T880 Series II

Base Station Equipment

800-960MHz

Initial Adjustment Manual

August 2000

M880-00-2A0

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About This Manual

Scope

This manual contains general, technical, tuning and adjustment information on T880 Series II 5W base stations which comprise the following equipment:

5W base station	T885 receiver T881 5W transmitter

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.

Copyright

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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 sub-divided into sections. There is a detailed table of contents at the start of each part and/or section.

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.

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. M880-00-2A0), 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).

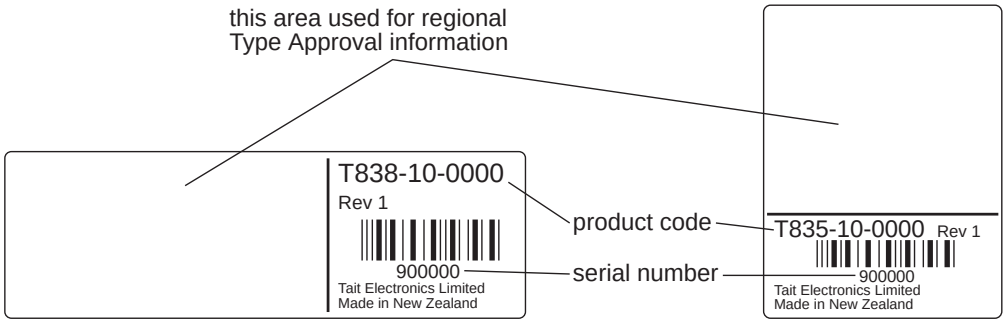


Figure 1.1 Typical Product Code & Serial Number Labels

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.

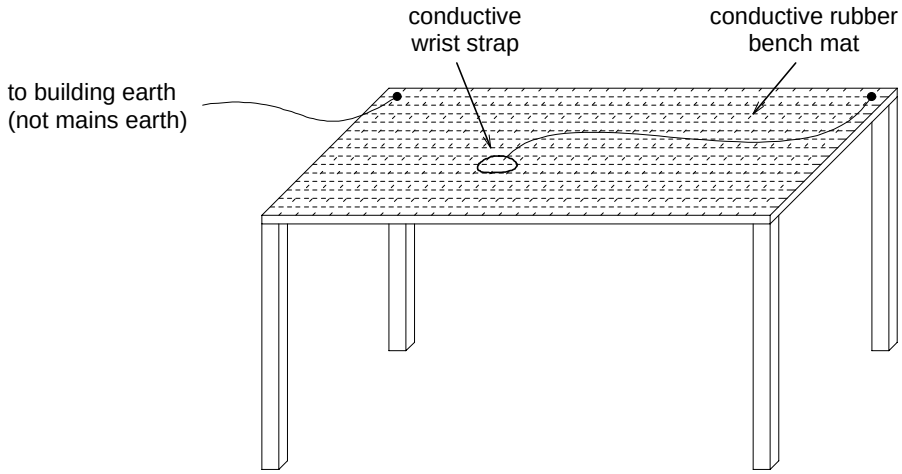


Figure 1.2 Typical Anti-static Bench Set-up

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).

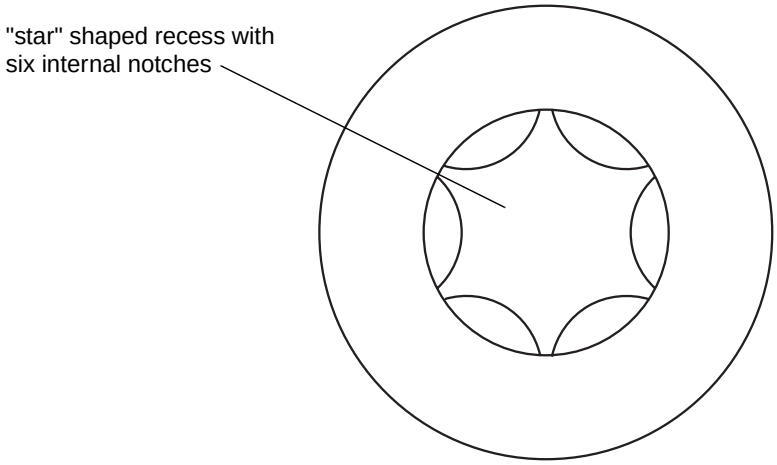


Figure 2.1 Torx Screw Identification

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).

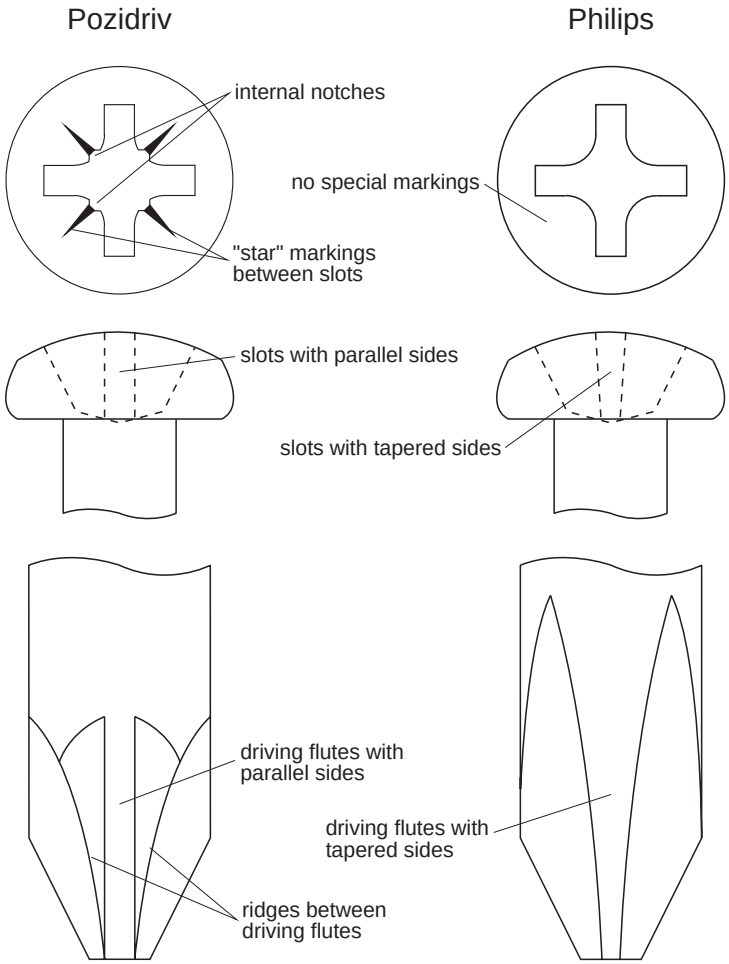


Figure 2.2 Pozidriv & Philips Screw & Screwdriver Identification

2.3 Disassembly/Reassembly

2.3.1 Receivers/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 the transmitter RF power module;
- 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.

Note: All black finish Pozidriv screws used in the T889 are 4-40 UNC thread and cannot be interchanged with M3 screws. Note that different lengths are used in different applications.

2.4 Cover Screw Torques

Receivers/Transmitters .. 2.0Nm/18in.lbf.

Power Amplifiers .. 0.9Nm/8in.lbf.

Note: To ensure that the receiver and transmitter will continue to meet their performance specifications, you must tighten the screws securing the bottom cover (the one furthest from the handle) to the correct torque, and in the correct order, as shown below.

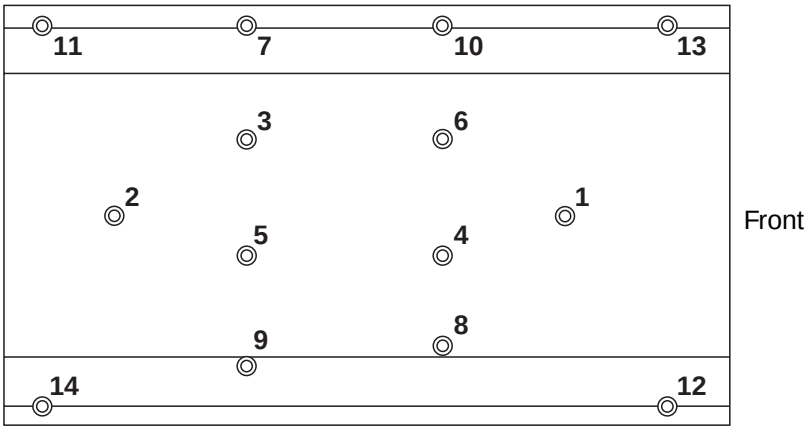


Figure 2.3 Receiver/Transmitter Bottom Cover Screw Tightening Order

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

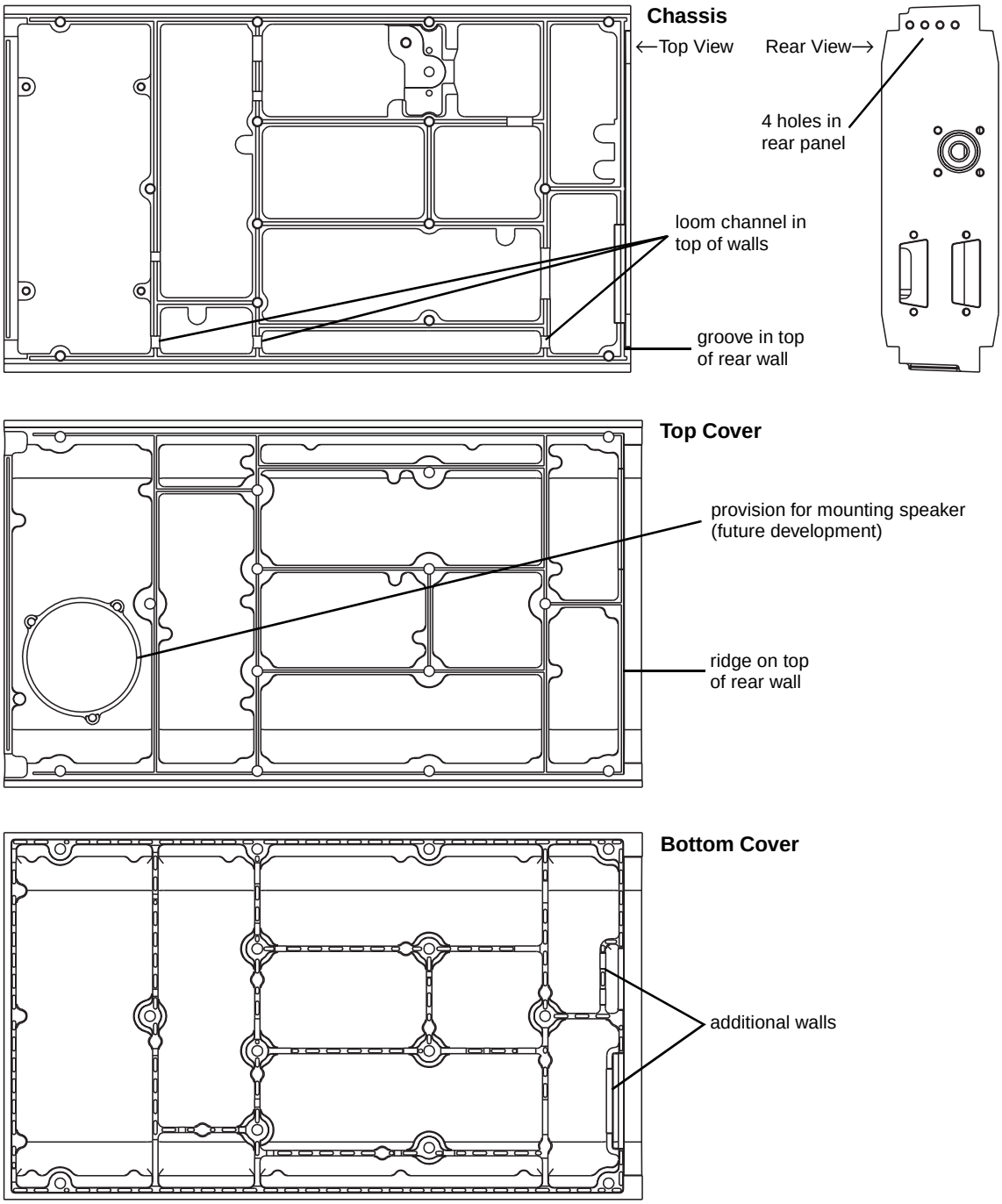


Figure 2.4 Identification Of New-Design Chassis & Covers

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 Windows[1] 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 T885 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 Initial Adjustment manual)
5	Fault Finding (not available for Initial Adjustment manual)
6	PCB Information

1 T885 General Information

This section provides a brief description of the T885 receiver, along with detailed specifications and a list of types available.

The following topics are covered in this section.

1.1 Introduction

The T885 is a high performance microprocessor controlled FM base station receiver designed for single or multichannel operation in the 800 to 960MHz frequency range[1].

The receiver is a dual conversion superhet with a synthesised local oscillator. The first IF is 45.0MHz, allowing exceptionally high spurious signal rejection to be achieved in the receiver front end. The second IF section (455kHz) combines amplitude limiting, detection, audio preamplification 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 additional D-range connector (D-range 2 - T800-03-0000) at the rear of the set.

All components 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 T885 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 800-960MHz frequency range, the T885 has a 6MHz 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 specification. 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 standard operating conditions which includes audio de-emphasis. Note that the sensitivity and distortion figures will be degraded when flat audio is selected.

	Link PL210[a]	Link PL220[a]
De-emphasised Audio	1-2	2-3
Flat Audio	2-3	1-2

a. Pin 1 is identified by the number "1" screen printed onto the PCB beside each set of links.

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	.. 800mA
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	.. 800-960MHz
Type	.. dual conversion superheterodyne
Frequency Increment	.. 5 or 6.25kHz
Switching Range	.. 6MHz (i.e. ±3MHz from the centre frequency)
Input Impedance	.. 50 ohms
Frequency Stability	.. ±1ppm, -20°C to +60°C
(see also Section 1.4)	.. ±1.5ppm, -30°C to +60°C
Signal Strength Indicator (RSSI optional)	.. -115dBm to -70dBm, 0 to 5V at approx. 10dB/V

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

IF Amplifiers:

Frequencies	.. 45MHz and 455kHz
Bandwidths-	
Narrow Bandwidth (NB)	.. 7.5kHz
Wide Bandwidth (WB)	.. 15kHz

Sensitivity (De-emphasised Response):

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

Sensitivity (Flat Response):

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

Signal+Noise To Noise Ratio (De-emphasised):

RF Level -107dBm	.. 24dB typical (NB & WB)
RF Level -83dBm (CEPT)	.. 45dB minimum, 47dB typical (NB)
RF Level -57dBm (EIA)	.. 47dB minimum, 49dB typical (WB)

Selectivity:

Narrow Bandwidth (±12.5kHz)	.. 79dB minimum, 80dB typical (CEPT)
Wide Bandwidth (±25kHz)	.. 85dB minimum, 88dB typical (EIA)

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

Intermodulation Response Attenuation:

Narrow Bandwidth	.. 75dB CEPT (typical)
Wide Bandwidth	.. 80dB EIA

Blocking	.. 100dB
Co-channel Rejection	.. 6dB
Amplitude Characteristic	.. 3dB

Spurious Emissions:

Conducted	.. -90dBm to 4GHz
Radiated	.. -57dBm to 1GHz -47dBm to 4GHz
Group Delay	.. +200/OFS (300Hz to 3kHz)

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):

		De-emphasised	Flat
Wide Bandwidth	..	≤2%	≤2%
Mid & 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 setup (SL210 linked and SL220 not linked - refer to Section 3.8).

1.2.5 Microprocessor Controller

Auxiliary Ports:

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

1.2.6 Test Standards

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

1.2.6.1 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.

1.2.6.2 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 T880 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T880 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:

T88X-XX-XXXX
T885 receiver
T881 5W transmitter
T889 70W 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:

T88X-**X**X-XXXX
'1' for 800-870MHz
'2' for 860-910MHz
'3' for 890-960MHz

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

T88X-X**X**-XXXX
'0' for wide bandwidth (25kHz)
'5' for narrow bandwidth (12.5kHz)

Options

T88X-XX-**XXXX**
The Options group uses four digits and/or letters to indicate any options that may be fitted to the product. This includes standard options and special options for specific customers. '0000' indicates a standard Tait product with no options fitted. The large number of options precludes listing them here.

1.4 Standard Product Range

The following table lists the range of standard T885 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)		800-870	
IF Bandwidth (kHz)		7.5	15
TCXO	±1ppm -20°C to +60°C ±1.5ppm -30°C to +60°C	•	•
Receiver Type: T885-		15-0000	10-0000

Frequency Range (MHz)		860-910	
IF Bandwidth (kHz)		7.5	15
TCXO	±1ppm -20°C to +60°C ±1.5ppm -30°C to +60°C	•	•
Receiver Type: T885-		25-0000	20-0000

Frequency Range (MHz)		890-960	
IF Bandwidth (kHz)		7.5	15
TXCO	±1ppm -20° to +60°C ±1.5ppm -30°C to +60°C	•	•
Receiver Type: T885-		35-0000	30-0000

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 T885 Circuit Operation

This section provides a basic description of the circuit operation of the T885 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 following topics are covered in this section.

2.1 Introduction

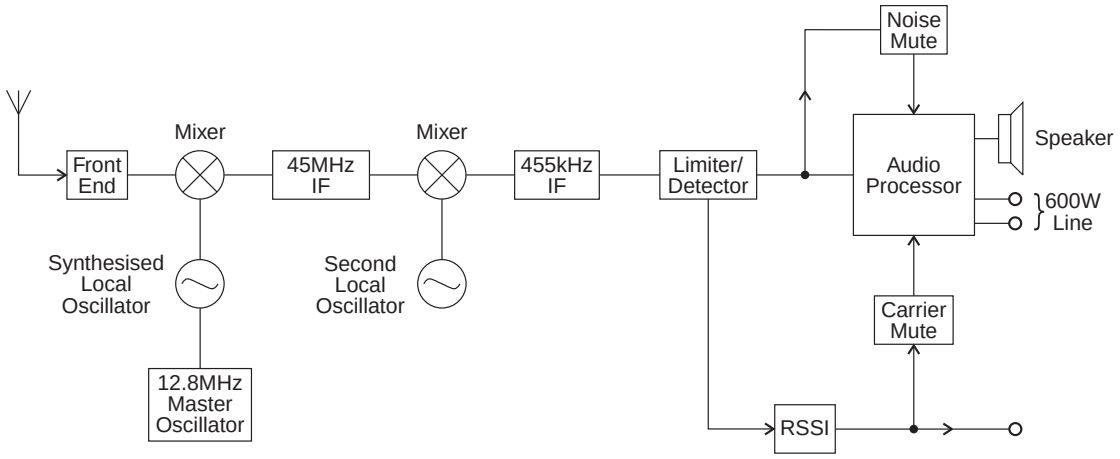


Figure 2.1 T885 High Level Block Diagram

The T885 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 6.2.)

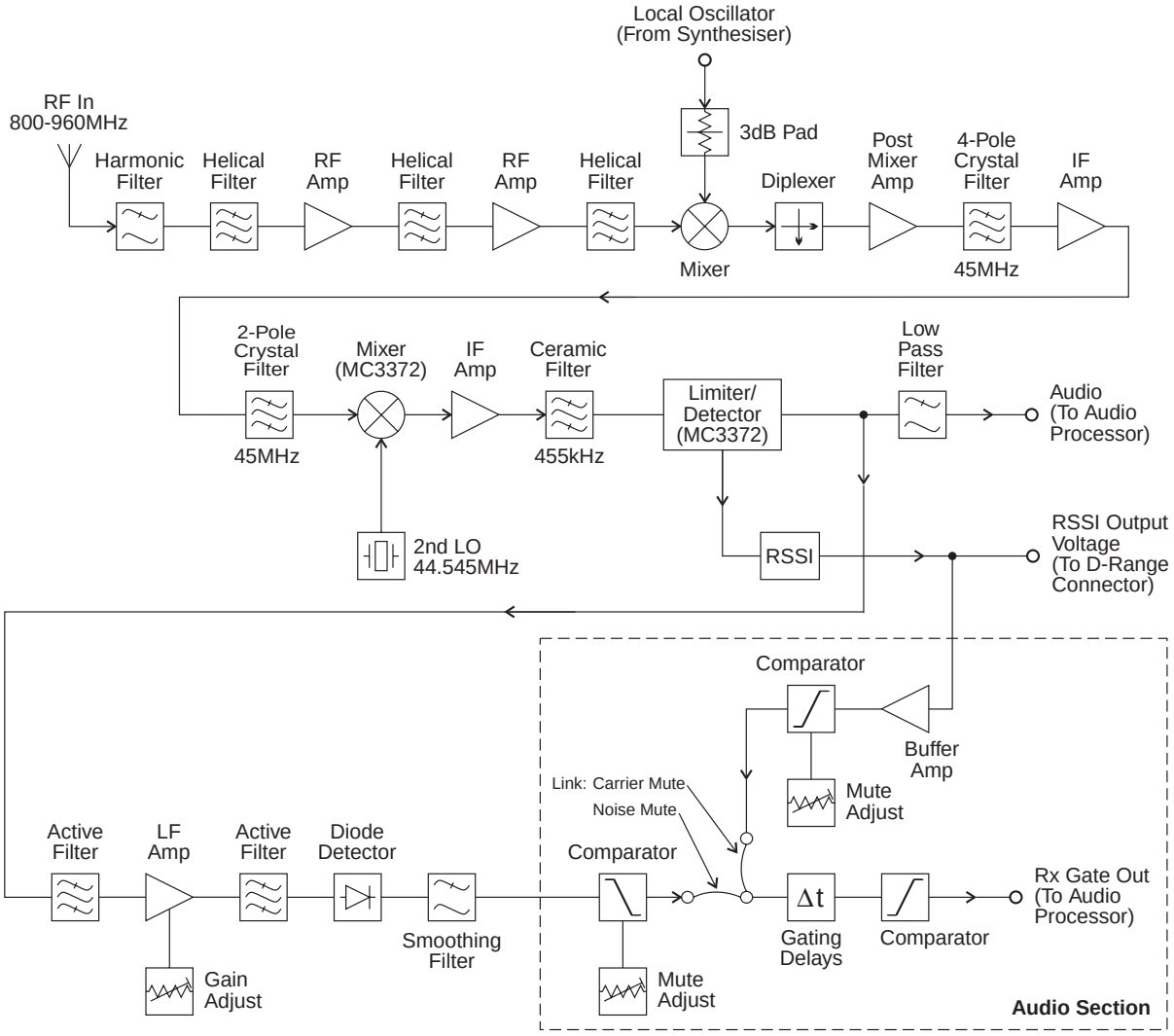


Figure 2.2 T885 Front End, IF and Mute Block Diagram

The incoming signal from the N-type antenna socket is fed through a 7-pole, low pass filter with a cut frequency of approximately 1.2GHz. This low loss filter (typically less than 0.5dB over 800-960MHz) provides excellent immunity to interference from high frequency signals.

The signal is filtered again, using a high performance helical resonator doublet (#H900) which provides exceptional image rejection, before being amplified by approximately 7dB (Q401). The signal is then passed through a further helical filter doublet (#H400), after which it is amplified again by 8dB (Q403). It is finally filtered by #H401 before being presented to the mixer.

Each sub-block within the front end has been designed with 50 ohm terminations for ease of testing and fault finding. The overall gain from the antenna socket to the mixer input is approximately 8dB.

2.3 Mixer

(Refer to the front end circuit diagram (sheet 4) in Section 6.2 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 +20dBm (typical) and this is fed to the mixer via a 3dB 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 6.2 and Figure 2.2.)

Losses in the mixer are made up for in a tuned, common gate, post mixer amplifier (Q300). Several stages of amplification and filtering are employed in the IF circuitry. The first crystal filter is a 4-pole device (&XF300) which is matched into 50 ohms on its input and directly to the impedance of the next stage on its output. This stage is followed by a cascode amplifier (Q302) whose output is matched into a 2-pole crystal filter (&XF302). The signal is then mixed down to 455kHz with the second crystal local oscillator (44.545MHz).

The 455kHz signal is filtered using a 6-pole ceramic filter (IC345) before being limited and detected.

The second IF mixer, limiter and detector is in a 16-pin IC (IC300). This IC also provides an RSSI signal on pin 13. Quadrature detection is employed, using L345, and the recovered audio on pin 9 of IC300 is typically 1V 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 6.2 and Figure 2.2.)

The noise mute operates on the detected noise outside the audio bandwidth. Two operational amplifiers in IC330 are used as an active band-pass filter centred on 70kHz to filter out audio components and provide gain. Between the active filter stages is a variable gain stage which utilises one of the remaining operational amplifiers in IC330. 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 provided 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 7 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 6.2 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 6.2.)

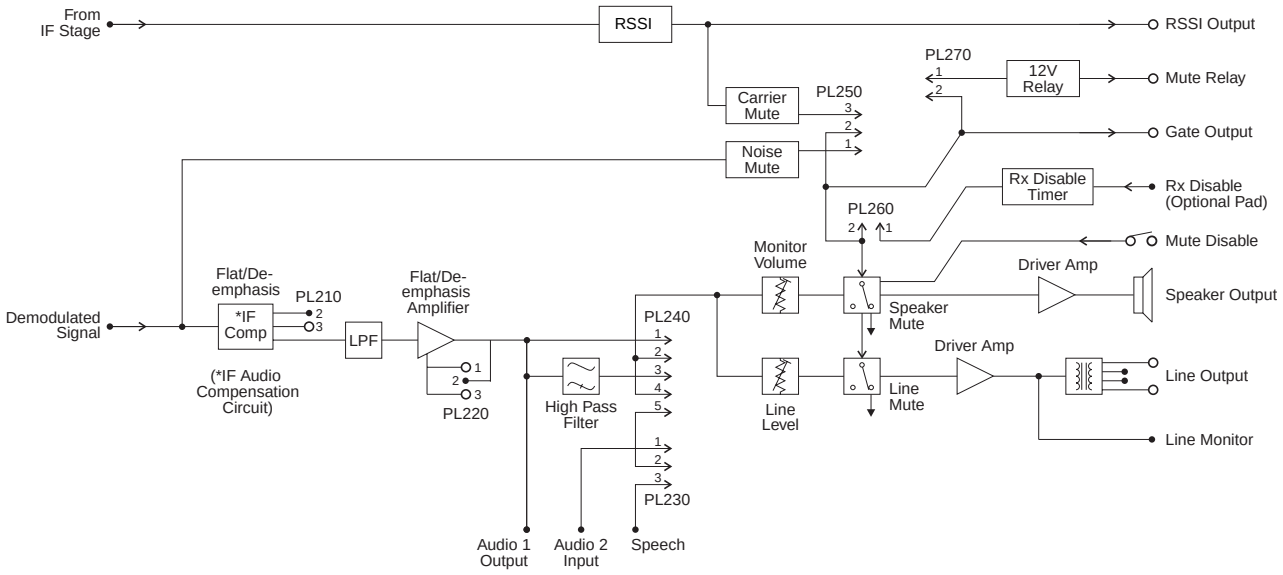


Figure 2.3 T885 Audio Processor Block Diagram

The recovered audio on pin 9 of IC310 is passed through a compensation network and processed in a third order elliptic active filter 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 pad 234 ("RX GATE OUT") for control of external circuitry. A high (9V) on pad 234 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 PL270.

2.8 Power Supply And Regulators

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

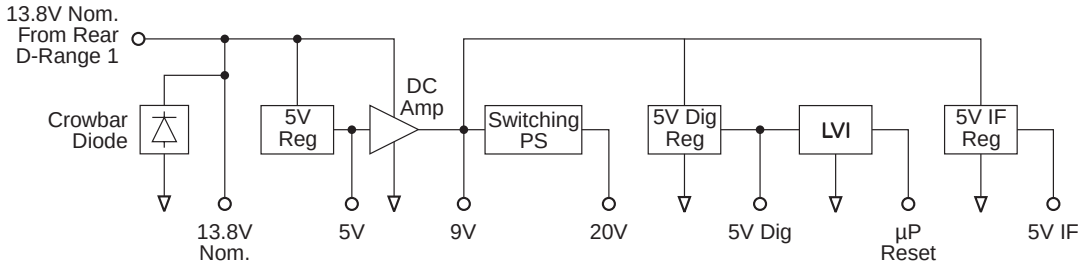


Figure 2.4 T885 Power Supply And Regulators Block Diagram

The T885 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). An additional 5V regulator (located in the IF cavity) supplies the first IF amplifier (Q301, Q302) and the demodulator IC (IC300).

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 6.2.)

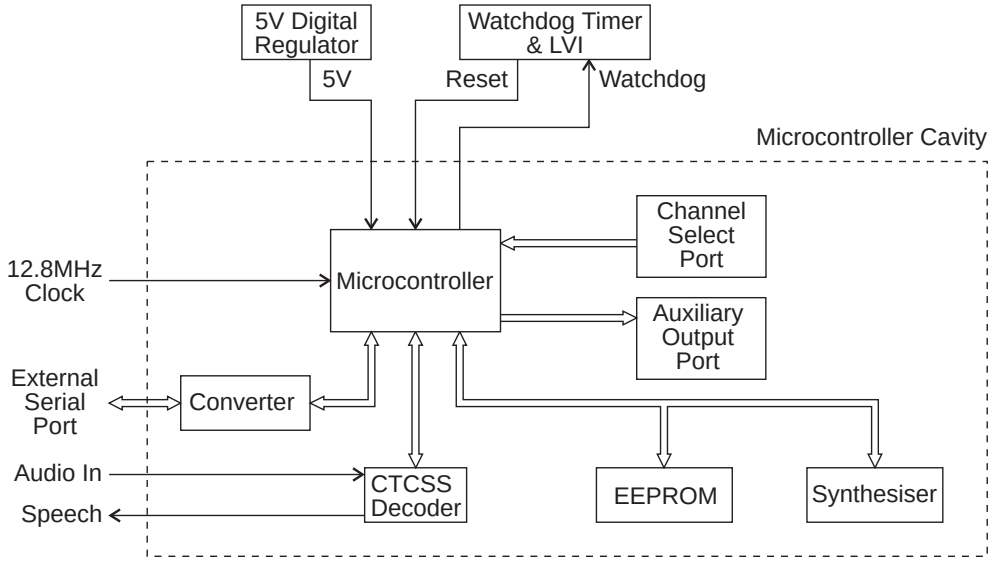


Figure 2.5 T885 Microcontroller Block Diagram

Overall system control of the T885 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) and the VCO circuit diagram (sheet 5) in Section 6.2.)

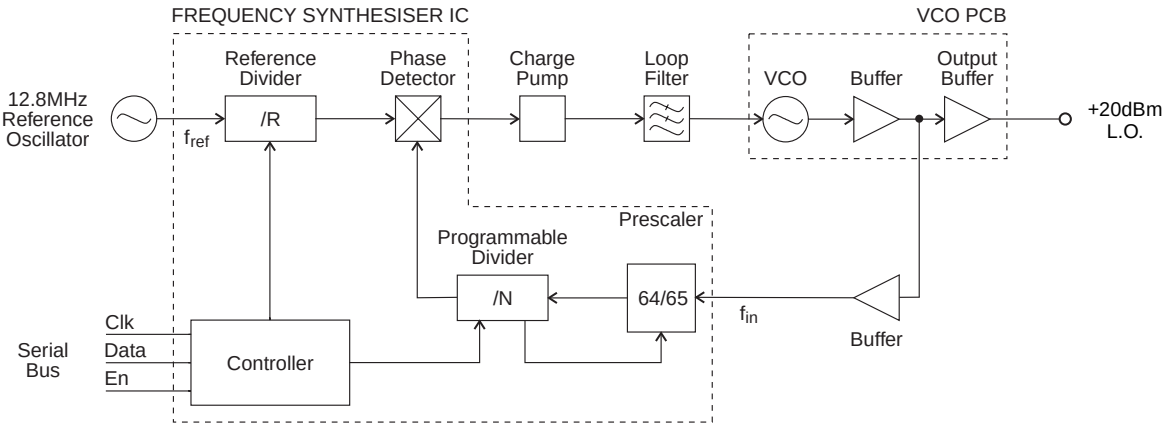


Figure 2.6 T885 Synthesiser Block Diagram

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 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 (sheet 5) in Section 6.2.)

The VCO consists of several stages: oscillator, cascode buffer, broadband amplifier and output buffer. The oscillator transistor (Q504) operates in a common base Colpitts configuration and is capacitively coupled to a short-circuited coaxial resonator (&TL500). The resonator frequency is capacitively tuned by varicaps (D501, D502, D509, D505) and coarse manual tuning is provided by the sapphire trimcap (CV500).

The cascode buffer (Q540, Q541) provides the signal to the divider buffer in the synthesiser circuit as well as 0dBm to the broadband amplifier (Q543). The broadband amplifier provides +10dB of gain, as does the output buffer stage (T540), which brings the VCO output up to +20dBm.

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

The VCO frequency spans from either 755-825MHz, 815-865MHz or 845-915MHz according to product type (refer to Section 1.4). The VCO is tuned to 45MHz below the desired receive frequency (low side injection) to produce a 45MHz 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 6.2.)

The RSSI provides a DC voltage proportional to the signal level at the receiver input and is an on-chip function of the demodulator IC (IC300). Circuitry external to IC300 conditions the RSSI signal and the 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 by RV235.

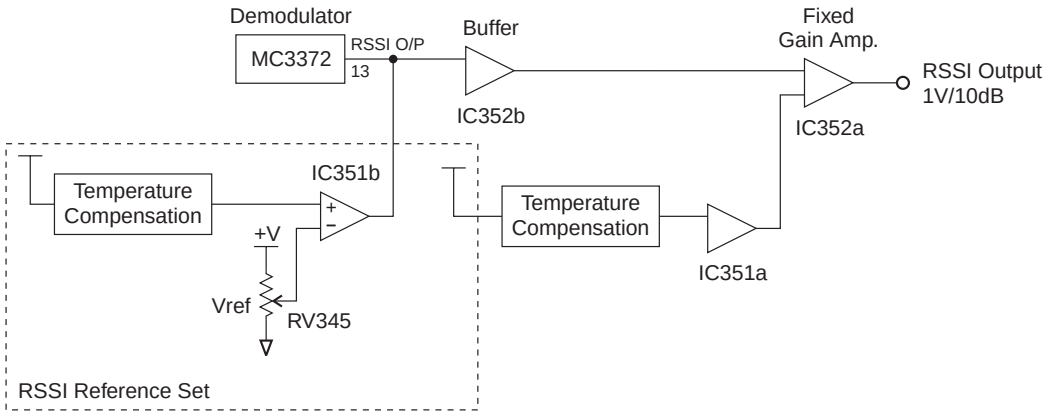


Figure 2.7 T885 RSSI Block Diagram

The voltage offset of the RSSI signal (IC300 pin 13) is adjusted by RV345. This adjustment is temperature compensated by an operational amplifier (IC351b). The signal passes through a buffer amplifier (IC352b) before being amplified (IC352a) to give the correct volts per dB. The amplifier is temperature compensated by IC351a and its associated circuitry.

3 T885 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.**

Note: To ensure that the T885 will continue to meet its performance specifications, you must tighten the bottom cover screws to the correct torque, and in the correct order, as described in Section 2.4 in Part A.

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.

3.1 Introduction

When you receive your T885 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 6MHz switching range (i.e. ±3MHz 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 6MHz 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 IBM™ 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

  } or RF test set (optional)

- oscilloscope
- distortion meter

  } not needed for short tuning procedure

- T800-01-0010 calibration test unit (optional)
- 4Ω speaker (not needed if the calibration test unit is used)

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

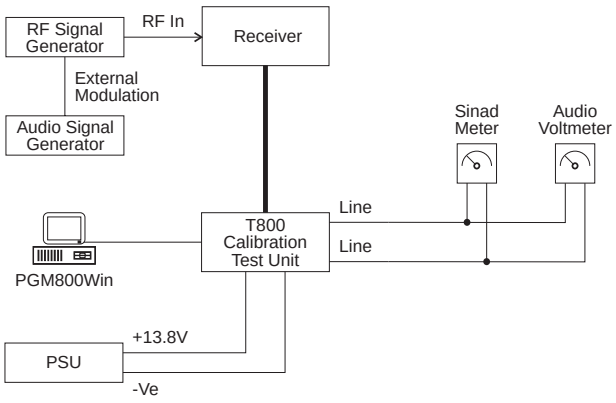


Figure 3.1 T885 Test Equipment Set-up For Short Tuning Procedure

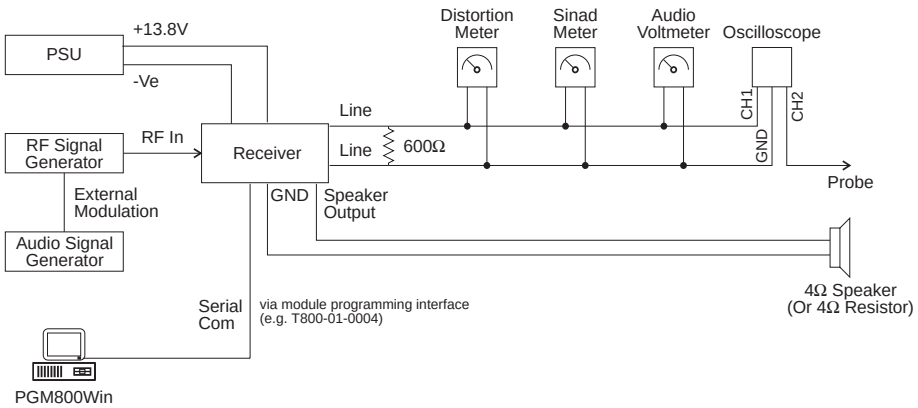


Figure 3.2 T885 Test Equipment Set-up For Full Tuning & Adjustment Procedure

3.4 Short Tuning Procedure

Use this procedure only if you want to reprogram the receiver to a frequency outside the 6MHz 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 the via next to R520 in the VCO cavity (this measures the synthesiser loop voltage).

- **Single Channel** Tune VCO trimmer CV500 for a synthesiser loop voltage of 10V.

  Multichannel Tune VCO trimmer CV500 for a synthesiser loop voltage of 10V on the middle channel.

  If there is no middle channel, tune CV500 so that the channels are symmetrically placed around a loop voltage of 10V.

  All channels should lie within the upper and lower limits of 16V and 3V respectively.

  Do not attempt to program channels with a greater frequency separation than the specified switching range of 6MHz.

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 ±3kHz deviation [±1.5kHz] at 1kHz into the antenna socket and adjust the helical resonators (#H900, #H400 and #H401) to give best sinad.

Continually decrease the RF level to maintain 12dB sinad.

Readjust #H900, #H400 and #H401 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

3.4.4.1 Noise Mute

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

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

Set RV230 (front panel gating sensitivity) fully anticlockwise.

Adjust RV346 (noise mute gain) fully anticlockwise to close the mute (if necessary turn off the RF signal and then turn it on again).

Rotate RV346 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 ±3kHz deviation [±1.5kHz] at ±1kHz.

Adjust RV235 (carrier mute) anticlockwise to close the mute (if necessary, momentarily turn off the RF), then slowly adjust it clockwise 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 ±3kHz deviation [±1.5kHz] 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 ±3kHz deviation [±1.5kHz]
- and a CTCSS tone at the programmed frequency at ±500Hz deviation [±300Hz].

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

3.4.6.2 Opening Sinad

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

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.

3.4.7 RSSI (If Used)

Apply an on-channel signal from the RF generator at a level of -110dBm with ±3kHz deviation [±1.5kHz] at 1kHz.

Adjust RV345 (RSSI level) to give 2.0V 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[a]	Function
PL210	[1 - 2] 2 - 3	de-emphasised response flat response
PL220	1 - 2 [2 - 3]	flat response de-emphasised response
PL230[b]	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[b]	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
PL270	[1 - 2] 2 - 3	relay link not connected

a. Pin 1 is identified by the number "1" screen printed onto the PCB beside each set of links.

b. 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[a]	PL240[a]
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

a. Pin 1 is identified by the number "1" screen printed onto the PCB beside each set of links.

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 -50dB
- 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 -25dB 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 the PGM800Win software.

- Connect a high impedance voltmeter to the via next to R520 in the VCO cavity (this measures the synthesiser loop voltage).

- **Single Channel** Tune VCO trimmer CV500 for a synthesiser loop voltage of 10V.

  Multichannel Tune VCO trimmer CV500 for a synthesiser loop voltage of 10V on the middle channel.

  If there is no middle channel, tune CV500 so that the channels are symmetrically placed around a loop voltage of 10V.

  All channels should lie within the upper and lower limits of 16V and 3V respectively.

  Do not attempt to programme channels with a greater frequency separation than the specified switching range of 6MHz.

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

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 ±3kHz deviation [±1.5kHz] at 1kHz into the antenna socket.

Connect a voltmeter to the RSSI output (D-range 1 [PL100] pin 5 or P238 in the audio processor cavity) and adjust the helicals (#H900, #H400 and #H401) to give maximum RSSI voltage. While adjusting the helicals, decrease the RF level to keep the RSSI voltage below 7V.

Adjust L345 coarsely for maximum line level.

While maintaining a low level unmodulated RF input to the receiver, loosely couple into the first IF an additional high level signal at 45MHz - 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 8 (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 the front end helicals (#H900, #H400 and #H401) to give the best sinad.

Change the RF signal level to -75dBm and modulate with ±3kHz deviation [±1.5kHz] at 1kHz.

Adjust L345 and then L301 for minimum distortion. If the distortion is still >2%, you may have to adjust L345 and L301 alternately until you reach the true minimum.

Check that the distortion reading is:

wide bandwidth	<2%
narrow bandwidth	<4%.

If required, reconnect plugs PL210 and PL220 to give a de-emphasised audio response and check that the distortion reading is <2% (all 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 3.12).

3.8 Gating Delay

Two solder links (SL210 & SL220) are provided in the audio processor cavity 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 ±3kHz deviation [±1.5kHz] at 1kHz.

Set RV230 (front panel gating sensitivity) fully anticlockwise.

Adjust RV346 (noise mute gain) fully anticlockwise to close the mute (if necessary turn off the RF signal and then turn it on again).

Rotate RV346 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 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 -110dBm with ±3kHz deviation [±1.5kHz] at 1kHz.

Adjust RV345 (RSSI level) to give 2.0V RSSI output on pin 5 of D-range 1 (PL100) when measured with a high impedance DMM.

3.11 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 ±3kHz deviation [±1.5kHz] at ±1kHz.

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

3.12 Audio Processor

3.12.1 Line Amplifier Output

Apply an on-channel signal from the RF generator at a level of -70dBm with ±3kHz deviation [±1.5kHz] 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.

3.12.2 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.

3.13 CTCSS

3.13.1 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 ±3kHz deviation [±1.5kHz]
- and a CTCSS tone at the programmed frequency at ±500Hz deviation [±300Hz].

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

3.13.2 Opening Sinad

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.

3.13.3 High Pass Filter

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.

6 T885 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.**

Note: To ensure that the T885 will continue to meet its performance specifications, you must tighten the bottom cover screws to the correct torque, and in the correct order, as described in Section 2.4 in Part A.

This section provides the following information on the T885 receiver:

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

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 T885-10-XXXX.

885-	
885-30	
885-35	
PRODUCT TYPE	

PRODUCT TYPE			
	885-10		885-20
	885-13		885-23
	885-15		885-25

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.

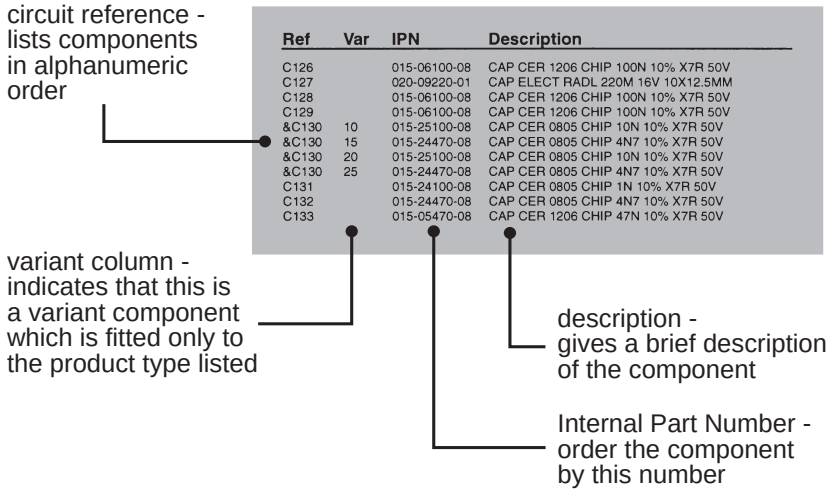
Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

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).

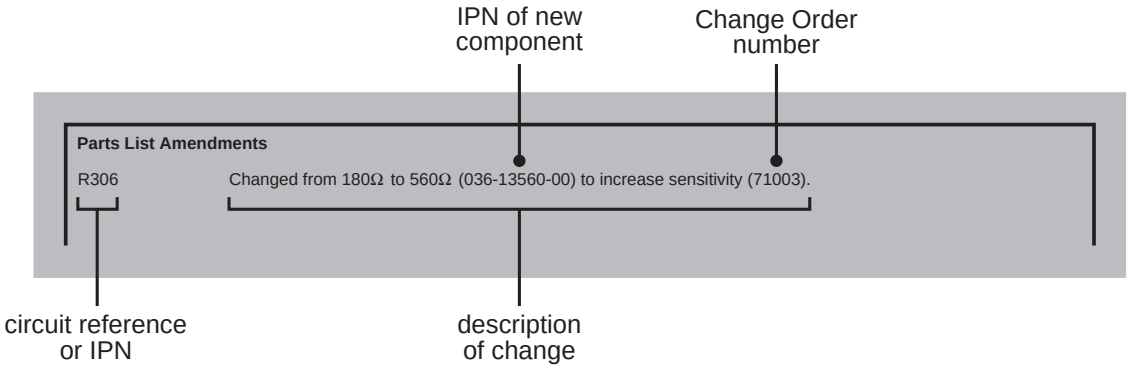
Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:



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

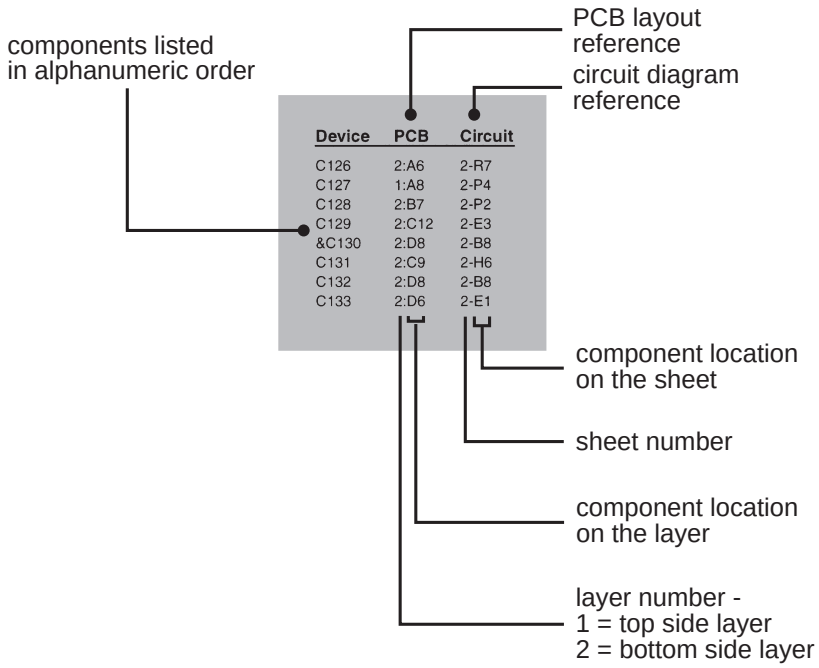
A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term "variant" is also used to describe components unplaced in one product. Variant components have a character prefix, such as "&",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

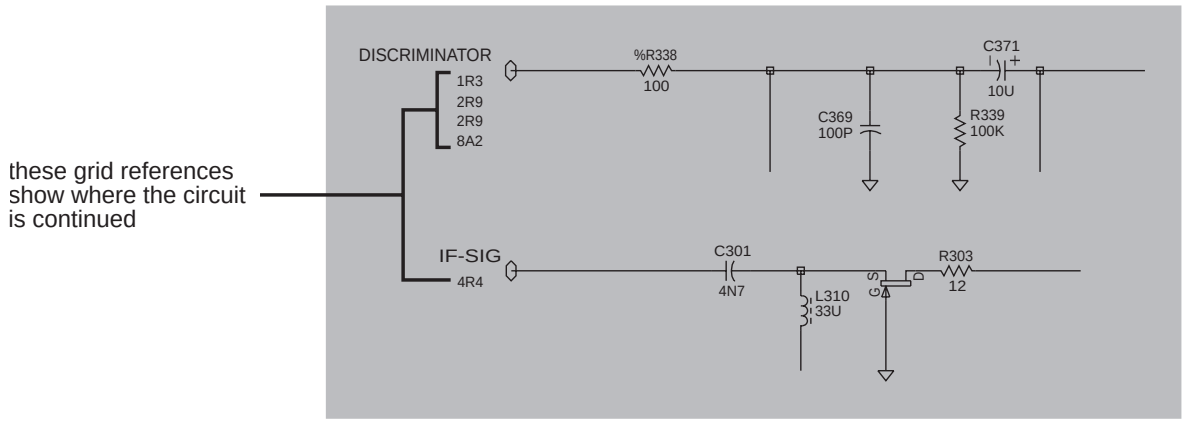
This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:



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 T885 Receiver PCB

This section contains the following information.

T885 Parts List (IPN 220-01595-02)

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

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
C201		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C203		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C205		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C207		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C209		016-08470-03	CAP SMD ELEC 47mF 20% 25v 8.3m
C210		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C211		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C212		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C213		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C215		015-21220-01	CAP CER 0805 2P2+-0.25 NPO 50V
C217		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C219		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C221		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C222		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C223		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C225		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C227		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C229		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C231		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C233		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C235		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C237		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C238		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C239		016-09100-05	CAP SMD ELECT 100U 25V 20%
C240A		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C240B		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C240C		016-09470-01	L)CAP ELECT 470U 20% SMD
C249		016-09470-01	L)CAP ELECT 470U 20% SMD
C251		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C253		016-09100-05	CAP SMD ELECT 100U 25V 20%
C255		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C257		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C259		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C260A		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C260B		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C260C		016-09470-01	L)CAP ELECT 470U 20% SMD
C261		016-09100-05	CAP SMD ELECT 100U 25V 20%
C262		016-09100-05	CAP SMD ELECT 100U 25V 20%
C264		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C266		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C268		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C270		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C272		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C273		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C274		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C276		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C278		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C280		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C286		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C300		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C302		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C303		015-22150-01	CAP CER 0805 15P 5% NPO 50V
C304		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C307		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C308		015-24100-08	CAP CER 0805 1N 10% X7R 50V
&C309	10	015-22220-01	CAP CER 0805 22P 5% NPO 50V
&C309	25	015-22270-01	CAP CER 0805 27P 5% NPO 50V
&C309	30	015-22220-01	CAP CER 0805 22P 5% NPO 50V
C310		015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C311	10	015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
&C311	25	015-21820-02	L)CAP 0805 8P2 15 NPO 50V
&C311	30	015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
&C314	10	015-21820-02	L)CAP 0805 8P2 15 NPO 50V
&C314	25	015-22180-05	CAP 0805 18P 1% 200V
&C314	30	015-21820-02	L)CAP 0805 8P2 15 NPO 50V
&C315	10	015-21820-02	L)CAP 0805 8P2 15 NPO 50V
&C315	25	015-21560-01	CAP CER 0805 5P6+-0.25 NPO 50V
&C315	30	015-21820-02	L)CAP 0805 8P2 15 NPO 50V
C316		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C317		015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C318	10	015-21560-01	CAP CER 0805 5P6+-0.25 NPO 50V
&C318	25	015-21680-01	CAP CER 0805 6P8+-0.25 NPO 50V
&C318	30	015-21560-01	CAP CER 0805 5P6+-0.25 NPO 50V
C321		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C322		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C324		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C325		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C328		015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C329	25	015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
&C330	10	015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C330	25	015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
&C330	30	015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C331	10	015-21680-01	CAP CER 0805 6P8+-0.25 NPO 50V
&C331	25	015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
&C331	30	015-21680-01	CAP CER 0805 6P8+-0.25 NPO 50V
&C332	25	015-21270-05	CAP CER 0805 CHIP 2P7 +0.1PF 2
&C335	25	015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C336		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C337		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C338		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C339		015-22220-01	CAP CER 0805 22P 5% NPO 50V
C340		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C341		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C342		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C343		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C345		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C346		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C347		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C348		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C349		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C350		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
C351		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C352		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C353		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C354		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C355		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C356		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C357		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C358		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C359		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C360		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C361		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C362		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C364		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C365		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C366		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C367		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C368		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C369		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C371		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C385		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C386		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C387		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C389		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C390		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C400		015-22180-05	CAP 0805 18P 1% 200V
C401		015-25150-08	CAP CER 0805 15N 10% X7R 50V
C402		015-22180-05	CAP 0805 18P 1% 200V
C403		015-22180-05	CAP 0805 18P 1% 200V
C404		015-22180-05	CAP 0805 18P 1% 200V
C407		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C408		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C409		015-22180-05	CAP 0805 18P 1% 200V
C410		015-25150-08	CAP CER 0805 15N 10% X7R 50V
C411		015-22180-05	CAP 0805 18P 1% 200V
C414		015-22180-05	CAP 0805 18P 1% 200V
C415		015-22180-05	CAP 0805 18P 1% 200V
C417		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C418		015-22390-05	CAP 0805 39P 1% 200V
C422		015-22390-05	CAP 0805 39P 1% 200V
C500		015-22180-05	CAP 0805 18P 1% 200V
C501		014-08220-01	(L)CAP TANT 22UF10V276MSER
C502		014-08220-01	(L)CAP TANT 22UF10V276MSER
C503		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C504		015-22180-05	CAP 0805 18P 1% 200V
C505		015-22180-05	CAP 0805 18P 1% 200V
C506		015-22180-05	CAP 0805 18P 1% 200V
C507		015-22180-05	CAP 0805 18P 1% 200V
C508		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C509		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C510		015-22180-05	CAP 0805 18P 1% 200V
C516		014-08220-01	(L)CAP TANT 22UF10V276MSER
&C517	10	015-22180-05	CAP 0805 18P 1% 200V
&C517	25	015-22180-05	CAP 0805 18P 1% 200V
&C517	30	015-22180-05	CAP 0805 18P 1% 200V
C518		015-26100-08	CAP CER 0805 100N 10% X7R 50V
&C519	10	015-22390-05	CAP 0805 39P 1% 200V
&C519	25	015-22390-05	CAP 0805 39P 1% 200V
&C519	30	015-22330-05	CAP CER 0805 33P+-0.1PF 200V
C520		015-22180-05	CAP 0805 18P 1% 200V
&C521	10	015-23330-08	CAP CER 0805 330P 10% X7R 50V
&C521	25	015-23330-08	CAP CER 0805 330P 10% X7R 50V
&C521	30	015-23330-08	CAP CER 0805 330P 10% X7R 50V
&C522	10	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C522	25	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C522	30	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C524	10	015-21120-05	CAP CER 0805 CHIP 1P2 +0.1PF 2
&C524	25	015-21120-05	CAP CER 0805 CHIP 1P2 +0.1PF 2
&C524	30	015-21100-05	CAP CER 0805 1P0 +-0.1PF 200V
&C525	10	015-21100-05	CAP CER 0805 1P0 +-0.1PF 200V
&C525	25	015-21100-05	CAP CER 0805 1P0 +-0.1PF 200V
&C525	30	015-20075-05	CAP CER 0805 CHIP OP75+-0.1PF
C531		015-22180-05	CAP 0805 18P 1% 200V
&C533	10	015-21180-05	CAP CER 0805 1P8 +-0.1 200V
&C533	25	015-21180-05	CAP CER 0805 1P8 +-0.1 200V
&C533	30	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
C536		015-22180-05	CAP 0805 18P 1% 200V
C537		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C540		015-22180-05	CAP 0805 18P 1% 200V
C541		015-22180-05	CAP 0805 18P 1% 200V
C542		014-08220-01	(L)CAP TANT 22UF10V276MSER
C543		015-22180-05	CAP 0805 18P 1% 200V
C544		015-22180-05	CAP 0805 18P 1% 200V
C545		015-22180-05	CAP 0805 18P 1% 200V
C548		015-22180-05	CAP 0805 18P 1% 200V
C549		015-22180-05	CAP 0805 18P 1% 200V
C555		015-22180-05	CAP 0805 18P 1% 200V
C556		015-22180-05	CAP 0805 18P 1% 200V
C557		015-22180-05	CAP 0805 18P 1% 200V
C558		015-22180-05	CAP 0805 18P 1% 200V
C559		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C560		015-22180-05	CAP 0805 18P 1% 200V
C561		015-22180-05	CAP 0805 18P 1% 200V
C562		015-22180-05	CAP 0805 18P 1% 200V
C563		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C564		015-22180-05	CAP 0805 18P 1% 200V

Ref	Var	IPN	Description
C569		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C570		015-22180-05	CAP 0805 18P 1% 200V
C571		015-22180-05	CAP 0805 18P 1% 200V
C572		015-22180-05	CAP 0805 18P 1% 200V
C573		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C574		015-22180-05	CAP 0805 18P 1% 200V
C575		015-22180-05	CAP 0805 18P 1% 200V
C576		015-22180-05	CAP 0805 18P 1% 200V
C577		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C578		015-21270-05	CAP CER 0805 CHIP 2P7 +0.1PF 2
C579		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C585		015-22180-05	CAP 0805 18P 1% 200V
C586		015-22180-05	CAP 0805 18P 1% 200V
C587		015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
C588		015-22180-05	CAP 0805 18P 1% 200V
C590		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C591		015-22180-05	CAP 0805 18P 1% 200V
C592		014-08220-01	(L)CAP TANT 22UF10V276MSER
C593		015-22180-05	CAP 0805 18P 1% 200V
C594		015-22180-05	CAP 0805 18P 1% 200V
C595		015-22180-05	CAP 0805 18P 1% 200V
C596		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C597		015-22180-05	CAP 0805 18P 1% 200V
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
C623		015-22180-05	CAP 0805 18P 1% 200V
C625		020-09470-07	CAP ELEC RADL 470M 16V 20% 3.5
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
C631B		014-08100-03	CAP TANT SMD 10U 35V 20%
C637		015-22180-05	CAP 0805 18P 1% 200V
C640		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C650		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C651		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C658		015-26100-08	CAP CER 0805 100N 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		014-08100-03	CAP TANT SMD 10U 35V 20%
C687		015-22180-05	CAP 0805 18P 1% 200V
C690		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C693		014-08100-03	CAP TANT SMD 10U 35V 20%
C700		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C702		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C703		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C705		015-21820-02	L)CAP 0805 8P2 15 NPO 50V
C707		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C708		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C709		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
C710A		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C710B		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C710C		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C711		015-22220-01	CAP CER 0805 22P 5% NPO 50V
C712		015-22220-01	CAP CER 0805 22P 5% NPO 50V
C713		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C741A		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C742A		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C745		015-22180-05	CAP 0805 18P 1% 200V
C750		014-08100-03	CAP TANT SMD 10U 35V 20%
C757		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C759		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C762		014-08220-01	(L)CAP TANT 22UF10V276MSER
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C765		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C770		014-08220-01	(L)CAP TANT 22UF10V276MSER
C772		014-08220-01	(L)CAP TANT 22UF10V276MSER
C774		013-06100-10	CAP SMD PPS 100N 100V 10%
C776		015-24680-08	CAP CER 0805 6N8 10% X7R 50V
C780		015-22180-05	CAP 0805 18P 1% 200V
C782		015-22180-05	CAP 0805 18P 1% 200V
C784		015-22180-05	CAP 0805 18P 1% 200V
C786		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C788		015-22180-05	CAP 0805 18P 1% 200V
C790		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C792		015-21560-01	CAP CER 0805 5P6+-0.25 NPO 50V
C810		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C814		015-22180-05	CAP 0805 18P 1% 200V
C815		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C816		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C818		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C819		015-22330-01	CAP CER 0805 33P 5% NPO 50V
C820		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C822		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C824		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C826		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C828		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C830		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C832		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C833		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C834		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C836		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C837		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C838		015-05100-07	CAP 1206 CHIP NPO 10nF 25V
C840		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C842		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C844		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C846		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C848		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C850		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C873		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C876		014-09100-00	CAP TANT SMD 100U 16V 20%
C879		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C900		015-21220-01	CAP CER 0805 2P2+-0.25 NPO 50V
C901		015-21390-01	CAP CER 0805 3P9+-0.25 NPO 50V
C902		015-21390-01	CAP CER 0805 3P9+-0.25 NPO 50V
C903		015-21220-01	CAP CER 0805 2P2+-0.25 NPO 50V
CV500		028-11500-00	CAP TRIM 0.6/4.5 P SAPPHIRE
%D111A		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
D220		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
D230		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D240		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D250		008-00014-79	S)LED 3MM RED WITH WIRE
D260		001-10084-33	S)DIODE ZENSMD BZX84C3V3 SOT23
D270		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D280		008-00014-80	S)LED 3MM GREEN WITH WIRE
D285		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM
D289		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM
D290		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM
D295		001-10011-73	DIODE SMD MRA4003T3 1A/300V SM
D330		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D501		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D502		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D504		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D505		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
D730A		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D740A		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D820A		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D860		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D880		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
#H400	10	051-00564-00	COIL HELC RES 2.625T 1.2MMSF
#H400	25	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
#H400	30	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
#H401	10	051-00564-00	COIL HELC RES 2.625T 1.2MMSF
#H401	25	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
#H401	30	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
#H900	10	051-00564-00	COIL HELC RES 2.625T 1.2MMSF
#H900	25	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
#H900	30	051-00565-00	COIL HELC RES 2.428T 1.2MMSF
IC210		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC240		002-00014-05	S) IC TDA7231 1.6W AF PWR
IC260		002-00014-05	S) IC TDA7231 1.6W AF PWR
IC270		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC280		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC300		002-10337-20	S) IC MC3372D SMD IF DETECTOR
IC330		002-10008-40	S)IC SMD TL084CD 4X O-AMP JFET
IC345		276-10010-14	FLTR CER SMD 455KHz E15KHz B/W
IC351		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC352		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC360		002-10078-05	S) IC SMD 78L05 5V REG
IC610		002-10078-05	S) IC SMD 78L05 5V REG
IC630		002-12523-17	(S)IC LM317L REG TO-252 0.5A
IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG
=IC700		539-00010-55	TCXO 12.8M 1PPM-20+70/2PPM -30
IC710		002-74900-04	S) IC SMD 74HC04D 6X INV BUFFD
IC740		002-14519-10	S) IC MC145191F SMD SYNTH
IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
IC820		002-12416-00	S)IC SMD AT24C16N-10SC EEPROM
IC830		002-10003-24	S) IC SMD 324 4X O-AMP SO14
IC840		002-10040-53	S)MC14053B SMD BREAK B4 MAKE
IC850		002-10003-24	S) IC SMD 324 4X O-AMP SO14
L230		057-10100-60	IND SHLD 100UH SMD 600MA
L300		050-00016-22	COIL TAIT NO 622 20-120M
L301		050-00016-22	COIL TAIT NO 622 20-120M
L302		059-16470-10	(L)IND FXD 1008CS 470NH 5%
&L303	10	056-14150-02	(L) IND SMD 1.5UH SIMID02
&L303	25	056-10820-02	(L) IND SMD 820NH SIMID02
&L303	30	056-14150-02	(L) IND SMD 1.5UH SIMID02
&L304	25	056-10820-02	(L) IND SMD 820NH SIMID02

Ref	Var	IPN	Description
&L307	10	056-14330-02	(L) IND SMD 3.3UH SIMID02
&L307	25	056-14150-02	(L) IND SMD 1.5UH SIMID02
&L307	30	056-14330-02	(L) IND SMD 3.3UH SIMID02
L308		056-10820-00	IND FXD SMD 820NH 3.2*2.5*1.6
L345		050-15119-75	COIL SMD 455KHz IF 5119-T075
L400		056-10330-02	(L) IND SMD 330NH SIMID02
L404		056-10330-02	(L) IND SMD 330NH SIMID02
L410		056-10330-02	(L) IND SMD 330NH SIMID02
L414		056-10330-02	(L) IND SMD 330NH SIMID02
L500		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L501		056-10100-02	(L) IND SMD 100NH SIMID02
L502		056-10100-02	(L) IND SMD 100NH SIMID02
L503		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L504		056-10100-02	(L) IND SMD 100NH SIMID02
L505		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L540		056-10082-02	(L) IND SMD 82NH SIMID02
L541		056-10015-03	IND SMD 0805 15NH 20%
L543		056-10006-83	(LSH) IND SMD 0805 6.8NH 20%
L700		056-10006-83	(LSH) IND SMD 0805 6.8NH 20%
L900		052-08120-15	COIL A/W 1.5T/2MM HOR 0.8MM
L901		052-08125-15	COIL A/W 1.5T/2.5MM HOR 0.8MM
L902		052-08120-15	COIL A/W 1.5T/2MM HOR 0.8MM
M400		002-10000-13	MIXER DBL BALANCE 5-1500MHz
PL100		070-01001-00	D-RANGE 15 WAY COMPL T800
PL200		240-10000-16	HEADER 4W PCB MTG SMD
PL210		240-10000-16	HEADER 4W PCB MTG SMD
PL220		240-10000-16	HEADER 4W PCB MTG SMD
PL230		240-10000-16	HEADER 4W PCB MTG SMD
PL240		240-10005-00	HEADER 5W PCB MTG SMD
PL250		240-10000-16	HEADER 4W PCB MTG SMD
PL260		240-10000-16	HEADER 4W PCB MTG SMD
PL270		240-10000-16	HEADER 4W PCB MTG SMD
Q210		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q220		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q230		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q240		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q245		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q250		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q255		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q260		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q270		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q280		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q290		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q300		000-10003-10	S) XSTR SMD BFJ310 JFET UHF
Q301		000-10008-92	S) XSTR SMD BFS17 NPN SOT23
Q302		000-10009-41	S) XSTR SMD BR941L SOT23
Q346		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q400		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q401		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q402		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q403		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q500		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q501		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q502		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q503		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q504		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q540		000-10009-41	S) XSTR SMD BR941L SOT23
Q541		000-10009-41	S) XSTR SMD BR941L SOT23
Q542		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q543		002-10003-18	IC BGA318 MMIC AMPLIFIER
Q544		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q545		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q546		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q590		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q591		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q592		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLTD
Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89
Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q760		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q780		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23
Q795		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q810		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q820		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q850		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q860		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q870		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
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
R160		036-12100-10	RES M/F 0805 10E 1%
R201		036-14470-10	RES M/F 0805 4K7 1%
R202		036-14470-10	RES M/F 0805 4K7 1%
R204		036-15100-10	RES M/F 0805 10K 1%
R205		036-16220-00	RES M/F 0805 220K 5%
R207		036-14820-10	RES M/F 0805 8K2 1%
&R209	10	036-15220-00	RES M/F 0805 22K 5%
&R209	25	036-15180-00	RES M/F 0805 18K 5%
&R209	30	036-15220-00	RES M/F 0805 22K 5%
R210		036-15150-00	RES M/F 0805 15K 5%
R211		036-15390-10	RES M/F 0805 39K 1%
R213		036-14270-10	RES M/F 0805 2K7 1%
R215		036-15150-00	RES M/F 0805 15K 5%
R218		036-14390-10	RES M/F 0805 3K9 1%
&R219	10	036-15100-10	RES M/F 0805 10K 1%
&R219	25	036-14820-10	RES M/F 0805 8K2 1%
&R219	30	036-15100-10	RES M/F 0805 10K 1%
R221		036-15470-10	RES M/F 0805 47K 1%
R222		036-16100-10	RES M/F 0805 100K 1%
%R223		036-12100-10	RES M/F 0805 10E 1%
R224		036-14390-10	RES M/F 0805 3K9 1%
R225		036-13470-00	RES M/F 0805 470E 5%
R227		036-14270-10	RES M/F 0805 2K7 1%
R229		036-14470-10	RES M/F 0805 4K7 1%
R230		036-14470-10	RES M/F 0805 4K7 1%
R232		036-15470-10	RES M/F 0805 47K 1%
R233		036-14820-10	RES M/F 0805 8K2 1%
R234		036-15470-10	RES M/F 0805 47K 1%
R236		036-15470-10	RES M/F 0805 47K 1%
R238		036-11470-00	RES M/F 0805 4E7 10%
R239		036-14100-10	RES M/F 0805 1K 1%
R241		036-14100-10	RES M/F 0805 1K 1%
R242		036-13100-10	RES M/F 0805 100E 1%
R244		036-14680-10	RES M/F 0805 6K8 1%
R245		036-14100-10	RES M/F 0805 1K 1%
R247		036-14220-00	RES M/F 0805 2K2 5%
R249		036-15100-10	RES M/F 0805 10K 1%
R251		036-15390-10	RES M/F 0805 39K 1%
R252		036-14470-10	RES M/F 0805 4K7 1%
R254		036-14820-10	RES M/F 0805 8K2 1%
R255		036-15470-10	RES M/F 0805 47K 1%
R256		036-14270-10	RES M/F 0805 2K7 1%
R258		036-15470-10	RES M/F 0805 47K 1%
R260		036-11470-00	RES M/F 0805 4E7 10%
R261		036-13150-10	RES M/F 0805 150E 1%
R262		036-14100-10	RES M/F 0805 1K 1%
R264		036-15150-00	RES M/F 0805 15K 5%
R265		036-13100-10	RES M/F 0805 100E 1%
R266		036-15470-10	RES M/F 0805 47K 1%
R267		036-16390-00	RES M/F 0805 390K 5%
R269		036-14220-00	RES M/F 0805 2K2 5%
R271		036-16100-10	RES M/F 0805 100K 1%
R272		036-15470-10	RES M/F 0805 47K 1%
R273		036-15150-00	RES M/F 0805 15K 5%
R274		036-13120-00	RES M/F 0805 120E 5%
R275		036-13100-10	RES M/F 0805 100E 1%
R276		036-13120-00	RES M/F 0805 120E 5%
R277		036-14560-00	RES M/F 0805 5K6 5%
R278		036-16220-00	RES M/F 0805 220K 5%
R279		036-12270-00	RES M/F 0805 27E 5%
R280		036-16100-10	RES M/F 0805 100K 1%
R281		036-14470-10	RES M/F 0805 4K7 1%
R282		036-16100-10	RES M/F 0805 100K 1%
R284		036-13100-10	RES M/F 0805 100E 1%
R285		036-15470-10	RES M/F 0805 47K 1%
R287		036-15100-10	RES M/F 0805 10K 1%
R288		036-14470-10	RES M/F 0805 4K7 1%
R289		036-14680-10	RES M/F 0805 6K8 1%
R290		036-14100-10	RES M/F 0805 1K 1%
R292		036-14680-10	RES M/F 0805 6K8 1%
R293		036-13560-10	RES M/F 0805 560E 1%
R294		036-14100-10	RES M/F 0805 1K 1%
R295		036-14680-10	RES M/F 0805 6K8 1%
R296		036-14120-00	RES M/F 0805 1K2 5%
R297		030-52100-20	RES FILM AI 10E 5% 0.4W 4X1.6
R298		036-15470-10	RES M/F 0805 47K 1%
R299		036-15470-10	RES M/F 0805 47K 1%
R300		036-12820-00	RES M/F 0805 82E 5%
R301		036-12100-10	RES M/F 0805 10E 1%
R302		036-13100-10	RES M/F 0805 100E 1%
R303		036-14270-10	RES M/F 0805 2K7 1%
R304		036-14220-00	RES M/F 0805 2K2 5%
R307		036-13100-10	RES M/F 0805 100E 1%
R308		036-15150-00	RES M/F 0805 15K 5%
R309		036-15100-10	RES M/F 0805 10K 1%
R310		036-15100-10	RES M/F 0805 10K 1%
R311		036-13100-10	RES M/F 0805 100E 1%
&R312	10	036-12470-00	RES M/F 0805 47E 5%
&R312	25	036-12220-00	RES M/F 0805 22E 5%
&R312	30	036-12470-00	RES M/F 0805 47E 5%
R314		036-14150-10	RES M/F 0805 1K5 1%
R315		036-14330-10	RES M/F 0805 3K3 1%
R316		036-14100-10	RES M/F 0805 1K 1%
R344		036-17100-10	RES M/F 0805 1M 1%
R345		036-10000-00	RES M/F 0805 ZERO OHM
R347		036-12220-00	RES M/F 0805 22E 5%
&R349	10	036-15560-10	RES MF 0805 56K 1%
&R349	25	036-16100-10	RES M/F 0805 100K 1%
&R349	30	036-15560-10	RES MF 0805 56K 1%
R350		036-14150-10	RES M/F 0805 1K5 1%
R351		036-14100-10	RES M/F 0805 1K 1%
R352		036-14220-00	RES M/F 0805 2K2 5%
R353		036-15820-00	RES M/F 0805 82K 5%
R354		036-16560-00	RES M/F 0805 560K 5%
R355		036-15470-10	RES M/F 0805 47K 1%

Ref	Var	IPN	Description
R356		036-15220-00	RES M/F 0805 22K 5%
R357		036-16120-10	RES M/F 0805 120K 1%
R358		036-15100-10	RES M/F 0805 10K 1%
R359		036-15100-10	RES M/F 0805 10K 1%
R362		036-15270-10	RES M/F 0805 27K 1%
R363		036-14820-10	RES M/F 0805 8K2 1%
R364		036-14560-00	RES M/F 0805 5K6 5%
R365		036-15100-10	RES M/F 0805 10K 1%
R366		036-16220-00	RES M/F 0805 220K 5%
R367		045-15100-00	RES NTC SMD 10K 5%
R368		036-16390-00	RES M/F 0805 390K 5%
R369		036-14560-00	RES M/F 0805 5K6 5%
R370		036-14390-10	RES M/F 0805 3K9 1%
R371		036-16220-00	RES M/F 0805 220K 5%
R372		036-14100-10	RES M/F 0805 1K 1%
R373		036-16220-00	RES M/F 0805 220K 5%
R374		036-15100-10	RES M/F 0805 10K 1%
R375		036-15100-10	RES M/F 0805 10K 1%
R376		036-15100-10	RES M/F 0805 10K 1%
R377		036-16390-00	RES M/F 0805 390K 5%
R378		036-14220-00	RES M/F 0805 2K2 5%
R379		036-14820-10	RES M/F 0805 8K2 1%
R380		036-14100-10	RES M/F 0805 1K 1%
R381		036-14560-00	RES M/F 0805 5K6 5%
R382		036-14820-10	RES M/F 0805 8K2 1%
R384		036-16390-00	RES M/F 0805 390K 5%
R385		036-16390-00	RES M/F 0805 390K 5%
R387		036-15100-10	RES M/F 0805 10K 1%
R388		036-15470-10	RES M/F 0805 47K 1%
R389		036-15470-10	RES M/F 0805 47K 1%
R391		036-13220-10	RES 0805 220E 1%
R392		036-14330-10	RES M/F 0805 3K3 1%
R393		036-16220-00	RES M/F 0805 220K 5%
R394		036-14100-10	RES M/F 0805 1K 1%
R395		036-14220-00	RES M/F 0805 2K2 5%
R396		036-15820-00	RES M/F 0805 82K 5%
R397		036-16560-00	RES M/F 0805 560K 5%
R400		036-14100-10	RES M/F 0805 1K 1%
R401		036-14390-10	RES M/F 0805 3K9 1%
R402		036-14220-00	RES M/F 0805 2K2 5%
R403		036-12100-10	RES M/F 0805 10E 1%
R404		036-12330-00	RES M/F 0805 33E 5%
R407		036-13180-00	RES M/F 0805 180E 5%
R408		036-17100-10	RES M/F 0805 1M 1%
R409		036-10000-00	RES M/F 0805 ZERO OHM
R410		036-12100-10	RES M/F 0805 10E 1%
R411		036-17100-10	RES M/F 0805 1M 1%
R414		036-12100-10	RES M/F 0805 10E 1%
R415		036-14100-10	RES M/F 0805 1K 1%
R416		036-14390-10	RES M/F 0805 3K9 1%
R417		036-14220-00	RES M/F 0805 2K2 5%
R418		036-12100-10	RES M/F 0805 10E 1%
R421		036-12330-00	RES M/F 0805 33E 5%
R422		036-13470-00	RES M/F 0805 470E 5%
R423		036-13470-00	RES M/F 0805 470E 5%
R424		036-12120-00	RES M/F 0805 12E 5%
R425		036-13470-00	RES M/F 0805 470E 5%
R428		036-13470-00	RES M/F 0805 470E 5%
R429		036-13470-00	RES M/F 0805 470E 5%
R430		036-12120-00	RES M/F 0805 12E 5%
R431		036-12470-00	RES M/F 0805 47E 5%
R500		036-12100-10	RES M/F 0805 10E 1%
R501		036-15390-10	RES M/F 0805 39K 1%
R502		036-13330-00	RES M/F 0805 330E 5%
R503		036-13220-10	RES 0805 220E 1%
R505		036-13820-00	RES M/F 0805 820E 5%
&R506	10	036-12470-00	RES M/F 0805 47E 5%
&R506	25	036-12470-00	RES M/F 0805 47E 5%
&R506	30	036-12470-00	RES M/F 0805 47E 5%
&R507	10	036-12470-00	RES M/F 0805 47E 5%
&R507	25	036-12470-00	RES M/F 0805 47E 5%
&R507	30	036-12470-00	RES M/F 0805 47E 5%
R508		036-11470-00	RES M/F 0805 4E7 10%
R509		036-12100-10	RES M/F 0805 10E 1%
R511		036-14180-00	RES M/F 0805 1K8 5%
&R516	10	036-11330-00	RES M/F 0805 3E3 5%
&R516	25	036-11470-00	RES M/F 0805 4E7 10%
&R516	30	036-11470-00	RES M/F 0805 4E7 10%
R517		036-13100-10	RES M/F 0805 100E 1%
R518		036-12330-00	RES M/F 0805 33E 5%
R520		036-14220-00	RES M/F 0805 2K2 5%
R540		036-12330-00	RES M/F 0805 33E 5%
R541		036-11470-00	RES M/F 0805 4E7 10%
R542		036-11470-00	RES M/F 0805 4E7 10%
R543		036-14180-00	RES M/F 0805 1K8 5%
R544		036-14220-00	RES M/F 0805 2K2 5%
R545		036-14100-10	RES M/F 0805 1K 1%
R546		036-12270-00	RES M/F 0805 27E 5%
R547		036-12680-00	RES M/F 0805 68E 5%
R548		036-10000-00	RES M/F 0805 ZERO OHM
R549		036-12120-00	RES M/F 0805 12E 5%
R550		036-12560-00	RES M/F 0805 56E 5%
R554		036-12680-00	RES M/F 0805 68E 5%
R557		036-13120-00	RES M/F 0805 120E 5%
R558		036-12100-10	RES M/F 0805 10E 1%
R560		036-11470-00	RES M/F 0805 4E7 10%
R561		036-14330-10	RES M/F 0805 3K3 1%
R562		036-15150-00	RES M/F 0805 15K 5%
R563		036-16180-00	RES M/F 0805 180K 5%
R564		036-12330-00	RES M/F 0805 33E 5%
R571		036-11470-00	RES M/F 0805 4E7 10%
R572		036-13820-00	RES M/F 0805 820E 5%
R573		036-11470-00	RES M/F 0805 4E7 10%
R574		036-13820-00	RES M/F 0805 820E 5%
R575		036-14150-10	RES M/F 0805 1K5 1%
R576		036-14680-10	RES M/F 0805 6K8 1%
R578		036-12270-00	RES M/F 0805 27E 5%
R579		036-14100-10	RES M/F 0805 1K 1%
R580		036-10000-00	RES M/F 0805 ZERO OHM
R586		036-13470-00	RES M/F 0805 470E 5%
R590		036-14100-10	RES M/F 0805 1K 1%
R591		036-15220-00	RES M/F 0805 22K 5%
R592		036-14220-00	RES M/F 0805 2K2 5%
R615		036-13100-10	RES M/F 0805 100E 1%
R617		036-10000-00	RES M/F 0805 ZERO OHM
R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R625		036-14100-10	RES M/F 0805 1K 1%
R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP
R633		036-14680-10	RES M/F 0805 6K8 1%
R636		036-12220-00	RES M/F 0805 22E 5%
R637		036-12220-00	RES M/F 0805 22E 5%
R640		036-12100-10	RES M/F 0805 10E 1%
R641		036-14150-10	RES M/F 0805 1K5 1%
R645		036-13470-00	RES M/F 0805 470E 5%
R649		036-14470-10	RES M/F 0805 4K7 1%
R653		036-15100-10	RES M/F 0805 10K 1%
R681		036-13100-10	RES M/F 0805 100E 1%
R685		036-15150-00	RES M/F 0805 15K 5%
R689		036-12100-10	RES M/F 0805 10E 1%
R693		036-16100-10	RES M/F 0805 100K 1%
R696		036-15560-10	RES MF 0805 56K 1%
R701		036-12220-00	RES M/F 0805 22E 5%
R702		036-17100-10	RES M/F 0805 1M 1%
R703		036-17100-10	RES M/F 0805 1M 1%
R706		036-15150-00	RES M/F 0805 15K 5%
R707		036-15470-10	RES M/F 0805 47K 1%
R708		036-13100-10	RES M/F 0805 100E 1%
R709		036-13100-10	RES M/F 0805 100E 1%
R710		036-13100-10	RES M/F 0805 100E 1%
R711		036-13100-10	RES M/F 0805 100E 1%
R712		036-12100-10	RES M/F 0805 10E 1%
R730		036-13470-00	RES M/F 0805 470E 5%
R731		036-13470-00	RES M/F 0805 470E 5%
R732		036-13470-00	RES M/F 0805 470E 5%
R742		036-13150-10	RES M/F 0805 150E 1%
R743		036-13150-10	RES M/F 0805 150E 1%
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		036-16470-00	RES M/F 0805 470K 5%
R757		036-16470-00	RES M/F 0805 470K 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		036-15180-10	RES M/F 0805 18K 1%
R784		036-12680-00	RES M/F 0805 68E 5%
R785		036-14330-10	RES M/F 0805 3K3 1%
R786		036-12100-10	RES M/F 0805 10E 1%
R787		036-12100-10	RES M/F 0805 10E 1%
R790		036-13390-10	RES M/F 0805 390E 1%
R791		036-14100-10	RES M/F 0805 1K 1%
R793		036-12180-00	RES M/F 0805 18E 5%
R794		036-13120-00	RES M/F 0805 120E 5%
R804		036-15470-10	RES M/F 0805 47K 1%
R805		036-13470-00	RES M/F 0805 470E 5%
R808		036-12100-10	RES M/F 0805 10E 1%
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%
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%

Ref	Var	IPN	Description
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		036-14270-10	RES M/F 0805 2K7 1%
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%
R869		036-15270-10	RES M/F 0805 27K 1%
R870		036-17120-10	RES M/F 0805 1M2 1%
R871		036-16820-10	RES M/F 0805 820K 1%
R872		036-14510-10	RES M/F 0805 5K1 1%
R873		036-14220-00	RES M/F 0805 2K2 5%
R875		036-14470-10	RES M/F 0805 4K7 1%
R876		036-16100-10	RES M/F 0805 100K 1%
R877		036-16100-10	RES M/F 0805 100K 1%
R878		036-16100-10	RES M/F 0805 100K 1%
R879		036-16100-10	RES M/F 0805 100K 1%
R881		036-15470-10	RES M/F 0805 47K 1%
R882		036-15470-10	RES M/F 0805 47K 1%
R884		036-16150-00	RES M/F 0805 150K 5%
R885		036-16150-00	RES M/F 0805 150K 5%
R886		036-15100-10	RES M/F 0805 10K 1%
R887		036-14100-10	RES M/F 0805 1K 1%
R888		036-14820-10	RES M/F 0805 8K2 1%
R889		036-16100-10	RES M/F 0805 100K 1%
R890		036-16150-00	RES M/F 0805 150K 5%
R891		036-16100-10	RES M/F 0805 100K 1%
R892		036-16330-00	RES M/F 0805 330K 5%
R894		036-14470-10	RES M/F 0805 4K7 1%
R895		036-15100-10	RES M/F 0805 10K 1%
R897		036-15100-10	RES M/F 0805 10K 1%
R898		036-16470-00	RES M/F 0805 470K 5%
R900		036-15100-10	RES M/F 0805 10K 1%
RL210		237-10010-00	RELAY 12V DPDT 10PIN SMD
RV205		040-05100-22	POT 10K LOG DUAL PCB 6 OD SFT
RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT
RV220		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
RV230		040-05100-21	POT 10K LIN PCB 15MM SLOT SFT
RV235		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
RV345		042-04220-05	RES PRESET SMD 2K CER 4MM SQ
RV346		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
SHLD610		062-00010-13	CAN 10MMSQ*11MM CAN SANWA 613
SK805		240-10000-07	CONN SMD SKT 16W 2R M-MATCH
SK810		240-04020-42	SKT 44 PIN SMD PLCC
SW201		230-00010-30	SWITCH TOG SPDT R-ANG PCB MTG
T210		053-00010-17	XFMR T4030 LINE MATCH POTCORE
T540		000-10080-00	XSTR SMD BLT80 UHF PWR SOT223
T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052
TL500		051-10950-00	COAX RES 950 MHZ 6X6 SMD
X300		274-00010-22	XTAL 44.545MHZ TE/22 HC45/U
&XF300A	10	276-00010-86	FLTR XTAL 45MHz 15KHz BW 4P
&XF300A	25	276-00010-87	FLTR XTAL 45MHz 7.5KHz BW 4P
&XF300A	30	276-00010-86	FLTR XTAL 45MHz 15KHz BW 4P
&XF300B	10	276-00010-86	FLTR XTAL 45MHz 15KHz BW 4P
&XF300B	25	276-00010-87	FLTR XTAL 45MHz 7.5KHz BW 4P
&XF300B	30	276-00010-86	FLTR XTAL 45MHz 15KHz BW 4P
&XF302	10	276-00010-68	FLTR XTL 45MHZ 15KHZ 2 POLE
&XF302	25	276-00010-69	FLTR XTL 45MHZ 7.5KHZ 2 POLE
&XF302	30	276-00010-68	FLTR XTL 45MHZ 15KHZ 2 POLE

T885 Mechanical & Miscellaneous Parts (220-01595-02)

IPN	Legend	Description
002-08951-20		S) IC AT89C51 PLCC44 MIC 12MHZ
066-00010-20		SLUG BRASS A4M764 HELIC RESNTR
220-01595-02		PCB T885 RX SERIES II
230-00010-31		SWITCH COVER FOR 230-00010-30
240-02100-06		SKT COAX N TYPE PNL MTG OP-TER
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
308-01048-00		HOUSING A3M2378 DOUBLET H/RES
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
349-00020-43		SCRW T/T M4X12MM P/POZ BZ
349-00020-45		SCRW T/T M4X20MM P/POZ BZ
352-00010-29		NUT M4 NYLOC HEX
352-00010-54		NUT Brass hex 1/4" UNF 3mm
353-00010-24		WSHR M4x8mm Flat
356-00010-03		TAG SOLDER 3MM LONG M614/3.2
362-00010-33		GROMMET LED MTG 3MM
365-00011-53		LABEL 104*37MM
365-00100-20		LABEL WHITE S/A 28X11MM
399-00010-51		BAG PLASTIC 75*100MM

T885 Grid Reference Index (IPN 220-01595-02)

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
C201	1:B5	2-B9	&C315	1:E7	3-G7	C409	1:K7	4-G3	C576	1:G5	5-N4
C203	1:C5	2-B8	C316	1:F7	3-G8	C410	1:K8	4-G4	C577	1:G6	5-N2
C205	1:D5	2-B8	C317	1:F7	3-H8	C411	1:J8	4-H5	C578	1:H6	5-N2
C207	1:C5	2-C8	&C318	1:E7	3-H7	C414	1:J8	4-H4	C579	1:H6	5-N2
C209	1:C6	2-E8	C321	1:E7	3-H7	C415	1:J8	4-H4	C585	1:G6	5-N2
C210	1:C5	2-D7	C322	1:E7	3-H7	C417	1:H8	4-L3	C586	1:G5	5-N4
C211	1:C4	2-D7	C324	1:E7	3-J7	C418	1:H8	4-M3	C587	1:G6	5-Q2
C212	1:C5	2-E8	C325	1:F7	3-J8	C422	1:G8	4-M4	C588	1:G6	5-Q2
C213	1:C5	2-E7	C328	1:E6	3-J8	C500	1:J4	5-D8	C590	1:J6	5-A8
C215	1:C4	2-E7	&C329	1:E7	3-K8	C501	1:J4	5-E8	C591	1:K6	5-B8
C217	1:C4	2-E7	&C330	1:E6	3-K8	C502	1:J5	5-E8	C592	1:K6	5-B8
C219	1:C5	2-H6	&C331	1:F6	3-L8	C503	1:J4	5-E8	C593	1:J6	5-B8
C221	1:C5	2-H6	&C332	1:E6	3-L8	C504	1:J5	5-F7	C594	1:J6	5-C8
C222	1:B5	2-J9	&C335	1:E6	3-M8	C505	1:K5	5-G7	C595	1:J6	5-C8
C223	1:B5	2-H8	C336	1:E6	3-M8	C506	1:J5	5-G6	C596	1:J5	5-C8
C225	1:B5	2-J8	C337	1:E6	3-M7	C507	1:J4	5-G7	C597	1:J5	5-D8
C227	1:B5	2-J8	C338	1:E5	3-M8	C508	1:J5	5-G7	C610A	1:M5	6-B6
C229	1:B6	2-K8	C339	1:E6	3-N8	C509	1:J5	5-G6	C610B	1:M5	6-B6
C231	1:B6	2-K8	C340	1:E3	3-N0	C510	1:J5	5-G7	C611A	1:M5	6-D6
C233	1:B5	2-J7	C341	1:E3	3-N0	C516	1:J5	5-G6	C611B	1:M4	6-D6
C235	1:B6	2-M6	C342	1:E5	3-B3	&C517	1:J5	5-H6	C623	1:N6	6-N8
C237	1:B6	2-M5	C343	1:E5	3-C3	C518	1:K5	5-J7	C625	1:M6	6-Q8
C238	1:B6	2-N7	C345	1:F4	3-D4	&C519	1:J5	5-J6	C626	1:M6	6-R8
C239	1:C6	2-P6	C346	1:F3	3-G0	C520	1:K5	5-J7	C628	1:M6	6-R8
C240A	1:D5	2-Q8	C347	1:E4	3-D4	&C521	1:J5	5-J5	C630	1:N5	6-K4
C240B	1:D5	2-R8	C348	1:E5	3-E4	&C522	1:J5	5-J6	C631A	1:M5	6-M6
C240C	1:D6	2-R8	C349	1:E5	3-E3	&C524	1:K5	5-K6	C631B	1:N4	6-M6
C249	1:D6	2-Q7	C350	1:E5	3-E4	&C525	1:K5	5-K6	C637	1:M6	6-P5
C251	1:C6	2-R7	C351	1:F3	3-E0	C531	1:J5	5-K6	C640	1:M5	6-G0
C253	1:D4	2-G5	C352	1:E3	3-F2	&C533	1:K5	5-L6	C650	1:N5	6-L4
C255	1:C7	2-L2	C353	1:F5	3-F3	C536	1:K4	5-Q6	C651	1:M5	6-M4
C257	1:C7	2-M2	C354	1:F4	3-G3	C537	1:K5	5-Q6	C658	1:L5	6-K1
C259	1:C7	2-M3	C355	1:F4	3-H2	C540	1:H6	5-D2	C660	1:L5	6-K1
C260A	1:D7	2-N4	C356	1:F4	3-H3	C541	1:H6	5-D1	C665	1:L5	6-L1
C260B	1:D7	2-M4	C357	1:F4	3-G4	C542	1:H6	5-E3	C670	1:L5	6-L1
C260C	1:D8	2-M4	C358	1:F4	3-L5	C543	1:J6	5-E2	C673	1:L5	6-N2
C261	1:C7	2-N2	C359	1:E3	3-H4	C544	1:H5	5-E1	C677	1:L6	6-P1
C262	1:D7	2-P3	C360	1:F3	3-J3	C545	1:J6	5-E2	C681	1:L6	6-Q2
C264	1:C7	2-P2	C361	1:E4	3-K3	C546	1:J5	5-F1	C684	1:M6	6-Q2
C266	1:D2	2-R3	C362	1:E4	3-K3	C547	1:J5	5-F0	C687	1:L6	6-P1
C268	1:D3	2-R3	C364	1:E4	3-M3	C548	1:J5	5-F0	C690	1:L6	6-Q1
C270	1:C8	2-E3	C365	1:E4	3-N3	C549	1:J6	5-F2	C693	1:L6	6-Q1
C272	1:C8	2-D2	C366	1:D5	3-M2	C555	1:J5	5-F0	C700	1:J4	7-A8
C273	1:C9	2-C1	C367	1:E3	3-K4	C556	1:H5	5-G3	C702	1:J4	7-B8
C274	1:C8	2-E2	C368	1:E4	3-L4	C557	1:J5	5-G0	C703	1:J3	7-B8
C276	1:D8	2-B0	C369	1:E4	3-L3	C558	1:J5	5-G0	C705	1:J3	7-C7
C278	1:D8	2-C0	C371	1:F3	3-E1	C559	1:H5	5-H4	C707	1:J2	7-B5
C280	1:D9	2-F1	C385	1:F8	3-P8	C560	1:G5	5-J4	C708	1:J3	7-C5
C286	1:B8	2-F1	C386	1:F8	3-P8	C561	1:H6	5-J2	C709	1:H3	7-C5
C300	1:F8	3-C7	C387	1:F7	3-R8	C562	1:G5	5-K4	C710A	1:H3	7-P7
C302	1:F8	3-D6	C389	1:F7	3-R8	C563	1:G5	5-L2	C710B	1:J4	7-Q7
C303	1:F8	3-E7	C390	1:E4	3-M0	C564	1:G5	5-K4	C710C	1:J3	7-P7
C304	1:E8	3-E8	C400	1:N8	4-C3	C569	1:G5	5-L4	C711	1:J2	7-E7
C307	1:E8	3-E8	C401	1:N8	4-D4	C570	1:H5	5-L2	C712	1:H2	7-E7
C308	1:E8	3-E8	C402	1:N8	4-D5	C571	1:G5	5-J2	C713	1:H2	7-E7
&C309	1:F8	3-E7	C403	1:M8	4-E4	C572	1:H6	5-L2	C735	1:J2	7-A1
C310	1:E8	3-E8	C404	1:N8	4-E3	C573	1:H5	5-M4	C736	1:H2	7-B1
&C311	1:F8	3-F7	C407	1:N7	4-E5	C574	1:G6	5-M4	C740A	1:H2	7-B4
&C314	1:E8	3-G7	C408	1:K7	4-G5	C575	1:H6	5-N2	C740B	1:G2	7-B3

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C741A	1:H2	7-C4	D289	1:B2	2-K0	IC830	1:N4	8-K0	P254	1:B2	2-K9
C741B	1:G2	7-C3	D290	1:B2	2-L0	IC830	1:N4	8-D0	P256	1:B2	2-L8
C742A	1:H2	7-D4	D295	1:B2	2-L0	IC830	1:N4	8-F2	P258	1:D3	2-P8
C742B	1:H2	7-D3	D330	1:E4	3-L4	IC830	1:N4	8-D2	P260	1:D3	2-P7
C743	1:H2	7-B1	D330	1:E4	3-L3	IC840	1:M2	8-L0	P263	1:C2	2-R6
C745	1:G3	7-D1	D500	1:K5	5-N7	IC850	1:M3	8-P1	P266	1:C2	2-R5
C750	1:H4	7-R7	D501	1:K5	5-N6	IC850	1:M3	8-Q2	P268	1:C2	2-R5
C757	1:G4	7-G5	D502	1:K5	5-N6	IC850	1:M3	8-M2	P270	1:C1	2-R5
C759	1:G4	7-G4	D503	1:K5	5-N6	IC850	1:M3	8-M2	P280	1:C2	2-R4
C761	1:G3	7-J4	D504	1:K5	5-P6	IC850	1:M3	8-M0	P282	1:C2	2-R4
C762	1:G3	7-K4	D505	1:K5	5-P6				P284	1:B4	2-R4
C764	1:G3	7-J2	D610	1:N6	6-L6	L230	1:D2	2-K2	P287	1:B2	2-R0
C765	1:G3	7-J2	D610	1:N6	6-M6	L300	1:F8	3-D7	P810	1:K2	8-A5
C767	1:H3	7-K3	D640	1:L5	6-M1	L301	1:E8	3-E8	P815	1:L4	8-C4
C769	1:H3	7-M4	D640	1:L5	6-M2	L302	1:F8	3-E7	P820	1:K4	8-L8
C770	1:H3	7-M4	D645	1:M5	6-H0	&L303	1:E7	3-H7	P825	1:K4	8-L8
C772	1:G3	7-M2	D730A	1:H3	7-H1	&L304	1:E6	3-K8	P830	1:K4	8-L8
C774	1:H4	7-N2	D740A	1:H3	7-K2	&L307	1:E6	3-L8	P835	1:K4	8-L7
C776	1:H4	7-M1	D820A	1:J3	8-B7	L308	1:E6	3-M8	P840	1:K4	8-L7
C780	1:G3	7-N1	D860	1:M2	8-P0	L345	1:F5	3-E4			
C782	1:G2	7-N0	D860	1:M2	8-P0	L400	1:N8	4-D4	PIN4	1:J4	7-B8
C784	1:G3	7-Q1	D880	1:M2	8-R2	L401	1:N7	4-D3			
C786	1:G3	7-Q1	D880	1:M2	8-R2	L402	2:M7	4-F3	PL100	1:P3	1-A0
C788	1:G3	7-P0				L403	2:M8	4-F3	PL200	1:C6	2-R7
C790	1:G4	7-Q0	#H400	1:M8	4-F4	L404	1:K8	4-H4	PL210	1:C5	2-B8
C792	1:G4	7-Q0	#H401	1:J8	4-K4	L407	1:K7	4-H3	PL220	1:B5	2-H7
C810	1:L4	8-J8	#H900	1:P8	9-D5	L408	2:J7	4-K3	PL230	1:B2	2-L8
C812	1:K2	8-F4				L409	2:J8	4-K3	PL240	1:B6	2-K7
C813	1:J3	8-J5	IC210	1:C5	2-F7	L410	1:H8	4-L3	PL250	1:C8	2-C3
C814	1:L2	8-F6	IC210	1:C5	2-G7	L414	1:G8	4-L4	PL260	1:C4	2-H3
C815	1:N3	8-B1	IC210	1:C5	2-C7	L500	1:K5	5-J7	PL270	1:C2	2-L1
C816	1:N3	8-B1	IC240	1:C6	2-P7	L501	1:K5	5-J7			
C818	1:N3	8-C1	IC260	1:C7	2-N2	L502	1:K5	5-M6	Q210	1:B5	2-J8
C819	1:N3	8-C1	IC270	1:C8	2-B2	L503	1:K5	5-M6	Q220	1:B6	2-M6
C820	1:N4	8-D1	IC270	1:C8	2-F3	L504	1:K5	5-P6	Q230	1:B6	2-N6
C822	1:N3	8-D2	IC270	1:C8	2-E2	L505	1:K5	5-P6	Q240	1:C4	2-H4
C824	1:N3	8-D2	IC280	1:D8	2-E1	L540	1:H6	5-K2	Q245	1:B6	2-J4
C826	1:N3	8-D0	IC280	1:D8	2-B0	L541	1:H6	5-N2	Q250	1:C8	2-G2
C828	1:N3	8-D0	IC280	1:D8	2-D0	L543	1:G6	5-P2	Q255	1:C7	2-H2
C830	1:M4	8-K0	IC300	1:E5	3-K0	L700	1:G4	7-Q0	Q260	1:B7	2-K0
C832	1:M3	8-E2	IC300	1:E5	3-M8	L900	1:P6	9-F5	Q270	1:B8	2-K0
C833	1:M4	8-E2	IC300	1:E5	3-K0	L901	1:P6	9-F5	Q280	1:B7	2-L2
C834	1:M3	8-F1	IC300	1:E5	3-D3	L902	1:P6	9-G5	Q290	1:B7	2-M2
C836	1:M3	8-E0	IC330	1:E4	3-J3	L904	2:P8	9-D4	Q300	1:F8	3-D7
C837	1:M3	8-E0	IC330	1:E4	3-P1	L905	2:P7	9-E4	Q301	1:F7	3-J8
C838	1:N4	8-F0	IC330	1:E4	3-K3				Q302	1:E7	3-J7
C840	1:M2	8-K2	IC330	1:E4	3-M0	LINK1	1:B3	2-Q3	Q346	1:F3	3-G0
C842	1:N2	8-L0	IC330	1:E4	3-G3	LINK2	1:A4	2-Q2	Q400	1:N8	4-C4
C844	1:N3	8-L0	IC345	1:E5	3-D3				Q401	1:N7	4-D3
C846	1:N2	8-M0	IC351	1:E3	3-N0	M400	1:G8	4-L3	Q402	1:K8	4-G4
C848	1:N2	8-M0	IC351	1:E3	3-E1				Q403	1:K7	4-H3
C850	1:M2	8-N0	IC351	1:E3	3-G0	P100	1:P6	1-R8	Q500	1:J5	5-D6
C873	1:M3	8-N2	IC352	1:E3	3-H1	P160	1:P2	1-Q4	Q501	1:J5	5-E7
C876	1:M4	8-P2	IC352	1:E3	3-F1	P170	1:P2	1-R4	Q502	1:J5	5-F7
C879	1:M4	8-Q1	IC352	1:E3	3-M0	P201	1:C8	2-A9	Q503	1:K5	5-G7
C900	1:P7	9-E4	IC360	1:F8	3-Q8	P204	1:D4	2-A9	Q504	1:K5	5-J6
C901	1:P6	9-F4	IC610	1:M5	6-C6	P207	1:C5	2-A8	Q540	1:J6	5-E1
C902	1:P6	9-G4	IC630	1:N5	6-K5	P210	1:D5	2-C7	Q541	1:J5	5-E0
C903	1:P6	9-H4	IC640	1:M5	6-N5	P213	1:D3	2-A7	Q542	1:G5	5-J3
			IC640	1:M5	6-J0	P216	1:D4	2-A7	Q543	1:H6	5-J1
CV500	1:K5	5-L6	IC640	1:M5	6-G0	P219	1:D3	2-A7	Q544	1:G5	5-K3
			IC650	1:L5	6-C2	P222	1:B9	2-A6	Q545	1:G6	5-M3
%D111	1:P4	1-R1	=IC700	1:J3	7-A8	P225	1:C4	2-A4	Q546	1:G6	5-P3
%D111A	1:P5	1-Q1	IC710	1:H3	7-P7	P228	1:C4	2-A4	Q590	1:J6	5-C8
D220	1:C4	2-E4	IC710	1:H3	7-J0	P231	1:C9	2-A4	Q591	1:J6	5-C8
D220	1:C4	2-E4	IC710	1:H3	7-D7	P234	1:C4	2-A3	Q592	1:J6	5-C8
D230	1:C6	2-J5	IC710	1:H3	7-C6	P236	1:C8	2-A1	Q620	1:N6	6-P8
D230	1:C6	2-J5	IC710	1:H3	7-D6	P238	1:D8	2-A1	Q630	1:M6	6-P5
D240	1:C8	2-D2	IC710	1:H3	7-D6	P240	1:C7	2-G2	Q660	1:L5	6-N1
D240	1:C8	2-D3	IC710	1:H3	7-C6	P242	1:C4	2-G1	Q670	1:L6	6-P2
D250	1:B7	2-H1	IC740	1:H2	7-D1	P244	1:C4	2-G8	Q750	1:G4	7-G3
D260	1:B7	2-H1	IC750	1:H4	7-M3	P246	1:B5	2-H9	Q760	1:G3	7-J3
D270	1:B7	2-J1	IC750	1:H4	7-Q7	P248	1:A5	2-H9	Q770	1:H3	7-J1
D270	1:B7	2-J1	IC750	1:H4	7-H5	P249	1:A5	2-K9	Q775	1:H3	7-K3
D280	1:B7	2-K1	IC820	1:L4	8-N4	P250	1:B2	2-K9	Q780	1:H3	7-K3
D285	1:D2	2-L1	IC830	1:N4	8-F0	P252	1:B2	2-K9	Q785	1:H3	7-K2

Device	PCB	Circuit
Q790	1:H3	7-L3
Q795	1:G3	7-P0
Q810	1:K2	8-B6
Q820	1:K2	8-B6
Q840	1:K2	8-F5
Q850	1:L2	8-G5
Q860	1:K4	8-B4
Q870	1:L4	8-C3
Q880	1:L2	8-Q3
Q890	1:L4	8-H3
Q895	1:M3	8-P2
R160	1:P2	1-Q4
R201	1:C5	2-B8
R202	1:C5	2-B7
R204	1:C5	2-C9
R205	1:C5	2-C8
R207	1:C5	2-D8
&R209	1:C4	2-D8
R210	1:C5	2-D8
R211	1:C5	2-E8
R213	1:C5	2-G6
R215	1:B5	2-G9
R218	1:C5	2-G8
&R219	1:C5	2-G7
R221	1:C5	2-H7
R222	1:C5	2-H7
%R223	1:A5	2-J9
R224	1:B5	2-J8
R225	1:B5	2-J8
R227	1:B5	2-J7
R229	1:B6	2-L6
R230	1:C6	2-M5
R232	1:B5	2-M7
R233	1:B6	2-M7
R234	1:B6	2-N7
R236	1:B5	2-N7
R238	1:C6	2-R6
R239	1:C6	2-R7
R241	1:D4	2-G5
R242	1:C4	2-G4
R244	1:C4	2-G4
R245	1:C4	2-H5
R247	1:C7	2-J5
R249	1:C6	2-J4
R251	1:B7	2-L3
R252	1:C6	2-L3
R254	1:B7	2-L3
R255	1:B7	2-L3
R256	1:C6	2-M3
R258	1:C7	2-M3
R260	1:C7	2-P2
R261	1:C7	2-P3
R262	1:B4	2-P3
%R263	1:C4	2-Q3
R264	1:B8	2-B3
R265	1:B8	2-B2
R266	1:B8	2-B2
R267	1:C8	2-C3
%R268	1:C3	2-Q2
R269	1:C8	2-B1
R271	1:D8	2-A0
R272	1:D8	2-B1
R273	1:D8	2-C1
R274	1:B3	2-P3
R275	1:D8	2-C1
R276	1:B3	2-Q3
R277	1:D8	2-C0
R278	1:D8	2-D1
R279	1:B3	2-Q2
R280	1:C8	2-D3
R281	1:C8	2-D2
R282	1:C8	2-E2
R284	1:C8	2-F3
R285	1:B8	2-F2
R287	1:C8	2-F2

Device	PCB	Circuit
R288	1:B8	2-F1
R289	1:C4	2-G3
R290	1:C4	2-H4
R292	1:C7	2-G2
R293	1:B7	2-H1
R294	1:B8	2-H0
R295	1:B6	2-J1
R296	1:B7	2-K1
R297	1:B2	2-M0
R298	1:B7	2-J0
R299	1:B7	2-J0
R300	1:F8	3-D6
R301	1:E9	3-E9
R302	1:E8	3-E8
R303	1:E8	3-E8
R304	1:F7	3-G8
R307	1:F7	3-H8
R308	1:E7	3-H8
R309	1:E7	3-H7
R310	1:E7	3-J7
R311	1:F7	3-J9
&R312	1:E7	3-J8
R314	1:F7	3-J8
R315	1:E6	3-L8
R316	1:E6	3-N7
R344	1:E5	3-C3
R345	1:E5	3-C3
R347	1:F5	3-D4
&R349	1:E5	3-F4
R350	1:E5	3-D3
R351	1:F3	3-G0
R352	1:F3	3-G1
R353	1:D3	3-G1
R354	1:E3	3-H1
R355	1:E5	3-E4
R356	1:E3	3-F2
R357	1:E3	3-E2
R358	1:E3	3-H0
R359	1:E3	3-F2
R362	1:D3	3-F1
R363	1:F5	3-G3
R364	1:F4	3-G3
R365	1:D3	3-G2
R366	1:F3	3-D1
R367	1:F3	3-D1
R368	1:F4	3-H3
R369	1:F3	3-E0
R370	1:F3	3-E0
R371	1:F3	3-E0
R372	1:F4	3-H3
R373	1:E3	3-E1
R374	1:F4	3-K5
R375	1:F4	3-K5
R376	1:E3	3-J1
R377	1:E4	3-G4
R378	1:E3	3-J1
R379	1:F3	3-J3
R380	1:F3	3-J3
R381	1:F3	3-J3
R382	1:E3	3-H4
R384	1:E3	3-K4
R385	1:E4	3-K3
R387	1:E4	3-M3
R388	1:E4	3-M4
R389	1:E4	3-M4
%R390	1:D5	3-M2
R391	1:D5	3-M2
R392	1:F3	3-D2
R393	1:F3	3-D1
R394	1:F3	3-D1
R395	1:F3	3-D1
R396	1:E3	3-H1
R397	1:E3	3-H1
R400	1:N8	4-C4
R401	1:N8	4-C4
R402	1:N8	4-C4

Device	PCB	Circuit
R403	1:N7	4-D5
R404	1:N8	4-D4
R407	1:M8	4-D4
R408	1:M8	4-E3
R409	1:N7	4-E3
R410	1:N7	4-E5
R411	1:M7	4-E3
R414	1:K7	4-F5
R415	1:K8	4-G5
R416	1:K8	4-G4
R417	1:K8	4-G4
R418	1:K7	4-H5
R421	1:J8	4-H5
R422	1:J8	4-H4
R423	1:J8	4-J3
R424	1:J7	4-J4
R425	1:J7	4-J3
R428	1:G8	4-K5
R429	1:G8	4-K4
R430	1:G8	4-L4
R431	1:G8	4-L3
R500	1:J5	5-D8
R501	1:J5	5-D7
R502	1:J5	5-E6
R503	1:J5	5-F8
R505	1:J5	5-G7
&R506	1:J4	5-G8
&R507	1:J4	5-G8
R508	1:K5	5-H7
R509	1:J5	5-H6
R511	1:J5	5-F6
&R516	1:J5	5-J6
R517	1:J5	5-K6
R518	1:J5	5-K5
R520	1:K4	5-Q6
R540	1:J5	5-E0
R541	1:J6	5-E3
R542	1:H6	5-E3
R543	1:J6	5-E2
R544	1:J5	5-E1
R545	1:J5	5-E0
R546	1:H6	5-E1
R547	1:J6	5-E2
R548	1:J6	5-E2
R549	1:J5	5-E1
R550	1:J5	5-E0
R554	1:H5	5-F3
R556	1:J6	5-F2
R557	1:H5	5-G2
R558	1:H6	5-G2
R559	1:H6	5-G2
R560	1:G5	5-H4
R561	1:G5	5-J4
R562	1:G5	5-J2
R563	1:G5	5-K2
R564	1:G5	5-K4
R571	1:G5	5-L4
R572	1:H6	5-M2
R573	1:H6	5-M2
R574	1:H6	5-M2
R575	1:G5	5-M4
R576	1:G5	5-M2
R577	1:G6	5-P2
R578	1:G5	5-P4
R579	1:G6	5-P2
R580	1:H6	5-N2
R585	1:G6	5-P4
R586	1:G6	5-P2
R590	1:J6	5-B8
R591	1:J6	5-C8
R592	1:J6	5-C7
R615	1:M5	6-B6
R617	1:M5	6-D5
R619	1:N6	6-L8
R621	1:N6	6-L8
R625	1:N6	6-L7

Device	PCB	Circuit
R629	1:M6	6-P6
R633	1:M5	6-Q8
R636	1:M5	6-K6
R637	1:N5	6-K5
R640	1:M5	6-G0
R641	1:N5	6-L4
R645	1:N5	6-L5
R649	1:M5	6-M5
R653	1:M5	6-Q4
R681	1:L5	6-L2
R685	1:L5	6-N2
R689	1:L6	6-Q3
R693	1:L5	6-P1
R696	1:L6	6-P1
R701	1:J4	7-A9
R702	1:J4	7-B9
R703	1:H4	7-B8
R706	1:J3	7-C6
R707	1:J3	7-C7
R708	1:J2	7-D7
R709	1:J2	7-E7
R710	1:J3	7-B6
R711	1:J3	7-C6
R712	1:J3	7-P8
R730	1:J2	7-A2
R731	1:J2	7-A2
R732	1:J2	7-A2
R742	1:G2	7-C4
R743	1:H2	7-C4
R744	1:G2	7-D4
R746	1:H2	7-D4
R747	1:H3	7-D4
R748	1:J2	7-A1
R749	1:H2	7-B1
R750	1:H4	7-Q8
R752	1:G4	7-F5
R753	1:G4	7-F3
R754	1:G3	7-F3
R756	1:G3	7-G5
R757	1:G4	7-H4
R758	1:H3	7-J4
R759	1:H3	7-J4
R760	1:H3	7-K4
R762	1:H3	7-K4
R763	1:H3	7-L4
R765	1:H3	7-J2
R766	1:G3	7-J3
R767	1:H3	7-K2
R769	1:H3	7-K3
R771	1:H4	7-L3
R772	1:G3	7-L2
R774	1:H3	7-L2
R775	1:H3	7-M2
R784	1:G3	7-P1
R785	1:G3	7-P1
R786	1:G3	7-Q1
R787	1:G3	7-Q1
R790	1:G3	7-P0
R791	1:G4	7-P0
R793	1:G3	7-P0
R794	1:G3	7-P1
R804	1:J3	8-B7
R805	1:J3	8-B7
R808	1:K2	8-A6
R809	1:K2	8-B6
R810	1:L2	8-C6
R811	1:L2	8-C6
R812	1:K2	8-B6
R813	1:K2	8-B5
R815	1:K2	8-F4
R816	1:K2	8-F4
R818	1:K2	8-G5
R819	1:L2	8-G4
R820	1:K4	8-B4
R821	1:L4	8-B4
R822	1:L4	8-C3

Device	PCB	Circuit
R823	1:L4	8-D3
R824	1:K4	8-L8
R825	1:K4	8-L8
R826	1:K4	8-L8
R827	1:K4	8-L7
R828	1:K4	8-L7
R829	1:K4	8-Q9
R830	1:K3	8-Q9
R831	1:K3	8-Q9
R832	1:K3	8-Q8
R833	1:K3	8-Q8
R835	1:K3	8-Q8
R836	1:K3	8-Q8
R837	1:K3	8-Q7
R838	1:L4	8-K6
R839	1:L4	8-L6
R840	1:K3	8-Q7
R841	1:K3	8-Q7
R842	1:K3	8-Q6
R843	1:K3	8-Q6
R844	1:L2	8-R3
R845	1:L2	8-R3
R846	1:L4	8-L6
R847	1:L4	8-L6
R848	1:L4	8-R5
R852	1:L2	8-G6
R853	1:L2	8-F6
R854	1:N3	8-C2
R855	1:N3	8-C1
R856	1:N3	8-C1
R857	1:N4	8-D1
R858	1:N3	8-C0
R859	1:N3	8-D0
R860	1:N3	8-D0
R861	1:M3	8-D0
R863	1:N3	8-D1
R865	1:M3	8-E2
R866	1:M3	8-F1
R867	1:M3	8-F2
R868	1:N4	8-E0
R869	1:M3	8-E0
R870	1:M3	8-E0
R871	1:N3	8-F0
R872	1:N4	8-F0
R873	1:N4	8-G0
R875	1:M4	8-F2
R876	1:M3	8-K1
R877	1:M2	8-K1
R878	1:M2	8-K0
R879	1:M2	8-K0
R881	1:L4	8-H3
R882	1:M4	8-H3
R884	1:M3	8-N3
R885	1:M3	8-N2
R886	1:M3	8-P3
R887	1:M3	8-P3
R888	1:M3	8-P2
R889	1:M3	8-N1
R890	1:M3	8-P1
R891	1:M2	8-P1
R892	1:M2	8-P0
R894	1:M2	8-Q1
R895	1:M2	8-Q1
R897	1:M2	8-Q2
R898	1:M2	8-Q2
R900	1:P6	9-H4
RL210	1:C2	2-Q4
RL210	1:C2	2-K1
RL210	1:C2	2-Q5
RV205	1:B5	2-M7
RV210	1:B7	2-K3
RV220	1:D4	2-G5
RV230	1:B8	2-B2
RV235	1:D9	2-C0
RV345	1:F3	3-E0
RV346	1:F3	3-J3
SHLD610	1:L6	6-J3
SK805	1:K3	8-Q9
SK805	1:K3	8-Q6
SK805	1:K3	8-Q9
SK805	1:K3	8-Q7
SK805	1:K3	8-Q6
SK805	1:K3	8-Q9
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK805	1:K3	8-Q6
SK805	1:K3	8-Q8
SK805	1:K3	8-Q6
SK805	1:K3	8-Q8
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK805	1:K3	8-Q7
SK805	1:K3	8-Q5
SK810	1:L3	8-H5
SL210	1:C8	2-E2
SL220	1:C8	2-D2
SW201	1:B4	2-A6
T210	1:C3	2-Q2
T540	1:G6	5-P2
T610	1:L6	6-N2
&TL500	1:K6	5-K6
TP202	1:C8	2-D9
TP211	1:D3	2-P8
TP300	1:F8	3-C8
TP301	1:E8	3-E7
TP345	1:E4	3-M4
TP400	1:G8	4-M4
TP401	2:G6	4-M5
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
X300	1:E6	3-M7
&XF300A	1:E8	3-F7
&XF300B	1:E8	3-G7
&XF302	1:E6	3-L8

Device	PCB	Circuit

Device	PCB	Circuit

Part C T881 Transmitter

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 Initial Adjustment manual)
5	Fault Finding (not available for Initial Adjustment manual)
6	PCB Information

1 T881 General Information

This section provides a brief description of the T881 transmitter, along with detailed specifications and a list of types available.

The following topics are covered in this section.

1.1 Introduction

The T881 is a synthesised, microprocessor controlled FM base station transmitter designed for single or multichannel operation in the 800 to 960MHz frequency range[1] with a standard power output of 5W. The RF section of the transmitter comprises a frequency synthesiser which provides 100mW of frequency modulated RF drive to a 5W RF power module. A thermal shutdown feature is provided in the T881 in case operating temperatures exceed acceptable levels.

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 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 T881 is 60mm wide 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 800-960MHz frequency range, the T881 has 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 specification. 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 .. 1.8A
- Standby .. 160mA

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	..	800-960MHz (refer to Section 1.4)
Modulation Type	..	FM
Frequency Increment	..	5 or 6.25kHz
Switching Range	..	8MHz (i.e. ±4MHz from the centre frequency)
Load Impedance	..	50 ohms
Frequency Stability	..	±1ppm, -20°C to +60°C
(see also Section 1.4)	..	±1.5ppm, -30°C to +60°C

Adjacent Channel Power (full deviation):

Wide Bandwidth (WB) (±25kHz/15kHz B/W)	..	-75dBc
Narrow Bandwidth (NB) (±12.5kHz/7.5kHz B/W)	..	-65dBc

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

At ±25kHz	..	-88dBc
At ±1MHz	..	-100dBc

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)
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 3.2GHz
Standby	..	-57dBm to 1GHz -47dBm 1GHz to 3.2GHz
Conducted Spurious Emissions:		
Transmit	..	-36dBm to 1GHz -30dBm 1GHz to 3.2GHz
Standby	..	-57dBm to 1GHz -47dBm 1GHz to 3.2GHz
Power Output:		
Rated Power	..	5W
Range Of Adjustment	..	1-5W
Duty Cycle	..	100% @ 5W 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	..	-48dB (300Hz to 3kHz [EIA]) typical
Narrow Bandwidth	..	-48dB (CEPT) typical
Compressor (optional):		
Attack Time	..	10ms
Decay Time	..	800ms
Range	..	50dB

1.2.4.3 CTCSS

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

1.2.5 Microcontroller

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

1.2.6 Test Standards

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

1.2.6.1 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.

1.2.6.2 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 T880 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T880 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:

T88X-XX-XXXX
- T885 receiver
- T881 5W transmitter
- T889 70W 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:

T88X-**X**X-XXXX
- '1' for 800-870MHz
- '2' for 860-910MHz
- '3' for 890-960MHz

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

T88X-X**X**-XXXX
- '0' for wide bandwidth (25kHz)
- '5' for narrow bandwidth (12.5kHz)

Options

T88X-XX-**XXXX**

The Options group uses four digits and/or letters to indicate any options that may be fitted to the product. This includes standard options and special options for specific customers. '0000' indicates a standard Tait product with no options fitted. The large number of options precludes listing them here.

1.4 T881 Standard Product Range

The following table lists the range of standard T881 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)		800-870	
Deviation (kHz)		2.5	5
TCXO	±1ppm -20°C to +60°C ±1.5ppm -30°C to +60°C	•	•
Transmitter Type: T881-		15-0000	10-0000

Frequency Range (MHz)		860-910	
Deviation (kHz)		2.5	5
TCXO	±1ppm -20°C to +60°C ±1.5ppm -30°C to +60°C	•	•
Transmitter Type: T881-		25-0000	20-0000

Frequency Range (MHz)		890-960	
Deviation (kHz)		2.5	5
TXCO	±1ppm -20° to +60°C ±1.5ppm -30°C to +60°C	•	•
Transmitter Type: T881-		35-0000	30-0000

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).

2 T881 Circuit Operation

This section provides a basic description of the circuit operation of the T881 transmitter.

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 following topics are covered in this section.

2.1 Introduction

The individual circuit blocks which make up the T881 are:

- synthesiser
- VCO
- audio processor
- power amplifier (RF power module)
- 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. Refer to the circuit diagrams in Section 6.2 for more detail.

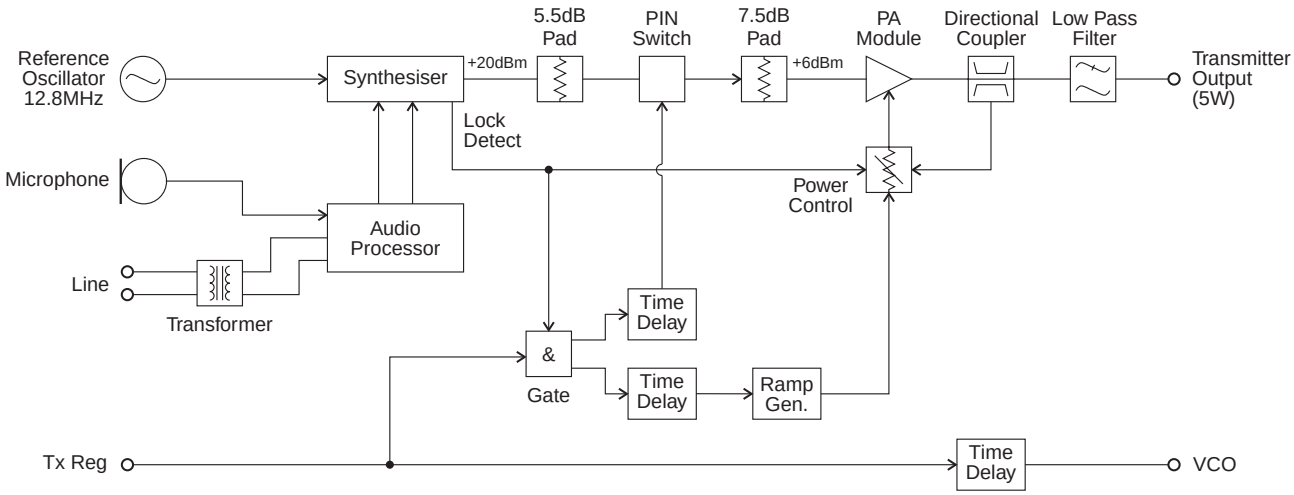


Figure 2.1 T881 High Level Block Diagram

2.2 Microcontroller

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

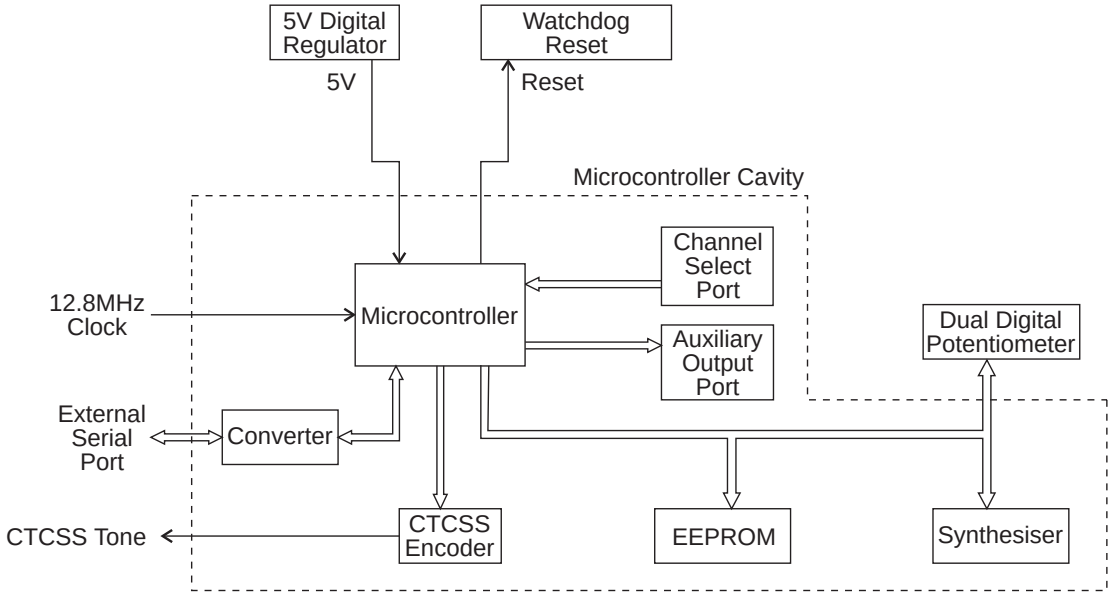


Figure 2.2 T881 Microcontroller Block Diagram

Overall system control of the T881 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) and the VCO circuit diagram (sheet 3) in Section 6.2.)

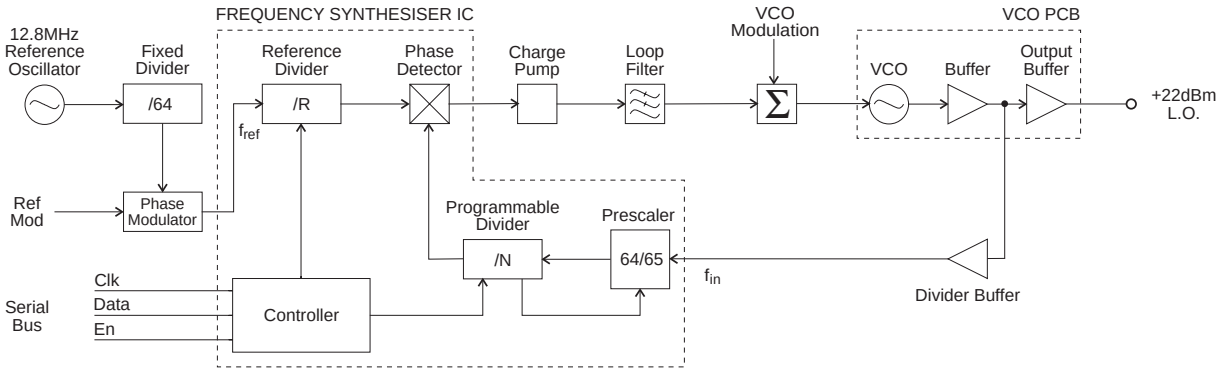


Figure 2.3 T881 Synthesiser Block Diagram

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 13 & 12, Q710, Q720). This produces a ramping waveform which is centred around a DC level determined by the incoming audio. IC720 pins 10 & 11 perform as a comparator, ultimately producing a phase-modulated 200kHz square wave. This is followed by another phase shifting stage (IC720 pins 8 & 9, 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, Q790) 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 2.4 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 2.4.

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.

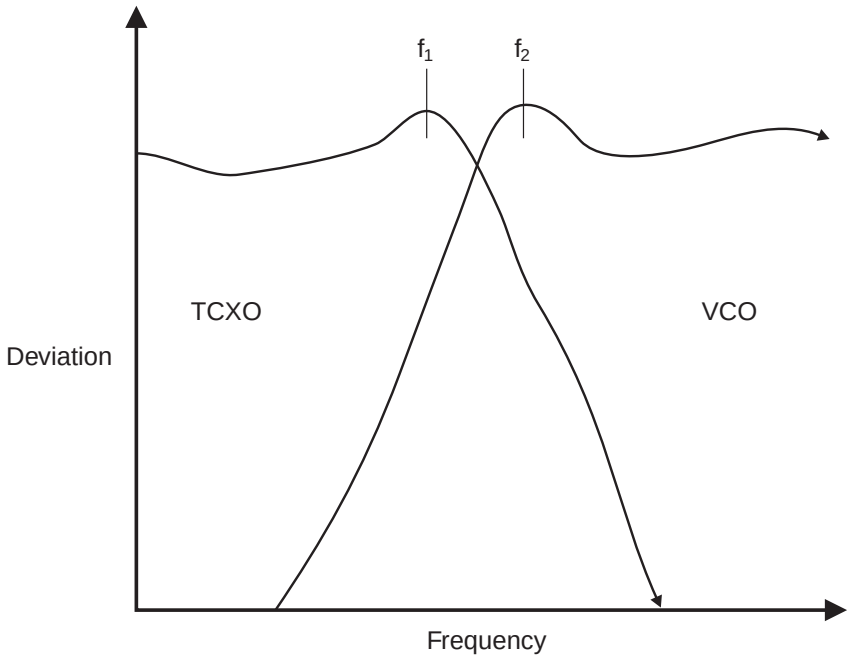


Figure 2.4 T881 Two Point Modulation

2.4 VCO

(Refer to the VCO circuit diagram (sheet 3) in Section 6.2.)

The VCO comprises the oscillator and three stages of buffer and gain to achieve the required power level and reverse isolation at the output of the VCO.

The oscillator transistor (Q309) operates in a common-base configuration, utilising a quarter-wave square ceramic resonator coupled between its collector and emitter to provide the feedback necessary for oscillation. The VCO control voltage from the loop filter (IC750) is applied to the varicaps (D300-D302) to facilitate tuning within an 8MHz band of frequencies. A high-Q sapphire trimcap (CV300) is used for coarse tuning of the VCO. The typical output power at the oscillator stage is 0dBm.

The output from the oscillator drives a cascode amplifier stage (Q302, Q303) which is designed to provide good reverse isolation from variable impedances of the following stages. The isolation of the circuit is typically 40dB, including 0-3dB of associated gain. An attenuated sample of the cascode output (Q302) is fed back to the synthesiser (IC640) through a divider buffer (Q795) for phase-locking.

Following the buffer is a broadband MMIC amplifier (Q308) which functions as a gain block to provide the drive to the final power stage (Q319). This stage typically provides approximately 11dB of gain.

The final stage of the VCO is a power amplification stage. The power transistor (Q319) and its associated circuitry increases the output power of the VCO to approximately +20dBm. The output power is then attenuated to +6dBm (approximately), which is the input level required to drive the RF power module.

Note: This power stage (Q319) is retained in the T881 transmitter to keep the VCO architecture the same as the T885 receiver, which does require a +20dBm output.

The VCO is an on-channel design, i.e. there are no multiplier stages to obtain the on-channel frequency. It 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 and cascode amplifier are supplied from one +9V switched supply by Q321 via the C multiplier (Q316, C365).

The MMIC and final amplifier are supplied from the other +9V supply by Q314.

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 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.)

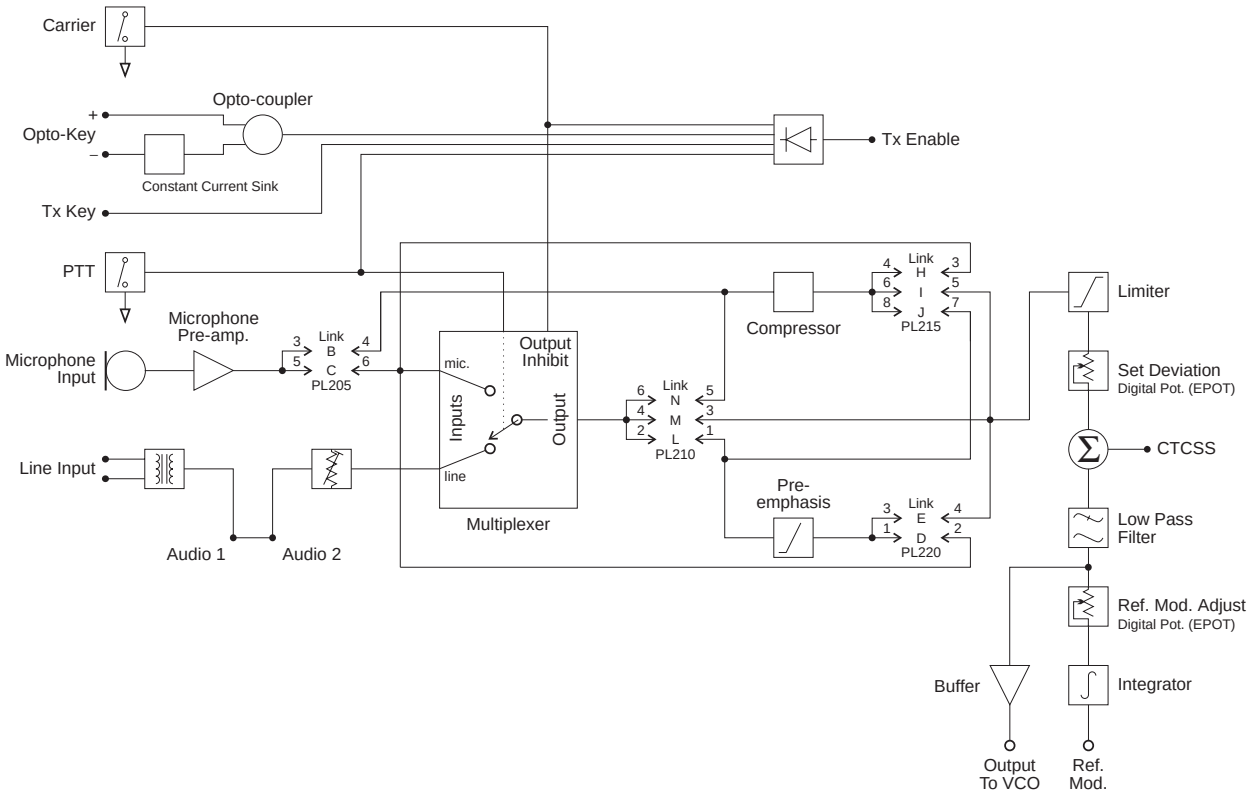


Figure 2.5 T881 Audio Processor Block Diagram

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 summed 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.)

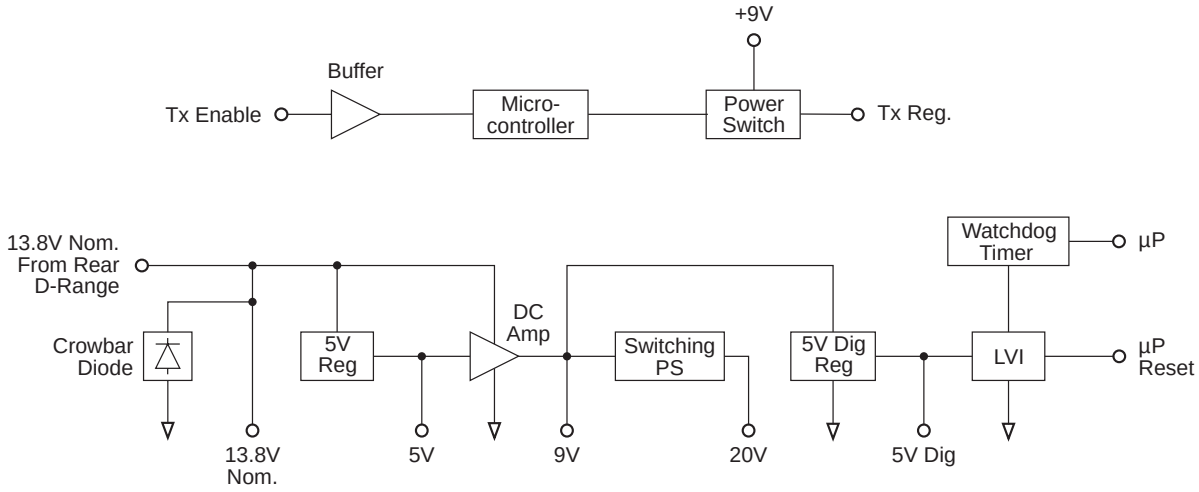


Figure 2.6 T881 Power Supply & Regulators Block Diagram

The T881 is 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. The T881 has a regulator (IC370) which produces 9V for use in the exciter and audio circuits.

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.

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 2.7):

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.

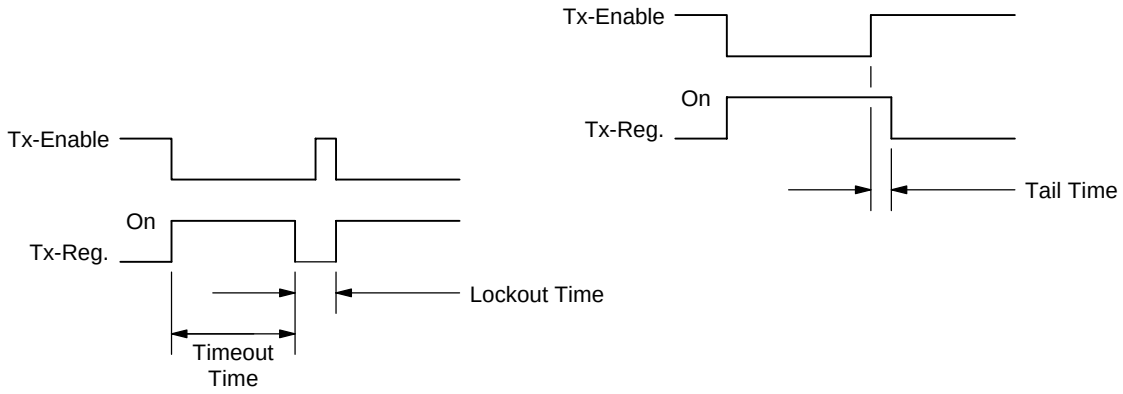


Figure 2.7 T881 Transmit Timers

2.8 Power Control Circuit & PA

(Refer to Figure 2.1 and the power control and PA circuit diagrams (sheets 5 & 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 bias pin of the RF power module (#IC400 pin 2). The forward and reverse RF power levels are sensed via a dual directional coupler and detector diodes (D400, D402 in the PA cavity). The detected DC signals are buffered (IC500 pins 3 & 5), summed with a very small bias current and then fed to the control integrator op-amp (IC510 pin 9). The purpose of the small bias current (provided by R559) is to raise the voltage potential slightly at the summed node. This is necessary to ensure the output voltage at IC510 pin 8 is zero when the transmitter is not keyed on.

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

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 RF power module. This is achieved by a PIN diode switch (D308). There is a 5.5dB (R370, R372, R383) and a 7.5dB (R390, R391, R392) pi-attenuator at the input and output of the PIN switch to attenuate the level of the VCO output and also provide good isolation between the VCO and RF power module. A level shifter is also implemented to enhance the transient performance by improving the dynamic range of the module bias voltage.

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

- Q505, Q508, IC510 — trapezoidal power ramping generator
- Q500, Q501 — Tx-Reg. and $\overline{\text{Lock-Detect}}$ gate
- Q502, Q506, Q510, Q512, Q513 — PIN switch drive plus delay
- Q507, Q511, Q515 — level shifter plus delay.

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

A temperature sensor (R450) is mounted on the input flange of the RF power module to monitor the flange operating temperature. When a pre-determined temperature threshold is exceeded, a protection circuit (IC510 pin 7, Q516) switches on to reduce the RF output power to a preset level. The purpose of the protection circuit is to prevent overheating, as the RF power module is rated for a maximum flange temperature of 100°C.

The RF power module is a 5W device which requires an input drive of approximately +6dBm. L402 and C430 are provided to match the impedance of the output low pass filter to the impedance of the module. A DC control signal is applied to the RF signal path via %L405 if cyclic keying is required with a Tait power amplifier.

3 T881 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.**

Note: To ensure that the T881 will continue to meet its performance specifications, you must tighten the bottom cover screws to the correct torque, and in the correct order, as described in Section 2.4 in Part A.

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
- 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.

3.1 Introduction

When you receive your T881 transmitter 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. ±4MHz from the factory programmed frequency), you should only need to reprogram the transmitter 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 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's EEPROM memory (IC820) by using the PGM800Win software package and an IBM™ PC. You can also use PGM800Win to select the transmitter's current operating frequency (or "default channel").

If the transmitter 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 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 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)
- 30dB pad

} or RF test set (optional)

- T800-01-0010 calibration test unit (optional)

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

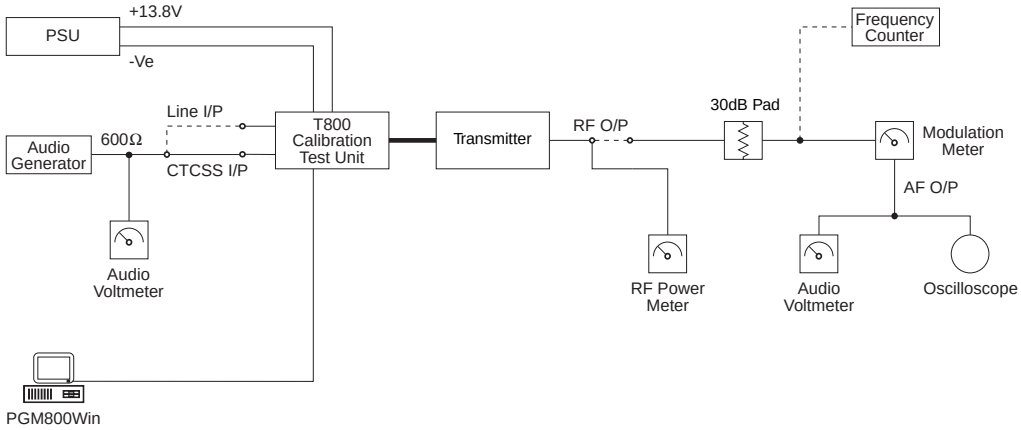


Figure 3.1 T881 Test Equipment Set-up With T800-01-0010

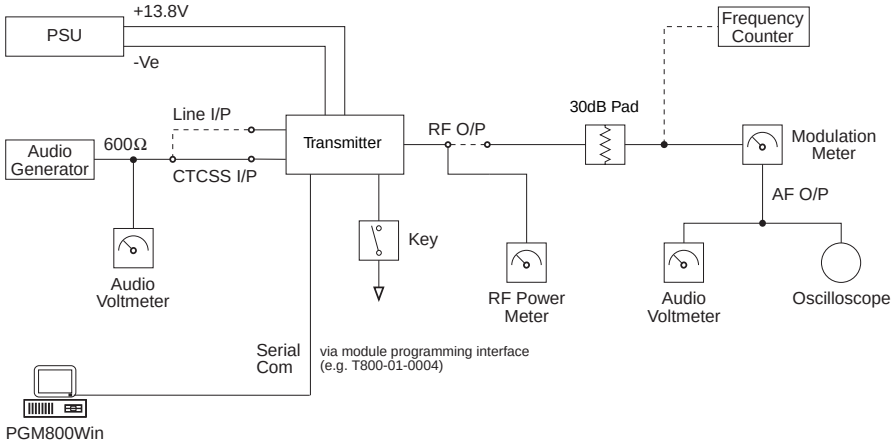


Figure 3.2 T881 Test Equipment Set-up Without T800-01-0010

3.4 Short Tuning Procedure

Use this procedure only if you want to reprogram the T881 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 TP300 (control voltage) in the VCO (this measures the synthesiser loop voltage).
- Key the transmitter by earthing the Tx-Key line.
- **Single Channel** Tune VCO trimmer CV300 for a synthesiser loop voltage of 10V.

  Multichannel Tune VCO trimmer CV300 for a synthesiser loop voltage of 10V on the middle channel.

  If there is no middle channel, tune CV300 so that the channels are symmetrically placed around a loop voltage of 10V.

  All channels should lie within the upper and lower limits of 16V and 3V 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

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

Adjust RV502 (power control) for the required output power (between 1 and 5W).

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" option[1] 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 300Hz 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 ±3kHz [±1.5kHz] deviation at 300Hz.

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 ±3kHz [±1.5kHz] deviation (you can use either the mouse or up and down arrow keys).

4. Change the input frequency back to 300Hz.

   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 ±1dB relative to 150Hz from 67 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 T881 with the front panel "Carrier" switch.

Adjust RV805 (CTCSS level adjust) to give ±500Hz [±250Hz] deviation.

Set the maximum deviation as per Section 3.4.6.

3.4.6 FM Deviation (Limiter) Adjustment

Note: If the T881 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 ±4.7kHz [±2.3kHz] (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 ±4.7kHz [±2.3kHz]. 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 ±3kHz [±1.5kHz] 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 T881 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 TP300 (control voltage) in the VCO (this measures the synthesiser loop voltage).

- Key the transmitter by earthing the Tx-Key line.

  Single Channel Tune VCO trimmer CV300 for a synthesiser loop voltage of 10V.

  Multichannel Tune VCO trimmer CV300 for a synthesiser loop voltage of 10V on the middle channel.

  If there is no middle channel, tune CV300 so that the channels are symmetrically placed around a loop voltage of 10V.

  All channels should lie within the upper and lower limits of 16V and 3V respectively.

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

  Measure the transmitter output frequency and adjust the TCXO (=IC700) trimmer if required.

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

3.7 PA Alignment

Connect an RF power meter to the PA output (use an appropriate attenuator as necessary).

Key the transmitter by earthing the Tx-Key line.

Adjust RV502 (power control) to 5W.

3.8 Thermal Shutdown

Key the transmitter by earthing the Tx-Key line and set the output power to 5W as described in Section 3.7.

Short L450 to ground.

Set RV501 (shutdown power level) for an output power of 1W.

3.9 Audio Processor & CTCSS

3.9.1 Two Point Modulation

The T881 utilises 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. $\Delta F > \pm 4MHz$).

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" option[1] 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 300Hz 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 ±3kHz [±1.5kHz] deviation at 300Hz.

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 ±3kHz [±1.5kHz] 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 300Hz.

   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 ±1dB relative to 150Hz from 67 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 T881 with the front panel "Carrier" switch.

Adjust RV805 (CTCSS level adjust) to give ±500Hz [±250Hz] deviation.

Set the maximum deviation as per Section 3.9.4.

3.9.4 Limiter Adjustment

Note: If the T881 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 ±4.7kHz [±2.3kHz] (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 ±4.7kHz [±2.3kHz]. 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 ±3kHz [±1.5kHz] 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 ±3kHz deviation [±1.5kHz] is still available.

Slowly increase the audio input level until the demodulated waveform shows significant signs of clipping (approximately ±4.5kHz [±2.3kHz] deviation).

Adjust RV220 anticlockwise until the demodulated waveform is just clipping (approximately ±4kHz [±2kHz] 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 ±4.5kHz [±2.3kHz] deviation).

Adjust RV220 anticlockwise until the demodulated waveform is just clipping (approximately ±4kHz [±2kHz] 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 ±4kHz [±2kHz] deviation is produced. The modulated waveform should be basically sinusoidal.

Speak into the microphone, checking that the modulation peaks reach about ±5kHz [±2.5kHz] 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 T881 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.**

Note: To ensure that the T881 will continue to meet its performance specifications, you must tighten the bottom cover screws to the correct torque, and in the correct order, as described in Section 2.4 in Part A.

This section provides the following information on the T881 transmitter:

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

6.1 Introduction

Product Type Identification

You can identify the transmitter 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 T881-10-XXXX.

PRODUCT TYPE			
■	-10	▮ ▮	-15
▮ ▮	-20	▮ ▮	-25
▮ ▮	-30	▮ ▮	-35

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.

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.

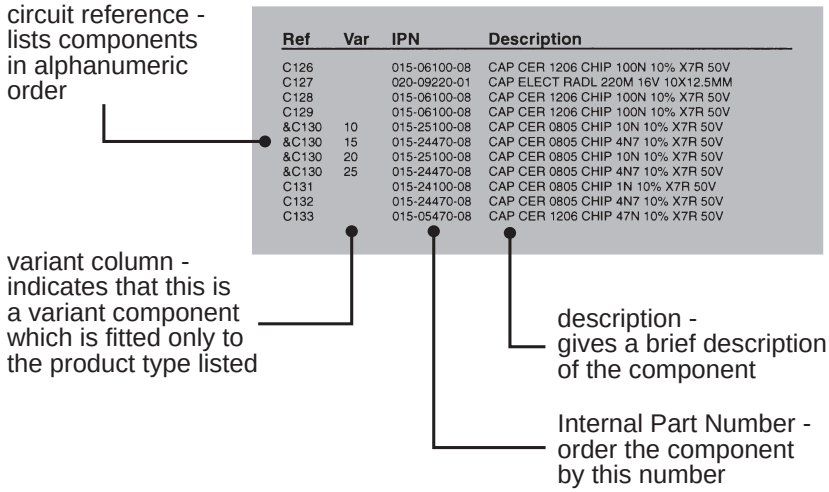
Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

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).

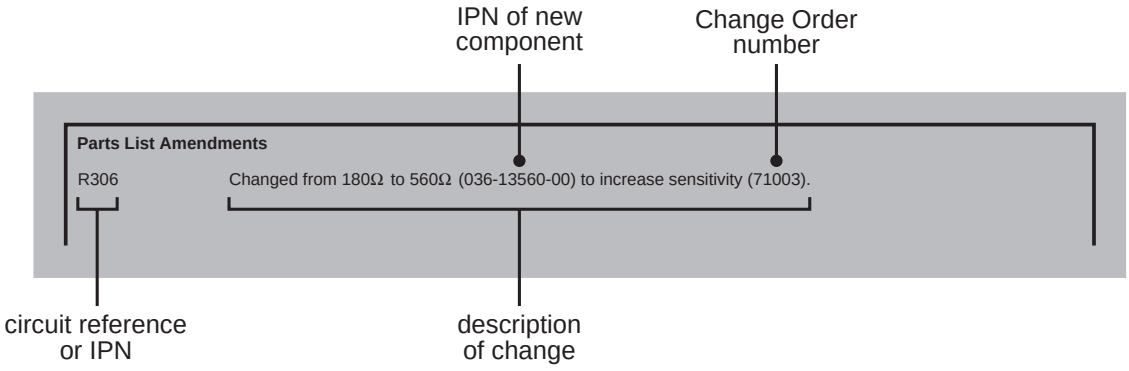
Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:



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.



Variant Components

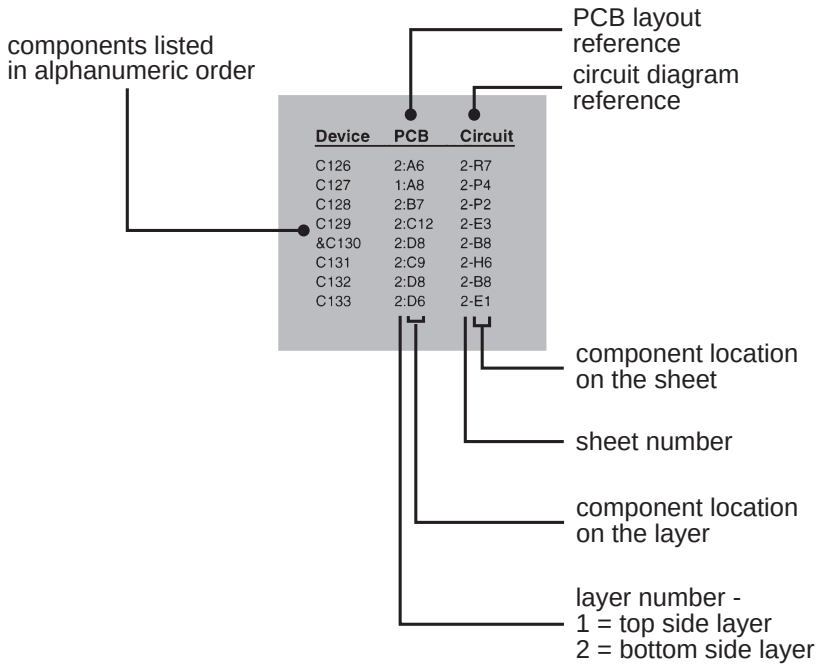
A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term "variant" is also used to describe components unplaced in one product. Variant components have a character prefix, such as "&",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

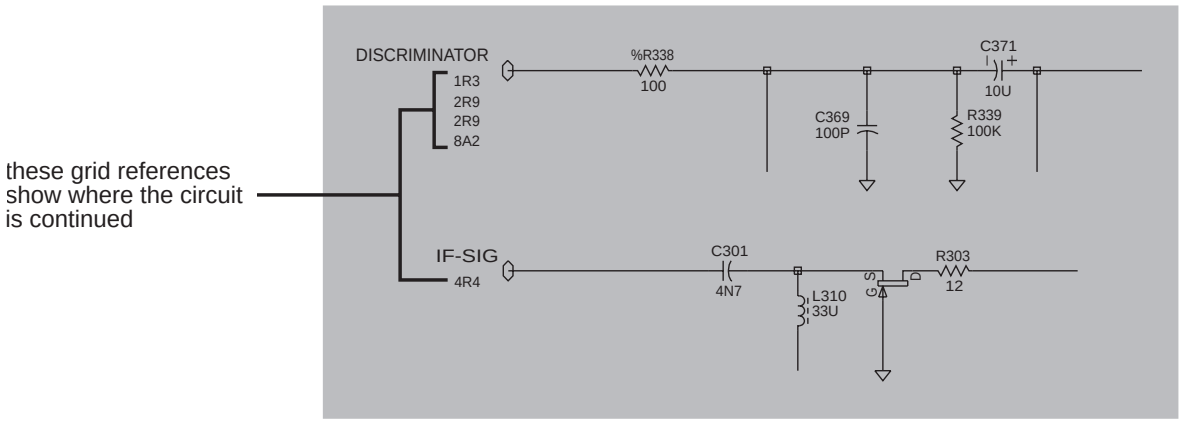
This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:



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 T881 Transmitter PCB

This section contains the following information.

T881 Parts List (IPN 220-01575-02)

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

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.

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).

Ref	Var	IPN	Description
C201		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C202		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C204		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C205		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C207		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C209		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C210		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C211		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C213		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C215		014-08220-01	(L)CAP TANT 22UF10V276MSER
C217		015-24220-08	CAP CER 0805 2N2 10% X7R 50V
C219		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C221		014-08220-01	(L)CAP TANT 22UF10V276MSER
C223		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C225		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C227		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C229		015-22180-05	CAP 0805 18P 1% 200V
C230		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C232		015-22180-05	CAP 0805 18P 1% 200V
C233		016-08470-01	CAP EL SMD 6*4 47UF 16V
C235		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C237		014-07100-02	CAP TANT CHIP 1U0 3.2 X 1.6MM
C239		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C240		015-22180-05	CAP 0805 18P 1% 200V
C241		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C242		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C243		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C245		015-22180-05	CAP 0805 18P 1% 200V
C247		015-22180-05	CAP 0805 18P 1% 200V
C249		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C251		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C253		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C255		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C257		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C259		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C260		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C261		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C263		016-09100-05	CAP SMD ELECT 100U 25V 20%
C265		016-07470-06	CAP SMD ELECT BI-P 4U7 50V 20%
C267		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
&C269	10	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C269	15	015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
&C269	20	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C269	25	015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
&C269	30	015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
&C269	35	015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
&C271	10	015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C271	15	015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C271	20	015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C271	25	015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C271	30	015-22470-01	CAP CER 0805 47P 5% NPO 50V
&C271	35	015-22470-01	CAP CER 0805 47P 5% NPO 50V
C273		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C275		015-22180-05	CAP 0805 18P 1% 200V
C277		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C279		015-23820-08	CAP CER 0805 820P 10% X7R 50V
C281		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C283		015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
C285		015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
C287		016-09100-05	CAP SMD ELECT 100U 25V 20%
&C289	10	015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C289	15	015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C289	20	015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C289	25	015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C289	30	015-25470-08	CAP CER 0805 47N 10% X7R 50V
&C289	35	015-25470-08	CAP CER 0805 47N 10% X7R 50V
C291		014-08220-01	(L)CAP TANT 22UF10V276MSER
C293		015-27100-10	CAP CER 0805 1M+80-20% Y5V 16V
%C294		015-22470-01	CAP CER 0805 47P 5% NPO 50V
%C295		013-06470-00	CAP SMD POLYESTER 470N 63V 10%
C300		015-22180-05	CAP 0805 18P 1% 200V
C301		015-22180-05	CAP 0805 18P 1% 200V
C302		015-22180-05	CAP 0805 18P 1% 200V
C303		015-22180-05	CAP 0805 18P 1% 200V
C304		014-08220-01	(L)CAP TANT 22UF10V276MSER
C305		015-22180-05	CAP 0805 18P 1% 200V
C306		014-08220-01	(L)CAP TANT 22UF10V276MSER
C307		015-22180-05	CAP 0805 18P 1% 200V
%C308		014-08220-01	(L)CAP TANT 22UF10V276MSER
C309		015-22180-05	CAP 0805 18P 1% 200V
%C310		014-08220-01	(L)CAP TANT 22UF10V276MSER
C311		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C315		015-22180-05	CAP 0805 18P 1% 200V
C316		015-22180-05	CAP 0805 18P 1% 200V
C317		015-22180-05	CAP 0805 18P 1% 200V
C318		015-22180-05	CAP 0805 18P 1% 200V
C319		015-22180-05	CAP 0805 18P 1% 200V
C321		015-22180-05	CAP 0805 18P 1% 200V
C322		015-22180-05	CAP 0805 18P 1% 200V
C323		015-22180-05	CAP 0805 18P 1% 200V
C324		015-22180-05	CAP 0805 18P 1% 200V
C325		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C326		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C328		015-22180-05	CAP 0805 18P 1% 200V
C329		014-08220-01	(L)CAP TANT 22UF10V276MSER
C330		015-22330-01	CAP CER 0805 33P 5% NPO 50V
C331		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C332		015-22180-05	CAP 0805 18P 1% 200V
C335		015-22180-05	CAP 0805 18P 1% 200V
C336		015-25330-08	CAP CER 0805 CHIP 33NF
C337		015-22180-05	CAP 0805 18P 1% 200V
C338		015-22180-05	CAP 0805 18P 1% 200V
C339		015-25330-08	CAP CER 0805 CHIP 33NF
C340		015-22180-05	CAP 0805 18P 1% 200V
C342		015-23330-08	CAP CER 0805 330P 10% X7R 50V
C343		015-21180-05	CAP CER 0805 1P8 +-0.1 200V
C345		015-22180-05	CAP 0805 18P 1% 200V
C346		015-21100-05	CAP CER 0805 1P0 +-0.1PF 200V
C347		015-20075-05	CAP CER 0805 CHIP OP75+-0.1PF
C349		015-22180-05	CAP 0805 18P 1% 200V
C350		015-22180-05	CAP 0805 18P 1% 200V
C351		015-22180-05	CAP 0805 18P 1% 200V
C352		015-22180-05	CAP 0805 18P 1% 200V
C353		015-22180-05	CAP 0805 18P 1% 200V
C356		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C357		015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
C359		015-22180-05	CAP 0805 18P 1% 200V
C360		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C361		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C363		015-22180-05	CAP 0805 18P 1% 200V
C364		015-22180-05	CAP 0805 18P 1% 200V
C365		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C366		015-22180-05	CAP 0805 18P 1% 200V
C367		015-22180-05	CAP 0805 18P 1% 200V
C368		015-22180-05	CAP 0805 18P 1% 200V
C370		015-22180-05	CAP 0805 18P 1% 200V
C371		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C372		015-22180-05	CAP 0805 18P 1% 200V
C373		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C374		015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
C375		015-21470-05	CAP CER 0805 4P7+-0.1PF 200V
C377		015-22180-05	CAP 0805 18P 1% 200V
C378		015-22180-05	CAP 0805 18P 1% 200V
C379		015-22180-05	CAP 0805 18P 1% 200V
C380		015-22180-05	CAP 0805 18P 1% 200V
C381		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C382		015-22180-05	CAP 0805 18P 1% 200V
C383		014-08220-01	(L)CAP TANT 22UF10V276MSER
C384		015-22180-05	CAP 0805 18P 1% 200V
C385		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C386		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C387		015-22120-05	CAP 0805 12P 1% 200V
C388		015-22180-05	CAP 0805 18P 1% 200V
C389		015-22180-05	CAP 0805 18P 1% 200V
C390		015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
C391		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C392		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C393		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C394		015-22180-05	CAP 0805 18P 1% 200V
C395		015-22180-05	CAP 0805 18P 1% 200V
C396		015-22180-05	CAP 0805 18P 1% 200V
C397		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C398		015-22180-05	CAP 0805 18P 1% 200V
C399		015-21150-05	CAP CER 0805 CHIP 1P5+0.1PF 2
C400		015-22180-05	CAP 0805 18P 1% 200V
C401		015-22180-05	CAP 0805 18P 1% 200V
C402		014-18220-02	L)CAP TANT SMD 22U 20% 35V
C403		015-22180-05	CAP 0805 18P 1% 200V
C404		015-22180-05	CAP 0805 18P 1% 200V
C406		015-22180-05	CAP 0805 18P 1% 200V
C407		015-22180-05	CAP 0805 18P 1% 200V
C408		015-22180-05	CAP 0805 18P 1% 200V
C409		015-22180-05	CAP 0805 18P 1% 200V
C410		015-22180-05	CAP 0805 18P 1% 200V
C411		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C412		015-22180-05	CAP 0805 18P 1% 200V
C413		015-22180-05	CAP 0805 18P 1% 200V
C415		015-22180-05	CAP 0805 18P 1% 200V
C416		015-22180-05	CAP 0805 18P 1% 200V
C417		015-22180-05	CAP 0805 18P 1% 200V
C418		015-22180-05	CAP 0805 18P 1% 200V
C419		015-22180-05	CAP 0805 18P 1% 200V
C420		015-22180-05	CAP 0805 18P 1% 200V
C421		015-22180-05	CAP 0805 18P 1% 200V
C422		015-22180-05	CAP 0805 18P 1% 200V
C423		015-22180-05	CAP 0805 18P 1% 200V
C424		015-22180-05	CAP 0805 18P 1% 200V
C425		015-22180-05	CAP 0805 18P 1% 200V
C426		015-22180-05	CAP 0805 18P 1% 200V
C427		015-22180-05	CAP 0805 18P 1% 200V
C428		015-22180-05	CAP 0805 18P 1% 200V
C430		015-02390-03	CAP CER 39P 5% 500V HIQ GRH111
C432		015-22180-05	CAP 0805 18P 1% 200V

Ref	Var	IPN	Description
C450		015-22180-05	CAP 0805 18P 1% 200V
C451		015-22180-05	CAP 0805 18P 1% 200V
C452		015-22180-05	CAP 0805 18P 1% 200V
C453		015-22180-05	CAP 0805 18P 1% 200V
C500		015-22180-05	CAP 0805 18P 1% 200V
C501		015-22180-05	CAP 0805 18P 1% 200V
C502		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C503		015-22180-05	CAP 0805 18P 1% 200V
C505		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C506		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C507		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C508		015-22180-05	CAP 0805 18P 1% 200V
C510		015-25330-08	CAP CER 0805 CHIP 33NF
C511		015-22180-05	CAP 0805 18P 1% 200V
C512		015-22180-05	CAP 0805 18P 1% 200V
C513		015-22180-05	CAP 0805 18P 1% 200V
C515		015-22180-05	CAP 0805 18P 1% 200V
C516		015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C517		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C518		015-22180-05	CAP 0805 18P 1% 200V
C519		015-22180-05	CAP 0805 18P 1% 200V
C520		015-22180-05	CAP 0805 18P 1% 200V
C521		015-22180-05	CAP 0805 18P 1% 200V
C523		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C525		015-22180-05	CAP 0805 18P 1% 200V
C526		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C527		015-22180-05	CAP 0805 18P 1% 200V
C530		015-22180-05	CAP 0805 18P 1% 200V
C531		015-22180-05	CAP 0805 18P 1% 200V
C532		015-22180-05	CAP 0805 18P 1% 200V
C535		015-22180-05	CAP 0805 18P 1% 200V
C537		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C538		015-22180-05	CAP 0805 18P 1% 200V
C541		015-22180-05	CAP 0805 18P 1% 200V
C542		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C543		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C545		015-22180-05	CAP 0805 18P 1% 200V
C546		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C547		015-22180-05	CAP 0805 18P 1% 200V
C548		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C551		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C559		015-22180-05	CAP 0805 18P 1% 200V
C605		015-22180-05	CAP 0805 18P 1% 200V
C607		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C608		015-24100-08	CAP CER 0805 1N 10% X7R 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
C623		015-22180-05	CAP 0805 18P 1% 200V
C625		020-09470-07	CAP ELEC RADL 470M 16V 20% 3.5
C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C627		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C629		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		015-22180-05	CAP 0805 18P 1% 200V
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		015-24100-08	CAP CER 0805 1N 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		015-22180-05	CAP 0805 18P 1% 200V
C690		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C693		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C700		015-26100-08	CAP CER 0805 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 4U7 SMD 'B'CASE 16V +-010%
C709		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C710		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C711		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C712		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C714		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C719		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C720		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C722		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C724		014-08220-01	(L)CAP TANT 22UF10V276MSER
C725		014-08220-01	(L)CAP TANT 22UF10V276MSER
C726		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C727		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C729		015-22470-01	CAP CER 0805 47P 5% NPO 50V
%C733		015-23470-08	CAP CER 0805 470P 10% X7R 50V
C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C741A		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C742A		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C745		015-22180-05	CAP 0805 18P 1% 200V
C750		014-08100-03	CAP TANT SMD 10U 35V 20%
C757		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C759		015-25680-08	CAP CER 0805 68N 10% X7R 50V
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C762		014-08220-01	(L)CAP TANT 22UF10V276MSER
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C765		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C770		014-08220-01	(L)CAP TANT 22UF10V276MSER
C772		014-08220-01	(L)CAP TANT 22UF10V276MSER
C774		013-06100-10	CAP SMD PPS 100N 100V 10%
C776		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C782		015-22180-05	CAP 0805 18P 1% 200V
C784		015-22180-05	CAP 0805 18P 1% 200V
C785		015-22180-05	CAP 0805 18P 1% 200V
C786		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C788		015-22180-05	CAP 0805 18P 1% 200V
C790		015-21330-05	CAP CER 0805 3P3+-0.1PF 200V
C792		015-21560-05	CAP CER 0805 CHIP 5P6+0.1PF 2
C810		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C822		014-07470-00	CAP 4U7 SMD 'B'CASE 16V +-010%
C823		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C824		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C826		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C827		015-22330-01	CAP CER 0805 33P 5% NPO 50V
C828		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C830		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C838		014-09100-00	CAP TANT SMD 100U 16V 20%
C841		014-09100-00	CAP TANT SMD 100U 16V 20%
C844		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C880		015-22180-05	CAP 0805 18P 1% 200V
C910		015-01270-06	CAP CER 1210 2P7 NPO200V GRM42
C920		015-01560-02	CAP CERHIQ1210 5P65%NPO200V
C930		015-01560-02	CAP CERHIQ1210 5P65%NPO200V
C940		015-01270-06	CAP CER 1210 2P7 NPO200V GRM42
CV300		028-11500-00	CAP TRIM 0.6/4.5 P SAPPHIRE
%D111A		001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
D211		008-00014-80	S)LED 3MM GREEN WITH WIRE
D212		008-00014-79	S)LED 3MM RED WITH WIRE
D220		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D230		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
D240		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
D250		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
D260		001-10000-56	S) DIODE SMD BAW56 D-SW SOT23
D270		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D300		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D301		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D305		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D307		001-10005-35	S) DIODE SMD VCAP BB535 SOD323
D308		001-10063-05	DIODE SMD BAR63-05W SOT323
D400		001-10066-00	DIODE SCHOTTKY HSMS2815
D401		001-10066-00	DIODE SCHOTTKY HSMS2815
D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D620		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D630		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D635A		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
D710		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D720		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D732		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D810		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
IC210		002-10003-24	S) IC SMD 324 4X O-AMP SO14
IC220		002-10126-70	S) IC SMD DS1267S10K 2XDIG POT
IC230		002-10003-24	S) IC SMD 324 4X O-AMP SO14
IC240		002-10040-53	S)MC14053B SMD BREAK B4 MAKE
IC250		002-10020-50	IC SMD 4N25A OPTOCOUPLER
IC260		002-10003-24	S) IC SMD 324 4X O-AMP SO14
#IC400	10	004-68701-00	MODULE M68701 806-870MHZ 6W
#IC400	15	004-68701-00	MODULE M68701 806-870MHZ 6W
#IC400	20	004-68701-01	MODULE M68701M 860-910MHZ 6W
#IC400	25	004-68701-01	MODULE M68701M 860-910MHZ 6W
#IC400	30	004-68701-02	MODULE M68701H 890-960MHZ 6W
#IC400	35	004-68701-02	MODULE M68701H 890-960MHZ 6W
IC500		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC510		002-10006-60	S) IC SMD LMC660CM O-AMP 4X
IC610		002-10078-05	S) IC SMD 78L05 5V REG
IC630		002-12523-17	(S)IC LM317L REG TO-252 0.5A
IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG
=IC700		539-00010-55	TCXO 12.8M 1PPM-20+70/2PPM -30
IC710		002-74904-00	IC SMD 74HC04A 6X INV BUFFD
IC720		002-74910-04	S) IC SMD 74HCU04 6X INV
IC730		002-10045-20	S) IC SMD 74HC4520T 2XCTR 4BIT
IC740		002-14519-10	S) IC MC145191F SMD SYNTH
IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
IC820		002-12416-00	S)IC SMD AT24C16N-10SC EEPROM
IC830		002-10003-24	S) IC SMD 324 4X O-AMP SO14

Ref	Var	IPN	Description
L300		056-14150-02	(L) IND SMD 1.5UH SIMID02
L301		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L302		056-10100-02	(L) IND SMD 100NH SIMID02
L303		056-10082-02	(L) IND SMD 82NH SIMID02
L304		056-10100-02	(L) IND SMD 100NH SIMID02
L305		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L307		056-10015-03	IND SMD 0805 15NH 20%
L308		056-10006-83	(LSH) IND SMD 0805 6.8NH 20%
L309		056-10100-02	(L) IND SMD 100NH SIMID02
L310		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L311		057-10120-03	IND 0805 EMI SUP 120E@100M 0.2
L312		056-10100-02	(L) IND SMD 100NH SIMID02
L314		056-10100-02	(L) IND SMD 100NH SIMID02
L315		056-10100-02	(L) IND SMD 100NH SIMID02
L316		059-14820-10	IND FXD 1008CT 8.2NH 5%
L317		059-14820-10	IND FXD 1008CT 8.2NH 5%
L318		059-14820-10	IND FXD 1008CT 8.2NH 5%
L401		056-10100-02	(L) IND SMD 100NH SIMID02
L403		056-10100-02	(L) IND SMD 100NH SIMID02
L404		056-10100-02	(L) IND SMD 100NH SIMID02
L406		056-10100-02	(L) IND SMD 100NH SIMID02
L407		056-10100-02	(L) IND SMD 100NH SIMID02
L408		056-10100-02	(L) IND SMD 100NH SIMID02
L450		056-10100-02	(L) IND SMD 100NH SIMID02
L451		056-10100-02	(L) IND SMD 100NH SIMID02
L601		057-10120-03	IND 0805 EMI SUP 120E@100M 0.2
L602		057-10120-03	IND 0805 EMI SUP 120E@100M 0.2
PL201		240-00021-03	LIM) HEADER 2X7 WAY SMD
PL202		240-00021-03	LIM) HEADER 2X7 WAY SMD
Q210		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q220		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q230		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q240		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q250		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q260		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q270		000-10004-10	S) XSTR SMD MJD41C NPN SW DPAK
Q300		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q301		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q302		000-10009-41	S) XSTR SMD BR941L SOT23
Q303		000-10009-41	S) XSTR SMD BR941L SOT23
Q304		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q305		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q307		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q308		002-10003-18	IC BGA318 MMIC AMPLIFIER
Q309		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q310		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q311		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q312		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q313		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q314		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q316		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q317		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q318		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q319		000-10080-00	XSTR SMD BLT80 UHF PWR SOT223
Q321		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q322		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q500		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q501		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q502		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q503		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q505		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q506		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q507		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q508		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q510		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q511		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q512		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q513		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q515		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q516		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q517		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q610		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLTD
Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89
Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q710		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q720		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q730		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q740		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q760		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q780		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23
Q795		000-10009-30	XSTR SMD BFR93A NPN SOT23
Q810		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q820		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q830		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q850		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q860		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
R160		036-12100-00	RES M/F 0805 10E 5%
R201		036-13560-00	RES M/F 0805 560E 5%
R202		036-14100-10	RES M/F 0805 1K 1%
R204		036-14220-00	RES M/F 0805 2K2 5%
R205		036-13220-10	RES 0805 220E 1%
R206		036-14100-10	RES M/F 0805 1K 1%
R207		036-14390-10	RES M/F 0805 3K9 1%
R208		036-13560-00	RES M/F 0805 560E 5%
R209		036-15100-10	RES M/F 0805 10K 1%
R210		036-14220-00	RES M/F 0805 2K2 5%
R211		036-13470-00	RES M/F 0805 470E 5%
R212		036-16100-00	RES M/F 0805 100K 5%
R213		036-15100-10	RES M/F 0805 10K 1%
R214		036-14820-10	RES M/F 0805 8K2 1%
R215		036-16100-00	RES M/F 0805 100K 5%
R216		036-16100-00	RES M/F 0805 100K 5%
R217		036-14100-10	RES M/F 0805 1K 1%
R218		036-16150-00	RES M/F 0805 150K 5%
R219		036-14220-00	RES M/F 0805 2K2 5%
R220		036-13470-00	RES M/F 0805 470E 5%
R221		036-14150-10	RES M/F 0805 1K5 1%
R223		036-17100-10	RES M/F 0805 1M 1%
R224		036-14680-10	RES M/F 0805 6K8 1%
R225		036-17100-10	RES M/F 0805 1M 1%
R226		036-15100-10	RES M/F 0805 10K 1%
R227		036-14180-00	RES M/F 0805 1K8 5%
R228		036-13120-00	RES M/F 0805 120E 5%
R229		036-16470-00	RES M/F 0805 470K 5%
R230		036-16100-00	RES M/F 0805 100K 5%
R231		036-15100-10	RES M/F 0805 10K 1%
R232		036-16330-00	RES M/F 0805 330K 5%
R233		036-16100-00	RES M/F 0805 100K 5%
R235		036-14470-10	RES M/F 0805 4K7 1%
R237		036-15470-10	RES M/F 0805 47K 1%
R238		036-15470-10	RES M/F 0805 47K 1%
R239		036-14150-10	RES M/F 0805 1K5 1%
R241		036-14470-10	RES M/F 0805 4K7 1%
R242		036-14220-00	RES M/F 0805 2K2 5%
R244		036-15100-10	RES M/F 0805 10K 1%
R245		036-16100-00	RES M/F 0805 100K 5%
R247		036-15100-10	RES M/F 0805 10K 1%
R248		036-16100-00	RES M/F 0805 100K 5%
R249		036-16100-00	RES M/F 0805 100K 5%
R251		036-16100-00	RES M/F 0805 100K 5%
R253		036-16100-00	RES M/F 0805 100K 5%
R254		036-16100-00	RES M/F 0805 100K 5%
R255		036-15100-10	RES M/F 0805 10K 1%
R256		036-15560-10	RES MF 0805 56K 1%
R257		036-16560-00	RES M/F 0805 560K 5%
R258		036-16150-00	RES M/F 0805 150K 5%
R259		036-15220-00	RES M/F 0805 22K 5%
R260		036-15470-10	RES M/F 0805 47K 1%
R262		036-15470-10	RES M/F 0805 47K 1%
R263		036-14470-10	RES M/F 0805 4K7 1%
&R264	10	036-15220-00	RES M/F 0805 22K 5%
&R264	15	036-15270-10	RES M/F 0805 27K 1%
&R264	20	036-15220-00	RES M/F 0805 22K 5%
&R264	25	036-15270-10	RES M/F 0805 27K 1%
&R264	30	036-15220-00	RES M/F 0805 22K 5%
&R264	35	036-15270-10	RES M/F 0805 27K 1%
&R265	10	036-15150-00	RES M/F 0805 15K 5%
&R265	15	036-15180-00	RES M/F 0805 18K 5%
&R265	20	036-15150-00	RES M/F 0805 15K 5%
&R265	25	036-15180-00	RES M/F 0805 18K 5%
&R265	30	036-15150-00	RES M/F 0805 15K 5%
&R265	35	036-15180-00	RES M/F 0805 18K 5%
&R266	10	036-15470-10	RES M/F 0805 47K 1%
&R266	15	036-15560-10	RES MF 0805 56K 1%
&R266	20	036-15470-10	RES M/F 0805 47K 1%
&R266	25	036-15560-10	RES MF 0805 56K 1%
&R266	30	036-15470-10	RES M/F 0805 47K 1%
&R266	35	036-15560-10	RES MF 0805 56K 1%
R267		036-14220-00	RES M/F 0805 2K2 5%
R268		036-13100-10	RES M/F 0805 100E 1%
R269		036-15100-10	RES M/F 0805 10K 1%
R270		036-14120-00	RES M/F 0805 1K2 5%
R271		036-17100-10	RES M/F 0805 1M 1%
R272		036-13560-00	RES M/F 0805 560E 5%
R273		036-15180-00	RES M/F 0805 18K 5%
R274		036-15180-00	RES M/F 0805 18K 5%
R275		036-14270-10	RES M/F 0805 2K7 1%
R277		036-16100-00	RES M/F 0805 100K 5%
R278		036-16120-00	RES M/F 0805 120K 5%
R279		036-17100-10	RES M/F 0805 1M 1%
R280		036-15100-10	RES M/F 0805 10K 1%
R282		036-15560-10	RES MF 0805 56K 1%
R283		036-15560-10	RES MF 0805 56K 1%
R284		036-17100-10	RES M/F 0805 1M 1%
R285		036-10000-00	RES M/F 0805 ZERO OHM
R286		036-14220-00	RES M/F 0805 2K2 5%
R287		036-15100-10	RES M/F 0805 10K 1%
R288		036-15180-00	RES M/F 0805 18K 5%
R289		036-16100-00	RES M/F 0805 100K 5%
&R290	10	036-13560-00	RES M/F 0805 560E 5%
&R290	15	036-13560-00	RES M/F 0805 560E 5%
&R290	20	036-13560-00	RES M/F 0805 560E 5%
&R290	25	036-13560-00	RES M/F 0805 560E 5%
&R290	30	036-13560-00	RES M/F 0805 560E 5%
&R290	35	036-13560-00	RES M/F 0805 560E 5%

Ref	Var	IPN	Description
R291		036-10000-00	RES M/F 0805 ZERO OHM
R292		036-14470-10	RES M/F 0805 4K7 1%
R293		036-15470-10	RES M/F 0805 47K 1%
R294		036-14470-10	RES M/F 0805 4K7 1%
R295		036-14270-10	RES M/F 0805 2K7 1%
R296		036-14100-10	RES M/F 0805 1K 1%
R297		036-14560-00	RES M/F 0805 5K6 5%
%R298		036-16100-00	RES M/F 0805 100K 5%
R299		036-14270-10	RES M/F 0805 2K7 1%
R300		036-12680-00	RES M/F 0805 68E 5%
%R301		036-12100-00	RES M/F 0805 10E 5%
R302		036-15390-00	RES M/F 0805 39K 5%
R303		036-12330-00	RES M/F 0805 33E 5%
R304		036-11470-00	RES M/F 0805 4E7 10%
R305		036-11470-00	RES M/F 0805 4E7 10%
R307		036-14180-00	RES M/F 0805 1K8 5%
R308		036-14220-00	RES M/F 0805 2K2 5%
R309		036-14100-10	RES M/F 0805 1K 1%
R310		036-12270-00	RES M/F 0805 27E 5%
R311		036-13330-00	RES M/F 0805 330E 5%
R312		036-12680-00	RES M/F 0805 68E 5%
R314		036-10000-00	RES M/F 0805 ZERO OHM
R315		036-12120-00	RES M/F 0805 12E 5%
R316		036-12560-00	RES M/F 0805 56E 5%
R318		036-13220-10	RES 0805 220E 1%
R321		036-13120-00	RES M/F 0805 120E 5%
R322		036-12100-00	RES M/F 0805 10E 5%
R323		036-13820-00	RES M/F 0805 820E 5%
R324		036-12470-00	RES M/F 0805 47E 5%
R326		036-12470-00	RES M/F 0805 47E 5%
R328		036-11470-00	RES M/F 0805 4E7 10%
R329		036-12100-00	RES M/F 0805 10E 5%
R330		036-14180-00	RES M/F 0805 1K8 5%
R331		036-11470-00	RES M/F 0805 4E7 10%
R332		036-16120-00	RES M/F 0805 120K 5%
R333		036-14330-10	RES M/F 0805 3K3 1%
R335		036-15150-00	RES M/F 0805 15K 5%
R336		036-15470-10	RES M/F 0805 47K 1%
R337		036-15330-00	RES M/F 0805 33K 5%
R338		036-12100-00	RES M/F 0805 10E 5%
R339		036-13100-10	RES M/F 0805 100E 1%
R340		036-12470-00	RES M/F 0805 47E 5%
R342		036-16180-00	RES M/F 0805 180K 5%
R343		036-15150-00	RES M/F 0805 15K 5%
R344		036-12330-00	RES M/F 0805 33E 5%
R346		036-11470-00	RES M/F 0805 4E7 10%
R347		036-14220-00	RES M/F 0805 2K2 5%
R349		036-13270-00	RES M/F 0805 270E 5%
R350		036-12180-00	RES M/F 0805 18E 5%
R351		036-14100-10	RES M/F 0805 1K 1%
R352		036-13270-00	RES M/F 0805 270E 5%
R353		036-14150-10	RES M/F 0805 1K5 1%
R354		036-14680-10	RES M/F 0805 6K8 1%
R356		036-15220-00	RES M/F 0805 22K 5%
R357		036-14220-00	RES M/F 0805 2K2 5%
R358		036-14220-00	RES M/F 0805 2K2 5%
%R359		036-14220-00	RES M/F 0805 2K2 5%
R363		036-12270-00	RES M/F 0805 27E 5%
R364		036-14100-10	RES M/F 0805 1K 1%
R365		036-14470-10	RES M/F 0805 4K7 1%
R367		036-13470-00	RES M/F 0805 470E 5%
R368		036-15150-00	RES M/F 0805 15K 5%
R370		036-13180-00	RES M/F 0805 180E 5%
R371		036-12120-00	RES M/F 0805 12E 5%
R372		036-12330-00	RES M/F 0805 33E 5%
R373		036-13180-00	RES M/F 0805 180E 5%
R374		036-13680-00	RES M/F 0805 680E 5%
R375		036-13330-00	RES M/F 0805 330E 5%
R376		036-14220-00	RES M/F 0805 2K2 5%
R377		036-13820-00	RES M/F 0805 820E 5%
R378		036-15100-10	RES M/F 0805 10K 1%
R379		036-12470-00	RES M/F 0805 47E 5%
R380		036-15100-10	RES M/F 0805 10K 1%
R381		036-10000-00	RES M/F 0805 ZERO OHM
R390		036-13120-00	RES M/F 0805 120E 5%
R391		036-12470-00	RES M/F 0805 47E 5%
R392		036-13120-00	RES M/F 0805 120E 5%
R399		036-12100-00	RES M/F 0805 10E 5%
R400		036-13100-10	RES M/F 0805 100E 1%
R401		036-13100-10	RES M/F 0805 100E 1%
R410		036-14100-10	RES M/F 0805 1K 1%
R450		045-05100-02	RES NTC 10K 2% Metal tagged
R500		036-15150-00	RES M/F 0805 15K 5%
R501		036-15150-00	RES M/F 0805 15K 5%
R502		036-15150-00	RES M/F 0805 15K 5%
R503		036-15100-10	RES M/F 0805 10K 1%
R505		036-15470-10	RES M/F 0805 47K 1%
R506		036-16120-00	RES M/F 0805 120K 5%
R510		036-15470-10	RES M/F 0805 47K 1%
R511		036-15470-10	RES M/F 0805 47K 1%
R512		036-15220-00	RES M/F 0805 22K 5%
R515		036-14100-10	RES M/F 0805 1K 1%
R516		036-15470-10	RES M/F 0805 47K 1%
R517		036-16120-00	RES M/F 0805 120K 5%
R518		036-15100-10	RES M/F 0805 10K 1%
R520		036-15470-10	RES M/F 0805 47K 1%
R521		036-15220-00	RES M/F 0805 22K 5%
R522		036-15470-10	RES M/F 0805 47K 1%
R523		036-14820-10	RES M/F 0805 8K2 1%
R525		036-14100-10	RES M/F 0805 1K 1%
R526		036-14120-00	RES M/F 0805 1K2 5%
R527		036-15150-00	RES M/F 0805 15K 5%
R528		036-15100-10	RES M/F 0805 10K 1%
R530		036-15100-10	RES M/F 0805 10K 1%
R531		036-14820-10	RES M/F 0805 8K2 1%
R532		036-15100-10	RES M/F 0805 10K 1%
R533		036-14100-10	RES M/F 0805 1K 1%
R535		036-14470-10	RES M/F 0805 4K7 1%
R536		036-15470-10	RES M/F 0805 47K 1%
R537		036-15100-10	RES M/F 0805 10K 1%
R538		036-15100-10	RES M/F 0805 10K 1%
R540		036-15220-00	RES M/F 0805 22K 5%
R541		036-14100-10	RES M/F 0805 1K 1%
R542		036-14470-10	RES M/F 0805 4K7 1%
R543		036-14470-10	RES M/F 0805 4K7 1%
R544		036-14100-10	RES M/F 0805 1K 1%
R546		036-13100-10	RES M/F 0805 100E 1%
R547		036-12100-00	RES M/F 0805 10E 5%
R548		036-14820-10	RES M/F 0805 8K2 1%
R550		036-14100-10	RES M/F 0805 1K 1%
R551		036-14100-10	RES M/F 0805 1K 1%
R552		036-15100-10	RES M/F 0805 10K 1%
R553		036-15100-10	RES M/F 0805 10K 1%
R555		036-15100-10	RES M/F 0805 10K 1%
R556		036-14470-10	RES M/F 0805 4K7 1%
R558		036-14470-10	RES M/F 0805 4K7 1%
R559		036-16220-00	RES M/F 0805 220K 5%
R560		036-14470-10	RES M/F 0805 4K7 1%
R565		036-13220-10	RES 0805 220E 1%
R566		036-10000-00	RES M/F 0805 ZERO OHM
R567		036-15220-00	RES M/F 0805 22K 5%
R568		036-15330-00	RES M/F 0805 33K 5%
R569		036-10000-00	RES M/F 0805 ZERO OHM
R570		036-15560-10	RES MF 0805 56K 1%
R571		036-15390-00	RES M/F 0805 39K 5%
R572		036-14220-00	RES M/F 0805 2K2 5%
R573		036-13100-10	RES M/F 0805 100E 1%
R575		036-14470-10	RES M/F 0805 4K7 1%
R576		036-14100-10	RES M/F 0805 1K 1%
R609		036-14100-10	RES M/F 0805 1K 1%
R613		036-13560-00	RES M/F 0805 560E 5%
R615		036-13100-10	RES M/F 0805 100E 1%
R617		036-10000-00	RES M/F 0805 ZERO OHM
R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R625		036-14100-10	RES M/F 0805 1K 1%
R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP
R633		036-14680-10	RES M/F 0805 6K8 1%
R637		036-12220-00	RES M/F 0805 22E 5%
R638		036-12220-00	RES M/F 0805 22E 5%
R640		036-12100-00	RES M/F 0805 10E 5%
R641		036-14150-10	RES M/F 0805 1K5 1%
R645		036-13470-00	RES M/F 0805 470E 5%
R649		036-14470-10	RES M/F 0805 4K7 1%
R651		036-10000-00	RES M/F 0805 ZERO OHM
R652		036-10000-00	RES M/F 0805 ZERO OHM
R653		036-15100-10	RES M/F 0805 10K 1%
R657		036-15100-10	RES M/F 0805 10K 1%
R661		036-15100-10	RES M/F 0805 10K 1%
R665		036-16100-00	RES M/F 0805 100K 5%
R669		036-15470-10	RES M/F 0805 47K 1%
R673		036-16100-00	RES M/F 0805 100K 5%
R677		036-15470-10	RES M/F 0805 47K 1%
R681		036-13100-10	RES M/F 0805 100E 1%
R685		036-15150-00	RES M/F 0805 15K 5%
R689		036-12100-00	RES M/F 0805 10E 5%
R693		036-16100-00	RES M/F 0805 100K 5%
R696		036-15560-10	RES MF 0805 56K 1%
R701		036-12220-00	RES M/F 0805 22E 5%
R702		036-17100-10	RES M/F 0805 1M 1%
R703		036-17100-10	RES M/F 0805 1M 1%
R706		036-12100-00	RES M/F 0805 10E 5%
R707		036-15100-10	RES M/F 0805 10K 1%
R708		036-17100-10	RES M/F 0805 1M 1%
R709		036-12100-00	RES M/F 0805 10E 5%
R710		036-13100-10	RES M/F 0805 100E 1%
R711		036-13100-10	RES M/F 0805 100E 1%
R712		036-12100-00	RES M/F 0805 10E 5%
R713		036-10000-00	RES M/F 0805 ZERO OHM
%R715		036-14100-10	RES M/F 0805 1K 1%
R717		036-14270-10	RES M/F 0805 2K7 1%
R718		036-15270-10	RES M/F 0805 27K 1%
R719		036-15270-10	RES M/F 0805 27K 1%
R720		036-15390-00	RES M/F 0805 39K 5%
R721		036-15100-10	RES M/F 0805 10K 1%
R722		036-15100-10	RES M/F 0805 10K 1%
R723		036-14270-10	RES M/F 0805 2K7 1%
R725		036-15390-00	RES M/F 0805 39K 5%
%R726		036-13100-10	RES M/F 0805 100E 1%
R727		036-15100-10	RES M/F 0805 10K 1%
R728		036-15100-10	RES M/F 0805 10K 1%
R730		036-13470-00	RES M/F 0805 470E 5%
R731		036-13470-00	RES M/F 0805 470E 5%
R732		036-13470-00	RES M/F 0805 470E 5%
R742		036-13150-10	RES M/F 0805 150E 1%
R743		036-13150-10	RES M/F 0805 150E 1%

Ref	Var	IPN	Description
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		036-15180-00	RES M/F 0805 18K 5%
R780		036-12680-00	RES M/F 0805 68E 5%
R782		036-12180-00	RES M/F 0805 18E 5%
R784		036-13120-00	RES M/F 0805 120E 5%
R785		036-14330-10	RES M/F 0805 3K3 1%
R786		036-12100-00	RES M/F 0805 10E 5%
R787		036-12100-00	RES M/F 0805 10E 5%
R790		036-13390-10	RES M/F 0805 390E 1%
R791		036-14100-10	RES M/F 0805 1K 1%
R801		036-16150-00	RES M/F 0805 150K 5%
R802		036-15470-10	RES M/F 0805 47K 1%
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%
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%
R880		036-14470-10	RES M/F 0805 4K7 1%
R881		036-14470-10	RES M/F 0805 4K7 1%
R882		036-13470-00	RES M/F 0805 470E 5%
RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT
RV220		042-05500-05	RES PRESET SMD 50K CER 4MM SQ
RV501		042-05200-05	RES PRESET SMD 20K CER 4MM SQ
RV502		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
RV805		042-05200-05	RES PRESET SMD 20K CER 4MM SQ
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

Ref	Var	IPN	Description
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
#TL300	10	051-11000-00	COAX RES 1000MHZ 6X6 SMD
#TL300	15	051-11000-00	COAX RES 1000MHZ 6X6 SMD
#TL300	20	051-11050-00	COAX RES 1050MHz 6x6 SMD
#TL300	25	051-11050-00	COAX RES 1050MHz 6x6 SMD
#TL300	30	051-11100-00	COAX RES 1100MHZ 6X6 SMD
#TL300	35	051-11100-00	COAX RES 1100MHZ 6X6 SMD

T881 Mechanical & Miscellaneous Parts (220-01575-02)

IPN	Legend	Description
070-01001-00		D-RANGE 15 WAY COMPL T800
220-01575-02		PCB T881 SERIES II 800-960M TX
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
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
308-13133-01		HEATSINK T881 MODULE
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
319-40015-00		STRAP EARTHING T881
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
352-00010-04		NUT M2.5 MACH HEX ST BZ
352-00010-29		NUT M4 NYLOC HEX
353-00010-10		WSHR M3 FLAT 7MM*0.6MM ST BZ
353-00010-24		WSHR M4x8mm Flat
362-00010-33		GROMMET LED MTG 3MM
399-00010-51		BAG PLASTIC 75*100MM

T881 Grid Reference Index (IPN 220-01575-02)

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
C201	1:C1	2-B3	C304	1:E4	3-B4	C375	1:E5	3-K3	C502	1:G6	5-D6
C202	1:C1	2-C3	C305	1:E4	3-B4	C377	1:E5	3-K4	C503	1:H5	5-D6
C204	1:B3	2-F3	C306	1:F5	3-M1	C378	1:F4	3-L1	C505	1:H5	5-E6
C205	1:A3	2-E3	C307	1:E4	3-B2	C379	1:F4	3-L2	C506	1:G5	5-E5
C207	1:C7	2-G0	%C308	1:F3	3-C9	C380	1:E6	3-K5	C507	1:K5	5-L1
C209	1:C6	2-T0	C309	1:E4	3-C4	C381	1:F7	3-P3	C508	1:J6	5-L3
C210	1:C7	2-J0	%C310	1:F3	3-C9	C382	1:F4	3-L1	C510	1:K5	5-M1
C211	1:B7	2-H3	C311	1:F3	3-D9	C383	1:F5	3-M1	C511	1:H6	5-F6
C213	1:A6	2-C5	%C312	1:E4	3-D2	C384	1:F4	3-M0	C512	1:H6	5-N3
C215	1:A6	2-D5	%C314	1:E4	3-D2	C385	1:E4	3-M0	C513	1:G5	5-G6
C217	1:B6	2-C5	C315	1:E4	3-D1	C386	1:E4	3-M0	C515	1:K5	5-O1
C219	1:B6	2-C5	C316	1:F4	3-D8	C387	1:E6	3-L3	C516	1:K6	5-O0
C221	1:C5	2-L8	C317	1:E4	3-D4	C388	1:F3	3-N7	%C517	1:J6	5-O2
C223	1:D4	2-J6	C318	1:E4	3-D1	C389	1:E6	3-L4	C518	1:G5	5-H6
C225	1:B3	2-N7	C319	1:E4	3-D1	C390	1:F7	3-Q3	C519	1:K6	5-E4
C227	1:B4	2-O6	C321	1:F4	3-E8	C391	1:E4	3-N0	C520	1:G6	5-I6
C229	1:B4	2-O6	C322	1:E4	3-E7	C392	1:F3	3-N7	C521	1:K6	5-P1
C230	1:B4	2-J0	C323	1:E4	3-E1	C393	1:F3	3-P8	C523	1:J5	5-N4
C232	1:B4	2-P6	C324	1:F3	3-E8	C394	1:E6	3-M3	C525	1:J5	5-N4
C233	1:B3	2-P7	C325	1:F4	3-E7	C395	1:F6	3-N4	C526	1:J5	5-P4
C235	1:B5	2-N5	C326	1:E4	3-E7	C396	1:F6	3-N3	C527	1:J5	5-N4
C237	1:B4	2-N5	C328	1:E4	3-F7	C397	1:F7	3-R3	%C528	1:J5	5-O2
C239	1:B4	2-O4	C329	1:E3	3-F7	C398	1:F7	3-P4	C530	1:H6	5-O6
C240	1:D2	2-T6	C330	1:E3	3-F7	C399	1:F7	3-Q3	C531	1:H6	5-O5
C241	1:B4	2-P5	C331	1:F5	3-F5	C400	1:N7	4-D3	C532	1:J5	5-P4
C242	1:B4	2-P5	C332	1:E5	3-F3	C401	1:G8	4-E4	C535	1:K5	5-P5
C243	1:B4	2-R5	%C333	1:E3	3-G8	C402	1:J9	4-E3	C537	1:K5	5-R5
C245	1:C5	2-B5	C335	1:E3	3-G7	C403	1:K9	4-E4	C538	1:K5	5-Q5
C247	1:C5	2-B5	C336	1:F6	3-G0	C404	1:J9	4-D3	C541	1:K6	5-S5
C249	1:D4	2-E6	C337	1:F5	3-F5	C406	1:K7	4-D6	C542	1:H6	5-U0
C251	1:C4	2-C9	C338	1:E5	3-F4	C407	1:G7	4-C4	C543	1:J6	5-U5
C253	1:D3	2-E8	C339	1:F6	3-G1	C408	1:G7	4-D4	C545	1:J6	5-U5
C255	1:D3	2-E8	C340	1:E3	3-G8	C409	1:J9	4-D4	C546	1:J5	5-V0
C257	1:D4	2-C8	C342	1:E4	3-G6	C410	1:J7	4-C3	C547	1:K5	5-R6
C259	1:C7	2-J2	C343	1:E3	3-G7	C411	1:N7	4-C3	C548	1:G6	5-V5
C260	1:C8	2-I0	C345	1:F5	3-G5	C412	1:G8	4-D3	C551	1:G6	5-V5
C261	1:C7	2-K2	C346	1:E3	3-H7	C413	1:L7	4-F3	C559	1:J6	5-U5
C263	1:D6	2-M2	C347	1:E3	3-H7	C415	1:L8	4-F3	C605	1:L6	6-C8
C265	1:D8	2-M1	C349	1:E5	3-G5	C416	1:M9	4-H3	C607	1:L6	6-D8
C267	1:C8	2-O2	C350	1:E4	3-H7	C417	1:M8	4-H3	C608	1:L6	6-D8
&C269	1:C8	2-O2	C351	1:E5	3-H3	C418	1:N7	4-J5	C610A	1:M5	6-F8
&C271	1:C8	2-P2	C352	1:F5	3-H1	C419	1:N7	4-K5	C610B	1:L5	6-F8
C273	1:C8	2-P2	C353	1:E5	3-H4	C420	1:N8	4-K5	C611A	1:M6	6-H8
C275	1:C3	2-E7	C356	1:E5	3-H4	C421	1:G8	4-L5	C611B	1:M5	6-H8
C277	1:B4	2-I4	C357	1:E3	3-J7	C422	1:L9	4-L5	C623	1:N6	6-P7
C279	1:B5	2-I4	C359	1:F4	3-J2	C423	1:G7	4-M5	C625	1:M6	6-Q6
C281	1:B5	2-I3	C360	1:F6	3-H5	C424	1:G7	4-M5	C626	1:M6	6-Q6
C283	1:B5	2-J2	C361	1:F4	3-K2	C425	1:G8	4-J3	C627	1:M6	6-R6
C285	1:C7	2-K2	C363	1:F5	3-K0	C426	1:L9	4-J3	C628	1:M6	6-Q6
C287	1:C6	2-L3	C364	1:F5	3-J5	C427	1:G7	4-K3	C629	1:M6	6-R6
&C289	1:C8	2-Q2	C365	1:F5	3-K1	C428	1:G7	4-K3	C630	1:M5	6-J5
C291	1:C7	2-T2	C366	1:F5	3-K0	C430	2:M8	4-G5	C631A	1:N5	6-L6
C293	1:D7	2-T2	C367	1:F4	3-K1	C432	1:M7	4-G6	C634	1:N5	6-L5
%C294	1:C7	2-U2	C368	1:F5	3-K0	C450	1:H8	4-N8	C636	1:M5	6-M5
%C295	1:C7	2-U2	C370	1:E5	3-J3	C451	1:H8	4-P8	C638	1:M5	6-N5
C300	1:F3	3-B9	C371	1:F5	3-K0	C452	1:H7	4-P8	C640	1:M5	6-R4
C301	1:E4	3-B5	C372	1:E6	3-J5	C453	1:G7	4-P8	C655	1:M4	6-C1
C302	1:E4	3-B4	C373	1:E6	3-J4	C500	1:H5	5-C6	C660	1:L5	6-Q1
C303	1:E4	3-B2	C374	1:E5	3-J3	C501	1:H5	5-C5	C665	1:L5	6-P1

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C670	1:L5	6-N1	CV300	1:E3	3-J7	IC610	1:L5	6-G8	P217	1:D4	2-A7
C673	1:L5	6-K2				IC630	1:N5	6-K5	P219	1:D2	2-A8
C677	1:L6	6-K1	%D111	1:P5	1-M0	IC640	1:M5	6-M5	P225	1:D2	2-A7
C681	1:L6	6-J2	%D111A	1:P5	1-R1	IC640	1:M5	6-Q4	P230	1:B5	2-M9
C684	1:L6	6-H2	%D205	1:B2	2-D3	IC640	1:M5	6-E1	P231	1:D7	2-M9
C687	1:L6	6-J1	%D210	1:B2	2-D3	IC650	1:L5	6-C4	P233	1:C1	2-F3
C690	1:L6	6-J1	D220	1:B4	2-R7	=IC700	1:K3	7-A8	P235	1:C1	2-F3
C693	1:L6	6-H1	D220	1:B4	2-R5	IC710	1:J2	7-C6	P237	1:B7	2-G3
C700	1:K4	7-A8	D230	1:B7	2-U5	IC710	1:J2	7-D8	P239	1:B6	2-M9
C703	1:J3	7-B7	D240	1:D4	2-E7	IC710	1:J2	7-D5	P240	1:B7	2-M9
C706	1:J2	7-B5	D240	1:D4	2-E7	IC710	1:J2	7-D7	P245	1:B8	2-S5
%C707	1:K4	7-B8	D250	1:D3	2-E8	IC710	1:J2	7-D6	P249	1:B7	2-V5
C708	1:J2	7-D9	D250	1:D3	2-E8	IC710	1:J2	7-C5	P251	1:B7	2-V5
C709	1:K4	7-D9	D260	1:C2	2-B8	IC710	1:J2	7-C6	P255	1:C4	2-L1
C710	1:J3	7-D8	D260	1:C2	2-C8	IC720	1:H3	7-L7	P257	1:C2	2-L1
C711	1:J3	7-B6	D270	1:C2	2-C7	IC720	1:H3	7-H0	P259	1:B8	2-L0
C712	1:H2	7-D7	D270	1:C2	2-B7	IC720	1:H3	7-K7	P261	1:B8	2-L0
%C713	1:H2	7-E6	D300	1:E3	3-L8	IC720	1:H3	7-E8	P263	1:B1	2-L0
C714	1:J2	7-E8	D301	1:E3	3-L7	IC720	1:H3	7-M7	P267	1:C9	2-Q2
C719	1:J4	7-F8	%D302	1:E3	3-L7	IC720	1:H3	7-N6	P269	1:C9	2-S3
C720	1:J4	7-F8	%D303	1:E3	3-L7	IC720	1:H3	7-J0	P271	1:C9	2-R2
C722	1:J4	7-G8	D305	1:E3	3-M7	IC730	1:J4	7-H8	P273	1:C9	2-S3
C724	1:J4	7-H6	D307	1:E3	3-M7	IC730	1:J4	7-G7	P275	1:C7	2-U2
C725	1:J3	7-J6	D308	1:E6	3-N3	IC740	1:H2	7-D1	P290	1:D5	2-R1
C726	1:J4	7-J6	D308	1:E6	3-P3	IC750	1:H4	7-M3	P291	1:D5	2-S1
C727	1:J3	7-K8	D400	1:M8	4-H4	IC750	1:H4	7-G5	P805	1:M2	8-A2
C729	1:J3	7-M8	D401	1:N8	4-J5	IC750	1:H4	7-K0	P810	1:L3	8-B6
%C733	1:H2	7-E3	D610	1:N6	6-N7	IC820	1:L4	8-K5	P820	1:L4	8-J8
C735	1:J2	7-A1	D610	1:N6	6-N7	IC830	1:N3	8-L0	P825	1:L4	8-J8
C736	1:J2	7-B1	D620	1:N4	6-B1	IC830	1:N3	8-H0	P830	1:L4	8-J8
C740A	1:H2	7-B4	D620	1:N4	6-B1	IC830	1:N3	8-L0	P835	1:L4	8-J7
C740B	1:H2	7-B3	D630	1:M5	6-E2	IC830	1:N3	8-L1	P840	1:L4	8-J7
C741A	1:H2	7-C4	D630	1:M5	6-E2	IC830	1:N3	8-Q0			
C741B	1:G2	7-C3	D635A	1:M5	6-F2				PL100	1:P3	1-F0
C742A	1:H2	7-D4	D640	1:L5	6-N1	L300	1:F6	3-F0	PL201	1:C4	2-K5
C742B	1:H3	7-D3	D640	1:L5	6-N1	L301	1:E3	3-H8	PL202	1:C3	2-K4
C743	1:H2	7-B1	D645	1:M5	6-R4	L302	1:E3	3-H8			
C745	1:G3	7-D1	D710	1:J3	7-L8	L303	1:E5	3-H4	Q210	1:B6	2-D5
C750	1:G4	7-K0	D710	1:J3	7-L8	L304	1:F3	3-K7	Q220	1:B4	2-O6
C757	1:G4	7-F4	D720	1:J3	7-N8	L305	1:F3	3-K7	Q230	1:B4	2-P7
C759	1:G4	7-F5	D720	1:J3	7-N8	L307	1:E5	3-J3	Q240	1:B7	2-U6
C761	1:G3	7-K4	D730	1:H3	7-J1	L308	1:E6	3-K4	Q250	1:B7	2-U5
C762	1:G3	7-K4	D732	1:H3	7-K2	L309	1:F3	3-M7	Q260	1:C4	2-C9
C764	1:H3	7-K2	D810	1:M2	8-B2	L310	1:F3	3-N7	Q270	1:D2	2-D7
C765	1:G3	7-K2	D811	1:B7	2-U6	L311	1:E4	3-N0	Q300	1:F4	3-C7
C767	1:H3	7-L3	D812	1:B7	2-T5	L312	1:E6	3-N3	Q301	1:F4	3-C7
C769	1:H4	7-M4				L314	1:F6	3-N4	Q302	1:E4	3-C3
C770	1:H4	7-N4	IC210	1:C7	2-J0	L315	1:F7	3-P4	Q303	1:E4	3-C2
C772	1:G4	7-M2	IC210	1:C7	2-U2	L316	1:E7	3-P3	Q304	1:F4	3-D8
C774	1:H4	7-N2	IC210	1:C7	2-G0	L317	1:E7	3-Q3	Q305	1:F4	3-E8
C776	1:H4	7-N2	IC210	1:C7	2-K1	L318	1:E7	3-Q3	Q307	1:F5	3-F4
C782	1:G2	7-P1	IC210	1:C7	2-K2	L401	1:J8	4-E4	Q308	1:E5	3-F3
C784	1:G2	7-Q1	IC220	1:C6	2-T2	L403	1:M8	4-H4	Q309	1:E3	3-H7
C785	1:G3	7-P1	IC220	1:C6	2-L3	L404	1:N7	4-J6	Q310	1:F5	3-H1
C786	1:G2	7-R1	IC220	1:C6	2-T0	%L405	1:M7	4-G5	Q311	1:E5	3-G4
C788	1:G3	7-P0	IC230	1:B4	2-O5	L406	1:G7	4-C4	Q312	1:F5	3-J0
C790	1:G3	7-Q0	IC230	1:B4	2-I0	L407	1:G7	4-M6	Q313	1:E6	3-J4
C792	1:G4	7-R0	IC230	1:B4	2-Q5	L408	1:G7	4-K4	Q314	1:F5	3-K0
C810	1:L3	8-H8	IC230	1:B4	2-I2	L450	1:H8	4-N8	Q316	1:F4	3-L1
C812	1:L2	8-D5	IC230	1:B4	2-I4	L451	1:G7	4-P8	Q317	1:F4	3-L2
C813	1:K2	8-G5	IC240	1:C4	2-J5	L601	1:L6	6-D8	Q318	1:E6	3-K4
C822	1:N2	8-Q1	IC250	1:D3	2-D7	L602	1:M6	6-R6	Q319	1:E6	3-K3
C823	1:M3	8-Q1	IC260	1:C8	2-T3	L910	1:P8	9-E6	Q321	1:F4	3-M0
C824	1:M2	8-Q1	IC260	1:C8	2-H0	L920	1:P7	9-E6	Q322	1:F4	3-L1
C826	1:N3	8-P0	IC260	1:C8	2-S2	L930	1:P6	9-F6	Q500	1:H5	5-C5
C827	1:N3	8-P1	IC260	1:C8	2-P2				Q501	1:H5	5-D6
C828	1:N3	8-P0	IC260	1:C8	2-N2	LINK1	2:B2	2-E3	Q502	1:H6	5-E6
C830	1:N3	8-J0	#IC400	2:K8	4-E4	LINK2	2:A2	2-E3	Q503	1:G5	5-E5
C838	1:N4	8-N0	IC500	1:H6	5-O6				Q505	1:H6	5-M2
C841	1:N2	8-K2	IC500	1:H6	5-U0	P100	1:Q6	1-R8	Q506	1:G6	5-G6
C844	1:M2	8-K2	IC500	1:H6	5-O5	P150	1:P2	1-Q4	Q507	1:K5	5-N1
C880	1:M2	8-K3	IC510	1:J5	5-V0	P160	1:P2	1-Q4	Q508	1:J6	5-N2
C910	1:P8	9-D5	IC510	1:J5	5-O3	P170	1:P2	1-Q3	Q510	1:G5	5-H5
C920	1:P7	9-E5	IC510	1:J5	5-N4	P204	1:D1	2-A3	Q511	1:K6	5-O1
C930	1:P7	9-F5	IC510	1:J5	5-Q5	P208	1:D1	2-A3	Q512	1:G5	5-I5
C940	1:P6	9-G5	IC510	1:J5	5-T5	P215	1:D4	2-A7	Q513	1:G6	5-I5

Device	PCB	Circuit
Q515	1:K6	5-Q0
Q516	1:J5	5-Q4
Q517	1:J6	5-U5
Q610	1:L6	6-D8
Q620	1:N6	6-P6
Q630	1:M6	6-N5
Q660	1:L5	6-M1
Q670	1:L6	6-K1
Q710	1:J3	7-K8
Q720	1:J4	7-K8
Q730	1:J3	7-M8
Q740	1:J3	7-M8
Q750	1:G4	7-F4
Q760	1:H3	7-J3
Q770	1:H3	7-J1
Q775	1:H3	7-K3
Q780	1:H3	7-K3
Q785	1:H3	7-K2
Q790	1:H3	7-M3
Q795	1:G3	7-P0
Q810	1:M2	8-C3
Q820	1:L2	8-C5
Q830	1:L2	8-C6
Q840	1:L2	8-E5
Q850	1:M2	8-E5
Q860	1:L4	8-B3
%R150	1:P2	1-R4
R160	1:P2	1-R3
%R200	1:B2	2-C3
R201	1:B3	2-E3
R202	1:C1	2-F3
%R203	1:B3	2-C2
R204	1:C7	2-F0
R205	1:C7	2-H0
R206	1:B6	2-D6
R207	1:B6	2-D5
R208	1:B6	2-C5
R209	1:B6	2-C5
R210	1:B6	2-D5
R211	1:B2	2-E3
R212	1:C4	2-I6
R213	1:D4	2-L8
R214	1:D4	2-L8
R215	1:C4	2-J6
R216	1:B4	2-N7
R217	1:B4	2-P7
R218	1:B3	2-P7
R219	1:B3	2-Q7
R220	1:B2	2-E3
R221	1:B7	2-U6
R223	1:B4	2-N5
R224	1:B4	2-N5
R225	1:B4	2-O5
R226	1:B4	2-O4
R227	1:B4	2-O4
R228	1:A2	2-E3
R229	1:A4	2-P6
R230	1:B4	2-P6
R231	1:B4	2-P5
R232	1:B4	2-P5
R233	1:B4	2-P5
R235	1:B4	2-Q5
R237	1:B7	2-U6
R238	1:B7	2-U6
R239	1:B8	2-T5
R241	1:B8	2-T5
R242	1:B7	2-T5
R244	1:C6	2-B5
R245	1:D4	2-J6
R247	1:C3	2-B9
R248	1:C3	2-C9
R249	1:D4	2-C9
R251	1:C4	2-K6
R253	1:C7	2-K2
R254	1:C6	2-K2

Device	PCB	Circuit
R255	1:C7	2-L1
R256	1:D8	2-M2
R257	1:D8	2-M1
R258	1:D8	2-M1
R259	1:D8	2-M1
R260	1:C8	2-M2
R262	1:D8	2-N2
R263	1:D8	2-N2
&R264	1:C8	2-O2
&R265	1:C8	2-O2
&R266	1:C8	2-P2
R267	1:C8	2-Q2
R268	1:C2	2-C7
R269	1:C2	2-C8
R270	1:C3	2-D8
R271	1:C3	2-D7
R272	1:C4	2-I4
R273	1:B4	2-I5
R274	1:B5	2-I4
R275	1:B5	2-J5
R277	1:B5	2-I3
R278	1:B5	2-I2
R279	1:B5	2-J2
R280	1:B5	2-J2
R282	1:D7	2-J3
R283	1:C7	2-J3
R284	1:C7	2-K2
R285	1:C9	2-R2
R286	1:C7	2-K3
R287	1:C8	2-S2
R288	1:C6	2-L3
R289	1:C9	2-R2
&R290	1:C8	2-Q2
R291	1:C9	2-R2
R292	1:C9	2-S3
R293	1:C9	2-S3
R294	1:D8	2-T3
R295	1:D8	2-U3
R296	1:D6	2-T2
R297	1:C7	2-T2
%R298	1:C7	2-U2
R299	1:C6	2-V2
R300	1:E5	3-B5
%R301	1:F3	3-B9
R302	1:F4	3-C8
R303	1:E4	3-B2
R304	1:E4	3-C5
R305	1:E4	3-C4
R307	1:E5	3-C4
R308	1:E4	3-C2
R309	1:E4	3-C1
R310	1:E4	3-C3
R311	1:F4	3-C7
R312	1:E4	3-C4
R314	1:E4	3-C3
R315	1:E4	3-C2
R316	1:E5	3-C1
%R317	1:E4	3-D4
R318	1:F3	3-D9
R321	1:E4	3-D4
R322	1:E4	3-E3
R323	1:E4	3-E7
R324	1:F3	3-E9
%R325	1:E4	3-E4
R326	1:F3	3-E9
R328	1:F3	3-F8
R329	1:E4	3-F7
R330	1:E4	3-E7
R331	1:F5	3-F6
R332	1:F5	3-G1
R333	1:F5	3-F5
R335	1:F5	3-F4
R336	1:F5	3-G1
R337	1:F6	3-G0
R338	1:E3	3-H7
R339	1:E3	3-H7

Device	PCB	Circuit
R340	1:E3	3-H6
R342	1:E5	3-G4
R343	1:F5	3-H1
R344	1:E5	3-G5
R346	1:E6	3-H6
R347	1:F5	3-J0
R349	1:E5	3-H3
R350	1:E5	3-J3
R351	1:F4	3-K2
R352	1:E5	3-J3
R353	1:E5	3-J5
R354	1:E6	3-J4
R356	1:F4	3-L2
R357	1:F4	3-L1
R358	1:F4	3-L0
%R359	1:F4	3-L0
%R360	1:F4	3-L0
%R361	1:E5	3-K3
R363	1:E6	3-K5
R364	1:E5	3-K4
R365	1:F4	3-M1
%R366	1:E6	3-K5
R367	1:E6	3-L4
R368	1:F3	3-N8
R370	1:E6	3-M3
R371	1:F3	3-N7
R372	1:E6	3-M3
R373	1:E6	3-M3
R374	1:F3	3-P7
R375	1:F3	3-P8
R376	1:F3	3-Q7
R377	1:E6	3-N3
R378	1:F6	3-N4
R379	1:F6	3-N2
R380	1:F7	3-P4
R381	1:E5	3-K3
R390	1:E8	3-R3
R391	1:F8	3-R3
R392	1:E8	3-R3
R399	1:F4	3-M1
R400	1:M8	4-H5
R401	1:N8	4-J4
R410	1:M7	4-F6
R450	2:J7	4-N8
R500	1:H5	5-B5
R501	1:H5	5-B5
R502	1:H5	5-C6
R503	1:H5	5-D5
R505	1:H6	5-K2
R506	1:H6	5-E6
%R508	1:H5	5-E5
R510	1:H6	5-L3
R511	1:H5	5-E6
R512	1:H5	5-E6
%R513	1:H5	5-E5
R515	1:G5	5-E5
R516	1:H6	5-M2
R517	1:K5	5-M1
R518	1:H6	5-F6
R520	1:K5	5-M1
R521	1:K5	5-M1
R522	1:J6	5-M3
R523	1:G6	5-G5
R525	1:G5	5-G5
R526	1:J6	5-N2
R527	1:K5	5-N1
R528	1:J6	5-N2
R530	1:J6	5-N3
R531	1:G5	5-H5
R532	1:J6	5-O3
R533	1:G5	5-H5
R535	1:J6	5-O3
R536	1:K6	5-O0
R537	1:J6	5-P3
R538	1:J6	5-P2
R540	1:K6	5-P0

Device	PCB	Circuit
R541	1:G6	5-I5
R542	1:J5	5-L5
R543	1:J5	5-M5
R544	1:J5	5-M4
%R545	1:J5	5-M4
R546	1:J5	5-L4
R547	1:J5	5-N5
R548	1:J5	5-N4
R550	1:H6	5-N6
R551	1:H6	5-N5
R552	1:H6	5-N6
R553	1:H6	5-N5
R555	1:J5	5-O4
R556	1:J5	5-P4
R558	1:K6	5-P6
R559	1:K5	5-P6
R560	1:K5	5-P5
R565	1:K5	5-Q5
R566	1:K5	5-Q5
R567	1:K5	5-P2
R568	1:J5	5-S5
R569	1:J5	5-R5
R570	1:K6	5-S5
R571	1:K6	5-S5
R572	1:J6	5-T5
R573	1:J6	5-U5
R575	1:J6	5-U5
R576	1:G6	5-V5
R609	1:L6	6-B8
R613	1:L6	6-C8
R615	1:M5	6-F9
R617	1:M5	6-H8
R619	1:N6	6-P7
R621	1:N6	6-P7
R625	1:N6	6-P7
R629	1:M6	6-N6
R633	1:M5	6-P5
R637	1:M5	6-J6
R638	1:M5	6-J6
R640	1:M5	6-Q4
R641	1:N5	6-K5
R645	1:N5	6-L5
R649	1:M5	6-M5
R651	1:L4	6-B4
R652	1:L4	6-B4
R653	1:M5	6-P5
R657	1:M5	6-C1
R661	1:M5	6-D2
R665	1:M5	6-D1
R669	1:M5	6-D2
R673	1:M5	6-D0
R677	1:M4	6-F2
R681	1:L5	6-P1
R685	1:L5	6-L2
R689	1:L6	6-J3
R693	1:L5	6-N1
R696	1:L5	6-N0
R701	1:K4	7-A9
R702	1:K4	7-B9
R703	1:J3	7-B8
=R705	1:K3	7-A7
R706	1:H3	7-B6
R707	1:J3	7-B6
R708	1:J3	7-B6
R709	1:J3	7-D9
R710	1:H2	7-D7
R711	1:J2	7-C5
R712	1:K4	7-E9
R713	1:J4	7-F8
%R715	1:J4	7-H6
R717	1:H4	7-H7
R718	1:J4	7-H7
R719	1:J3	7-J6
R720	1:H3	7-K7
R721	1:J3	7-K9
R722	1:J4	7-K8

Device	PCB	Circuit
R723	1:J3	7-L7
R725	1:J3	7-M7
%R726	1:H3	7-M6
R727	1:J3	7-M9
R728	1:J3	7-M8
R730	1:K2	7-A2
R731	1:K2	7-A2
R732	1:K2	7-A2
R742	1:H2	7-C4
R743	1:H2	7-C4
R744	1:G2	7-D4
R746	1:H3	7-D4
R747	1:H3	7-D4
R748	1:J2	7-A1
R749	1:J2	7-B1
R750	1:H4	7-K0
R752	1:G4	7-F4
R753	1:G4	7-F4
R754	1:G3	7-F4
R756	1:G3	7-F5
R757	1:G4	7-F5
R758	1:H3	7-J4
R759	1:H3	7-J4
R760	1:H3	7-K4
R762	1:H3	7-L4
R763	1:H3	7-L4
R765	1:H3	7-J2
R766	1:G3	7-K3
R767	1:H3	7-K2
R769	1:H3	7-L3
R771	1:H4	7-M3
R772	1:G4	7-M2
R774	1:H4	7-M3
R775	1:H4	7-N2
R780	1:G2	7-P1
R782	1:G3	7-P1
R784	1:G3	7-P1
R785	1:G3	7-Q1
R786	1:G2	7-Q1
R787	1:G2	7-R2
R790	1:G3	7-P0
R791	1:G3	7-Q0
R801	1:M2	8-C3
R802	1:M2	8-C2
R808	1:M2	8-B5
R809	1:L2	8-C6
R810	1:L3	8-C6
R811	1:L2	8-D6
R812	1:L2	8-C5
R813	1:L2	8-C5
R815	1:L2	8-D5
R816	1:L2	8-D5
R818	1:M2	8-E5
R819	1:M2	8-E4
R821	1:L4	8-B3
R822	1:M4	8-C3
R824	1:L4	8-J8
R825	1:L4	8-J8
R826	1:L4	8-J8
R827	1:L4	8-J7
R828	1:L4	8-J7
R829	1:L4	8-Q9
R830	1:L3	8-Q9
R831	1:L3	8-Q9
R832	1:L3	8-Q8
R833	1:L3	8-Q8
R835	1:L3	8-Q8
R836	1:L3	8-Q8
R837	1:L3	8-Q7
R840	1:L3	8-Q7
R841	1:L3	8-Q7
R842	1:L3	8-Q6
R843	1:L3	8-Q6
R845	1:M4	8-R4
R847	1:L2	8-R3
R848	1:L2	8-K3
R849	1:L2	8-R3
R850	1:K2	8-R3
R853	1:M4	8-L6
R854	1:M4	8-L6
R855	1:M2	8-Q0
R859	1:N2	8-P1
R861	1:N2	8-P1
R863	1:N3	8-N1
R865	1:N4	8-N0
R867	1:N3	8-N1
R871	1:N3	8-M2
R872	1:M4	8-L1
R873	1:N3	8-M1
R874	1:N3	8-L0
R875	1:N3	8-M0
R876	1:N3	8-L0
R877	1:N2	8-K2
R879	1:N2	8-K2
R880	1:M4	8-J6
R881	1:M4	8-L6
R882	1:M2	8-K3
RV210	1:B7	2-G3
RV220	1:A4	2-P6
RV501	1:K5	5-Q4
RV502	1:K5	5-Q2
RV805	1:N4	8-N1
SK200	1:C5	2-R1
SK205	1:B5	2-A5
=SK710	1:K3	7-A7
SK805	1:K3	8-Q9
SK805	1:K3	8-Q7
SK805	1:K3	8-Q5
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK805	1:K3	8-Q6
SK805	1:K3	8-Q8
SK805	1:K3	8-Q6
SK805	1:K3	8-Q6
SK805	1:K3	8-Q9
SK805	1:K3	8-Q6
SK805	1:K3	8-Q9
SK805	1:K3	8-Q7
SK805	1:K3	8-Q8
SK810	1:M3	8-G5
SL201	2:D1	2-B3
SL202	2:D1	2-B3
SL203	2:D2	2-B8
SL204	2:D2	2-B7
SL345	1:F5	3-J1
SL506	1:G5	5-E5
SL810	1:M2	8-B3
SW230	1:B8	2-B9
T210	1:B2	2-C3
T610	1:L6	6-M2
#TL300	1:E3	3-H7
TP206	1:B5	2-M8
TP300	1:F3	3-R8
TP500	1:H5	5-B5
TP501	1:H5	5-B6
TP502	1:H6	5-C6
TP503	1:J6	5-P3
TP505	1:J5	5-M4
TP506	1:J5	5-O4
TP508	1:J6	5-V5
TP601	1:N5	6-J6
TP602	1:M6	6-Q6
TP603	1:L5	6-Q1
TP604	1:L4	6-L6
TP607	1:L5	6-J9
TP710	1:G4	7-G5
TP715	1:J2	7-C5

Device	PCB	Circuit