

Receiver Block Diagram

Low Noise Amplifier

- Low IM Distortion
- High Current
- Optimized Gain FB Design

Front End RF Frequency Selectivity

- Helical Filters - UHF
- Voltage Tuned-VHF

Dual Conversion

- 45 or 21.4 MHz 1st IF
- 455 KHz 2nd IF

PLL Synthesizer

- VCO on Final Frequency
- Microprocessor Controlled
- High Stability 1 ppm TCXO

Double Balanced 1st Mixer

- Low IM Products
- +13 dBm LO

2 Stage 1st IF Amplifier

- 1st Stage Terminates Mixer
- Two 2 Pole Xtal Filters

2nd Mixer, Limiter, Discriminator

- 2 x 455 KHz Ceramic Filters
- 12.5 or 25 KHz Channel Space
- RSSI

Voice Audio Processing

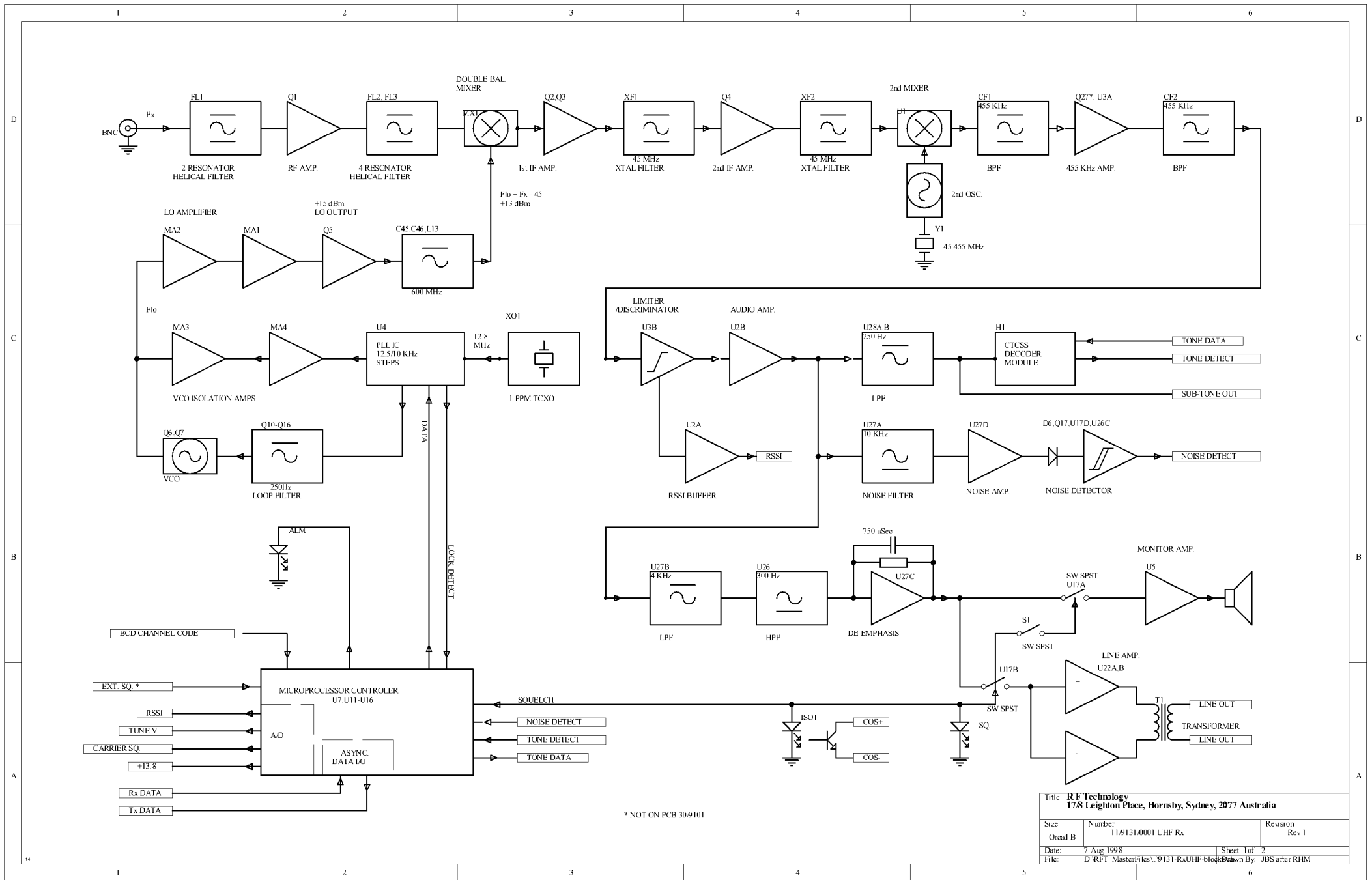
- 4KHz Low Pass Filter
- 300 Hz HPF and 240 Hz Notch
- De-Empasis
- Line and Monitor Output
- Discriminator Output

Noise Squelch

- 10 KHz Noise Filter and Amp.
- Detector with 2 dB Hysteressis
- Timing Controlled by Microprocessor
- Adapts to Strength of Signal

CTCSS

- 250 Hz Low Pass Filter
- Output for External Tone Panel
- DSP Decoder



* NOT ON PCB 30/9101

Title R F Technology 17/8 Leighton Place, Hornsby, Sydney, 2077 Australia		
Size	Number	Revision
Orcaad B	119131/0001 UHF Rx	Rev 1
Date:	7-Aug-1998	Sheet 1 of 2
File:	D:\RFT MasterFiles\119131-RxUHF-block	Drawn By: JBS after RHM

Transmitter Block Diagram

PLL Synthesizer

- Single Loop
- VCO on Output Frequency
- Fast Locking and Settling
- 1 ppm TCXO-UHF
- 2.5 ppm Osc-VHF
- Microprocessor Controlled

Buffer Amplifiers

- MMICs'
- Isolate VCO from Output
- Switched to Enable/Disable Tx

Power Amplifier

- 4-10 mW Input
- 25 Watt Output - VHF
- 10/15 Watt Output- UHF
- Output Power Regulated
 - Forward Power
 - Reverse Power
 - Temperature
- Variable Gain Amplifier
- Power Modules
- Low Pass Filter

Audio Inputs

- 600 Ohm Transformer
- Direct ac Coupled
- Sub-Audible
- Test Microphone

Voice Band Audio Processing

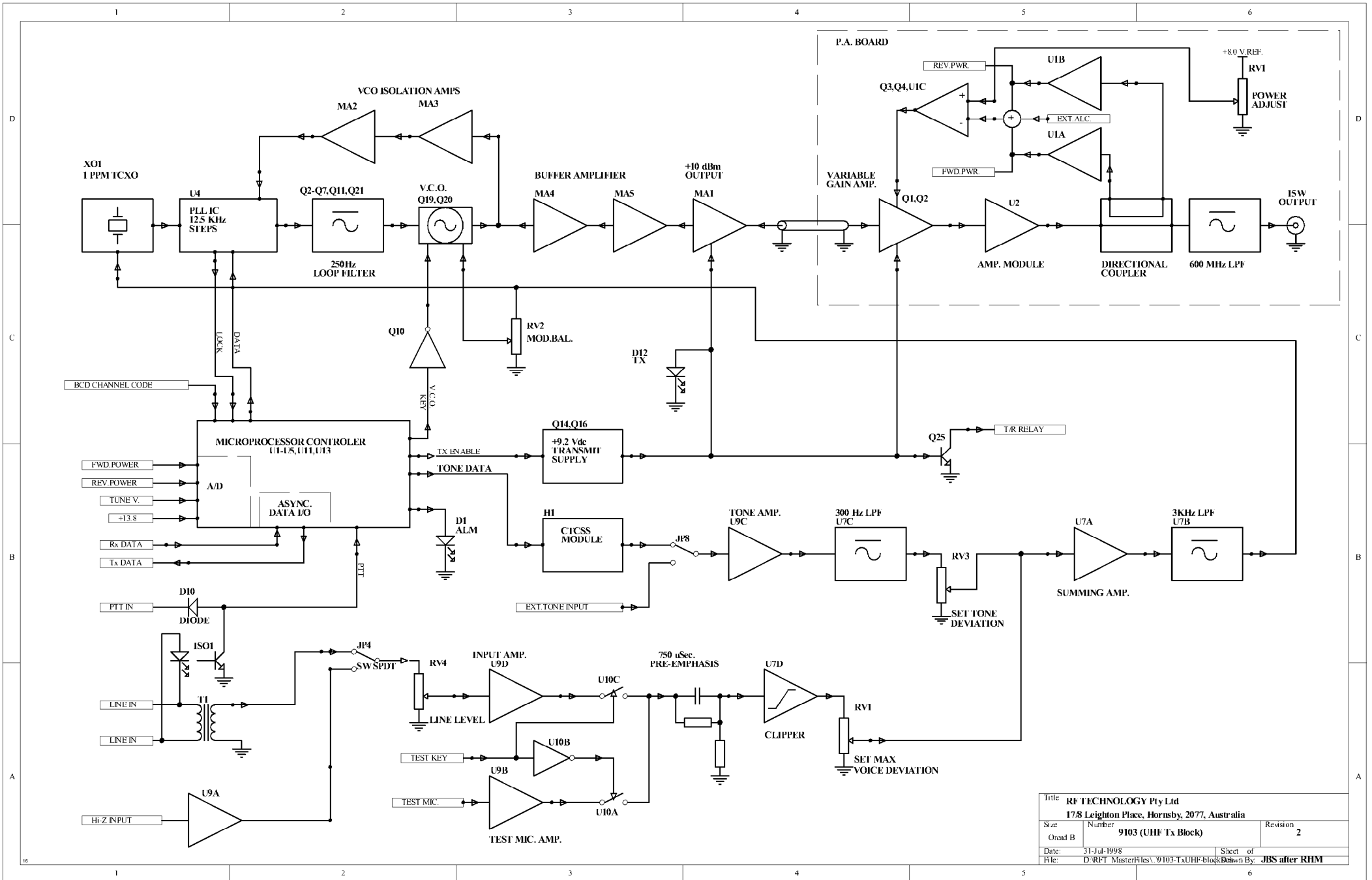
- Input Amplifier
- 750 uSec. Pre-Emphasis
- Peak Deviation Limiter/Clipper
- Summing Amplifier
- 3 KHz Low Pass Filter

Sub-Audible Audio Processing

- External or CTCSS Module Input
- Tone Amplifier and Low Pass Filter
- Separate Deviation Adjustment

Two Point Modulation Used

- VCO and Reference Modulated
- High/Low Frequency Balanced



Title: RF TECHNOLOGY Pty Ltd		
17/8 Leighton Place, Hornsby, 2077, Australia		
Size: Number	Revision	2
Order B	9103 (UHF Tx Block)	
Date: 31-Jul-1998	Sheet of	
File: D:\RFT MasterFiles\9103-TxUHF-block	Drawn By: JBS after RHM	

Power Amplifier Block Diagram

Power Amplifier Stage

- Broad Band Design
- Single or Parallel Combined

Power Combiner/Splitter

- Transmission Line
- Lumped Element

Directional Coupler

- Forward and Reverse Power
- Frequency Compensated

Low Pass Filter

Power Control Circuits

- Forward and Reverse
- Summed
- Separate
- Compared to dc Reference
- ALC Voltage for Transmitter

Temperature Protection

- Thermistor on Transistor Case
- 90 Celsius Maximum
- Reduces Power to 10-25%
- Front Panel LED

RF Output Detector

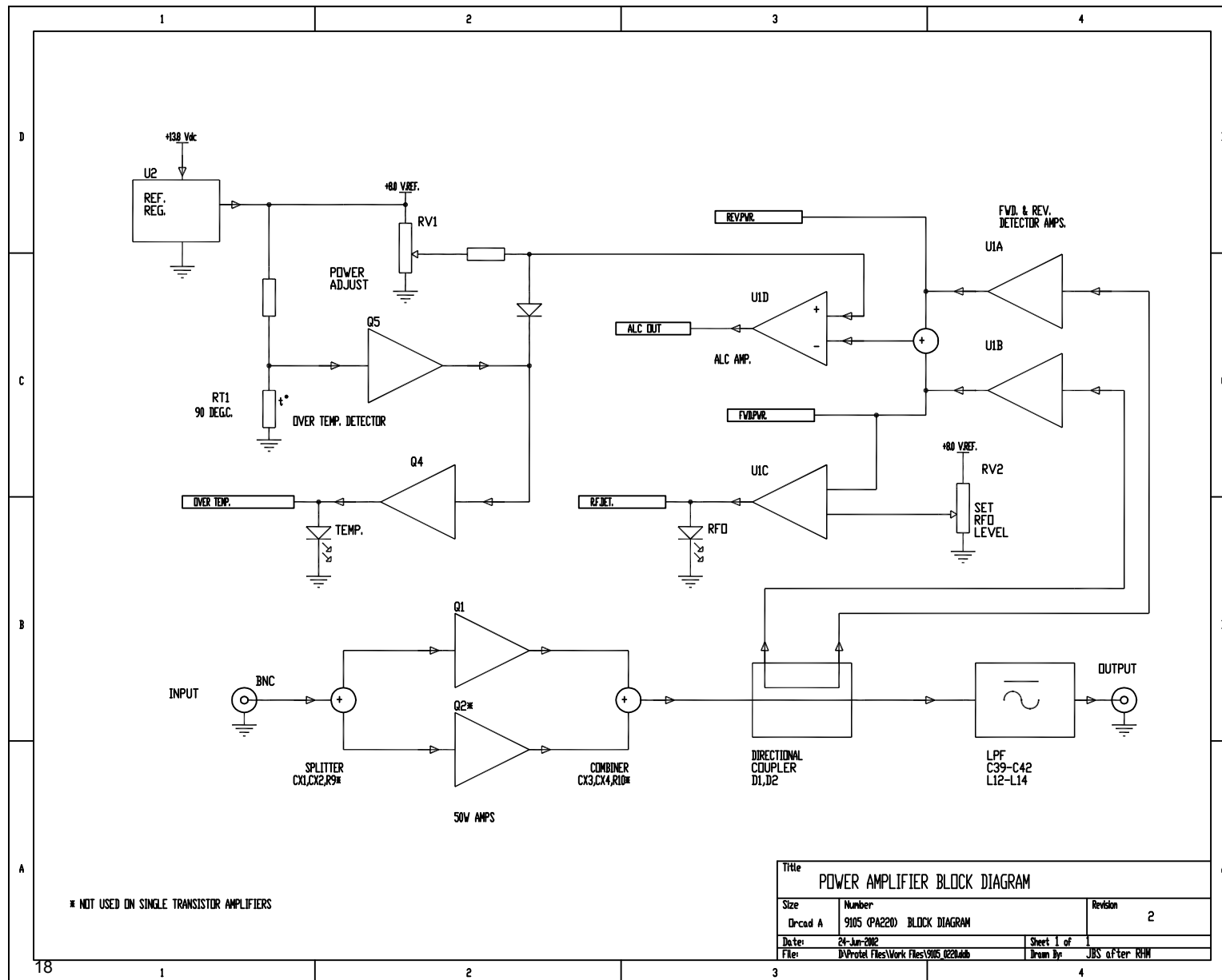
- Indicates RF Output on LED
- Preset Level - 50%

Special Assembly/Repair Requirements

- Silver/Tin Solder
- Power Transistors
- Coils
- Combiner Terminations

Heatsink Compound

- DC340
- Transistors
- Combiner Terminations



* NOT USED ON SINGLE TRANSISTOR AMPLIFIERS

Title		
POWER AMPLIFIER BLOCK DIAGRAM		
Size	Number	Revision
Dr cad A	9105 (PA220) BLOCK DIAGRAM	2
Date:	24-Jun-2002	Sheet 1 of 1
File:	D:\Protel Files\Work Files\9105_0220\lab	Drawn By: JBS after RHM

Module Configuration and Programming

RECEIVERS

Internal Jumpers

240 Hz notch filter	- JP1
High pass filter	- JP3
Flat or de-emphasis	- JP2
DC loop switching	- JP4
COS polarity	- JP6
COS configuration	- JP7, 8, 9

TRANSMITTERS

Internal Jumpers

DC loop input	- JP3
DC loop configuration	- JP9,10,11
Line/Hi-Z input	- JP4
20 dB input atten.	- JP6
Flat or pre-emphasis	- JP7
Int./Ext. tone source	- JP8

Software Configurable – Service Monitor or Tech Help

Signal strength calibration
Low signal alarm point
Fast noise squelch threshold

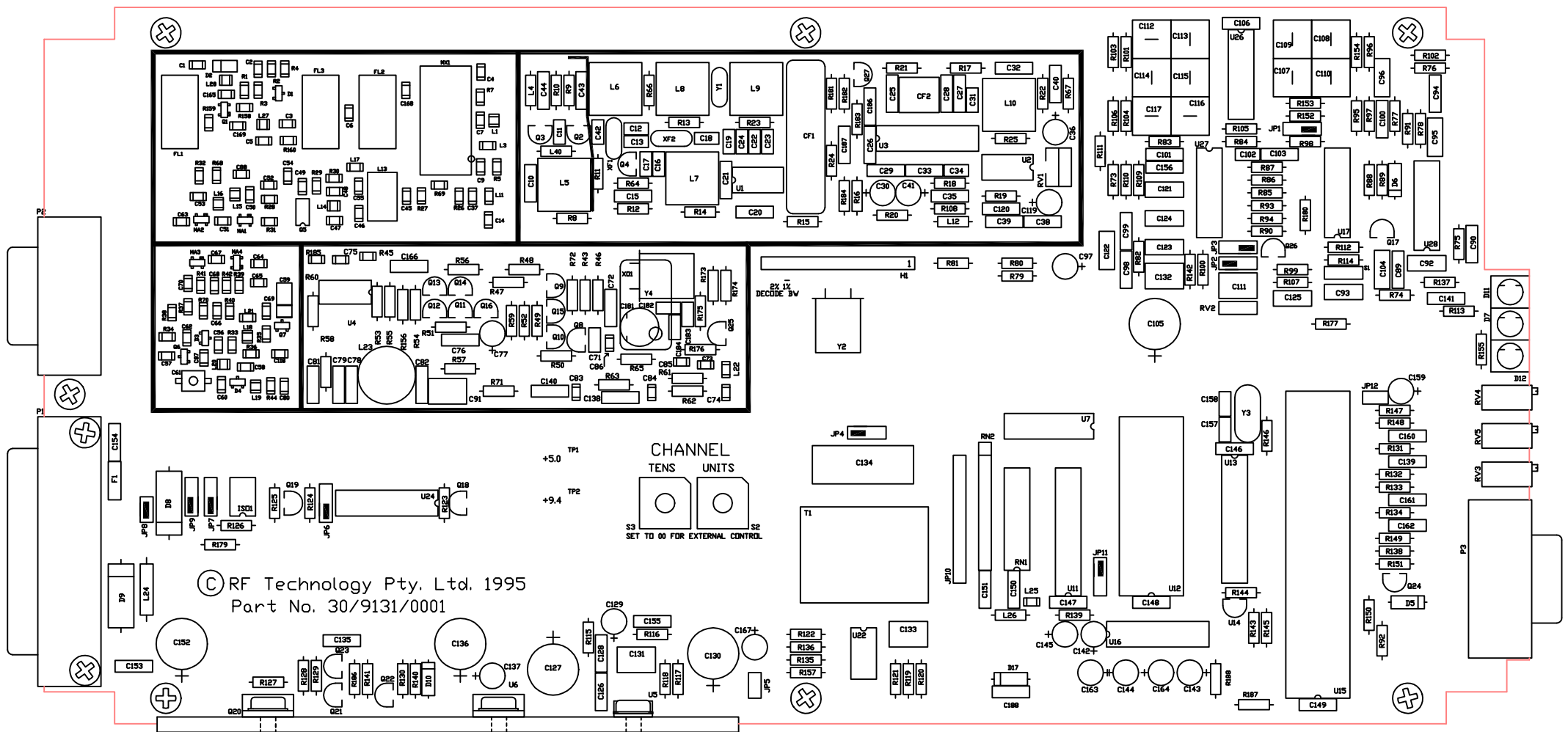
Programmable Channel Information 0-99

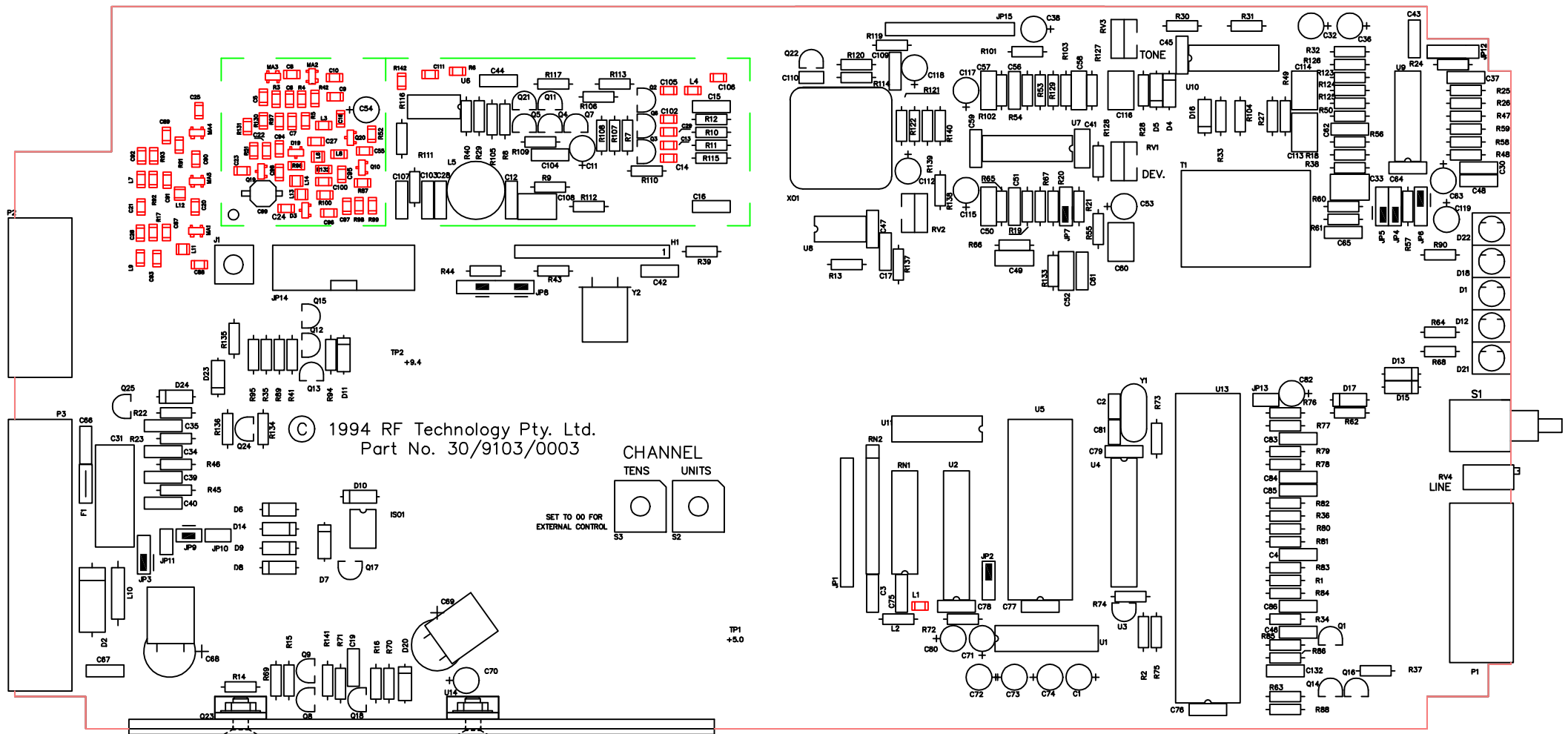
Frequency
CTCSS Tone

NoTone period with CTCSS, 0 to 9.9 S
Tx time out, 0 to 254 minutes
Tx power calibration
Low power limit for alarm
Reverse power limit for alarm
Tx or power amp (no ALC) alarm

Programmable channel Information 0-99

Frequency
CTCSS Tone
Tx tail time, 0 to 15 sec.





RECEIVER Jumper Options

JP1 - 240 Hz Notch Filter

	<u>Position</u>
Notch Filter IN	1-2 *
OUT	2-3

JP2 - Audio Response

	<u>Position</u>
750 uSec. de-emphasis	1-2 *
Flat response	2-3

JP3 - Audio Filter in/Out

	<u>Position</u>
Hi-pass & Notch In	2-3 *
Flat Response	1-2

JP4 - 600 Ohm Line dc Loop COS

	<u>Position</u>
dc Loop Configured by JP7, JP8, JP9	1-2 *
dc Loop Not Used	2-3

JP6 - COS Polarity

	<u>Position</u>
Active on Signal	2-3 *
Active on No Signal	1-2

JP7, JP8, JP9 - dc Loop COS Configuration (JP4 1-2)

	<u>JP7</u>	<u>JP8</u>	<u>JP9</u>
Source +12Vdc Loop	2-3	ON	1-2 *
Free Switch Output	1-2	ON	2-3

JP7, JP8, JP9 - Direct Output COS (JP4 2-3)

	<u>JP7</u>	<u>JP8</u>	<u>JP9</u>
+12 Vdc Direct Output	2-3	OFF	OFF
Free Switch Output	1-2	OFF	OFF

JP11 EPROM Type

	<u>Position</u>
27C256	2-3 *
27C64	1-2

* = Standard Factory Configuration

TRANSMITTER Jumper Options

JP2- EPROM Type

	<u>Position</u>
27C256	2-3 *
27C64	1-2

JP3 - 600 Ohm Line dc Loop PTT Input

	<u>Position</u>
dc Loop Connected	1-2 *
dc Loop Not Connected	2-3

JP4 - Audio Input Source Selection

	<u>Position</u>
600 Ohm Line Input	2-3 *
Hi-Z Balanced Input	1-2

JP6 - Input Level Attenuation

	<u>Position</u>
0 dB	1-2 *
20 dB	2-3

JP7 - Audio Frequency Response

	<u>Position</u>
750 uSec. Pre-emphasis	1-2 *
Flat Response	2-3

JP8 - Subaudible Tone Source

	<u>Position</u>
Internal CTCSS	1-2, 4-5 *
External Input	2-3, 5-6

JP9, JP10, JP11 dc Loop PTT Input Configuration (JP3 1-2)

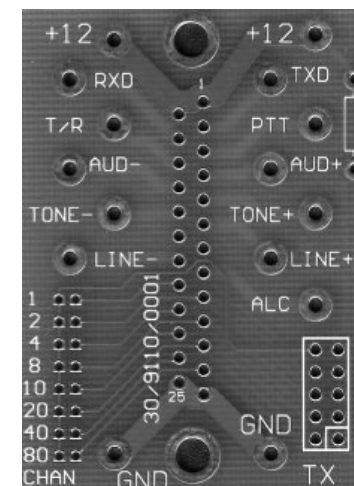
	<u>JP9</u>	<u>JP10</u>	<u>JP11</u>
Current Loop input	ON	OFF	OFF *
+12 Vdc Loop Source	OFF	ON	ON

* = Standard Factory Configuration

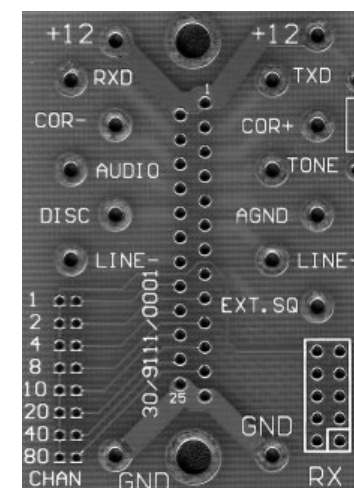
The Receiver and Transmitter modules plug into the back plane DB25/F connectors

Miniature spade connectors (2.1 x 0.6 x 7mm) are captive/ soldered at the labelled points.
To configure: Solder wire connections between appropriate points.

Receiver DB25/F	RX PCB	DESCRIPTION		TX PCB	Transmitter DB25/F
1, 14	+12V	+12V DC SUPPLY		+12V	1, 14
2	TXD	TX Data		TXD	2
15	RXD	RX Data		RXD	15
3	COR+	Carrier Operate Sw+	PressToTalk input	PTT	3
16	COR-	Carrier Operate Sw-	Tx/Rx output	T/R	16
4	TONE	Subtone output	Hi Z audio input+	AUD+	4
17	AUDIO	Audio output	Hi Z audio input-	AUD-	17
5	AGND	Audio Ground	Ext tone input+	TONE+	5
18	DISC	Discriminator output	Ext tone input-	TONE-	18
6	LINE+	Line output+	Line input+	LINE+	6
20	LINE-	Line output-	Line input-	LINE-	20
8	EXT SQ	Ext Squelch input	Auto Level Control	ALC	8
13, 25	GND	Ground, 0V		GND	13, 25
21	BCD 1	Channel select 1's digit		BCD 1	21
9	BCD 2	Channel select 1's digit		BCD 2	9
22	BCD 4	Channel select 1's digit		BCD 4	22
10	BCD 8	Channel select 1's digit		BCD 8	10
23	BCD 10	Channel select 10's digit		BCD 10	23
11	BCD 20	Channel select 10's digit		BCD 20	11
24	BCD 40	Channel select 10's digit		BCD 40	24
12	BCD 80	Channel select 10's digit		BCD 80	12



TX PCB



RX PCB