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM	Q304		000-10095-10	S) XSTR SMD BR951 NPN UHF
D295		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM	Q331		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D330		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q400		000-10054-00	XSTR SMD BFG540 NPNUHF SOT143B
D400		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q401		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q540		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLDT
D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33	Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89
D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
D740		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D820		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
D860		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q760		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D880		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC210		002-10003-58	S) IC SMD LM358 DUAL O-AMP	Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC240		002-00014-05	S) IC TDA7231 1.6W AF PWR	Q780		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
IC260		002-00014-05	S) IC TDA7231 1.6W AF PWR	Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC270		002-10003-58	S) IC SMD LM358 DUAL O-AMP	Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23
IC280		002-10003-58	S) IC SMD LM358 DUAL O-AMP	Q795		000-10009-30	XSTR SMD BFR93A NPN SOT23
IC330		002-10337-20	S) IC MC3372D SMD IF DETECTOR	Q810		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
IC332		002-10003-58	S) IC SMD LM358 DUAL O-AMP	Q820		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC333		002-10003-58	S) IC SMD LM358 DUAL O-AMP	Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC339		002-10078-05	S) IC SMD 78L05 5V REG	Q850		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
IC340		002-10008-40	S)IC SMD TL084CD 4X O-AMP JFET	Q860		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC410		002-10000-14	MIXER DBL BALANCE 2-500 MHZ	Q870		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
IC610		002-10078-05	S) IC SMD 78L05 5V REG	Q880		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
				Q890		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
				Q895		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R160		036-12100-00	RES M/F 0805 10E 5%	R319		036-12390-00	RES M/F 0805 39E 5%
R201		036-14470-10	RES M/F 0805 4K7 1%	R320		036-13150-10	RES M/F 0805 150E 1%
R202		036-14470-10	RES M/F 0805 4K7 1%	R321		036-13150-10	RES M/F 0805 150E 1%
R204		036-15100-10	RES M/F 0805 10K 1%	&R323	15	036-10000-00	RES M/F 0805 ZERO OHM
R205		036-16220-00	RES M/F 0805 220K 5%	&R324	15	036-10000-00	RES M/F 0805 ZERO OHM
RV205		040-05100-22	POT 10K LOG DUAL PCB 6 OD SFT	R329		036-17100-10	RES M/F 0805 1M 1%
R207		036-14820-10	RES M/F 0805 8K2 1%	R330		036-10000-00	RES M/F 0805 ZERO OHM
&R209	10	036-15220-00	RES M/F 0805 22K 5%	RV330		042-04220-05	RES PRESET SMD 2K CER 4MM SQ
&R209	15	036-15180-10	RES M/F 0805 18K 1%	RV331		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
R210		036-15150-00	RES M/F 0805 15K 5%	R333		036-12220-00	RES M/F 0805 22E 5%
RL210		237-10010-00	RELAY 12V DPDT 10PIN SMD	R336		036-14150-10	RES M/F 0805 1K5 1%
RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT	R337		036-14220-00	RES M/F 0805 2K2 5%
R211		036-15390-00	RES M/F 0805 39K 5%	R338		036-14100-10	RES M/F 0805 1K 1%
R213		036-14270-00	RES M/F 0805 2K7 5%	R339		036-15470-10	RES M/F 0805 47K 1%
R215		036-15150-00	RES M/F 0805 15K 5%	R340		036-16220-00	RES M/F 0805 220K 5%
R218		036-14390-10	RES M/F 0805 3K9 1%	R341		036-16120-00	RES M/F 0805 120K 5%
&R219	10	036-15100-10	RES M/F 0805 10K 1%	R342		036-15220-00	RES M/F 0805 22K 5%
&R219	15	036-14820-10	RES M/F 0805 8K2 1%	R343		036-15100-10	RES M/F 0805 10K 1%
RV220		042-05100-05	RES PRESET SMD 10K CER 4MM SQ	R344		036-15100-10	RES M/F 0805 10K 1%
R221		036-15470-10	RES M/F 0805 47K 1%	&R346	10	036-15560-10	RES MF 0805 56K 1%
R222		036-16100-00	RES M/F 0805 100K 5%	&R346	15	036-16100-00	RES M/F 0805 100K 5%
%R223	10	036-12100-00	RES M/F 0805 10E 5%	R347		036-15470-10	RES M/F 0805 47K 1%
%R223	15	036-12100-00	RES M/F 0805 10E 5%	R348		036-14820-10	RES M/F 0805 8K2 1%
R224		036-14390-10	RES M/F 0805 3K9 1%	R349		036-14560-00	RES M/F 0805 5K6 5%
R225		036-13470-00	RES M/F 0805 470E 5%	R350		036-14100-10	RES M/F 0805 1K 1%
R227		036-14270-00	RES M/F 0805 2K7 5%	R351		036-14560-00	RES M/F 0805 5K6 5%
R229		036-14470-10	RES M/F 0805 4K7 1%	R352		036-14390-10	RES M/F 0805 3K9 1%
R230		036-14470-10	RES M/F 0805 4K7 1%	R353		036-16220-00	RES M/F 0805 220K 5%
RV230		040-05100-21	POT 10K LIN PCB 15MM SLOT SFT	R354		036-16220-00	RES M/F 0805 220K 5%
R232		036-15470-10	RES M/F 0805 47K 1%	R355		036-14330-10	RES M/F 0805 3K3 1%
R233		036-14820-10	RES M/F 0805 8K2 1%	R356		036-14220-00	RES M/F 0805 2K2 5%
R234		036-15470-10	RES M/F 0805 47K 1%	R357		036-15270-10	RES M/F 0805 27K 1%
RV235		042-05100-05	RES PRESET SMD 10K CER 4MM SQ	R358		036-16220-00	RES M/F 0805 220K 5%
R236		036-15470-10	RES M/F 0805 47K 1%	R359		045-15100-00	RES NTC SMD 10K 5%
R238		036-11470-00	RES M/F 0805 4E7 10%	R360		036-15100-10	RES M/F 0805 10K 1%
R239		036-14100-10	RES M/F 0805 1K 1%	R361		036-16390-00	RES M/F 0805 390K 5%
R241		036-14100-10	RES M/F 0805 1K 1%	R362		036-15470-10	RES M/F 0805 47K 1%
R242		036-13100-10	RES M/F 0805 100E 1%	R363		036-14100-10	RES M/F 0805 1K 1%
R244		036-14680-10	RES M/F 0805 6K8 1%	R365		036-13220-10	RES 0805 220E 1%
R245		036-14100-10	RES M/F 0805 1K 1%	R368		036-15100-10	RES M/F 0805 10K 1%
R247		036-14220-00	RES M/F 0805 2K2 5%	R369		036-14220-00	RES M/F 0805 2K2 5%
R249		036-15100-10	RES M/F 0805 10K 1%	R370		036-14100-10	RES M/F 0805 1K 1%
R251		036-15390-00	RES M/F 0805 39K 5%	R371		036-14820-10	RES M/F 0805 8K2 1%
R252		036-14470-10	RES M/F 0805 4K7 1%	R372		036-14560-00	RES M/F 0805 5K6 5%
R254		036-14820-10	RES M/F 0805 8K2 1%	R373		036-16390-00	RES M/F 0805 390K 5%
R255		036-15470-10	RES M/F 0805 47K 1%	R374		036-15100-10	RES M/F 0805 10K 1%
R256		036-14270-00	RES M/F 0805 2K7 5%	R375		036-16390-00	RES M/F 0805 390K 5%
R258		036-15470-10	RES M/F 0805 47K 1%	R376		036-15100-10	RES M/F 0805 10K 1%
R260		036-11470-00	RES M/F 0805 4E7 10%	R377		036-16390-00	RES M/F 0805 390K 5%
R261		036-13150-10	RES M/F 0805 150E 1%	R378		036-16390-00	RES M/F 0805 390K 5%
R262		036-14100-10	RES M/F 0805 1K 1%	R382		036-15100-10	RES M/F 0805 10K 1%
R264		036-15100-10	RES M/F 0805 10K 1%	R383		036-15470-10	RES M/F 0805 47K 1%
R265		036-13100-10	RES M/F 0805 100E 1%	R384		036-15470-10	RES M/F 0805 47K 1%
R266		036-15270-10	RES M/F 0805 27K 1%	R400		036-13220-10	RES 0805 220E 1%
R267		036-16180-00	RES M/F 0805 180K 5%	R401		036-12220-00	RES M/F 0805 22E 5%
R269		036-14220-00	RES M/F 0805 2K2 5%	R402		036-13220-10	RES 0805 220E 1%
R271		036-16100-00	RES M/F 0805 100K 5%	R403		036-12820-00	RES M/F 0805 82E 5%
R272		036-15470-10	RES M/F 0805 47K 1%	R404		036-12820-00	RES M/F 0805 82E 5%
R273		036-15150-00	RES M/F 0805 15K 5%	R408		036-11470-00	RES M/F 0805 4E7 10%
R274		036-13120-00	RES M/F 0805 120E 5%	R409		036-13820-00	RES M/F 0805 820E 5%
R275		036-13100-10	RES M/F 0805 100E 1%	R410		036-13820-00	RES M/F 0805 820E 5%
R276		036-13120-00	RES M/F 0805 120E 5%	R411		036-17100-10	RES M/F 0805 1M 1%
R277		036-14560-00	RES M/F 0805 5K6 5%	R412		036-10000-00	RES M/F 0805 ZERO OHM
R278		036-16220-00	RES M/F 0805 220K 5%	R416		036-17100-10	RES M/F 0805 1M 1%
R279		036-12270-00	RES M/F 0805 27E 5%	R417		036-13560-00	RES M/F 0805 560E 5%
R280		036-16100-00	RES M/F 0805 100K 5%	R418		036-12390-00	RES M/F 0805 39E 5%
R281		036-14470-10	RES M/F 0805 4K7 1%	R419		036-12390-00	RES M/F 0805 39E 5%
R282		036-16100-00	RES M/F 0805 100K 5%	R420		036-12100-00	RES M/F 0805 10E 5%
R284		036-13100-10	RES M/F 0805 100E 1%	R424		036-13330-00	RES M/F 0805 330E 5%
R285		036-15470-10	RES M/F 0805 47K 1%	R425		036-14220-00	RES M/F 0805 2K2 5%
R287		036-15100-10	RES M/F 0805 10K 1%	R426		036-13470-00	RES M/F 0805 470E 5%
R288		036-14470-10	RES M/F 0805 4K7 1%	R427		036-14330-10	RES M/F 0805 3K3 1%
R289		036-14680-10	RES M/F 0805 6K8 1%	R510		036-14220-00	RES M/F 0805 2K2 5%
R290		036-14100-10	RES M/F 0805 1K 1%	R515		036-12560-00	RES M/F 0805 56E 5%
R292		036-14680-10	RES M/F 0805 6K8 1%	R555		036-13470-00	RES M/F 0805 470E 5%
R293		036-13560-00	RES M/F 0805 560E 5%	R615		036-13100-10	RES M/F 0805 100E 1%
R294		036-14100-10	RES M/F 0805 1K 1%	R617		036-10000-00	RES M/F 0805 ZERO OHM
R295		036-14680-10	RES M/F 0805 6K8 1%	R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R296		036-14120-00	RES M/F 0805 1K2 5%	R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R297		030-52100-20	RES FILM AI 10E 5% 0.4W 4X1.6	R625		036-14100-10	RES M/F 0805 1K 1%
R298		036-15470-10	RES M/F 0805 47K 1%	R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP
R299		036-15470-10	RES M/F 0805 47K 1%	R633		036-14680-10	RES M/F 0805 6K8 1%
R300		036-14680-10	RES M/F 0805 6K8 1%	R636		036-12220-00	RES M/F 0805 22E 5%
R301		036-12270-00	RES M/F 0805 27E 5%	R637		036-12220-00	RES M/F 0805 22E 5%
R302		036-12120-00	RES M/F 0805 12E 5%	R640		036-12100-00	RES M/F 0805 10E 5%
R303		036-12100-00	RES M/F 0805 10E 5%	R641		036-14150-10	RES M/F 0805 1K5 1%
R304		036-13820-00	RES M/F 0805 820E 5%	R645		036-13470-00	RES M/F 0805 470E 5%
R307		036-14100-10	RES M/F 0805 1K 1%	R649		036-14470-10	RES M/F 0805 4K7 1%
R308		036-14330-10	RES M/F 0805 3K3 1%	R653		036-15100-10	RES M/F 0805 10K 1%
R309		036-14100-10	RES M/F 0805 1K 1%	R681		036-13100-10	RES M/F 0805 100E 1%
R310		036-11470-00	RES M/F 0805 4E7 10%	R685		036-15150-00	RES M/F 0805 15K 5%
R311		036-12470-00	RES M/F 0805 47E 5%	R689		036-12100-00	RES M/F 0805 10E 5%
R312		036-13100-10	RES M/F 0805 100E 1%	R693		036-16100-00	RES M/F 0805 100K 5%
R313		036-12560-00	RES M/F 0805 56E 5%	R696		036-15560-10	RES MF 0805 56K 1%
R314		036-12390-00	RES M/F 0805 39E 5%	R701		036-12220-00	RES M/F 0805 22E 5%
R315		036-13470-00	RES M/F 0805 470E 5%	R702		036-17100-10	RES M/F 0805 1M 1%
R317		036-14330-10	RES M/F 0805 3K3 1%	R703		036-17100-10	RES M/F 0805 1M 1%
R318		036-12560-00	RES M/F 0805 56E 5%	R706		036-15150-00	RES M/F 0805 15K 5%

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R707		036-15470-10	RES M/F 0805 47K 1%	R869		036-15270-10	RES M/F 0805 27K 1%
R708		036-13100-10	RES M/F 0805 100E 1%	R870		036-17120-10	RES M/F 0805 1M2 1%
R709		036-13100-10	RES M/F 0805 100E 1%	R871		036-16820-10	RES M/F 0805 820K 1%
R710		036-13100-10	RES M/F 0805 100E 1%	R872		036-14510-10	RES M/F 0805 5K1 1%
R711		036-13100-10	RES M/F 0805 100E 1%	R873		036-14220-00	RES M/F 0805 2K2 5%
R712		036-12100-00	RES M/F 0805 10E 5%	R875		036-14470-10	RES M/F 0805 4K7 1%
R713		036-16470-00	RES M/F 0805 470K 5%	R876		036-16100-00	RES M/F 0805 100K 5%
R730		036-13470-00	RES M/F 0805 470E 5%	R877		036-16100-00	RES M/F 0805 100K 5%
R731		036-13470-00	RES M/F 0805 470E 5%	R878		036-16100-00	RES M/F 0805 100K 5%
R732		036-13470-00	RES M/F 0805 470E 5%	R879		036-16100-00	RES M/F 0805 100K 5%
R742		036-13150-10	RES M/F 0805 150E 1%	R881		036-15470-10	RES M/F 0805 47K 1%
R743		036-13150-10	RES M/F 0805 150E 1%	R882		036-15470-10	RES M/F 0805 47K 1%
R744		036-12220-00	RES M/F 0805 22E 5%	R884		036-16150-00	RES M/F 0805 150K 5%
R746		036-12220-00	RES M/F 0805 22E 5%	R885		036-16150-00	RES M/F 0805 150K 5%
R747		036-12220-00	RES M/F 0805 22E 5%	R886		036-15100-10	RES M/F 0805 10K 1%
R748		036-15470-10	RES M/F 0805 47K 1%	R887		036-14100-10	RES M/F 0805 1K 1%
R749		036-15470-10	RES M/F 0805 47K 1%	R888		036-14820-10	RES M/F 0805 8K2 1%
R750		036-12220-00	RES M/F 0805 22E 5%	R889		036-16100-00	RES M/F 0805 100K 5%
R752		036-12220-00	RES M/F 0805 22E 5%	R890		036-16150-00	RES M/F 0805 150K 5%
R753		036-17100-10	RES M/F 0805 1M 1%	R891		036-16100-00	RES M/F 0805 100K 5%
R754		036-14100-10	RES M/F 0805 1K 1%	R892		036-16330-00	RES M/F 0805 330K 5%
R756		036-16470-00	RES M/F 0805 470K 5%	R894		036-14470-10	RES M/F 0805 4K7 1%
R757		036-16470-00	RES M/F 0805 470K 5%	R895		036-15100-10	RES M/F 0805 10K 1%
R758		036-14120-00	RES M/F 0805 1K2 5%	R897		036-15100-10	RES M/F 0805 10K 1%
R759		036-13330-00	RES M/F 0805 330E 5%	R898		036-16470-10	RES M/F 0805 470K 5%
R760		036-13180-00	RES M/F 0805 180E 5%	R900		036-15100-00	RES M/F 0805 10K 1%
R762		036-13100-10	RES M/F 0805 100E 1%				
R763		036-13100-10	RES M/F 0805 100E 1%	SW201		230-00010-30	SWITCH TOG SPDT R-ANG PCB MTG
R765		036-13680-00	RES M/F 0805 680E 5%				
R766		036-14100-10	RES M/F 0805 1K 1%	SHLD610		062-00010-13	CAN 10MM SQ X 11MM CAN A4M1017
R767		036-13680-00	RES M/F 0805 680E 5%				
R769		036-13180-00	RES M/F 0805 180E 5%	SK805		240-10000-07	CONN SMD SKT 16W 2R M-MATCH
R771		036-14820-10	RES M/F 0805 8K2 1%	SK810		240-04020-42	SKT 44 PIN SMD PLCC
R772		036-15220-00	RES M/F 0805 22K 5%				
R774		036-14820-10	RES M/F 0805 8K2 1%	T210		053-00010-17	XFMR T4030 LINE MATCH POTCORE
R775		036-14270-00	RES M/F 0805 2K7 5%	T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052
R784		036-12680-00	RES M/F 0805 68E 5%				
R785		036-14330-10	RES M/F 0805 3K3 1%	&XF300	10	276-00010-36	FLTR XTAL 10.7M 15KHZ PR 4POLE
R786		036-12100-00	RES M/F 0805 10E 5%	&XF300	15	276-00010-37	FLTR XTL 10.7M 7.5KHZ PR 4POLE
R787		036-12100-00	RES M/F 0805 10E 5%	&XF301	10	276-00010-36	FLTR XTAL 10.7M 15KHZ PR 4POLE
R790		036-13220-10	RES 0805 220E 1%	&XF301	15	276-00010-37	FLTR XTL 10.7M 7.5KHZ PR 4POLE
R793		036-13100-10	RES M/F 0805 100E 1%	&XF302	10	276-00010-20	FLTR XTAL 10.7M 15KHZ 2 POLE
R794		036-14100-10	RES M/F 0805 1K 1%	&XF302	15	276-00010-19	FLTR XTAL 10.7M 7.5KHZ 2 POLE
R804		036-15470-10	RES M/F 0805 47K 1%	X330		274-00010-10	XTAL 10.245MHZ SPEC TE/4
R805		036-13470-00	RES M/F 0805 470E 5%				
R808		036-12100-00	RES M/F 0805 10E 5%	&XF304	10	276-10010-14	FLTR CER SMD 455KHz E15KHz B/W
R809		036-14470-10	RES M/F 0805 4K7 1%	&XF304	15	276-10010-13	FLTR CER SMD 455KHz G 9KHz B/W
R810		036-14470-10	RES M/F 0805 4K7 1%				
R811		036-14470-10	RES M/F 0805 4K7 1%				
R812		036-14470-10	RES M/F 0805 4K7 1%				
R813		036-14470-10	RES M/F 0805 4K7 1%				
R815		036-15470-10	RES M/F 0805 47K 1%				
R816		036-16150-00	RES M/F 0805 150K 5%				
R818		036-14470-10	RES M/F 0805 4K7 1%				
R819		036-14470-10	RES M/F 0805 4K7 1%				
R820		036-15470-10	RES M/F 0805 47K 1%				
R821		036-15470-10	RES M/F 0805 47K 1%				
R822		036-15470-10	RES M/F 0805 47K 1%				
R823		036-15470-10	RES M/F 0805 47K 1%				
R824		036-14220-00	RES M/F 0805 2K2 5%				
R825		036-14220-00	RES M/F 0805 2K2 5%				
R826		036-14220-00	RES M/F 0805 2K2 5%				
R827		036-14220-00	RES M/F 0805 2K2 5%				
R828		036-14220-00	RES M/F 0805 2K2 5%				
R829		036-14220-00	RES M/F 0805 2K2 5%				
R830		036-14220-00	RES M/F 0805 2K2 5%				
R831		036-14220-00	RES M/F 0805 2K2 5%				
R832		036-14220-00	RES M/F 0805 2K2 5%				
R833		036-14220-00	RES M/F 0805 2K2 5%				
R835		036-14220-00	RES M/F 0805 2K2 5%				
R836		036-14220-00	RES M/F 0805 2K2 5%				
R837		036-14220-00	RES M/F 0805 2K2 5%				
R838		036-14470-10	RES M/F 0805 4K7 1%				
R839		036-14470-10	RES M/F 0805 4K7 1%				
R840		036-14220-00	RES M/F 0805 2K2 5%				
R841		036-14220-00	RES M/F 0805 2K2 5%				
R842		036-14220-00	RES M/F 0805 2K2 5%				
R843		036-14220-00	RES M/F 0805 2K2 5%				
R844		036-15470-10	RES M/F 0805 47K 1%				
R845		036-16150-00	RES M/F 0805 150K 5%				
R846		036-14470-10	RES M/F 0805 4K7 1%				
R847		036-14470-10	RES M/F 0805 4K7 1%				
R848		036-13470-00	RES M/F 0805 470E 5%				
R852		036-14470-10	RES M/F 0805 4K7 1%				
R853		036-13470-00	RES M/F 0805 470E 5%				
R854		036-16330-00	RES M/F 0805 330K 5%				
R855		036-15470-10	RES M/F 0805 47K 1%				
R856		036-16150-00	RES M/F 0805 150K 5%				
R857		036-16150-00	RES M/F 0805 150K 5%				
R858		036-15270-10	RES M/F 0805 27K 1%				
R859		036-17120-10	RES M/F 0805 1M2 1%				
R860		036-16820-10	RES M/F 0805 820K 1%				
R861		036-14510-10	RES M/F 0805 5K1 1%				
R863		036-14470-10	RES M/F 0805 4K7 1%				
R865		036-14270-00	RES M/F 0805 2K7 5%				
R866		036-16820-10	RES M/F 0805 820K 1%				
R867		036-16820-10	RES M/F 0805 820K 1%				
R868		036-14470-10	RES M/F 0805 4K7 1%				

T825 Mechanical & Miscellaneous Parts (220-01446-03)

IPN	Legend	Description	IPN	Legend	Description
002-08951-20		S) IC AT89C51 PLCC44 MIC 12MHZ			
220-01446-03		PCB T825 RX SII			
230-00010-31		SWITCH COVER FOR 230-00010-30			
240-02100-06		SKT COAX N TYPE PNL MTG OP-TER			
240-04020-62		SKT 2 W RECEP SHORTING LINK			
240-04021-77		SKT JACK 1.3 PCB MT 64W			
303-11169-04		CHASSIS PAINTED T800 SER II			
303-23118-00		COVER A3M2247 D RANGE T855/7			
303-50074-00		CLIP A3M2246 SPRING CLAMP T857			
308-01007-01		HANDLE BS SII 2 WASHERS INC			
311-01015-00		KNOB 15MM & SKIRT 6MM SFT			
312-01052-02		LID TOP T800 SER II PTND			
312-01053-02		LID BOTTOM T800 SER II PNTD			
316-06622-00		PNL FRT RX T800 SERIES II			
349-00020-36		SCREW TT M3X8m PANTORX BLK			
349-00020-36		SCREW TT M3X8m PANTORX BLK			
349-00020-43		SCRW T/T M4X12MM P/POZ BZ			
349-00020-45		SCRW T/T M4X20MM P/POZ BZ			
349-00020-55		SCRW M3*8 P/P T/T BLCKZNC CHRM			
352-00010-08		NUT M3 COLD FORM HEX ST BZ			
352-00010-29		NUT M4 NYLOC HEX			
353-00010-13		WSHR M3 S/PROOF INT BZ			
353-00010-24		WSHR M4x8mm Flat			
356-00010-03		TAG SOLDER 3MM LONG M614/3.2			
362-00010-33		GROMMET LED MTG 3MM			
399-00010-51		BAG PLASTIC 75*100MM			

T825 Grid Reference Index (IPN 220-01446-03)**How To Use This Grid Reference Index**

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C201	1:B5	2-B9	&C310	1:F7	3-G7	C410	1:H8	4-K3	C705	1:J3	7-C7
C203	1:C5	2-B8	&C311	1:E7	3-H7	C411	1:J8	4-K3	C707	1:J3	7-B5
C205	1:D5	2-B8	C312	1:F7	3-J7	C412	1:J9	4-K3	C708	1:J3	7-C5
C207	1:C5	2-C8	C313	1:F6	3-J7	C416	1:J9	4-J3	C709	1:H3	7-C5
C209	1:C6	2-D8	C314	1:E6	3-K8	C417	1:J8	4-J4	C710A	1:H3	7-P7
C210	1:C5	2-P0	C315	1:E6	3-K8	C418	1:J8	4-J3	C710B	1:J4	7-Q7
C211	1:C4	2-D7	C316	1:E6	3-K7	C419	1:J8	4-J3	C710C	1:J3	7-P7
C212	1:C5	2-E8	C317	1:E6	3-L8	C420	1:J7	4-G5	C711	1:J2	7-E7
C213	1:C5	2-E7	&C318	1:E5	3-M7	C424	1:J8	4-G4	C712	1:H2	7-E7
C215	1:C4	2-E7	&C319	1:F5	3-N7	C425	1:K8	4-G3	C713	1:H2	7-E7
C217	1:C4	2-E7	C320	1:F8	3-C7	C426	1:J8	4-G4	C735	1:J2	7-A1
C219	1:C5	2-H6	C321	1:F8	3-C8	C427	1:J7	4-F4	C736	1:J2	7-B1
C221	1:C5	2-H6	&C325	1:E5	3-P7	C428	1:K7	4-F3	C740A	1:H2	7-B4
C222	1:B5	2-J9	&C326	1:F5	3-Q7	C432	1:K7	4-F3	C740B	1:H2	7-B3
C223	1:B5	2-H8	C327	1:E5	3-Q8	C433	1:L9	4-E3	C741A	1:H2	7-C4
C225	1:B5	2-J8	C329	1:F4	3-D3	C434	1:M9	4-E3	C741B	1:G2	7-C3
C227	1:B5	2-J8	C330	1:E4	3-C3	C435	1:M8	4-E4	C742A	1:H2	7-D4
C229	1:B6	2-K8	C331	1:E4	3-C3	C436	1:M8	4-E3	C742B	1:H3	7-D3
C231	1:B6	2-K8	C332	1:E4	3-C3	C440	1:M8	4-D3	C743	1:H2	7-B1
C233	1:B5	2-J7	C333	1:F4	3-E4	C441	1:M8	4-D3	C745	1:G3	7-D1
C235	1:B6	2-M6	C334	1:F3	3-E4	C442	1:M8	4-D3	C750	1:H4	7-R7
C237	1:B6	2-N5	C335	1:E3	3-G0	C443	1:M9	4-D3	C757	1:G4	7-G5
C238	1:B6	2-N7	C336	1:E4	3-F4	C444	1:N9	4-C3	C759	1:G4	7-G4
C239	1:C6	2-P6	C337	1:F4	3-F4	C448	1:N8	4-C4	C761	1:H3	7-J4
C240A	1:D5	2-P8	C338	1:E3	3-E1	C449	1:N8	4-C3	C762	1:G3	7-K4
C240B	1:D5	2-P8	C339	1:F4	3-F4	C450	1:N8	4-C3	C764	1:H3	7-J2
C240C	1:D6	2-Q8	C340	1:E3	3-E2	C505	1:K6	5-H7	C765	1:G3	7-J2
C249	1:D6	2-Q7	C341	1:E3	3-G1	C515	1:H5	5-D5	C767	1:H3	7-K3
C251	1:C6	2-Q7	C342	1:F4	3-G3	C530	1:K5	5-G3	C769	1:H3	7-M4
C253	1:D4	2-G4	C343	1:F3	3-H3	C535	1:K5	5-H3	C770	1:H4	7-M4
C255	1:C7	2-L2	C344	1:E3	3-H3	C610A	1:M5	6-B6	C772	1:G3	7-M2
C257	1:C7	2-M2	C345	1:F3	3-J4	C610B	1:M5	6-B6	C774	1:H4	7-N2
C259	1:C7	2-M3	C348	1:D5	3-J2	C611A	1:M5	6-D6	C776	1:H4	7-M1
C260A	1:D7	2-N4	C349	1:F3	3-K3	C611B	1:M4	6-D6	C782	1:G3	7-N0
C260B	1:D7	2-M4	C350	1:F3	3-L4	C623	1:N6	6-N8	C784	1:G3	7-Q1
C260C	1:D8	2-M4	C351	1:F3	3-L3	C625	1:M6	6-Q8	C786	1:G3	7-Q1
C261	1:C7	2-N2	C352	1:E3	3-H4	C626	1:M6	6-R8	C788	1:G3	7-P0
C262	1:D7	2-P3	C353	1:E3	3-J5	C628	1:M6	6-R8	C790	1:G4	7-Q0
C264	1:C7	2-P3	C354	1:E3	3-J4	C630	1:N5	6-K4	C792	1:G4	7-Q0
C266	1:D2	2-R3	C355	1:F3	3-L4	C631A	1:M5	6-M6	C793	1:G3	7-Q1
C268	1:D3	2-R3	C357	1:F3	3-M4	C631B	1:N4	6-M6	C810	1:L4	8-J8
C270	1:C8	2-E3	C358	1:F3	3-N4	C637	1:M6	6-P5	C812	1:K2	8-F4
C272	1:C8	2-E1	C359	1:E3	3-L0	C640	1:M5	6-G0	C813	1:J3	8-J5
C273	1:C9	2-E0	C360	1:E4	3-N0	C650	1:N5	6-L4	C814	1:L2	8-F6
C274	1:C8	2-E1	C361	1:E5	3-N4	C651	1:M5	6-M4	C815	1:N3	8-B1
C276	1:D8	2-B0	C362	1:F6	3-P0	C658	1:L5	6-K1	C816	1:N3	8-B2
C278	1:D8	2-C0	C363	1:E6	3-P4	C660	1:L5	6-K1	C818	1:N3	8-C1
C280	1:D9	2-E0	C364	1:F5	3-P0	C665	1:L5	6-L1	C819	1:N3	8-C2
C286	1:B8	2-F2	C365	1:F5	3-Q0	C670	1:L5	6-L1	C820	1:N4	8-D1
C300	1:E9	3-B7	C366	1:F5	3-R0	C673	1:L5	6-N2	C822	1:N3	8-C2
C301	1:F9	3-B6	C367	1:E3	3-M0	C677	1:L6	6-P1	C824	1:N3	8-C2
C302	1:F8	3-C7	C400	1:G8	4-P3	C681	1:L6	6-Q2	C826	1:N3	8-D0
C303	1:E8	3-C8	C401	1:G8	4-P3	C684	1:L6	6-Q2	C828	1:N3	8-D0
C304	1:F9	3-C6	C402	1:H9	4-L3	C687	1:M6	6-P1	C830	1:M4	8-K0
C305	1:E8	3-D8	C403	1:H9	4-L3	C690	1:L6	6-Q1	C832	1:M3	8-E2
C306	1:F8	3-D7	C404	1:H8	4-L4	C693	1:L6	6-Q1	C833	1:M4	8-E1
C307	1:F8	3-E7	C405	1:G8	4-Q3	C700	1:J4	7-A8	C834	1:M3	8-F2
C308	1:F8	3-F7	C408	1:H8	4-L3	C702	1:J4	7-B8	C836	1:M3	8-E0
&C309	1:E7	3-F7	C409	1:H8	4-K3	C703	1:J3	7-B8	C837	1:M3	8-F0

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C838	1:N4	8-F0	IC333	1:E4	3-M0	P204	1:D4	2-A9	Q660	1:L5	6-N1
C840	1:M2	8-K1	IC333	1:E4	3-H0	P207	1:C5	2-A8	Q670	1:L6	6-P2
C842	1:N2	8-L0	IC339	1:F5	3-P0	P210	1:D5	2-C7	Q750	1:G4	7-G3
C844	1:N3	8-L0	IC340	1:F3	3-L4	P213	1:D3	2-P0	Q760	1:G3	7-J3
C846	1:N2	8-M0	IC340	1:F3	3-L0	P216	1:D4	2-P0	Q770	1:H3	7-J1
C848	1:N2	8-M0	IC340	1:F3	3-K4	P219	1:D3	2-P0	Q775	1:H3	7-K3
C850	1:M2	8-N0	IC340	1:F3	3-H3	P222	1:B9	2-P0	Q780	1:H3	7-K3
C873	1:M3	8-P2	IC340	1:F3	3-K0	P225	1:C4	2-F4	Q785	1:H3	7-K2
C876	1:M4	8-P2	IC410	1:G8	4-N3	P228	1:C4	2-F3	Q790	1:H3	7-L3
C879	1:M4	8-Q0	IC610	1:M5	6-C6	P231	1:C9	2-G3	Q795	1:G3	7-P0
C900	1:P8	9-E4	IC630	1:N5	6-K5	P234	1:C4	2-G3	Q810	1:K2	8-B6
C901	1:P7	9-E4	IC640	1:M5	6-N5	P236	1:C8	2-A1	Q820	1:K2	8-C6
C902	1:P7	9-F4	IC640	1:M5	6-J0	P238	1:D8	2-A1	Q840	1:K2	8-F5
C903	1:P6	9-G4	IC640	1:M5	6-G0	P240	1:C7	2-G1	Q850	1:L2	8-G5
			IC650	1:L5	6-C2	P242	1:C4	2-G1	Q860	1:K4	8-B4
CTP410	2:K7	4-E3	=IC700	1:J3	7-A8	P244	1:C4	2-G8	Q870	1:L4	8-C4
CTP420	1:K8	4-H3	IC710	1:H3	7-D7	P246	1:B5	2-H9	Q880	1:L2	8-Q3
CTP430	1:H8	4-M3	IC710	1:H3	7-P7	P248	1:A5	2-H9	Q890	1:L4	8-H2
CTP440	2:G8	4-Q3	IC710	1:H3	7-C6	P249	1:A5	2-K9	Q895	1:M3	8-P1
CTP900	2:P8	9-D4	IC710	1:H3	7-D6	P250	1:B2	2-K9			
			IC710	1:H3	7-D6	P252	1:B2	2-K9	R160	1:P2	1-Q4
CV300	1:F7	3-G7	IC710	1:H3	7-C6	P254	1:B2	2-K9	R201	1:C5	2-B8
			IC710	1:H3	7-J0	P256	1:B2	2-L8	R202	1:C5	2-B7
%D111	1:P5	1-R1	IC740	1:H2	7-D1	P258	1:D3	2-P8	R204	1:C5	2-C9
%D111A	1:P5	1-Q1	IC750	1:H4	7-M3	P260	1:D3	2-P7	R205	1:C5	2-C8
D220	1:C4	2-F4	IC750	1:H4	7-Q7	P263	1:C2	2-R1	R207	1:C5	2-D8
D220	1:C4	2-F4	IC750	1:H4	7-H5	P266	1:C2	2-Q1	&R209	1:C4	2-D8
D230	1:C6	2-J5	IC820	1:L4	8-N4	P268	1:C2	2-R1	R210	1:C5	2-D8
D230	1:C6	2-J5	IC830	1:N4	8-G0	P270	1:C1	2-R0	R211	1:C5	2-E8
D240	1:C8	2-E2	IC830	1:N4	8-D2	P280	1:C2	2-Q0	R213	1:C5	2-G6
D240	1:C8	2-E2	IC830	1:N4	8-D0	P282	1:C2	2-R0	R215	1:B5	2-G9
D250	1:B7	2-H0	IC830	1:N4	8-F2	P284	1:B4	2-P4	R218	1:C5	2-G8
D260	1:B7	2-H0	IC830	1:N4	8-K0	P287	1:B2	2-M0	&R219	1:C5	2-G7
D270	1:B7	2-J1	IC840	1:M2	8-L0	P300	1:F5	3-Q7	R221	1:C5	2-H7
D270	1:B7	2-H1	IC850	1:M3	8-P0	P810	1:K2	8-A5	R222	1:C5	2-H7
D280	1:B7	2-K1	IC850	1:M3	8-Q2	P815	1:L4	8-C4	%R223	1:A5	2-J9
D285	1:D2	2-L1	IC850	1:M3	8-M2	P820	1:K4	8-L8	R224	1:B5	2-J8
D289	1:B2	2-L0	IC850	1:M3	8-M2	P825	1:K4	8-L8	R225	1:B5	2-J8
D290	1:B2	2-L0	IC850	1:M3	8-M0	P830	1:K4	8-L8	R227	1:B5	2-J7
D295	1:B2	2-L0				P835	1:K4	8-L7	R229	1:B6	2-M7
D330	1:F3	3-M4	L230	1:D2	2-L2	P840	1:K4	8-L7	R230	1:C6	2-M5
D330	1:F3	3-M4	L300	1:F9	3-C7				R232	1:B5	2-M7
D400	1:J7	4-F4	L301	1:E8	3-D8	PIN4	1:J4	7-B8	R233	1:B6	2-N7
D400	1:J7	4-F5	L302	1:E8	3-E7				R234	1:B6	2-N7
D610	1:N6	6-L6	&L303	1:E8	3-E7	PL100	1:P3	1-A0	R236	1:B5	2-N7
D610	1:N6	6-M6	&L304	1:E7	3-F7	PL200	1:C6	2-R7	R238	1:C6	2-Q6
D640	1:L5	6-M2	&L305	1:E7	3-H7	PL210	1:C5	2-B8	R239	1:C6	2-Q7
D640	1:L5	6-M1	&L306	1:F7	3-J7	PL220	1:B5	2-H7	R241	1:D4	2-G4
D645	1:M5	6-H0	&L307	1:E6	3-M8	PL230	1:B2	2-L8	R242	1:C4	2-G4
D730	1:H3	7-H1	&L308	1:E5	3-M8	PL240	1:B6	2-K7	R244	1:C4	2-G4
D740	1:H3	7-K2	&L309	1:E5	3-P8	PL250	1:C8	2-D2	R245	1:C4	2-H4
D820	1:J3	8-B7	&L310	1:E5	3-P8	PL260	1:C4	2-H2	R247	1:C7	2-J5
D860	1:M2	8-P0	&L325	1:E5	3-N7	PL270	1:C2	2-L1	R249	1:C6	2-J4
D860	1:M2	8-P0	L330	1:F4	3-F4				R251	1:B7	2-L3
D880	1:M2	8-R2	L400	1:G8	4-P3	Q210	1:B5	2-J8	R252	1:C6	2-L4
D880	1:M2	8-R2	L401	1:G8	4-P3	Q220	1:B6	2-N7	R254	1:B7	2-L3
			L402	1:H8	4-L3	Q230	1:B6	2-N6	R255	1:B7	2-L3
			L403	1:J8	4-J3	Q240	1:C4	2-H4	R256	1:C6	2-M4
IC210	1:C5	2-F7	L404	1:J8	4-G4	Q245	1:B6	2-J4	R258	1:C7	2-M3
IC210	1:C5	2-G7	L405	1:J7	4-G5	Q250	1:C8	2-G2	R260	1:C7	2-P2
IC210	1:C5	2-N0	L406	1:G9	4-Q3	Q255	1:C7	2-H1	R261	1:C7	2-P3
IC240	1:C6	2-P7	L408	1:K7	4-F3	Q260	1:B7	2-K1	R262	1:B4	2-P4
IC260	1:C7	2-N3	L409	1:L8	4-E3	Q270	1:B8	2-L0	%R263	1:C4	2-Q3
IC270	1:C8	2-B2	L410	1:M8	4-C3	Q280	1:B7	2-L3	R264	1:B8	2-B3
IC270	1:C8	2-E3	L750	1:G3	7-Q0	Q290	1:B7	2-M3	R265	1:B8	2-B2
IC270	1:C8	2-F2	L900	1:P7	9-E5	Q300	1:E9	3-B7	R266	1:B8	2-B2
IC280	1:D8	2-E0	L901	1:P7	9-F5	Q301	1:F9	3-C7	R267	1:C8	2-C3
IC280	1:D8	2-B0	L902	1:P7	9-G5	Q302	1:F8	3-D7	%R268	1:C3	2-Q2
IC280	1:D8	2-C0				Q303	1:E6	3-K7	R269	1:C8	2-B1
IC330	1:E4	3-P0				Q304	1:F6	3-L8	R271	1:D8	2-A0
IC330	1:E4	3-E3	LINK1	1:B3	2-Q3	Q304	1:F6	3-L8	R272	1:D8	2-A1
IC330	1:E4	3-N0	LINK2	1:A4	2-Q2	Q331	1:E3	3-G0	R273	1:D8	2-C1
IC330	1:E4	3-B3				Q400	1:K8	4-G3	R274	1:B3	2-P3
IC332	1:E3	3-N0	P100	1:Q6	1-R8	Q401	1:J7	4-F4	R275	1:D8	2-E0
IC332	1:E3	3-H1	P160	1:P2	1-Q4	Q540	1:K5	5-G4	R276	1:B3	2-Q3
IC332	1:E3	3-F2	P170	1:P2	1-R4	Q620	1:N6	6-P8	R277	1:D8	2-D0
IC333	1:E4	3-G1	P201	1:C8	2-A9	Q630	1:M6	6-P5			

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
R278	1:D8	2-C1	R372	1:F3	3-L3	R756	1:G3	7-G5	R868	1:N4	8-E0
R279	1:B3	2-Q3	R373	1:F3	3-L3	R757	1:G4	7-H4	R869	1:M3	8-F0
R280	1:C8	2-D2	R374	1:E3	3-H5	R758	1:H3	7-J4	R870	1:M3	8-F0
R281	1:C8	2-D2	R375	1:E3	3-H4	R759	1:H3	7-J4	R871	1:N3	8-F0
R282	1:C8	2-E2	R376	1:E3	3-J5	R760	1:H3	7-K4	R872	1:N4	8-F0
R284	1:C8	2-F3	R377	1:E3	3-K4	R762	1:H3	7-K4	R873	1:N4	8-G0
R285	1:B8	2-E3	R378	1:F3	3-L4	R763	1:H3	7-L4	R875	1:M4	8-F2
R287	1:C8	2-F2	R382	1:F3	3-N4	R765	1:H3	7-J2	R876	1:M3	8-K1
R288	1:B8	2-F2	R383	1:F3	3-N4	R766	1:G3	7-J3	R877	1:M2	8-K1
R289	1:C4	2-G2	R384	1:E5	3-P4	R767	1:H3	7-K2	R878	1:M2	8-K0
R290	1:C4	2-H3	R400	1:G7	4-Q4	R769	1:H3	7-K3	R879	1:M2	8-K0
R292	1:C7	2-G1	R401	1:G7	4-P5	R771	1:H4	7-L3	R881	1:L4	8-H2
R293	1:B7	2-H1	R402	1:H7	4-P4	R772	1:G4	7-L2	R882	1:M4	8-H2
R294	1:B8	2-H0	R403	1:G8	4-P3	R774	1:H3	7-L2	R884	1:M3	8-P3
R295	1:B6	2-J1	R404	1:G8	4-P3	R775	1:H4	7-M2	R885	1:M3	8-P2
R296	1:B7	2-K1	R408	1:H9	4-M3	R784	1:G3	7-P1	R886	1:M3	8-Q3
R297	1:B2	2-M0	R409	1:G9	4-M3	R785	1:G3	7-P1	R887	1:M3	8-P3
R298	1:B7	2-K1	R410	1:H9	4-M3	R786	1:G3	7-Q2	R888	1:M3	8-P2
R299	1:B7	2-K1	R411	1:J8	4-H3	R787	1:G2	7-Q2	R889	1:M3	8-N1
R300	1:E9	3-B7	R412	1:K8	4-H3	R790	1:G3	7-P0	R890	1:M3	8-P1
R301	1:F9	3-C6	R416	1:K9	4-H3	R793	1:G3	7-P1	R891	1:M2	8-P0
R302	1:F8	3-D7	R417	1:J8	4-G4	R794	1:G3	7-Q1	R892	1:M2	8-P0
R303	1:E8	3-D8	R418	1:J7	4-G5	R804	1:J3	8-B7	R894	1:M2	8-Q0
R304	1:F8	3-D8	R419	1:K8	4-G3	R805	1:J3	8-B7	R895	1:M2	8-Q1
R307	1:E6	3-K7	R420	1:K8	4-G3	R808	1:K2	8-B6	R897	1:M2	8-Q2
R308	1:F6	3-K8	R424	1:J7	4-G3	R809	1:K2	8-B6	R898	1:M2	8-Q2
R309	1:E6	3-K8	R425	1:J7	4-F4	R810	1:L2	8-C6	R900	1:P6	9-G4
R310	1:E6	3-K7	R426	1:J8	4-F5	R811	1:L2	8-C6			
R311	1:F6	3-K8	R427	1:J7	4-F4	R812	1:K2	8-C6	RL210	1:C2	2-R0
R312	1:E6	3-L9	R510	1:K6	5-H7	R813	1:K2	8-C5	RL210	1:C2	2-L1
R313	1:E6	3-L8	R515	1:H6	5-E5	R815	1:K2	8-F4	RL210	1:C2	2-R1
R314	1:E6	3-L7	R555	1:K5	5-G3	R816	1:K2	8-F4			
R315	1:E6	3-L7	R615	1:M5	6-B6	R818	1:K2	8-G5	RV205	1:B5	2-M7
R317	1:F5	3-Q7	R617	1:M5	6-D5	R819	1:L2	8-G5	RV210	1:B7	2-K3
R318	1:F5	3-Q7	R619	1:N6	6-L8	R820	1:K4	8-B4	RV220	1:D4	2-G4
R319	1:F6	3-L8	R621	1:N6	6-L8	R821	1:L4	8-C4	RV230	1:B8	2-B2
R320	1:F6	3-L7	R625	1:N6	6-L7	R822	1:L4	8-C4	RV235	1:D9	2-D0
R321	1:F6	3-L7	R629	1:M6	6-P6	R823	1:L4	8-C4	RV330	1:E3	3-E1
&R323	1:E5	3-P8	R633	1:M5	6-Q8	R824	1:K4	8-K8	RV331	1:F3	3-K3
&R324	1:E5	3-P8	R636	1:M5	6-K6	R825	1:K4	8-K8			
R329	1:E4	3-D3	R637	1:N5	6-K5	R826	1:K4	8-K8	SHLD610	1:L6	6-J3
R330	1:E4	3-D3	R640	1:M5	6-G0	R827	1:K4	8-K7			
R333	1:F3	3-E5	R641	1:N5	6-L4	R828	1:K4	8-K7	SK501	1:G6	5-C6
R336	1:F4	3-E4	R645	1:N5	6-L5	R829	1:K4	8-P9	SK502	1:G6	5-C6
R337	1:E3	3-G0	R649	1:M5	6-M5	R830	1:K3	8-P9	SK503	1:G6	5-C5
R338	1:E3	3-G0	R653	1:M5	6-Q4	R831	1:K3	8-P9	SK504	1:G5	5-C4
R339	1:F4	3-F4	R681	1:L5	6-L2	R832	1:K3	8-P8	SK505	1:G5	5-C4
R340	1:E3	3-E2	R685	1:L5	6-N2	R833	1:K3	8-P8	SK513	1:H5	5-D4
R341	1:E3	3-F3	R689	1:L6	6-Q3	R835	1:K3	8-P8	SK522	1:H6	5-F6
R342	1:E3	3-F3	R693	1:L5	6-P1	R836	1:K3	8-P8	SK531	1:K6	5-J6
R343	1:E3	3-G3	R696	1:L6	6-P1	R837	1:K3	8-P7	SK532	1:K5	5-J6
R344	1:D4	3-H1	R701	1:J4	7-A9	R838	1:L4	8-L6	SK533	1:K5	5-J5
&R346	1:F4	3-G5	R702	1:J4	7-B9	R839	1:L4	8-L6	SK534	1:K5	5-J4
R347	1:E3	3-H1	R703	1:J4	7-B8	R840	1:K3	8-P7	SK535	1:K5	5-J4
R348	1:F4	3-G3	R706	1:J3	7-C6	R841	1:K3	8-P7	SK805	1:K3	8-Q9
R349	1:F4	3-H3	R707	1:J3	7-C7	R842	1:K3	8-P6	SK805	1:K3	8-Q9
R350	1:E3	3-D2	R708	1:J2	7-D7	R843	1:K3	8-P6	SK805	1:K3	8-Q7
R351	1:E3	3-E1	R709	1:H2	7-E7	R844	1:L2	8-R3	SK805	1:K3	8-Q8
R352	1:E3	3-E1	R710	1:J3	7-B6	R845	1:L2	8-R3	SK805	1:K3	8-Q6
R353	1:E3	3-E1	R711	1:H3	7-C6	R846	1:L4	8-L6	SK805	1:K3	8-Q8
R354	1:E3	3-F2	R712	1:J4	7-P8	R847	1:L4	8-M6	SK805	1:K3	8-Q6
R355	1:E3	3-D2	R713	1:J3	7-C6	R848	1:L4	8-R5	SK805	1:K3	8-Q8
R356	1:E3	3-D2	R730	1:J2	7-A2	R852	1:L2	8-G6	SK805	1:K3	8-Q7
R357	1:E4	3-G1	R731	1:J2	7-A2	R853	1:L2	8-F6	SK805	1:K3	8-Q8
R358	1:E3	3-E2	R732	1:J2	7-A2	R854	1:N3	8-C2	SK805	1:K3	8-Q7
R359	1:E3	3-E2	R742	1:H2	7-C4	R855	1:N3	8-C2	SK805	1:K3	8-Q5
R360	1:E3	3-H1	R743	1:H2	7-C4	R856	1:N3	8-C2	SK805	1:K3	8-Q7
R361	1:F3	3-H3	R744	1:G2	7-D4	R857	1:N4	8-D2	SK805	1:K3	8-Q6
R362	1:E3	3-H1	R746	1:H3	7-D4	R858	1:N3	8-C1	SK805	1:K3	8-Q9
R363	1:F3	3-J4	R747	1:H3	7-D4	R859	1:N3	8-D0	SK805	1:K3	8-Q6
%R364	1:E4	3-J2	R748	1:J2	7-A1	R860	1:N3	8-D1	SK810	1:L3	8-H5
R365	1:E5	3-J2	R749	1:J2	7-B1	R861	1:M3	8-D0			
R368	1:E3	3-J1	R750	1:H4	7-Q8	R863	1:N3	8-E2	SL210	1:C8	2-E1
R369	1:E3	3-J1	R752	1:G4	7-F5	R865	1:M3	8-E2	SL220	1:C8	2-E1
R370	1:F3	3-K3	R753	1:G4	7-F3	R866	1:M3	8-F2	#SL400	1:N8	4-C3
R371	1:F3	3-K4	R754	1:G3	7-F3	R867	1:M3	8-F1	#SL401	1:M8	4-D3

<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>
#SL402	1:M8	4-E3									
#SL403	1:J8	4-J4									
#SL404	1:H8	4-K3									
#SL405	1:H8	4-L4									
SW201	1:B4	2-L6									
T210	1:C3	2-Q3									
T610	1:L6	6-N2									
TP202	1:C8	2-D9									
TP211	1:D3	2-P8									
TP300	1:E8	3-E7									
TP301	1:F6	3-J7									
TP302	1:F6	3-M8									
TP305	1:E6	3-P4									
TP601	1:N5	6-K9									
TP602	1:L5	6-R9									
TP603	1:L5	6-J2									
TP604	1:L4	6-N6									
TP607	1:M4	6-E6									
TP710	1:G4	7-J5									
&XF300	1:F7	3-G7									
&XF301	1:F7	3-H7									
&XF302	1:E5	3-N8									
X330	1:E4	3-C3									
&XF304	1:F4	3-E3									

Part C T826 Transmitter & T827 Exciter

This part of the manual is divided into six sections, as listed below. There is a detailed table of contents at the start of each section.

Section	Title
1	General Information
2	Circuit Operation
3	Initial Tuning & Adjustment
4	Functional Testing (not available for Tuning & Adjustment manual)
5	Fault Finding (not available for Tuning & Adjustment manual)
6	PCB Information

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.

Section	Title	Page
1.1	Introduction	1.3
1.2	Specifications	1.4
1.2.1	Introduction	1.4
1.2.2	General	1.4
1.2.3	RF Section	1.5
1.2.4	Audio Processor	1.6
1.2.4.1	Inputs	1.6
1.2.4.2	Modulation Characteristics	1.7
1.2.4.3	CTCSS	1.7
1.2.5	Microcontroller	1.7
1.2.6	Test Standards	1.8
1.3	Product Codes	1.9
1.4	T826 Standard Product Range	1.10
1.5	T827 Standard Product Range	1.10

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 range¹ 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 shut-down 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 range¹. 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. ± 4 MHz from the centre frequency)
Load Impedance	.. 50 ohms
Frequency Stability (see also Section 1.4 and Section 1.5)	.. ± 2.5 ppm, -30°C to +60°C
Adjacent Channel Power (full deviation):	
Wide Bandwidth (WB) (± 25 kHz/15kHz B/W)	.. -70dBc
Narrow Bandwidth (NB) (± 12.5 kHz/7.5kHz B/W)	.. -60dBc
Transmitter Switching	.. complies with ETS 300 113
Transmitter Side Band Noise: (no modulation, 15kHz bandwidth)	
At ± 25 kHz	.. -95dBc
At ± 1 MHz	.. -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 $\pm$ 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
 V_{ds} max.

.. capable of sinking 2.25mA via $2k2\Omega$
.. 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:

<u>T82X</u> -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- <u>X</u> X-XXXX	'1' for 66-88MHz
-----------------------	------------------

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

T82X- <u>XX</u> -XXXX	'0' for wide bandwidth (25kHz)
	'5' for narrow bandwidth (12.5kHz)

Options

T82X-XX- <u>XXXX</u>	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 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).

2 T826/827 Circuit Operation

This section provides a basic description of the circuit operation of the T826 transmitter and T827 exciter.

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

Refer 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.

Section	Title	Page
2.1	Introduction	2.3
2.2	Microcontroller	2.4
2.3	Synthesised Local Oscillator	2.5
2.3.1	Two Point Modulation	2.6
2.4	VCO	2.7
2.4.1	VCO Supply	2.7
2.5	Audio Processor	2.8
2.5.1	General	2.8
2.5.2	Audio Inputs	2.8
2.5.3	Keying Inputs	2.9
2.5.4	Compressor (Automatic Level Control (ALC))	2.9
2.5.5	Outputs To Modulators	2.9
2.6	Power Supply & Regulator Circuits	2.10
2.7	Transmit Timers	2.11
2.8	T826 Drive Amplifier & PA	2.12
2.9	T827 Exciter Drive Amplifier	2.13

Figure	Title	Page
2.1	T826 High Level Block Diagram	2.3
2.2	T827 High Level Block Diagram	2.3
2.3	T826/827 Microcontroller Block Diagram	2.4
2.4	T826/827 Synthesiser Block Diagram	2.5
2.5	T826/827 Two Point Modulation	2.6
2.6	T826/827 Audio Processor Block Diagram	2.8
2.7	T826/827 Power Supply & Regulators Block Diagram	2.10
2.8	T826/827 Transmit Timers	2.11

2.1 Introduction

The individual circuit blocks which make up the T826 and T827 are:

- synthesiser
- VCO
- audio processor
- drive amplifier
- power amplifier (T826 only)
- voltage regulators.

Each of these circuit blocks is set in its own shielded compartment, formed as an integral part of the main chassis.

The configuration of the circuit blocks may be seen on a functional level in Figure 2.1 and Figure 2.2. Refer to the circuit diagrams in Section 6.2 (T826) or 6.3 (T827) for more detail.

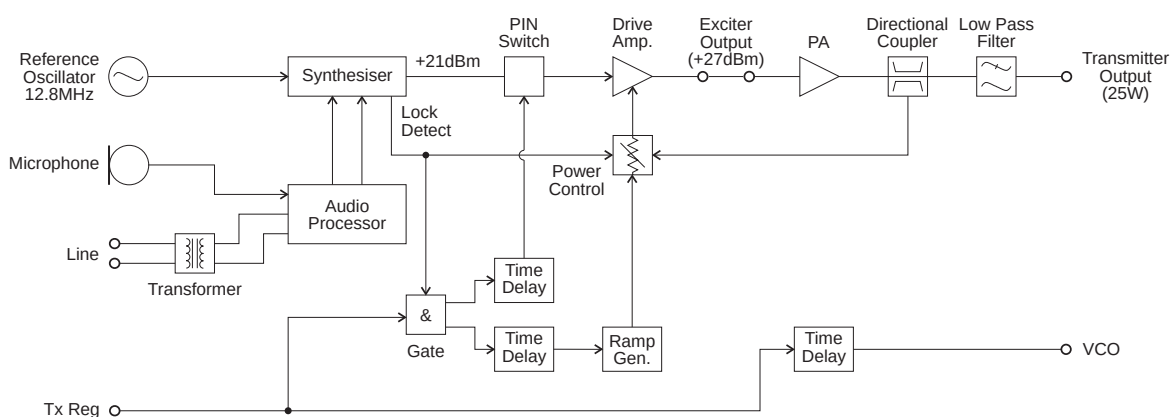


Figure 2.1 T826 High Level Block Diagram

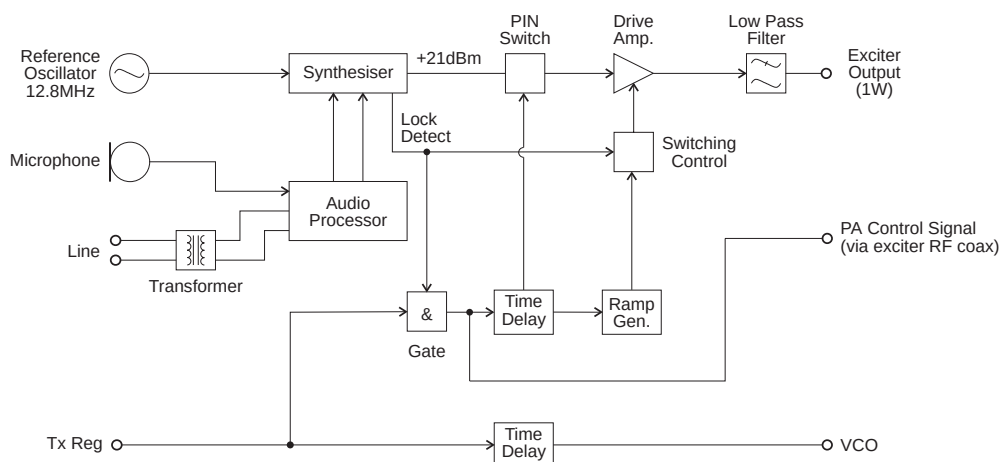


Figure 2.2 T827 High Level Block Diagram

2.2 Microcontroller

(Refer to the microcontroller circuit diagram (sheet 8) in Section 6.2 or 6.3.)

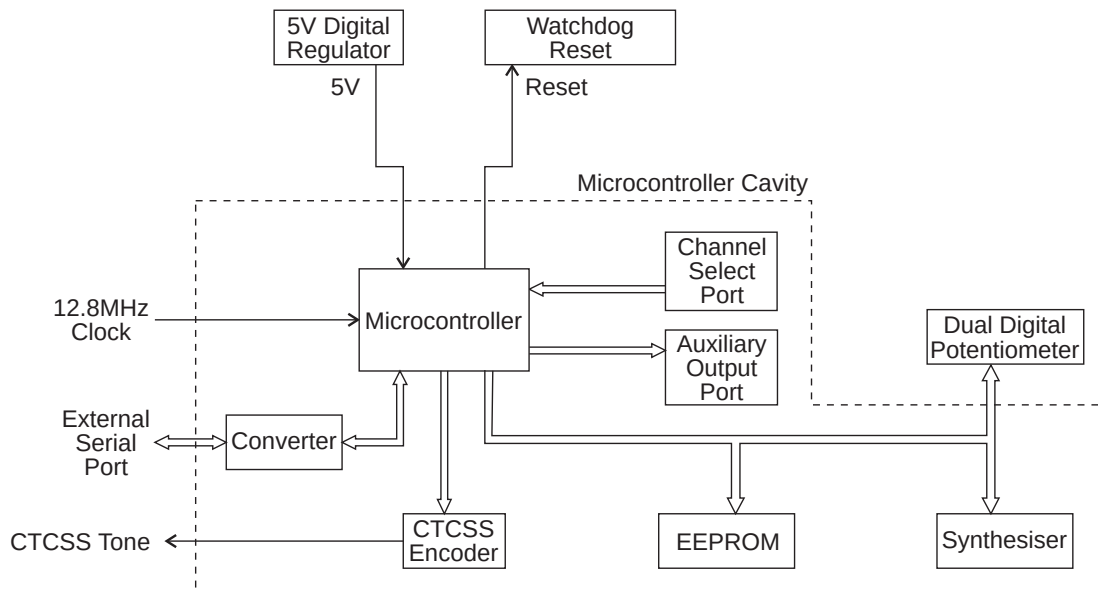


Figure 2.3 T826/827 Microcontroller Block Diagram

Overall system control of the T826/827 is accomplished by the use of a member of the 80C51 family of microcontrollers (IC810). It runs from internal ROM and RAM, thus leaving all four ports free for input/output functions.

Non-volatile data storage is achieved by serial communication with a 16kBit EEPROM (IC820). This serial bus is also used by the microcontroller to program the synthesiser (IC740) and deviation control EPOTS (IC220).

The main tasks of the microcontroller are as follows:

- program the synthesiser and EPOT;
- interface with the PGM800Win programming software at 9600 baud via the serial communication lines on D-range 1 (PL100) & D-range 2;
- monitor channel change inputs from D-range 2;
- generate timing waveforms for CTCSS encoding;
- coordinate and implement timing control of the exciter/transmitter;
- control the front panel "Supply" LED.

2.3 Synthesised Local Oscillator

(Refer to the synthesiser circuit diagram (sheet 7) in Section 6.2 or 6.3 and the VCO circuit diagram in Part E.)

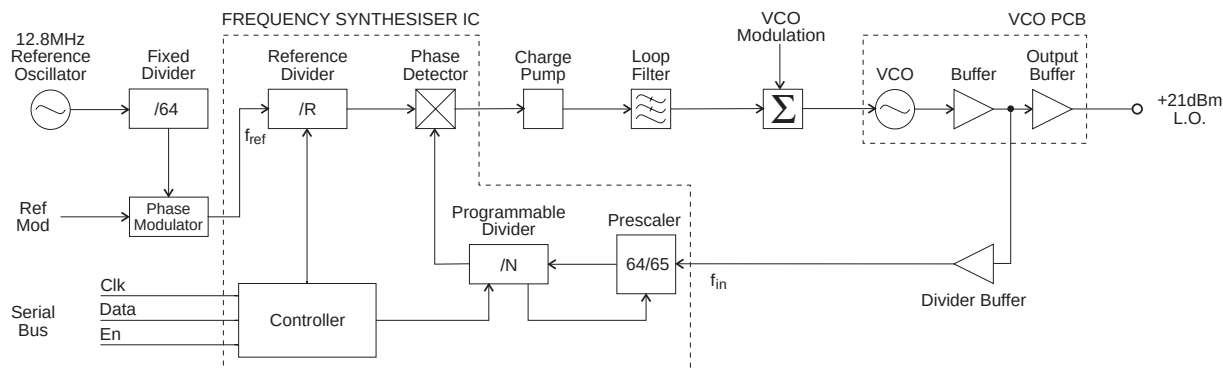


Figure 2.4 T826/827 Synthesiser Block Diagram

The synthesiser (IC740) employs a phase-locked loop (PLL) to lock a voltage controlled oscillator (VCO) to a given reference frequency. The synthesiser receives the divider information from the control microprocessor via a 3 wire serial bus (clock, data, enable). When the data has been latched in, the synthesiser processes the incoming signals from the VCO buffer (f_{in}) and the phase modulator (f_{ref}).

A reference oscillator at 12.8MHz (=IC700) is buffered (IC710 pins 5 & 6) and divided down to 200kHz (IC730). This 200kHz square wave is then summed with the modulating audio and passed to an integrator (IC720 pins 9 & 8, Q710, Q720). This produces a ramping waveform which is centred around a DC level determined by the incoming audio. IC720 pins 5 & 6 perform as a comparator, ultimately producing a phase-modulated 200kHz square wave. This is followed by another phase shifting stage (IC720 pins 3 & 4, Q730, Q740), before being divided down to 6.25kHz or 5kHz within the synthesiser IC (IC740).

A buffered output of the VCO (Q795) is divided with a prescaler and programmable divider which is incorporated into the synthesiser chip (IC740). This signal is compared with the phase modulated reference signal at the phase detector (also part of the synthesiser chip). The phase detector outputs drive a balanced charge pump circuit (Q760, Q770, Q775, Q780, Q785) and active loop filter (IC750 pins 5, 6 & 7) which produces a DC voltage between 0V and 20V to tune the VCO. This VCO control line is further filtered to attenuate noise and other spurious signals. Note that the VCO frequency increases with increasing control voltage.

If the synthesiser loop loses lock, a pulsed signal appears at LD (pin 2) of IC740. This signal is filtered and buffered by IC750 pins 1, 2 & 3, producing the Lock-Detect signal used to shut off the power supply to the drive amplifier. IC750 pin 1 is at 20V when the synthesiser is out of lock.

2.3.1 Two Point Modulation

Frequency modulation occurs by modulating both the VCO input and the synthesiser reference input. This process is called two point modulation and ensures a flat modulation response from 67Hz to 3kHz (2.55kHz for narrow bandwidth).

The PLL has a fast response time, allowing a Tx key-up time of <30ms. Because of this fast response time the PLL sees lower modulation frequencies superimposed on the VCO as an error and corrects for it, resulting in no modulation on the carrier. At modulation frequencies greater than 300Hz the loop cannot correct fast enough and modulation is seen on the carrier. The response of the loop to VCO modulation is shown by f_2 in Figure 2.5 below.

To achieve low frequency modulation, the reference oscillator is also modulated so that the phase detector of IC740 detects no frequency error under modulation. Thus, the synthesiser loop will not attempt to correct for modulation and the audio frequency response of the transmitter remains unaffected. The response of the loop to reference frequency modulation is shown by f_1 in Figure 2.5.

The reference modulation is controlled by a 256-step 10k electronic potentiometer (EPOT) which is adjustable via PGM800Win. The EPOT is made up of 256 resistive sections (representing approximately 39Ω each) which can be individually addressed by the microcontroller. Each section can be switched in or out of circuit to achieve the required total resistance, thus giving control of the reference modulation.

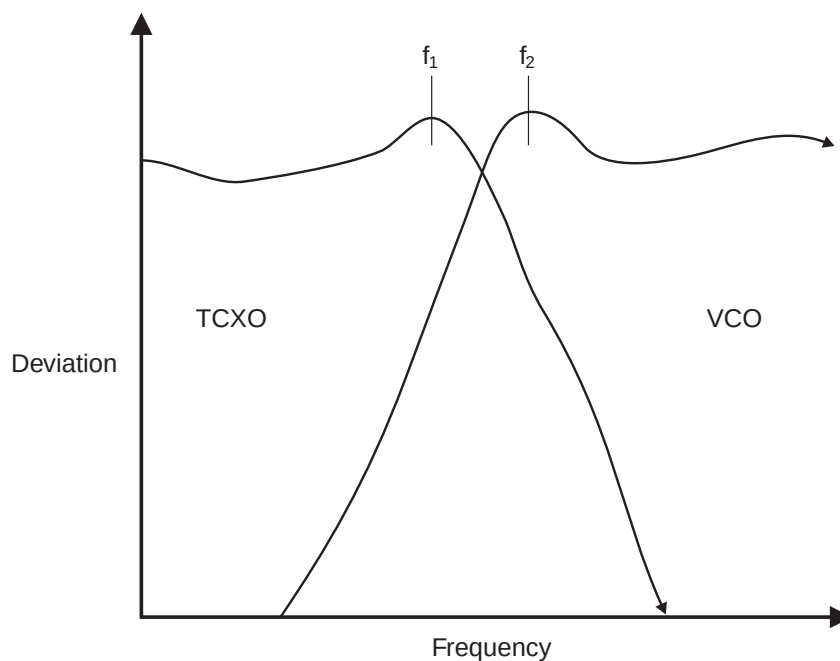


Figure 2.5 *T826/827 Two Point Modulation*

2.4 VCO

(Refer to the VCO circuit diagram in Part E.)

The VCO transistor (Q1) operates in a common source configuration, with an LC tank circuit coupled between its gate and drain to provide the feedback necessary for oscillation. The VCO control voltage from the loop filter (IC750 pin 7) is applied to the varicaps (D1-D6) to facilitate tuning within an 8MHz band of frequencies. A trimcap (&VC1-TX) is used for coarse tuning of the VCO. The output from the oscillator circuit drives a cascode amplifier stage (Q2, Q3) which supplies +10dBm (typically) to a further stage of amplification, Q5. This is the final amplifier on the VCO PCB, and delivers +21dBm (typically) to the exciter drive amplifier.

A low level "sniff" is taken from the output of Q3 and used to drive the divider buffer (Q795) for the synthesiser (IC740).

The VCO operates at the actual output frequency of the exciter, i.e. there are no multiplier stages. The VCO is modulated by superimposing the audio signal onto the control voltage and by phase modulating the reference signal.

2.4.1 VCO Supply

The VCO is supplied from two switched +9V supplies under the control of the Tx-Reg. supply.

The VCO (Q1) and buffer amplifier (Q2 & Q3) are supplied from one +9V switched supply by Q540 via the capacitor multiplier (Q550, C550).

The output amplifier is supplied from the other +9V supply by Q520, Q530, and Q510.

A delay circuit holds the VCO on for a short time after the Tx-Reg. supply has been switched off. This is to allow the RF power circuits (both exciter and PA) to ramp down in the correct manner before the VCO is switched off.

2.5 Audio Processor

(Refer to the audio processor circuit diagram (sheet 2) in Section 6.2 or 6.3.)

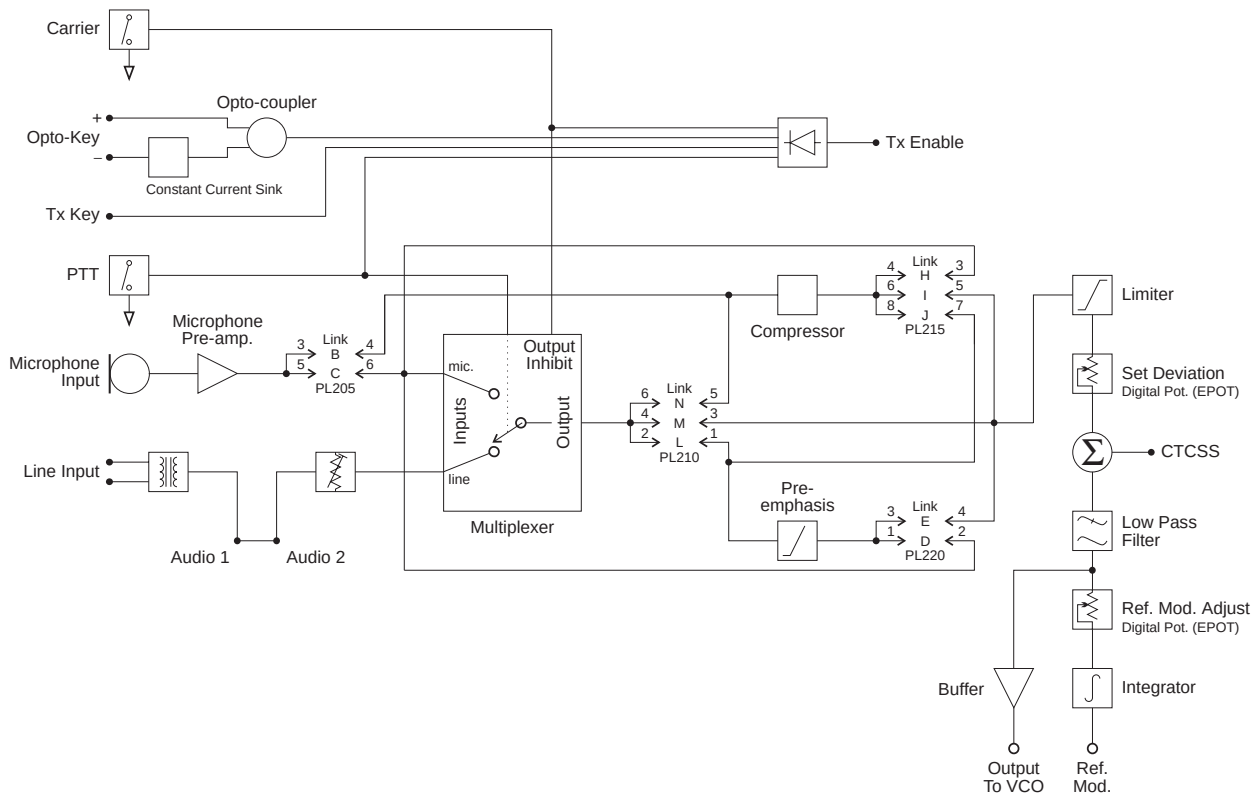


Figure 2.6 T826/827 Audio Processor Block Diagram

2.5.1 General

The audio processor comprises several link selectable circuit blocks which may be configured in a variety of combinations to suit individual requirements. The pre-emphasis network and compressor may be linked individually or cascaded between either or both audio inputs and the limiter.

Refer to Section 3.5.1 for linking details.

2.5.2 Audio Inputs

Two audio inputs are available: one from a 600 ohm balanced (or unbalanced) line, and the other from a local microphone. The microphone signal is passed first to a pre-amplifier (Q210) and ultimately to a multiplexer (IC240), but in between may pass through the compressor (depending on the linking details). The line transformer is also connected to the multiplexer and is disabled by the microphone PTT switch.

A third input for external CTCSS tones is also provided.

2.5.3 Keying Inputs

There are four ways to key the exciter:

- pulling the Tx-Key line low (pin 13 on D-range 1 [PL100]) at the rear of the set);
- pushing the "Carrier" button on the front panel - this will inhibit all audio;
- using the PTT button on the local microphone, disabling audio from the line;
- via the opto-key inputs (pins 11 and 12 on D-range 1 [PL100]) when electrical isolation is required. This features a constant current sink (Q270) to ensure reliable activation of the opto-coupler (IC250) at low keying voltages.

2.5.4 Compressor (Automatic Level Control (ALC))

The input signal is fed via a current controlled attenuator (Q230, Q220) to a high gain stage (IC230) from which the output signal is taken. This signal is passed to a comparator (IC230) which toggles whenever the audio signal exceeds a DC threshold determined by RV220. Thus, the comparator produces a square wave whose mark-space ratio is determined by the amplitude of the audio signal. This square wave pumps up the reservoir capacitor (C233) which controls the attenuator (Q230, Q220), thus completing the feedback loop.

The compression level is set by adjustment of the comparator threshold (RV220).

Note: Although the high dynamic range of the compressor allows the use of very low audio signal levels, such conditions will be accompanied by a degradation of the signal-to-noise ratio. Very low audio input levels should therefore be avoided where possible.

2.5.5 Outputs To Modulators

The output signal from the limiter (IC210, IC230) is added with a CTCSS tone at a summing amplifier (IC260). The signal is then low pass filtered (IC260) and split to supply the two modulators.

Since the VCO modulator is a true frequency modulator, its audio is simply buffered (IC260). The reference modulator, however, is a phase modulator and its audio must first be integrated (IC210).

It is vital that the audio levels to the modulators are accurately set, *relative to each other*. Hence the inclusion of level adjustment in the reference modulator path. Once set, adjustments to absolute deviation may be made only by IC220, a 256-step 10k electronic potentiometer (EPOT), which is controlled via PGM800Win. The EPOT is made up of 256 resistive sections (representing approximately 39Ω each) which can be individually addressed by the microcontroller. Each section can be switched in or out of circuit to achieve the required total resistance, thus adjusting the absolute deviation level.

2.6 Power Supply & Regulator Circuits

(Refer to the regulators circuit diagram (sheet 6) in Section 6.2 or 6.3.)

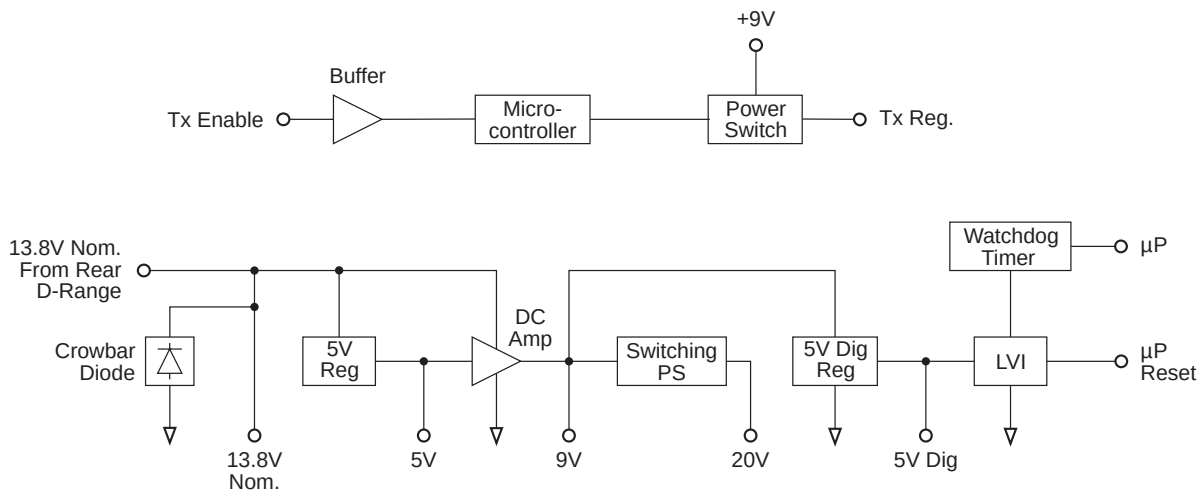


Figure 2.7 T826/827 Power Supply & Regulators Block Diagram

The T826 and T827 are designed to operate from a 10.8-16V DC supply (13.8V nominal). A 5.3V regulator (IC630) runs directly from the 13.8V rail, driving much of the synthesiser circuitry. It is also used as the reference for a DC amplifier (IC640, Q630, Q620) which provides a medium current capability 9V supply.

A switching power supply (Q660, Q670) runs from the 9V supply and provides a low current capability +20V supply. This is used to drive the synthesiser loop filter (IC750), giving a VCO control voltage range of up to 20V, and the Lock-Detect amplifiers.

Ultimate control of the transmitter is via the Tx-Reg. supply, switched from 9V by Q610. This is enabled via the Tx-Enable signal from the audio processor, and microprocessor.

A crowbar diode is fitted for protection against connection to a power supply of incorrect polarity. It also provides transient overvoltage protection.

Note: A fuse must be fitted in the power supply line for the diode to provide effective protection.

2.7 Transmit 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 2.8):

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 ^a
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 ^b 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 from 0 to 600 seconds in PGM800Win version 2.12 and later.

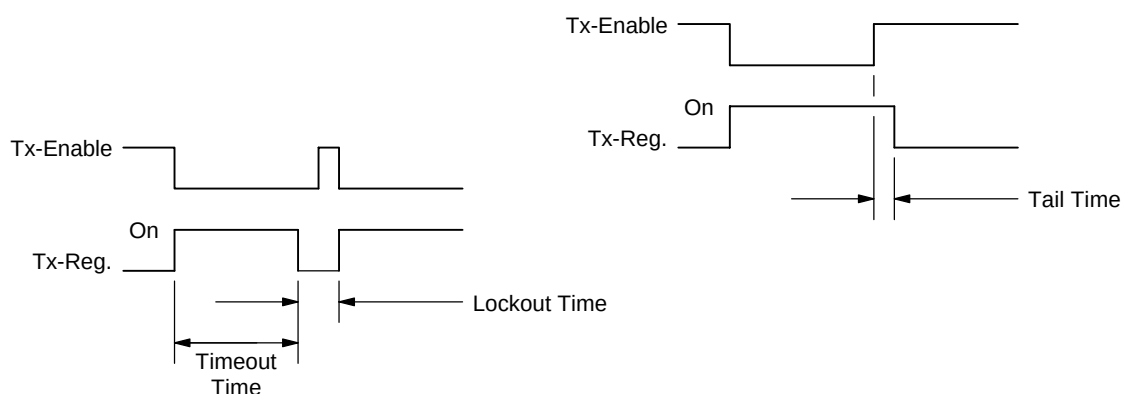


Figure 2.8 T826/827 Transmit Timers

2.8 T826 Drive Amplifier & PA

(Refer to Figure 2.1 and the exciter and PA circuit diagrams (sheets 3 & 4) in Section 6.2.)

The output power of the PA is maintained at a constant level via a power control loop applied to the two-stage, wide band exciter amplifier (Q307, Q312). The forward and reverse RF power levels are sensed via a dual directional coupler and detector diodes (D440, D441 in the PA cavity). The detected DC signals are summed with the "power set" level and fed to the control integrator (IC310 pins 1, 2 & 3). The output control voltage is buffered by Q309 and Q315, and applied to the collectors of the wide band exciter amplifiers.

Note: Forward and reflected power signals are summed so that, under high VSWR, the power control will turn the output RF level down.

The maximum output power of the transmitter is limited by a voltage clamp circuit (consisting of a potential divider formed by R369//R374 and R375//R359//R360) which turns on Q308, clamping the control voltage to approximately 7.8V. When the maximum operating temperature is exceeded, the clamp voltage is reduced to approximately 5.7V by removing R359//R360 from the circuit (see below).

To reduce the spurious output level when the synthesiser is out-of-lock, the Tx-Reg. and Lock-Detect signals are gated to inhibit the PA control circuit and to switch off the RF signal at the input to the drive amplifier. The RF input signal is switched by a PIN switch attenuator (D300, D301, D302).

Cyclic keying control is provided by additional circuitry consisting of several time delay, ramp and gate stages:

- Q305, IC310 power ramping
- Q304, Q305 Tx-Reg. and $\overline{\text{Lock-Detect}}$ gate
- Q300, Q301, Q302 delay and PIN switch drive.

This is to allow the RF power circuits (both exciter and PA) to ramp up and down in a controlled manner so that minimal adjacent channel interference is generated during the transition.

The output of the wide band amplifier is approximately 550mW (+27.5dBm) for an input of 65mW (+18dBm) when the power control is set to maximum.

Note: The VCO output level of 125mW (+21dBm) is attenuated by a 3dB attenuator (R517, R518 & R519) in the VCO cavity. This provides good VCO/exciter isolation as well as the correct exciter drive level.

A temperature sensor (R480) is provided so that the RF output power can be reduced to a preset level when a set temperature is exceeded. This is a protection circuit (IC310 pins 5, 6 & 7, Q311) to prevent overheating, as the unit is *not* rated for continuous operation at high temperatures (refer to Section 1.2.3 for duty cycle specifications). RV302 sets the PA output power while under high temperature fold-back conditions.

The output of the temperature-sense comparator (IC310 pin 7) also feeds to a secondary shutdown clamp circuit (Q303, Q360, Q308). The clamp voltage is set to approximately

5.7V by the potential divider R369//R374 and R375 when the maximum operating temperature is exceeded. This ensures that the temperature shutdown will reduce the output power even if the power control circuit is in an open loop condition.

The attenuator (R410, R411 & R412) aids in reducing exciter/PA interaction while also ensuring a reasonable match for Q312.

The RF output from the exciter is fed to the driver stage (Q415) and then to the final (Q425). The DC supply is fed to the final via a low pass filter with special low frequency decoupling.

The directional coupler provides the required feedback for the power control loop while the harmonics are attenuated by the low pass filter.

2.9 T827 Exciter Drive Amplifier

(Refer to Figure 2.2 and the exciter circuit diagram (sheet 3) in Section 6.3.)

A two-stage, wide band amplifier (Q320, Q321) provides an output level of approximately 1W (+30dBm) for an input of 125mW (+21dBm) from the VCO. IC300 pins 5, 6 & 7, Q301 and Q302 provide a 10.5V regulated supply for the exciter.

To reduce the spurious output level when the synthesiser is out-of-lock, the Tx-Reg. and Lock-Detect signals are gated to inhibit the exciter control circuit and to switch off the RF signal at the input to the drive amplifier. This is achieved by a PIN switch attenuator (D320, D321, D322).

Cyclic keying control is provided by additional circuitry consisting of several time delay, ramp and gate stages:

- Q300, IC300 pins 5, 6 & 7 power ramping
- Q380, Q381 Tx-Reg. and $\overline{\text{Lock-Detect}}$ gate
- Q365, Q366, Q367, Q368 delay and PIN switch drive.

This is to allow the RF power circuits (both exciter and PA) to ramp up and down in a controlled manner so that minimal adjacent channel interference is generated during the transition.

R517, R518 and R519 form a 3dB attenuator to provide good VCO/drive amplifier isolation.

The output attenuator (R337, R338, R339) assists in reducing exciter/PA interaction while also ensuring a good match for Q321.

Note: The exciter provides a DC control signal to the PA via the RF coax. This is injected via %L382.

3 T826/827 Initial Tuning & Adjustment



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 section describes both short and full tuning and adjustment procedures and provides information on:

- channel programming
- selecting required audio links
- synthesiser alignment
- PA alignment (T826 only)
- modulator adjustment
- limiter adjustment
- setting line level
- compressor adjustment
- timer adjustment.

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

Refer 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.

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3.1	T826/827 Test Equipment Set-up With T800-01-0010	3.4
3.2	T826/827 Test Equipment Set-up Without T800-01-0010	3.4

3.1 Introduction

When you receive your T826 transmitter or T827 exciter it will be run up and working on a particular frequency (the "default channel")¹. If you want to switch to a frequency that is within the 8MHz switching range (i.e. ± 4 MHz from the factory programmed frequency), you should only need to reprogram the transmitter/exciter with the PGM800Win software (refer to the PGM800Win programming kit and Section 3.2 below).

However, if you want to switch to a frequency outside the 8MHz switching range, you will have to reprogram and re-tune the transmitter/exciter to ensure correct operation. In this case you should carry out the short tuning procedure described in Section 3.4.

If you have carried out repairs or other major adjustments, you must carry out the full tuning and adjustment procedure described in this section (except for Section 3.4).

3.2 Channel Programming

You can program up to 128 channel frequencies into the transmitter/exciter's EEPROM memory (IC820) by using the PGM800Win software package and an IBMTM PC. You can also use PGM800Win to select the transmitter/exciter's current operating frequency (or "default channel").

If the transmitter/exciter is installed in a rack frame, you can program it via the programming port in the speaker panel. However, you can also program the transmitter/exciter before it is installed in a rack frame as follows:

- by using a T800-01-0010 calibration test unit;
- via D-range 1;
- via D-range 2 (standard T800-03-0000 auxiliary D-range only);
- via SK805 (internal Micromatch connector).

If you do not use the T800-01-0010, you will have to connect the PC to the transmitter/exciter via a module programming interface (such as the T800-01-0004).

For a full description of the channel programming procedure, refer to the PGM800Win programming software user's manual.

Note: When an auxiliary D-range kit (D-range 2 - T800-03-0000) is fitted, you can also select a channel with an external switch, such as the DIP switch on the rack frame backplane PCB. Refer to Part C in the T800 Series Ancillary Equipment Service Manual (M800-00-101 or later issue) or consult your nearest Tait Dealer or Customer Service Organisation for further details.

1. Use the "Read Module" function in PGM800Win to find out what the default channel is.

3.3 Test Equipment Required

You will need the following test equipment:

- computer with PGM800Win installed
 - T800 programming kit
 - module programming interface (e.g. T800-01-0004 - optional)
 - 13.8V power supply
 - digital multimeter
 - audio signal generator
 - RF power meter
 - audio voltmeter x 2
 - modulation meter
 - oscilloscope (digital preferred)
 - 20dB or 40dB pad
 - T800-01-0010 calibration test unit (optional)
- } or RF test set (optional)

Figure 3.1 and Figure 3.2 show typical test equipment set-ups.

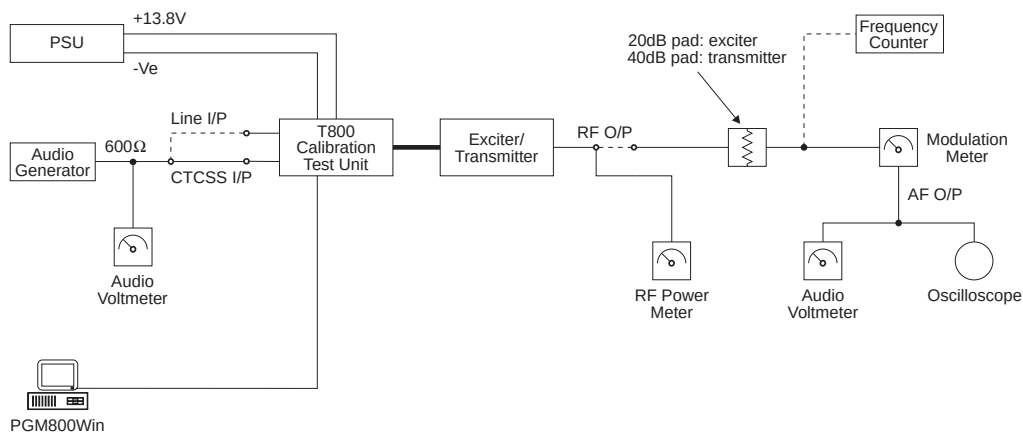


Figure 3.1 T826/827 Test Equipment Set-up With T800-01-0010

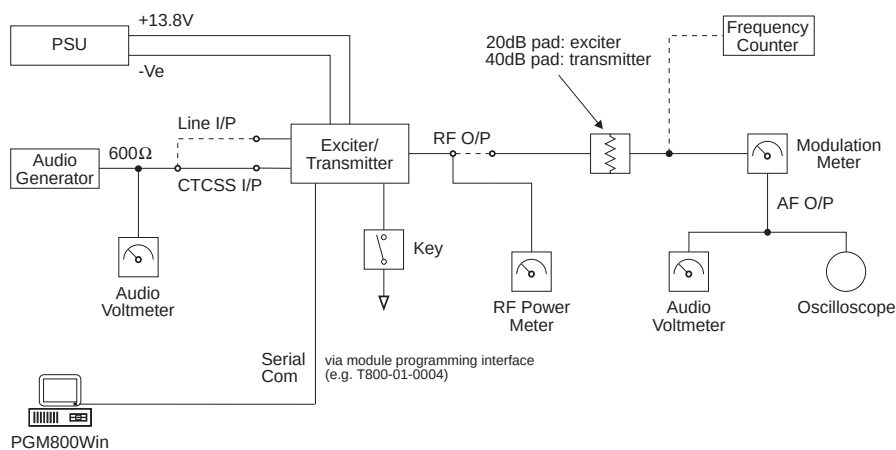


Figure 3.2 T826/827 Test Equipment Set-up Without T800-01-0010

3.4 Short Tuning Procedure

Use this procedure only if you want to reprogram the T826/827 to a frequency outside the 8MHz switching range and do not intend to carry out any other major adjustments or repairs.

3.4.1 Introduction

Reprogram the operating frequency as described in the PGM800Win programming kit (refer to Section 3.2).

Remove the top cover (nearest the handle).

Set up the test equipment as described in Section 3.3.

Set the links in the audio processor section as required (refer to Section 3.5).

3.4.2 Synthesiser Alignment

- Connect a high impedance voltmeter to PL4-1 or the junction of L1 & R1 in the VCO (this measures the synthesiser loop voltage).
- Key the transmitter by earthing the Tx-Key line.
- **Single Channel** Tune VCO trimmer &VC1-TX for a synthesiser loop voltage of 9V.
- **Multichannel** Tune VCO trimmer &VC1-TX for a synthesiser loop voltage of 9V on the middle channel.

If there is no middle channel, tune &VC1-TX so that the channels are symmetrically placed around a loop voltage of 9V.

All channels should lie within the upper and lower limits of 13V and 5V respectively.

Do not attempt to program channels with a greater frequency separation than the specified switching range of 8MHz.

3.4.3 Output Power Adjustment (T826 Only)

Connect an RF power meter with suitable attenuation to the output socket and key the transmitter.

Adjust RV301 for the required output power (between 5 and 25W).

3.4.4 Two Point Modulation Adjustment

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

Note 2: The reference modulation and limiter adjustments are controlled by 256-step electronic potentiometers (EPOTs), which are adjusted via the “Reference Modulation” and “Deviation” settings in PGM800Win. This allows the two point modulation and deviation settings to be adjusted for each channel.

Note 3: To optimise the modulation response across the switching range, repeat steps 1-4 below for each channel that will be used (usually needed only for data applications). In applications where the modulation response is less critical (e.g. voice use only), carry out steps 1-4 below on the middle channel and use the “EPOT Fill” option¹ in PGM800Win to copy the value to the other channels.

Note 4: If you are using an RF test set, turn the low pass filter off and set the high pass filter to 15kHz *before* beginning this procedure.

1. Inject an audio signal of 450Hz 1.5V rms (+5dBm) into the CTCSS input (D-range 1 (PL100) pin 8).

Key the transmitter by earthing the Tx-Key line.

2. Adjust the output from the audio generator to obtain $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation at 450Hz.

3. Change the input frequency to 100Hz and, using PGM800Win, adjust the value of the “Reference Modulation” EPOT setting for the current channel to obtain $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation (you can use either the mouse or up and down arrow keys).

4. Change the input frequency back to 450Hz.

Repeat steps 2 and 3 above until the deviations achieved at the two input frequencies are within 0.2dB of each other. You will need to do this at least four times.

5. Sweep the audio between 50 and 300Hz for peaks.

Note: A peak between 50 and 300Hz will indicate a fault condition, i.e:

- incorrect set-up
- or - modulation circuitry fault.

The specification window is $\pm 1\text{dB}$ relative to 150Hz from 65 to 260Hz.

1. Use the “EDIT FILL” button on the tool bar or go to “Edit”, “Fill”, “Epot Settings” on the menu bar.

3.4.5 CTCSS Encoder (If Used)

Program a CTCSS tone on the default channel using PGM800Win.

If you are using an RF test set, turn off the 300Hz high pass filter.

Key the T826/827 with the front panel "Carrier" switch.

Adjust RV805 (CTCSS level adjust) to give $\pm 500\text{Hz}$ [$\pm 250\text{Hz}$] deviation.

Set the maximum deviation as per Section 3.4.6.

3.4.6 FM Deviation (Limiter) Adjustment

Note: If the T826/827 will be used over the whole 8MHz switching range, you must set the deviation for each channel. However, if the module will be used on frequencies that cover only a 1MHz (or less) switching range, you can set the deviation on the middle channel and use this value for all other channels with the "EPOT Fill" option in PGM800Win.

Inject 1kHz at -10dBm into the line input (D-range 1 (PL100) pins 1 & 4; pins 2 & 3 shorted).

Adjust RV210 (line sensitivity) fully clockwise and key the transmitter by earthing the Tx-Key line. Using PGM800Win, adjust the value of the "Deviation" EPOT setting for the current channel to obtain a deviation limit of $\pm 4.7\text{kHz}$ [$\pm 2.3\text{kHz}$] (you can use either the mouse or up and down arrow keys).

Sweep the audio frequency from 100Hz to 4kHz and ensure that the maximum deviation does not exceed $\pm 4.7\text{kHz}$ [$\pm 2.3\text{kHz}$]. Readjust "Deviation" if necessary via PGM800Win.

3.4.7 Line-in Level Adjustment

Remove the CTCSS signal (if used).

Set the injected signal at the line input to the required line level (typically -10 to -20dBm).

Adjust RV210 (line sensitivity) to provide $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation.

Reapply the CTCSS signal (if required).

3.5 Audio Processor Links

3.5.1 Link Details

Use the following table to set up the audio processor to the configuration you require. You should set the audio processor links before carrying out any of the tuning and adjustment procedures. The factory settings are shown in brackets [].

Plug	Link ^a		Function
PL205	1-2	A	not connected
	[3-4]	B	microphone pre-amp. output to compressor input
	5-6	C	microphone pre-amp. output to multiplexer input
PL210	[1-2]	L	multiplexer output to pre-emphasis input
	3-4	M	multiplexer output to limiter input
	5-6	N	multiplexer output to compressor input
PL215	1-2	G	not connected
	[3-4]	H	compressor output to multiplexer input
	5-6	I	compressor output to limiter input
	7-8	J	compressor output to pre-emphasis input
	9-10	K	not connected
PL220	1-2	D	pre-emphasis output to multiplexer input
	[3-4]	E	pre-emphasis output to limiter input
	5-6	F	not connected

a. The letters in this column and in the table in Section 3.5.2 below refer to the identification letters screen printed onto the PCB beside each pair of pins.

3.5.2 Typical Options

	PL205	PL210	PL215	PL220
microphone pre-amp. compressed and pre-emphasised; line input pre-emphasised (standard set-up)	[3-4] B	[1-2] L	[3-4] H	[3-4] E
microphone pre-amp. compressed and pre-emphasised; line input unprocessed	3-4 B	3-4 M	7-8 J	1-2 D
line and microphone compressed and pre-emphasised	5-6 C	5-6 N	7-8 J	3-4 E
microphone pre-amp. compressed; line and microphone flat response	3-4 B	3-4 M	3-4 H	5-6 F

3.6 Synthesiser Alignment

- Ensure that the T826/827 has been programmed with the required frequencies using PGM800Win software.
- **Single Channel** Select a channel using PGM800Win.
Multichannel Select the middle channel via PGM800Win.
- Connect a high impedance voltmeter to PL4-1 or the junction of L1 and R1 in the VCO (this measures the synthesiser loop voltage).
- Key the transmitter by earthing the Tx-Key line.
 - Single Channel** Tune VCO trimmer &VC1-TX for a synthesiser loop voltage of 9V.
 - Multichannel** Tune VCO trimmer &VC1-TX for a synthesiser loop voltage of 9V on the middle channel.

If there is no middle channel, tune &VC1-TX so that the channels are symmetrically placed around a loop voltage of 9V.

All channels should lie within the upper and lower limits of 13V and 5V respectively.

Do not attempt to program channels with a greater frequency separation than the specified switching range (8MHz).
- Measure the T826/827 output frequency (at the rear panel N-type connector) and adjust the TCXO (=IC700) trimmer if required.
- **T827 Only** Check that the exciter output power is 1W $\pm$ 300mW (measured at the rear panel N-type connector).

**Caution:**

This trimmer is susceptible to physical damage. Do not exert a downward force of more than 500g (1lb) when adjusting.

3.7 Output Power Adjustment (T826 Only)

Connect an RF power meter to the PA output.

Key the transmitter by earthing the Tx-Key line.

Adjust RV301 for 25W output power and check that the total current drawn is <4.5A.

Adjust RV301 for the required output power (between 5 and 25W).

3.8 Thermal Shutdown (T826 Only)

3.8.1 Normal Operation

Key the transmitter by earthing the Tx-Key line and set the output power to 25W as described in Section 3.7.

Short L480 to ground by connecting solder link SL480.

Set RV302 (high temperature power adjust) for an output power of 5W.

Remove the solder link on SL480.

Note: The thermal shutdown temperature is factory set (%R320 and %R328) to 88°C for 25W continuous operation at 25°C ambient temperature¹.

3.8.2 Continuous Operation

If you want to operate the transmitter continuously at 60°C ambient temperature, you must:

- reduce the output power to 10W;
- increase the thermal shutdown temperature to 105°C by changing the resistor values to those shown in the following table:

Operating Conditions/ Ambient Temperature	%R320	%R328
25W continuous @ 25°C	18k	18k
10W continuous @ 60°C	1k5	8k2

1. Ambient temperature is defined as the temperature of the air immediately surrounding the heatsink.

3.9 Audio Processor & CTCSS

3.9.1 Two Point Modulation

The T826 and T827 utilise two point modulation to obtain a wide audio bandwidth independent of the synthesiser loop filter response. This is achieved by simultaneously frequency modulating the VCO and phase modulating the synthesiser reference frequency. The relative signal levels fed to the two modulators are quite critical and cause interaction when setting up.

Both modulating signals require readjustment when the exciter is shifted in frequency greater than the switching range (i.e. $\Delta F > \pm 4\text{MHz}$).

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

Note 2: The reference modulation and limiter adjustments are controlled by 256-step electronic potentiometers (EPOTs), which are adjusted via the “Reference Modulation” and “Deviation” settings in PGM800Win. This allows the two point modulation and deviation settings to be adjusted for each channel.

Note 3: To optimise the modulation response across the switching range, repeat steps 1-4 below for each channel that will be used (usually needed only for data applications). In applications where the modulation response is less critical (e.g. voice use only), carry out steps 1-4 below on the middle channel and use the “EPOT Fill” option¹ in PGM800Win to copy the value to the other channels.

Note 4: If you are using an RF test set, turn the low pass filter off and set the high pass filter to 15kHz *before* beginning this procedure.

3.9.2 Modulator Adjustment

1. Inject an audio signal of 450Hz 1.5V rms (+5dBm) into the CTCSS input (D-range 1 (PL100) pin 8).
Key the transmitter by earthing the Tx-Key line.
2. Adjust the output from the audio generator to obtain $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation at 450Hz.
3. Change the input frequency to 100Hz and, using PGM800Win, adjust the value of the “Reference Modulation” EPOT setting for the current channel to obtain $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation (you can use either the mouse or up and down arrow keys).

1. Use the “EDIT FILL” button on the tool bar or go to “Edit”, “Fill”, “Epot Settings” on the menu bar.

4. Change the input frequency back to 450Hz.

Repeat steps 2 and 3 above until the deviations achieved at the two input frequencies are within 0.2dB of each other. You will need to do this at least four times.

5. Sweep the audio between 50 and 300Hz for peaks.

Note: A peak between 50 and 300Hz will indicate a fault condition, i.e:

- incorrect set-up
- or - modulation circuitry fault.

The specification window is $\pm 1\text{dB}$ relative to 150Hz from 65 to 260Hz.

3.9.3 CTCSS Encoder (If Used)

Program a CTCSS tone on the default channel using PGM800Win.

If you are using an RF test set, turn off the 300Hz high pass filter.

Key the T826/827 with the front panel "Carrier" switch.

Adjust RV805 (CTCSS level adjust) to give $\pm 500\text{Hz}$ [$\pm 250\text{Hz}$] deviation.

Set the maximum deviation as per Section 3.9.4.

3.9.4 Limiter Adjustment

Note: If the T826/827 will be used over the whole 8MHz switching range, you must set the deviation for each channel. However, if the module will be used on frequencies that cover only a 1MHz (or less) switching range, you can set the deviation on the middle channel and use this value for all other channels with the "EPOT Fill" option in PGM800Win.

Set the links in the audio processor section as required (refer to Section 3.5).

Inject 1kHz at -10dBm into the line input (D-range 1 (PL100) pins 1 & 4; and pins 2 & 3 shorted).

Adjust RV210 (line sensitivity) fully clockwise and key the transmitter by earthing the Tx-Key line. Using PGM800Win, adjust the value of the "Deviation" EPOT setting for the current channel to obtain a deviation limit of $\pm 4.7\text{kHz}$ [$\pm 2.3\text{kHz}$] (you can use either the mouse or up and down arrow keys).

Sweep the audio frequency from 100Hz to 4kHz and ensure that the maximum deviation does not exceed $\pm 4.7\text{kHz}$ [$\pm 2.3\text{kHz}$]. Readjust "Deviation" if necessary via PGM800Win.

3.9.5 Line Level Without Compressor

This section assumes that the compressor is not used. If the compressor is required, refer to Section 3.9.6.

Remove the CTCSS signal (if used).

Adjust the line sensitivity as follows:

- set the injected signal at the line input to the required line level (typically -10 to -20dBm);
- adjust RV210 (line sensitivity) to provide $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation.

Reapply the CTCSS signal (if required).

3.9.6 Compressor

The compressor may be used on the line input only, the microphone input only, or on both the line and microphone inputs. If the compressor is used, refer to one of the following sections as appropriate.

3.9.6.1 Compressor On Line Input Only

Set RV210 (line sensitivity) fully clockwise and key the transmitter by earthing the Tx-Key line.

Reduce the line level to -50dBm at 1kHz and set RV220 (compression level) fully clockwise.

Check that $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] deviation is still available.

Slowly increase the audio input level until the demodulated waveform shows significant signs of clipping (approximately $\pm 4.5\text{kHz}$ [$\pm 2.3\text{kHz}$] deviation).

Adjust RV220 anticlockwise until the demodulated waveform is just clipping (approximately $\pm 4\text{kHz}$ [$\pm 2\text{kHz}$] deviation).

Increase the input level to -10dBm and check that the test tone is still held just into clipping. The input line level should be typically -10 to -20dBm.

3.9.6.2 Compressor On Microphone Input Only

Key the transmitter by earthing the Tx-Key line and plug a microphone jack into the front panel socket.

Adjust RV220 (compression level) fully clockwise.

Acoustically couple the microphone to a tone box (1kHz) and close the PTT switch.

Increase the audio level until the demodulated waveform shows significant signs of clipping (approximately $\pm 4.5\text{kHz}$ [$\pm 2.3\text{kHz}$] deviation).

Adjust RV220 anticlockwise until the demodulated waveform is just clipping (approximately $\pm 4\text{kHz}$ [$\pm 2\text{kHz}$] deviation).

Increase the audio level by 10dB and verify that the test tone is held just into clipping.

Whistle steadily into the microphone, checking that approximately $\pm 4\text{kHz}$ [$\pm 2\text{kHz}$] deviation is produced. The modulated waveform should be basically sinusoidal.

Speak into the microphone, checking that the modulation peaks reach about $\pm 5\text{kHz}$ [$\pm 2.5\text{kHz}$] deviation.

As the line is to be used without compression, set RV210 (line sensitivity) as described in Section 3.9.5.

3.9.6.3 Compressor On Both Line & Microphone Inputs

Set up as described in Section 3.9.6.1.

6 T826/827 PCB Information

**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.

This section provides the following information on the T826 transmitter and T827 exciter:

- parts lists
- grid reference indexes
- PCB layouts
- circuit diagrams.

Section	Title	IPN	Page
6.1	Introduction		6.1.3
6.2	T826 Transmitter PCB	220-01443-04	6.2.1
6.3	T827 Exciter PCB	220-01447-04	6.3.1

6.1 Introduction

Product Type Identification

You can identify the transmitter or exciter type by checking the product code printed on a label on the rear of the chassis (product codes are explained in Section 1.3 in this Part of the manual, and Figure 1.1 in Part A shows typical labels). You can further verify the product type by checking the placement of an SMD resistor in the table that is screen printed onto the top side of the PCB, similar to the example drawn below. In this example, the resistor indicates that the product was built as a T826-10-XXXX.

	T82610
	T82615
PRODUCT TYPE	

Note: The only function of this resistor is to indicate the product type. It has no effect on the circuitry or operation of the transmitter or exciter.

PCB Identification

All PCBs are identified by a unique 10 digit “internal part number” (IPN), e.g. 220-01390-02, which is screen printed onto the PCB (usually on the top side), as shown in the example below:



The last 2 digits of this number define the issue status, which starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are “internal part numbers” (IPNs). We can process your spare parts orders more efficiently and accurately if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:

circuit reference - lists components in alphanumeric order

variant column - indicates that this is a variant component which is fitted only to the product type listed

description - gives a brief description of the component

Internal Part Number - order the component by this number

Ref	Var	IPN	Description
C126		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C127		020-09220-01	CAP ELECT RADL 220M 16V 10X12.5MM
C128		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C129		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
&C130	10	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	15	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
&C130	20	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	25	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C131		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C132		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C133		015-05470-08	CAP CER 1206 CHIP 47N 10% X7R 50V

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

At the front of the parts list is the Parts List Amendments box (an example of which is shown below). This box contains a list of component changes which took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order. The number in brackets at the end of each entry refers to the Tait internal Change Order document.

IPN of new component

Change Order number

Parts List Amendments		
R306	Changed from 180Ω to 560Ω (036-13560-00) to increase sensitivity	(71003).

circuit reference or IPN

description of change

Variant Components

A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term “variant” is also used to describe components unplaced in one product. Variant components have a character prefix, such as “&”, “=” or “#”, before the circuit reference (e.g. &R100).

The table below explains the variant prefixes used in T800 Series II products:

If the variant prefix is . . .	the component will. . .
&	change according to channel spacing
=	change according to frequency stability
#	change according to frequency range
%	change or be placed/unplaced for special applications
*	be unplaced in one product (where two products share the same PCB)

Grid Reference Index

This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:

Device	PCB	Circuit
C126	2:A6	2-R7
C127	1:A8	2-P4
C128	2:B7	2-P2
C129	2:C12	2-E3
&C130	2:D8	2-B8
C131	2:C9	2-H6
C132	2:D8	2-B8
C133	2:D6	2-E1

components listed in alphanumeric order

PCB layout reference

circuit diagram reference

component location on the sheet

sheet number

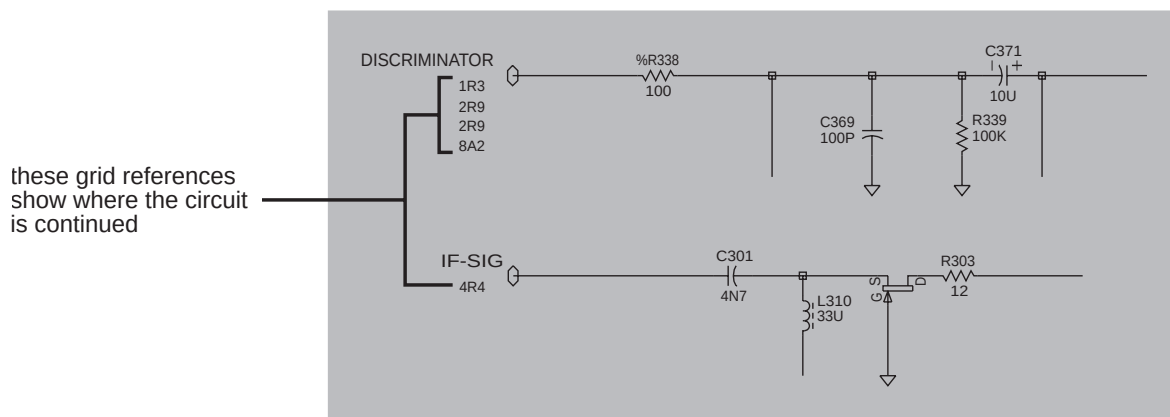
component location on the layer

layer number -
1 = top side layer
2 = bottom side layer

Using CAD Circuit Diagrams

Reading a CAD circuit diagram is similar to reading a road map, in that both have an alphanumeric border. The circuit diagrams in this manual use letters to represent the horizontal axis, and numbers for the vertical axis. These circuit diagram “grid references” are useful in following a circuit that is spread over two or more sheets.

When a line representing part of the circuitry is discontinued, a reference will be given at the end of the line to indicate where the rest of the circuitry is located, as shown below. The first digit refers to the sheet number and the last two characters refer to the location on that sheet of the continuation of the circuit (e.g. 1R3).



6.2 T826 Transmitter PCB

This section contains the following information.

IPN	Section	Page
220-01443-04	Parts List	6.2.3
	Mechanical & Miscellaneous Parts	6.2.10
	Grid Reference Index	6.2.11
	PCB Layout - Top Side	6.2.15
	PCB Layout - Bottom Side	6.2.16
	Transmitter Overview Diagram	6.2.17
	Audio Processor Circuit Diagram	6.2.18
	Exciter Circuit Diagram	6.2.19
	PA Circuit Diagram	6.2.20
	VCO Section Circuit Diagram	6.2.21
	Regulators Circuit Diagram	6.2.22
	Synthesiser Circuit Diagram	6.2.23
	Microcontroller Circuit Diagram	6.2.24
	Harmonic Filter Circuit Diagram	6.2.25

T826 Parts List (IPN 220-01443-04)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A number in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The miscellaneous and mechanical section lists the variant and common parts in IPN order. Where possible, a number in the legend column indicates their position in the mechanical assembly drawing.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Parts List Amendments - Continued

This page is provided for entering future amendments to the parts list.

Ref	Var	IPN	Description	Ref	Var	IPN	Description
Note: %D205 and %D210 are optional level limiting diodes for special applications. =R705 (47 ohm) and =SK710 are fitted in place of =IC700 when an external frequency reference is used. These two components are supplied with the auxiliary D-range kits (T800-06-0000 & T800-06-0001).				C328		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C201		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C329		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C202		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C330		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C204		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C331		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C205		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C332		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C207		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	C333		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C209		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C334		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C210		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C335		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C211		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C336		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C213		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C337		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C215		014-08220-01	(L)CAP TANT 22UF10V276MSER	C338		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C217		015-24220-08	CAP CER 0805 2N2 10% X7R 50V	C339		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C219		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C340		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C221		014-08220-01	(L)CAP TANT 22UF10V276MSER	C341		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C223		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C342		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C225		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C344		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C227		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C346		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C229		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C347		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C230		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C348		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C232		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C349		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C233		016-08470-03	CAP SMD ELEC 47mF 20% 25v 8.3m	C350		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C235		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C351		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C237		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	C352		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C239		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C353		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C241		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C354		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C242		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C355		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C243		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C356		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C245		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C357		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C247		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C358		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C249		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C359		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C251		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C360		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C253		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C361		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C255		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C362		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C257		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C363		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C259		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C364		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C260		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C365		014-18220-02	(L)CAP TANT SMD 22U 20% 35V
C261		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	C366		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C263		016-09100-05	CAP SMD ELECT 100U 25V 20%	C367		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C265		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%	C369		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C267		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	C370		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C269 10		015-21150-01	CAP CER 0805 1P5+-1/4P NPO 50V	C371		015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C269 15		015-21470-01	CAP CER 0805 4P7+-1/4P NPO 50V	C372		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C271 10		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C373		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C271 15		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C374		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C273		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C375		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
C275		015-23120-01	CAP CER 0805 120P 5% NPO 50V	C376		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C277		015-25100-08	CAP CER 0805 10N 10% X7R 50V	C377		015-22220-01	CAP CER 0805 22P 5% NPO 50V
C279		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C378		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C281		015-25220-08	CAP CER 0805 22N 10% X7R 50V	C379		014-07470-04	CAP TANT SMD 4U7 50V 20%
C283		015-21470-01	CAP CER 0805 4P7+-1/4P NPO 50V	C380		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C285		015-21470-01	CAP CER 0805 4P7+-1/4P NPO 50V	C381		015-04100-06	CAP CER 1210 1Nf NPO200V GRM42
C287		016-09100-05	CAP SMD ELECT 100U 25V 20%	C385		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C289 10		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C386		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C289 15		015-25470-08	CAP CER 0805 47N 10% X7R 50V	C387		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C291		014-08220-01	(L)CAP TANT 22UF10V276MSER	C388		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C293		015-27100-10	CAP CER 0805 1M+80-20% Y5V 16V	C389		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
%C294 10		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C390		015-26100-08	CAP CER 0805 100N 10% X7R 50V
%C294 15		015-22470-01	CAP CER 0805 47P 5% NPO 50V	C393		015-25100-08	CAP CER 0805 10N 10% X7R 50V
%C295 10		013-06470-00	CAP SMD POLYESTER 470N 63V 10%	C395		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
%C295 15		013-06470-00	CAP SMD POLYESTER 470N 63V 10%	C396		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C300		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C397		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C301		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C400		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C302		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C401		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C303		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C402		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C304		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C403		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C305		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C410		015-22820-01	CAP CER 0805 82P 5% NPO 50V
C306		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C411		015-03100-06	CAP CER 1210 100P NPO500VGRM42
C307		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C412		014-07470-04	CAP TANT SMD 4U7 50V 20%
C308		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C413		015-02680-06	CAP CER 1210 68P NPO500VGRM42
C309		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C414		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C310		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C415		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C311		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C416		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C312		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C425		015-03120-06	CAP CER 1210 120P NPO500VGRM42
C313		014-08100-00	CAP TANT CHIP 10M 16VW +20%	C426		015-03680-06	CAP CER 1210 680P NPO200VGRM42
C314		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C427		014-07470-04	CAP TANT SMD 4U7 50V 20%
C315		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C428		015-03470-03	CAP CER 470P 5% NPO200V GRH111
C316		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C429		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C317		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C430		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C318		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C431		015-05470-08	CAP CER 1206 47N 10% X7R 50V
C319		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C440		015-02470-06	CAP CER 1210 47P NPO500VGRM42
C320		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C441		015-02470-06	CAP CER 1210 47P NPO500VGRM42
C323		015-25220-08	CAP CER 0805 22N 10% X7R 50V	C442		015-03120-06	CAP CER 1210 120P NPO500VGRM42
C324		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C443		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C326		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C444		015-03150-06	CAP CER 1210 150P NPO500VGRM42
C327		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C445		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C446		015-02390-06	CAP CER 1210 39P NPO500VGRM42
				C447		015-02390-06	CAP CER 1210 39P NPO500VGRM42
				C448		015-03680-06	CAP CER 1210 680P NPO200VGRM42
				C449		015-21560-01	CAP CER 0805 5P6+-1/4P NPO 50V
				C450		015-21560-01	CAP CER 0805 5P6+-1/4P NPO 50V
				C451		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C452		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C480		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C503		015-24220-08	CAP CER 0805 2N2 10% X7R 50V
				C505		015-25470-08	CAP CER 0805 47N 10% X7R 50V
				C510		015-25220-08	CAP CER 0805 22N 10% X7R 50V
				C514		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C515		015-24100-08	CAP CER 0805 1N 10% X7R 50V

Ref	Var	IPN	Description	Ref	Var	IPN	Description
C516		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C838		014-09100-00	CAP TANT SMD 100U 16V 20%
C520		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C841		014-09100-00	CAP TANT SMD 100U 16V 20%
C522		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C844		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C530		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C900		015-02330-06	CAP CER 1210 33P 500V GRM42
C535		015-26100-08	CAP CER 0805 100N 10% X7R 50V	C901		015-02330-06	CAP CER 1210 33P 500V GRM42
C536		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C902		015-02330-06	CAP CER 1210 33P 500V GRM42
C537		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C903		015-02220-06	CAP CER 1210 22P 5% 500V GRM42
C545		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C904		015-02270-06	CAP CER 1210 27P NPO500V/GRM42
C546		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C905		015-02330-06	CAP CER 1210 33P 500V GRM42
C550		014-08220-01	(L)CAP TANT 22UF10V276MSER	C906		015-02330-06	CAP CER 1210 33P 500V GRM42
C600		015-24100-08	CAP CER 0805 1N 10% X7R 50V	C907		015-02330-06	CAP CER 1210 33P 500V GRM42
C601		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C605		015-23120-01	CAP CER 0805 120P 5% NPO 50V	%D111A 10		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
C610A		015-25100-08	CAP CER 0805 10N 10% X7R 50V	%D111A 15		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
C610B		014-09100-00	CAP TANT SMD 100U 16V 20%	D220		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C611A		014-09100-00	CAP TANT SMD 100U 16V 20%	D230		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
C611B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	D240		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
C615		015-24100-08	CAP CER 0805 1N 10% X7R 50V	D250		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
C616		015-24100-08	CAP CER 0805 1N 10% X7R 50V	D260		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
C623		015-23120-01	CAP CER 0805 120P 5% NPO 50V	D270		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C625		020-09470-07	CAPEL470M16V20%V 8*20 3.5L.ESR	D300		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	D301		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V	D302		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
C630		015-26100-08	CAP CER 0805 100N 10% X7R 50V	D303		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C631A		015-26100-08	CAP CER 0805 100N 10% X7R 50V	D440		001-10066-00	DIODE SCHOTTKY HSMS2815
C634		014-08100-00	CAP TANT CHIP 10M 16VW +20%	D441		001-10066-00	DIODE SCHOTTKY HSMS2815
C636		015-26100-08	CAP CER 0805 100N 10% X7R 50V	D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C638		015-23120-01	CAP CER 0805 120P 5% NPO 50V	D620		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
C640		015-24100-08	CAP CER 0805 1N 10% X7R 50V	D630		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
C655		015-24100-08	CAP CER 0805 1N 10% X7R 50V	D635		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
C660		015-26100-08	CAP CER 0805 100N 10% X7R 50V	D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
C665		014-08100-03	CAP TANT SMD 10U 35V 20%	D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
C670		014-07330-10	CAP TANT SMD 3U3 35V 10%	D710		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C673		015-24470-08	CAP CER 0805 4N7 10% X7R 50V	D720		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
C677		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM	D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
C681		015-26100-08	CAP CER 0805 100N 10% X7R 50V	D740		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
C684		014-08100-00	CAP TANT CHIP 10M 16VW +20%	D810		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
C687		015-23120-01	CAP CER 0805 120P 5% NPO 50V				
C690		015-26100-08	CAP CER 0805 100N 10% X7R 50V	IC210		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C693		014-08100-00	CAP TANT CHIP 10M 16VW +20%	IC220		002-10126-70	S) IC SMD DS1267S10K 2XDIG POT
C700		015-26100-08	CAP CER 0805 100N 10% X7R 50V	IC230		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C703		015-24100-08	CAP CER 0805 1N 10% X7R 50V	IC240		002-10040-53	S)MC14053B SMD BREAK B4 MAKE
C706		015-22470-01	CAP CER 0805 47P 5% NPO 50V	IC250		002-10020-50	IC SMD 4N25A OPTOCOUPLER
C708		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	IC260		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C709		015-26100-08	CAP CER 0805 100N 10% X7R 50V	IC300		002-10003-58	S) IC SMD LM358 DUAL O-AMP
C710		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC310		002-10003-58	S) IC SMD LM358 DUAL O-AMP
C712		015-22470-01	CAP CER 0805 47P 5% NPO 50V	IC385		002-12951-00	IC SMD LP2951CM ADJ VLTGE REG
C714		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	IC610		002-10078-05	S) IC SMD 78L05 5V REG
C719		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	IC630		002-12523-17	(S)IC LM317L REG TO-252 0.5A
C720		015-26100-08	CAP CER 0805 100N 10% X7R 50V	IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP
C722		015-26100-08	CAP CER 0805 100N 10% X7R 50V	IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG
C724		014-08220-01	(L)CAP TANT 22UF10V276MSER	=IC700 10		539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
C725		014-08220-01	(L)CAP TANT 22UF10V276MSER	=IC700 15		539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
C726		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC710		002-74900-04	S) IC SMD 74HC04D 6X INV BUFFD
C727		015-23220-01	CAP CER 0805 220P 5% NPO 50V	IC720		002-74910-04	S) IC SMD 74HC04D 6X INV
C729		015-23220-01	CAP CER 0805 220P 5% NPO 50V	IC730		002-10045-20	S) IC SMD 74HC4520T 2XCTR 4BIT
%C733 10		015-23470-08	CAP CER 0805 470P 10% X7R 50V	IC740		002-14519-10	S) IC MC145191F SMD SYNTH
%C733 15		015-23470-08	CAP CER 0805 470P 10% X7R 50V	IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V	IC820		002-12416-00	S)IC SMD AT24C16N-10SC EEPROM
C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V	IC830		002-10003-24	S) IC SMD 324 4X O-AMP SO14
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L300		056-10820-02	(L) IND SMD 820NH
C741A		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L301		056-10820-02	(L) IND SMD 820NH
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L302		056-10820-02	(L) IND SMD 820NH
C742A		015-26100-08	CAP CER 0805 100N 10% X7R 50V	L303		052-08355-40	COIL A/W 4T/5.5mm SMD 0.8mm
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L304		052-08350-20	COIL A/W 2T/5.0MM SMD 0.8MM
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V	L305		052-08330-50	COIL A/W 5T/3.0MM SMD 0.8MM
C745		015-23120-01	CAP CER 0805 120P 5% NPO 50V	L306		056-10820-02	(L) IND SMD 820NH
C750		014-08100-03	CAP TANT SMD 10U 35V 20%	L307		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
C757		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L308		056-10102-12	IND SMD 1u2 1812CS 5%
C759		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L309		052-08340-50	COIL A/W 5T/4.0MM SMD 0.8MM
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L310		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C762		014-08220-01	(L)CAP TANT 22UF10V276MSER	L330		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L385		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C765		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L400		056-00021-00	IND FXD 3.3UH AX
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L401		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L410		052-08135-55	COIL A/W 5.5T/3.5MM HOR 0.8MM
C770		014-08220-01	(L)CAP TANT 22UF10V276MSER	L411		052-08140-15	COIL A/W 1.5T/4.0MM HOR 0.8MM
C772		014-08220-01	(L)CAP TANT 22UF10V276MSER	L412		065-00010-01	BEAD FERR 3B 6 HOLE
C776		015-25220-08	CAP CER 0805 22N 10% X7R 50V	L413		052-08140-65	COIL A/W 6.5T/4.0MM HOR 0.8MM
C778		022-07100-05	CAP METAL PPS 1U 20% 63V 5MM	L414		065-00010-01	BEAD FERR 3B 6 HOLE
C780		015-26100-08	CAP CER 0805 100N 10% X7R 50V	L415		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
C781		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L416		056-00021-04	IND FXD 330NH AX (uH33)
C782		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L425		052-08130-25	COIL A/W 2.5T/3.0MM HOR 0.8MM
C783		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L426		052-08320-10	COIL A/W 1T/2.0MM SMD 0.8MM
C784		015-23100-01	CAP CER 0805 100P 5% NPO 50V	L427		065-00010-01	BEAD FERR 3B 6 HOLE
C785		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L428		052-08150-55	COIL A/W 5.5T/5.0MM HOR 0.8MM
C786		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L440		052-08130-15	COIL A/W 1.5T/3.0MM HOR 0.8MM
C810		015-25470-08	CAP CER 0805 47N 10% X7R 50V	L441		052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V	L442		056-14330-02	(L) IND SMD 3.3UH
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L443		056-10820-02	(L) IND SMD 820NH
C822		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L444		056-10820-02	(L) IND SMD 820NH
C823		015-25220-08	CAP CER 0805 22N 10% X7R 50V	L445		056-14330-02	(L) IND SMD 3.3UH
C824		015-25470-08	CAP CER 0805 47N 10% X7R 50V	L480		056-10820-02	(L) IND SMD 820NH
C826		015-23220-01	CAP CER 0805 220P 5% NPO 50V	L520		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C827		015-22330-01	CAP CER 0805 33P 5% NPO 50V	L535		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C828		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L600		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C830		015-25470-08	CAP CER 0805 47N 10% X7R 50V	L615		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A

Ref	Var	IPN	Description	Ref	Var	IPN	Description
L780		056-10330-02	(L) IND SMD 330NH	R233		036-16100-00	RES M/F 0805 100K 5%
L900		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM	R235		036-14470-10	RES M/F 0805 4K7 1%
L901		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM	R237		036-15470-10	RES M/F 0805 47K 1%
L902		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM	R238		036-15470-10	RES M/F 0805 47K 1%
L903		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM	R239		036-14150-10	RES M/F 0805 1K5 1%
L904		052-08155-15	COIL A/W 1.5T/5.5MM HOR 0.8MM	R241		036-14470-10	RES M/F 0805 4K7 1%
PL100		070-01001-00	D-RANGE 15 WAY COMPL T800	R242		036-14220-00	RES M/F 0805 2K2 5%
PL205		240-00020-67	HEADER 6W 2X3 PCB MTG STD	R244		036-15100-10	RES M/F 0805 10K 1%
PL210		240-00020-67	HEADER 6W 2X3 PCB MTG STD	R245		036-16100-00	RES M/F 0805 100K 5%
PL215		240-00020-44	HEADER 10W X2R PCB MTG 5*2	R247		036-15100-10	RES M/F 0805 10K 1%
PL220		240-00020-67	HEADER 6W 2X3 PCB MTG STD	R248		036-16100-00	RES M/F 0805 100K 5%
Q210		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R249		036-16100-00	RES M/F 0805 100K 5%
Q220		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23	R251		036-16100-00	RES M/F 0805 100K 5%
Q230		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R253		036-16100-00	RES M/F 0805 100K 5%
Q240		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R254		036-16100-00	RES M/F 0805 100K 5%
Q250		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23	R255		036-15100-10	RES M/F 0805 10K 1%
Q260		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R256		036-15470-10	RES M/F 0805 47K 1%
Q270		000-10004-10	S) XSTR SMD MJD41C NPN SW DPAK	R257		036-16560-00	RES M/F 0805 560K 5%
Q300		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R258		036-16150-00	RES M/F 0805 150K 5%
Q301		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R259		036-15220-00	RES M/F 0805 22K 5%
Q302		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R260		036-15470-10	RES M/F 0805 47K 1%
Q303		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R262		036-15470-10	RES M/F 0805 47K 1%
Q304		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R263		036-14470-10	RES M/F 0805 4K7 1%
Q305		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	&R264	10	036-15220-00	RES M/F 0805 22K 5%
Q307		000-10095-10	S) XSTR SMD BR951 NPN UHF	&R264	15	036-15270-10	RES M/F 0805 27K 1%
Q308		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	&R265	10	036-15150-00	RES M/F 0805 15K 5%
Q309		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23	&R265	15	036-15180-00	RES M/F 0805 18K 5%
Q310		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	&R266	10	036-15470-10	RES M/F 0805 47K 1%
Q311		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	&R266	15	036-15560-10	RES MF 0805 56K 1%
Q312		000-10938-20	L)XSTR MRF9382TI HI FRQ PWRFET	R267		036-14220-00	RES M/F 0805 2K2 5%
Q315		000-00033-12	XSTR BD242 TO-220 PNP ISOLDT	R268		036-13100-10	RES M/F 0805 100E 1%
Q360		000-10017-00	LS) XSTR SMD BF170LT1 SOT23	R269		036-15100-10	RES M/F 0805 10K 1%
Q415		000-00026-27	S) XSTR 2SC2627 NPN 5W VHF STD	R270		036-14120-00	RES M/F 0805 1K2 5%
Q425		000-00000-60	S) XSTR BLW60C 45W 175MHZ RF	R271		036-17100-10	RES M/F 0805 1M 1%
Q510		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R272		036-13560-00	RES M/F 0805 560E 5%
Q520		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R273		036-15120-00	RES M/F 0805 12K 5%
Q530		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R274		036-15150-00	RES M/F 0805 15K 5%
Q540		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R275		036-14270-00	RES M/F 0805 2K7 5%
Q550		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R277		036-16100-00	RES M/F 0805 100K 5%
Q610		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R278		036-16120-00	RES M/F 0805 120K 5%
Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLDT	R279		036-17100-10	RES M/F 0805 1M 1%
Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89	R280		036-15100-10	RES M/F 0805 10K 1%
Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23	R282		036-15560-10	RES MF 0805 56K 1%
Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R283		036-15560-10	RES MF 0805 56K 1%
Q710		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R284		036-17100-10	RES M/F 0805 1M 1%
Q720		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R285		036-10000-00	RES M/F 0805 ZERO OHM
Q730		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R286		036-14220-00	RES M/F 0805 2K2 5%
Q740		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R287		036-15100-10	RES M/F 0805 10K 1%
Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF	R288		036-15120-00	RES M/F 0805 12K 5%
Q760		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R289		036-16100-00	RES M/F 0805 100K 5%
Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	&R290	10	036-13560-00	RES M/F 0805 560E 5%
Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	&R290	15	036-13560-00	RES M/F 0805 560E 5%
Q780		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R291		036-10000-00	RES M/F 0805 ZERO OHM
Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R292		036-14470-10	RES M/F 0805 4K7 1%
Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23	R293		036-15470-10	RES M/F 0805 47K 1%
Q795		000-10057-10	S) XSTR SMD BR571 NPN SOT23	R294		036-14470-10	RES M/F 0805 4K7 1%
Q810		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R295		036-14270-00	RES M/F 0805 2K7 5%
Q820		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23	R296		036-14100-10	RES M/F 0805 1K 1%
Q830		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	R297		036-14560-00	RES M/F 0805 5K6 5%
Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS	%R298	10	036-16100-00	RES M/F 0805 100K 5%
Q850		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	%R298	15	036-16100-00	RES M/F 0805 100K 5%
Q860		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS	R299		036-14270-00	RES M/F 0805 2K7 5%
R160		036-12100-00	RES M/F 0805 10E 5%	R300		036-15100-10	RES M/F 0805 10K 1%
R201		036-13560-00	RES M/F 0805 560E 5%	R301		036-14100-10	RES M/F 0805 1K 1%
R202		036-14100-10	RES M/F 0805 1K 1%	RV301		042-04220-05	RES PRESET SMD 2K CER 4MM SQ
R204		036-14220-00	RES M/F 0805 2K2 5%	R302		036-14100-10	RES M/F 0805 1K 1%
R205		036-13220-10	RES 0805 220E 1%	RV302		042-06500-05	RES PRESET SMD 500K CER 4MM SQ
R206		036-14100-10	RES M/F 0805 1K 1%	R303		036-15220-00	RES M/F 0805 22K 5%
R207		036-14390-10	RES M/F 0805 3K9 1%	R304		036-14150-10	RES M/F 0805 1K5 1%
R208		036-13560-00	RES M/F 0805 560E 5%	R305		036-15330-00	RES M/F 0805 33K 5%
R209		036-15100-10	RES M/F 0805 10K 1%	R306		036-14470-10	RES M/F 0805 4K7 1%
R210		036-14220-00	RES M/F 0805 2K2 5%	R307		036-15100-10	RES M/F 0805 10K 1%
RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT	R308		036-15100-10	RES M/F 0805 10K 1%
R211		036-13470-00	RES M/F 0805 470E 5%	R309		036-12470-00	RES M/F 0805 47E 5%
R212		036-16100-00	RES M/F 0805 100K 5%	R310		036-15100-10	RES M/F 0805 10K 1%
R213		036-15100-10	RES M/F 0805 10K 1%	R311		036-13100-10	RES M/F 0805 100E 1%
R214		036-14820-10	RES M/F 0805 8K2 1%	R312		036-14470-10	RES M/F 0805 4K7 1%
R215		036-16100-00	RES M/F 0805 100K 5%	R313		036-13560-00	RES M/F 0805 560E 5%
R216		036-16100-00	RES M/F 0805 100K 5%	R314		036-13560-00	RES M/F 0805 560E 5%
R217		036-14100-10	RES M/F 0805 1K 1%	R315		036-11330-00	RES M/F 0805 3E3 5%
R218		036-16150-00	RES M/F 0805 150K 5%	R316		036-14150-10	RES M/F 0805 1K5 1%
R219		036-14220-00	RES M/F 0805 2K2 5%	R317		036-14560-00	RES M/F 0805 5K6 5%
R220		036-13470-00	RES M/F 0805 470E 5%	R318		036-14270-00	RES M/F 0805 2K7 5%
RV220		042-05500-05	RES PRESET SMD 50K CER 4MM SQ	R319		036-15100-10	RES M/F 0805 10K 1%
R221		036-14150-10	RES M/F 0805 1K5 1%	%R320	10	036-15180-00	RES M/F 0805 18K 5%
R223		036-17100-10	RES M/F 0805 1M 1%	%R320	15	036-15180-00	RES M/F 0805 18K 5%
R224		036-14680-10	RES M/F 0805 6K8 1%	R321		036-15100-10	RES M/F 0805 10K 1%
R225		036-17100-10	RES M/F 0805 1M 1%	R322		036-14220-00	RES M/F 0805 2K2 5%
R226		036-15100-10	RES M/F 0805 10K 1%	R323		036-15470-10	RES M/F 0805 47K 1%
R227		036-14220-00	RES M/F 0805 2K2 5%	R324		036-15220-00	RES M/F 0805 22K 5%
R228		036-13120-00	RES M/F 0805 120E 5%	R325		036-15470-10	RES M/F 0805 47K 1%
R229		036-16470-00	RES M/F 0805 470K 5%	R326		036-15470-10	RES M/F 0805 47K 1%
R230		036-16100-00	RES M/F 0805 100K 5%	R327		036-15470-10	RES M/F 0805 47K 1%
R231		036-15100-10	RES M/F 0805 10K 1%	%R328	10	036-15180-00	RES M/F 0805 18K 5%
R232		036-16330-00	RES M/F 0805 330K 5%	%R328	15	036-15180-00	RES M/F 0805 18K 5%
				R329		036-14150-10	RES M/F 0805 1K5 1%
				R330		036-16100-00	RES M/F 0805 100K 5%
				R331		036-15100-10	RES M/F 0805 10K 1%

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R332		036-14220-00	RES M/F 0805 2K2 5%	R633		036-14680-10	RES M/F 0805 6K8 1%
R333		036-12680-00	RES M/F 0805 68E 5%	R637		036-12220-00	RES M/F 0805 22E 5%
R334		036-15220-00	RES M/F 0805 22K 5%	R638		036-12220-00	RES M/F 0805 22E 5%
R335		036-12680-00	RES M/F 0805 68E 5%	R640		036-12100-00	RES M/F 0805 10E 5%
R336		036-15100-10	RES M/F 0805 10K 1%	R641		036-14150-10	RES M/F 0805 1K5 1%
R337		036-16100-00	RES M/F 0805 100K 5%	R645		036-13470-00	RES M/F 0805 470E 5%
R338		036-16100-00	RES M/F 0805 100K 5%	R649		036-14470-10	RES M/F 0805 4K7 1%
R339		036-15150-00	RES M/F 0805 15K 5%	R653		036-15100-10	RES M/F 0805 10K 1%
R340		036-16100-00	RES M/F 0805 100K 5%	R655		036-10000-00	RES M/F 0805 ZERO OHM
R341		036-15150-00	RES M/F 0805 15K 5%	R656		036-10000-00	RES M/F 0805 ZERO OHM
R342		036-15100-10	RES M/F 0805 10K 1%	R657		036-15100-10	RES M/F 0805 10K 1%
R343		036-15470-10	RES M/F 0805 47K 1%	R661		036-15100-10	RES M/F 0805 10K 1%
R344		036-16470-00	RES M/F 0805 470K 5%	R665		036-16100-00	RES M/F 0805 100K 5%
R345		036-03150-02	RES RC-01 1206 150E 200V 250MW	R669		036-15470-10	RES M/F 0805 47K 1%
R346		036-12220-00	RES M/F 0805 22E 5%	R673		036-16100-00	RES M/F 0805 100K 5%
R347		036-12270-00	RES M/F 0805 27E 5%	R677		036-15470-10	RES M/F 0805 47K 1%
R348		036-16330-00	RES M/F 0805 330K 5%	R681		036-13100-10	RES M/F 0805 100E 1%
R349		036-14100-10	RES M/F 0805 1K 1%	R685		036-15150-00	RES M/F 0805 15K 5%
R350		036-13330-00	RES M/F 0805 330E 5%	R689		036-12100-00	RES M/F 0805 10E 5%
R351		036-14100-10	RES M/F 0805 1K 1%	R693		036-16100-00	RES M/F 0805 100K 5%
R352		036-14100-10	RES M/F 0805 1K 1%	R696		036-15560-1K	RES MF 0805 56K 1%
R353		036-10000-00	RES M/F 0805 ZERO OHM	R701		036-12220-00	RES M/F 0805 22E 5%
R354		036-13100-10	RES M/F 0805 100E 1%	R702		036-17100-10	RES M/F 0805 1M 1%
R355		036-03150-02	RES RC-01 1206 150E 200V 250MW	R703		036-17100-10	RES M/F 0805 1M 1%
R356		036-14220-00	RES M/F 0805 2K2 5%	R705		036-15100-10	RES M/F 0805 10K 1%
R358		036-16150-00	RES M/F 0805 150K 5%	R706		036-12100-00	RES M/F 0805 10E 5%
R359		036-16470-00	RES M/F 0805 470K 5%	R708		036-17100-10	RES M/F 0805 1M 1%
R360		036-14150-10	RES M/F 0805 1K5 1%	R710		036-13100-10	RES M/F 0805 100E 1%
R361		036-16150-00	RES M/F 0805 150K 5%	R711		036-13100-10	RES M/F 0805 100E 1%
R362		036-15470-10	RES M/F 0805 47K 1%	R712		036-12100-00	RES M/F 0805 10E 5%
R363		036-15560-10	RES MF 0805 56K 1%	R713		036-10000-00	RES M/F 0805 ZERO OHM
R364		036-13100-10	RES M/F 0805 100E 1%	R714		036-12100-00	RES M/F 0805 10E 5%
R365		036-13100-10	RES M/F 0805 100E 1%	%R715 10		036-14100-10	RES M/F 0805 1K 1%
R369		036-14470-10	RES M/F 0805 4K7 1%	%R715 15		036-14100-10	RES M/F 0805 1K 1%
R370		036-11330-00	RES M/F 0805 3E3 5%	R717		036-14270-00	RES M/F 0805 2K7 5%
R371		036-15180-00	RES M/F 0805 18K 5%	R718		036-15150-00	RES M/F 0805 15K 5%
R372		036-14330-10	RES M/F 0805 3K3 1%	R719		036-15150-00	RES M/F 0805 15K 5%
R373		036-12270-00	RES M/F 0805 27E 5%	R720		036-15390-00	RES M/F 0805 39K 5%
R374		036-16100-00	RES M/F 0805 100K 5%	R721		036-15100-10	RES M/F 0805 10K 1%
R375		036-13560-00	RES M/F 0805 560E 5%	R722		036-15100-10	RES M/F 0805 10K 1%
R376		036-14220-00	RES M/F 0805 2K2 5%	R723		036-14270-00	RES M/F 0805 2K7 5%
R377		036-14100-10	RES M/F 0805 1K 1%	R725		036-15390-00	RES M/F 0805 39K 5%
R378		036-12470-00	RES M/F 0805 47E 5%	%R726 10		036-13100-10	RES M/F 0805 100E 1%
R380		036-03033-10	RES 3E3 1W SMD 2512	%R726 15		036-13100-10	RES M/F 0805 100E 1%
R385		036-11330-00	RES M/F 0805 3E3 5%	R727		036-15100-10	RES M/F 0805 10K 1%
R386		036-16100-00	RES M/F 0805 100K 5%	R728		036-15100-10	RES M/F 0805 10K 1%
R387		036-14150-10	RES M/F 0805 1K5 1%	R734		036-13470-00	RES M/F 0805 470E 5%
R388		036-14680-10	RES M/F 0805 6K8 1%	R735		036-13470-00	RES M/F 0805 470E 5%
R389		036-14270-00	RES M/F 0805 2K7 5%	R736		036-13470-00	RES M/F 0805 470E 5%
R392		036-12220-00	RES M/F 0805 22E 5%	R742		036-13150-00	RES M/F 0805 150E 5%
R395		036-12220-00	RES M/F 0805 22E 5%	R743		036-13150-00	RES M/F 0805 150E 5%
R410		036-13270-00	RES M/F 0805 270E 5%	R744		036-12220-00	RES M/F 0805 22E 5%
R411		036-03118-10	RES 18R 1W SMD 2512	R746		036-12220-00	RES M/F 0805 22E 5%
R412		036-13270-00	RES M/F 0805 270E 5%	R747		036-12220-00	RES M/F 0805 22E 5%
R413		036-11330-00	RES M/F 0805 3E3 5%	R748		036-15470-10	RES M/F 0805 47K 1%
R414		036-03180-10	RES 180R 1W SMD 2512	R749		036-15470-10	RES M/F 0805 47K 1%
R415		036-03180-10	RES 180R 1W SMD 2512	R750		036-12220-00	RES M/F 0805 22E 5%
R416		036-03110-10	RES 10R 1W SMD 2512	R752		036-12220-00	RES M/F 0805 22E 5%
R425		036-11330-00	RES M/F 0805 3E3 5%	R753		036-17100-10	RES M/F 0805 1M 1%
R426		036-03110-10	RES 10R 1W SMD 2512	R754		036-14100-10	RES M/F 0805 1K 1%
R427		036-03110-10	RES 10R 1W SMD 2512	R756		036-15120-00	RES M/F 0805 12K 5%
R428		036-03180-10	RES 180R 1W SMD 2512	R757		036-15120-00	RES M/F 0805 12K 5%
R429		036-03180-10	RES 180R 1W SMD 2512	R758		036-14120-00	RES M/F 0805 1K2 5%
R440		036-15470-10	RES M/F 0805 47K 1%	R759		036-13330-00	RES M/F 0805 330E 5%
R441		036-13270-00	RES M/F 0805 270E 5%	R760		036-13180-00	RES M/F 0805 180E 5%
R442		036-13100-10	RES M/F 0805 100E 1%	R762		036-13100-10	RES M/F 0805 100E 1%
R443		036-13100-10	RES M/F 0805 100E 1%	R763		036-13100-10	RES M/F 0805 100E 1%
R444		036-13270-00	RES M/F 0805 270E 5%	R765		036-13680-00	RES M/F 0805 680E 5%
R445		036-15470-10	RES M/F 0805 47K 1%	R766		036-14100-10	RES M/F 0805 1K 1%
R480		045-04470-01	RES NTC 4K7 5% 5MM DISC	R767		036-13680-00	RES M/F 0805 680E 5%
R504		036-13330-00	RES M/F 0805 330E 5%	R769		036-13180-00	RES M/F 0805 180E 5%
R505		036-15270-10	RES M/F 0805 27K 1%	R771		036-14820-10	RES M/F 0805 8K2 1%
R510		036-14150-10	RES M/F 0805 1K5 1%	R772		036-15220-00	RES M/F 0805 22K 5%
R514		036-12180-00	RES M/F 0805 18E 5%	R774		036-14820-10	RES M/F 0805 8K2 1%
R515		036-12560-00	RES M/F 0805 56E 5%	R775		036-14270-00	RES M/F 0805 2K7 5%
R517		036-13330-00	RES M/F 0805 330E 5%	R777		036-14220-00	RES M/F 0805 2K2 5%
R518		036-12180-00	RES M/F 0805 18E 5%	R780		036-12100-00	RES M/F 0805 10E 5%
R519		036-13330-00	RES M/F 0805 330E 5%	R781		036-12100-00	RES M/F 0805 10E 5%
R520		036-16120-00	RES M/F 0805 120K 5%	R782		036-12680-00	RES M/F 0805 68E 5%
R522		036-12680-00	RES M/F 0805 68E 5%	R783		036-13220-10	RES 0805 220E 1%
R525		036-15470-10	RES M/F 0805 47K 1%	R784		036-14330-10	RES M/F 0805 3K3 1%
R530		036-15220-00	RES M/F 0805 22K 5%	R785		036-13100-10	RES M/F 0805 100E 1%
R533		036-12680-00	RES M/F 0805 68E 5%	R786		036-14100-10	RES M/F 0805 1K 1%
R535		036-15100-10	RES M/F 0805 10K 1%	R787		036-12560-00	RES M/F 0805 56E 5%
R540		036-14220-00	RES M/F 0805 2K2 5%	R801		036-16150-00	RES M/F 0805 150K 5%
R545		036-14470-10	RES M/F 0805 4K7 1%	R802		036-15470-10	RES M/F 0805 47K 1%
%R550 10		036-14470-10	RES M/F 0805 4K7 1%	RV805		042-05200-05	RES PRESET SMD 20K CER 4MM SQ
%R550 15		036-14470-10	RES M/F 0805 4K7 1%	R808		036-12100-00	RES M/F 0805 10E 5%
R555		036-14470-10	RES M/F 0805 4K7 1%	R809		036-14470-10	RES M/F 0805 4K7 1%
R560		036-13470-00	RES M/F 0805 470E 5%	R810		036-14470-10	RES M/F 0805 4K7 1%
R609		036-14100-10	RES M/F 0805 1K 1%	R811		036-14470-10	RES M/F 0805 4K7 1%
R613		036-13560-00	RES M/F 0805 560E 5%	R812		036-14470-10	RES M/F 0805 4K7 1%
R615		036-13100-10	RES M/F 0805 100E 1%	R813		036-14470-10	RES M/F 0805 4K7 1%
R617		036-10000-00	RES M/F 0805 ZERO OHM	R815		036-15470-10	RES M/F 0805 47K 1%
R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP	R816		036-16150-00	RES M/F 0805 150K 5%
R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP	R818		036-14470-10	RES M/F 0805 4K7 1%
R625		036-14100-10	RES M/F 0805 1K 1%	R819		036-14470-10	RES M/F 0805 4K7 1%
R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP	R821		036-15470-10	RES M/F 0805 47K 1%

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R822		036-15470-10	RES M/F 0805 47K 1%				
R824		036-14220-00	RES M/F 0805 2K2 5%				
R825		036-14220-00	RES M/F 0805 2K2 5%				
R826		036-14220-00	RES M/F 0805 2K2 5%				
R827		036-14220-00	RES M/F 0805 2K2 5%				
R828		036-14220-00	RES M/F 0805 2K2 5%				
R829		036-14220-00	RES M/F 0805 2K2 5%				
R830		036-14220-00	RES M/F 0805 2K2 5%				
R831		036-14220-00	RES M/F 0805 2K2 5%				
R832		036-14220-00	RES M/F 0805 2K2 5%				
R833		036-14220-00	RES M/F 0805 2K2 5%				
R835		036-14220-00	RES M/F 0805 2K2 5%				
R836		036-14220-00	RES M/F 0805 2K2 5%				
R837		036-14220-00	RES M/F 0805 2K2 5%				
R840		036-14220-00	RES M/F 0805 2K2 5%				
R841		036-14220-00	RES M/F 0805 2K2 5%				
R842		036-14220-00	RES M/F 0805 2K2 5%				
R843		036-14220-00	RES M/F 0805 2K2 5%				
R845		036-13470-00	RES M/F 0805 470E 5%				
R847		036-13470-00	RES M/F 0805 470E 5%				
R848		036-14470-10	RES M/F 0805 4K7 1%				
R849		036-13470-00	RES M/F 0805 470E 5%				
R850		036-13470-00	RES M/F 0805 470E 5%				
R853		036-14470-10	RES M/F 0805 4K7 1%				
R854		036-14470-10	RES M/F 0805 4K7 1%				
R855		036-14470-10	RES M/F 0805 4K7 1%				
R859		036-16150-00	RES M/F 0805 150K 5%				
R861		036-16150-00	RES M/F 0805 150K 5%				
R863		036-16150-00	RES M/F 0805 150K 5%				
R865		036-16100-00	RES M/F 0805 100K 5%				
R867		036-16100-00	RES M/F 0805 100K 5%				
R871		036-15470-10	RES M/F 0805 47K 1%				
R872		036-14470-10	RES M/F 0805 4K7 1%				
R873		036-15330-00	RES M/F 0805 33K 5%				
R874		036-14470-10	RES M/F 0805 4K7 1%				
R875		036-15470-10	RES M/F 0805 47K 1%				
R876		036-14470-10	RES M/F 0805 4K7 1%				
R877		036-14470-10	RES M/F 0805 4K7 1%				
R879		036-15100-10	RES M/F 0805 10K 1%				
SK200		240-10000-05	CONN SMD SKT 8W 2R M-MATCH				
SK205		240-02020-05	SKT STEREO PHONE JACK PCB MTG				
SK805		240-10000-07	CONN SMD SKT 16W 2R M-MATCH				
SK810		240-04020-42	SKT 44 PIN SMD PLCC				
SW230		232-00010-26	SWITCH PUSH SPDT R-ANG PCB MTG				
T210		053-00010-17	XFMR T4030 LINE MATCH POTCORE				
T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052				

T826 Mechanical & Miscellaneous Parts (220-01443-04)

IPN	Legend	Description	IPN	Legend	Description
002-08951-20		S) IC AT89C51 PLCC44 MIC 12MHZ			
008-00014-79		S)LED 3MM RED WITH WIRE			
008-00014-80		S)LED 3MM GREEN WITH WIRE			
220-01443-04		PCB T826 TX SII			
232-00020-26		BUTTON 232-00010-26 SWITCH			
240-02100-06		SKT COAX N TYPE PNL MTG OP-TER			
240-04020-62		SKT 2 W RECEP SHORTING LINK			
240-04021-77		SKT JACK 1.3 PCB MT 64W			
303-11169-04		CHASSIS PAINTED T800 SER II			
303-23118-00		COVER A3M2247 D RANGE T855/7			
303-50074-00		CLIP A3M2246 SPRING CLAMP T857			
308-01007-01		HANDLE BS SII 2 WASHERS INC			
308-13090-00		HSINK A4M2361 BRKT COPPER T856			
312-01052-02		LID TOP T800 SER II PTND			
312-01053-02		LID BOTTOM T800 SER II PNTD			
316-06621-00		PNL FRT TX T800 SERIES II			
349-00020-36		SCREW TT M3X8m PANTORX BLK			
349-00020-43		SCRW T/T M4X12MM P/POZ BZ			
349-00020-45		SCRW T/T M4X20MM P/POZ BZ			
349-00020-55		SCRW M3*8 P/P T/T BLCKZNC CHRM			
352-00010-08		NUT M3 COLD FORM HEX ST BZ			
352-00010-29		NUT M4 NYLOC HEX			
352-00010-35		NUT 8-32 UNC HEX XSTR MTG			
353-00010-13		WSHR M3 S/PROOF INT BZ			
353-00010-24		WSHR M4x8mm Flat			
362-00010-23		GASKET SIL TO-220 CLIP MTG.			
362-00010-33		GROMMET LED MTG 3MM			
399-00010-51		BAG PLASTIC 75*100MM			

T826 Grid Reference Index (IPN 220-01443-04)**How To Use This Grid Reference Index**

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C201	1:C1	2-B8	C305	1:F5	3-B4	C370	1:F7	3-N5	C516	1:J5	5-H4
C202	1:C1	2-C8	C306	1:F4	3-B0	C371	1:F7	3-M5	C520	1:J5	5-H0
C204	1:B3	2-E8	C307	1:F3	3-C2	C372	1:E5	3-M1	C522	1:H5	5-H3
C205	1:A3	2-E8	C308	1:F8	3-C8	C373	1:F5	3-N1	C530	1:J5	5-K2
C207	1:C7	2-B6	C309	1:F9	3-C7	C374	1:F5	3-N0	C535	1:K5	5-M2
C209	1:C6	2-D6	C310	1:F8	3-B6	C375	1:F6	3-N0	C536	1:K5	5-L2
C210	1:C7	2-K0	C311	1:F5	3-C4	C376	1:E6	3-P1	C537	1:J5	5-L2
C211	1:B7	2-F8	C312	1:F4	3-C0	C377	1:F6	3-P0	C545	1:J5	5-K2
C213	1:B6	2-G8	C313	1:E8	3-E6	C378	1:E6	3-P2	C546	1:K5	5-J3
C215	1:B6	2-G8	C314	1:F8	3-B6	C379	1:F6	3-Q1	C550	1:K5	5-K3
C217	1:C6	2-H8	C315	1:F3	3-C2	C380	1:F7	3-Q0	C600	1:L6	6-D8
C219	1:C6	2-H7	C316	1:F4	3-C1	C381	1:F7	3-Q0	C601	1:L6	6-D8
C221	1:D5	2-G6	C317	1:F4	3-C0	C385	1:E8	3-H8	C605	1:L6	6-C8
C223	1:C5	2-J6	C318	1:F8	3-C5	C386	1:E8	3-H8	C610A	1:M5	6-F8
C225	1:C3	2-K7	C319	1:F3	3-D2	C387	1:E8	3-J8	C610B	1:L5	6-F8
C227	1:B4	2-K7	C320	1:E7	3-D7	C388	1:E9	3-L8	C611A	1:M6	6-H8
C229	1:B3	2-L7	C323	1:F5	3-D4	C389	1:E9	3-L8	C611B	1:M5	6-H8
C230	1:B4	2-J0	C324	1:E8	3-F6	C390	1:E9	3-M8	C615	1:M6	6-R8
C232	1:A4	2-M7	C326	1:F5	3-D4	C393	1:F8	3-R5	C616	1:M6	6-R8
C233	1:B5	2-N7	C327	1:F5	3-E4	C395	1:F8	3-R3	C623	1:N6	6-M8
C235	1:B5	2-K5	C328	1:F3	3-E2	C396	1:F8	3-R3	C625	1:M6	6-Q8
C237	1:C4	2-K5	C329	1:E7	3-F4	C397	1:F8	3-R3	C626	1:M6	6-Q8
C239	1:C4	2-L4	C330	1:F3	3-F2	C400	1:G7	4-C7	C628	1:M6	6-Q8
C241	1:B4	2-M6	C331	1:E7	3-G3	C401	1:G8	4-C7	C630	1:M5	6-J5
C242	1:B4	2-L6	C332	1:E7	3-G4	C402	1:G8	4-D7	C631A	1:N5	6-L6
C243	1:B4	2-P6	C333	1:E8	3-G6	C403	1:G7	4-B7	C634	1:N5	6-L5
C245	1:C5	2-A4	C334	1:F4	3-G0	C410	1:H8	4-D3	C636	1:M5	6-M5
C247	1:C6	2-B4	C335	1:E8	3-G3	C411	1:H8	4-D2	C638	1:M5	6-N6
C249	1:D4	2-C4	C336	1:E7	3-G3	C412	1:H7	4-D5	C640	1:M5	6-Q6
C251	1:C3	2-E4	C337	1:E8	3-G6	C413	2:H8	4-E2	C655	1:M4	6-C1
C253	1:D3	2-E3	C338	1:F4	3-H0	C414	1:H7	4-E5	C660	1:L5	6-K1
C255	1:D3	2-D2	C339	1:E4	3-H3	C415	1:J7	4-E5	C665	1:L5	6-K1
C257	1:D3	2-F2	C340	1:E8	3-H7	C416	1:J9	4-E4	C670	1:L5	6-L1
C259	1:C6	2-J2	C341	1:E8	3-H7	C425	2:J8	4-G2	C673	1:L5	6-P2
C260	1:D8	2-H0	C342	1:F7	3-F4	C426	2:J8	4-G3	C677	1:L6	6-P1
C261	1:C6	2-K2	C344	1:F7	3-J5	C427	1:L7	4-G5	C681	1:L6	6-R3
C263	1:D6	2-L3	C346	1:E4	3-J1	C428	2:K8	4-G2	C684	1:L6	6-R3
C265	1:D6	2-N4	C347	1:E7	3-H5	C429	1:L7	4-G5	C687	1:L6	6-Q1
C267	1:C8	2-P3	C348	1:E4	3-J0	C430	1:L7	4-H5	C690	1:L6	6-R1
&C269	1:C8	2-P3	C349	1:E4	3-J0	C431	1:L7	4-J4	C693	1:L6	6-R1
&C271	1:C8	2-Q3	C350	1:E4	3-K0	C440	2:L8	4-J2	C700	1:K3	7-A8
C273	1:C8	2-Q4	C351	1:E5	3-K1	C441	2:L7	4-K2	C703	1:J3	7-B7
C275	1:C3	2-E1	C352	1:E5	3-K0	C442	1:L8	4-L2	C706	1:J2	7-B5
C277	1:C4	2-G1	C353	1:F8	3-L5	C443	1:G9	4-M5	#C707	1:K4	7-C8
C279	1:B4	2-G1	C354	1:E5	3-K0	C444	1:L8	4-L2	C708	1:J2	7-C9
C281	1:B5	2-J1	C355	1:F8	3-M7	C445	1:M9	4-M4	C709	1:K4	7-D9
C283	1:B5	2-K0	C356	1:F7	3-M6	C446	1:M8	4-M2	C710	1:J3	7-D8
C285	1:D7	2-L0	C357	1:E5	3-L1	C447	1:M8	4-M2	C711	1:J3	7-C5
C287	1:C6	2-M1	C358	1:E5	3-L1	C448	2:M8	4-N4	C712	1:H2	7-E7
&C289	1:C8	2-N1	C359	1:E5	3-L2	C449	1:M8	4-M4	%C713	1:H2	7-E6
C291	1:D7	2-P1	C360	1:E5	3-L1	C450	1:N7	4-N2	C714	1:J3	7-E8
C293	1:D7	2-Q1	C361	1:F8	3-M7	C451	1:N7	4-P2	C719	1:J3	7-F8
%C294	1:D7	2-Q0	C362	1:F5	3-L0	C452	1:G8	4-Q2	C720	1:J3	7-F8
%C295	1:C7	2-Q0	C363	1:F7	3-L6	C480	1:J8	4-P6	C722	1:J4	7-G8
C300	1:F5	3-B0	C364	1:F8	3-M7	C503	1:K6	5-L9	C724	1:J4	7-H6
C301	1:F8	3-C6	C365	1:F7	3-L7	C505	1:K5	5-M6	C725	1:J4	7-J6
C302	1:F8	3-B8	C366	1:E5	3-P3	C510	1:H5	5-C0	C726	1:K4	7-J6
C303	1:F9	3-B7	C367	1:E5	3-L2	C514	1:H5	5-H3	C727	1:J3	7-J8
C304	1:F8	3-C6	C369	1:F8	3-N7	C515	1:J5	5-F1	C729	1:H3	7-M8

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
%C733	1:H2	7-E3	D610	1:N6	6-L6	IC830	1:N3	8-C0	P259	1:B8	2-R3
C735	1:J2	7-A1	D620	1:N4	6-B2				P261	1:B8	2-R3
C736	1:J2	7-B1	D620	1:N4	6-B1	L300	1:F4	3-C0	P263	1:B1	2-R2
C740A	1:H2	7-B4	D630	1:M5	6-G2	L301	1:F4	3-D0	P267	1:C8	2-N2
C740B	1:H2	7-B3	D630	1:M5	6-G3	L302	1:E4	3-J2	P269	1:D8	2-P2
C741A	1:H2	7-C4	D635	1:M4	6-G3	L303	1:E4	3-J0	P271	1:C9	2-N1
C741B	1:G2	7-C3	D640	1:L5	6-M1	L304	1:E5	3-K0	P273	1:D9	2-P0
C742A	1:H2	7-D4	D640	1:L5	6-M2	L305	1:F5	3-L0	P275	1:D7	2-Q0
C742B	1:H3	7-D3	D645	1:M5	6-R6	L306	1:F5	3-L0	P290	1:D5	2-E0
C743	1:H2	7-B1	D710	1:J3	7-L8	L307	1:E6	3-P3	P291	1:D5	2-G0
C745	1:G3	7-D1	D710	1:J3	7-L8	L308	1:E6	3-P1	P805	1:M2	8-A7
C750	1:H4	7-Q7	D720	1:H3	7-P8	L309	1:F6	3-P0	P810	1:L3	8-A5
C757	1:G4	7-F5	D720	1:H3	7-P8	L310	1:F8	3-B6	P820	1:L4	8-M8
C759	1:G4	7-G4	D730	1:H3	7-H1	L330	1:F5	3-E5	P825	1:L4	8-M8
C761	1:G3	7-J4	D740	1:H3	7-J2	L385	1:E8	3-G9	P830	1:L4	8-M8
C762	1:G3	7-J4	D810	1:M2	8-B7	L400	1:G7	4-C7	P835	1:L4	8-M7
C764	1:H3	7-H2				L401	1:G8	4-C7	P840	1:L4	8-M7
C765	1:G3	7-J2	IC210	1:C7	2-C6	L410	1:H8	4-D2			
C767	1:H3	7-K3	IC210	1:C7	2-J0	L411	1:H8	4-E3	PL100	1:P3	1-M0
C769	1:J3	7-M4	IC210	1:C7	2-L1	L412	1:H8	4-E2	PL205	1:C5	2-J8
C770	1:H4	7-N4	IC210	1:C7	2-K2	L413	1:H9	4-E3	PL210	1:C3	2-H4
C772	1:G4	7-M2	IC210	1:C7	2-Q0	L414	1:J7	4-F5	PL215	1:C4	2-K3
C776	1:H3	7-L1	IC220	1:C6	2-D5	L415	1:J7	4-F5	PL220	1:C4	2-H2
C778	1:H4	7-M1	IC220	1:C6	2-P0	L416	1:J7	4-F4			
C780	1:G2	7-N1	IC220	1:C6	2-M3	L425	1:J8	4-G3	Q210	1:C6	2-J8
C781	1:G2	7-P1	IC230	1:B4	2-J0	L426	2:K8	4-H3	Q220	1:B3	2-L7
C782	1:G2	7-P1	IC230	1:B4	2-J0	L427	1:J7	4-H2	Q230	1:A4	2-M8
C783	1:G3	7-P0	IC230	1:B4	2-L5	L428	1:M7	4-J5	Q240	1:B7	2-Q7
C784	1:G4	7-Q0	IC230	1:B4	2-N6	L440	1:L8	4-K4	Q250	1:B7	2-R6
C785	1:G3	7-Q1	IC230	1:B4	2-G1	L441	1:L8	4-L4	Q260	1:C4	2-F3
C786	1:G4	7-Q0	IC240	1:D4	2-F3	L442	1:G9	4-M5	Q270	1:D2	2-D1
C810	1:L3	8-K8	IC250	1:D3	2-E1	L443	1:M8	4-N4	Q300	1:F5	3-B3
C812	1:L2	8-F5	IC260	1:D8	2-N0	L444	1:N7	4-N3	Q301	1:F4	3-C1
C813	1:K2	8-J5	IC260	1:D8	2-H0	L445	1:G8	4-P3	Q302	1:F5	3-C4
C822	1:M2	8-B2	IC260	1:D8	2-Q2	L480	1:J9	4-P6	Q303	1:E7	3-J5
C823	1:M3	8-C2	IC260	1:D8	2-Q3	L520	1:H5	5-G3	Q304	1:E7	3-F3
C824	1:M2	8-C1	IC260	1:D8	2-N3	L535	1:K5	5-L2	Q305	1:E8	3-H3
C826	1:N3	8-C0	IC300	1:F9	3-C7	L600	1:L6	6-D8	Q307	1:F4	3-J0
C827	1:N3	8-D0	IC300	1:F9	3-Q5	L615	1:M6	6-R8	Q308	1:F7	3-K6
C828	1:N3	8-E0	IC300	1:F9	3-C8	L780	1:G3	7-Q0	Q309	1:F8	3-M6
C830	1:N3	8-R1	IC310	1:E8	3-D6	L900	1:P8	9-D6	Q310	1:E5	3-L2
C838	1:N4	8-F0	IC310	1:E8	3-Q3	L901	1:P7	9-E6	Q311	1:F7	3-G5
C841	1:N2	8-L2	IC310	1:E8	3-H7	L902	1:P7	9-F6	Q312	1:F6	3-P0
C844	1:M2	8-L2	IC385	1:E9	3-J8	L903	1:P6	9-H6	Q315	1:F8	3-N6
C900	1:N8	9-D4	IC610	1:L5	6-G8	L904	1:P7	9-F5	Q360	1:E7	3-K5
C901	1:P7	9-E4	IC630	1:N5	6-K5				Q415	2:J8	4-F3
C902	1:P8	9-E4	IC640	1:M5	6-M5	LINK1	2:B2	2-E9	Q425	2:K8	4-J3
C903	1:P7	9-F4	IC640	1:M5	6-Q6	LINK2	2:A2	2-E8	Q510	1:J5	5-D1
C904	1:P7	9-F4	IC640	1:M5	6-F1				Q520	1:J5	5-G3
C905	1:P6	9-G4	IC650	1:L5	6-F4	P100	1:Q6	1-R8	Q530	1:J5	5-G0
C906	1:P7	9-H4	=IC700	1:K3	7-A8	P150	1:P2	1-Q4	Q540	1:J5	5-L2
C907	1:P6	9-H4	IC710	1:J2	7-D8	P160	1:P2	1-Q4	Q550	1:K5	5-L4
			IC710	1:J2	7-C6	P170	1:P2	1-Q3	Q610	1:L6	6-D8
%D111	1:P5	1-R1	IC710	1:J2	7-C5	P204	1:D1	2-A8	Q620	1:N6	6-P8
%D111A	1:P5	1-Q1	IC710	1:J2	7-D6	P208	1:D1	2-A8	Q630	1:M6	6-P5
%D205	1:B2	2-D9	IC710	1:J2	7-D7	P210	1:D3	2-A3	Q660	1:L5	6-N1
%D210	1:B2	2-D9	IC710	1:J2	7-D6	P215	1:D4	2-A2	Q670	1:L6	6-Q2
D220	1:B4	2-P7	IC710	1:J2	7-C6	P217	1:D4	2-A2	Q710	1:J3	7-K8
D220	1:B4	2-P6	IC720	1:J3	7-P6	P219	1:D2	2-A1	Q720	1:J3	7-K8
D230	1:B7	2-R5	IC720	1:J3	7-G0	P225	1:D2	2-A0	Q730	1:H3	7-N8
D240	1:D4	2-C4	IC720	1:J3	7-N7	P230	1:C5	2-B0	Q740	1:H3	7-N8
D240	1:D4	2-B2	IC720	1:J3	7-M7	P231	1:D8	2-B0	Q750	1:G4	7-F3
D250	1:D3	2-E2	IC720	1:J3	7-K7	P233	1:C1	2-R9	Q760	1:H3	7-H3
D250	1:D3	2-D3	IC720	1:J3	7-E8	P235	1:C1	2-R9	Q770	1:H3	7-H1
D260	1:C3	2-C2	IC720	1:J3	7-G0	P237	1:B7	2-R8	Q775	1:H3	7-K3
D260	1:C3	2-C2	IC730	1:J4	7-H8	P239	1:C7	2-R8	Q780	1:H3	7-K3
D270	1:C2	2-C1	IC730	1:J4	7-G7	P240	1:C7	2-R8	Q785	1:H3	7-K2
D270	1:C2	2-C1	IC740	1:H2	7-D1	P243	1:B7	2-R7	Q790	1:H3	7-L3
D300	1:F4	3-B0	IC750	1:H4	7-M3	P244	1:B7	2-R7	Q795	1:G3	7-P0
D301	1:F4	3-C0	IC750	1:H4	7-H5	P245	1:B8	2-R6	Q810	1:M2	8-E7
D302	1:F4	3-C0	IC750	1:H4	7-Q7	P247	1:B8	2-R6	Q820	1:L2	8-D5
D303	1:E6	3-M0	IC820	1:L4	8-N2	P248	1:B7	2-R6	Q830	1:L2	8-D5
D303	1:E6	3-L0	IC830	1:N3	8-J0	P249	1:C7	2-R5	Q840	1:L2	8-F5
D440	1:M8	4-M5	IC830	1:N3	8-Q1	P251	1:C7	2-R5	Q850	1:M2	8-G5
D441	1:N7	4-P3	IC830	1:N3	8-J0	P255	1:D4	2-R4	Q860	1:L4	8-B3
D610	1:N6	6-K6	IC830	1:N3	8-J1	P257	1:C2	2-R4			

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
%R150	1:P2	1-R4	R285	1:C8	2-M0	R362	1:E5	3-K2	R653	1:M5	6-P5
R160	1:P2	1-R3	R286	1:C7	2-M0	R363	1:E5	3-K1	R655	1:L4	6-D4
%R200	1:B2	2-C9	R287	1:D9	2-M0	R364	1:F8	3-M7	R656	1:L4	6-D4
R201	1:B3	2-E9	R288	1:C6	2-M2	R365	1:F7	3-M6	R657	1:M5	6-D1
R202	1:C1	2-F9	R289	1:D9	2-M0	R369	1:F7	3-M5	R661	1:M5	6-E3
%R203	1:B3	2-C8	&R290	1:C8	2-N2	R370	1:E5	3-L1	R665	1:M5	6-E2
R204	1:C7	2-B6	R291	1:C8	2-N1	R371	1:E5	3-L1	R669	1:M5	6-E2
R205	1:C7	2-D6	R292	1:D8	2-Q2	R372	1:E6	3-L1	R673	1:M5	6-E0
R206	1:B7	2-G8	R293	1:D9	2-Q2	R373	1:F5	3-M0	R677	1:M4	6-F4
R207	1:B6	2-G8	R294	1:D9	2-Q1	R374	1:F7	3-N5	R681	1:L5	6-L2
R208	1:B6	2-G8	R295	1:D8	2-R1	R375	1:F7	3-N5	R685	1:L5	6-N2
R209	1:C6	2-H8	R296	1:D6	2-P0	R376	1:E6	3-M1	R689	1:L6	6-Q3
R210	1:B6	2-H7	R297	1:D7	2-P1	R377	1:F6	3-N1	R693	1:L5	6-Q1
R211	1:B2	2-D9	%R298	1:D7	2-Q0	R378	1:F6	3-N0	R696	1:L5	6-Q1
R212	1:D4	2-F6	R299	1:C7	2-R0	R380	1:E6	3-P2	R701	1:K4	7-A9
R213	1:C4	2-G6	R300	1:F4	3-B0	R385	1:E8	3-G9	R702	1:K4	7-C9
R214	1:D4	2-G6	R301	1:F9	3-B9	R386	1:E9	3-K8	R703	1:J3	7-C8
R215	1:C4	2-H6	R302	1:F9	3-B8	R387	1:E9	3-L7	=R705	1:K3	7-A7
R216	1:C3	2-K7	R303	1:F4	3-B1	R388	1:E8	3-L8	R705	1:J3	7-C5
R217	1:A4	2-M8	R304	1:F5	3-B0	R389	1:E8	3-L8	R706	1:H3	7-C5
R218	1:A5	2-N7	R305	1:F3	3-B2	R392	1:F8	3-Q5	R708	1:J3	7-B5
R219	1:B4	2-N8	R306	1:F8	3-C6	R395	1:F8	3-Q4	R710	1:H2	7-E7
R220	1:B2	2-E9	R307	1:F8	3-B8	R410	1:G8	4-C2	R711	1:J2	7-B6
R221	1:B7	2-R7	R308	1:F9	3-B7	R411	1:G8	4-C3	R712	1:J2	7-D8
R223	1:B4	2-K6	R309	1:F4	3-B0	R412	1:G8	4-C2	R713	1:J3	7-F8
R224	1:C4	2-K5	R310	1:F5	3-B4	R413	1:H7	4-E5	R714	1:J3	7-D9
R225	1:B4	2-L5	R311	1:F8	3-B6	R414	1:J9	4-F4	%R715	1:K4	7-H6
R226	1:B4	2-L4	R312	1:F8	3-B6	R415	1:J7	4-F5	R717	1:J4	7-H7
R227	1:B4	2-M4	R313	1:F8	3-C5	R416	1:H8	4-F2	R718	1:J4	7-H7
R228	1:A2	2-E9	R314	1:F4	3-C0	R425	1:L7	4-H5	R719	1:J4	7-J6
R229	1:B4	2-M7	R315	1:E7	3-E7	R426	1:K7	4-H3	R720	1:J3	7-K7
R230	1:B4	2-M6	R316	1:F4	3-C1	R427	1:J7	4-H2	R721	1:J3	7-K9
R231	1:B4	2-M6	R317	1:E8	3-E7	R428	1:L7	4-H5	R722	1:J3	7-K8
R232	1:B4	2-M5	R318	1:E8	3-E6	R429	1:K7	4-H4	R723	1:H3	7-M7
R233	1:B4	2-M6	R319	1:E8	3-E6	R440	1:M9	4-L4	R725	1:J4	7-N7
R235	1:B4	2-P6	%R320	1:F8	3-C5	R441	1:M8	4-N4	%R726	1:J3	7-N6
R237	1:B7	2-Q7	R321	1:F7	3-F5	R442	1:M7	4-N3	R727	1:H3	7-N9
R238	1:B7	2-R7	R322	1:F7	3-F4	R443	1:N8	4-N4	R728	1:H3	7-N8
R239	1:B8	2-R6	R323	1:F5	3-D4	R444	1:N7	4-P3	R734	1:K2	7-A2
R241	1:B8	2-Q6	R324	1:F5	3-C3	R445	1:N7	4-P2	R735	1:K2	7-A2
R242	1:B7	2-Q5	R325	1:E8	3-F6	R480	1:J8	4-N6	R736	1:K2	7-A2
R244	1:C6	2-A5	R326	1:F8	3-D8	R504	1:K6	5-K9	R742	1:H2	7-B4
R245	1:D4	2-D4	R327	1:F8	3-D7	R505	1:K6	5-L8	R743	1:H2	7-C5
R247	1:D3	2-E4	%R328	1:E8	3-D5	R510	1:K6	5-L7	R744	1:G2	7-D4
R248	1:C3	2-E3	R329	1:F5	3-D3	R514	1:K5	5-M5	R746	1:H3	7-E4
R249	1:D4	2-F3	R330	1:F5	3-D4	R515	1:H6	5-J5	R747	1:H3	7-E5
R251	1:C4	2-G4	R331	1:E7	3-H5	R517	1:G5	5-E2	R748	1:J2	7-A1
R253	1:C6	2-J2	R332	1:E7	3-H5	R518	1:G5	5-F2	R749	1:J2	7-B1
R254	1:C7	2-K3	R333	1:F5	3-E5	R519	1:G5	5-F2	R750	1:H4	7-Q7
R255	1:C7	2-K2	R334	1:E7	3-E3	R520	1:H5	5-C1	R752	1:G4	7-F5
R256	1:D8	2-M3	R335	1:F3	3-F2	R522	1:H5	5-H3	R753	1:G4	7-F3
R257	1:D8	2-N5	R336	1:E7	3-F4	R525	1:H5	5-D1	R754	1:G3	7-F3
R258	1:D8	2-N4	R337	1:E7	3-F2	R530	1:J5	5-D0	R756	1:G3	7-G5
R259	1:D6	2-P4	R338	1:E7	3-F3	R533	1:K5	5-L2	R757	1:G4	7-G4
R260	1:D8	2-N4	R339	1:E7	3-F3	R535	1:J5	5-F1	R758	1:H3	7-H4
R262	1:D8	2-N3	R340	1:E8	3-G6	R540	1:J5	5-H3	R759	1:H3	7-H4
R263	1:C8	2-P3	R341	1:E7	3-G3	R545	1:J5	5-H0	R760	1:H3	7-K4
&R264	1:C8	2-P3	R342	1:E8	3-G4	%R550	1:J5	5-J2	R762	1:H3	7-K4
&R265	1:C8	2-P3	R343	1:E7	3-J5	%R553	1:J5	5-J2	R763	1:H3	7-L4
&R266	1:C8	2-P3	R344	1:E8	3-G5	R555	1:J5	5-K3	R765	1:H3	7-H2
R267	1:C8	2-R2	R345	1:E4	3-H1	R560	1:K5	5-K4	R766	1:G3	7-J3
R268	1:D2	2-C0	R346	1:F4	3-G0	R609	1:L6	6-B8	R767	1:H3	7-K2
R269	1:D3	2-C1	R347	1:F4	3-H0	R613	1:L6	6-C8	R769	1:H3	7-K3
R270	1:D3	2-D1	R348	1:E8	3-H4	R615	1:M5	6-F9	R771	1:H4	7-L3
R271	1:C3	2-E1	R349	1:E7	3-J5	R617	1:M5	6-J8	R772	1:G4	7-M2
R272	1:C4	2-F2	R350	1:F4	3-H0	R619	1:N6	6-K8	R774	1:H4	7-M3
R273	1:B5	2-G2	R351	1:E4	3-H0	R621	1:N6	6-K8	R775	1:H3	7-L2
R274	1:C4	2-G1	R352	1:F4	3-H0	R625	1:N6	6-K7	R777	1:H4	7-R2
R275	1:C4	2-H0	R353	1:E4	3-H1	R629	1:M6	6-P6	R780	1:G2	7-N2
R277	1:B5	2-J1	R354	1:E8	3-H6	R633	1:M5	6-P8	R781	1:G2	7-N2
R278	1:B5	2-J0	R355	1:E4	3-H1	R637	1:M5	6-J6	R782	1:G3	7-P1
R279	1:B5	2-K0	R356	1:E8	3-J6	R638	1:M5	6-J6	R783	1:G3	7-P0
R280	1:B5	2-K0	R358	1:E4	3-J0	R640	1:M5	6-Q6	R784	1:G3	7-Q2
R282	1:D7	2-K1	R359	1:E7	3-K5	R641	1:N5	6-K5	R785	1:G3	7-Q1
R283	1:D7	2-L1	R360	1:E7	3-K5	R645	1:N5	6-L5	R786	1:G3	7-R1
R284	1:D7	2-L0	R361	1:E4	3-J0	R649	1:M5	6-M5	R787	1:G4	7-R0

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
R801	1:M2	8-D7	SK805	1:K3	8-Q9						
R802	1:M2	8-D7	SK805	1:K3	8-Q6						
R808	1:L2	8-B4	SK805	1:K3	8-Q9						
R809	1:L2	8-D5	SK805	1:K3	8-Q7						
R810	1:L3	8-D6	SK805	1:K3	8-Q8						
R811	1:L2	8-E6	SK805	1:K3	8-Q6						
R812	1:L2	8-D5	SK805	1:K3	8-Q5						
R813	1:L2	8-D4	SK805	1:K3	8-Q7						
R815	1:L2	8-F4	SK805	1:K3	8-Q8						
R816	1:L2	8-F4	SK805	1:K3	8-Q7						
R818	1:M2	8-F5	SK805	1:K3	8-Q8						
R819	1:M2	8-F5	SK805	1:K3	8-Q6						
R821	1:M4	8-B3	SK805	1:K3	8-Q8						
R822	1:M4	8-E3	SK810	1:M3	8-H5						
R824	1:L4	8-L8									
R825	1:L4	8-L8	SL201	2:D1	2-B9						
R826	1:L4	8-L8	SL202	2:D1	2-B8						
R827	1:L4	8-L7	SL203	2:D2	2-B1						
R828	1:L4	8-L7	SL204	2:D2	2-B1						
R829	1:L4	8-P9	SL480	1:H9	4-P6						
R830	1:L3	8-P9	SL501	2:J5	5-E0						
R831	1:L3	8-P9	SL810	1:M2	8-C7						
R832	1:L3	8-P8									
R833	1:L3	8-P8	SW230	1:B8	2-A3						
R835	1:L3	8-P8									
R836	1:L3	8-P8	T210	1:B2	2-C8						
R837	1:L3	8-P7	T610	1:L6	6-N2						
R840	1:L3	8-P7									
R841	1:L3	8-P7	TP206	1:C5	2-H7						
R842	1:L3	8-P6	TP300	1:F5	3-A5						
R843	1:L3	8-P6	TP301	1:F3	3-A2						
R845	1:M4	8-Q5	TP303	1:F7	3-P3						
R847	1:L2	8-Q4	TP310	1:F5	3-B3						
R848	1:L2	8-J4	TP315	1:F3	3-D1						
R849	1:L2	8-Q4	TP601	1:N5	6-K9						
R850	1:K2	8-Q4	TP602	1:M6	6-Q9						
R853	1:M4	8-N3	TP603	1:L5	6-J2						
R854	1:M4	8-N3	TP604	1:L4	6-L6						
R855	1:M2	8-B0	TP607	1:L5	6-J9						
R859	1:N2	8-C1	TP710	1:G4	7-H5						
R861	1:N2	8-D1	TP715	1:J2	7-C6						
R863	1:N3	8-E1									
R865	1:N4	8-E0									
R867	1:N3	8-E1									
R871	1:N3	8-G2									
R872	1:M4	8-H1									
R873	1:N3	8-G1									
R874	1:N3	8-H0									
R875	1:N3	8-G0									
R876	1:N3	8-H0									
R877	1:M2	8-K2									
R879	1:N2	8-L3									
RV210	1:B7	2-F9									
RV220	1:A4	2-M6									
RV301	1:E8	3-E6									
RV302	1:F7	3-G5									
RV805	1:N4	8-F1									
SK200	1:D5	2-F0									
SK205	1:B5	2-A5									
SK501	1:G6	5-D6									
SK502	1:G6	5-D5									
SK503	1:G6	5-D4									
SK504	1:G5	5-D3									
SK505	1:G5	5-D2									
SK513	1:H5	5-G3									
SK522	1:H6	5-K5									
SK531	1:K6	5-N6									
SK532	1:K5	5-N5									
SK533	1:K5	5-N4									
SK534	1:K5	5-N3									
SK535	1:K5	5-N2									
=SK710	1:K3	7-A7									
SK805	1:K3	8-Q9									
SK805	1:K3	8-Q7									
SK805	1:K3	8-Q6									

6.3 T827 Exciter PCB

This section contains the following information.

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	Grid Reference Index	6.3.11
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	Exciter Overview Diagram	6.3.17
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	13.8V Supply Filter Circuit Diagram (PA Cavity)	6.3.20
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	Microcontroller Circuit Diagram	6.3.24
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T827 Parts List (IPN 220-01447-04)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A number in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The miscellaneous and mechanical section lists the variant and common parts in IPN order. Where possible, a number in the legend column indicates their position in the mechanical assembly drawing.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Parts List Amendments - Continued

This page is provided for entering future amendments to the parts list.

Ref	Var	IPN	Description	Ref	Var	IPN	Description
Note: %D205 and %D210 are optional level limiting diodes for special applications. =R705 (47 ohm) and =SK710 are fitted in place of =IC700 when an external frequency reference is used. These two components are supplied with the auxiliary D-range kits (T800-06-0000 & T800-06-0001).				C337		015-22220-01	CAP CER 0805 22P 5% NPO 50V
				C338		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C339		014-07470-01	CAP 4U7 'B' CASE 25V +-10% 267
				C340		015-22560-01	CAP CER 0805 56P 5% NPO 50V
				C341		015-04100-06	CAP CER 1210 1Nf NPO200V GRM42
				C342		015-04100-06	CAP CER 1210 1Nf NPO200V GRM42
				C343		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C344		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C350		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C351		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C352		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C353		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
				C354		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C355		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C356		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C357		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C365		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C366		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C367		015-25100-08	CAP CER 0805 10N 10% X7R 50V
				C368		015-25220-08	CAP CER 0805 22N 10% X7R 50V
				C369		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C370		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C380		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C381		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C382		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C383		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C384		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C385		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C386		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C390		015-25100-08	CAP CER 0805 10N 10% X7R 50V
				C391		014-08100-03	CAP TANT SMD 10U 35V 20%
				C392		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C393		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C394		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
				C395		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C396		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
				C397		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C400		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C401		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C402		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C403		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C503		015-24220-08	CAP CER 0805 2N2 10% X7R 50V
				C505		015-25470-08	CAP CER 0805 47N 10% X7R 50V
				C510		015-25220-08	CAP CER 0805 22N 10% X7R 50V
				C513		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C515		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C516		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C517		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C520		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C535		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C536		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C537		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C542		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C545		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C546		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C550		014-08220-01	(L)CAP TANT 22UF10V276MSER
				C600		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C601		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C605		015-23120-01	CAP CER 0805 120P 5% NPO 50V
				C610A		015-25100-08	CAP CER 0805 10N 10% X7R 50V
				C610B		014-09100-00	CAP TANT SMD 100U 16V 20%
				C611A		014-09100-00	CAP TANT SMD 100U 16V 20%
				C611B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
				C615		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C616		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C623		015-23120-01	CAP CER 0805 120P 5% NPO 50V
				C625		020-09470-07	CAPEL470M16V20%V 8*20 3.5L.ESR
				C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
				C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C630		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C631A		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C634		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
				C636		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C638		015-23120-01	CAP CER 0805 120P 5% NPO 50V
				C640		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C655		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C660		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C665		014-08100-03	CAP TANT SMD 10U 35V 20%
				C670		014-07330-10	CAP TANT SMD 3U3 35V 10%
				C673		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
				C677		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
				C681		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C684		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
				C687		015-23120-01	CAP CER 0805 120P 5% NPO 50V
				C690		015-26100-08	CAP CER 0805 100N 10% X7R 50V
				C693		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
				C700		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C703		015-24100-08	CAP CER 0805 1N 10% X7R 50V
				C706		015-22470-01	CAP CER 0805 47P 5% NPO 50V
				C708		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
				C709		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C710		015-25100-08	CAP CER 0805 10N 10% X7R 50V
				C711		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C712		015-22470-01	CAP CER 0805 47P 5% NPO 50V
				C714		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
				C719		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM
				C720		015-06100-08	CAP CER 1206 100N 10% X7R 50V
				C722		015-06100-08	CAP CER 1206 100N 10% X7R 50V

Ref	Var	IPN	Description	Ref	Var	IPN	Description
C724		014-08220-01	(L)CAP TANT 22UF10V276MSER	IC720		002-74910-04	S) IC SMD 74HCU04 6X INV
C725		014-08220-01	(L)CAP TANT 22UF10V276MSER	IC730		002-10045-20	S) IC SMD 74HC4520T 2XCTR 4BIT
C726		015-25100-08	CAP CER 0805 10N 10% X7R 50V	IC740		002-14519-10	S) IC MC145191F SMD SYNTH
C727		015-23220-01	CAP CER 0805 220P 5% NPO 50V	IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
C729		015-23220-01	CAP CER 0805 220P 5% NPO 50V	IC820		002-12416-00	S) IC SMD AT24C16N-10SC EEPROM
%C733 10		015-23470-08	CAP CER 0805 470P 10% X7R 50V	IC830		002-10003-24	S) IC SMD 324 4X O-AMP SO14
%C733 15		015-23470-08	CAP CER 0805 470P 10% X7R 50V				
C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V	L320		056-10820-02	(L) IND SMD 820NH
C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V	L321		056-10820-02	(L) IND SMD 820NH
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L322		056-10820-02	(L) IND SMD 820NH
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L323		052-08345-60	COIL A/W 6T/4.5mm SMD 0.8mm
C741A		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L324		052-08340-50	COIL A/W 5T/4.0MM SMD 0.8MM
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L325		052-08330-50	COIL A/W 5T/3.0MM SMD 0.8MM
C742A		015-06100-08	CAP CER 1206 100N 10% X7R 50V	L326		056-10820-02	(L) IND SMD 820NH
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L327		065-10009-20	BEAD FER SMD BDS 3/3/8.9-4S2
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V	L328		056-10102-12	IND SMD 1u2 1812CS 5%
C745		015-23120-01	CAP CER 0805 120P 5% NPO 50V	L329		052-08340-50	COIL A/W 5T/4.0MM SMD 0.8MM
C750		014-08100-03	CAP TANT SMD 10U 35V 20%	L380		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C757		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L381		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C759		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L390		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L400		065-10009-20	BEAD FER SMD BDS 3/3/8.9-4S2
C762		014-08220-01	(L)CAP TANT 22UF10V276MSER	L510		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V	L535		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C765		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	L600		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L615		057-10120-03	IND 805 EMI SUP 120E@100M 0.2A
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V	L780		056-10330-02	(L) IND SMD 330NH
C770		014-08220-01	(L)CAP TANT 22UF10V276MSER	L900		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM
C772		014-08220-01	(L)CAP TANT 22UF10V276MSER	L901		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM
C776		015-25220-08	CAP CER 0805 22N 10% X7R 50V	L902		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM
C778		022-07100-05	CAP METAL PPS 1U 20% 63V 5MM	L903		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM
C780		015-06100-08	CAP CER 1206 100N 10% X7R 50V	L904		052-08155-15	COIL A/W 1.5T/5.5MM HOR 0.8MM
C781		015-24100-08	CAP CER 0805 1N 10% X7R 50V	PL100		070-01001-00	D-RANGE 15 WAY COMPL T800
C782		015-24100-08	CAP CER 0805 1N 10% X7R 50V	PL205		240-00020-67	HEADER 6W 2X3 PCB MTG STD
C783		015-24100-08	CAP CER 0805 1N 10% X7R 50V	PL210		240-00020-67	HEADER 6W 2X3 PCB MTG STD
C784		015-23100-01	CAP CER 0805 100P 5% NPO 50V	PL215		240-00020-44	HEADER 10W X2R PCB MTG 5*2
C785		015-24100-08	CAP CER 0805 1N 10% X7R 50V	PL220		240-00020-67	HEADER 6W 2X3 PCB MTG STD
C786		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C810		015-25470-08	CAP CER 0805 47N 10% X7R 50V	Q210		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V	Q220		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V	Q230		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C822		014-07470-00	CAP TANT CHIP 4U7 3.5 X 2.8MM	Q240		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C823		015-25220-08	CAP CER 0805 22N 10% X7R 50V	Q250		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
C824		015-25470-08	CAP CER 0805 47N 10% X7R 50V	Q260		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
C826		015-23220-01	CAP CER 0805 220P 5% NPO 50V	Q270		000-10004-10	S) XSTR SMD MJD41C NPN SW DPAK
C827		015-22330-01	CAP CER 0805 33P 5% NPO 50V	Q300		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C828		015-25100-08	CAP CER 0805 10N 10% X7R 50V	Q301		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C830		015-25470-08	CAP CER 0805 47N 10% X7R 50V	Q302		000-00033-12	XSTR BD242 TO-220 PNP ISOLDT
C838		014-09100-00	CAP TANT SMD 100U 16V 20%	Q320		000-10095-10	S) XSTR SMD BR951 NPN UHF
C841		014-09100-00	CAP TANT SMD 100U 16V 20%	Q321		000-10938-20	L)XSTR MRF9382T1 HI FRQ PWRFET
C844		015-25100-08	CAP CER 0805 10N 10% X7R 50V	Q350		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
C900		015-02330-06	CAP CER 1210 33P 500V GRM42	Q351		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
C901		015-02330-06	CAP CER 1210 33P 500V GRM42	Q365		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
C902		015-02330-06	CAP CER 1210 33P 500V GRM42	Q366		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
C903		015-02220-06	CAP CER 1210 22P 5% 500V GRM42	Q367		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
C904		015-02270-06	CAP CER 1210 27P NPO500VGRM42	Q368		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
C905		015-02330-06	CAP CER 1210 33P 500V GRM42	Q380		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C906		015-02330-06	CAP CER 1210 33P 500V GRM42	Q381		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
C907		015-02330-06	CAP CER 1210 33P 500V GRM42	Q510		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
%D111A 10		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3	Q520		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
%D111A 15		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3	Q530		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
D220		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q540		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
D230		001-10010-40	DIODE SMD ZENER 33V BZG03-C33	Q550		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D240		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23	Q610		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
D250		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23	Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLDT
D260		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23	Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89
D270		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
D320		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23	Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D321		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23	Q710		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D322		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23	Q720		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D351		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q730		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q740		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D620		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
D630		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q760		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D635		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23	Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33	Q780		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D710		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
D720		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23	Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23
D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q795		000-10057-10	S) XSTR SMD BR571 NPN SOT23
D740		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q810		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
D810		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323	Q820		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
				Q830		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC210		002-10003-24	S) IC SMD 324 4X O-AMP SO14	Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
IC220		002-10126-70	S) IC SMD DS1267S10K 2XDIG POT	Q850		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
IC230		002-10003-24	S) IC SMD 324 4X O-AMP SO14	Q860		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
IC240		002-10040-53	S)MC14053B SMD BREAK B4 MAKE				
IC250		002-10020-50	IC SMD 4N25A OPTOCOUPLER	R160		036-12100-00	RES M/F 0805 10E 5%
IC260		002-10003-24	S) IC SMD 324 4X O-AMP SO14	R201		036-13560-00	RES M/F 0805 560E 5%
IC300		002-10003-58	S) IC SMD LM358 DUAL O-AMP	R202		036-14100-10	RES M/F 0805 1K 1%
IC310		002-12951-00	IC SMD LP2951CM ADJ VLTGE REG	R204		036-14220-00	RES M/F 0805 2K2 5%
IC610		002-10078-05	S) IC SMD 78L05 5V REG	R205		036-13220-10	RES 0805 220E 1%
IC630		002-12523-17	(S)IC LM317L REG TO-252 0.5A	R206		036-14100-10	RES M/F 0805 1K 1%
IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP	R207		036-14390-10	RES M/F 0805 3K9 1%
IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG	R208		036-13560-00	RES M/F 0805 560E 5%
=IC700 10		539-00010-41	TCXO 12.8MHZ +2.5PPM -30 +70C	R209		036-15100-10	RES M/F 0805 10K 1%
=IC700 15		539-00010-41	TCXO 12.8MHZ +2.5PPM -30 +70C	R210		036-14220-00	RES M/F 0805 2K2 5%
IC710		002-74900-04	S) IC SMD 74HC04D 6X INV BUFFD	RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R211		036-13470-00	RES M/F 0805 470E 5%	R313		036-15100-10	RES M/F 0805 10K 1%
R212		036-16100-00	RES M/F 0805 100K 5%	R319		036-12100-00	RES M/F 0805 10E 5%
R213		036-15100-10	RES M/F 0805 10K 1%	R320		036-15100-10	RES M/F 0805 10K 1%
R214		036-14820-10	RES M/F 0805 8K2 1%	R321		036-14150-10	RES M/F 0805 1K5 1%
R215		036-16100-00	RES M/F 0805 100K 5%	R322		036-12470-00	RES M/F 0805 47E 5%
R216		036-16100-00	RES M/F 0805 100K 5%	R323		036-13560-00	RES M/F 0805 560E 5%
R217		036-14100-10	RES M/F 0805 1K 1%	R324		036-12220-00	RES M/F 0805 22E 5%
R218		036-16150-00	RES M/F 0805 150K 5%	R325		036-12270-00	RES M/F 0805 27E 5%
R219		036-14220-00	RES M/F 0805 2K2 5%	R326		036-13330-00	RES M/F 0805 330E 5%
R220		036-13470-00	RES M/F 0805 470E 5%	R327		036-14100-10	RES M/F 0805 1K 1%
RV220		042-05500-05	RES PRESET SMD 50K CER 4MM SQ	R328		036-14100-10	RES M/F 0805 1K 1%
R221		036-14150-10	RES M/F 0805 1K5 1%	R329		036-03150-07	LJ)RES 150E 0.5W 5% 2010 PWRCHP
R223		036-17100-10	RES M/F 0805 1M 1%	R330		036-03150-07	LJ)RES 150E 0.5W 5% 2010 PWRCHP
R224		036-14680-10	RES M/F 0805 6K8 1%	R331		036-16150-00	RES M/F 0805 150K 5%
R225		036-17100-10	RES M/F 0805 1M 1%	R332		036-16150-00	RES M/F 0805 150K 5%
R226		036-15100-10	RES M/F 0805 10K 1%	R333		036-12270-00	RES M/F 0805 27E 5%
R227		036-14220-00	RES M/F 0805 2K2 5%	R334		036-12470-00	RES M/F 0805 47E 5%
R228		036-13120-00	RES M/F 0805 120E 5%	R335		036-03130-10	RES 30E 1W SMD 2512
R229		036-16470-00	RES M/F 0805 470K 5%	R336		036-03130-10	RES 30E 1W SMD 2512
R230		036-16100-00	RES M/F 0805 100K 5%	R337		036-14150-10	RES M/F 0805 1K5 1%
R231		036-15100-10	RES M/F 0805 10K 1%	R338		036-03033-10	RES 3E3 1W SMD 2512
R232		036-16330-00	RES M/F 0805 330K 5%	R339		036-14150-10	RES M/F 0805 1K5 1%
R233		036-16100-00	RES M/F 0805 100K 5%	R350		036-14150-10	RES M/F 0805 1K5 1%
R235		036-14470-10	RES M/F 0805 4K7 1%	R351		036-15470-10	RES M/F 0805 47K 1%
R237		036-15470-10	RES M/F 0805 47K 1%	R352		036-15150-00	RES M/F 0805 15K 5%
R238		036-15470-10	RES M/F 0805 47K 1%	R353		036-15150-00	RES M/F 0805 15K 5%
R239		036-14150-10	RES M/F 0805 1K5 1%	R354		036-11330-00	RES M/F 0805 3E3 5%
R241		036-14470-10	RES M/F 0805 4K7 1%	R355		036-15180-00	RES M/F 0805 18K 5%
R242		036-14220-00	RES M/F 0805 2K2 5%	R356		036-14330-10	RES M/F 0805 3K3 1%
R244		036-15100-10	RES M/F 0805 10K 1%	R357		036-14220-00	RES M/F 0805 2K2 5%
R245		036-16100-00	RES M/F 0805 100K 5%	R358		036-14100-10	RES M/F 0805 1K 1%
R247		036-15100-10	RES M/F 0805 10K 1%	R359		036-16100-00	RES M/F 0805 100K 5%
R248		036-16100-00	RES M/F 0805 100K 5%	R365		036-15470-10	RES M/F 0805 47K 1%
R249		036-16100-00	RES M/F 0805 100K 5%	R367		036-13100-10	RES M/F 0805 100E 1%
R251		036-16100-00	RES M/F 0805 100K 5%	R368		036-15100-10	RES M/F 0805 10K 1%
R253		036-16100-00	RES M/F 0805 100K 5%	R369		036-16100-00	RES M/F 0805 100K 5%
R254		036-16100-00	RES M/F 0805 100K 5%	R371		036-15470-10	RES M/F 0805 47K 1%
R255		036-15100-10	RES M/F 0805 10K 1%	R372		036-15150-00	RES M/F 0805 15K 5%
R256		036-15470-10	RES M/F 0805 47K 1%	R373		036-16100-00	RES M/F 0805 100K 5%
R257		036-16560-00	RES M/F 0805 560K 5%	R374		036-14470-10	RES M/F 0805 4K7 1%
R258		036-16150-00	RES M/F 0805 150K 5%	R380		036-14100-10	RES M/F 0805 1K 1%
R259		036-15220-00	RES M/F 0805 22K 5%	R381		036-15150-00	RES M/F 0805 15K 5%
R260		036-15470-10	RES M/F 0805 47K 1%	R382		036-14100-10	RES M/F 0805 1K 1%
R262		036-15470-10	RES M/F 0805 47K 1%	R383		036-15150-00	RES M/F 0805 15K 5%
R263		036-14470-10	RES M/F 0805 4K7 1%	R384		036-12680-00	RES M/F 0805 68E 5%
&R264	10	036-15220-00	RES M/F 0805 22K 5%	R385		036-12680-00	RES M/F 0805 68E 5%
&R264	15	036-15270-10	RES M/F 0805 27K 1%	R390		036-12220-00	RES M/F 0805 22E 5%
&R265	10	036-15150-00	RES M/F 0805 15K 5%	R391		036-13100-10	RES M/F 0805 100E 1%
&R265	15	036-15180-00	RES M/F 0805 18K 5%	R392		036-16100-00	RES M/F 0805 100K 5%
&R266	10	036-15470-10	RES M/F 0805 47K 1%	R393		036-14150-10	RES M/F 0805 1K5 1%
&R266	15	036-15560-10	RES MF 0805 56K 1%	R394		036-14680-10	RES M/F 0805 6K8 1%
R267		036-14220-00	RES M/F 0805 2K2 5%	R395		036-14270-00	RES M/F 0805 2K7 5%
R268		036-13100-10	RES M/F 0805 100E 1%	R504		036-13330-00	RES M/F 0805 330E 5%
R269		036-15100-10	RES M/F 0805 10K 1%	R505		036-15270-10	RES M/F 0805 27K 1%
R270		036-14120-00	RES M/F 0805 1K2 5%	R510		036-14150-10	RES M/F 0805 1K5 1%
R271		036-17100-10	RES M/F 0805 1M 1%	R514		036-12180-00	RES M/F 0805 18E 5%
R272		036-13560-00	RES M/F 0805 560E 5%	R515		036-12560-00	RES M/F 0805 56E 5%
R273		036-15120-00	RES M/F 0805 12K 5%	R517		036-13330-00	RES M/F 0805 330E 5%
R274		036-15150-00	RES M/F 0805 15K 5%	R518		036-12180-00	RES M/F 0805 18E 5%
R275		036-14270-00	RES M/F 0805 2K7 5%	R519		036-13330-00	RES M/F 0805 330E 5%
R277		036-16100-00	RES M/F 0805 100K 5%	R520		036-16120-00	RES M/F 0805 120K 5%
R278		036-16120-00	RES M/F 0805 120K 5%	R525		036-15470-10	RES M/F 0805 47K 1%
R279		036-17100-10	RES M/F 0805 1M 1%	R530		036-15220-00	RES M/F 0805 22K 5%
R280		036-15100-10	RES M/F 0805 10K 1%	R535		036-15100-10	RES M/F 0805 10K 1%
R282		036-15560-10	RES MF 0805 56K 1%	R537		036-12680-00	RES M/F 0805 68E 5%
R283		036-15560-10	RES MF 0805 56K 1%	R540		036-14220-00	RES M/F 0805 2K2 5%
R284		036-17100-10	RES M/F 0805 1M 1%	R545		036-14470-10	RES M/F 0805 4K7 1%
R285		036-10000-00	RES M/F 0805 ZERO OHM	%R550	10	036-14470-10	RES M/F 0805 4K7 1%
R286		036-14220-00	RES M/F 0805 2K2 5%	%R550	15	036-14470-10	RES M/F 0805 4K7 1%
R287		036-15100-10	RES M/F 0805 10K 1%	R555		036-14470-10	RES M/F 0805 4K7 1%
R288		036-15120-00	RES M/F 0805 12K 5%	R560		036-13470-00	RES M/F 0805 470E 5%
R289		036-16100-00	RES M/F 0805 100K 5%	R565		036-12680-00	RES M/F 0805 68E 5%
&R290	10	036-13560-00	RES M/F 0805 560E 5%	R609		036-14100-10	RES M/F 0805 1K 1%
&R290	15	036-13560-00	RES M/F 0805 560E 5%	R613		036-13560-00	RES M/F 0805 560E 5%
R291		036-10000-00	RES M/F 0805 ZERO OHM	R615		036-13100-10	RES M/F 0805 100E 1%
R292		036-14470-10	RES M/F 0805 4K7 1%	R617		036-10000-00	RES M/F 0805 ZERO OHM
R293		036-15470-10	RES M/F 0805 47K 1%	R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R294		036-14470-10	RES M/F 0805 4K7 1%	R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R295		036-14270-00	RES M/F 0805 2K7 5%	R625		036-14100-10	RES M/F 0805 1K 1%
R296		036-14100-10	RES M/F 0805 1K 1%	R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP
R297		036-14560-00	RES M/F 0805 5K6 5%	R633		036-14680-10	RES M/F 0805 6K8 1%
%R298	10	036-16100-00	RES M/F 0805 100K 5%	R637		036-12220-00	RES M/F 0805 22E 5%
%R298	15	036-16100-00	RES M/F 0805 100K 5%	R638		036-12220-00	RES M/F 0805 22E 5%
R299		036-14270-00	RES M/F 0805 2K7 5%	R640		036-12100-00	RES M/F 0805 10E 5%
R300		036-15220-00	RES M/F 0805 22K 5%	R641		036-14150-10	RES M/F 0805 1K5 1%
RV300		042-04220-05	RES PRESET SMD 2K CER 4MM SQ	R645		036-13470-00	RES M/F 0805 470E 5%
R301		036-14270-00	RES M/F 0805 2K7 5%	R649		036-14470-10	RES M/F 0805 4K7 1%
R302		036-15100-10	RES M/F 0805 10K 1%	R653		036-15100-10	RES M/F 0805 10K 1%
R303		036-16100-00	RES M/F 0805 100K 5%	R655		036-10000-00	RES M/F 0805 ZERO OHM
R304		036-15220-00	RES M/F 0805 22K 5%	R656		036-10000-00	RES M/F 0805 ZERO OHM
R305		036-14150-10	RES M/F 0805 1K5 1%	R657		036-15100-10	RES M/F 0805 10K 1%
R306		036-13150-00	RES M/F 0805 150E 5%	R661		036-15100-10	RES M/F 0805 10K 1%
R307		036-15100-10	RES M/F 0805 10K 1%	R665		036-16100-00	RES M/F 0805 100K 5%
R308		036-14220-00	RES M/F 0805 2K2 5%	R669		036-15470-10	RES M/F 0805 47K 1%
R309		036-14100-10	RES M/F 0805 1K 1%	R673		036-16100-00	RES M/F 0805 100K 5%
R310		036-12220-00	RES M/F 0805 22E 5%	R677		036-15470-10	RES M/F 0805 47K 1%
R311		036-13680-00	RES M/F 0805 680E 5%	R681		036-13100-10	RES M/F 0805 100E 1%
R312		036-13680-00	RES M/F 0805 680E 5%	R685		036-15150-00	RES M/F 0805 15K 5%

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R689		036-12100-00	RES M/F 0805 10E 5%	R845		036-13470-00	RES M/F 0805 470E 5%
R693		036-16100-00	RES M/F 0805 100K 5%	R847		036-13470-00	RES M/F 0805 470E 5%
R696		036-15560-10	RES M/F 0805 56K 1%	R848		036-14470-10	RES M/F 0805 4K7 1%
R701		036-12220-00	RES M/F 0805 22E 5%	R849		036-13470-00	RES M/F 0805 470E 5%
R702		036-17100-10	RES M/F 0805 1M 1%	R850		036-13470-00	RES M/F 0805 470E 5%
R703		036-17100-10	RES M/F 0805 1M 1%	R853		036-14470-10	RES M/F 0805 4K7 1%
R705		036-15100-10	RES M/F 0805 10K 1%	R854		036-14470-10	RES M/F 0805 4K7 1%
R706		036-12100-00	RES M/F 0805 10E 5%	R855		036-14470-10	RES M/F 0805 4K7 1%
R708		036-17100-10	RES M/F 0805 1M 1%	R859		036-16150-00	RES M/F 0805 150K 5%
R710		036-13100-10	RES M/F 0805 100E 1%	R861		036-16150-00	RES M/F 0805 150K 5%
R711		036-13100-10	RES M/F 0805 100E 1%	R863		036-16150-00	RES M/F 0805 150K 5%
R712		036-12100-00	RES M/F 0805 10E 5%	R865		036-16100-00	RES M/F 0805 100K 5%
R713		036-10000-00	RES M/F 0805 ZERO OHM	R867		036-16100-00	RES M/F 0805 100K 5%
R714		036-12100-00	RES M/F 0805 10E 5%	R871		036-15470-10	RES M/F 0805 47K 1%
%R715	10	036-14100-10	RES M/F 0805 1K 1%	R872		036-14470-10	RES M/F 0805 4K7 1%
%R715	15	036-14100-10	RES M/F 0805 1K 1%	R873		036-15330-00	RES M/F 0805 33K 5%
R717		036-14270-00	RES M/F 0805 2K7 5%	R874		036-14470-10	RES M/F 0805 4K7 1%
R718		036-15150-00	RES M/F 0805 15K 5%	R875		036-15470-10	RES M/F 0805 47K 1%
R719		036-15150-00	RES M/F 0805 15K 5%	R876		036-14470-10	RES M/F 0805 4K7 1%
R720		036-15390-00	RES M/F 0805 39K 5%	R877		036-14470-10	RES M/F 0805 4K7 1%
R721		036-15100-10	RES M/F 0805 10K 1%	R879		036-15100-10	RES M/F 0805 10K 1%
R722		036-15100-10	RES M/F 0805 10K 1%				
R723		036-14270-00	RES M/F 0805 2K7 5%	SK200		240-10000-05	CONN SMD SKT 8W 2R M-MATCH
R725		036-15390-00	RES M/F 0805 39K 5%	SK205		240-02020-05	SKT STEREO PHONE JACK PCB MTG
%R726	10	036-13100-10	RES M/F 0805 100E 1%	SK805		240-10000-07	CONN SMD SKT 16W 2R M-MATCH
%R726	15	036-13100-10	RES M/F 0805 100E 1%	SK810		240-04020-42	SKT 44 PIN SMD PLCC
R727		036-15100-10	RES M/F 0805 10K 1%				
R728		036-15100-10	RES M/F 0805 10K 1%	SW230		232-00010-26	SWITCH PUSH SPDT R-ANG PCB MTG
R734		036-13470-00	RES M/F 0805 470E 5%				
R735		036-13470-00	RES M/F 0805 470E 5%	T210		053-00010-17	XFMR T4030 LINE MATCH POTCORE
R736		036-13470-00	RES M/F 0805 470E 5%	T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052
R742		036-13150-00	RES M/F 0805 150E 5%				
R743		036-13150-00	RES M/F 0805 150E 5%				
R744		036-12220-00	RES M/F 0805 22E 5%				
R746		036-12220-00	RES M/F 0805 22E 5%				
R747		036-12220-00	RES M/F 0805 22E 5%				
R748		036-15470-10	RES M/F 0805 47K 1%				
R749		036-15470-10	RES M/F 0805 47K 1%				
R750		036-12220-00	RES M/F 0805 22E 5%				
R752		036-12220-00	RES M/F 0805 22E 5%				
R753		036-17100-10	RES M/F 0805 1M 1%				
R754		036-14100-10	RES M/F 0805 1K 1%				
R756		036-15120-00	RES M/F 0805 12K 5%				
R757		036-15120-00	RES M/F 0805 12K 5%				
R758		036-14120-00	RES M/F 0805 1K2 5%				
R759		036-13330-00	RES M/F 0805 330E 5%				
R760		036-13180-00	RES M/F 0805 180E 5%				
R762		036-13100-10	RES M/F 0805 100E 1%				
R763		036-13100-10	RES M/F 0805 100E 1%				
R765		036-13680-00	RES M/F 0805 680E 5%				
R766		036-14100-10	RES M/F 0805 1K 1%				
R767		036-13680-00	RES M/F 0805 680E 5%				
R769		036-13180-00	RES M/F 0805 180E 5%				
R771		036-14820-10	RES M/F 0805 8K2 1%				
R772		036-15220-00	RES M/F 0805 22K 5%				
R774		036-14820-10	RES M/F 0805 8K2 1%				
R775		036-14270-00	RES M/F 0805 2K7 5%				
R777		036-14220-00	RES M/F 0805 2K2 5%				
R780		036-12100-00	RES M/F 0805 10E 5%				
R781		036-12100-00	RES M/F 0805 10E 5%				
R782		036-12680-00	RES M/F 0805 68E 5%				
R783		036-13220-10	RES 0805 220E 1%				
R784		036-14330-10	RES M/F 0805 3K3 1%				
R785		036-13100-10	RES M/F 0805 100E 1%				
R786		036-14100-10	RES M/F 0805 1K 1%				
R787		036-12560-00	RES M/F 0805 56E 5%				
R801		036-16150-00	RES M/F 0805 150K 5%				
R802		036-15470-10	RES M/F 0805 47K 1%				
RV805		042-05200-05	RES PRESET SMD 20K CER 4MM SQ				
R808		036-12100-00	RES M/F 0805 10E 5%				
R809		036-14470-10	RES M/F 0805 4K7 1%				
R810		036-14470-10	RES M/F 0805 4K7 1%				
R811		036-14470-10	RES M/F 0805 4K7 1%				
R812		036-14470-10	RES M/F 0805 4K7 1%				
R813		036-14470-10	RES M/F 0805 4K7 1%				
R815		036-15470-10	RES M/F 0805 47K 1%				
R816		036-16150-00	RES M/F 0805 150K 5%				
R818		036-14470-10	RES M/F 0805 4K7 1%				
R819		036-14470-10	RES M/F 0805 4K7 1%				
R821		036-15470-10	RES M/F 0805 47K 1%				
R822		036-15470-10	RES M/F 0805 47K 1%				
R824		036-14220-00	RES M/F 0805 2K2 5%				
R825		036-14220-00	RES M/F 0805 2K2 5%				
R826		036-14220-00	RES M/F 0805 2K2 5%				
R827		036-14220-00	RES M/F 0805 2K2 5%				
R828		036-14220-00	RES M/F 0805 2K2 5%				
R829		036-14220-00	RES M/F 0805 2K2 5%				
R830		036-14220-00	RES M/F 0805 2K2 5%				
R831		036-14220-00	RES M/F 0805 2K2 5%				
R832		036-14220-00	RES M/F 0805 2K2 5%				
R833		036-14220-00	RES M/F 0805 2K2 5%				
R835		036-14220-00	RES M/F 0805 2K2 5%				
R836		036-14220-00	RES M/F 0805 2K2 5%				
R837		036-14220-00	RES M/F 0805 2K2 5%				
R840		036-14220-00	RES M/F 0805 2K2 5%				
R841		036-14220-00	RES M/F 0805 2K2 5%				
R842		036-14220-00	RES M/F 0805 2K2 5%				
R843		036-14220-00	RES M/F 0805 2K2 5%				

T827 Mechanical & Miscellaneous Parts (220-01447-04)

IPN	Legend	Description	IPN	Legend	Description
002-08951-20		S) IC AT89C51 PLCC44 MIC 12MHZ			
008-00014-79		S)LED 3MM RED WITH WIRE			
008-00014-80		S)LED 3MM GREEN WITH WIRE			
220-01447-04		PCB T827 EX SII			
240-02100-06		SKT COAX N TYPE PNL MTG OP-TER			
240-04020-62		SKT 2 W RECEP SHORTING LINK			
240-04021-77		SKT JACK 1.3 PCB MT 64W			
240-10000-05		CONN SMD SKT 8W 2R M-MATCH			
303-11169-04		CHASSIS PAINTED T800 SER II			
303-23118-00		COVER A3M2247 D RANGE T855/7			
303-50074-00		CLIP A3M2246 SPRING CLAMP T857			
308-01007-01		HANDLE BS SII 2 WASHERS INC			
312-01052-02		LID TOP T800 SER II PTND			
312-01053-02		LID BOTTOM T800 SER II PNTD			
316-06619-00		PNL FRT EX, NO EX OUT SER II			
349-00020-36		SCREW TT M3X8m PANTORX BLK			
349-00020-36		SCREW TT M3X8m PANTORX BLK			
349-00020-43		SCRW T/T M4X12MM P/POZ BZ			
349-00020-45		SCRW T/T M4X20MM P/POZ BZ			
349-00020-55		SCRW M3*8 P/P T/T BLCKZNC CHRM			
352-00010-08		NUT M3 COLD FORM HEX ST BZ			
352-00010-29		NUT M4 NYLOC HEX			
353-00010-13		WSHR M3 S/PROOF INT BZ			
353-00010-24		WSHR M4x8mm Flat			
362-00010-33		GROMMET LED MTG 3MM			
365-00100-20		LABEL WHITE S/A 28X11MM			

T827 Grid Reference Index (IPN 220-01447-04)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C201	1:C1	2-B8	C305	1:F8	3-D8	C402	1:H8	4-E4	C720	1:J3	7-F8
C202	1:C1	2-C8	C306	1:F8	3-E8	C403	1:H7	4-F4	C722	1:J4	7-G8
C204	1:B3	2-E8	C307	1:F8	3-E8	C503	1:K6	5-L9	C724	1:J4	7-H6
C205	1:A3	2-E8	C320	1:F5	3-C4	C505	1:K5	5-M6	C725	1:J4	7-J6
C207	1:C7	2-B6	C321	1:F4	3-C5	C510	1:H5	5-C0	C726	1:K4	7-J6
C209	1:C6	2-D6	C322	1:F5	3-D4	C513	1:H5	5-G2	C727	1:J3	7-J8
C210	1:C7	2-K0	C323	1:F4	3-E5	C515	1:H5	5-G2	C729	1:H3	7-M8
C211	1:B7	2-F8	C324	1:F4	3-F4	C516	1:J5	5-H1	%C733	1:H2	7-E3
C213	1:B6	2-G8	C325	1:F4	3-G4	C517	1:J5	5-F1	C735	1:J2	7-A1
C215	1:B6	2-G8	C326	1:E4	3-H6	C520	1:J5	5-H0	C736	1:J2	7-B1
C217	1:C6	2-H8	C327	1:F4	3-H6	C535	1:K5	5-M2	C740A	1:H2	7-B4
C219	1:B6	2-H7	C328	1:F3	3-H5	C536	1:K5	5-L2	C740B	1:H2	7-B3
C221	1:D5	2-G6	C329	1:F4	3-J4	C537	1:J5	5-L2	C741A	1:H2	7-C4
C223	1:C5	2-J6	C330	1:F4	3-J4	C542	1:J5	5-J1	C741B	1:G2	7-C3
C225	1:C3	2-K7	C331	1:E5	3-J4	C545	1:J5	5-K1	C742A	1:H2	7-D4
C227	1:B4	2-K7	C332	1:F5	3-K4	C546	1:K5	5-K0	C742B	1:H3	7-D3
C229	1:B3	2-L7	C333	1:F5	3-L4	C550	1:K5	5-L0	C743	1:H2	7-B1
C230	1:B4	2-J0	C334	1:F5	3-M4	C600	1:L6	6-D8	C745	1:G3	7-D1
C232	1:A4	2-M7	C335	1:F6	3-M4	C601	1:L6	6-D8	C750	1:H4	7-Q7
C233	1:B5	2-N7	C336	1:E6	3-N5	C605	1:L6	6-C8	C757	1:G4	7-F5
C235	1:B5	2-K5	C337	1:F6	3-N4	C610A	1:M5	6-F8	C759	1:G4	7-G4
C237	1:C4	2-K5	C338	1:E6	3-P6	C610B	1:L5	6-F8	C761	1:G3	7-J4
C239	1:C4	2-L4	C339	1:F7	3-P5	C611A	1:M6	6-H8	C762	1:G3	7-J4
C241	1:B4	2-M6	C340	1:F7	3-P4	C611B	1:M5	6-H8	C764	1:H3	7-H2
C242	1:B4	2-L6	C341	1:F7	3-P5	C615	1:M6	6-R8	C765	1:G3	7-J2
C243	1:B4	2-P6	C342	1:F7	3-Q5	C616	1:M6	6-R8	C767	1:H3	7-K3
C245	1:C5	2-A4	C343	1:E7	3-M7	C623	1:N6	6-M8	C769	1:J3	7-M4
C247	1:C6	2-B4	C344	1:E7	3-M6	C625	1:M6	6-Q8	C770	1:H4	7-N4
C249	1:D4	2-C4	C350	1:F4	3-E3	C626	1:M6	6-Q8	C772	1:G4	7-M2
C251	1:C3	2-E4	C351	1:E5	3-F3	C628	1:M6	6-Q8	C776	1:H3	7-L1
C253	1:D3	2-E3	C352	1:E6	3-J3	C630	1:M5	6-J5	C778	1:H4	7-M1
C255	1:D3	2-D2	C353	1:E6	3-K2	C631A	1:N5	6-L6	C780	1:G2	7-N1
C257	1:D3	2-F2	C354	1:E5	3-K3	C634	1:N5	6-L5	C781	1:G2	7-P1
C259	1:C6	2-J2	C355	1:E6	3-K2	C636	1:M5	6-M5	C782	1:G2	7-P1
C260	1:D8	2-H0	C356	1:E6	3-L2	C638	1:M5	6-N6	C783	1:G3	7-P0
C261	1:C6	2-K2	C357	1:F6	3-M2	C640	1:M5	6-Q6	C784	1:G4	7-Q0
C263	1:D6	2-L3	C365	1:E5	3-B1	C655	1:M4	6-C1	C785	1:G3	7-Q1
C265	1:D6	2-N4	C366	1:E4	3-C1	C660	1:L5	6-K1	C786	1:G4	7-Q0
C267	1:C8	2-P3	C367	1:E3	3-C0	C665	1:L5	6-K1	C810	1:L3	8-K8
&C269	1:C8	2-P3	C368	1:E4	3-D1	C670	1:L5	6-L1	C812	1:L2	8-F5
&C271	1:C8	2-Q3	C369	1:E4	3-D1	C673	1:L5	6-P2	C813	1:K2	8-J5
C273	1:C8	2-Q4	C370	1:E4	3-E2	C677	1:L6	6-P1	C822	1:M2	8-B2
C275	1:C3	2-E1	C380	1:E3	3-P2	C681	1:L6	6-R3	C823	1:M3	8-C2
C277	1:C4	2-G1	C381	1:E3	3-P1	C684	1:L6	6-R3	C824	1:M2	8-C1
C279	1:B4	2-G1	C382	1:F5	3-Q2	C687	1:L6	6-Q1	C826	1:N3	8-C0
C281	1:B5	2-J1	C383	1:F3	3-Q1	C690	1:L6	6-R1	C827	1:N3	8-D0
C283	1:B5	2-K0	C384	1:F5	3-Q2	C693	1:L6	6-R1	C828	1:N3	8-E0
C285	1:D7	2-L0	C385	1:F3	3-Q1	C700	1:K4	7-A8	C830	1:N3	8-R1
C287	1:C6	2-M1	C386	1:F7	3-R1	C703	1:J3	7-B7	C838	1:N4	8-F0
&C289	1:C8	2-N1	C390	1:F8	3-J8	C706	1:J2	7-B5	C841	1:N2	8-L2
C291	1:D7	2-P1	C391	1:F8	3-J8	#C707	1:K4	7-C8	C844	1:M2	8-L2
C293	1:D7	2-Q1	C392	1:E9	3-K8	C708	1:J2	7-C9	C900	1:N8	9-D4
%C294	1:D7	2-Q0	C393	1:E8	3-K8	C709	1:K4	7-D9	C901	1:P8	9-E4
%C295	1:C6	2-Q0	C394	1:E8	3-L8	C710	1:J3	7-D8	C902	1:P7	9-E4
C300	1:E8	3-A8	C395	1:E9	3-N8	C711	1:J3	7-C5	C903	1:P7	9-F4
C301	1:E7	3-B8	C396	1:E8	3-P8	C712	1:H2	7-E7	C904	1:P7	9-F4
C302	1:E8	3-B8	C397	1:E8	3-P8	%C713	1:H2	7-E6	C905	1:P7	9-G4
C303	1:E8	3-C8	C400	1:H8	4-D4	C714	1:J3	7-E8	C906	1:P6	9-H4
C304	1:F8	3-D7	C401	1:H8	4-D4	C719	1:J3	7-F8	C907	1:P6	9-H4

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
%D111	1:P5	1-R1	IC720	1:J3	7-P6	P259	1:B8	2-R3	R201	1:B3	2-E9
%D111A	1:P5	1-Q1	IC720	1:J3	7-G0	P261	1:B8	2-R3	R202	1:C1	2-F9
%D205	1:B2	2-D9	IC720	1:J3	7-N7	P263	1:B1	2-R2	%R203	1:B3	2-C8
%D210	1:B2	2-D9	IC720	1:J3	7-M7	P267	1:C8	2-N2	R204	1:C7	2-B6
D220	1:B4	2-P7	IC720	1:J3	7-K7	P269	1:D8	2-P2	R205	1:C7	2-D6
D220	1:B4	2-P6	IC720	1:J3	7-E8	P271	1:C9	2-N1	R206	1:B7	2-G8
D230	1:B7	2-R5	IC720	1:J3	7-G0	P273	1:D9	2-P0	R207	1:B6	2-G8
D240	1:D4	2-C4	IC730	1:J4	7-H8	P275	1:D7	2-Q0	R208	1:B6	2-G8
D240	1:D4	2-B2	IC730	1:J4	7-G7	P290	1:D5	2-E0	R209	1:C6	2-H8
D250	1:D3	2-E2	IC740	1:H2	7-D1	P291	1:D5	2-G0	R210	1:B6	2-H7
D250	1:D3	2-D3	IC750	1:H4	7-M3	P805	1:M2	8-A7	R211	1:B2	2-D9
D260	1:C3	2-C2	IC750	1:H4	7-H5	P810	1:L3	8-A5	R212	1:D4	2-F6
D260	1:C3	2-C2	IC750	1:H4	7-Q7	P820	1:L4	8-M8	R213	1:C4	2-G6
D270	1:C2	2-C1	IC820	1:L4	8-N2	P825	1:L4	8-M8	R214	1:D4	2-G6
D270	1:C2	2-C1	IC830	1:N3	8-J0	P830	1:L4	8-M8	R215	1:C4	2-H6
D320	1:F5	3-D4	IC830	1:N3	8-Q1	P835	1:L4	8-M7	R216	1:C3	2-K7
D321	1:F5	3-D4	IC830	1:N3	8-J0	P840	1:L4	8-M7	R217	1:A4	2-M8
D322	1:F5	3-D4	IC830	1:N3	8-J1				R218	1:A5	2-N7
D351	1:E6	3-L1	IC830	1:N3	8-C0	PL100	1:P3	1-M0	R219	1:B4	2-N8
D351	1:E6	3-L2				PL205	1:C5	2-J8	R220	1:B2	2-E9
D610	1:N6	6-L6	L320	1:F5	3-D4	PL210	1:C3	2-H4	R221	1:B7	2-R7
D610	1:N6	6-K6	L321	1:F4	3-E4	PL215	1:C4	2-K3	R223	1:B4	2-K6
D620	1:N4	6-B2	L322	1:E4	3-H7	PL220	1:C4	2-H2	R224	1:C4	2-K5
D620	1:N4	6-B1	L323	1:F3	3-H5				R225	1:B4	2-L5
D630	1:M5	6-G3	L324	1:F4	3-J4	Q210	1:C6	2-J8	R226	1:B4	2-L4
D630	1:M5	6-G2	L325	1:F5	3-K4	Q220	1:B3	2-L7	R227	1:B4	2-M4
D635	1:M4	6-G3	L326	1:F5	3-L4	Q230	1:A4	2-M8	R228	1:A2	2-E9
D640	1:L5	6-M1	L327	1:E7	3-N7	Q240	1:B7	2-Q7	R229	1:B4	2-M7
D640	1:L5	6-M2	L328	1:E6	3-N5	Q250	1:B7	2-R6	R230	1:B4	2-M6
D645	1:M5	6-R6	L329	1:F6	3-P5	Q260	1:C4	2-F3	R231	1:B4	2-M6
D710	1:J3	7-L8	L380	1:F5	3-Q2	Q270	1:D2	2-D1	R232	1:B4	2-M5
D710	1:J3	7-L8	L381	1:F3	3-Q1	Q300	1:E8	3-B7	R233	1:B4	2-M6
D720	1:H3	7-P8	%L382	1:F7	3-R1	Q301	1:F8	3-E8	R235	1:B4	2-P6
D720	1:H3	7-P8	L390	1:E9	3-K9	Q302	1:F8	3-F8	R237	1:B7	2-Q7
D730	1:H3	7-H1	L400	1:H8	4-E5	Q320	1:F4	3-H4	R238	1:B7	2-R7
D740	1:H3	7-J2	L510	1:H5	5-H2	Q321	1:F6	3-N4	R239	1:B8	2-R6
D810	1:M2	8-B7	L535	1:K5	5-L2	Q350	1:E5	3-K3	R241	1:B8	2-Q6
			L600	1:L6	6-D8	Q351	1:E5	3-L3	R242	1:B7	2-Q5
			L615	1:M6	6-R8	Q365	1:E5	3-B1	R244	1:C6	2-A5
IC210	1:C7	2-C6	L780	1:G3	7-Q0	Q366	1:E5	3-C1	R245	1:D4	2-D4
IC210	1:C7	2-J0	L900	1:P8	9-D6	Q367	1:E4	3-C0	R247	1:D3	2-E4
IC210	1:C7	2-L1	L901	1:P7	9-E6	Q368	1:E4	3-D1	R248	1:C3	2-E3
IC210	1:C7	2-K2	L902	1:P7	9-F6	Q380	1:E3	3-P3	R249	1:D4	2-F3
IC210	1:C7	2-Q0	L903	1:P6	9-H6	Q381	1:E3	3-P2	R251	1:C4	2-G4
IC220	1:C6	2-D5	L904	1:P7	9-F5	Q510	1:J5	5-D1	R253	1:C6	2-J2
IC220	1:C6	2-P0				Q520	1:J5	5-H2	R254	1:C7	2-K3
IC220	1:C6	2-M3				Q530	1:J5	5-H0	R255	1:C7	2-K2
IC230	1:B4	2-J0	LINK1	2:B2	2-E9	Q540	1:J5	5-L2	R256	1:D8	2-M3
IC230	1:B4	2-J0	LINK2	2:A2	2-E8	Q550	1:K5	5-L0	R257	1:D8	2-N5
IC230	1:B4	2-L5				Q610	1:L6	6-D8	R258	1:D8	2-N4
IC230	1:B4	2-N6	P100	1:Q6	1-R8	Q620	1:N6	6-P8	R259	1:D6	2-P4
IC230	1:B4	2-G1	P150	1:P2	1-Q4	Q630	1:M6	6-P5	R260	1:D8	2-N4
IC240	1:D4	2-F3	P160	1:P2	1-Q4	Q660	1:L5	6-N1	R262	1:D8	2-N3
IC250	1:D3	2-E1	P170	1:P2	1-Q3	Q670	1:L6	6-Q2	R263	1:C8	2-P3
IC260	1:D8	2-N0	P204	1:D1	2-A8	Q710	1:J3	7-K8	&R264	1:C8	2-P3
IC260	1:D8	2-H0	P208	1:D1	2-A8	Q720	1:J3	7-K8	&R265	1:C8	2-P3
IC260	1:D8	2-Q2	P210	1:D3	2-A3	Q730	1:H3	7-N8	&R266	1:C8	2-P3
IC260	1:D8	2-Q3	P215	1:D4	2-A2	Q740	1:H3	7-N8	R267	1:C8	2-R2
IC260	1:D8	2-N3	P217	1:D4	2-A2	Q750	1:G4	7-F3	R268	1:D2	2-C0
IC300	1:E8	3-H8	P219	1:D2	2-A1	Q760	1:H3	7-H3	R269	1:D3	2-C1
IC300	1:E8	3-E0	P225	1:D2	2-A0	Q770	1:H3	7-H1	R270	1:D3	2-D1
IC300	1:E8	3-C8	P230	1:C5	2-B0	Q775	1:H3	7-K3	R271	1:C3	2-E1
IC310	1:E8	3-L8	P231	1:D8	2-B0	Q780	1:H3	7-K3	R272	1:C4	2-F2
IC610	1:L5	6-G8	P233	1:C1	2-R9	Q785	1:H3	7-K2	R273	1:B5	2-G2
IC630	1:N5	6-K5	P235	1:C1	2-R9	Q790	1:H3	7-L3	R274	1:C4	2-G1
IC640	1:M5	6-M5	P237	1:B7	2-R8	Q795	1:G3	7-P0	R275	1:C4	2-H0
IC640	1:M5	6-Q6	P239	1:C7	2-R8	Q810	1:M2	8-E7	R277	1:B5	2-J1
IC640	1:M5	6-F1	P240	1:C7	2-R8	Q820	1:L2	8-D5	R278	1:B5	2-J0
IC650	1:L5	6-F4	P243	1:B7	2-R7	Q830	1:L2	8-D5	R279	1:B5	2-K0
=IC700	1:K3	7-A8	P244	1:B7	2-R7	Q840	1:L2	8-F5	R280	1:B5	2-K0
IC710	1:J2	7-D8	P245	1:B8	2-R6	Q850	1:M2	8-G5	R282	1:D7	2-K1
IC710	1:J2	7-C6	P247	1:B8	2-R6	Q860	1:L4	8-B3	R283	1:D7	2-L1
IC710	1:J2	7-C5	P248	1:B7	2-R6				R284	1:D7	2-L0
IC710	1:J2	7-D6	P249	1:C7	2-R5	%R150	1:P2	1-R4	R285	1:C8	2-M0
IC710	1:J2	7-D7	P251	1:C7	2-R5	R160	1:P2	1-R3	R286	1:C7	2-M0
IC710	1:J2	7-D6	P255	1:D4	2-R4	%R200	1:B2	2-C9	R287	1:D9	2-M0
IC710	1:J2	7-C6	P257	1:C2	2-R4						

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
R288	1:C6	2-M2	R394	1:E9	3-N8	R735	1:K2	7-A2	R859	1:N2	8-C1
R289	1:D9	2-M0	R395	1:E9	3-N8	R736	1:K2	7-A2	R861	1:N2	8-D1
&R290	1:C8	2-N2	R504	1:K6	5-K9	R742	1:H2	7-B4	R863	1:N3	8-E1
R291	1:C8	2-N1	R505	1:K6	5-L8	R743	1:H2	7-C5	R865	1:N4	8-E0
R292	1:D8	2-Q2	R510	1:K6	5-L7	R744	1:G2	7-D4	R867	1:N3	8-E1
R293	1:D9	2-Q2	R514	1:K5	5-M5	R746	1:H3	7-E4	R871	1:N3	8-G2
R294	1:D9	2-Q1	R515	1:H6	5-J5	R747	1:H3	7-E5	R872	1:M4	8-H1
R295	1:D8	2-R1	R517	1:G5	5-E2	R748	1:J2	7-A1	R873	1:N3	8-G1
R296	1:D6	2-P0	R518	1:G5	5-F2	R749	1:J2	7-B1	R874	1:N3	8-H0
R297	1:D7	2-P1	R519	1:G5	5-F2	R750	1:H4	7-Q7	R875	1:N3	8-G0
%R298	1:D7	2-Q0	R520	1:H5	5-C1	R752	1:G4	7-F5	R876	1:N3	8-H0
R299	1:C7	2-R0	R525	1:H5	5-D1	R753	1:G4	7-F3	R877	1:M2	8-K2
R300	1:E8	3-A7	R530	1:J5	5-D0	R754	1:G3	7-F3	R879	1:N2	8-L3
R301	1:E8	3-A7	R535	1:J5	5-E1	R756	1:G3	7-G5			
R302	1:E8	3-A8	R537	1:H5	5-G2	R757	1:G4	7-G4	RV210	1:B7	2-F9
R303	1:E8	3-B8	R540	1:J5	5-H2	R758	1:H3	7-H4	RV220	1:A4	2-M6
R304	1:F8	3-B8	R545	1:J5	5-J1	R759	1:H3	7-H4	RV300	1:E8	3-C6
R305	1:E8	3-C7	%R550	1:J5	5-J2	R760	1:H3	7-K4	RV805	1:N4	8-F1
R306	1:E8	3-C6	%R553	1:J5	5-J1	R762	1:H3	7-K4			
R307	1:F8	3-D7	R555	1:J5	5-K1	R763	1:H3	7-L4	SK200	1:D5	2-F0
R308	1:F8	3-D8	R560	1:K5	5-M0	R765	1:H3	7-H2	SK205	1:B5	2-A5
R309	1:F8	3-E8	R565	1:K5	5-L2	R766	1:G3	7-J3	SK501	1:G6	5-D6
R310	1:F8	3-E8	R609	1:L6	6-B8	R767	1:H3	7-K2	SK502	1:G6	5-D5
R311	1:F8	3-F8	R613	1:L6	6-C8	R769	1:H3	7-K3	SK503	1:G6	5-D4
R312	1:F8	3-F7	R615	1:M5	6-F9	R771	1:H4	7-L3	SK504	1:G5	5-D3
R313	1:F8	3-F8	R617	1:M5	6-J8	R772	1:G4	7-M2	SK505	1:G5	5-D2
R319	1:E4	3-H6	R619	1:N6	6-K8	R774	1:H4	7-M3	SK513	1:H5	5-H3
R320	1:F4	3-C5	R621	1:N6	6-K8	R775	1:H3	7-L2	SK522	1:H6	5-K5
R321	1:F5	3-C4	R625	1:N6	6-K7	R777	1:H4	7-R2	SK531	1:K6	5-N6
R322	1:F5	3-D5	R629	1:M6	6-P6	R780	1:G2	7-N2	SK532	1:K5	5-N5
R323	1:F4	3-D5	R633	1:M5	6-P8	R781	1:G2	7-N2	SK533	1:K5	5-N4
R324	1:F4	3-F4	R637	1:M5	6-J6	R782	1:G3	7-P1	SK534	1:K5	5-N3
R325	1:F4	3-G4	R638	1:M5	6-J6	R783	1:G3	7-P0	SK535	1:K5	5-N2
R326	1:F4	3-G4	R640	1:M5	6-Q6	R784	1:G3	7-Q2	=SK710	1:K3	7-A7
R327	1:F3	3-G5	R641	1:N5	6-K5	R785	1:G3	7-Q1	SK805	1:K3	8-Q9
R328	1:F4	3-G4	R645	1:N5	6-L5	R786	1:G3	7-R1	SK805	1:K3	8-Q7
R329	1:E3	3-G6	R649	1:M5	6-M5	R787	1:G4	7-R0	SK805	1:K3	8-Q6
R330	1:F3	3-H6	R653	1:M5	6-P5	R801	1:M2	8-D7	SK805	1:K3	8-Q9
R331	1:F4	3-H4	R655	1:L4	6-D4	R802	1:M2	8-D7	SK805	1:K3	8-Q6
R332	1:F4	3-H4	R656	1:L4	6-D4	R808	1:L2	8-B4	SK805	1:K3	8-Q9
R333	1:F5	3-L4	R657	1:M5	6-D1	R809	1:L2	8-D5	SK805	1:K3	8-Q7
R334	1:F6	3-M4	R661	1:M5	6-E3	R810	1:L3	8-D6	SK805	1:K3	8-Q8
R335	1:E7	3-N6	R665	1:M5	6-E2	R811	1:L2	8-E6	SK805	1:K3	8-Q6
R336	1:E7	3-N6	R669	1:M5	6-E2	R812	1:L2	8-D5	SK805	1:K3	8-Q8
R337	1:F7	3-P4	R673	1:M5	6-E0	R813	1:L2	8-D4	SK805	1:K3	8-Q5
R338	1:F7	3-Q5	R677	1:M4	6-F4	R815	1:L2	8-F4	SK805	1:K3	8-Q7
R339	1:F7	3-Q4	R681	1:L5	6-L2	R816	1:L2	8-F4	SK805	1:K3	8-Q8
R350	1:F4	3-F3	R685	1:L5	6-N2	R818	1:M2	8-F5	SK805	1:K3	8-Q7
R351	1:E5	3-J3	R689	1:L6	6-Q3	R819	1:M2	8-F5	SK805	1:K3	8-Q8
R352	1:E5	3-K3	R693	1:L5	6-Q1	R821	1:M4	8-B3	SK805	1:K3	8-Q6
R353	1:E5	3-K3	R696	1:L5	6-Q1	R822	1:M4	8-E3	SK810	1:M3	8-H5
R354	1:E5	3-L2	R701	1:K4	7-A9	R824	1:L4	8-L8			
R355	1:E6	3-L2	R702	1:K4	7-C9	R825	1:L4	8-L8	SL201	2:D1	2-B9
R356	1:E6	3-L2	R703	1:J3	7-C8	R826	1:L4	8-L8	SL202	2:D1	2-B8
R357	1:E6	3-M2	=R705	1:K3	7-A7	R827	1:L4	8-L7	SL203	2:D2	2-B1
R358	1:F6	3-M2	R705	1:J3	7-C5	R828	1:L4	8-L7	SL204	2:D2	2-B1
R359	1:E6	3-L2	R706	1:H3	7-C5	R829	1:L4	8-P9	SL360	1:E3	3-C0
R365	1:E5	3-B1	R708	1:J3	7-B5	R830	1:L3	8-P9	SL501	2:J5	5-F0
%R366	1:E4	3-C0	R710	1:H2	7-E7	R831	1:L3	8-P9	SL810	1:M2	8-C7
R367	1:E3	3-C0	R711	1:J2	7-B6	R832	1:L3	8-P8			
R368	1:E4	3-C1	R712	1:J2	7-D8	R833	1:L3	8-P8	SW230	1:B8	2-A3
R369	1:E3	3-C0	R713	1:J3	7-F8	R835	1:L3	8-P8			
R371	1:E4	3-D1	R714	1:J3	7-D9	R836	1:L3	8-P8	T210	1:B2	2-C8
R372	1:E4	3-D1	%R715	1:K4	7-H6	R837	1:L3	8-P7	T610	1:L6	6-N2
R373	1:E4	3-D2	R717	1:J4	7-H7	R840	1:L3	8-P7			
R374	1:E4	3-E1	R718	1:J4	7-H7	R841	1:L3	8-P7	TP206	1:C5	2-H7
R380	1:E3	3-P1	R719	1:J4	7-J6	R842	1:L3	8-P6	TP310	1:F8	3-G8
R381	1:E3	3-P3	R720	1:J3	7-K7	R843	1:L3	8-P6	TP320	1:E4	3-C5
R382	1:E3	3-Q2	R721	1:J3	7-K9	R845	1:M4	8-Q5	TP340	1:E5	3-E3
R383	1:F3	3-Q2	R722	1:J3	7-K8	R847	1:L2	8-Q4	TP380	1:E3	3-P1
R384	1:F5	3-Q3	R723	1:H3	7-M7	R848	1:L2	8-J4	TP381	1:E3	3-P3
R385	1:F3	3-Q2	R725	1:J4	7-N7	R849	1:L2	8-Q4	TP382	1:F3	3-Q2
R390	1:E8	3-H9	%R726	1:J3	7-N6	R850	1:K2	8-Q4	TP601	1:N5	6-K9
R391	1:E9	3-K9	R727	1:H3	7-N9	R853	1:M4	8-N3	TP602	1:M6	6-Q9
R392	1:E8	3-M8	R728	1:H3	7-N8	R854	1:M4	8-N3	TP603	1:L5	6-J2
R393	1:E9	3-N7	R734	1:K2	7-A2	R855	1:M2	8-B0	TP604	1:L4	6-L6

<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>
TP607	1:L5	6-J9									
TP710	1:G4	7-H5									
TP715	1:J2	7-C6									

Part D T828 Power Amplifier

**Caution:**

There are no user serviceable components in these power amplifiers. Refer all servicing to your nearest Tait Dealer or Customer Service Organisation.

This part of the manual is divided into five sections, as listed below. There is a detailed table of contents at the start of each section.

Section	Title
1	General Information
2	Circuit Operation
3	Initial Adjustment
4	Fault Finding
5	PCB Information

1 T828 General Information

This section provides a brief description of the T828 power amplifier, along with detailed specifications and a list of types available.

The following topics are covered in this section.

Section	Title	Page
1.1	Introduction	1.3
1.2	Specifications	1.4
1.2.1	Introduction	1.4
1.2.2	General	1.4
1.2.3	Test Standards	1.5
1.2.3.1	European Telecommunication Standard	1.5
1.2.3.2	DTI CEPT Recommendation T/R-24-01	1.6
1.2.3.3	Telecommunications Industry Association	1.6
1.3	Product Codes	1.7
1.4	Standard Product Range	1.8

1.1 Introduction

The T828 is an FM base station power amplifier designed for single or multichannel operation within the frequency range 66 to 88MHz. The output power capability is 10 to 60W.

The PA 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, while monitoring and alarm signals are available for both forward and reverse power. The output power is adjustable from the front panel.

The circuitry is built on a single PCB which is mounted directly on a die-cast chassis/ heatsink. Extensive use is made of surface mount technology.

The T828 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.

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).

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:

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

Note: Actual power used will depend on regulatory requirements.

Input Power .. 1W $\pm$ 300mW

Duty Cycle Rating .. 50W continuous to +60°C without fan¹
 (@ 13.8V supply) .. 60W continuous to +40°C without fan¹

Intermodulation .. -70dBc or -40dBi² with 25dB isolation
 (PA with output isolator) & interfering signal of -30dBc

Mismatch Capability:

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

Supply Voltage:

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

-
1. The use of a fan is to be preferred at high temperatures. Adequate ventilation must always be provided through base station equipment cabinets.
 2. dBi denotes the level of intermodulation product relative to the interfering signal.

Maximum Supply Current (@ 50W):

Standby	.. 50mA
Transmit	.. 11A

Spurious Emissions:

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

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

Height	.. 183mm
Width	.. 60mm
Length	.. 340mm

Weight	.. 3.1kg
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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 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:

<u>T82X</u> -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- <u>X</u> X-XXXX	'1' for 66-88MHz
-----------------------	------------------

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

T82X- <u>X</u> X-XXXX	'0' for wide bandwidth (25kHz)
	'5' for narrow bandwidth (12.5kHz)

Options

T82X-XX- <u>XXXX</u>	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 T828 types (i.e. no options fitted and no cyclic keying) 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
PA Type: T828-	10-0500

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).

2 T828 Circuit Operation

This section provides a basic description of the circuit operation of the T828 power amplifier.

Refer to Section 5 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components.

The following topics are covered in this section.

Section	Title	Page
2.1	Introduction	2.3
2.2	RF Circuitry	2.4
2.3	Control Circuitry	2.5
2.3.1	Power Control	2.5
2.3.2	Thermal Protection	2.6
2.3.3	Forward And Reverse Power Alarms	2.6
2.3.4	Forward And Reverse Power Metering	2.6

Figure	Title	Page
2.1	T828 High Level Block Diagram	2.3
2.2	T828 RF Circuitry Block Diagram	2.4
2.3	T828 Control Circuitry Block Diagram	2.5

2.1 Introduction

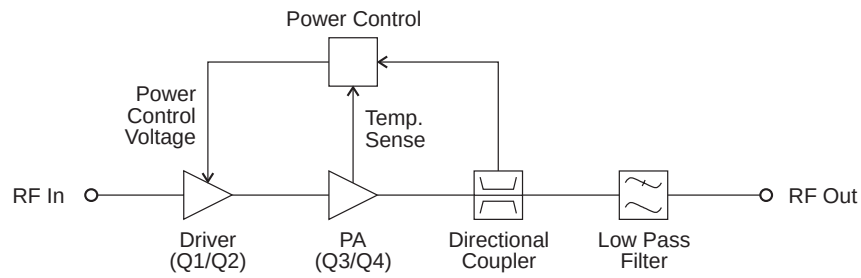


Figure 2.1 T828 High Level Block Diagram

The T828 comprises a four-stage RF power amplifier, the final two stages of which are combined, and extensive control circuitry.

The configuration of each of the main circuit blocks may be seen on a functional level in Figure 2.1.

2.2 RF Circuitry

(Refer to the RF section circuit diagram in Section 5.)

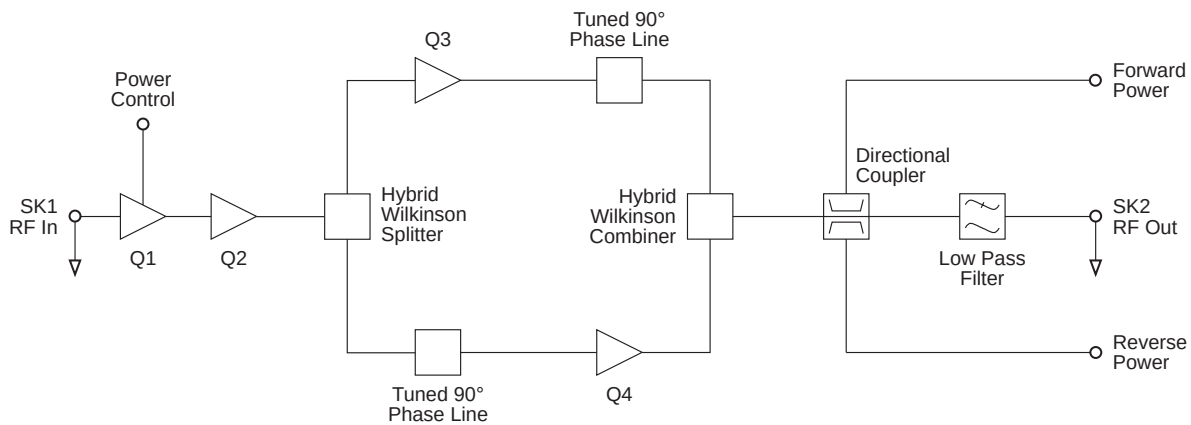


Figure 2.2 T828 RF Circuitry Block Diagram

The driver stage of the T828 consists of a two-stage transistor amplifier (Q1, Q2) which delivers 20W. This signal is split via a hybrid Wilkinson splitter (L220, L221) and used to drive the two final amplifiers (Q3, Q4). The outputs from the finals are combined with a hybrid Wilkinson combiner (L250, L251) and passed to the antenna socket via a directional coupler and a low pass filter.

The directional coupler senses forward and reflected power, which is rectified (D201, D200) and passed to the control circuitry for metering, alarm and power control purposes.

Power control is via a series pass transistor (Q16), which controls the supply voltage on the collector of the driver transistor (Q1).

2.3 Control Circuitry

(Refer to the control section circuit diagram in Section 5.)

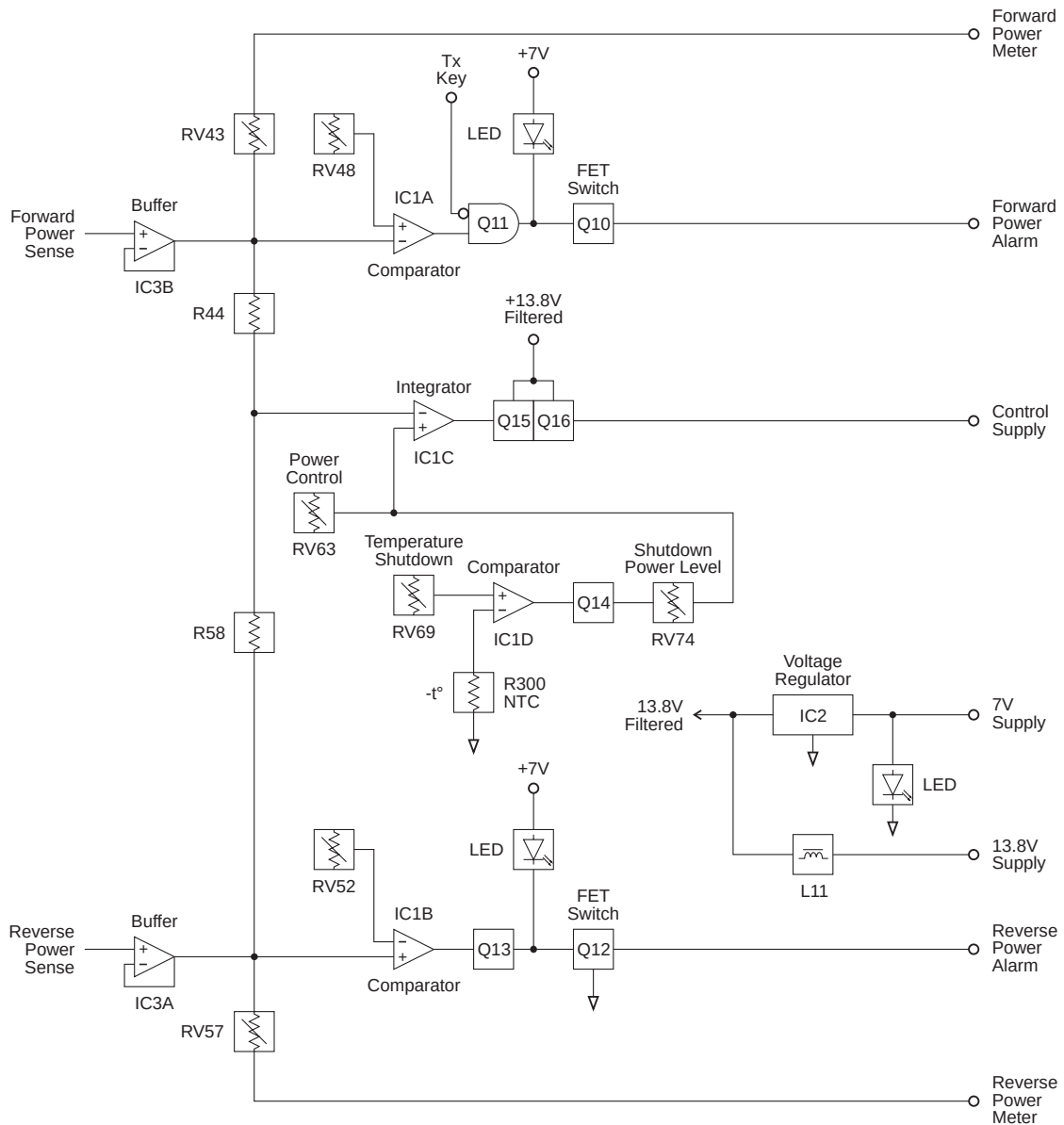


Figure 2.3 T828 Control Circuitry Block Diagram

2.3.1 Power Control

The DC voltages from the directional coupler representing forward and reflected power are buffered by the voltage followers IC3b and IC3a respectively. Their outputs are summed at an integrator (IC1c), which drives the series pass control element (Q16).

Forward and reflected power are summed so that, under high output VSWR, the power control turns the PA down. This is because the control loop adjusts for the same DC voltage from the directional coupler that would have been present if there were no reflected power.

2.3.2 Thermal Protection

At excessively high temperatures, the output power will automatically reduce to a pre-set level, thus preventing the PA from overheating.

A thermistor controlled voltage divider (R68, R300) applies a voltage to a comparator with hysteresis (IC1d). The threshold of the comparator is independently set by RV69. This sets the shutdown temperature.

The output from the comparator and driver Q14 is summed into the power control network via RV74 so that the power level to which the PA must turn down may be set.

2.3.3 Forward And Reverse Power Alarms

If forward power drops below, or reverse power rises above, presettable limits, alarms may be triggered.

The alarm outputs are open drain configuration and are low under normal conditions (i.e. forward and reverse power levels are normal).

IC1a and IC1b form comparators with thresholds adjusted via RV48 (forward power) and RV52 (reverse power) respectively. The inputs are from the forward and reverse power signals from the directional coupler, buffered by IC3b and IC3a. Thus, the power levels at which the forward and reverse power alarms are triggered are defined by RV48 and RV52 respectively.

2.3.4 Forward And Reverse Power Metering

Forward and reverse power signals from buffers IC3b and IC3a are available for metering purposes. The output currents are adjustable via RV43 (forward power) and RV57 (reverse power).

3 T828 Initial Adjustment


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 section describes the full adjustment procedure to be carried out before operating the T828.

Note: The T828 requires no RF tuning or alignment.

Refer to Section 5 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components.

The following topics are covered in this section.

Section	Title	Page
3.1	Test Equipment Required	3.3
3.2	Optimising Intermodulation Performance	3.4
3.2.1	Trimming	3.4
3.2.2	Fitting	3.4
3.3	Preliminary Checks	3.6
3.4	Setting The Output Power	3.6
3.5	High Temperature Shutdown Power Level	3.7
3.6	Remote Forward Power Meter Calibration	3.7
3.7	Remote Reverse Power Meter Calibration	3.8
3.8	Setting Alarm Levels	3.8
3.8.1	Forward Power	3.8
3.8.2	Reverse Power	3.8

Figure	Title	Page
3.1	T828 Test Equipment Set-up	3.3
3.2	T828 Phasing Section Trimming Detail	3.4
3.3	T828 Phasing Section Location	3.5
3.4	T828 Phasing Section Soldering Detail	3.5

3.1 Test Equipment Required

- DC power supply capable of delivering 15A at 13.8V (e.g. Tait T807).
- Multimeter or DMM (e.g. Fluke 77).
- RF power meter usable 66-88MHz (e.g. HP 435 series or Bird Wattmeter).
- Thru-line wattmeter with 5W element.
- 150W 30dB 50 ohm attenuator.
- 150W 3dB 50 ohm pad.
- 'BNC' to 'N' type adaptors (e.g. Amphenol, Greenpar).
- Appropriate trimming tools.

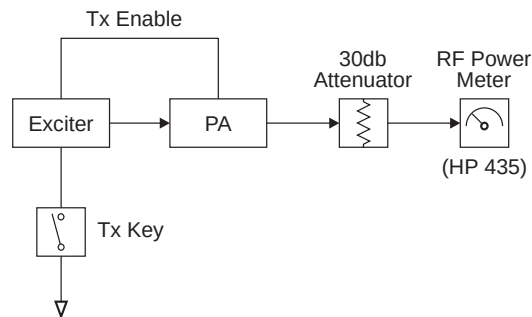


Figure 3.1 T828 Test Equipment Set-up

3.2 Optimising Intermodulation Performance

Note: If the T828 is to be used in countries where intermodulation performance is a Type Approval requirement (e.g. Europe, UK), or if intermodulation performance is of particular concern, the two 50 ohm Teflon coax phasing sections provided must be fitted.

3.2.1 Trimming

The Teflon phasing sections supplied are cut for 66MHz. If the required operating frequency is greater than 66MHz, you must trim both sections to the correct length according to the following formula:

$$\text{length of centre conductor (cm)} = \frac{5250}{\text{frequency (MHz)}}$$

Note: If the T828 is to be used over a band of frequencies, trim both sections for the centre operating frequency.

Trim the ends of the Teflon coax as shown in Figure 3.2 (dimensions shown in mm).

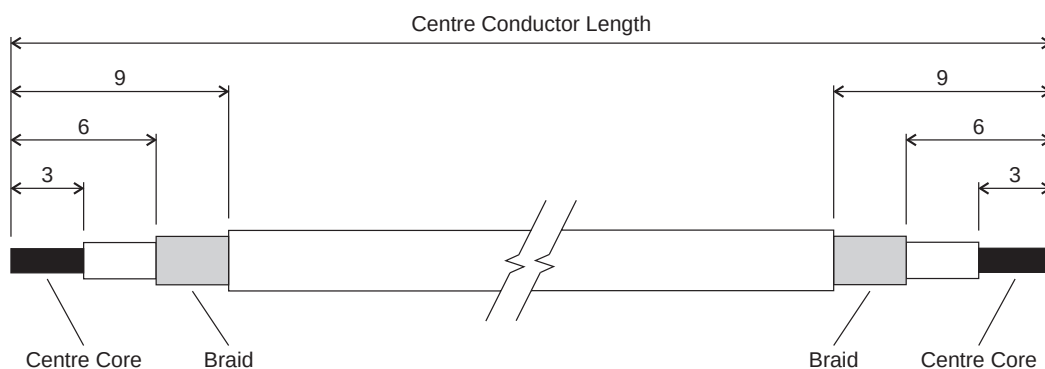


Figure 3.2 T828 Phasing Section Trimming Detail

3.2.2 Fitting

Note: If the Teflon phasing sections have been unbound for trimming, they must be rebound in the same way as the original components.

Remove the wire links fitted in locations TL1 and TL2 (refer to Figure 3.3).

Fit the Teflon phasing sections as shown in Figure 3.3 and solder the terminations as shown in Figure 3.4.

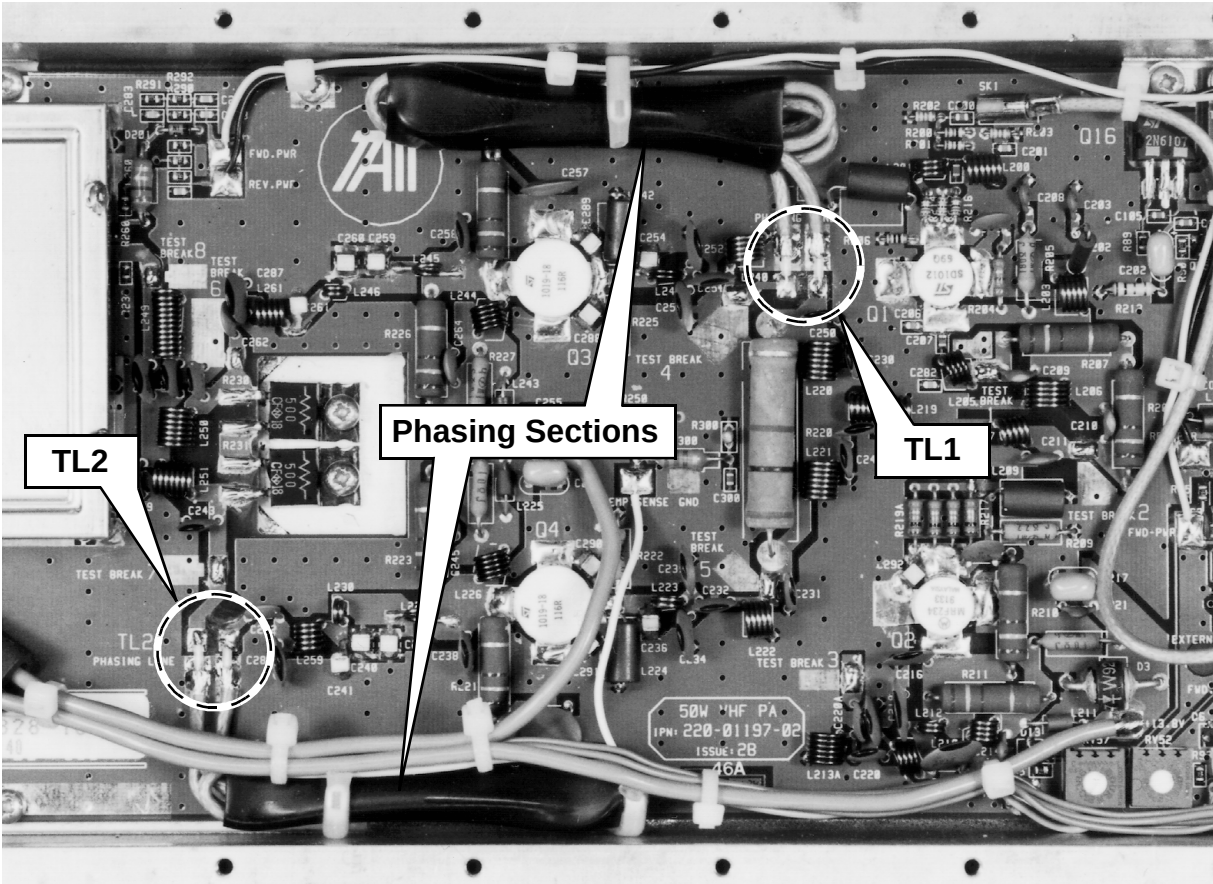


Figure 3.3 T828 Phasing Section Location

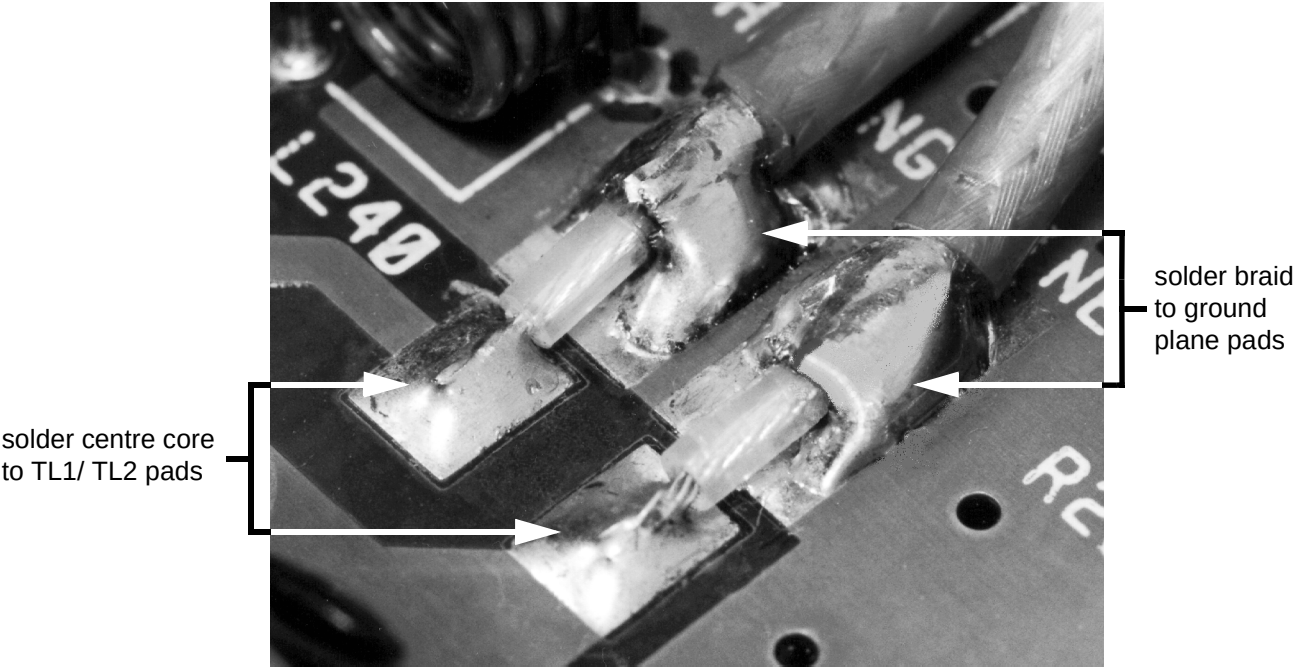


Figure 3.4 T828 Phasing Section Soldering Detail

3.3 Preliminary Checks

Check for short circuits between the positive rail and earth.

Set up the test equipment as in Figure 3.1.

Connect the T828 to a 13.8V DC supply.

Check that the quiescent current is approximately 45mA.

To key the transmitter, earth the key line (D-range 1 pin 13) on the exciter.

Check that the power supply is still at 13.8V under load.

Check that the regulated power control supply is approximately 7V.

Note: The output power and alarm levels should be set with the cover shield on. If the cover is removed for other adjustment procedures, make a final check of the output power and alarm levels with the cover shield on.

3.4 Setting The Output Power



Caution: If the temperature shutdown power level has not yet been set or is unknown, check that the unit does not overheat while setting the output power.

Note 1: Cables and connectors can easily cause a power loss of several watts if either too long or poorly terminated. Always use the shortest possible lead between the T828 and power meter.

Note 2: You will need appropriate extension leads if you wish to carry out the adjustment procedures with the T828 withdrawn from the rack in the latched position. Alternatively, disconnect and withdraw the T828 and reconnect it behind the rack.

Note 3: The actual power used may be limited by regulatory requirements.

Connect the exciter output to the PA input via a thru-line wattmeter with a 5W full scale reading. Special SMC/BNC leads will be required.

Connect an RF power meter to the PA output. Set the front panel power control preset (RV63) fully clockwise.

Key on the drive source.

Check that the power output exceeds 60W.

Adjust RV63 to reduce the power output to the required level (e.g. 50W).

3.5 High Temperature Shutdown Power Level

Note: The temperature shutdown circuit is factory set to approximately 130°C and 20W. RV69 and RV74 should not be readjusted if normal operation is required.

Power up the T828 and adjust the power control pot. (RV63) for the normal operating power level.

Turn the temperature set pot. (RV69) fully anticlockwise to avoid RF power cycling between the levels set by RV63 and RV74.

Apply heat to the NTC (R300) with the tip of a soldering iron.

Adjust the shutdown power level pot. (RV74) to the desired level. For continuous operation during fault conditions, set the shutdown power in the range 10 to 20W.

For normal operation, i.e. shutdown under extreme PA internal temperatures (approx. 130°C) or excessive dissipation in the splitter balance resistor (R220), adjust the temperature set pot. (RV69) for a voltage reading of 150mV at TP1 (pin 12 of the LM324D [IC1]).

3.6 Remote Forward Power Meter Calibration

If a remote meter is connected, adjust the forward power meter calibration control (RV43) for the remote reading to agree with the RF power meter reading.

3.7 Remote Reverse Power Meter Calibration

If a remote meter is connected, connect a 50 ohm 3dB pad (with the output open circuit) to the PA output.

Apply RF drive and Tx key.

Adjust the reverse power meter calibration control (RV57) for a quarter of the forward power reading.

3.8 Setting Alarm Levels

Note: If forward and reverse power metering is being used, set up their calibration (Section 3.6 and Section 3.7) before setting the alarm levels.

3.8.1 Forward Power

Power up the T828 and adjust the front panel power control (RV63) so that the output power is at the alarm level required (e.g. 40W if the PA normally operates at 50W).

Adjust the forward power alarm set control (RV48) so that the forward power alarm LED lights.

Check the alarm level setting by adjusting the power up and down and observing the alarm LED. A few watts hysteresis can be expected.

Readjust RV63 for the normal operating level.

Note: Remote indication is available at D-range pin 3.

3.8.2 Reverse Power

Power up the T828 and adjust the front panel power control (RV63) for the normal operating power level.

Place a known mismatch of the required value (e.g. 3:1 VSWR) and adjust the reverse power alarm set control (RV52) so that the reverse power alarm LED lights.

Example: A VSWR of 3:1 can be simulated by connecting an unterminated 3dB pad (100W) to the PA output. This will result in a return loss of 6dB.

Note: Remote indication is available at D-range pin 4.

4 T828 Fault Finding


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 and fault finding flow charts may be used to help locate a hardware problem, however they are by no means a complete fault finding procedure. If you still cannot trace the fault after progressing through them in a logical manner, 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 (full contact details are on page 2).

Refer to Section 5 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components.

The following topics are covered in this section.

Section	Title	Page
4.1	Visual Checks	4.3
4.2	Component Checks	4.3
4.3	DC Checks	4.3
4.4	RF Checks	4.4
4.4.1	General	4.4
4.4.2	PA Faults	4.4
4.5	Voltage Chart	4.5
4.6	Fault Finding Charts	4.6
4.6.1	PA	4.6
4.6.2	Power Control	4.7
4.7	Replacing RF Power Transistors	4.8
4.8	Removing The PCB From The Heatsink	4.9

Figure	Title	Page
4.1	T828 Test Break Point Location	4.4

4.1 Visual Checks

Remove the side cover from the T828 and inspect the PCB for damaged or broken components, paying particular attention to the surface mounted devices (SMDs). Also check for defective solder joints.

Refer to Section 4.7, Section 4.8 and Section 3 of Part A for more details on repair and replacement of components.

4.2 Component Checks

If you suspect a transistor is faulty, you can assess its performance by measuring the forward and reverse resistance of the junctions. Unless the device is completely desoldered, first make sure that the transistor is not shunted by some circuit resistance. Use a good quality EVM (e.g. Fluke 75) for taking the measurements (or a 20k ohm/V or better multimeter, using only the medium or low resistance ranges).

The collector current drawn by multi-junction transistors is a further guide to their performance.

If an IC is suspect, the most reliable check is to measure the DC operating voltages. Due to the catastrophic nature of most IC failures, the pin voltages will usually be markedly different from the recommended values in the presence of a fault. The recommended values can be obtained from either the circuit diagram or the component data catalogue.

4.3 DC Checks

Note: No RF power is to be applied during these checks.

Check that +13.8V is present on the collectors of Q1, Q2, Q3 and Q4. Make this measurement when the transmitter is not keyed.

Check that +13.8V is present at pin 4 of IC1 and pin 8 of IC3.

Check that 7.0V is present at the output of regulator IC2.

4.4 RF Checks

4.4.1 General

You can measure in-circuit RF levels around Q1 and Q2 with an RF probe on which the earth lead has been shortened to a minimum (i.e. 13mm); refer to the PA Fault Finding Chart (Section 4.6.1). You must measure all other stages with a power meter at the 50Ω points in the circuit.

For problems with the power control circuitry, refer to the Power Control Fault Finding Chart (Section 4.6.2).

4.4.2 PA Faults

If a PA fault has occurred, or is suspected, it is easier to find if the various stages are isolated by use of the test breaks (refer to Figure 4.1) and each stage analysed individually. Eight 50 ohm test break points have been included throughout the RF circuitry to enable individual transistor stages to be tested.

Testing may be performed by removing the solder short across the test break and soldering a 50 ohm test lead to the appropriate signal and earth pads.

Note 1: Use good quality 50Ω coax for the "flying" test leads.

Note 2: Ensure each output is terminated in a 50Ω load of the correct power rating.

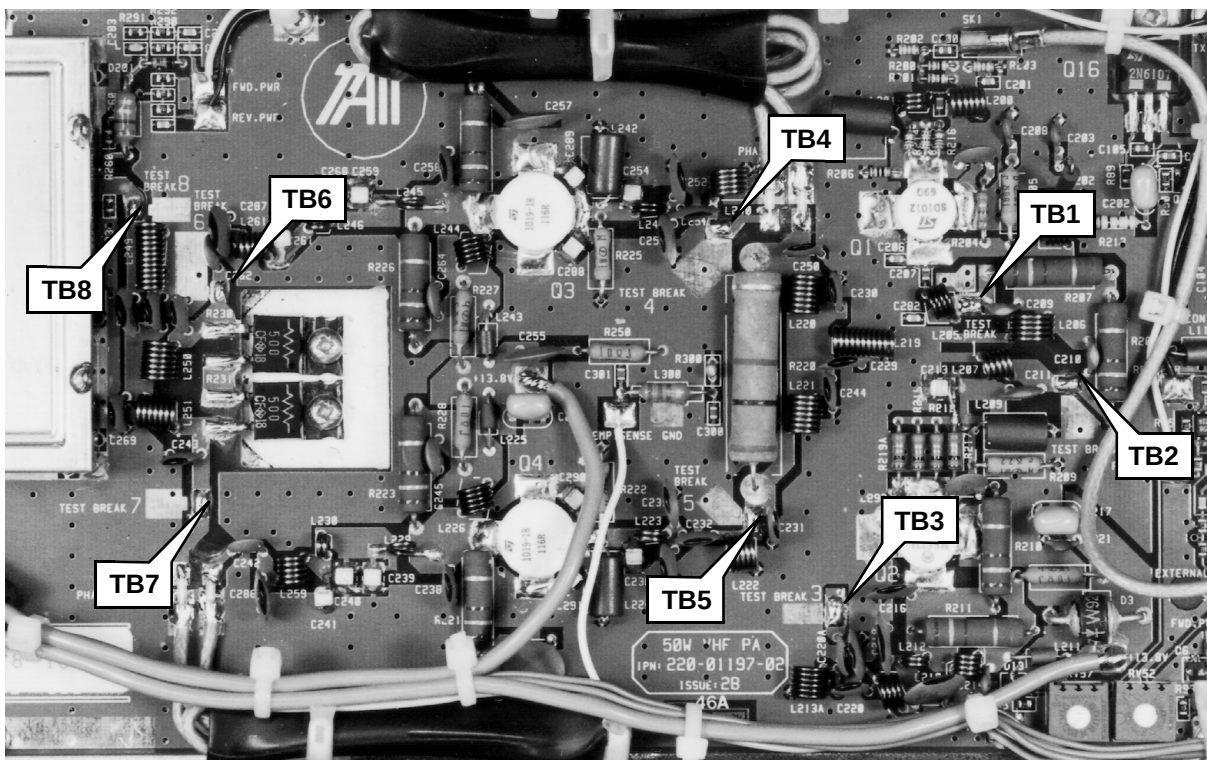


Figure 4.1 T828 Test Break Point Location

4.5 Voltage Chart

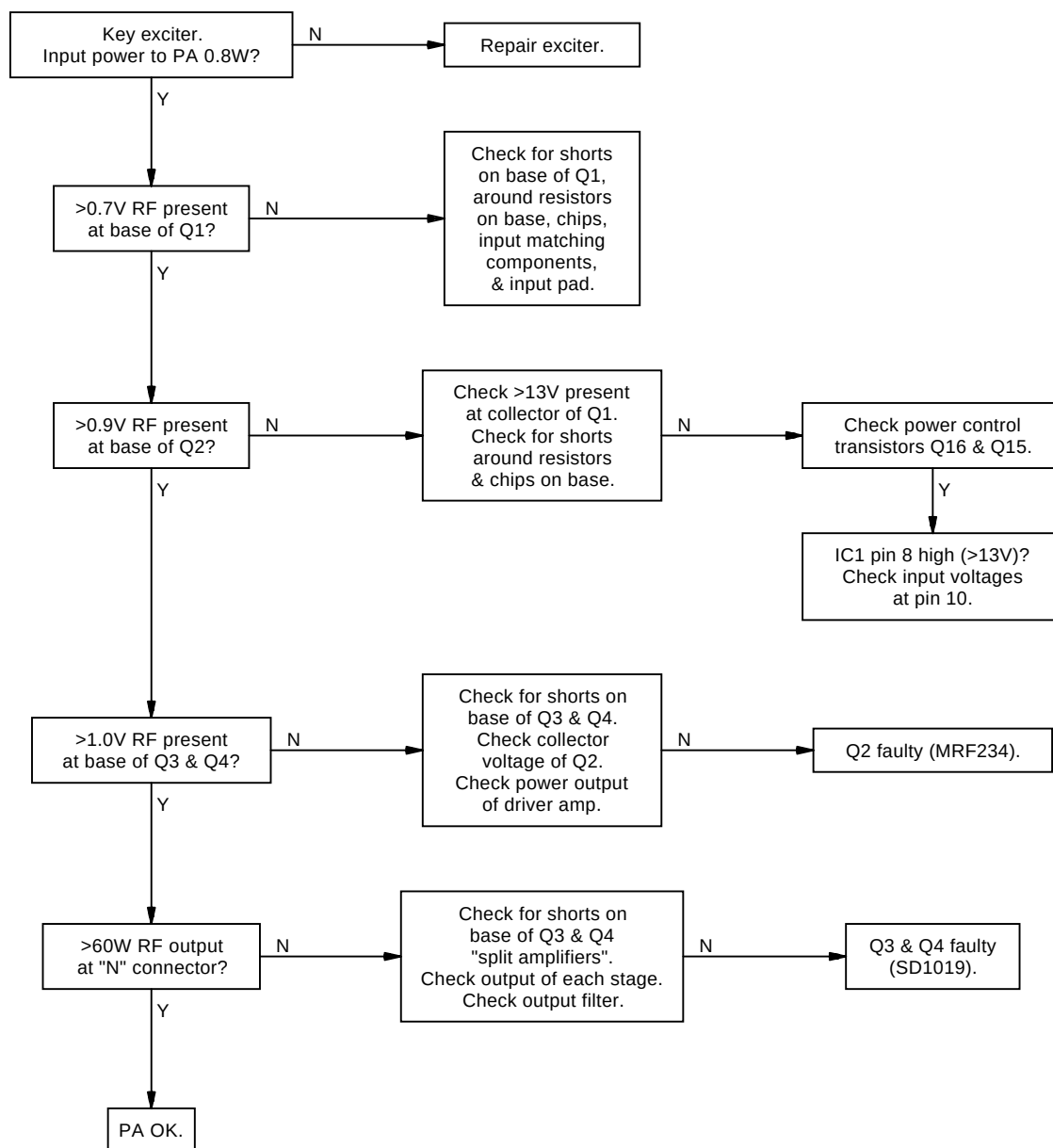
Test conditions:

- typical DC voltages measured with Fluke 77 DVM
- supply voltage 13.8V at socket
- transmitter unkeyed
- allow $\pm 20\%$ for spread of transistor characteristics.

Device	Emitter	Base	Collector
Q1	0.0V	0.0V	13.0V
Q2	0.0V	0.0V	13.8V
Q3	0.0V	0.0V	13.8V
Q4	0.0V	0.0V	13.8V
Q11	1.8V	2.2V	5.9V
Q13	0.0V	0.0V	5.9V
Q15	13.0V	13.6V	13.6V
Q16	13.8V	13.6V	13.0V

4.6 Fault Finding Charts

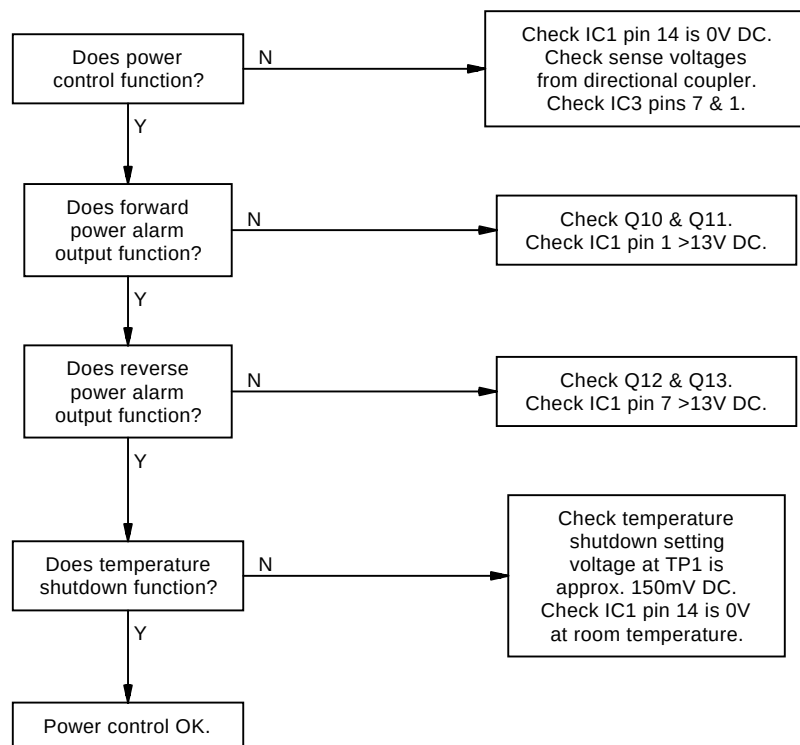
4.6.1 PA



4.6.2 Power Control

Normal operating conditions:

Measurement	Output Power	
	10W	50W
forward power at "FWD-PWR" pad (beside IC3)	1V	2.6V
reverse power at "REV-PWR" pad (beside IC3)	<10mV	50mV
IC1 pin 8	4.8V	6.8V
RV63/R64 (RV63 wiper)	7V	7V
L202	4.13V	6.2V



4.7 Replacing RF Power Transistors

**Caution:**

Failure to comply with the following procedure can result in failure of the device due to poor heatsinking, or worse, can endanger the health of the assembler if the beryllium oxide die carrier is smashed during assembly.

**Caution:**

As the location of certain components in the PA is critical to performance, it is important that any components removed or disturbed are refitted in *exactly* the same position. Before attempting to remove a transistor, note the location of any other components that will also need to be removed. Replacing each component in its original location will help to maintain the performance of the PA.

**Caution:**

Do not apply too much heat or pressure to the PCB pads and tracks as you may damage them or lift them from the PCB, causing permanent damage to the PA.

Desolder and remove the components from around the transistor.

Desolder the transistor tabs by heating with a soldering iron and lifting away from the PCB with a screwdriver or thin stainless steel spike. Unscrew the transistor stud nut and remove the device.

Remove any excess solder from the PCB pads with solder wick.

Trim the tabs of the replacement transistor so that the device sits neatly on the PCB pads provided.

Lightly tin the underside of the transistor tabs.

Apply a small amount of heatsink compound (Dow-Corning 340 or equivalent) to the transistor mounting surface. Sufficient compound should be used to ensure an even film over the entire mounting surface.

Place the transistor on the PCB in the correct orientation and ensure the tabs are flush to the surface.

Lightly solder one tab to the PCB, then torque down the retaining nut to the correct torque (0.7Nm/6in.lbf.).

**Caution:**

Do not solder all the tabs before torquing down otherwise the device may be broken.

Solder all transistor tabs to the PCB.

Replace each component in exactly the same position as noted previously.

4.8 Removing The PCB From The Heatsink

Note: This is a lengthy procedure and should be considered only after all other checks have been carried out. There are no components on the bottom of the PCB.

Remove the harmonic filter shield lid.

Remove the 50 ohm output N-type connector by unscrewing it from the heatsink casting and desoldering it from the PCB.

Unplug the 50 ohm input coaxial cable from the PCB, unscrew the BNC connector from the heatsink, and remove the connector and cable (cutting cable ties as required).

Desolder the positive and negative power feed wires from the PCB.

Desolder the alarm and metering wires from the PCB.

Remove the 2 screws securing the D-range connector and PCB to the heatsink and withdraw the assembly and wires from the heatsink (cutting cable ties as required).

Remove the transistor stud nuts.

Remove the mounting screws for the TO-220 devices: R230, R231 and Q16.

Remove the 10 PCB retaining screws.

Push the three LEDs out of their front panel grommets.

Lift the PCB gently from the heatsink to gain access to the underside of the board.

Note: R230/231 and Q1-Q4 may be stuck down with heatsink compound. You may need to carefully prise them away from the heatsink with a small screwdriver.



Caution: Keep the heatsink compound clean while the PCB is detached. Any objects caught in the heatsink compound underneath the device which prevent effective earthing and/or heatsinking may cause the device to fail.



Caution: Do not operate the PA with the PCB detached as the heatsink is used for earthing and heat dissipation.

To replace the PCB, reverse the order of removal, taking care that the wiring is correctly positioned and not 'pinched'.

Q1-Q4: Torque down the retaining nut to the correct torque (0.7Nm/ 6in.lbf.).

Make sure that the heatsink compound has stayed clean, and that the insulating pad for Q16 is not damaged.

If you have difficulty refitting the LEDs, try pushing the body of the LED back into the grommet with a thin screwdriver or spike.

5 T828 PCB Information

**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.

This section provides the following information on the T828 power amplifier:

- parts lists
- grid reference index
- PCB layouts
- circuit diagrams.

Section	Title	IPN	Page
5.1	Introduction		5.1.3
5.2	T828 PA PCB	220-01197-02	5.2.1

5.1 Introduction

Product Type Identification

You can identify the PA type by checking the product code printed on a label on the rear of the chassis/heatsink (product codes are explained in Section 1.3 in this Part of the manual, and Figure 1.1 in Part A shows typical labels).

PCB Identification

All PCBs are identified by a unique 10 digit “internal part number” (IPN), e.g. 220-01390-02, which is screen printed onto the PCB (usually on the top side), as shown in the example below:



The last 2 digits of this number define the issue status, which starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are “internal part numbers” (IPNs). We can process your spare parts orders more efficiently and accurately if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:

circuit reference - lists components in alphanumeric order

Ref	Var	IPN	Description
C126		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C127		020-09220-01	CAP ELECT RADL 220M 16V 10X12.5MM
C128		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C129		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
&C130	10	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	15	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
&C130	20	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	25	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C131		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C132		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C133		015-05470-08	CAP CER 1206 CHIP 47N 10% X7R 50V

variant column - indicates that this is a variant component which is fitted only to the product type listed

description - gives a brief description of the component

Internal Part Number - order the component by this number

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

At the front of the parts list is the Parts List Amendments box (an example of which is shown below). This box contains a list of component changes which took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order. The number in brackets at the end of each entry refers to the Tait internal Change Order document.

IPN of new component

Change Order number

Parts List Amendments	
R306	Changed from 180Ω to 560Ω (036-13560-00) to increase sensitivity (71003).

circuit reference or IPN

description of change

Variant Components

A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term “variant” is also used to describe components unplaced in one product. Variant components have a character prefix, such as “&”, “=” or “#”, before the circuit reference (e.g. &R100).

Grid Reference Index

This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:

Device	PCB	Circuit
C126	2:A6	2-R7
C127	1:A8	2-P4
C128	2:B7	2-P2
C129	2:C12	2-E3
&C130	2:D8	2-B8
C131	2:C9	2-H6
C132	2:D8	2-B8
C133	2:D6	2-E1

components listed in alphanumeric order

PCB layout reference

circuit diagram reference

component location on the sheet

sheet number

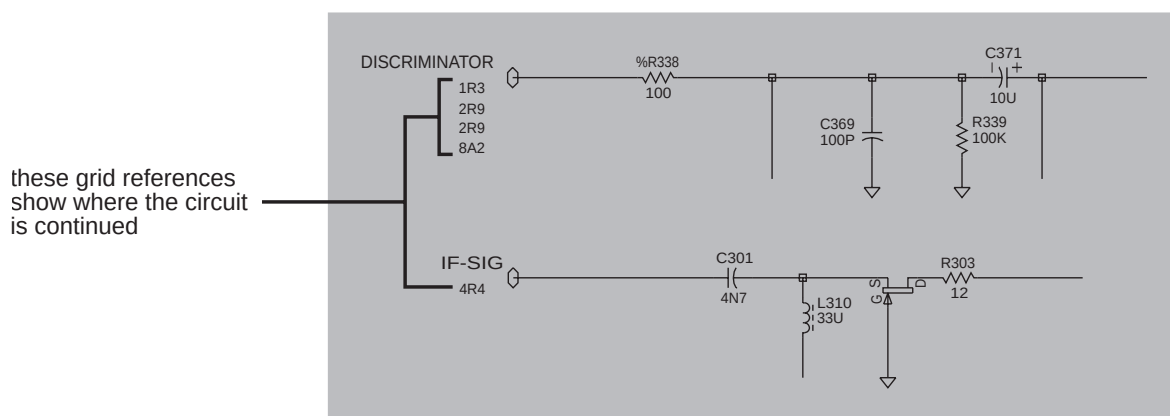
component location on the layer

layer number -
1 = top side layer
2 = bottom side layer

Using CAD Circuit Diagrams

Reading a CAD circuit diagram is similar to reading a road map, in that both have an alphanumeric border. The circuit diagrams in this manual use letters to represent the horizontal axis, and numbers for the vertical axis. These circuit diagram “grid references” are useful in following a circuit that is spread over two or more sheets.

When a line representing part of the circuitry is discontinued, a reference will be given at the end of the line to indicate where the rest of the circuitry is located, as shown below. The first digit refers to the sheet number and the last two characters refer to the location on that sheet of the continuation of the circuit (e.g. 1R3).



5.2 T828 Power Amplifier PCB

This section contains the following information.

IPN	Section	Page
220-01197-02	Parts List	5.2.3
	Mechanical & Miscellaneous Parts	5.2.6
	Grid Reference Index	5.2.7
	PCB Layout - Bottom Side	5.2.9
	PCB Layout - Top Side	5.2.10
	RF Section Circuit Diagram	5.2.11
	Control Section Circuit Diagram	5.2.12

T828 Parts List (IPN 220-01197-02)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A number in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The miscellaneous and mechanical section lists the variant and common parts in IPN order. Where possible, a number in the legend column indicates their position in the mechanical assembly drawing.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

RV63	2k 10 turn pot (IPN 044-04200-03) replaced with better quality 2k 15 turn pot (IPN 044-04200-06) and pot cover (IPN 044-04200-07) (710800).
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Ref	Var	IPN	Description	Ref	Var	IPN	Description
C76		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C287		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09
C77		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C288		015-03560-03	CAP CER CHIP 560P 5% NPO 100V HIQ GRH11
C78		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C289		015-03560-03	CAP CER CHIP 560P 5% NPO 100V HIQ GRH11
C80		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C290		015-03560-03	CAP CER CHIP 560P 5% NPO 100V HIQ GRH11
C81		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C291		015-03560-03	CAP CER CHIP 560P 5% NPO 100V HIQ GRH11
C84		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C292		015-03560-03	CAP CER CHIP 560P 5% NPO 100V HIQ GRH11
C85		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C300		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C86		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	C301		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C87		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V				
C90		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	D3		001-00011-60	(S) DIODE SR2607 6A/30V
C91		025-08100-02	CAP TANT BEAD 10M 10% 16V	D5		008-00013-32	(S) LED 3MM RED LO CURRENT NO MTG
C92		015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	D6		001-10000-70	(S) DIODE SMD BAV70 DUAL SWITCH SOT-23 CO
C93		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	D10		008-00013-35	(S) LED 3MM GREEN LO CURRENT NO MTG
C95		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	D11		008-00013-32	(S) LED 3MM RED LO CURRENT NO MTG
C96		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	D13		001-10000-70	(S) DIODE SMD BAV70 DUAL SWITCH SOT-23 C
C99		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	D200		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
C100		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	D201		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
C101		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V				
C103		015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	IC1		002-10003-24	(S) IC SMD 324 QUAD OP AMP SO14
C104		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	IC2		002-00014-62	(S) IC 317L 100MA REG 3 TERMINAL TO-92
C105		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	IC3		002-10003-58	(S) IC SMD LM358 DUAL OP AMP
C107		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V				
C108		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	L11		065-00010-04	BEAD FERRITE F8 4X2X5MM
C109		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	L200		052-08135-55	COIL A/W 5.5T/3.5MM HOR 0.8MM WIRE
C111		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	L201		052-08135-25	COIL A/W 2.5T/3.5MM HOR 0.8MM WIRE
C112		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	L202		065-00010-08	BEAD FERRITE 4S3 3*0.7*10MM RED
C200		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V	L203		052-08145-45	COIL A/W 4.5T/4.5MM HOR 0.8MM WIRE
C201		015-22560-01	CAP CER 0805 CHIP 56P 5% NPO 50V	L204		065-00010-01	BEAD FERRITE 3B 6 HOLE
C202		020-07470-04	CAP ELECT RADL 4M7 25V 20% 8X13MM SOLID	L205		052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM WIRE
C203		011-54100-01	CAP CER AI 1N 10% T/C B 63V	L206		052-08160-35	COIL A/W 3.5T/6.0MM HOR 0.8MM WIRE
C204		011-54470-03	CAP CER AI 4N7 10% T/C B 50V	L207		052-08130-45	COIL A/W 4.5T/3.0MM HOR 0.8MM WIRE
C205		015-23120-01	CAP CER 0805 CHIP 120P 5% NPO 50V	L209		065-00010-01	BEAD FERRITE 3B 6 HOLE
C206		015-22270-01	CAP CER 0805 CHIP 27P 5% NPO 50V	L210		052-08130-35	COIL A/W 3.5T/3.0MM HOR 0.8MM WIRE
C207		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V	L211		065-00010-11	BEAD FERRITE 4S3 3*1*4MM RED
C208		011-54100-01	CAP CER AI 1N 10% T/C B 63V	L212		052-08130-15	COIL A/W 1.5T/3.0MM HOR 0.8MM WIRE
C209		011-52390-01	CAP CER AI 39P 5% N150 50/63V	L213		052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM WIRE
C210		011-52390-01	CAP CER AI 39P 5% N150 50/63V	L213A		052-08145-55	COIL A/W 5.5T/4.5MM HOR 0.8MM WIRE
C211		011-53120-01	CAP CER AI 120P 5% N150 50/63V	L219		052-08131-05	COIL A/W 10.5T/3.0MM HOR 0.8MM WIRE
C213		015-03470-03	CAP CER CHIP 470P 5% NPO 200V HIQ GRH11	L220		052-08140-65	COIL A/W 6.5T/4.0MM HOR 0.8MM WIRE
C214		011-54100-01	CAP CER AI 1N 10% T/C B 63V	L221		052-08140-65	COIL A/W 6.5T/4.0MM HOR 0.8MM WIRE
C215		011-54470-03	CAP CER AI 4N7 10% T/C B 50V	L222		052-08145-45	COIL A/W 4.5T/4.5MM HOR 0.8MM WIRE
C216		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	L223		052-08140-15	COIL A/W 1.5T/4.0MM HOR 0.8MM WIRE
C217		020-07470-04	CAP ELECT RADL 4M7 25V 20% 8X13MM SOLID	L224		065-00010-01	BEAD FERRITE 3B 6 HOLE
C218		010-03150-01	CAP CER 150P 5% NPO 500V	L225		065-00010-11	BEAD FERRITE 4S3 3*1*4MM RED
C219		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	L226		052-08140-45	COIL A/W 4.5T/4.0MM HOR 0.8MM WIRE
C220		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L229		052-08335-10	COIL A/W 17/3.5MM SMD 0.8MM WIRE
C220A		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L230		052-08125-15	COIL A/W 1.5T/2.5MM HOR 0.8MM WIRE
C221		011-54100-01	CAP CER AI 1N 10% T/C B 63V	L240		052-08145-45	COIL A/W 4.5T/4.5MM HOR 0.8MM WIRE
C223		010-03150-01	CAP CER 150P 5% NPO 500V	L241		052-08140-15	COIL A/W 1.5T/4.0MM HOR 0.8MM WIRE
C229		010-02820-00	CAP CER 82P 5% NPO 500V 9.5MM OD DD09	L242		065-00010-01	BEAD FERRITE 3B 6 HOLE
C230		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L243		065-00010-11	BEAD FERRITE 4S3 3*1*4MM RED
C231		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L244		052-08140-45	COIL A/W 4.5T/4.0MM HOR 0.8MM WIRE
C232		010-02560-00	CAP CER 56P 5% NPO 500V 8.0MM OD DD08	L245		052-08335-10	COIL A/W 17/3.5MM SMD 0.8MM WIRE
C234		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	L246		052-08125-15	COIL A/W 1.5T/2.5MM HOR 0.8MM WIRE
C235		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	L249		052-08131-15	COIL A/W 11.5T/3.0MM HOR 0.8MM WIRE
C236		015-03470-03	CAP CER CHIP 470P 5% NPO 200V HIQ GRH11	L250		052-08140-65	COIL A/W 6.5T/4.0MM HOR 0.8MM WIRE
C237		017-15470-01	CAP CER SURFACE BARRIER 47N 20% 50V	L251		052-08140-65	COIL A/W 6.5T/4.0MM HOR 0.8MM WIRE
C238		010-02560-00	CAP CER 56P 5% NPO 500V 8.0MM OD DD08	L254		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM WIRE
C239		015-03150-03	CAP CER CHIP 150P 5% NPO 300V HIQ GRH11	L255		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM WIRE
C240		015-03150-03	CAP CER CHIP 150P 5% NPO 300V HIQ GRH11	L256		052-08140-25	COIL A/W 2.5T/4.0MM HOR 0.8MM WIRE
C241		015-02680-03	CAP CER CHIP 68P 5% NPO 500V HIQ GRH11	L257		052-08155-45	COIL A/W 4.5T/5.5MM HOR 0.8MM WIRE
C242		010-04100-01	CAP CER 1N 10% T/C B 500V	L258		052-08135-85	COIL A/W 8.5T/3.5MM HOR 0.8MM WIRE
C243		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L259		052-08130-45	COIL A/W 4.5T/3.0MM HOR 0.8MM WIRE
C244		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L260		056-00021-52	IND FXD 820NH 10% NON MAGNETIC
C245		010-04100-01	CAP CER 1N 10% T/C B 500V	L260A		056-00021-60	IND FXD 330NH 6.6X2.7MM AXIAL NON MAGN
C250		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	L261		052-08130-45	COIL A/W 4.5T/3.0MM HOR 0.8MM WIRE
C251		010-02560-00	CAP CER 56P 5% NPO 500V 8.0MM OD DD08	L300		056-00021-00	IND FXD 3.3UH AXIAL
C252		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09				
C253		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	Q1		000-00021-65	(S) XSTR SD1012-9 NPN STUD MTG VHF PWR
C254		015-03470-03	CAP CER CHIP 470P 5% NPO 200V HIQ GRH11	Q2		000-00030-74	(S) XSTR MRF234 STUD MTG RF PWR 25W 90MH
C255		017-15470-01	CAP CER SURFACE BARRIER 47N 20% 50V	Q3		000-00022-66	(S) XSTR SD1019-18 VHF PWR 40W STUD MTD
C256		020-07470-04	CAP ELECT RADL 4M7 25V 20% 8X13MM SOLID	Q4		000-00022-66	(S) XSTR SD1019-18 VHF PWR 40W STUD MTD
C257		017-15470-01	CAP CER SURFACE BARRIER 47N 20% 50V	Q10		000-00020-70	(S) XSTR BS170 JFET TO-92 SMALL SIG
C258		010-02560-00	CAP CER 56P 5% NPO 500V 8.0MM OD DD08	Q11		000-10008-17	(S) XSTR SMD BC817-25 NPN SOT-23 AF LO P
C259		015-03150-03	CAP CER CHIP 150P 5% NPO 300V HIQ GRH11	Q12		000-00020-70	(S) XSTR BS170 JFET TO-92 SMALL SIG
C260		015-03150-03	CAP CER CHIP 150P 5% NPO 300V HIQ GRH11	Q13		000-10008-17	(S) XSTR SMD BC817-25 NPN SOT-23 AF LO P
C261		015-02680-03	CAP CER CHIP 68P 5% NPO 500V HIQ GRH11	Q14		000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C262		010-04100-01	CAP CER 1N 10% T/C B 500V	Q15		000-10008-17	(S) XSTR SMD BC817-25 NPN SOT-23 AF LO P
C263		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	Q16		000-00030-95	(S) XSTR 2N6107 PNP TO-220 AF PWR
C264		010-04100-01	CAP CER 1N 10% T/C B 500V				
C265		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	R36		036-13680-00	RES M/F 0805 CHIP 680E 5%
C269		010-02390-00	CAP CER 39P 5% NPO 500V 7.5MM OD DD07	R38		036-17100-00	RES M/F 0805 CHIP 1M 5%
C270		010-02820-00	CAP CER 82P 5% NPO 500V 9.5MM OD DD09	R39		036-16100-00	RES M/F 0805 CHIP 100K 5%
C271		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R42		036-15100-00	RES M/F 0805 CHIP 10K 5%
C271A		015-21680-01	CAP CER 0805 CHIP 6P8 +/-0.25P NPO 50V	R44		036-14470-00	RES M/F 0805 CHIP 4K7 5%
C272		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R47		036-15270-00	RES M/F 0805 CHIP 27K 5%
C273		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R49		036-13680-00	RES M/F 0805 CHIP 680E 5%
C274		015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R50		036-13680-00	RES M/F 0805 CHIP 680E 5%
C275		015-02330-03	CAP CER CHIP 33P 5% NPO 500V HIQ GRH11	R55		036-17100-00	RES M/F 0805 CHIP 1M 5%
C276		015-02470-03	CAP CER CHIP 47P 5% NPO 500V HIQ GRH11	R56		036-15100-00	RES M/F 0805 CHIP 10K 5%
C277		015-02220-03	CAP CER CHIP 22P 5% NPO 500V HIQ GRH11	R58		036-14470-00	RES M/F 0805 CHIP 4K7 5%
C278		015-02470-03	CAP CER CHIP 47P 5% NPO 500V HIQ GRH11	R61		036-13220-00	RES M/F 0805 CHIP 220E 5%
C279		015-02220-03	CAP CER CHIP 22P 5% NPO 500V HIQ GRH11	R62		036-14100-00	RES M/F 0805 CHIP 1K 5%
C280		015-02470-03	CAP CER CHIP 47P 5% NPO 500V HIQ GRH11	R64		036-14470-00	RES M/F 0805 CHIP 4K7 5%
C281		015-02330-03	CAP CER CHIP 33P 5% NPO 500V HIQ GRH11	R67		036-15100-00	RES M/F 0805 CHIP 10K 5%
C282		015-22680-01	CAP CER 0805 CHIP 68P 5% NPO 50V	R68		036-14470-00	RES M/F 0805 CHIP 4K7 5%
C283		015-21680-01	CAP CER 0805 CHIP 6P8 +/-0.25P NPO 50V	R73		036-16220-00	RES M/F 0805 CHIP 220K 5%
C286		010-02680-00	CAP CER 68P 5% NPO 500V 9.5MM OD DD09	R74		036-14470-00	RES M/F 0805 CHIP 4K7 5%

Ref	Var	IPN	Description	Ref	Var	IPN	Description
R75		036-14470-00	RES M/F 0805 CHIP 4K7 5%				
R76		036-14220-00	RES M/F 0805 CHIP 2K2 5%				
R77		036-14220-00	RES M/F 0805 CHIP 2K2 5%				
R78		036-14270-00	RES M/F 0805 CHIP 2K7 5%				
R79		036-13220-00	RES M/F 0805 CHIP 220E 5%				
R80		036-13100-00	RES M/F 0805 CHIP 100E 5%				
R81		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R82		036-14470-00	RES M/F 0805 CHIP 4K7 5%				
R83		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R84		036-14470-00	RES M/F 0805 CHIP 4K7 5%				
R85		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R86		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R87		036-12100-00	RES M/F 0805 CHIP 10E 5%				
R89		036-13100-00	RES M/F 0805 CHIP 100E 5%				
R90		036-15100-00	RES M/F 0805 CHIP 10K 5%				
R92		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R93		036-14560-00	RES M/F 0805 CHIP 5K6 5%				
R94		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R95		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R96		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R97		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R98		036-12100-00	RES M/F 0805 CHIP 10E 5%				
R99		036-14270-00	RES M/F 0805 CHIP 2K7 5%				
R100		036-14470-00	RES M/F 0805 CHIP 4K7 5%				
R200		030-02120-20	RES FILM 12E 5% 0.4W 4X1.6MM				
R201		030-02120-20	RES FILM 12E 5% 0.4W 4X1.6MM				
R202		030-53820-20	RES FILM AI 820E 5% 0.4W 4X1.6MM				
R203		030-53820-20	RES FILM AI 820E 5% 0.4W 4X1.6MM				
R204		030-03270-10	RES FILM 270E 5% 0.5W 7X2.5MM				
R205		032-33180-00	RES M/F PWR 180E 5% 1W 12X4.5MM				
R206		030-52100-20	RES FILM AI 10E 5% 0.4W 4X1.6MM				
R207		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R208		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R209		032-32220-00	RES M/F PWR 22E 5% 1W 12X4.5MM				
R210		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R211		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R212		032-32100-00	RES M/F PWR 10E 5% 1W 10X4MM				
R213		030-01100-00	RES FILM 1E 5% 0.25W 7X2.5MM				
R214		030-52180-20	RES FILM AI 18E 5% 0.4W 4X1.6MM				
R215		030-52180-20	RES FILM AI 18E 5% 0.4W 4X1.6MM				
R216		030-52180-20	RES FILM AI 18E 5% 0.4W 4X1.6MM				
R217		030-01100-10	RES FILM 1E 5% 0.5W 7X2.5MM				
R218		030-01100-10	RES FILM 1E 5% 0.5W 7X2.5MM				
R219		030-01100-10	RES FILM 1E 5% 0.5W 7X2.5MM				
R219A		030-01100-10	RES FILM 1E 5% 0.5W 7X2.5MM				
R220		032-33100-02	RES M/F PWR 100E 5% 6W 33X9MM				
R221		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R222		032-32220-00	RES M/F PWR 22E 5% 1W 12X4.5MM				
R223		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R224		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R225		032-32220-00	RES M/F PWR 22E 5% 1W 12X4.5MM				
R226		032-33180-01	RES M/F PWR 180E 5% 2.5W 17X5MM				
R227		032-32100-00	RES M/F PWR 10E 5% 1W 10X4MM				
R228		032-32100-00	RES M/F PWR 10E 5% 1W 10X4MM				
R230		039-02500-01	RES DUMP LOAD 50E 1% 10W TO-220 NIKKOHM				
R231		039-02500-01	RES DUMP LOAD 50E 1% 10W TO-220 NIKKOHM				
R232		036-13100-00	RES M/F 0805 CHIP 100E 5%				
R233		036-13100-00	RES M/F 0805 CHIP 100E 5%				
R250		032-32100-00	RES M/F PWR 10E 5% 1W 10X4MM				
R260		036-13270-00	RES M/F 0805 CHIP 270E 5%				
R290		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R291		036-15470-00	RES M/F 0805 CHIP 47K 5%				
R292		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R293		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R294		036-15470-00	RES M/F 0805 CHIP 47K 5%				
R295		036-14100-00	RES M/F 0805 CHIP 1K 5%				
R300		045-04470-01	RES NTC 4K7 5% 5MM DISC				
RV43		042-05470-09	RES PRESET 50K CERMET 9.5MM SQ FLAT				
RV48		042-04500-08	RES PRESET 5K CERMET 9.5MM SQ FLAT				
RV52		042-04500-08	RES PRESET 5K CERMET 9.5MM SQ FLAT				
RV57		042-05470-09	RES PRESET 50K CERMET 9.5MM SQ FLAT				
RV63		044-04200-03	RES PRESET MULTITURN 2K 10T PNL MTG				
RV69		042-04220-02	RES PRESET 2K CERMET 9.5MM SQ FLAT TOP				
RV74		042-05470-09	RES PRESET 50K CERMET 9.5MM SQ FLAT				
SK1		240-02100-44	SKT COAX MINI JACK PCB MTG ANGLED				

T828 Mechanical & Miscellaneous Parts (220-01197-02)

IPN	Description	IPN	Description
008-00014-79	S)LED 3MM RED WITH WIRE	349-00020-09	SCRW T/T 4-40X3/8 IN P/POZ BLK
008-00014-80	S)LED 3MM GREEN WITH WIRE	349-00020-36	SCREW TT M3X8m PANTORX BLK
065-00010-08	BEAD FERR 4S3 3*0.7*10MM RED	352-00010-29	NUT M4 NYLOC HEX
065-00010-20	BEAD FERRITE BALUN 4B1 PHILIPS	352-00010-35	NUT 8-32 UNC HEX XSTR MTG Q1 & Q2
070-01001-00	D-RANGE 15 WAY COMPL T800	352-00010-36	NUT 10-32 UNF LARGE STUD Q3 & Q4
201-00030-01	WIRE #1 T/C WIRE 7/0.2MM PVC BROWN 1x 410mm	353-00010-10	WSHR M3 FLAT 7MM*0.6MM ST BZ Q16
201-00030-02	WIRE #1 T/C WIRE 7/0.2MM PVC RED 3x 20mm	356-00010-03	TAG SOLDER 3MM LONG M614/3.2
201-00030-03	WIRE #1 T/C WIRE 7/0.2MM PVC ORANGE 1x 235mm	360-00010-41	BUSH SHORTY BLK
201-00030-04	WIRE #1 T/C WIRE 7/0.2MM PVC YELLOW 1x 325mm	362-00010-07	GASKET SIL INSULATING TO-220 Q16
201-00030-05	WIRE #1 T/C WIRE 7/0.2MM PVC GREEN 1x 265mm	362-00010-13	BUSH INSULATING 1.1MM TOP HAT Q16
201-00030-06	WIRE #1 T/C WIRE 7/0.2MM PVC BLUE 1x 410mm	362-00010-33	GROMMET LED MTG 3MM
201-00030-07	WIRE #1 T/C WIRE 7/0.2MM PVC VIOLET 1x 410mm	365-00011-53	LABEL 104*37MM
201-00030-09	WIRE #1 T/C WIRE 7/0.2MM PVC WHITE 1x 285mm	365-01540-00	LABEL PA TYPE APPL/SERIAL NO
201-00030-10	WIRE #1 T/C WIRE 7/0.2MM PVC BLACK 1x 310mm, 3x 25mm-FOR LEDS	369-00010-14	TIE CABLE NYLON 100*2.6MM
201-00050-12	CABLE AUTO 152 RED 28/0.3MM PVC 1x 290mm, 1x 220mm	399-00010-56	BAG PLASTIC 200*250MM
201-00050-20	CABLE AUTO 152 BLACK 28/0.3MM PVC 1x 40mm	400-00020-69	HEATSHRINK 12.7MM
206-00010-11	CABLE COAX 50 OHM RG316-U PTFE 2x 790mm (90 deg phase section)	410-01081-00	CRTN T800 PRNTD 402X192X66MM
209-00010-25	STRIP CU 3*0.35 SLOT CAR TRACK		
219-02609-00	COAX 190MM 1 MINI PIN 1 PNL JK		
220-01197-02	PCB T828 PA		
240-02010-54	SKT 15W DRANGE PNL MTG 125 C		
240-02100-06	SKT COAX N TYPE PNL MTG OPEN TERMN		
240-06010-14	CLAMP LATCHING 15 W D RANGE		
240-06010-15	BLOCK LATCHING 15W D RANGE		
303-23117-00	COVER SIDE COMPL A2M2223		
303-50005-00	CONTACT A4M2311 SPRING EARTH		
308-01007-01	HANDLE BASE STATION SERIES II		
308-13068-01	HSINK DIECAST A1M2274		
316-06617-00	PNL PA NO INP DRV SER II SNGL		
316-85018-00	PIN A4M1397 COAX CONDUCTOR N-type connector extension		
319-01147-00	SHIELD A3M2224 WALL T859 PA		
319-01148-00	SHIELD A3M2225 LID T859 PA		
345-00040-06	SCRW M3*8MM P/POZ ST BZ		
345-00040-16	SCRW M3X20MM P/POZ ST BZ		
349-00020-07	SCRW 4-40 X 5/16 P/POZ T/T BLK		

T828 Grid Reference Index (IPN 220-01197-02)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C76	1:N7	2-B6	C240	1:E3	1-G1	IC1	1:N3	2-H0	Q2	1:K3	1-L8
C77	1:N7	2-C6	C241	1:E3	1-H1			2-F7	Q3	1:G6	1-F3
C78	1:N7	2-D5	C242	1:E3	1-H2			2-E4	Q4	1:G3	1-F1
C80	1:N3	2-F6	C243	1:D4	1-J1			2-N4	Q10	1:N7	2-B7
C81	1:N2	2-G5	C244	1:J4	1-A2			2-N1	Q11	1:N7	2-D6
C84	1:N6	2-C4	C245	1:F4	1-F2	IC2	1:N6	2-K4	Q12	1:N6	2-C4
C85	1:N6	2-C4	C250	1:J5	1-B3	IC3	1:M4	2-J7	Q13	1:N6	2-D4
C86	1:N4	2-E3	C251	1:H6	1-C3			2-H6	Q14	1:P3	2-P1
C87	1:L2	2-G3	C252	1:H6	1-D3			2-H3	Q15	1:M6	2-Q4
C90	1:N5	2-K4	C253	1:H5	1-D3				Q16	1:M7	2-R4
C91	1:P6	2-N4	C254	1:H6	1-E3	L11	1:N4	1-N9			
C92	1:N3	2-P5	C255	1:G4	1-E4	L200	1:K7	1-C7	R36	1:P6	2-C5
C93	1:M3	2-N5	C256	1:G4	1-F4	L201	1:K6	1-C7	R38	1:N4	2-E6
C95	1:N3	2-H0	C257	1:G6	1-F3	L202	1:L6	1-D9	R39	1:N4	2-E5
C96	1:N3	2-N2	C258	1:F6	1-G3	L203	1:L5	1-D9	R42	1:N3	2-G6
C99	1:N3	2-M0	C259	1:F6	1-G3	L204	1:J6	1-D7	R44	1:M3	2-H6
C100	1:N3	2-N4	C260	1:E6	1-H3	L205	1:K5	1-E8	R47	1:N4	2-F5
C101	1:P3	2-P1	C261	1:E5	1-H3	L206	1:L5	1-G7	R49	1:P7	2-C5
C103	1:M6	2-Q4	C262	1:D5	1-J4	L207	1:L4	1-J7	R50	1:P6	2-D5
C104	1:N5	2-R5	C263	1:D5	1-J3	L209	1:L4	1-L7	R55	1:N4	2-E3
C105	1:M6	2-R5	C264	1:F5	1-G4	L210	1:K2	1-L8	R56	1:N4	2-F4
C107	1:N4	2-H7	C265	1:D5	1-L2	L211	1:L2	1-L9	R58	1:N4	2-H5
C108	1:M3	2-J6	C269	1:D4	1-L2	L212	1:K2	1-M8	R61	1:N6	2-L4
C109	1:N4	2-J4	C270	1:D5	1-L3	L213	1:K2	1-N8	R62	1:N5	2-L4
C111	1:N7	2-A7	C271	1:C5	1-N3	L213A	1:J2	1-P7	R64	1:N3	2-N4
C112	1:N6	2-B4	C271A	1:C5	1-M3	L219	1:K4	1-A2	R67	1:N3	2-M2
C200	1:K7	1-B7	C272	1:D6	1-P3	L220	1:J5	1-B3	R68	1:N3	2-L2
C201	1:L7	1-B7	C273	1:D7	1-M1	L221	1:J4	1-B2	R73	1:N3	2-N2
C202	1:M6	1-C9	C274	1:D7	1-N1	L222	1:J3	1-C1	R74	1:N3	2-N1
C203	1:L6	1-D9	C275	1:C4	1-N2	L223	1:H3	1-D1	R75	1:N3	2-P1
C204	1:L6	1-D8	C276	1:B4	1-P2	L224	1:H2	1-F1	R76	1:P3	2-P1
C205	1:K6	1-C7	C277	1:B4	1-P2	L225	1:G4	1-F2	R77	1:N3	2-P5
C206	1:K5	1-E7	C278	1:B5	1-P2	L226	1:F3	1-F2	R78	1:N6	2-Q4
C207	1:K5	1-E8	C279	1:B5	1-Q2	L229	1:F3	1-G2	R79	1:N3	2-N5
C208	1:L6	1-E9	C280	1:B5	1-Q2	L230	1:E3	1-H2	R80	1:M6	2-Q5
C209	1:L5	1-G8	C281	1:B6	1-R2	L240	1:J6	1-C3	R81	1:N4	2-D6
C210	1:L4	1-G8	C282	1:K5	1-E7	L241	1:H6	1-D3	R82	1:N4	2-D6
C211	1:L4	1-J8	C283	1:D7	1-M2	L242	1:H6	1-F3	R83	1:N4	2-D3
C213	1:K4	1-J7	C286	1:E3	1-H1	L243	1:G4	1-F4	R84	1:N4	2-D4
C214	1:L2	1-L9	C287	1:E5	1-H3	L244	1:F5	1-F4	R85	1:M4	2-F3
C215	1:L3	1-L8	C288	1:G5	1-E3	L245	1:F6	1-G4	R86	1:M3	2-G6
C216	1:K2	1-M7	C289	1:G6	1-F3	L246	1:E5	1-H4	R87	1:N3	2-P5
C217	1:L3	1-M8	C290	1:G3	1-E1	L249	1:D5	1-L2	R89	1:M6	2-R4
C218	1:K2	1-M7	C291	1:G3	1-F1	L250	1:D4	1-K3	R90	1:M6	2-Q3
C219	1:K2	1-N7	C292	1:K3	1-L7	L251	1:D4	1-K2	R92	1:L2	2-D3
C220	1:K2	1-N8	C300	1:H4	1-C2	L254	1:C4	1-N3	R93	1:M2	2-F5
C220A	1:J2	1-P8	C301	1:H4	1-D2	L255	1:B4	1-P3	R94	1:N2	2-F7
C221	1:L3	1-M8				L256	1:B4	1-P2	R95	1:N3	2-M1
C223	1:K2	1-M7	D3	1:M2	2-A1	L257	1:B5	1-Q3	R96	1:M3	2-K7
C229	1:K4	1-A2	D5	1:P7	2-C6	L258	1:B6	1-R3	R97	1:M4	2-K4
C230	1:J5	1-A2	D6	1:M2	2-G5	L259	1:E3	1-H2	R98	1:N5	2-M5
C231	1:J3	1-B1				L260	1:D6	1-M2	R99	1:N5	2-M4
C232	1:H3	1-C1	D10	1:P7	2-C4	L260A	1:C5	1-N3	R100	1:N5	2-M4
C234	1:H3	1-D1	D11	1:P6	2-D4	L261	1:E5	1-H4	R200	1:K7	1-B7
C235	1:H3	1-D1	D13	1:L2	2-F2	L300	1:H4	1-C2	R201	1:K7	1-B7
C236	1:H3	1-E1							R202	1:K7	1-B7
C237	1:G2	1-F2	D200	1:C5	1-N3	PL1	1:E5	2-B0	R203	1:L7	1-B7
C238	1:F3	1-G1	D201	1:D7	1-M2				R204	1:L6	1-D8
C239	1:F3	1-G1				Q1	1:K6	1-D7	R205	1:L6	1-D9

<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>
R206	1:K6	1-D7									
R207	1:L5	1-G7									
R208	1:M5	1-G7									
R209	1:L3	1-L7									
R210	1:L3	1-L8									
R211	1:L2	1-L8									
R212	1:L3	1-L9									
R213	1:L5	1-C8									
R214	1:K6	1-D8									
R215	1:K6	1-D7									
R216	1:K6	1-D7									
R217	1:K4	1-K8									
R218	1:K4	1-K8									
R219	1:K4	1-K8									
R219A	1:K4	1-K7									
R220	1:J5	1-B2									
R221	1:G2	1-F2									
R222	1:H3	1-F1									
R223	1:F4	1-G2									
R224	1:G7	1-F4									
R225	1:H6	1-F3									
R226	1:F5	1-G4									
R227	1:F4	1-G4									
R228	1:F4	1-G2									
R230	1:E4	1-K3									
R231	1:E4	1-K2									
R232	1:C6	1-N2									
R233	1:D6	1-M3									
R250	1:G4	1-E4									
R260	1:D6	1-M2									
R290	1:D7	1-M2									
R291	1:D7	1-N1									
R292	1:D7	1-N2									
R293	1:D7	1-N4									
R294	1:D7	1-P3									
R295	1:D6	1-P4									
R300	1:H4	1-C2									
RV43	1:N1	2-G6									
RV48	1:P1	2-F5									
RV52	1:M1	2-F5									
RV57	1:L1	2-F3									
RV63	1:N5	2-M4									
RV69	1:N2	2-M2									
RV74	1:P2	2-P2									
SK1	1:L7	1-A7									
TL1	1:J5	1-C3									
TL2	1:D3	1-J2									
TP1	1:N2	2-N2									
TP2	1:N3	2-P1									

Part E T820 VCO PCB Information

This part of the manual provides the parts list, grid reference index, PCB layouts and circuit diagram for the T820 VCO PCB. There is a detailed table of contents at the start of Section 2.

Section	Title	IPN	Page
1	Introduction		1.1
2	T820 VCO PCB	220-01180-05	2.1

1 Introduction

PCB Identification

All PCBs are identified by a unique 10 digit “internal part number” (IPN), e.g. 220-12345-00, which is screen printed onto the PCB (usually on the top side), as shown in the example below:



The last 2 digits of this number define the issue status, which starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are “internal part numbers” (IPNs). We can process your spare parts orders more efficiently and accurately if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:

circuit reference - lists components in alphanumeric order

variant column - indicates that this is a variant component which is fitted only to the product type listed

description - gives a brief description of the component

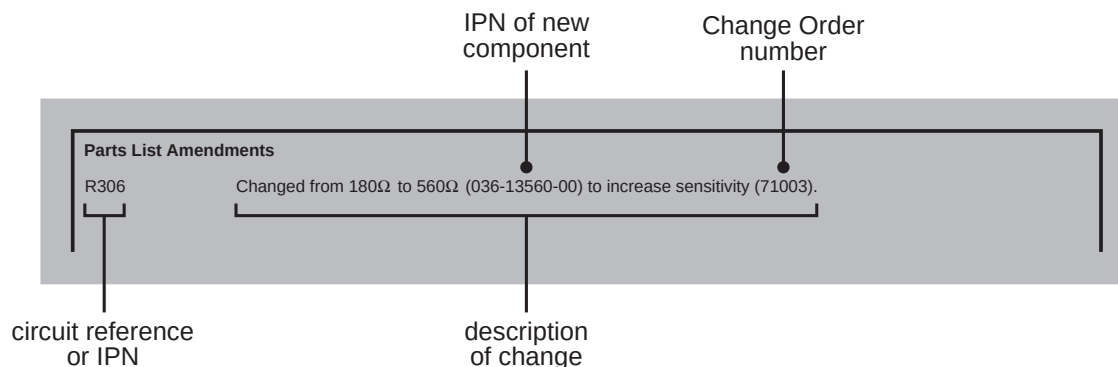
Internal Part Number - order the component by this number

Ref	Var	IPN	Description
C126		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C127		020-09220-01	CAP ELECT RADL 220M 16V 10X12.5MM
C128		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
C129		015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V
&C130	10	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
	15	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
&C130	20	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V
&C130	25	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C131		015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V
C132		015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V
C133		015-05470-08	CAP CER 1206 CHIP 47N 10% X7R 50V

The mechanical and miscellaneous section lists the variant and common parts in IPN order.

Parts List Amendments

At the front of the parts list is the Parts List Amendments box (an example of which is shown below). This box contains a list of component changes which took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order. The number in brackets at the end of each entry refers to the Tait internal Change Order document.



Variant Components

A variant component is one that has the same circuit reference but different value or specification in different product types. Variant components have a character prefix, such as "&", "=", or "#", before the circuit reference (e.g. &R100).

Grid Reference Index

This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:

Device	PCB	Circuit
C126	2:A6	2-R7
C127	1:A8	2-P4
C128	2:B7	2-P2
C129	2:C12	2-E3
&C130	2:D8	2-B8
C131	2:C9	2-H6
C132	2:D8	2-B8
C133	2:D6	2-E1

components listed in alphanumeric order

PCB layout reference

circuit diagram reference

component location on the sheet

sheet number

component location on the layer

layer number -
1 = top side layer
2 = bottom side layer

2 T820 VCO PCB

This section contains the following information.

IPN	Section	Page
220-01180-05	Parts List	2.3
	Mechanical & Miscellaneous Parts	2.5
	Grid Reference Index	2.6
	PCB Layout - Bottom Side	2.7
	PCB Layout - Top Side	2.8
	Circuit Diagram	2.9

T820 VCO Parts List (IPN 220-01180-05)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A letter in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The mechanical and miscellaneous section lists the variant and common parts in IPN order.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Ref	Var	IPN	Description	Ref	Var	IPN	Description
C1		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
&C2	RX	015-22560-01	CAP CER 0805 56P 5% NPO 50V				
&C2	TX	015-23100-01	CAP CER 0805 100P 5% NPO 50V				
&C3	RX	015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V				
&C3	TX	015-21820-02	L)CAP 0805 8P2 15 NPO 50V				
&C4	RX	015-22180-01	CAP CER 0805 18P 5% NPO 50V				
&C4	TX	015-22120-01	CAP CER 0805 12P 5% NPO 50V				
C5		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C6		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C8		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C9		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C10		015-21100-01	CAP CER 0805 1PO+-1/4P NPO 50V				
C11		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C12		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C13		015-22390-01	CAP CER 0805 39P 5% NPO 50V				
C14		015-22820-01	CAP CER 0805 82P 5% NPO 50V				
C15		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C16		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C17		015-25470-08	CAP CER 0805 47N 10% X7R 50V				
C18		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C19		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C20		015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C21	RX	015-21330-01	CAP CER 0805 3P3+-1/4P NPO 50V				
C21	TX	015-22560-01	CAP CER 0805 56P 5% NPO 50V				
C22	RX	015-21470-01	CAP CER 0805 4P7+-1/4P NPO 50V				
C22	TX	015-22270-01	CAP CER 0805 27P 5% NPO 50V				
C23	RX	015-24470-08	CAP CER 0805 4N7 10% X7R 50V				
C23	TX	015-24100-08	CAP CER 0805 1N 10% X7R 50V				
C24		014-08100-00	CAP TANT CHIP 10M 16VW +-20%				
&C25	RX	015-22180-01	CAP CER 0805 18P 5% NPO 50V				
&C25	TX	015-22270-01	CAP CER 0805 27P 5% NPO 50V				
&C26	RX	015-22270-01	CAP CER 0805 27P 5% NPO 50V				
&C26	TX	015-22390-01	CAP CER 0805 39P 5% NPO 50V				
D1		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
D2		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
D3		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
D4		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
D5		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
D6		001-10043-90	S) DIODE SMD BB439 VCAP SOD323				
L1		056-14330-02	(L) IND SMD 3.3UH				
L2		056-14330-02	(L) IND SMD 3.3UH				
L3		056-14330-02	(L) IND SMD 3.3UH				
L4		056-14330-02	(L) IND SMD 3.3UH				
L5		056-10100-02	(L) IND SMD 100NH				
L6		056-10033-00	IND FXD SMD 33NH 3.2*2.5*1.6				
L7	RX	056-10330-02	(L) IND SMD 330NH				
L7	TX	056-10100-02	(L) IND SMD 100NH				
L8	RX	056-10068-02	(L) IND SMD 68NH				
L8	TX	056-10100-02	(L) IND SMD 100NH				
&L9	RX	055-01005-00	COIL TROID 280NH 22P 18T T82X				
&L9	TX	055-01005-00	COIL TROID 280NH 22P 18T T82X				
Q1		000-10003-10	S) XSTR SMD BFJ310 JFET UHF				
Q2		000-10057-10	S) XSTR SMD BR571 NPN SOT23				
Q3		000-10057-10	S) XSTR SMD BR571 NPN SOT23				
Q4		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS				
Q5		000-10050-00	S) XSTR SMD BLT50 UHF SOT22				
R1		036-12220-00	RES M/F 0805 22E 5%				
R2		036-12560-00	RES M/F 0805 56E 5%				
R3		036-13560-00	RES M/F 0805 560E 5%				
R4		036-14270-00	RES M/F 0805 2K7 5%				
R5		036-14100-10	RES M/F 0805 1K 1%				
R6		036-14100-10	RES M/F 0805 1K 1%				
R7		036-12220-00	RES M/F 0805 22E 5%				
R8		036-12220-00	RES M/F 0805 22E 5%				
R9		036-13180-00	RES M/F 0805 180E 5%				
R10		036-12100-00	RES M/F 0805 10E 5%				
R11		036-12560-00	RES M/F 0805 56E 5%				
R12		036-13180-00	RES M/F 0805 180E 5%				
R13		036-12270-00	RES M/F 0805 27E 5%				
R14		036-13180-00	RES M/F 0805 180E 5%				
R15	RX	036-14560-00	RES M/F 0805 5K6 5%				
R15	TX	036-14680-10	RES M/F 0805 6K8 1%				
R16		036-14120-00	RES M/F 0805 1K2 5%				
R17		036-14100-10	RES M/F 0805 1K 1%				
R18		036-12100-00	RES M/F 0805 10E 5%				
R19		036-12100-00	RES M/F 0805 10E 5%				
R20		036-13330-00	RES M/F 0805 330E 5%				
R21		036-12560-00	RES M/F 0805 56E 5%				
R22		036-13470-00	RES M/F 0805 470E 5%				
R23		036-12560-00	RES M/F 0805 56E 5%				
&VC1-RX	RX	028-02341-08	CAP TRIM 1-30P PISTON TRONSER				
&VC1-TX	TX	028-02400-02	CAP TRM SMD 5/40P JZ400				

T820 VCO Mechanical & Miscellaneous Parts (220-01180-05)

IPN	Description
220-01180-05	PCB T820 VCO SI/SII
240-00026-32	PLUG 32WAY 1ROW PC MTG HARWIN
345-00040-10	SCRW M3*6MM P/POZ ST BZ
345-00060-08	SCRW M5 X 16 CH SLOT PLASTIC
350-00016-42	SPACER 5MM HI 8MM ST 2.5MM HO
352-00010-14	NUT M5 HEX PLASTIC T800 TOROID
353-00010-10	WSHR M3 FLAT 7MM*0.6MM ST BZ
353-00010-13	WSHR M3 S/PROOF INT BZ
353-00010-41	WSHR M6 NYLON BULTE LOCK

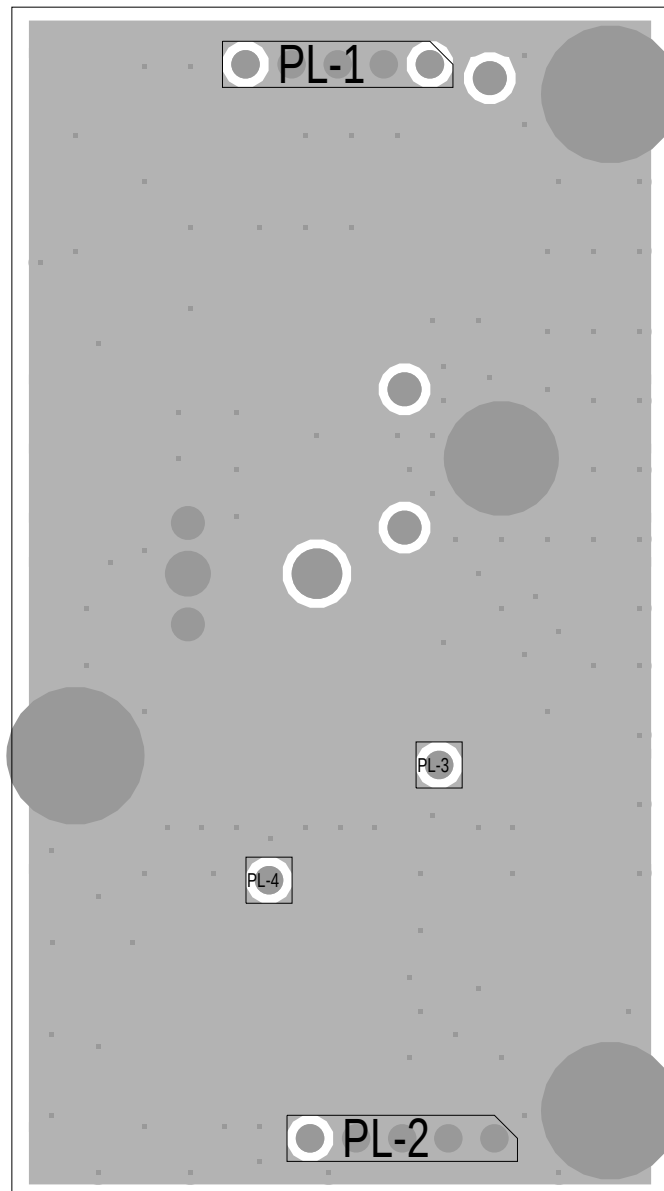
T820 VCO Grid Reference Index (IPN 220-01180-05)

How To Use This Grid Reference Index

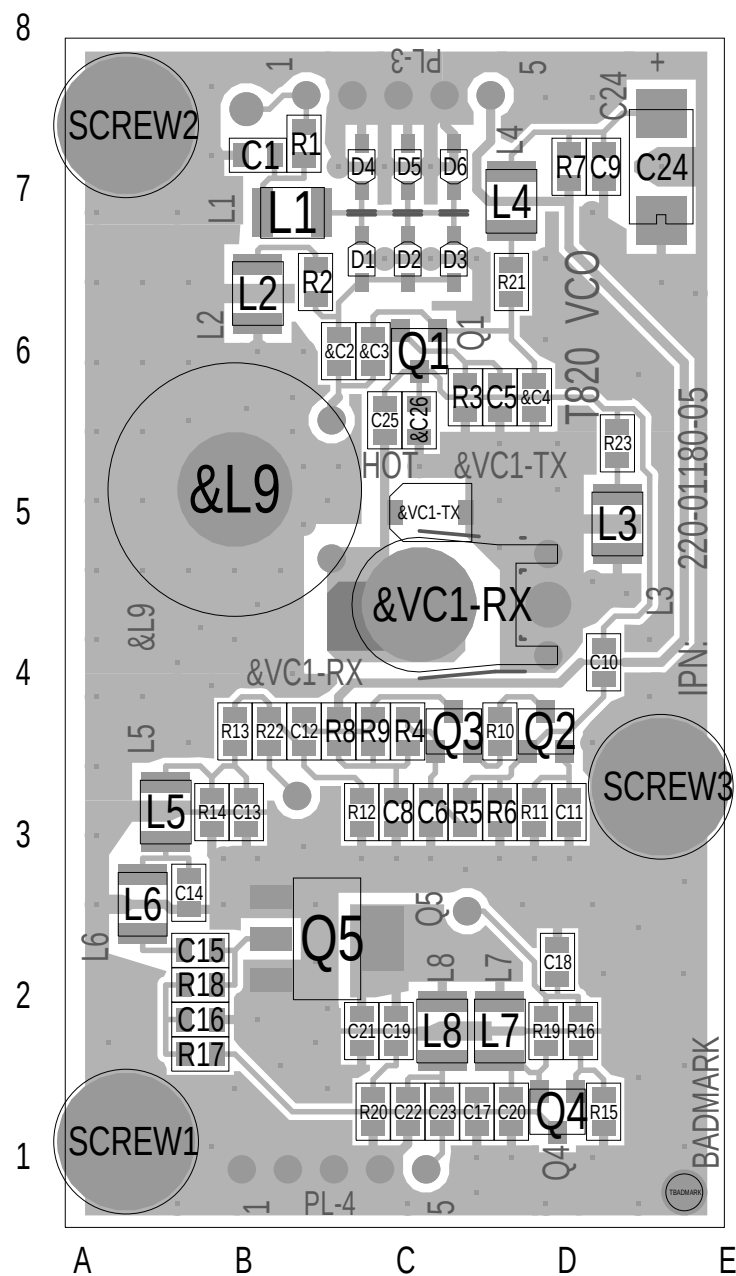
The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>	<u>Device</u>	<u>PCB</u>	<u>Circuit</u>
C1	1:B7	1-B2	R6	1:D3	1-G2						
&C2	1:C6	1-D3	R7	1:D7	1-F6						
&C3	1:C6	1-D3	R8	1:C4	1-G5						
&C4	1:D6	1-D2	R9	1:C4	1-G5						
C5	1:D6	1-F3	R10	1:D4	1-G3						
C6	1:C3	1-G3	R11	1:D3	1-G2						
C8	1:C3	1-G5	R12	1:C3	1-H3						
C9	1:D7	1-F5	R13	1:B4	1-H4						
C10	1:D4	1-G2	R14	1:B3	1-H3						
C11	1:D3	1-H2	R15	1:D1	1-J5						
C12	1:B4	1-H4	R16	1:D2	1-J6						
C13	1:B3	1-J3	R17	1:B2	1-K5						
C14	1:B3	1-J3	R18	1:B2	1-K5						
C15	1:B2	1-J4	R19	1:D2	1-K6						
C16	1:B2	1-J5	R20	1:C1	1-K5						
C17	1:D1	1-J5	R21	1:D6	1-F5						
C18	1:D2	1-J6	R22	1:B4	1-H5						
C19	1:C2	1-K5	R23	1:D5	1-E3						
C20	1:D1	1-K5									
C21	1:C2	1-K3	&VC1-RX	1:D4	1-D2						
C22	1:C1	1-L3	&VC1-TX	1:C5	1-E2						
C23	1:C1	1-L4									
C24	1:E7	1-G5									
C25	1:C6	1-E3									
&C26	1:C6	1-E3									
D1	1:C7	1-B3									
D2	1:C7	1-C3									
D3	1:C7	1-C3									
D4	1:C7	1-B2									
D5	1:C7	1-C2									
D6	1:C7	1-C2									
L1	1:B7	1-B2									
L2	1:B6	1-C2									
L3	1:D5	1-E2									
L4	1:D7	1-F5									
L5	1:B3	1-J4									
L6	1:A3	1-J4									
L7	1:D2	1-K5									
L8	1:C2	1-L4									
&L9	1:B5	1-D3									
PL-1	2:C8	2-G4									
PL-2	2:C1	2-G4									
PL-3	2:B3	2-G3									
PL-4	2:C3	2-H3									
Q1	1:C6	1-F3									
Q2	1:D4	1-G3									
Q3	1:C4	1-G4									
Q4	1:D1	1-K6									
Q5	1:C2	1-K4									
R1	1:B7	1-B2									
R2	1:C6	1-C3									
R3	1:C6	1-F3									
R4	1:C4	1-G5									
R5	1:C3	1-G3									



T820 VCO PCB (IPN 220-01180-05) - Bottom Side



T820 VCO PCB (IPN 220-01180-05) - Top Side