Part B T825 Receiver

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

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

1 T825 General Information

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

The following topics are covered in this section.

1.1 Introduction

The T825 is a high performance microprocessor controlled FM base station receiver designed for single or multichannel operation in the 66 to 88MHz frequency range[1].

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

The audio section output can be adjusted to deliver >+10dBm to a 600 ohm balanced output, and 1W to a local monitor speaker. A flat or de-emphasised audio response is link selectable.

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

All components except those on the VCO board are mounted on a single PCB. This is secured to a die-cast chassis which is divided into compartments to individually shield each section of circuitry. Access to both sides of the main PCB is obtained by removing each of the two chassis covers. There is provision within the chassis to mount small option PCBs.

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

The T825 has a width of 60mm and occupies a single space in a Tait rack frame, which has the ability to accommodate up to seven standard modules.

1. Although capable of operating over the 66-88MHz frequency range, the T825 has a 2MHz switching range (see Section 1.2.3 and Section 3.1).

1.2 Specifications

1.2.1 Introduction

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

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

Details of test methods and the conditions which apply for Type Approval testing in all countries can be obtained from Tait Electronics Ltd.

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

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

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

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

1.2.2 General

Number Of Channels	.. 128 (standard)[1]
Supply Voltage:	
Operating Voltage	.. 10.8 to 16V DC
Standard Test Voltage	.. 13.8V DC
Polarity	.. negative earth only
Polarity Protection	.. crowbar diode
Supply Current:	
Standby	.. 350mA
Full Audio	.. 750mA
Operating Temperature Range	.. -30°C to +60°C
Dimensions:	
Height	.. 183mm
Width	.. 60mm
Length	.. 322mm
Weight	.. 2.13kg

1.2.3 RF Section

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

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

IF Amplifiers:

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

Sensitivity (De-emphasised Response):

Single Channel	..	-117dBm
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 (Typical):

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

Selectivity:

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

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

Intermodulation Response Attenuation:

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

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

Spurious Emissions:

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

1.2.4 Audio Section

1.2.4.1 General

Outputs Available .. line and monitor

Frequency Response .. flat or de-emphasised (750µs)
(link selectable)

Flat Response:

Bandwidth .. 67 to 3400Hz
Response .. within +1, -2dB of output level
at 1kHz

De-emphasised Response:

Bandwidth .. 300 to 3400Hz
Response .. within +1, -3dB of a 6dB/octave
de-emphasis characteristic (ref. 1kHz)

Line Output:

Power .. adjustable to >+10dBm
Load Impedance .. 600 ohms
Distortion (@ -70dBm signal level):

		De-emphasised	Flat
Wide Bandwidth	..	≤2%	≤2%
Narrow Bandwidth	..	≤2%	≤4%

Monitor Output:

Power .. 1W
Speaker Impedance .. 4 ohms
Distortion .. ≤3%
(@ -70dBm signal level, links set to de-emphasis)

1.2.4.2 CTCSS

Linkable High Pass Filter:

Bandwidth .. 350 to 3400Hz
Response .. within +1, -3dB of level at 1kHz
Hum And Noise .. 30dB min. at 250.3Hz
(1kHz at 60% system deviation 35dB typical (67 to 240Hz)
CTCSS at 10% system deviation)

Tone Detect:

Tone Squelch Opening .. better than 6dB sinad
3dB sinad at 250.3Hz (typical)
4dB sinad at 100Hz (typical)

Tone Detect Bandwidth .. ±2.1Hz accept (typical)
±3.0Hz reject (typical)

Response Time .. 150ms open and close (typical)

1.2.4.3 Mute Operation

Systems Available .. noise mute and carrier mute

Noise Mute:

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

Carrier Mute (Optional):

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

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

1.2.5 Microcontroller

Auxiliary Ports:

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

1.2.6 Test Standards

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

1.2.6.1 European Telecommunication Standard

ETS 300 086 January 1991

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment with an internal or external RF connector intended primarily for analogue speech.

ETS 300 113 March 1996

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector.

ETS 300 219 October 1993

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment transmitting signals to initiate a specific response in the receiver.

ETS 300 279 February 1996

Radio equipment and systems; electromagnetic compatibility (EMC) standard for private land mobile radio (PMR) and ancillary equipment (speech and/or non-speech).

1.2.6.2 DTI CEPT Recommendation T/R-24-01

Annex I: 1988

Technical characteristics and test conditions for radio equipment in the land mobile service intended primarily for analogue speech.

Annex II: 1988

Technical characteristics of radio equipment in the land mobile service with regard to quality and stability of transmission.

1.2.6.3 Telecommunications Industry Association

ANSI/TIA/EIA-603-1992

Land mobile FM or PM communications equipment measurement and performance standards.

1.3 Product Codes

The three groups of digits in the T820 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T820 Series II product codes is not intended to suggest that any combination of features is necessarily available in any one product. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models, types and options.

Model

The Model group indicates the basic function of the product, as follows:

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

Type

The Type group uses two digits to indicate the basic RF configuration of the product.

The first digit in the Type group designates the frequency range:

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

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

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

Options

T82X-XX-**XXXX** The Options group uses four digits and/or letters to indicate any options that may be fitted to the product. This includes standard options and special options for specific customers. '0000' indicates a standard Tait product with no options fitted. The large number of options precludes listing them here.

1.4 Standard Product Range

The following table lists the range of standard T825 types (i.e. no options fitted) available at the time this manual was published. Consult your nearest Tait Dealer or Customer Service Organisation for more information.

Frequency Range (MHz)[a]		66-88	
IF Bandwidth (kHz)		7.5	15
TCXO[b]	±2.5ppm -30°C to +60°C	•	•
Receiver Type: T825-		15-0000	10-0000

a. Selectable by solder links - refer to Section 3.7.

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

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

2 T825 Circuit Operation

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

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

Refer to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

The following topics are covered in this section.

2.1 Introduction

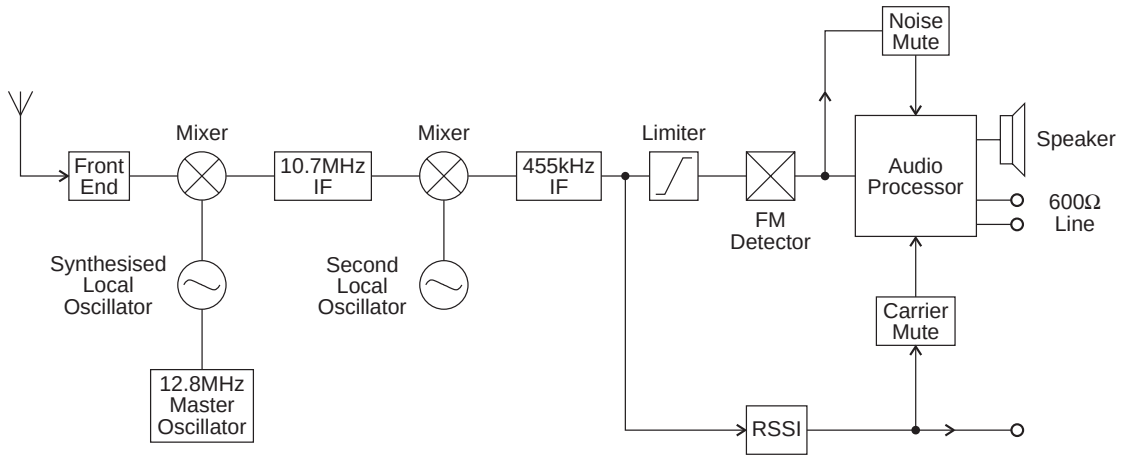


Figure 2.1 T825 High Level Block Diagram

The T825 receiver consists of a number of distinct stages:

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

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

2.2 Receiver Front End

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

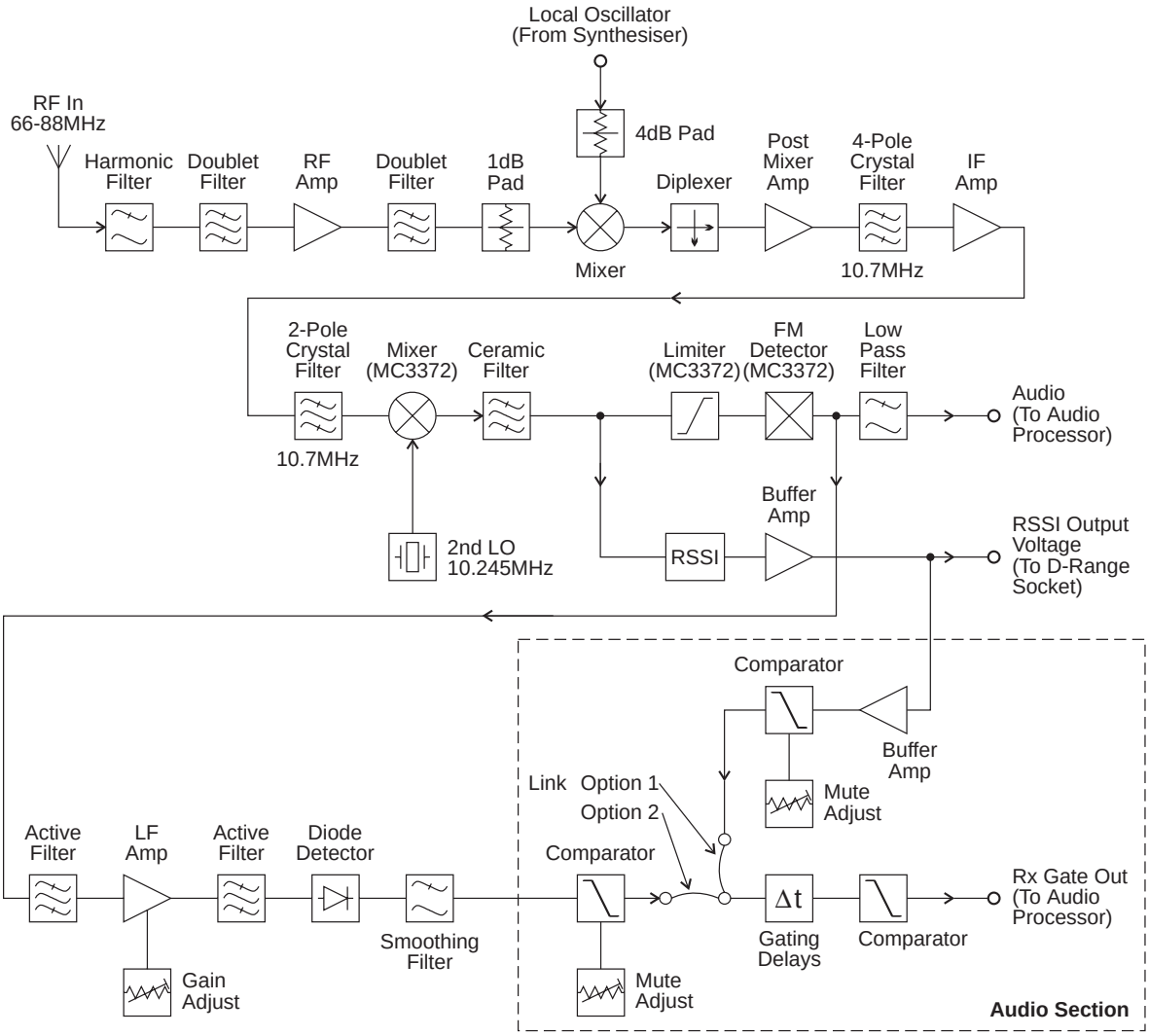


Figure 2.2 T825 Front End, IF and Mute Block Diagram

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

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

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

2.3 Mixer

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

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

2.4 IF Circuitry

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

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

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

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

2.5 Noise Mute (Squelch)

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

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

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

2.6 Carrier Mute

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

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

2.7 Audio Processor

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

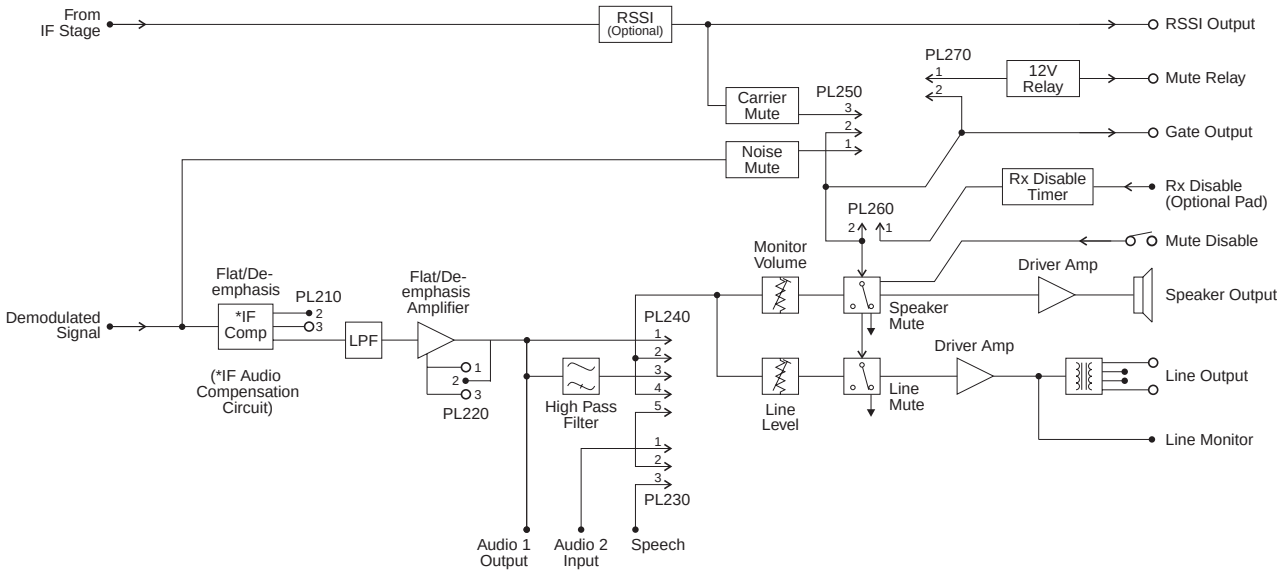


Figure 2.3 T825 Audio Processor Block Diagram

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

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

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

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

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

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

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

2.8 Power Supply And Regulators

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

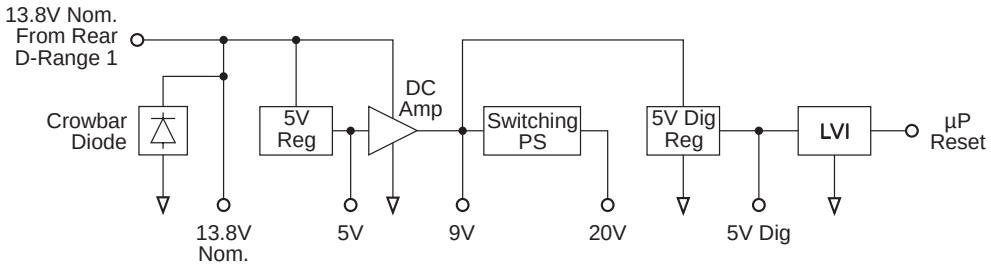


Figure 2.4 T825 Power Supply And Regulators Block Diagram

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

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

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

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

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

2.9 Microcontroller

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

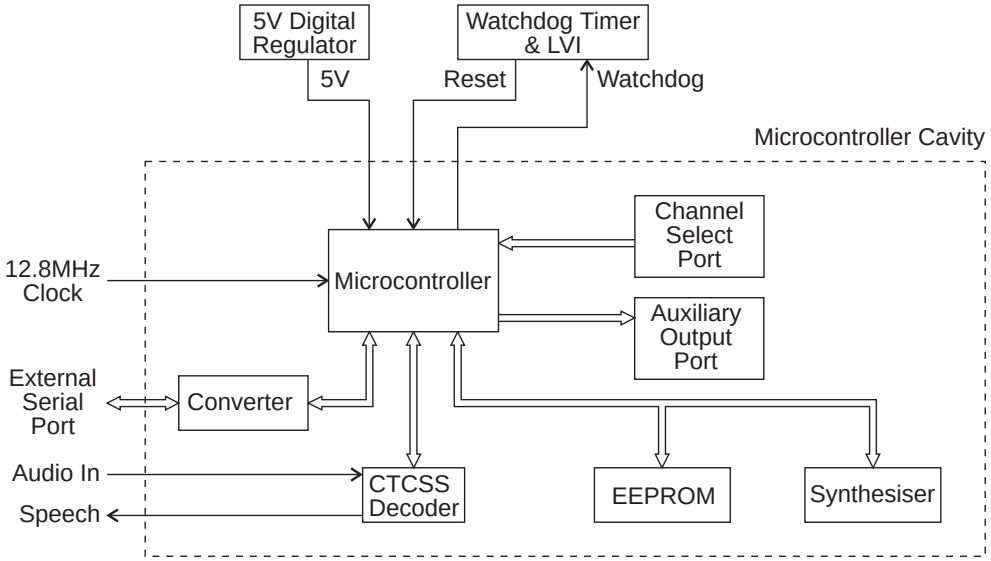


Figure 2.5 T825 Microcontroller Block Diagram

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

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

The main tasks of the microcontroller are as follows:

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

2.10 Synthesised Local Oscillator

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

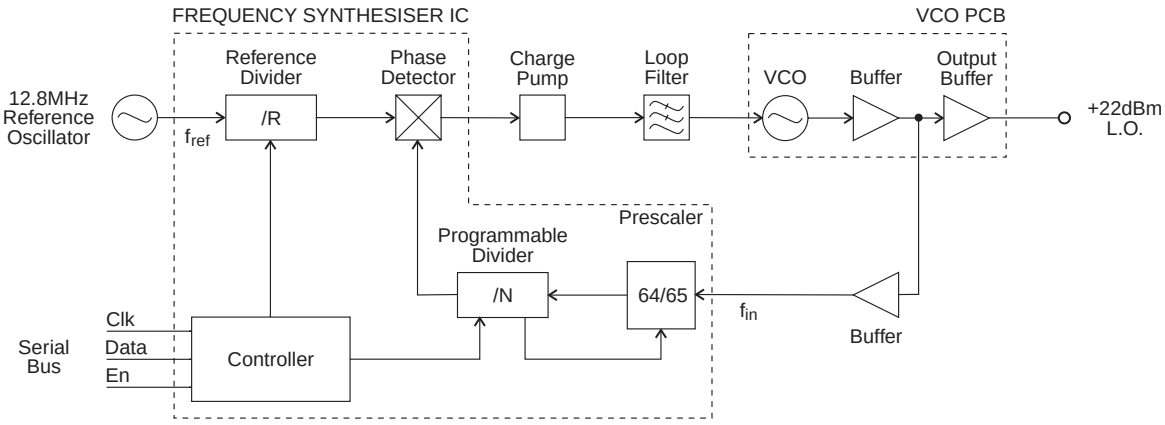


Figure 2.6 T825 Synthesiser Block Diagram

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

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

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

2.11 VCO

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

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

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

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

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

2.12 Received Signal Strength Indicator (RSSI)

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

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

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

3 T825 Initial Tuning & Adjustment

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

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

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

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

Refer to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

3.1 Introduction

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

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

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

3.2 Channel Programming

You can program up to 128 channel frequencies into the receiver's EEPROM memory (IC820) by using the PGM800Win software package and an 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).

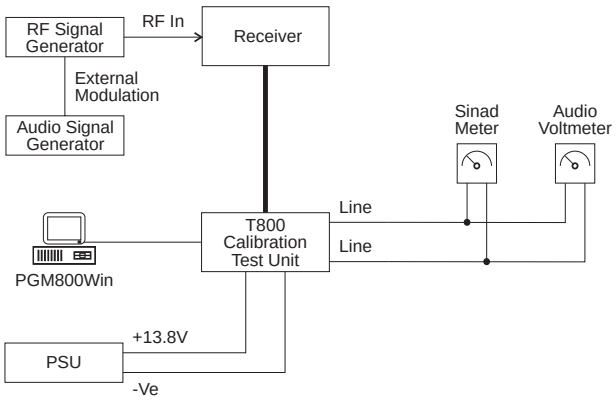


Figure 3.1 T825 Test Equipment Set-up For Short Tuning Procedure

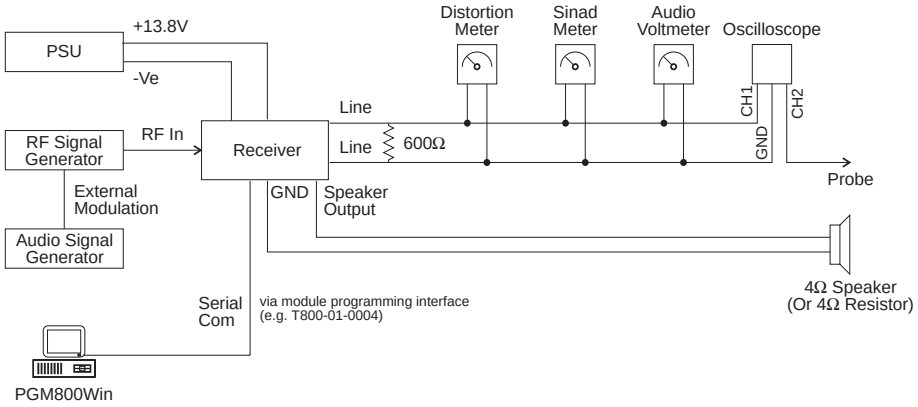


Figure 3.2 T825 Test Equipment Set-up For Full Tuning & Adjustment Procedure

3.4 Short Tuning Procedure

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

3.4.1 Introduction

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

Remove the top cover (nearest the handle).

Set up the test equipment as described in Section 3.3.

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

3.4.2 Synthesiser Alignment

- Connect a high impedance voltmeter to PL4-1 or the junction of L1 & R1 in the VCO (this measures the synthesiser loop voltage).

- **Single Channel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V.

  Multichannel Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V on the middle channel.

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

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

  Do not attempt to program channels with a greater frequency separation than the specified switching range of 2MHz.

3.4.3 Front End Alignment

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

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

Set RV230 (front panel gating sensitivity) fully clockwise.

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

Continually decrease the RF level to maintain 12dB sinad.

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

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

3.4.4 Mute Adjustment

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

3.4.4.1 Noise Mute

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

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

Set RV230 (front panel gating sensitivity) fully anticlockwise.

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

Rotate RV331 clockwise until the mute just opens.

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

3.4.4.2 Carrier Level Mute

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

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

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

3.4.5 Line Amplifier Output

Apply an on-channel signal from the RF generator at a level of -70dBm with ±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

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

Adjust RV230 (front panel gating sensitivity) fully clockwise.

Reduce the RF signal level to -110dBm.

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

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

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

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

3.4.6.3 High Pass Filter

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

Set the audio processor links as follows:

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

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

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

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

3.4.7 RSSI (If Used)

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

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

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

3.5 Audio Processor Links

3.5.1 General

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

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

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

a. Refer to Section 3.5.2 for further details.

3.5.2 Audio Processor Linking Details For CTCSS

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

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

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

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

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

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

3.6 Synthesiser Alignment

- Ensure that the receiver has been programmed with the required frequencies using PGM800Win software.

- Connect a high impedance voltmeter to PL4-1 or the junction of L1 & R1 in the VCO (this measures the synthesiser loop voltage).

- **Single Channel** Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V.

  Multichannel Tune VCO trimmer &VC1-RX for a synthesiser loop voltage of 9V on the middle channel.

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

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

  Do not attempt to program channels with a greater frequency separation than the specified switching range of 2MHz.

- The TCXO (=IC700) output frequency should be trimmed when the IF is tuned - refer to Section 3.7.

3.7 Alignment Of Receiver Front End And IF

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

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

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

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

Set RV230 (front panel gating sensitivity) fully clockwise.

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

Continually decrease the RF level to maintain 12dB sinad.

Tune quad coil L330 for maximum audio level.

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

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

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

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

Change the RF signal level to -70dBm and modulate with ±3kHz deviation [±1.5kHz] at 1kHz.

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

Adjust quad coil L330 and CV300 for minimum audio distortion.

Check that the distortion reading is:

wide bandwidth	≤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% (both bandwidths).

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

3.8 Gating Delay

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

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

*Factory setting.

3.9 Noise Mute Adjustment

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

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

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

Set RV230 (front panel gating sensitivity) fully anticlockwise.

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

Rotate RV331 clockwise until the mute just opens.

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

3.10 Carrier Level Mute

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

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

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

3.11 Audio Processor

3.11.1 Line Amplifier Output

Apply an on-channel signal from the RF generator at a level of -70dBm with ±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.

3.11.2 Monitor Amplifier Output (Speaker Output)

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

Check for any clipping or distortion on the oscilloscope.

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

3.12 CTCSS

3.12.1 Decoder Operation

Program a CTCSS tone on the default channel using PGM800Win.

Set the RF signal generator output to -70dBm.

Modulate the generator with both:

- a 1kHz tone at ±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.

3.12.2 Opening Sinad

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

Adjust RV230 (front panel gating sensitivity) fully clockwise.

Reduce the RF signal level to -110dBm.

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

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

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

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

3.12.3 High Pass Filter

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

Set the audio processor links as follows:

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

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

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

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

3.13 RSSI

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

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

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

6 T825 PCB Information

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

This section provides the following information on the T825 receiver:

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

6.1 Introduction

Product Type Identification

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

825-
825-
825-
PRODUCT TYPE

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

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

PCB Identification

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

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

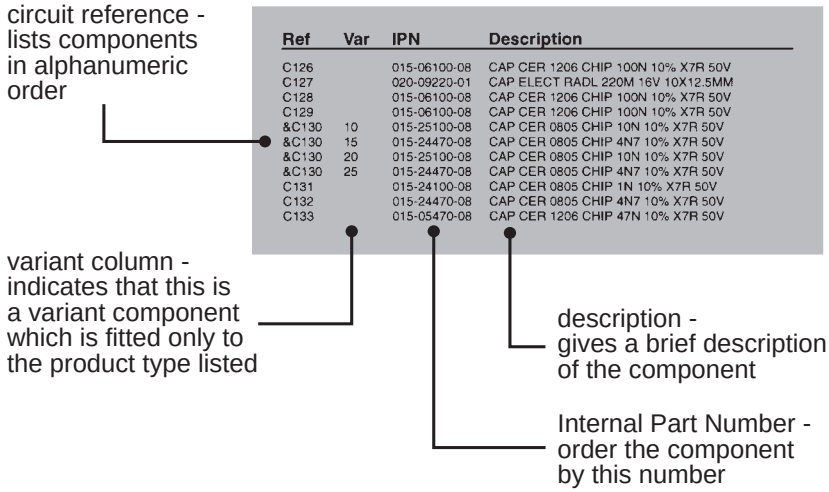
Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

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

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

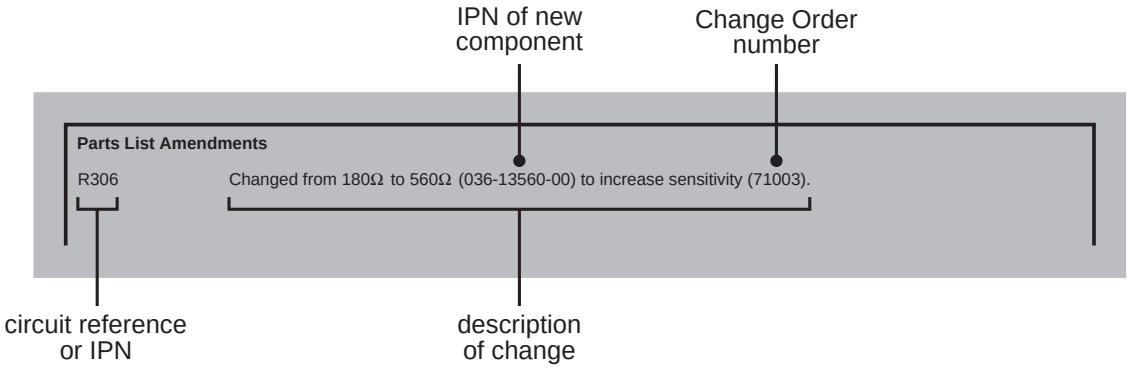
Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:



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

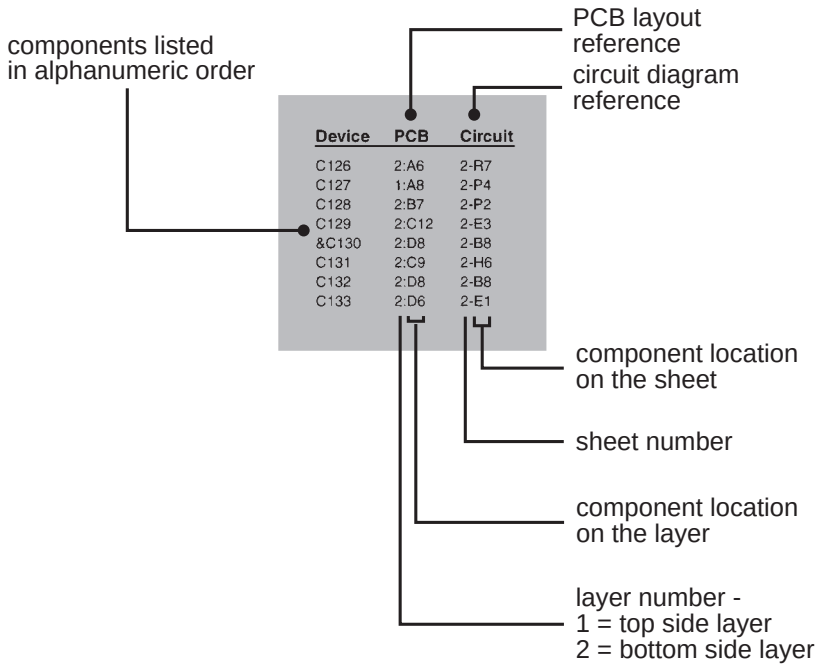
A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term "variant" is also used to describe components unplaced in one product. Variant components have a character prefix, such as "&",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

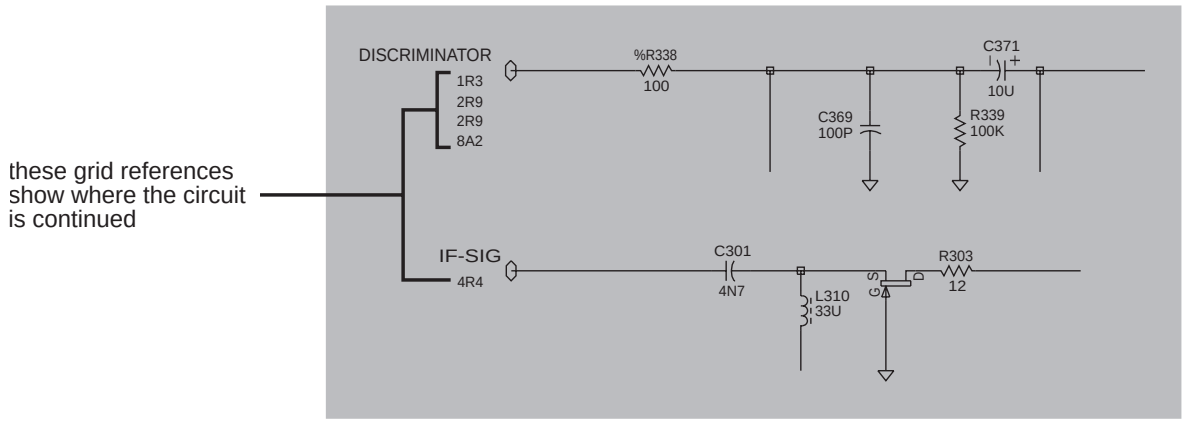
This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:



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 T825 Receiver PCB

This section contains the following information.

T825 Parts List (IPN 220-01446-03)

How To Use This Parts List

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

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

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

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

Parts List Amendments

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

Parts List Amendments - Continued

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

Ref	Var	IPN	Description
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+-1/4P 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		016-09220-01	CAP SMD ELECT 220U 35V 20%
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		016-09220-01	CAP SMD ELECT 220U 35V 20%
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		015-25100-08	CAP CER 0805 10N 10% X7R 50V
CV300		028-01500-01	CAP TRM 1.5/5P NPO TOP ADJ
C301		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C302		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C303		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C304		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C305		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C306		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C307		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C308		015-23100-01	CAP CER 0805 100P 5% NPO 50V
&C309	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V
&C309	15	015-22220-01	CAP CER 0805 22P 5% NPO 50V
&C310	10	015-21180-01	CAP CER 0805 1P8+-1/4P NPO 50V
&C310	15	015-22180-01	CAP CER 0805 18P 5% NPO 50V
&C311	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V
&C311	15	015-22220-01	CAP CER 0805 22P 5% NPO 50V
C312		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C313		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C314		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C315		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C316		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C317		015-25100-08	CAP CER 0805 10N 10% X7R 50V
&C318	10	015-23120-01	CAP CER 0805 120P 5% NPO 50V
&C318	15	015-23100-01	CAP CER 0805 100P 5% NPO 50V
&C319	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V
&C319	15	015-22180-01	CAP CER 0805 18P 5% NPO 50V
C320		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C321		015-23330-08	CAP CER 0805 330P 10% X7R 50V
&C325	10	015-22180-01	CAP CER 0805 18P 5% NPO 50V
&C325	15	015-22270-01	CAP CER 0805 27P 5% NPO 50V
&C326	10	015-22220-01	CAP CER 0805 22P 5% NPO 50V
C327		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C329		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C330		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C331		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C332		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C333		014-07470-03	L) CAP TANT SMD 4U7 35V 20%
C334		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C335		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C336		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C337		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C338		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C339		015-22100-01	CAP CER 0805 10P+-1/2P NPO 50V
C340		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C341		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C342		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C343		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C344		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C345		015-24470-08	CAP CER 0805 4N7 10% X7R 50V

Ref	Var	IPN	Description
C348		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C349		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C350		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C351		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C352		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C353		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C354		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C355		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C357		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C358		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C359		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C360		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C361		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C362		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C363		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C364		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C365		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C366		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C367		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C400		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C401		015-23220-01	CAP CER 0805 220P 5% NPO 50V
C402		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C403		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C404		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C405		015-23470-08	CAP CER 0805 470P 10% X7R 50V
C408		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C409		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C410		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C411		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C412		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C416		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C417		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C418		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C419		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C420		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C424		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C425		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C426		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C427		015-05470-08	CAP CER 1206 47N 10% X7R 50V
C428		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C432		015-22820-01	CAP CER 0805 82P 5% NPO 50V
C433		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C434		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C435		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C436		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C440		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C441		015-22560-01	CAP CER 0805 56P 5% NPO 50V
C442		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C443		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C444		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C448		015-22270-01	CAP CER 0805 27P 5% NPO 50V
C449		015-22390-01	CAP CER 0805 39P 5% NPO 50V
C450		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C505		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C515		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C530		014-08220-01	(L)CAP TANT 22UF10V276MSER
C535		015-26100-08	CAP CER 0805 100N 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		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C625		020-09470-07	CAPEL470M16V20%V 8*20 3.5L.ESR
C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C630		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C631A		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C631B		014-08100-03	CAP TANT SMD 10U 35V 20%
C637		015-24100-08	CAP CER 0805 1N 10% X7R 50V
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		015-24100-08	CAP CER 0805 1N 10% X7R 50V
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 TANT CHIP 4U7 3.5 X 2.8MM
C710B		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C710C		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C711		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C712		015-23100-01	CAP CER 0805 100P 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

Ref	Var	IPN	Description
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 TANT CHIP 4U7 3.5 X 2.8MM
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		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
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 TANT CHIP 4U7 3.5 X 2.8MM
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		022-07100-05	CAP METAL PPS 1U 20% 63V 5MM
C776		015-25330-08	CAP CER 0805 CHIP 33NF
C782		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C784		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C786		015-26100-08	CAP CER 0805 100N 10% X7R 50V
C788		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C790		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C792		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C793		015-24100-08	CAP CER 0805 1N 10% X7R 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		015-24100-08	CAP CER 0805 1N 10% X7R 50V
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		015-22330-01	CAP CER 0805 33P 5% NPO 50V
C901		015-22680-01	CAP CER 0805 68P 5% NPO 50V
C902		015-22680-01	CAP CER 0805 68P 5% NPO 50V
C903		015-22330-01	CAP CER 0805 33P 5% NPO 50V
%D111A	10	001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
%D111A	15	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
D400		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
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
D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D740		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D820		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
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
IC330		002-10337-20	S) IC MC3372D SMD IF DETECTOR
IC332		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC333		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC339		002-10078-05	S) IC SMD 78L05 5V REG
IC340		002-10008-40	S)IC SMD TL084CD 4X O-AMP JFET
IC410		002-10000-14	MIXER DBL BALANCE 2-500 MHZ
IC610		002-10078-05	S) IC SMD 78L05 5V REG

Ref	Var	IPN	Description
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	10	539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
=IC700	15	539-00010-41	TCXO 12.8MHZ +-2.5PPM -30 +70C
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		056-10102-12	IND SMD 1u2 1812CS 5%
L301		056-10802-12	IND SMD 8u2 1812CS 5%
L302		056-10105-12	IND SMD 1u5 1812CS 5%
&L303	10	056-10102-12	IND SMD 1u2 1812CS 5%
&L303	15	056-10105-12	IND SMD 1u5 1812CS 5%
&L304	10	056-10010-12	IND SMD 10uH 1812CS 5%
&L304	15	056-10802-12	IND SMD 8u2 1812CS 5%
&L305	10	056-10010-12	IND SMD 10uH 1812CS 5%
&L305	15	056-10802-12	IND SMD 8u2 1812CS 5%
&L306	10	056-10102-12	IND SMD 1u2 1812CS 5%
&L306	15	056-10105-12	IND SMD 1u5 1812CS 5%
&L307	10	056-10102-12	IND SMD 1u2 1812CS 5%
&L307	15	056-10105-12	IND SMD 1u5 1812CS 5%
&L308	10	056-10010-12	IND SMD 10uH 1812CS 5%
&L308	15	056-10802-12	IND SMD 8u2 1812CS 5%
&L309	10	056-10010-12	IND SMD 10uH 1812CS 5%
&L310	10	056-10802-12	IND SMD 8u2 1812CS 5%
&L325	15	056-10010-12	IND SMD 10uH 1812CS 5%
L330		050-15119-75	COIL SMD 455KHz IF 5119-T075
L400		056-10001-10	IND SMD 1uH 1206CS 5%
L401		056-10001-10	IND SMD 1uH 1206CS 5%
L402		050-00016-54	COIL 654 10 CAN T720
L403		050-00016-54	COIL 654 10 CAN T720
L404		056-14150-02	(L) IND SMD 1.5UH
L405		056-14150-02	(L) IND SMD 1.5UH
L406		056-10105-12	IND SMD 1u5 1812CS 5%
L409		050-00016-54	COIL 654 10 CAN T720
L410		050-00016-54	COIL 654 10 CAN T720
L750		056-10330-02	(L) IND SMD 330NH
L900		056-10121-00	IND SMD 120NH 1812SMS 5%
L901		056-10121-00	IND SMD 120NH 1812SMS 5%
L902		056-10121-00	IND SMD 120NH 1812SMS 5%
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		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q301		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q302		000-10003-10	S) XSTR SMD BFJ310 JFET UHF
Q303		000-10095-10	S) XSTR SMD BR951 NPN UHF
Q304		000-10095-10	S) XSTR SMD BR951 NPN UHF
Q331		000-10008-48	S) XSTR SMD BCW60 NPN SOT23 SS
Q400		000-10054-00	XSTR SMD BFG540 NPNUHF SOT143B
Q401		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q540		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

Ref	Var	IPN	Description
R160		036-12100-00	RES M/F 0805 10E 5%
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%
RV205		040-05100-22	POT 10K LOG DUAL PCB 6 OD SFT
R207		036-14820-10	RES M/F 0805 8K2 1%
&R209	10	036-15220-00	RES M/F 0805 22K 5%
&R209	15	036-15180-10	RES M/F 0805 18K 1%
R210		036-15150-00	RES M/F 0805 15K 5%
RL210		237-10010-00	RELAY 12V DPDT 10PIN SMD
RV210		040-05100-23	POT 10K LOG PCB 15MM SLOT SFT
R211		036-15390-00	RES M/F 0805 39K 5%
R213		036-14270-00	RES M/F 0805 2K7 5%
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	15	036-14820-10	RES M/F 0805 8K2 1%
RV220		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
R221		036-15470-10	RES M/F 0805 47K 1%
R222		036-16100-00	RES M/F 0805 100K 5%
%R223	10	036-12100-00	RES M/F 0805 10E 5%
%R223	15	036-12100-00	RES M/F 0805 10E 5%
R224		036-14390-10	RES M/F 0805 3K9 1%
R225		036-13470-00	RES M/F 0805 470E 5%
R227		036-14270-00	RES M/F 0805 2K7 5%
R229		036-14470-10	RES M/F 0805 4K7 1%
R230		036-14470-10	RES M/F 0805 4K7 1%
RV230		040-05100-21	POT 10K LIN PCB 15MM SLOT SFT
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%
RV235		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
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		036-15390-00	RES M/F 0805 39K 5%
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		036-14270-00	RES M/F 0805 2K7 5%
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		036-15100-10	RES M/F 0805 10K 1%
R265		036-13100-10	RES M/F 0805 100E 1%
R266		036-15270-10	RES M/F 0805 27K 1%
R267		036-16180-00	RES M/F 0805 180K 5%
R269		036-14220-00	RES M/F 0805 2K2 5%
R271		036-16100-00	RES M/F 0805 100K 5%
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		036-16100-00	RES M/F 0805 100K 5%
R281		036-14470-10	RES M/F 0805 4K7 1%
R282		036-16100-00	RES M/F 0805 100K 5%
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		036-13560-00	RES M/F 0805 560E 5%
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		036-14680-10	RES M/F 0805 6K8 1%
R301		036-12270-00	RES M/F 0805 27E 5%
R302		036-12120-00	RES M/F 0805 12E 5%
R303		036-12100-00	RES M/F 0805 10E 5%
R304		036-13820-00	RES M/F 0805 820E 5%
R307		036-14100-10	RES M/F 0805 1K 1%
R308		036-14330-10	RES M/F 0805 3K3 1%
R309		036-14100-10	RES M/F 0805 1K 1%
R310		036-11470-00	RES M/F 0805 4E7 10%
R311		036-12470-00	RES M/F 0805 47E 5%
R312		036-13100-10	RES M/F 0805 100E 1%
R313		036-12560-00	RES M/F 0805 56E 5%
R314		036-12390-00	RES M/F 0805 39E 5%
R315		036-13470-00	RES M/F 0805 470E 5%
R317		036-14330-10	RES M/F 0805 3K3 1%
R318		036-12560-00	RES M/F 0805 56E 5%

Ref	Var	IPN	Description
R319		036-12390-00	RES M/F 0805 39E 5%
R320		036-13150-10	RES M/F 0805 150E 1%
R321		036-13150-10	RES M/F 0805 150E 1%
&R323	15	036-10000-00	RES M/F 0805 ZERO OHM
&R324	15	036-10000-00	RES M/F 0805 ZERO OHM
R329		036-17100-10	RES M/F 0805 1M 1%
R330		036-10000-00	RES M/F 0805 ZERO OHM
RV330		042-04220-05	RES PRESET SMD 2K CER 4MM SQ
RV331		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
R333		036-12220-00	RES M/F 0805 22E 5%
R336		036-14150-10	RES M/F 0805 1K5 1%
R337		036-14220-00	RES M/F 0805 2K2 5%
R338		036-14100-10	RES M/F 0805 1K 1%
R339		036-15470-10	RES M/F 0805 47K 1%
R340		036-16220-00	RES M/F 0805 220K 5%
R341		036-16120-00	RES M/F 0805 120K 5%
R342		036-15220-00	RES M/F 0805 22K 5%
R343		036-15100-10	RES M/F 0805 10K 1%
R344		036-15100-10	RES M/F 0805 10K 1%
&R346	10	036-15560-10	RES MF 0805 56K 1%
&R346	15	036-16100-00	RES M/F 0805 100K 5%
R347		036-15470-10	RES M/F 0805 47K 1%
R348		036-14820-10	RES M/F 0805 8K2 1%
R349		036-14560-00	RES M/F 0805 5K6 5%
R350		036-14100-10	RES M/F 0805 1K 1%
R351		036-14560-00	RES M/F 0805 5K6 5%
R352		036-14390-10	RES M/F 0805 3K9 1%
R353		036-16220-00	RES M/F 0805 220K 5%
R354		036-16220-00	RES M/F 0805 220K 5%
R355		036-14330-10	RES M/F 0805 3K3 1%
R356		036-14220-00	RES M/F 0805 2K2 5%
R357		036-15270-10	RES M/F 0805 27K 1%
R358		036-16220-00	RES M/F 0805 220K 5%
R359		045-15100-00	RES NTC SMD 10K 5%
R360		036-15100-10	RES M/F 0805 10K 1%
R361		036-16390-00	RES M/F 0805 390K 5%
R362		036-15470-10	RES M/F 0805 47K 1%
R363		036-14100-10	RES M/F 0805 1K 1%
R365		036-13220-10	RES 0805 220E 1%
R368		036-15100-10	RES M/F 0805 10K 1%
R369		036-14220-00	RES M/F 0805 2K2 5%
R370		036-14100-10	RES M/F 0805 1K 1%
R371		036-14820-10	RES M/F 0805 8K2 1%
R372		036-14560-00	RES M/F 0805 5K6 5%
R373		036-16390-00	RES M/F 0805 390K 5%
R374		036-15100-10	RES M/F 0805 10K 1%
R375		036-16390-00	RES M/F 0805 390K 5%
R376		036-15100-10	RES M/F 0805 10K 1%
R377		036-16390-00	RES M/F 0805 390K 5%
R378		036-16390-00	RES M/F 0805 390K 5%
R382		036-15100-10	RES M/F 0805 10K 1%
R383		036-15470-10	RES M/F 0805 47K 1%
R384		036-15470-10	RES M/F 0805 47K 1%
R400		036-13220-10	RES 0805 220E 1%
R401		036-12220-00	RES M/F 0805 22E 5%
R402		036-13220-10	RES 0805 220E 1%
R403		036-12820-00	RES M/F 0805 82E 5%
R404		036-12820-00	RES M/F 0805 82E 5%
R408		036-11470-00	RES M/F 0805 4E7 10%
R409		036-13820-00	RES M/F 0805 820E 5%
R410		036-13820-00	RES M/F 0805 820E 5%
R411		036-17100-10	RES M/F 0805 1M 1%
R412		036-10000-00	RES M/F 0805 ZERO OHM
R416		036-17100-10	RES M/F 0805 1M 1%
R417		036-13560-00	RES M/F 0805 560E 5%
R418		036-12390-00	RES M/F 0805 39E 5%
R419		036-12390-00	RES M/F 0805 39E 5%
R420		036-12100-00	RES M/F 0805 10E 5%
R424		036-13330-00	RES M/F 0805 330E 5%
R425		036-14220-00	RES M/F 0805 2K2 5%
R426		036-13470-00	RES M/F 0805 470E 5%
R427		036-14330-10	RES M/F 0805 3K3 1%
R510		036-14220-00	RES M/F 0805 2K2 5%
R515		036-12560-00	RES M/F 0805 56E 5%
R555		036-13470-00	RES M/F 0805 470E 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		036-12100-00	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%
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		036-12100-00	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		036-15150-00	RES M/F 0805 15K 5%

Ref	Var	IPN	Description
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		036-12100-00	RES M/F 0805 10E 5%
R713		036-16470-00	RES M/F 0805 470K 5%
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		036-14270-00	RES M/F 0805 2K7 5%
R784		036-12680-00	RES M/F 0805 68E 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		036-13220-10	RES 0805 220E 1%
R793		036-13100-10	RES M/F 0805 100E 1%
R794		036-14100-10	RES M/F 0805 1K 1%
R804		036-15470-10	RES M/F 0805 47K 1%
R805		036-13470-00	RES M/F 0805 470E 5%
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%
R820		036-15470-10	RES M/F 0805 47K 1%
R821		036-15470-10	RES M/F 0805 47K 1%
R822		036-15470-10	RES M/F 0805 47K 1%
R823		036-15470-10	RES M/F 0805 47K 1%
R824		036-14220-00	RES M/F 0805 2K2 5%
R825		036-14220-00	RES M/F 0805 2K2 5%
R826		036-14220-00	RES M/F 0805 2K2 5%
R827		036-14220-00	RES M/F 0805 2K2 5%
R828		036-14220-00	RES M/F 0805 2K2 5%
R829		036-14220-00	RES M/F 0805 2K2 5%
R830		036-14220-00	RES M/F 0805 2K2 5%
R831		036-14220-00	RES M/F 0805 2K2 5%
R832		036-14220-00	RES M/F 0805 2K2 5%
R833		036-14220-00	RES M/F 0805 2K2 5%
R835		036-14220-00	RES M/F 0805 2K2 5%
R836		036-14220-00	RES M/F 0805 2K2 5%
R837		036-14220-00	RES M/F 0805 2K2 5%
R838		036-14470-10	RES M/F 0805 4K7 1%
R839		036-14470-10	RES M/F 0805 4K7 1%
R840		036-14220-00	RES M/F 0805 2K2 5%
R841		036-14220-00	RES M/F 0805 2K2 5%
R842		036-14220-00	RES M/F 0805 2K2 5%
R843		036-14220-00	RES M/F 0805 2K2 5%
R844		036-15470-10	RES M/F 0805 47K 1%
R845		036-16150-00	RES M/F 0805 150K 5%
R846		036-14470-10	RES M/F 0805 4K7 1%
R847		036-14470-10	RES M/F 0805 4K7 1%
R848		036-13470-00	RES M/F 0805 470E 5%
R852		036-14470-10	RES M/F 0805 4K7 1%
R853		036-13470-00	RES M/F 0805 470E 5%
R854		036-16330-00	RES M/F 0805 330K 5%
R855		036-15470-10	RES M/F 0805 47K 1%
R856		036-16150-00	RES M/F 0805 150K 5%
R857		036-16150-00	RES M/F 0805 150K 5%
R858		036-15270-10	RES M/F 0805 27K 1%
R859		036-17120-10	RES M/F 0805 1M2 1%
R860		036-16820-10	RES M/F 0805 820K 1%
R861		036-14510-10	RES M/F 0805 5K1 1%
R863		036-14470-10	RES M/F 0805 4K7 1%
R865		036-14270-00	RES M/F 0805 2K7 5%
R866		036-16820-10	RES M/F 0805 820K 1%
R867		036-16820-10	RES M/F 0805 820K 1%
R868		036-14470-10	RES M/F 0805 4K7 1%
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		036-16100-00	RES M/F 0805 100K 5%
R877		036-16100-00	RES M/F 0805 100K 5%
R878		036-16100-00	RES M/F 0805 100K 5%
R879		036-16100-00	RES M/F 0805 100K 5%
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		036-16100-00	RES M/F 0805 100K 5%
R890		036-16150-00	RES M/F 0805 150K 5%
R891		036-16100-00	RES M/F 0805 100K 5%
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%
SW201		230-00010-30	SWITCH TOG SPDT R-ANG PCB MTG
SHLD610		062-00010-13	CAN 10MM SQ X 11MM CAN A4M1017
SK805		240-10000-07	CONN SMD SKT 16W 2R M-MATCH
SK810		240-04020-42	SKT 44 PIN SMD PLCC
T210		053-00010-17	XFMR T4030 LINE MATCH POTCORE
T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052
&XF300	10	276-00010-36	FLTR XTAL 10.7M 15KHZ PR 4POLE
&XF300	15	276-00010-37	FLTR XTL 10.7M 7.5KHZ PR 4POLE
&XF301	10	276-00010-36	FLTR XTAL 10.7M 15KHZ PR 4POLE
&XF301	15	276-00010-37	FLTR XTL 10.7M 7.5KHZ PR 4POLE
&XF302	10	276-00010-20	FLTR XTAL 10.7M 15KHZ 2 POLE
&XF302	15	276-00010-19	FLTR XTAL 10.7M 7.5KHZ 2 POLE
X330		274-00010-10	XTAL 10.245MHZ SPEC TE/4
&XF304	10	276-10010-14	FLTR CER SMD 455KHz E15KHz B/W
&XF304	15	276-10010-13	FLTR CER SMD 455KHz G 9KHz B/W

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

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

T825 Grid Reference Index (IPN 220-01446-03)

How To Use This Grid Reference Index

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

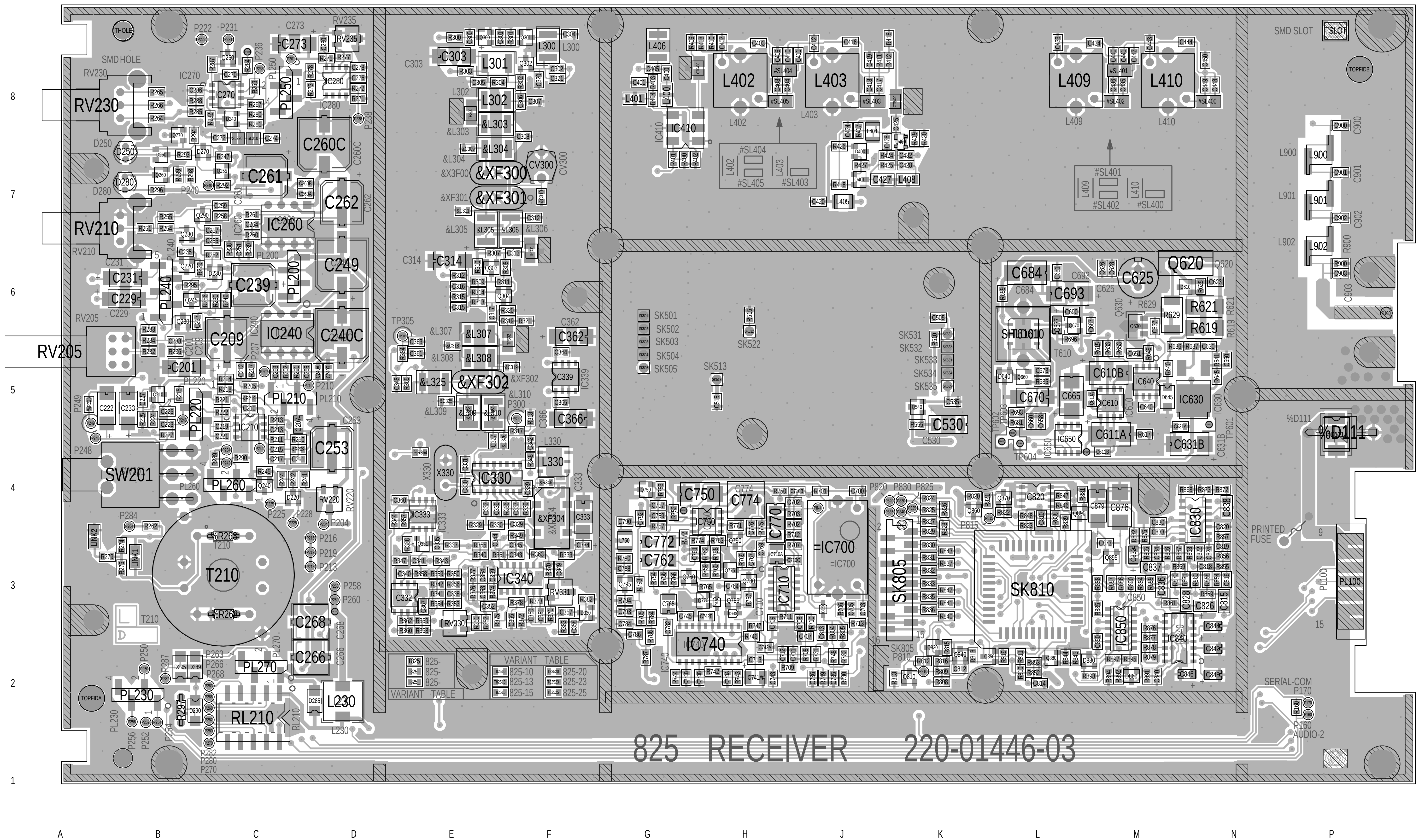
The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

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

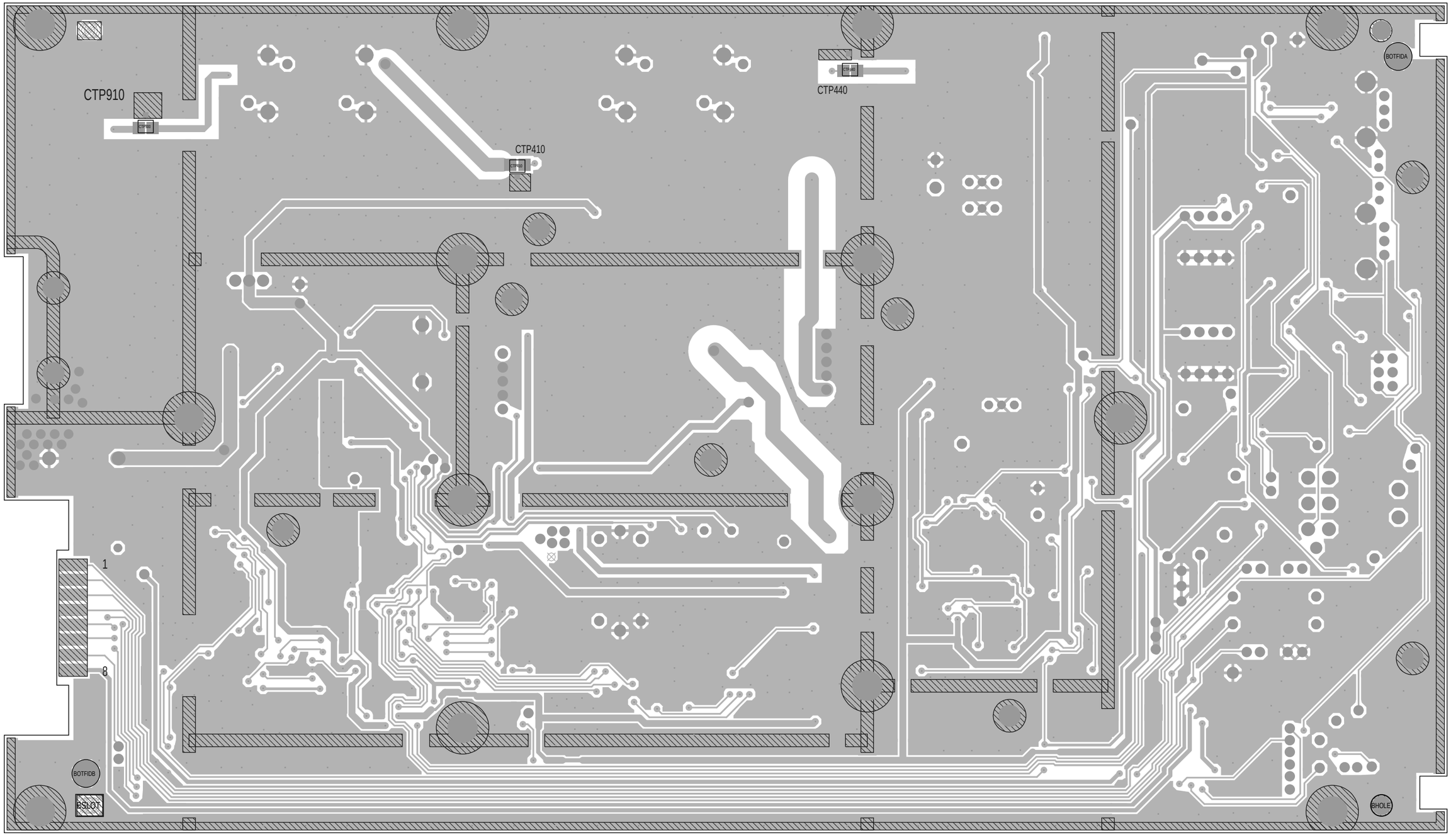
Device	PCB	Circuit
C838	1:N4	8-F0
C840	1:M2	8-K1
C842	1:N2	8-L0
C844	1:N3	8-L0
C846	1:N2	8-M0
C848	1:N2	8-M0
C850	1:M2	8-N0
C873	1:M3	8-P2
C876	1:M4	8-P2
C879	1:M4	8-Q0
C900	1:P8	9-E4
C901	1:P7	9-E4
C902	1:P7	9-F4
C903	1:P6	9-G4
CTP410	2:K7	4-E3
CTP420	1:K8	4-H3
CTP430	1:H8	4-M3
CTP440	2:G8	4-Q3
CTP900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

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

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



T825 PCB Layout - Top Side
220-01446-03

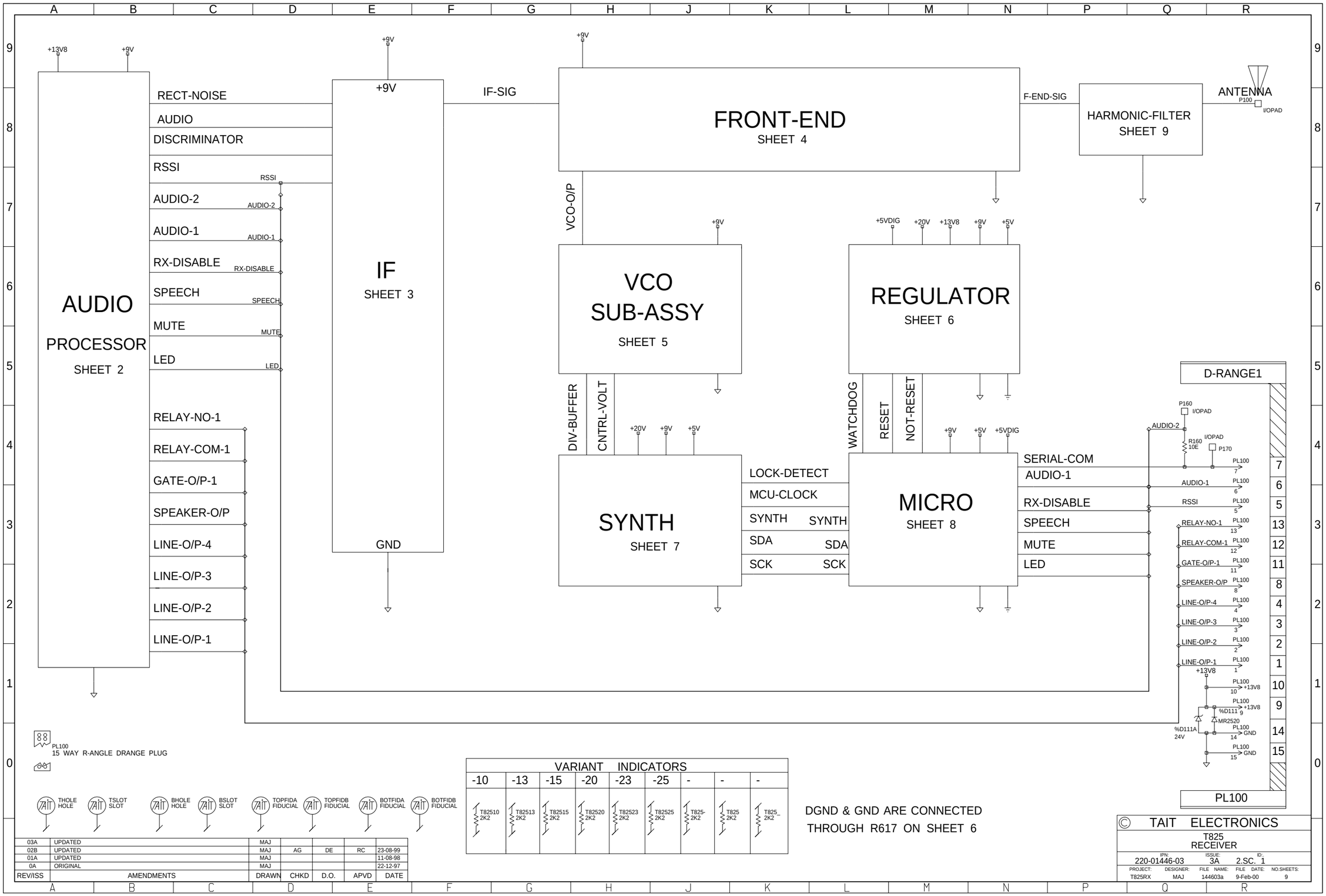


8 7 6 5 4 3 2 1

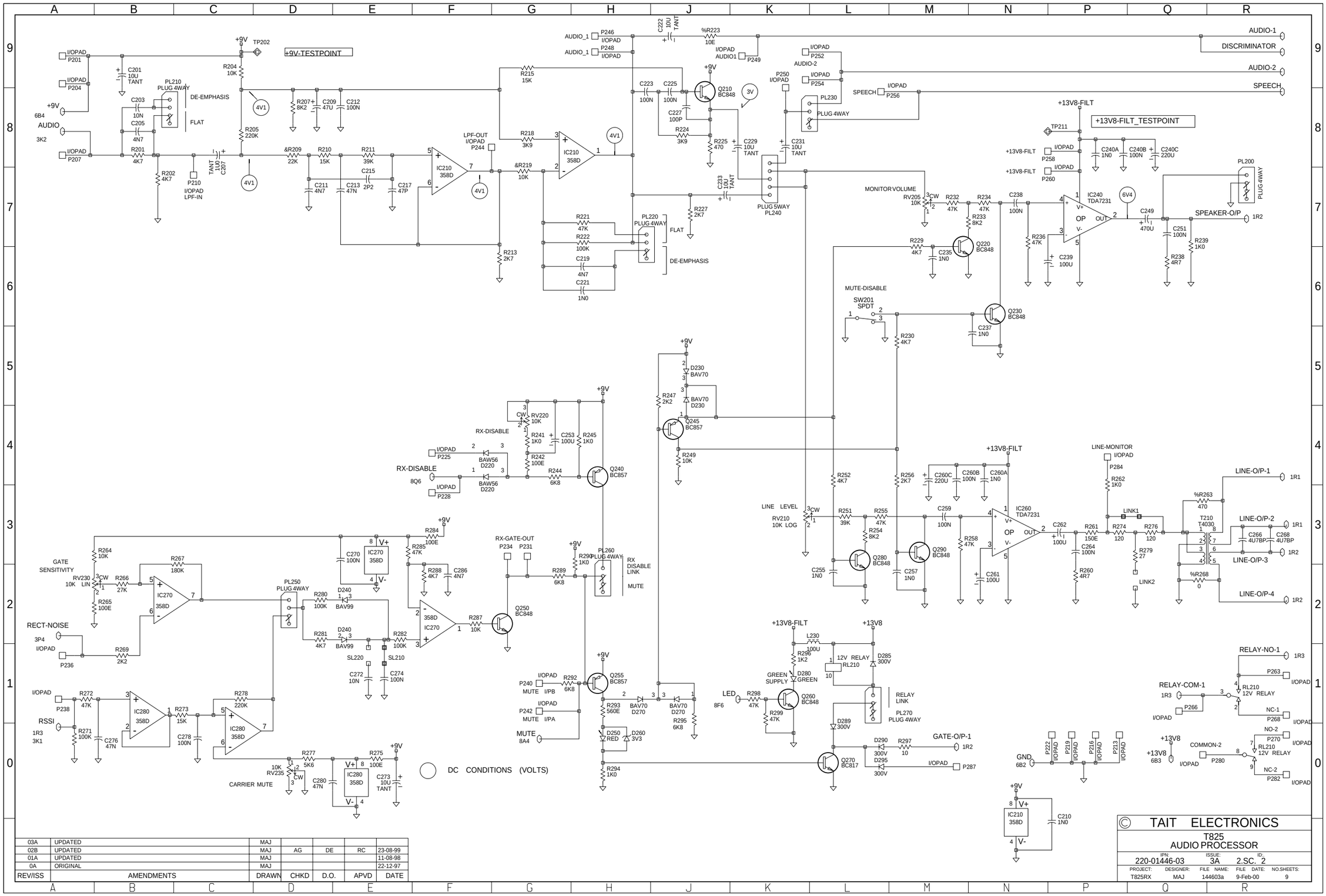
P N M L K J H G F E D C B A

T825 PCB Layout - Bottom Side
220-01446-03

01/07/00



Sheet 1 - T825 Receiver Overview
220-01446-03



REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

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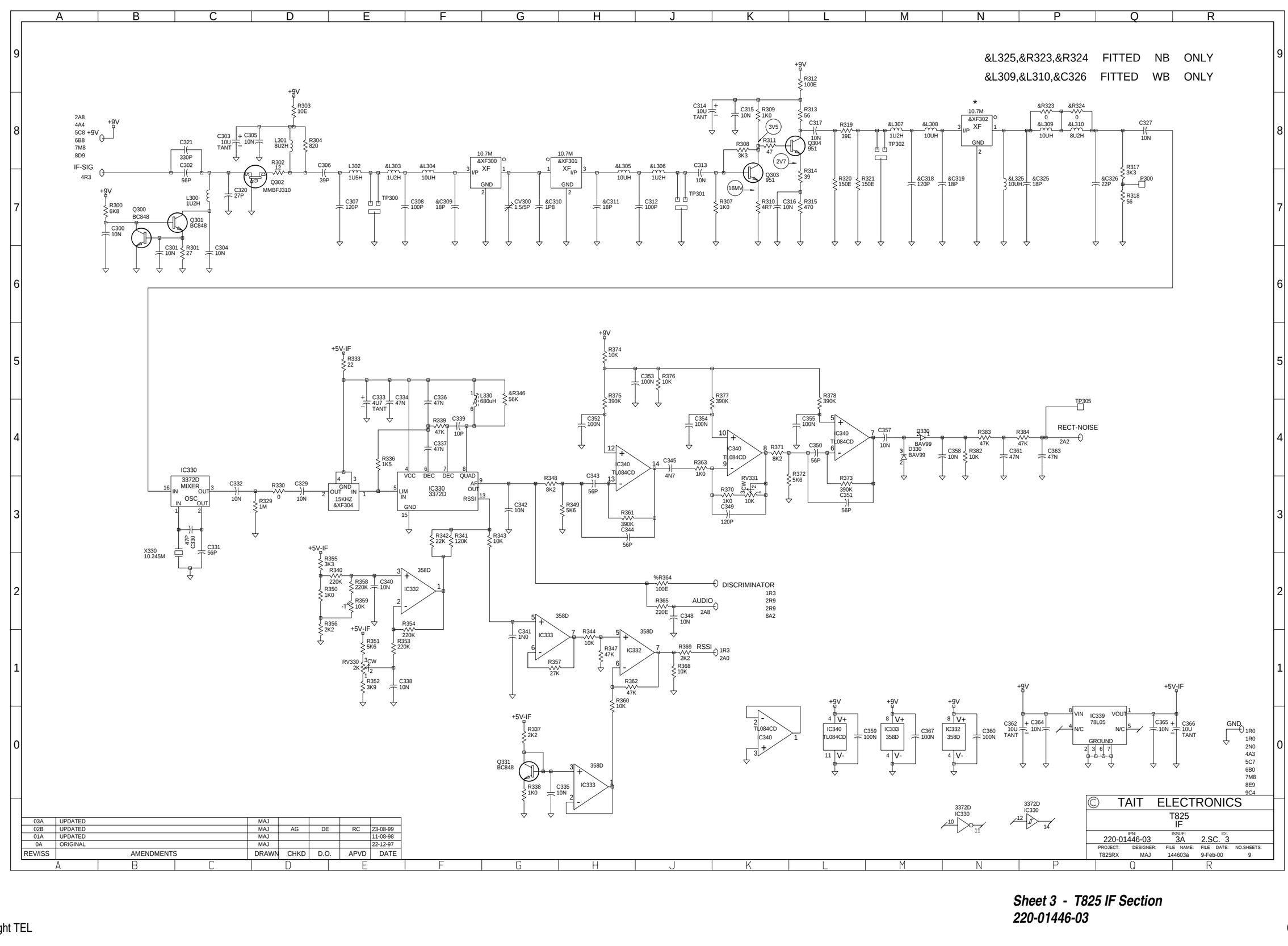
T825
AUDIO PROCESSOR

IPN:	ISSUE:	ID:
220-01446-03	3A	2.SC. 2

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9

Sheet 2 - T825 Audio Processor
220-01446-03

&L325,&R323,&R324 FITTED NB ONLY
&L309,&L310,&C326 FITTED WB ONLY



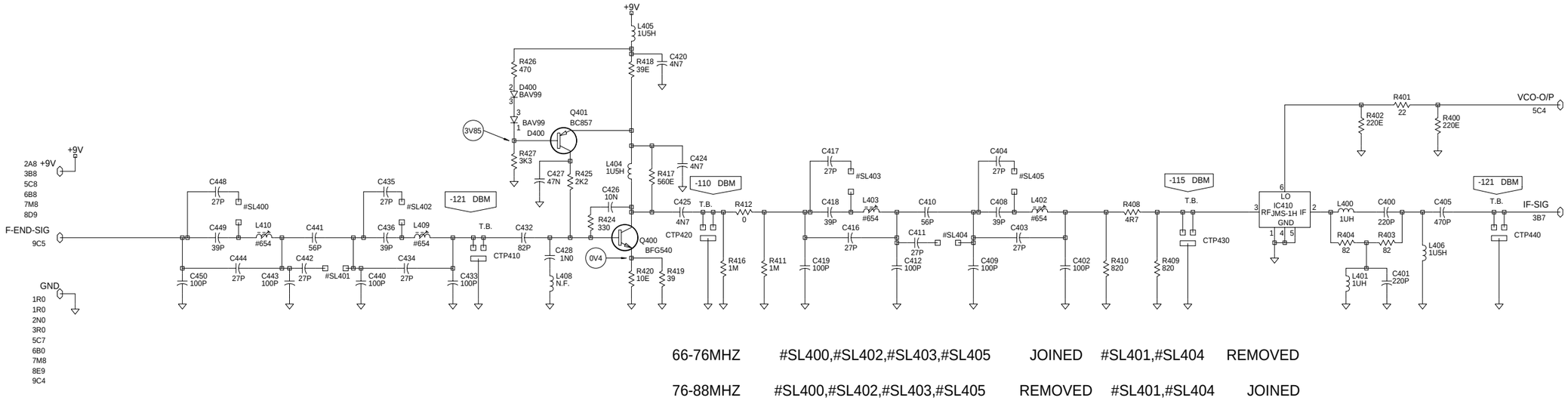
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

T825
IF

IPN:	ISSUE:	ID:
220-01446-03	3A	2.SC. 3

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9

Sheet 3 - T825 IF Section
220-01446-03



66-76MHZ #SL400,#SL402,#SL403,#SL405 JOINED #SL401,#SL404 REMOVED

76-88MHZ #SL400,#SL402,#SL403,#SL405 REMOVED #SL401,#SL404 JOINED

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

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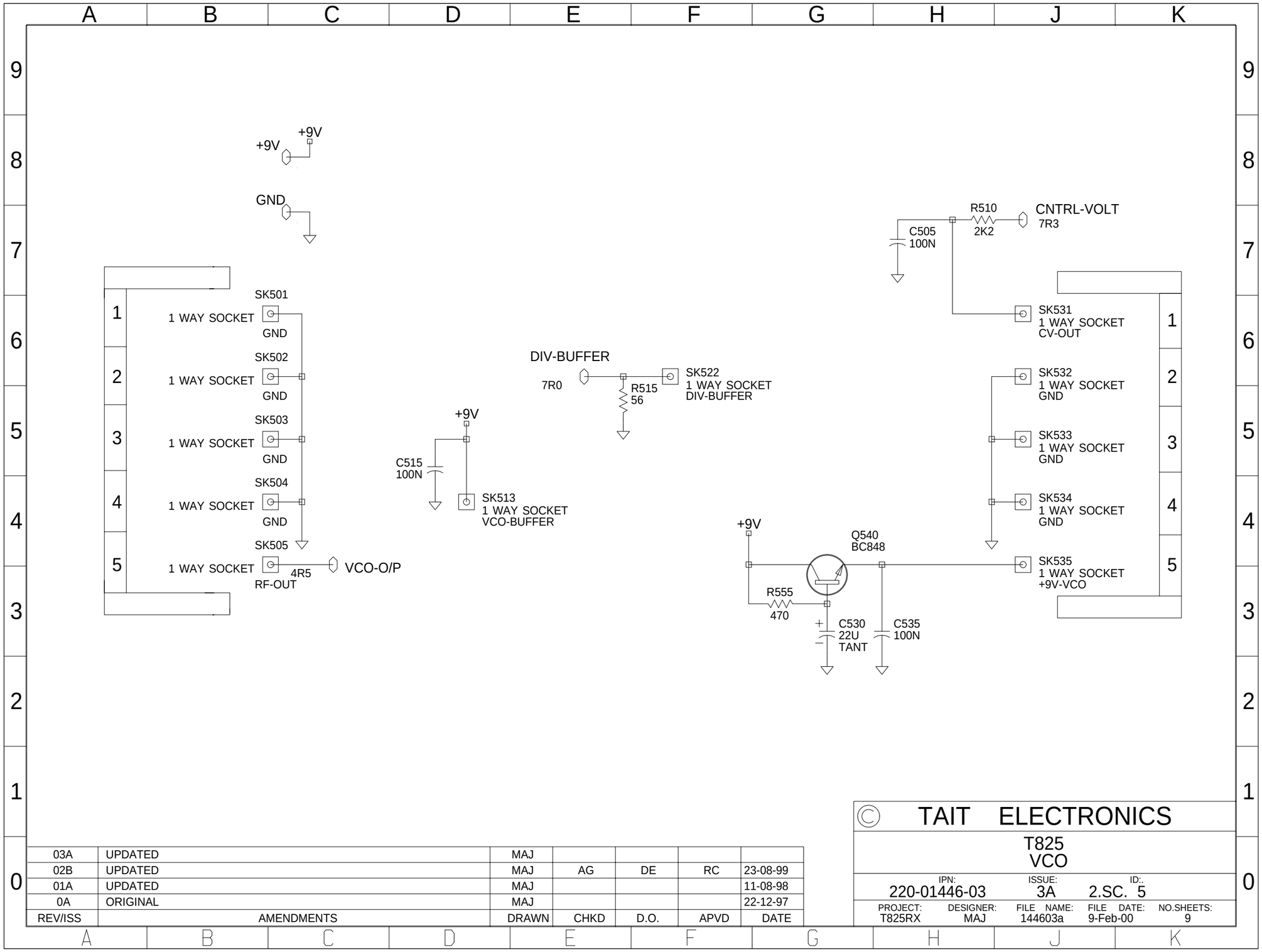
T825
FRONT END

IPN:	ISSUE:	ID:
220-01446-03	3A	2.SC. 4

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9

Sheet 4 - T825 Front End
220-01446-03



REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

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T825
VCO

IPN:	ISSUE:	ID:.
220-01446-03	3A	2.SC. 5

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9

Sheet 5 - T825 VCO Section
220-01446-03

+5VDIG +5V +9V +13V8 +20V
+5VDIG 8D9 | +5V 7L8 8D9 | +9V 2A8 3B8 4A4 5C8 7M8 8D9 | +13V8 1R1 1R1 2Q0 | +20V 7M8

+9V R615 100E
IC610 78L05: VIN 8, VOUT 1, N/C 4, N/C 5, GROUND 2 3 6 7
C610A 10N | C610B 100U TANT | C611A 100U TANT | C611B 10N
+5VDIG TP607
R617 0
DGND CONNECTS GND THROUGH R617
+5VDIG-SUPPLY

+13V8 TP601
+13V8-TESTPOINT
+9V TP602
+9V-TESTPOINT
Q620 BD242FP
R619 1 | R621 1 | C623 1N0 | R625 1K0
R633 6K8 1% | C625 470U | C626 4N7 | C628 1N0
+5V REGULATOR
D610 BAV99 | D610 BAV99
R636 22 | R637 22
+5V TP604
+5V TESTPOINT
C631A 100N | C631B 10U TANT
R629 270
LM317MDT IC630 VREG: VIN 3, VOUT 2, ADJ 1
R649 4K7 | R645 470
C637 1N0
IC640 358D
Q630 BSR30
5V
C630 100N | R641 1K5 1% | C650 100N | C651 100N
R653 10K 1%
+9V REGULATOR

CAN TO SHIELD T610
10MM SQ * 11MM SHLD610

240KHz 24vpp
+20V SUPPLY
+20V TESTPOINT
+20V TP603
R681 100E
BAV70 D640 | BAV70 D640
T610 680uH
R685 15K | C673 4N7
Q660 BC817
Q670 BC857
C658 100N | C660 100N | C665 10U TANT | C670 3U3 TANT | C677 1U0 TANT
R689 10E | C681 100N | C684 10U TANT
C687 1N0 | C690 100N | C693 10U TANT
R693 100K 1% | R696 56K 1%

WATCHDOG 8R5
NOT-RESET 7A2 8R4 8R4
RESET 8J8
+5VDIG
IC650: +V 8, ST 7, PBRST 1, RST 6, TD 2, LOWPWRMON RST 5, TOL 3, GND 4

DGND 8E9 | GND 1R0 1R0 2N0 3R0 4A3 5C7 7M8 8E9 9C4

+13V8 R640 10E
IC640 358D: V+ 8, V- 4
C640 1N0 | D645 33V

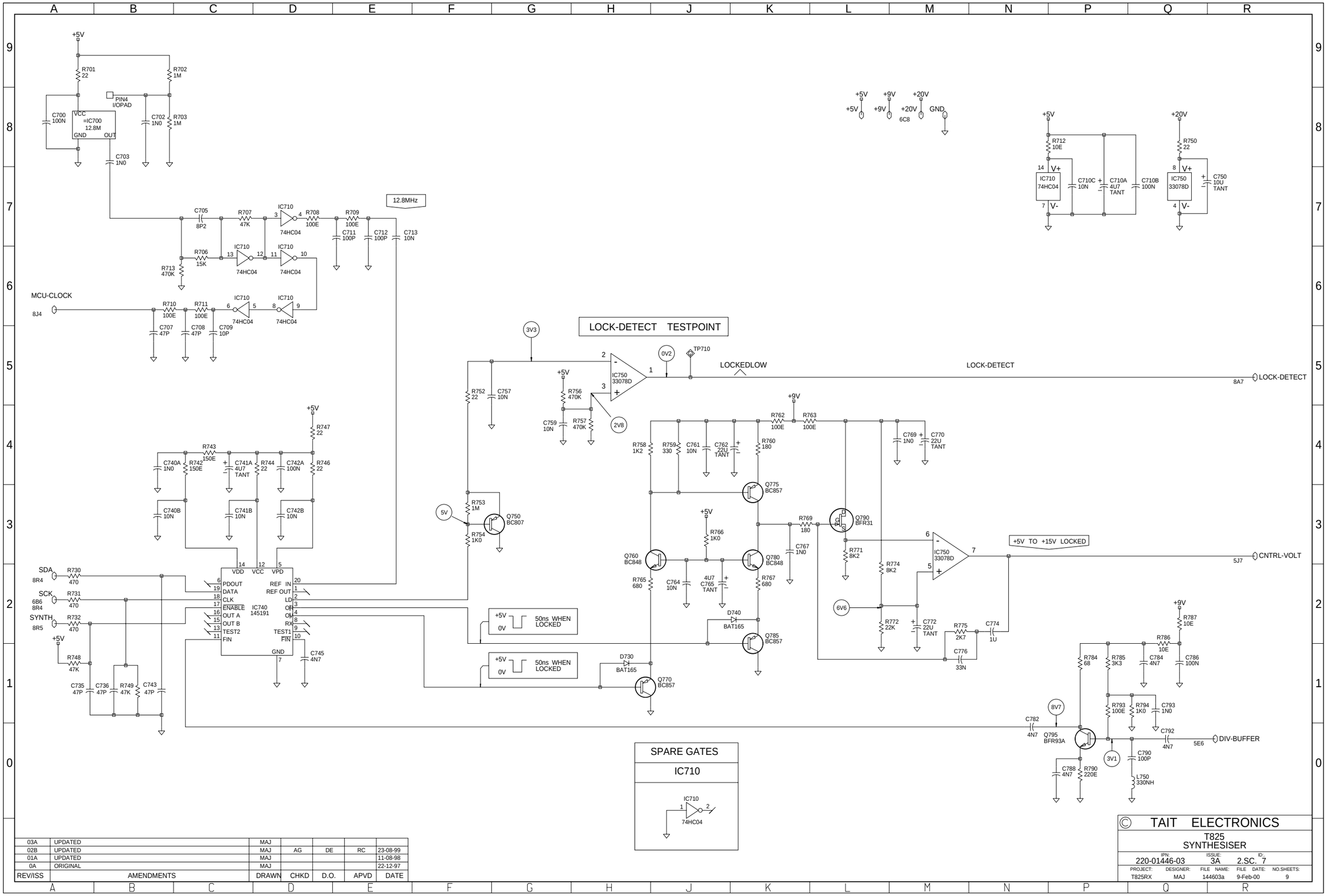
IC640 SPARE GATE
IC640 358D: 5, 6, 7

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

T825
REGULATOR

IPN:	ISSUE:	ID:
220-01446-03	3A	2.SC. 6

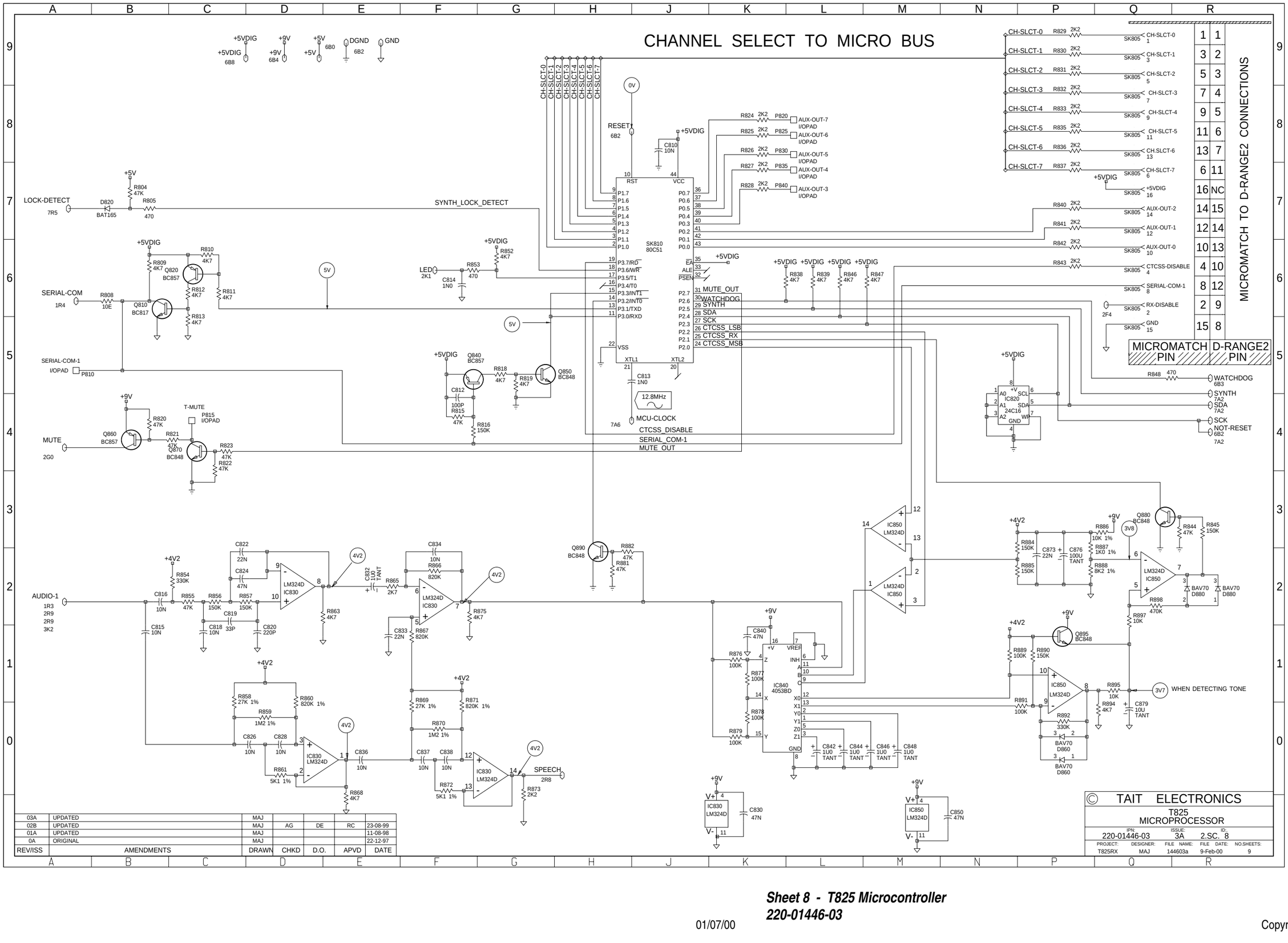
PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9



REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

Sheet 7 - T825 Synthesiser
220-01446-03

CHANNEL SELECT TO MICRO BUS

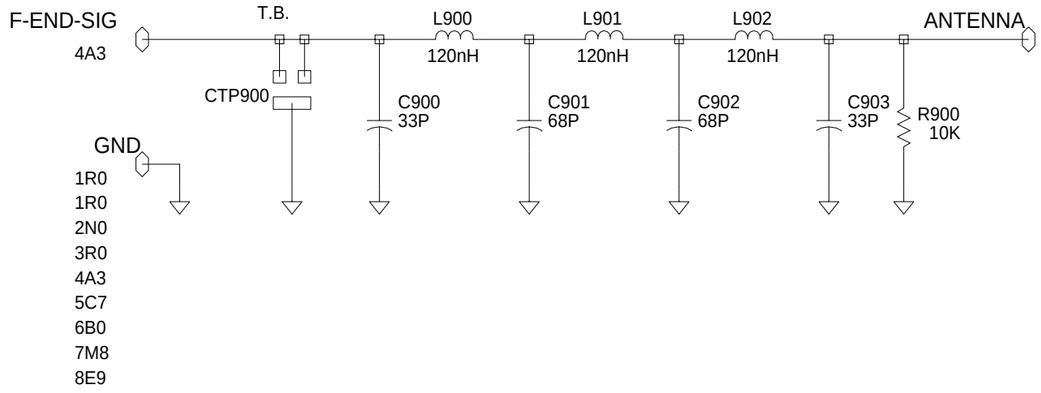


REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

IPN: 220-01446-03 ISSUE: 3A ID: 2.SC. 8
PROJECT: T825RX DESIGNER: MAJ FILE NAME: 144603a FILE DATE: 9-Feb-00 NO.SHEETS: 9

Sheet 8 - T825 Microcontroller
220-01446-03

01/07/00



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03A	UPDATED	MAJ				
02B	UPDATED	MAJ	AG	DE	RC	23-08-99
01A	UPDATED	MAJ				11-08-98
0A	ORIGINAL	MAJ				22-12-97

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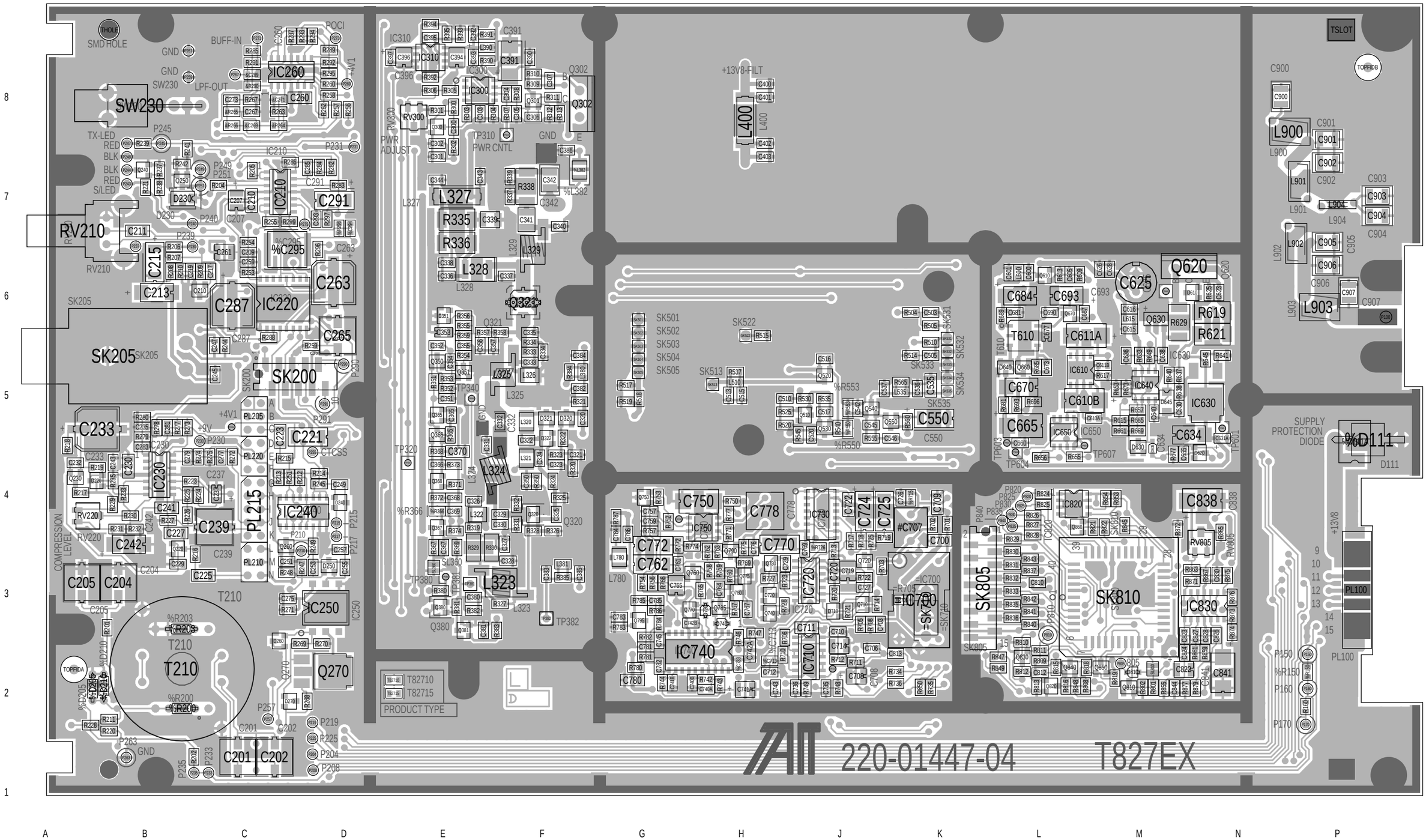
T825
HARMONIC FILTER

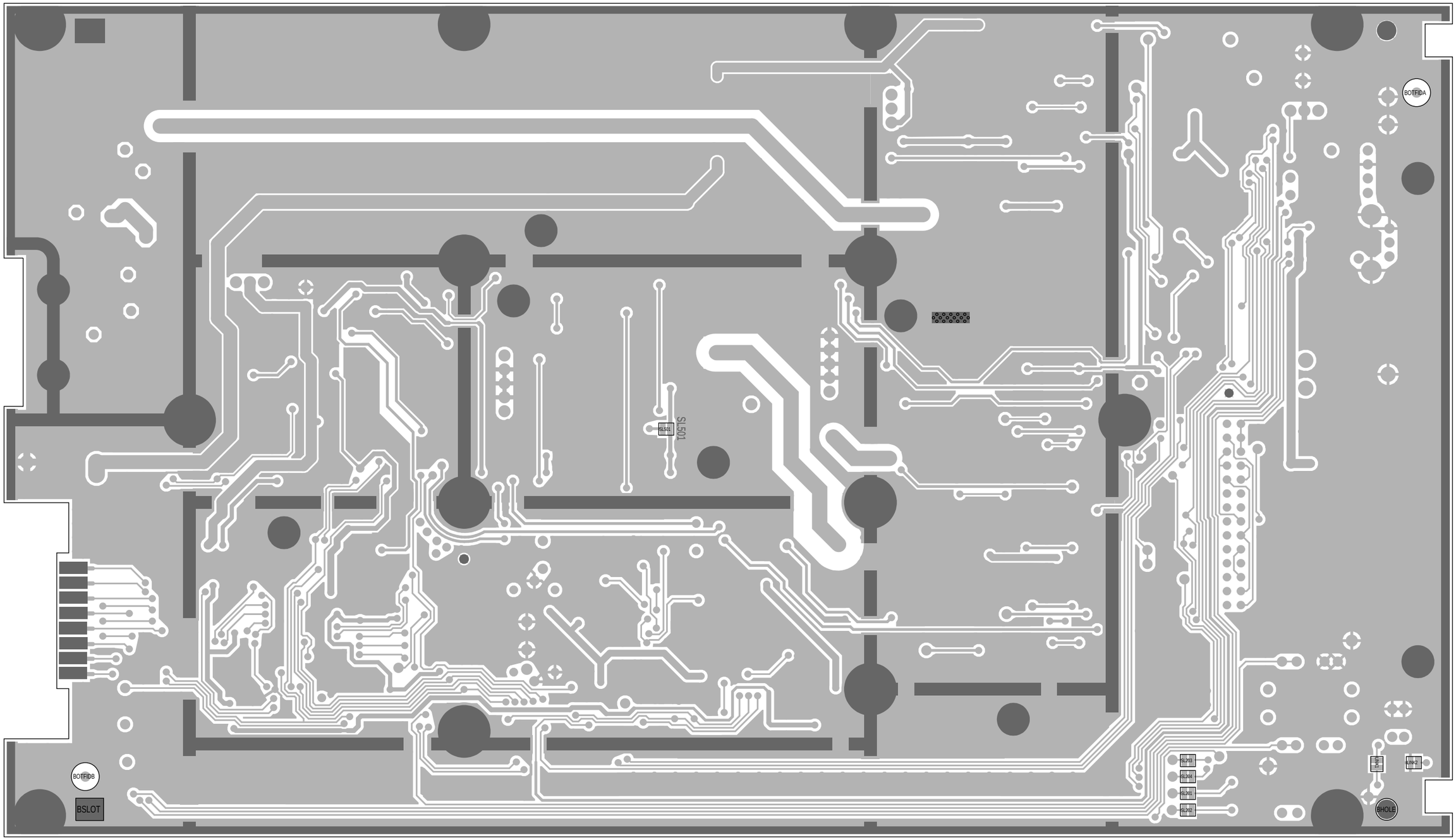
IPN:	ISSUE:	ID:.		
220-01446-03	3A	2.SC. 9		
PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T825RX	MAJ	144603a	9-Feb-00	9

Sheet 9 - T825 Harmonic Filter
220-01446-03



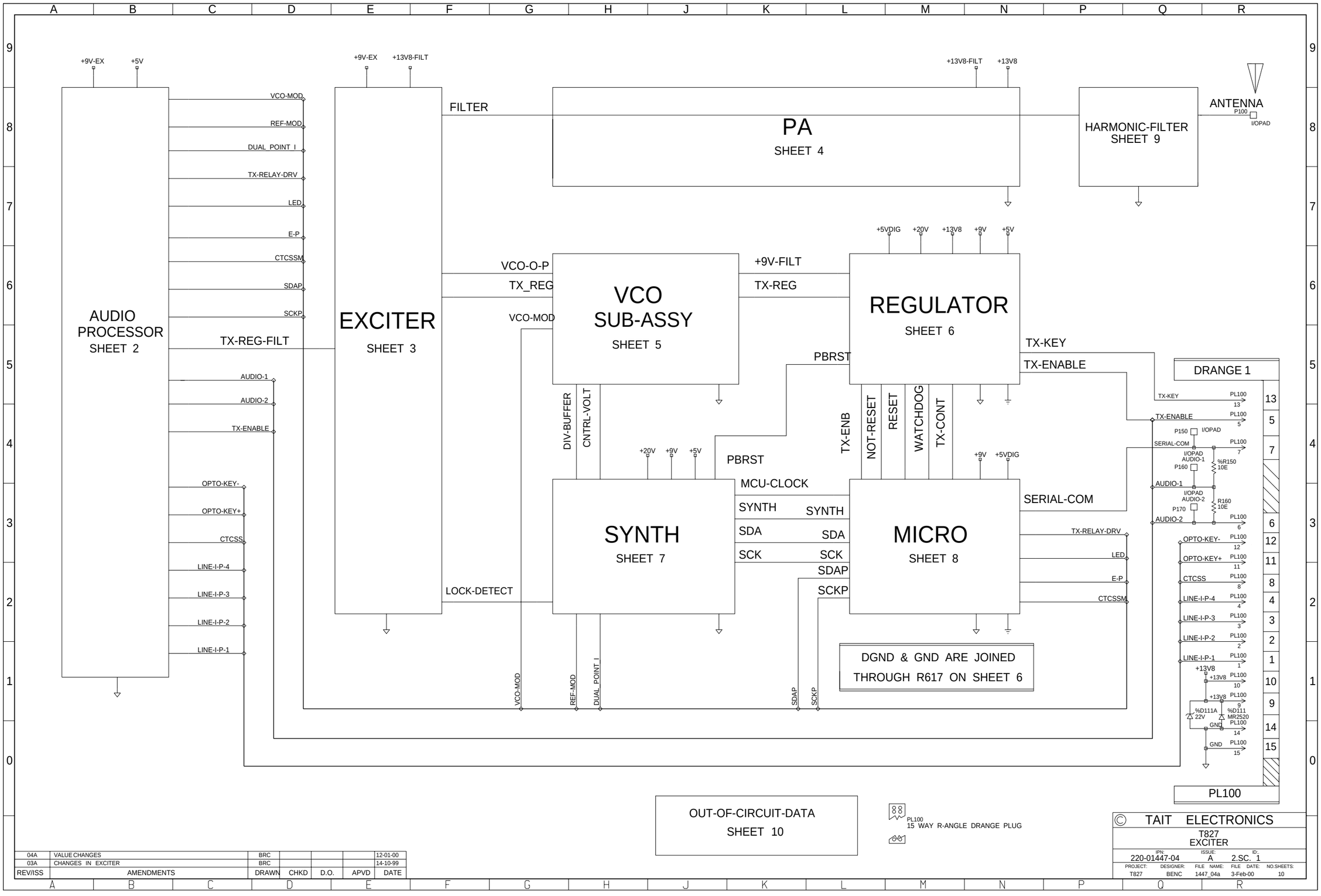
T827 PCB Layout - Top Side
220-01447-04

01/07/00

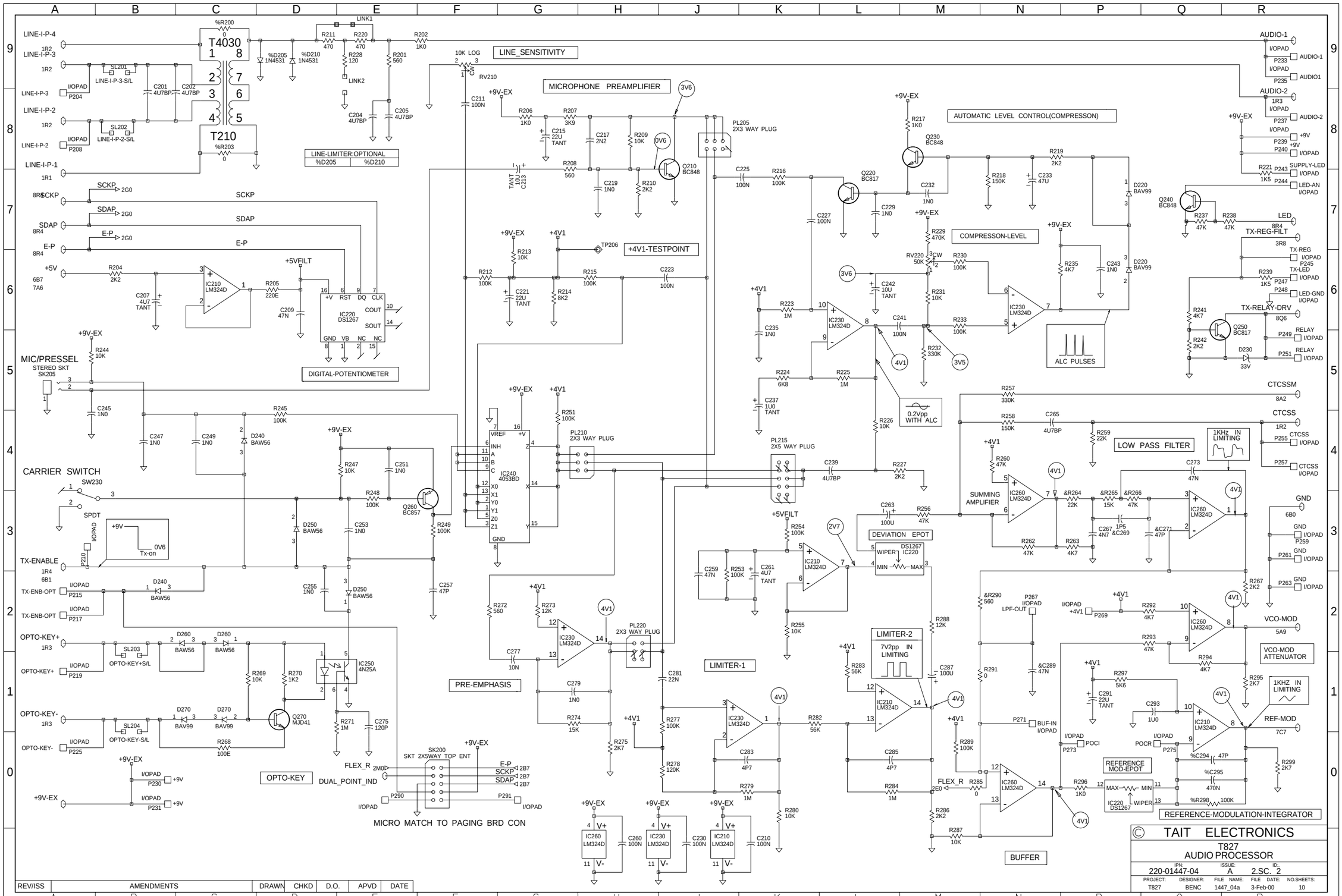


T827 PCB Layout - Bottom Side
220-01447-04

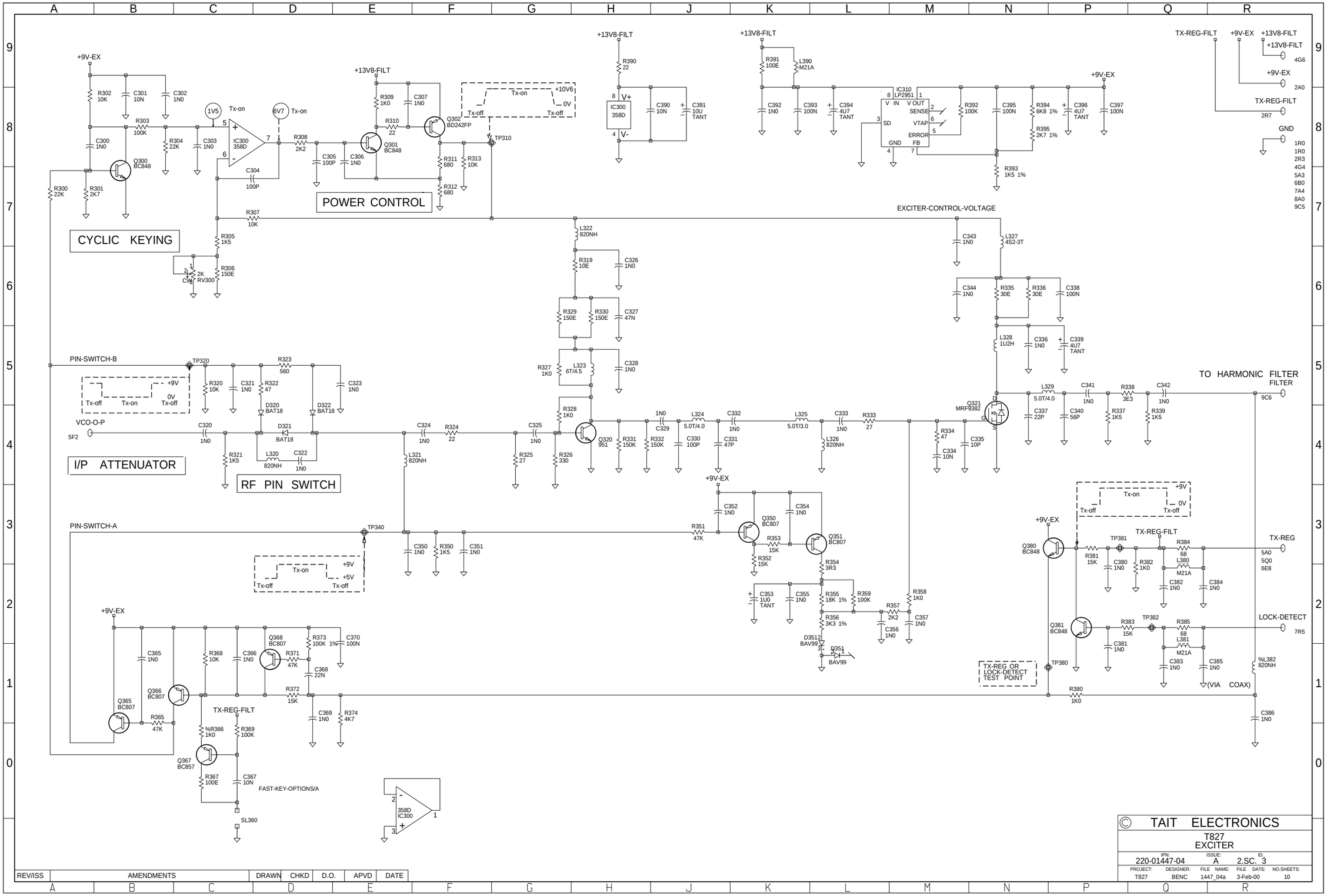
01/07/00



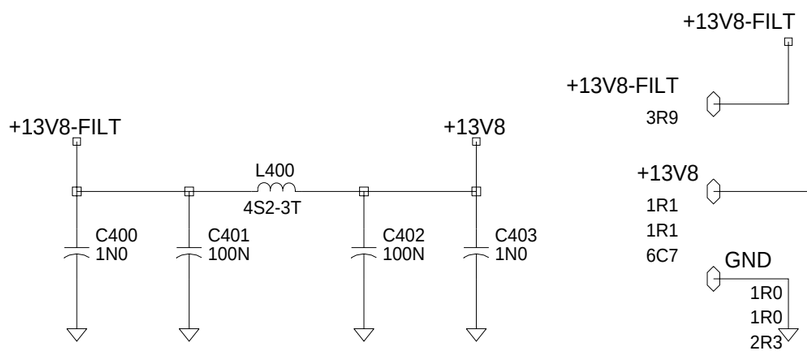
Sheet 1 - T827 Exciter Overview
220-01447-04

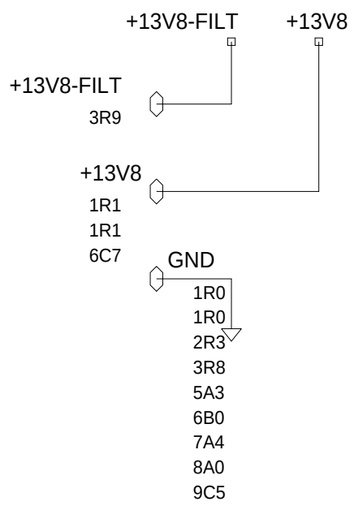


Sheet 2 - T827 Audio Processor
220-01447-04



Sheet 3 - T827 Exciter
220-01447-04





REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

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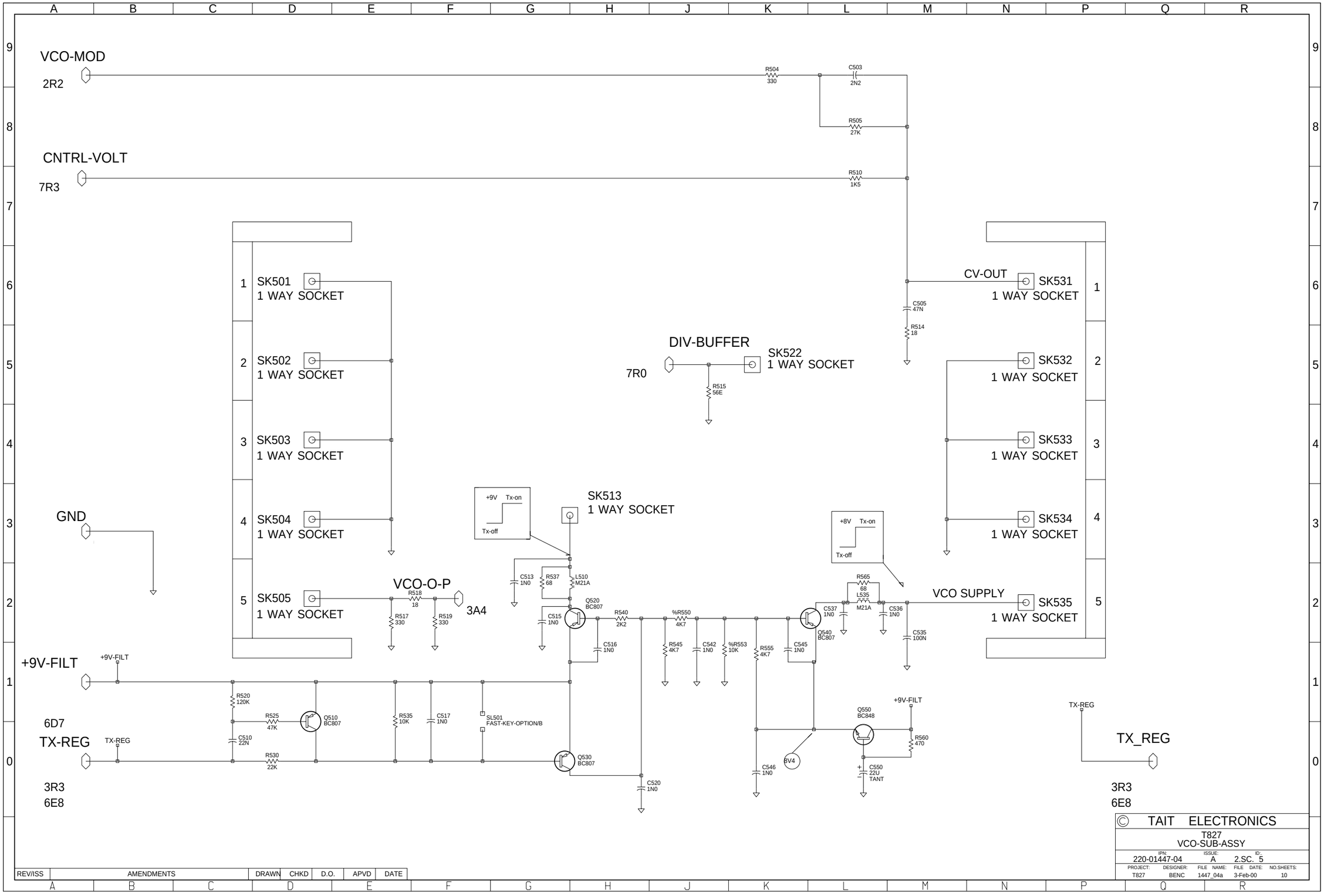
T827

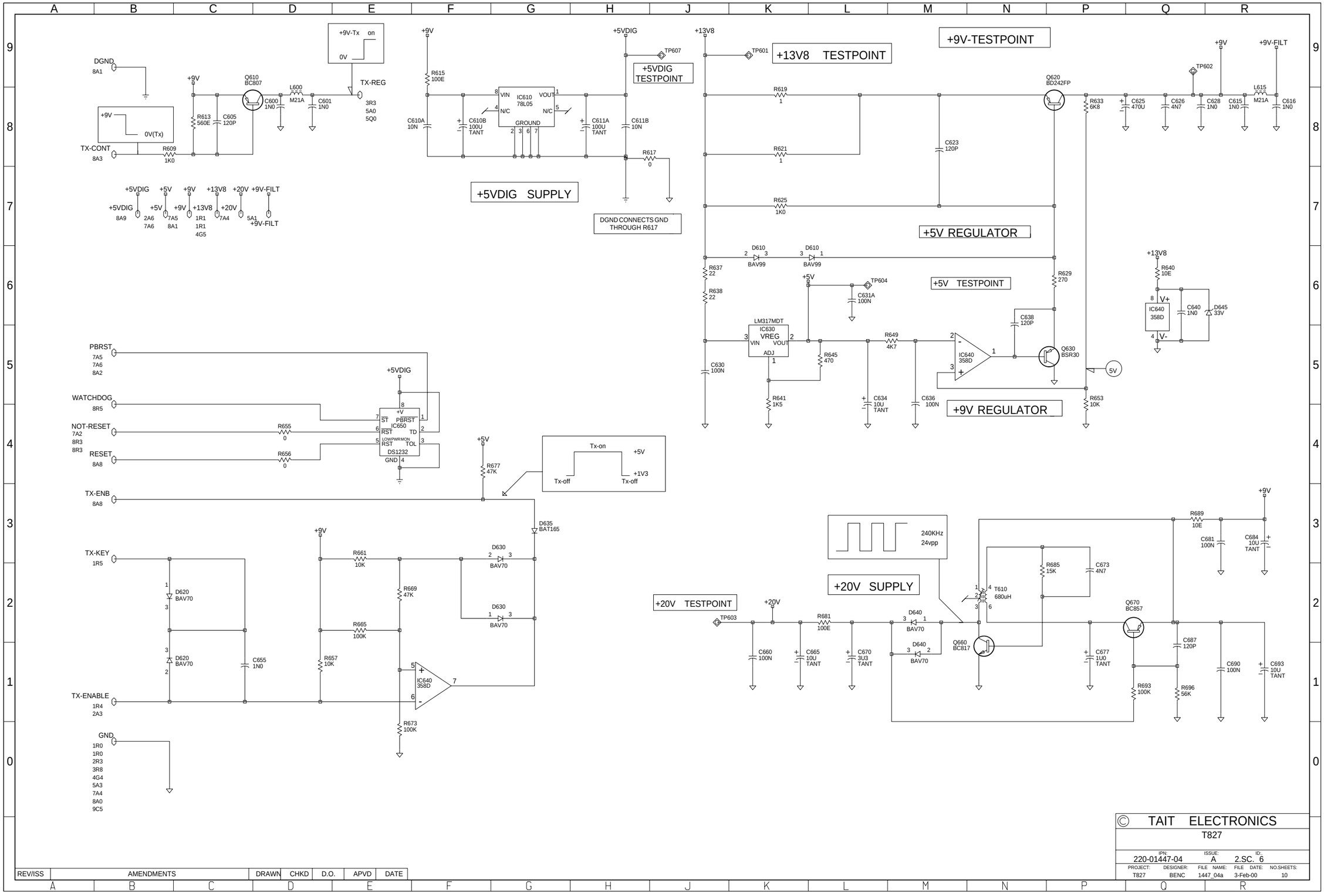
IPN:	ISSUE:	ID:.
220-01447-04	A	2.SC. 4

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:
T827	BENC	1447_04a	3-Feb-00	10

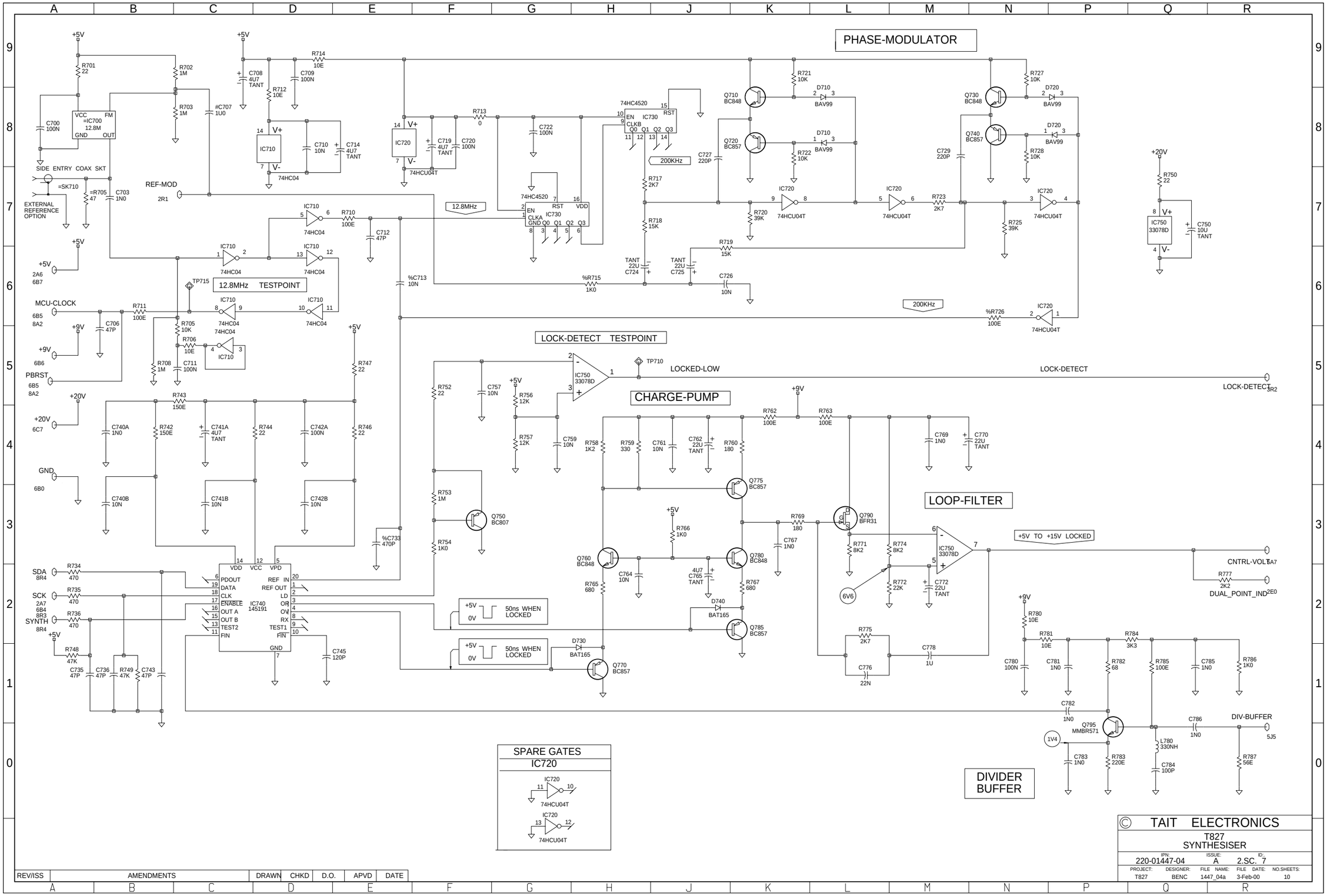
Sheet 4 - T827 13.8V Supply Filter (PA Cavity)
220-01447-04



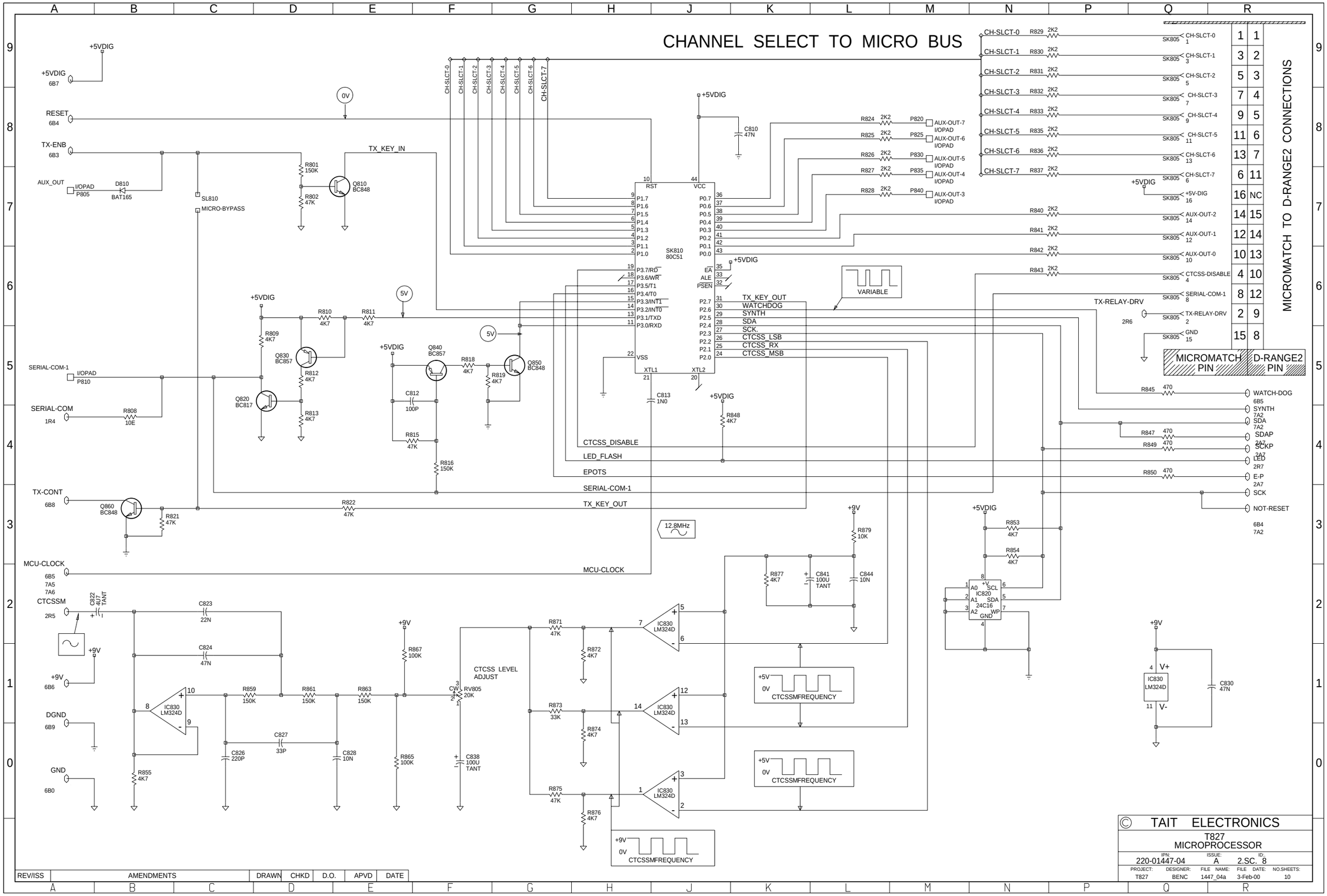
Sheet 5 - T827 VCO Section
220-01447-04



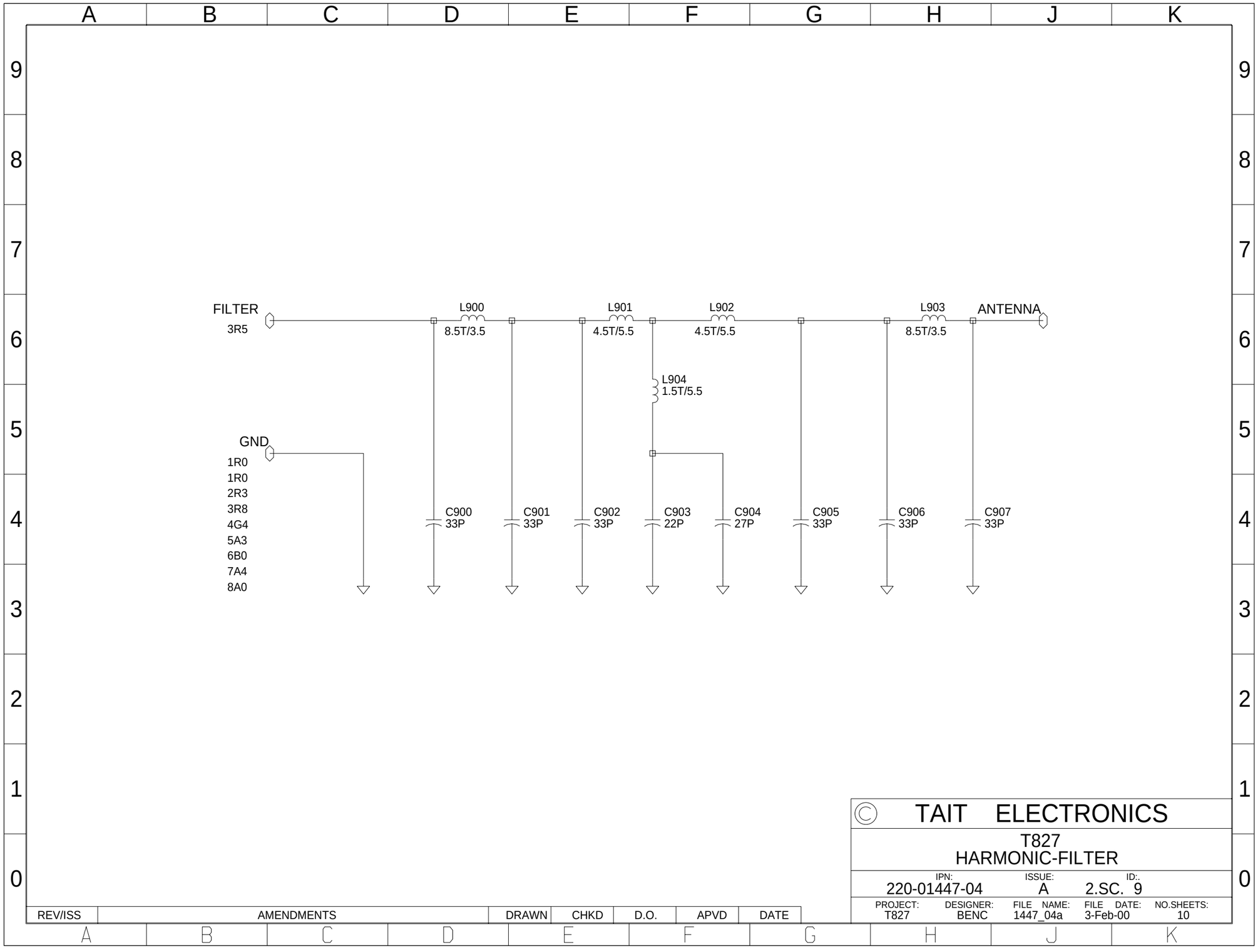
Sheet 6 - T827 Regulators
220-01447-04



Sheet 7 - T827 Synthesiser
220-01447-04



Sheet 8 - T827 Microcontroller
220-01447-04



Sheet 9 - T827 Harmonic Filter
220-01447-04