



***SmarTrunk  
Systems, Inc.***

**ST-1000C** (400Mhz ~ 470Mhz)

**UHF FM COMPACT DIGITAL TRANSCEIVER**



**SERVICE MANUAL**

**SmarTrunk Systems, INC.**

**ST-1000C SM R1.1a**

## Table of Contents

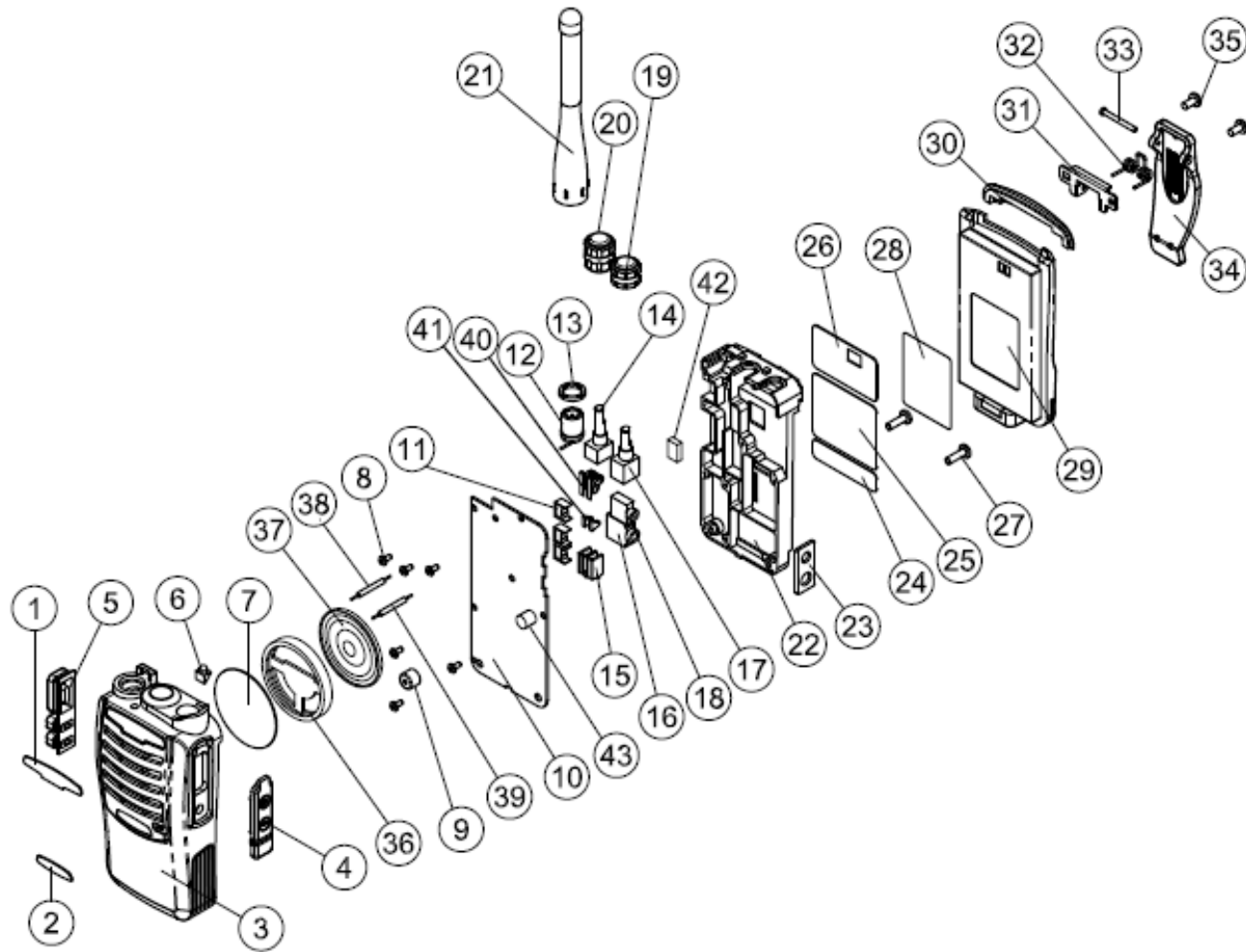
1. Specifications: .....	4
2. ST-1000 EXPLODED VIEW .....	5
3. ST-1000 SIMPLIFIED DIAGRAM.....	6
4. - ST-1000 RF DESCRIPTION .....	7
4.1. Circuit Configuration .....	8
4.2. Receiver System .....	8
4.2.1. Front-end RF Receiver .....	8
4.2.2. ANALOG Audio Processing .....	8
4.2.3. Virtual Squelch Circuit .....	8
4.2.4. Virtual VOLUME CONTROL .....	9
4.2.5. Sub audio signaling.....	9
4.2.6. ANALOG AUDIBLE SIGNALING .....	9
4.2.7. DIGITAL AUDIO PROCESSING.....	9
4.3. Transmitter System .....	10
4.3.1. ANALOG TX SIGNAL .....	10
4.3.2. DIGITAL TX AUDIO: .....	10
4.3.3. Driver and Final Amplifier Stages .....	10
4.3.4. Automatic Transmit Power Control.....	11
5. RC-1000 ALIGNMENT .....	12
5.1. Introduction .....	12
6. COMPLIMENTARY USER ALIGNMENT.....	13
6.1. OPTION ALIGNMENT:.....	13
6.1.1. SQUELCH LEVEL:.....	13
6.1.2. ANNUNCIATION .....	13
6.1.3. Tones.....	14
6.1.4. Voice activated transmission.....	14
6.1.4.1. VOX sensitivity level .....	14

6.1.4.2.	VOX inhibit on receive .....	14
6.1.4.3.	VOX delay .....	15
6.1.5.	Battery save .....	15
6.1.6.	Microphone sensitivity.....	15
7.	ST-1000 SCHEMATIC .....	17
11	ST-1000 COMPONENT LOCATOR.....	18
11.1	ST-1000 TOP LAYER COMPONENTS LOCATION .....	18
11.2	ST-1000 BOTTOM LAYER COMPONENTS LOCATION .....	19
12	ST-1000 PCB LAYOUT .....	20
12.1	ST-1000 TOP LAYER PCB LAYOUT .....	20
12.2	ST-1000 BOTTOM LAYER PCB LAYOUT .....	21
12.3	ST-1000 PCB GROUND LAYER.....	22
12.4	ST-1000 PCB POWER LAYER .....	23
13	ST-1000 BOM .....	24
14	ST-1000C MECHANICAL BOM.....	30
15	ACCESSORY PORT:.....	32
16	ST-1000 SERVICE MANUAL REVISIONS.....	34

## 1. Specifications:

	SPECIFICATION	ST-1000C
GENERAL	Frequency Range [Mhz]	400 TO 470
	Channels	16
	Power [Vdc]	6.4 to 8.8
	Dimensions [mm]	120(H)x33(D)x57(W)
	Weight [gr] (oz)	190 - (6.7)
	Temperature range	- 30 °C ~ 60 °C (-22°F ~ +140°F)
	Signaling	51 CTCSS tones / 183 DCS tones / 65533 SDR IDs
	Display	No
	Emergency call	No
	GPS	No
	Channel Scan	Yes
	BCLO / BTLO	Yes
	Power Saver control	Yes
	TOT	Yes
	Radio Kill/Alive	Yes
	Adjustable Power Selection	H/L
	Key lock	No
	Password	Yes
	Key Function selection	Yes
TRANSMIT	MAX RF power	2 W
	Frequency Stability	>1PPM
	Bandwidth [Khz]	12.5/25
	Adjacent Channel Power	-65dBC (typ)
	SNR	45dB typ
	Analog harmonic distortion	5% typ (AF 1Khz, 60% deviation)
	Data transmit rate	2400/4800bps
	Max frequency deviation	2.5Khz@12.5Khz BW/5Khz@25Khz BW
	Analog Modulation type	11K0F3E, 25K0F3E
	FDMA Digital emissions	8K30F1E, 8K30F1D, 8K30F1W
	Ext. Mic. Impedance	600 Ohms
RECEIVER	Analog Sensitivity	0.25uV (12dB Sinad)
	Digital Sensitivity	0.3uV (5% BER)
	Image rejection	60dB typ
	Adjacent Channel selectivity	60dB typ @25KHz BW
	HUM and NOISE ratio	40dB
	Speaker Audio Power	1W
	External audio power	1W

*Specifications subject to change without notice or obligation*



NO.	PART NO.	DESCRIPTION
1	BL1000110A	NAME PLATE
2	BL1000010A	MODEL PLATE
3	PL1000011A	FRONT HOUSING
4	QL1000270A	MIC RUBBER
5	PL1000060A	PTT RUBBER
6	PL1000100A	LED BAR
7	LZZZZ6092A	SHIELD CLOTH
8	JS052103MN	SET SCREW M2x0.5Px3
9	QL1000071A	MIC RUBBER CAP
10	-	SUB MAIN PCB
11	EWPS33091X	SWITCH TACTILE
12	EX06B41269	ANT JACK
13	JN301403ZE	NUT FOR ANTJACK
14	EWRT32010S	ROTARY SELECTOR
15	EX07B40000	BATTERY CONNECTOR
16	EX06B40000	3.5MM JACK
17	EWSP30000S	LINEAR POTENTIOMETER
18	EX06B40001	2.5MM JACK
19	PL1000090A	VOL KNOB
20	PL1000080A	CHANNEL KNOB
21	EX10N41858	ANTENNA
22	ML1000010X	MAIN CHASSIS
23	PL1000030B	EAR JACK COVER
24	-	-
25	LMZZ61001A	BARCODE LABEL(RADIO)
26	XZZZZ1000C	INSULATING PLATE(BLACK)
27	JS052308MN	SET SCREW M3x0.5Px8
28	LMZZ61002A	BARCODE LABEL(BATTERY)
29	EX08B40001	BATTERY PACK
30	PL1000050A	REAR COVER
31	ML1000130A	BELT CLIP BASE
32	ML1000130X	BELT CLIP SPRING
33	ML1000140N	BELT CLIP PIN
34	PL1000A11B	BELT CLIP
35	JS052206MB	SET SCREW M3x0.5Px6
36	QL1000070A	RUBBER SPEAKER
37	ES800835SQ	SPEAKER 16 OHM 1W
38	WL0206005Z	LEAD WIRE RED 50MM
39	WL0006005Z	LEAD WIRE BLACK 50MM
40	ML1000A10A	BATTERY SPRING
41	QL1000170A	BATTERY SPRING RUBBER
42	QL1000A10A	HEAT CONDUCTOR
43	EX04N04759	CONDENSER MIC

REVISIONS	SIGN	DATE	SCALE	UNITS	MODEL	APPROVED	DATE M/D/Y	TITLE
					ST-1000			EXPLODE DRAWING
								PART NO.
								FILE NAME :
						3RD. ANG.		A4



ST-1000

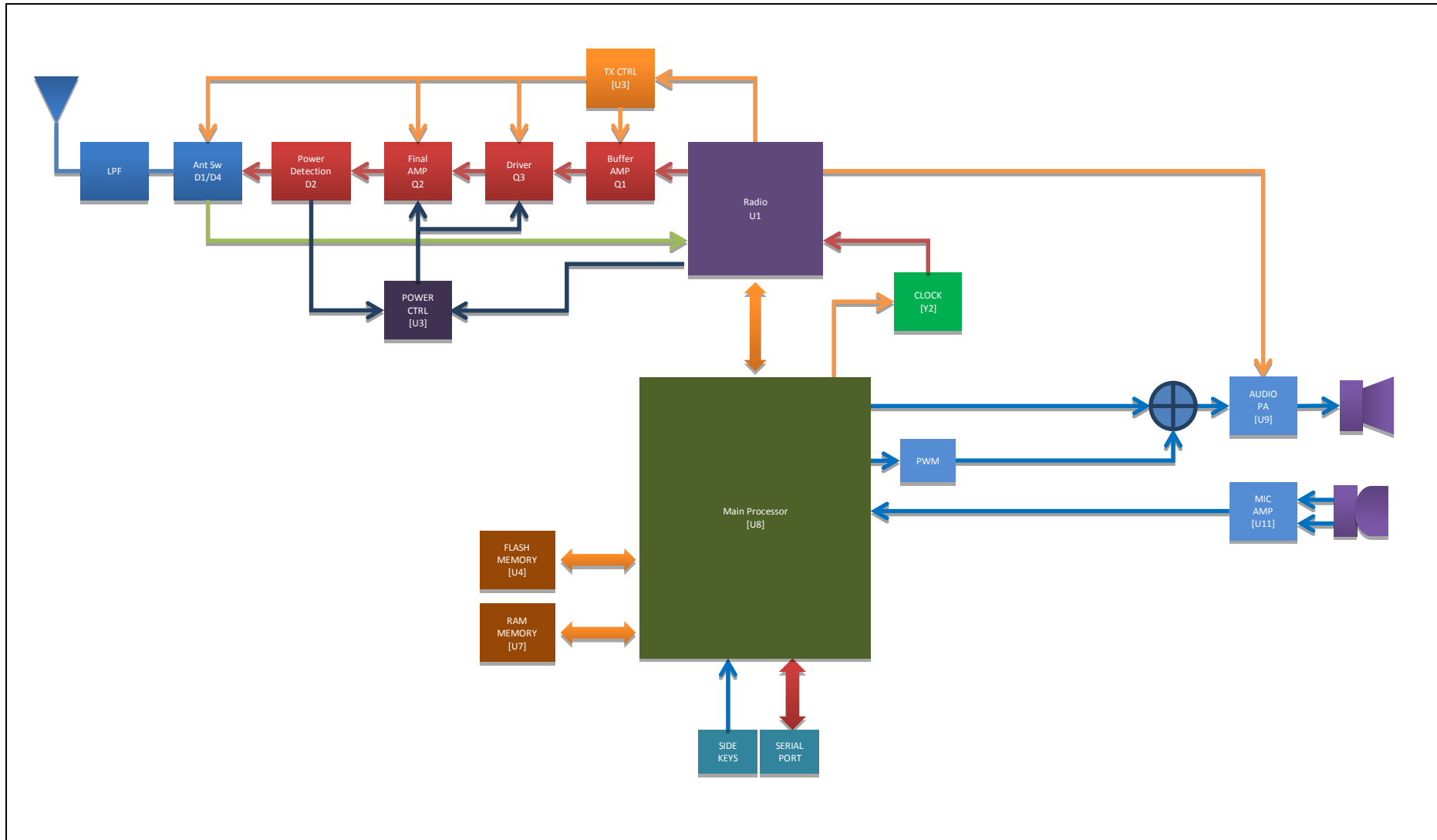
EXPLODE DRAWING

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3RD. ANG. A4

### 3. ST-1000 SIMPLIFIED DIAGRAM



**Notes:**

## 4. - ST-1000 RF DESCRIPTION

### 4.1. Circuit Configuration

The receiver is a single receiver with built-in DSP fully integrated.

Incoming signals from the antenna, after passing through LPF filter, are fed direct to the DSP down converter to get the baseband voice from 0Hz to 3500Hz.

Demodulated signals are fed to the DSP processor where are filtered and conditioned. This processor also includes a high efficiency FSK modem.

For digital demodulation, once the data is decoded, and free of errors, it is fed into the into a vocoder firmware module, which converts the data to voice.

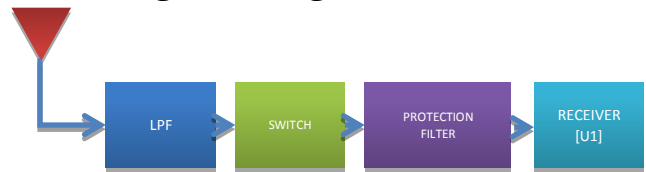
Analog voice from the analog path or the analog voice recovered from the vocoder firmware, are fed into an audio power amplifier direct from a digital to analog converter.

Transmit signal frequency is generated by integrated VCO and PLL. RF frequency generated by the integrated RF chip is amplified into a 3-step amplifier then filtered by a low pass filter to be applied to the antenna.

## 4.2. Receiver System

### 4.2.1. Front-end RF Receiver

Incoming RF signals from the



antenna are delivered to the Receiver Unit and pass through a Low-pass filter, antenna switching diode, and then fed to the receiver (U1) passing through a limiter BPF.

### 4.2.2. ANALOG Audio Processing



The RF signal is tuned by U1, which includes a base band DSP audio processing, recovering flat audio from DC up to 3500 hz.

The detected audio is amplified, filtered and conditioned inside of U8 which also includes a de-emphasize filtering shape for received audio signals by firmware.

The output of the filtered and conditioned audio is delivered to an audio power amplifier (U9) then to the speaker passing through the external audio connector switch.

### 4.2.3. Virtual Squelch Circuit

S/N ratio is measured by the receiver (U1) as the result of the analysis of the signal and the noise of the carrier. The output is sent to the main processor as a digital frame, which is analyzed by radio



firmware, removing noise then qualifying the signal level. If the signal level is higher than the expected for the current programmed squelch threshold, then the processor analyzes the expected signaling programmed on the current channel table.

In case of not any signaling is required, or the signal has been detected, the processor opens the virtual audio path, unmuting the audio amplifier (U9).

#### 4.2.4. Virtual VOLUME CONTROL

The potentiometer position (RV1) is measured by one analog to digital converter on the main processor (U8). The firmware immediately adjusts the processor path gain to get the appropriate overall circuitry volume control.

Minimum volume, emergency and private audio level are controlled only by software overriding the information received from the DAC on U8.

#### 4.2.5. Sub audio signaling

Received sub audio signaling as CTCSS and DCS are received and processed and detected by the receiver (U1). Once decoded, the sub audio signaling is reported to the processor where the firmware compares it with the value programmed into the current channel programming.

If the received signaling matches the channel programming, then the main processor (U8) opens the audio patch.

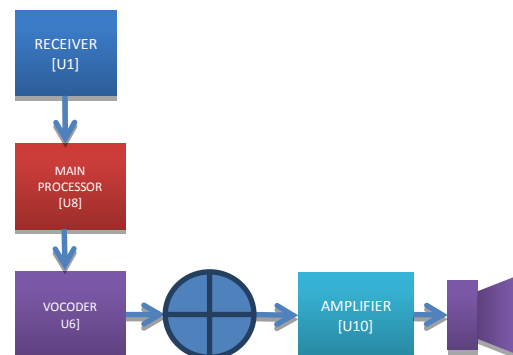
#### 4.2.6. ANALOG AUDIBLE SIGNALING

DTMF signals, MDC1200 and tone signals are processed and decoded by the main processor (U8). Decoded information or received tone is analyzed by firmware on the main processor (U8).

#### 4.2.7. DIGITAL AUDIO PROCESSING

Digital received information is processed by the receiver DSP (U1) then delivered to the main processor (U8), which includes a very sensitive FSK modem.

Data decoded by the modem firmware is transferred to the main



code, which de-encrypts the information, checks the integrity, corrects the wrong bits and extract the audio information form the received frame.

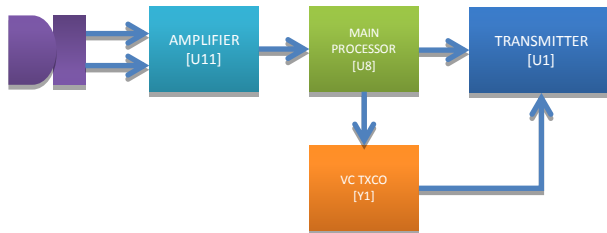
The portion of the data received, error free, is moved to the vocoder firmware module internally into the main processor (U8).

The vocoder firmware re-builds the audio from the compressed data then applies filter it, adjust the volume and fed it to the audio power amplifier (U10) through one

high definition digital to analog converter.

### 4.3. Transmitter System

#### 4.3.1. ANALOG TX SIGNAL



The AF signal from the internal microphone (MK1) or external microphone (J4) are processed as differential signal, then it is conditioned and transformed into common mode by the microphone pre-amplifier (U11).

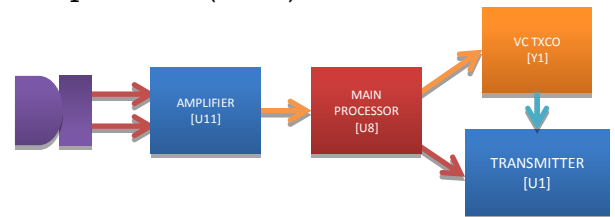
The result of the conditioned in-band filtered signal is fed to the Main Processor (U8), which provides audio gain control, compander, emphasize, limitation, encryption, etc. by software algorithms.

The high audio band of the signals from 300 to 3500 Hz are directly fed to the transmitter (U1), which performs a direct modulation of a generated carrier.

Low frequency signaling audio is fed directly to Y1 VC TXCO main clock generator and U1 with a corresponding balance controlled by software.

#### 4.3.2. DIGITAL TX AUDIO:

The AF signal from the internal microphone (MK1) or external



microphone (J4) are fed directly to the main processor (U8), which perform the signal filtering, the data codification, into especial firmware block. The result of the digitized information is processed by a FEC (Frame Error Correction) module, adding spare bits to ensure high robustness to the data, then it is encrypted and the user related information as user ID is added.

The final data frame is fed to the modem code, which generates the FDMA signals, controlling the modulation of the Transmitter (U1) through the VC TXCO for DC to low frequencies and the direct modulation for higher frequencies.

#### 4.3.3. Driver and Final Amplifier Stages

Final RF is amplified on Q1 (2SC3356) then filtered to be fed to Q3 (2SK3475) then finally amplified by Q2 (2SK3476) up to 2 watts output power.

The transmit signal then passes through the antenna switch D1 (BAR88) and is low-pass filtered to suppress harmonic spurious radiation before delivery to the antenna.

#### 4.3.4. Automatic Transmit Power Control

The RF power detector (BAS70) detects transmitted feedback then sends the readout to audio processor U8. The special firmware module compares the transmitted power against the referred level stored on current channel memory adjusting the power control level generated as reference by one DAC output on the same processor (U8) then amplified by U3 (MCP6241U) controlling the gate current on Q1 and Q17.

Notes:

## 5. RC-1000 ALIGNMENT

### 5.1. Introduction

The ST-1000 series is carefully aligned in factory for the specified performance, across the frequency range depending for each version.

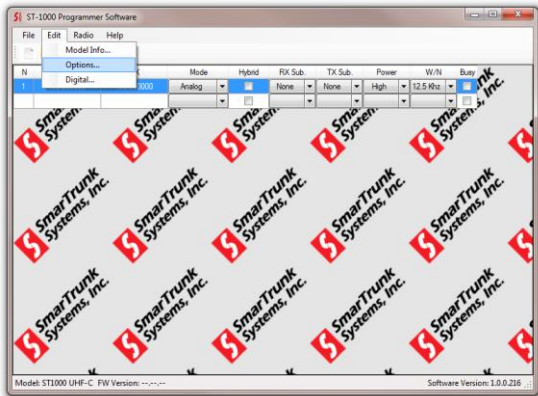
As the core of the radio is firmware only, all processes are the result of the internal feed-back where alignment by user is not required.

## 6. COMPLIMENTARY USER ALIGNMENT

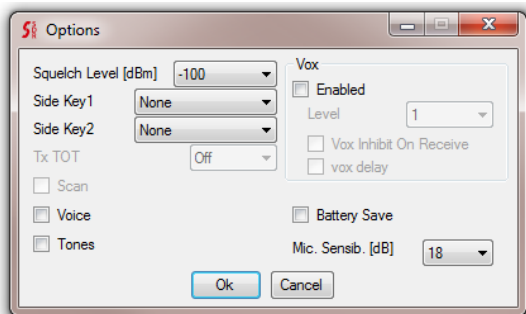
Additional complimentary parameters should be also aligned on user login mode; it means the user can align it as per the most convenient way for particular radio usage.

### 6.1. OPTION ALIGNMENT:

To access to the option alignment menu, select Edit then Options form the main software toolbar:



As soon as you click on Options... the Options screen is popped up:

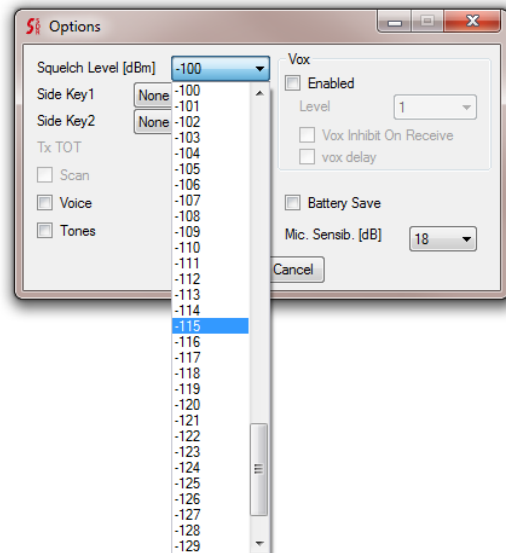


From this screen the user can adjust some parameters as:

### 6.1.1. SQUELCH LEVEL:

ST-1000 supports a dBm scaled squelch adjustment.

To set a desired squelch reference, please select you desired squelch level form the list:



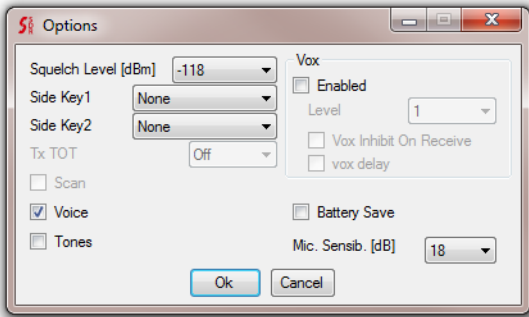
Press [OK] to store it in the file.

The value will be updated after the file is transferred to the radio.

### 6.1.2. ANNUNCIATION

You can enable or disable voice annunciation.

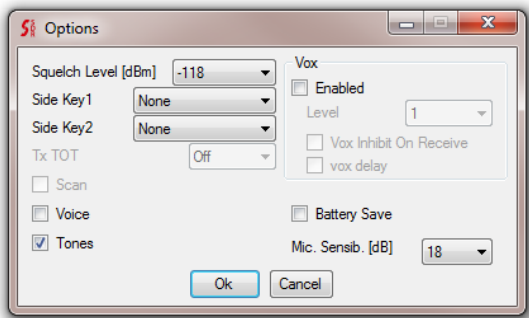
To enable it, please check the Voice box into the Options alignment screen:



### 6.1.3. Tones

You can enable or disable tones generation when a key is pressed.

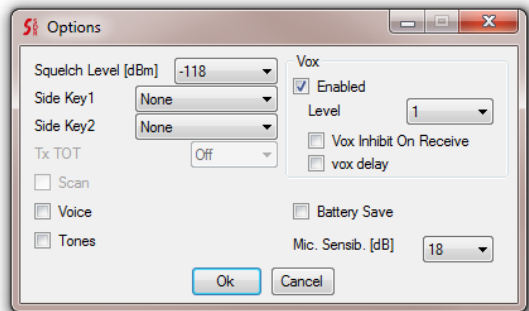
To enable it, please check the Tones box into the Options alignment screen:



### 6.1.4. Voice activated transmission

You can enable or disable the VOX functionality for your radio.

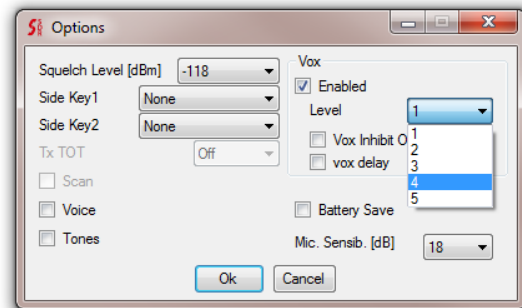
To activate this feature, please check the VOX-Enabled Box.



Once you check it, some additional VOX control parameters are enabled:

#### 6.1.4.1. VOX sensitivity level

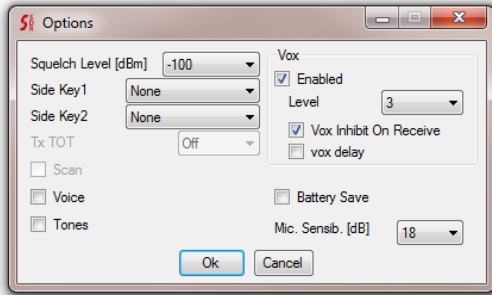
To adjust the VOX sensitivity level, please press on the down-arrow of the scroll-down box on the right side of the Level label, and then select the desired value. Low values means less sensitivity (noisy environments)



#### 6.1.4.2. VOX inhibit on receive

In case you do not use headphones, the audio received on the speaker can be captured by the microphone, setting the radio on transmit mode. To avoid this issue, you can automatically disable the VOX feature when the radio is receiving voice.

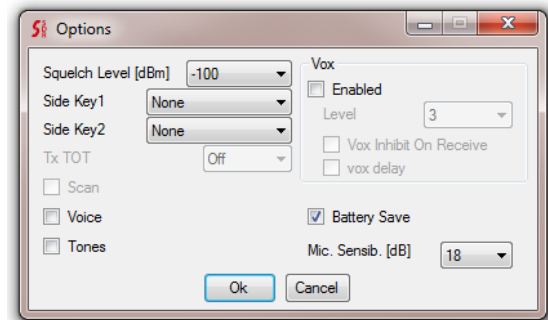
To enable this feature, check the Vox Inhibit On Receive box:



### 6.1.5. Battery save

If the radio is not active on any conversation, it is not necessary that all radios internal functionalities remain active.

To save battery by disabling some radio functionalities temporary when the radio is not involved on any conversation, please check the Battery Save box:



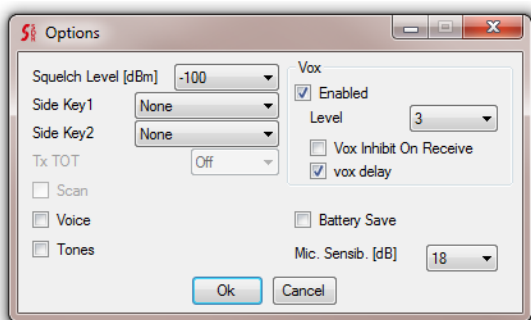
### 6.1.4.3. VOX delay

It is very common that when you use VOX services in the radios, the first words cannot be transmitted because the voice detection and the transmit power warm-up takes time, losing part of the message.

SmarTrunk VOX delay can be activated to avoid this issue.

When active Vox Delay service, the radio is recording any audio captured by the microphone and it is real time analyzed by the processor. In case audio is detected, the radio sets on TX mode, playing back the pre-recorded audio after a delay to ensure the receiver is already getting the incoming voice. On this way, no word is missed on the air.

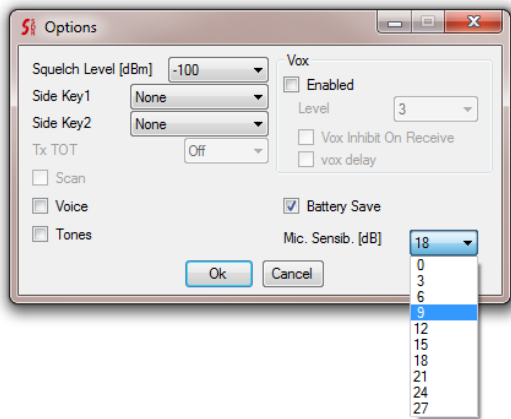
To activate this feature, please check the Vox Delay box:



### 6.1.6. Microphone sensitivity

Depending how noisy the environment is, or how sensitive is the external microphone in use, the microphone sensitivity must be adjusted as per user comfort.

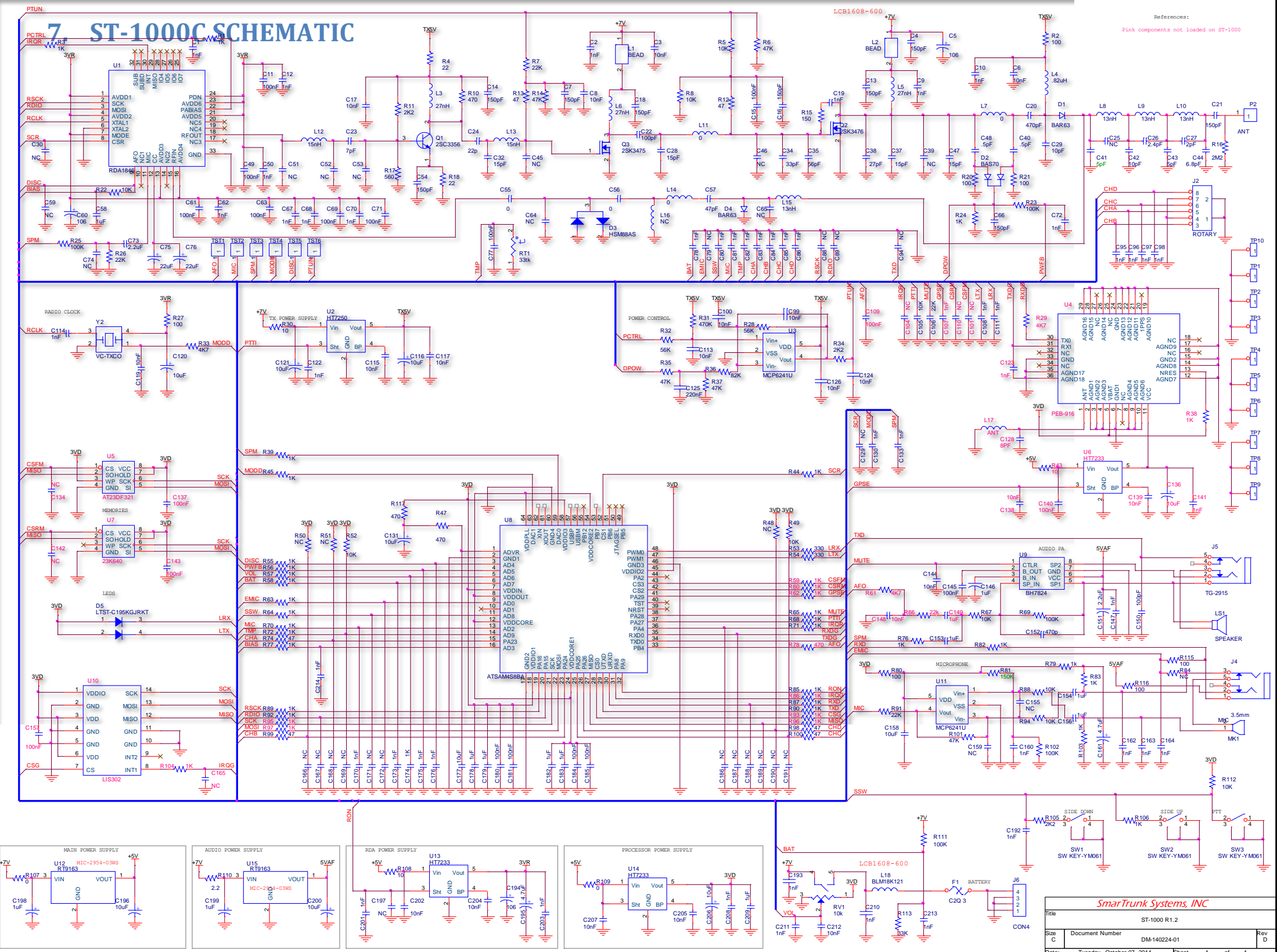
Please use the drop down list on the right side of Mic Sensibility label to select the desired microphone sensitivity gain.



Press OK to store your changes into the radio file. The information will be updated to the radio once you transfer the file.



# 7 ST-1000C SCHEMATIC

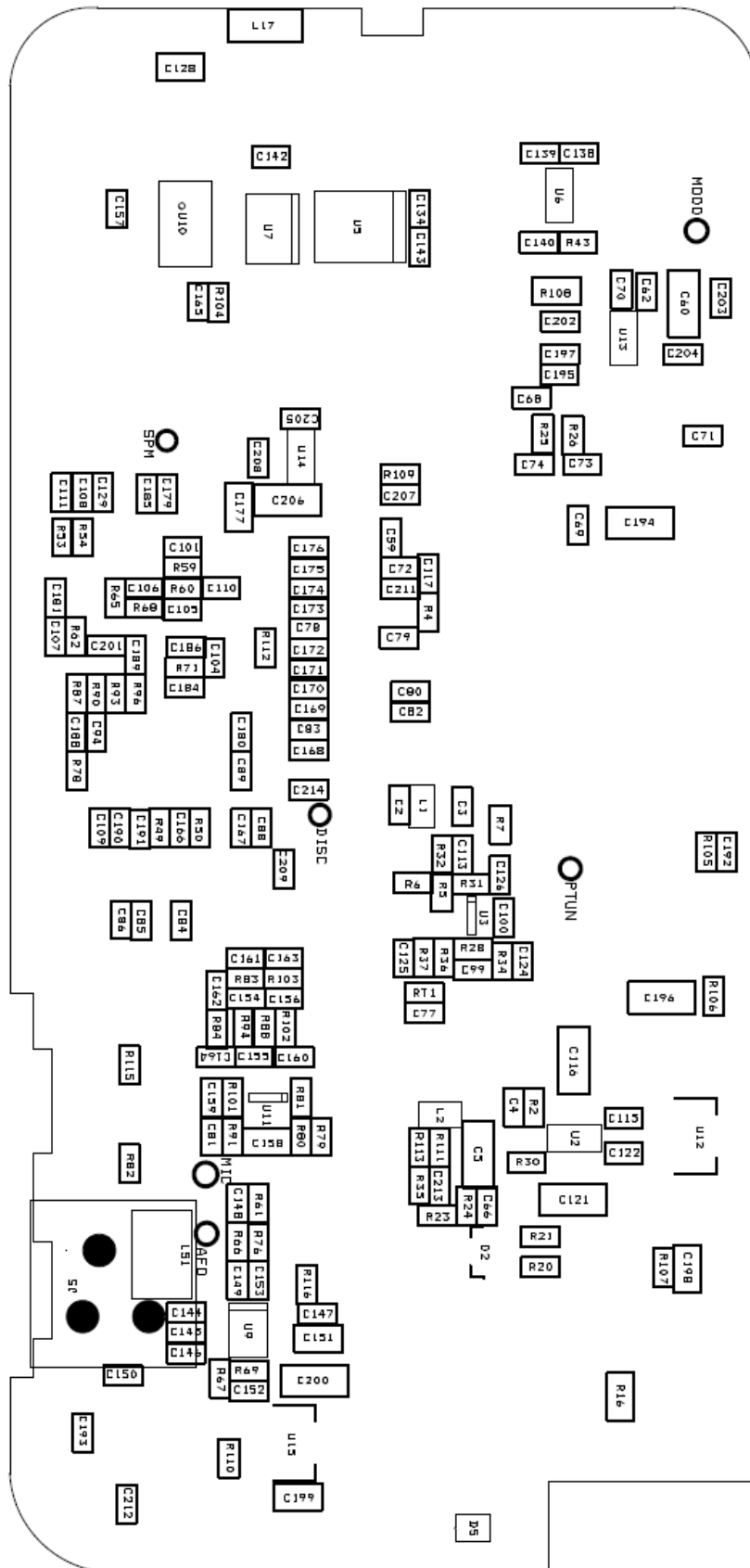


**SmarterTrunk Systems, INC**

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Date	Tuesday, October 07, 2014		

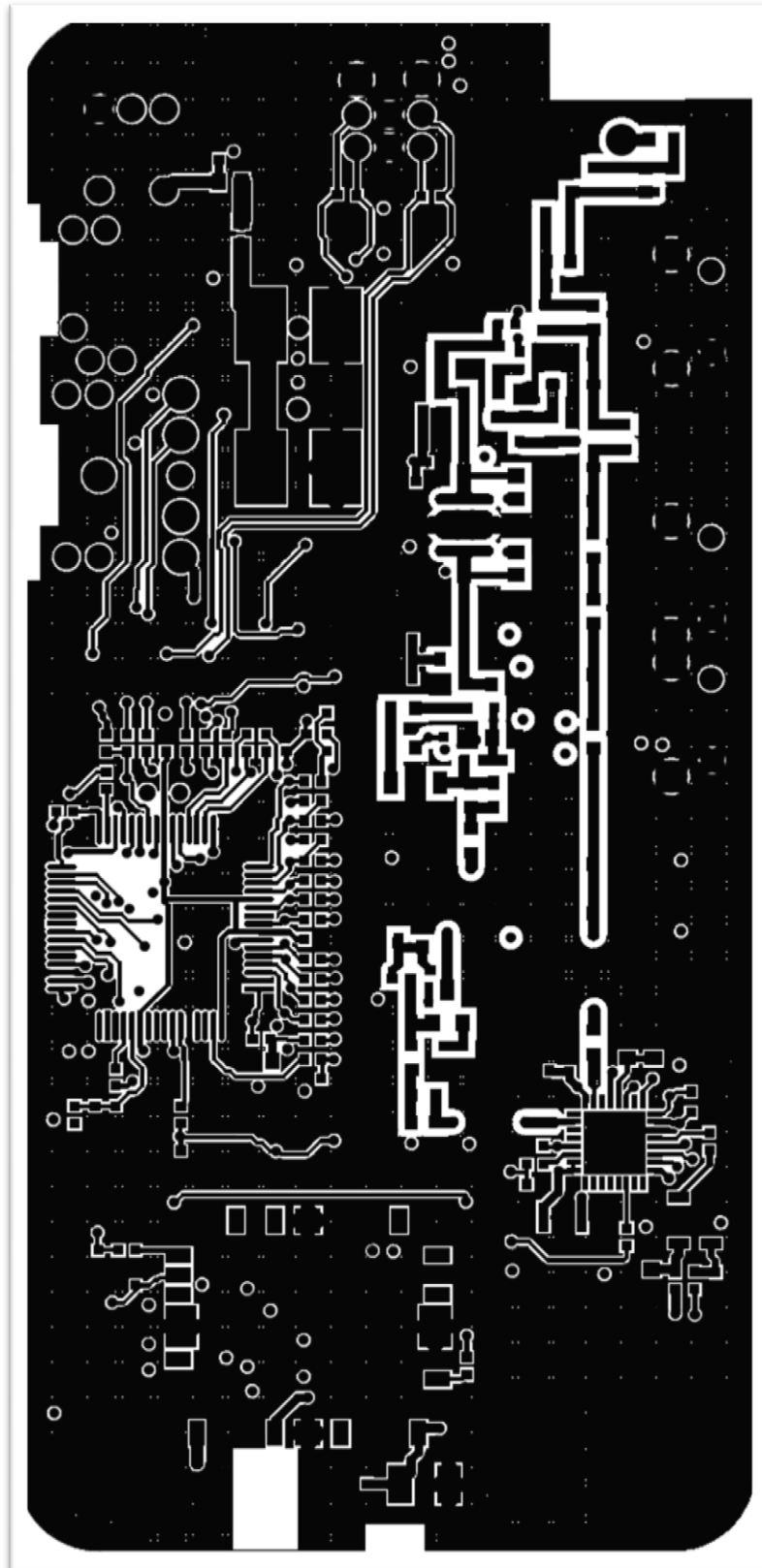


## 11.2 ST-1000C BOTTOM LAYER COMPONENTS LOCATION

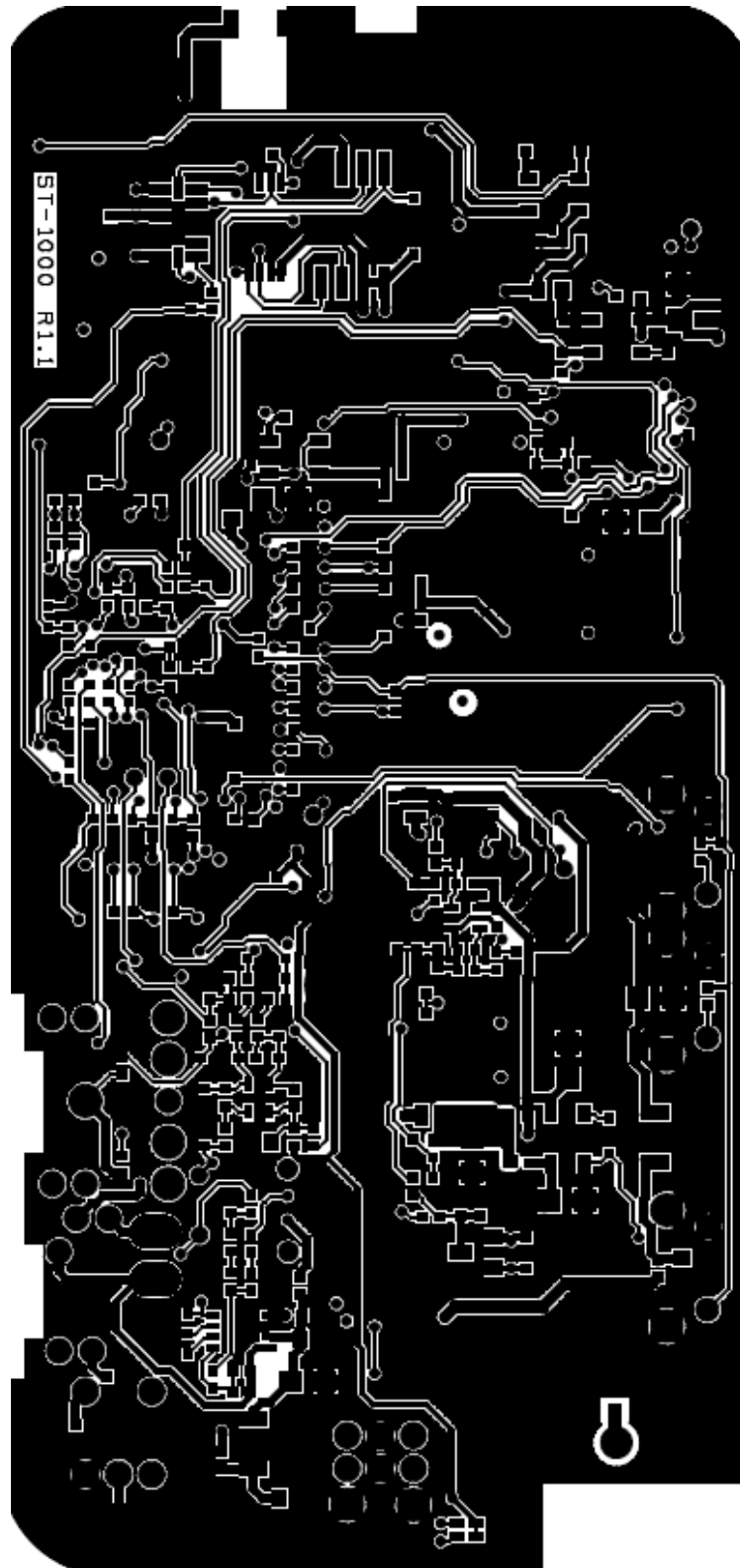


## 12 ST-1000C PCB LAYOUT

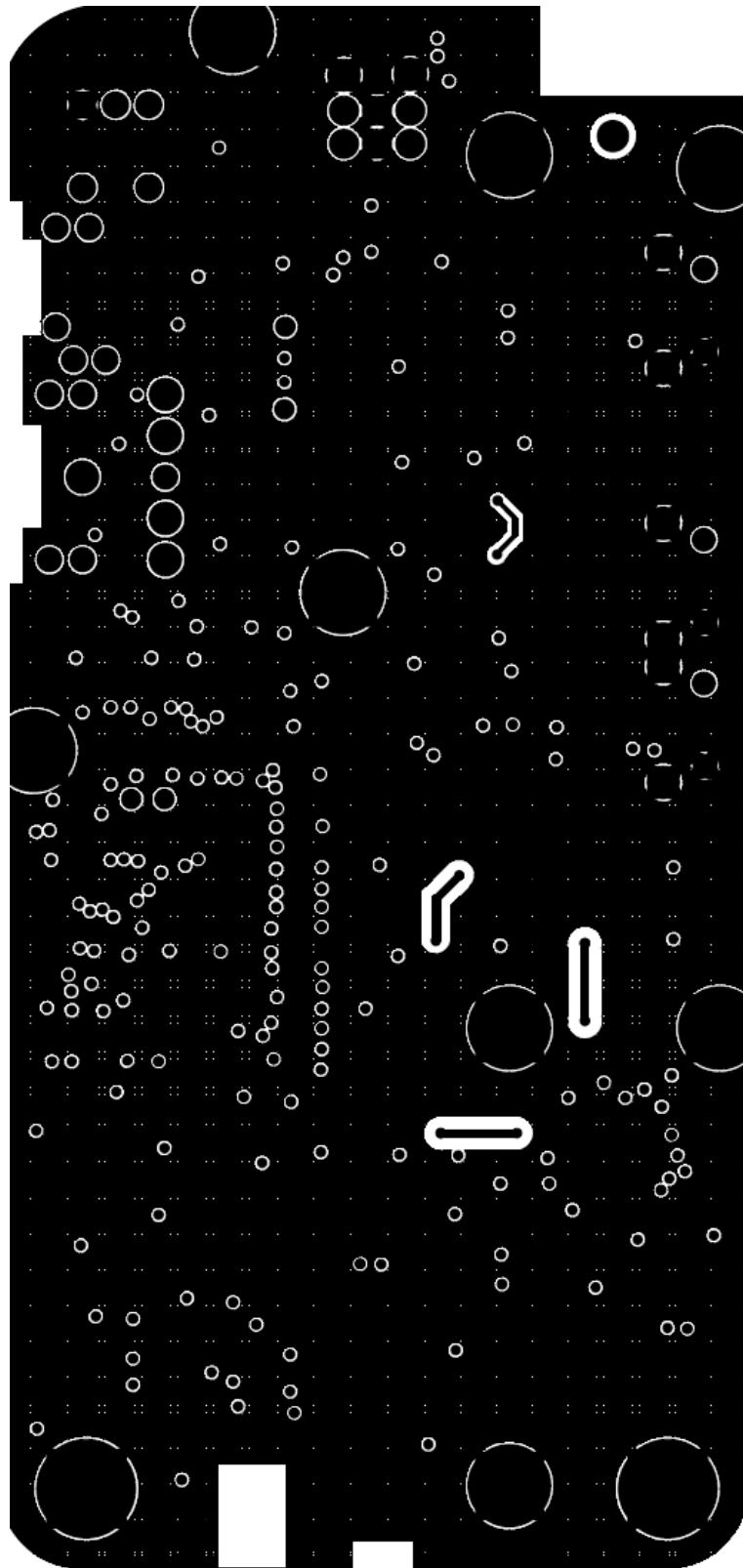
### 12.1 ST-1000C TOP LAYER PCB LAYOUT



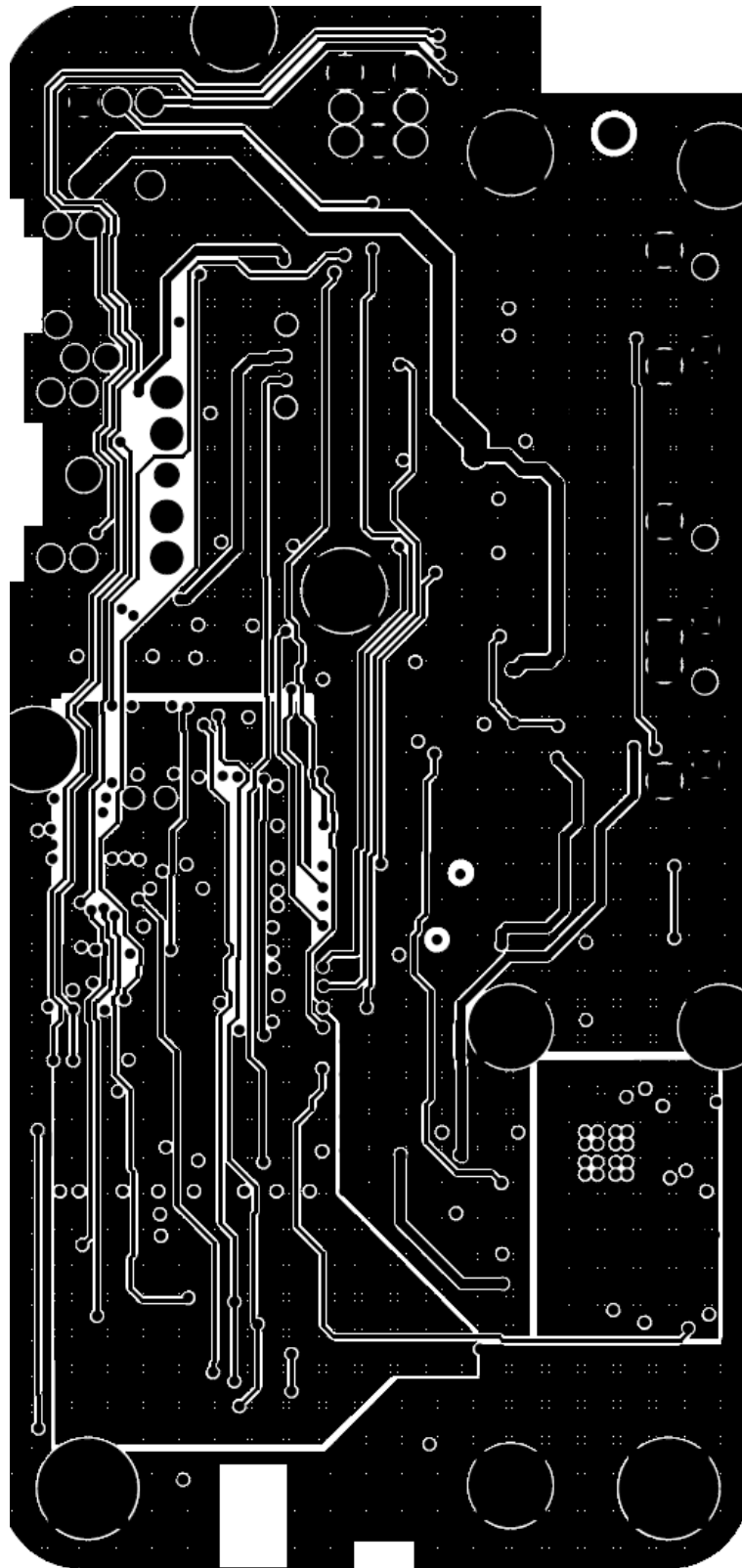
## 12.2 ST-1000 BOTTOM LAYER PCB LAYOUT



## 12.3 ST-1000C PCB GROUND LAYER



## 12.4 ST-1000C PCB POWER LAYER



### 13 ST-1000C BOM

ST-1000C BOM VERSION 1.0			
NAME	DESCRIPTION	VALUE	SMARTRUNK PN
	MAIN P.C.B.		EPT100010A
C40	CAP CERAMIC 0.5PF 50V C0G 0402	.5pF	CK1059AK1A
C48	CAP CERAMIC 0.5PF 50V C0G 0402	.5pF	CK1059AK1A
C150	CAP CERAMIC 100PF 50V NP0 0402	100pF	CK1101AK5A
C19	CAP CER 1000PF 50V 0603 LOW DIST	1nF	CK1102AD5XR
C1	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C2	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C9	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C10	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C12	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C50	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C62	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C67	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C68	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C70	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C72	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C78	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C80	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C81	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C82	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C83	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C84	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C85	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C86	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C95	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C96	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C97	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C98	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C108	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C111	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
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C122	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C130	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C133	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C147	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C155	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X



C160	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C162	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C163	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C164	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C170	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C173	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
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C192	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C193	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C201	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C203	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C208	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C210	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C211	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C213	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C214	CAP 1000PF 50V CERAMIC X7R 0402	1nF	CK1102AK5X
C4	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C7	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C13	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C14	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C16	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C18	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C54	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C66	CAP CER 150PF 50V COG 0402	150pF	CK1151AK5A
C57	CAP CER 47PF 50V 5% NPO 0603	47pF	CK1470AD4AR
C35	CAP CERAMIC 56PF 100V 10% NPO 0603	56pF	CK1560AD4A
C27	CAP CERAMIC 2PF 100V NPO 0603	2pF	CK4020AD1A
C41	CAP CER 10PF 250V 5% NPO 0603	10pF	CK9100AD2A
C42	CAP CER 10PF 250V 5% NPO 0603	10pF	CK9100AD2A
C22	CAP CER 100PF 100V 10% NPO 0603	100pF	CK4101AD5A
C28	CAP CER 15PF 100V 10% NPO 0603	15pF	CK4150AD5A
C29	CAP CER 15PF 100V 10% NPO 0603	15pF	CK4150AD5A
C32	CAP CER 15PF 100V 10% NPO 0603	15pF	CK4150AD5A
C37	CAP CER 15PF 100V 10% NPO 0603	15pF	CK4150AD5A
C47	CAP CER 15PF 100V 10% NPO 0603	15pF	CK4150AD5A
C20	CAP CER 470PF 100V 10% NPO 0603	470pF	CK4470AD5A
C21	CAP CERAMIC 150PF 100V COG 5% 0603	150pF	CK4151AD4A
C26	CAP CERAMIC 2.4PF 100V NPO 0603	2.4pF	CK4249AD1A
C34	CAP CER 33PF 100V 5% NPO 0603	33pF	CK4330AD4A
C3	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C6	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C17	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C99	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X

C100	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C113	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C115	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C117	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C125	CAP CERAMIC .22UF 50V X7R 0402	220nF	CK0224AK5T
C126	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C144	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C202	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C204	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C205	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C207	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C212	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C124	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C119	CAP CERAMIC .01UF 50V X7R 0402	10nF	CK5103AK5X
C8	CHIP/C 0.01UF 50WX K X7R 0603	10nF	CK1103AD5XR
C5	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C60	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C116	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C121	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C194	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C196	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C200	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C206	CAP CER 10UF 10V Y5V 0805	10uF	CK0106AB7R
C11	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C15	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C49	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C61	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C63	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C69	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C71	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C77	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C145	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C180	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C181	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C184	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C185	CAP .10UF 16V CERAMIC Y5V 0402	100nF	CK5104AK5X
C198	CAP CERAMIC 1UF 16V Y5V 0603	1uF	CK5105AD7RR
C199	CAP CERAMIC 1UF 16V Y5V 0603	1uF	CK5105AD7RR
C151	CAP CER 2.2UF 16V Y5V 0603	2.2uF	CK5225AD7R
C58	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C146	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C154	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C156	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C153	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T

C178	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C179	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C182	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C183	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C209	CAP CER 1.0UF 6.3V X5R 20% 0402	1uF	CK6105AK6T
C120	CAP CER 10UF 6.3V X5R 20% 0603	10uF	CK6106AD6T
C158	CAP CER 10UF 6.3V X5R 20% 0603	10uF	CK6106AD6T
C177	CAP CER 10UF 6.3V X5R 20% 0603	10uF	CK6106AD6T
C131	CAP CER 10UF 6.3V X5R 20% 0603	10uF	CK6106AD6T
C73	CAP CER 2.2UF 4.0V X5R 20% 0402	2.2uF	CK6225AK6T
C75	CAP CER 22UF 6.3V 20% X5R 0603	22uF	CK6226AD6T
C76	CAP CER 22UF 6.3V 20% X5R 0603	22uF	CK6226AD6T
C161	CAP CER 4.7UF 6.3V 20% X5R 0402	4.7uF	CK6475AK6T
C195	CAP CER 4.7UF 6.3V 20% X5R 0402	4.7uF	CK6475AK6T
C43	CAP CER 5PF 250V COG SMD	5pF	CK9050AD1A
C23	CAP CER 7PF 250V NP0 0603	7pF	CK9070AD1A
C24	CAP CER 22PF 250V 5% NP0 0603	22pF	CK9220AD4A
C38	CAP CER 27PF 250V 5% NP0 0603	27pF	CK9270AD4A
C152	CHIP/C 470PF 50V 10% X7R 0402	470pF	CK1471AK4A
C159	CHIP/C 470PF 50V 10% X7R 0402	470pF	CK1471AK4A
C44	CAP CERAMIC 6.8PF 250V COG SMD	6.8pF	CK9689AD4A
D1	DIODE RF PIN 80V 100MA SC79	BAR88	EDBAR0886Y
D4	DIODE RF SGL 50V 100MA SOD-323	BAR63	EDBAR0063Y
D3	SILICON SCHOTTKY BARRIER DIODE	HSM88AS	EDHSM0088A
Y2	12.8MHZ OSCILLATOR VC-TXCO	VC-TXCO	EFO128000Y
D5	LED GREEN/RED BICOLOR 0606 SMD	LTST-C195KGJRKT	EX01Y40203
F1	FUSE 3A 32V 0603 FAST C2Q	C2Q 3	EX02Y40258
R30	RES 10 OHM 1/16W 5% 0402 SMD	10	RCY041004Z
R108	RES 10 OHM 1/16W 5% 0402 SMD	10	RCY041004Z
R109	RES 0 OHM 1/16W 5% 0402 SMD	0	RCY040004Z
R107	RES 0 OHM 1/16W 5% 0402 SMD	0	RCY040004Z
R2	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R20	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R21	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R27	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R80	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R115	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R116	RES 100 OHM 1/16W 5% 0402 SMD	100	RCY041014Z
R1	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R3	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R24	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R39	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R44	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R45	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z

R55	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R56	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R57	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R58	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R63	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R64	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R65	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R68	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R70	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R71	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R72	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R76	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R77	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R79	RES 1.0K OHM 1/16W 5% 0402 SMD	1k	RCY041024Z
R82	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R83	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R85	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R87	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R89	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R90	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R92	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R103	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R106	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
C174	RES 1.0K OHM 1/16W 5% 0402 SMD	1K	RCY041024Z
R5	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R8	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R22	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R52	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R67	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R88	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R94	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
C105	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R112	RES 10K OHM 1/16W 5% 0402 SMD	10K	RCY041034Z
R23	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R25	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R69	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R81	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R102	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R111	RES 100K OHM 1/16W 5% 0402 SMD	100K	RCY041044Z
R28	RES 56K OHM 1/16W 5% 0402 SMD	56K	RCY045634Z
R4	RES 22 OHM 1/16W 5% 0402 SMD	22	RCY042204Z
R18	RES 22 OHM 1/16W 5% 0402 SMD	22	RCY042204Z
R11	RES 2.2K OHM 1/16W 5% 0402 SMD	2K2	RCY042224Z
R34	RES 2.2K OHM 1/16W 5% 0402 SMD	2K2	RCY042224Z

R105	RES 2.2K OHM 1/16W 5% 0402 SMD	2K2	RCY042224Z
R7	RES 22K OHM 1/16W 5% 0402 SMD	22K	RCY042234Z
R26	RES 22K OHM 1/16W 5% 0402 SMD	22k	RCY042234Z
R91	RES 22K OHM 1/16W 5% 0402 SMD	22k	RCY042234Z
C106	RES 22K OHM 1/16W 5% 0402 SMD	22k	RCY042234Z
R110	RES 2.2 OHM 1/16W 5% 0402 SMD	2.2	RCY042294Z
R53	RES 330 OHM 1/16W 5% 0402 SMD	330	RCY043314Z
R54	RES 330 OHM 1/16W 5% 0402 SMD	330	RCY043314Z
R113	RES 33K OHM 1/16W 5% 0402 SMD	33K	RCY043334Z
R10	RES 470 OHM 1/16W 5% 0402 SMD	470	RCY044714Z
R47	RES 470 OHM 1/16W 5% 0402 SMD	470	RCY044714Z
R117	RES 470 OHM 1/16W 5% 0402 SMD	470	RCY044714Z
R33	RES 4.7K OHM 1/16W 5% 0402 SMD	4K7	RCY044724Z
R6	RES 47K OHM 1/16W 5% 0402 SMD	47K	RCY044734Z
R14	RES 47K OHM 1/16W 5% 0402 SMD	47K	RCY044734Z
R35	RES 47K OHM 1/16W 5% 0402 SMD	47K	RCY044734Z
R37	RES 47K OHM 1/16W 5% 0402 SMD	47K	RCY044734Z
R101	RES 47K OHM 1/16W 5% 0402 SMD	47K	RCY044734Z
R31	RES 470K OHM 1/16W 5% 0402 SMD	470K	RCY044744Z
R17	RES 560 OHM 1/16W 5% 0402 SMD	560	RCY045614Z
R32	RES 56K OHM 1/16W 5% 0402 SMD	56K	RCY045634Z
R36	RES 82K OHM 1/16W 5% 0402 SMD	82K	RCY048234Z
L14	RES 0.0 OHM 1/16W 0603SMD	0	RCY060004ZR
C55	RES 0.0 OHM 1/16W 0603SMD	0	RCY060004ZR
C56	RES 0.0 OHM 1/16W 0603SMD	0	RCY060004ZR
L7	RES 0.0 OHM 1/16W 0603SMD	0	RCY060004ZR
L11	RES 0.0 OHM 1/16W 0603SMD	0	RCY060004ZR
R15	RES 150 OHM 1/10W 5% 0603 SMD	150	RCY061514Z
R16	RES 2.2M OHM 1/10W 5% 0603 SMD	2M2	RCY062254Z
R12	RES 47 OHM 1/16 5% 0603 SMD	47	RCY064704ZR
R13	RES 47 OHM 1/16 5% 0603 SMD	47	RCY064704ZR
RT1	THERMISTOR	33tk	RTU143334Y
Q1	TRANSISTOR	2SC3356	TY2SC3356Z
Q3	TRANSISTOR	2SK3475	TY2SK3475Z
Q2	TRANSISTOR	2SK3476	TY2SK3476Z
L1	BEAD COIL	BEAD	YCBAD18592
L2	BEAD COIL	BEAD	YCBAD18592
L18	BEAD COIL	BLM18K121	YCBAD18592
L12	INDUCTOR	15nH	YCMCI1533D
L13	INDUCTOR	15nH	YCMCI1533D
L3	INDUCTOR	27nH	YCMCI2733D
L6	INDUCTOR	27nH	YCMCI2733D
L4	INDUCTOR	.82uH	YCMCI8243D
L5	SPRING COIL	27nH	YCSPG18424

L8	SPRING COIL	13nH	YCSPG18426
L9	SPRING COIL	13nH	YCSPG18426
L10	SPRING COIL	13nH	YCSPG18426
L15	SPRING COIL	13nH	YCSPG18426
U13	IC	HT7233	YNHT07233Z
U14	IC	HT7233	YNHT07233Z
U2	LDO LINEAR REGULATOR 5V	HT7250	YNHT07250Z
U3	OPERATIONAL AMPLIFIER	MCP6241U	YNMR6241UT
U11	OPERATIONAL AMPLIFIER	MCP6241U	YNMR6241UT
U1	SINGLE CHIP RADIO TRANSCEIVER	RDA1846	YNRD01846Z
U9	AUDIO AMPLIFIER	BH7824	YNRO07824Z
U12	5V LINEAR REGULATOR	XC6201	YNTX1P502P
U15	5V LINEAR REGULATOR	XC6201	YNTX1P502P
D2	DIODE SCHOTTKY 70V 70MA SOT23	RB705D	EDBAS0070Y
R74	RES 47 OHM 1/16W 5% 0402 SMD	47	RCY044704Z
R98	RES 47 OHM 1/16W 5% 0402 SMD	47	RCY044704Z
R99	RES 47 OHM 1/16W 5% 0402 SMD	47	RCY044704Z
R100	RES 47 OHM 1/16W 5% 0402 SMD	47	RCY044704Z
U8	IC MCU 32BIT 512KB FLASH 64LQFP	ATSAM4S8BA	YNATSAM04S

## 14 ST-1000C MECHANICAL BOM

ST-1000C BOM (MECHANICAL)			
LOCATION	DESCRIPTION	VALUE	SMARTRUNK PN
J2	ROTARY SELECTOR	ROTARY	EWRT32010S
RV1	LINEAR POTENTIOMETER WITH SWITCH	10K	EWSP30000S
J4	3.5MM JACK 3 CONTACTS SINGLE SWITCH	3.5MM	EX06B40000
J5	2.5MM JACK 3 CONTACTS SINGLE SWITCH	2.5MM	EX06B40001
	SPEAKER 16 OHM 1W	SP	ES800835SQ
SPK	SHIELD CLOTH		LZZZZ6092A
MK1	CONDUCTOR MIC	MIC	EX04N04759
SW1	SWITCH TACTILE SPST-NO 0.05A 12V	SW KEY -YM061	EWPS33091X
SW2	SWITCH TACTILE SPST-NO 0.05A 12V	SW KEY -YM061	EWPS33091X
SW3	SWITCH TACTILE SPST-NO 0.05A 12V	SW KEY -YM061	EWPS33091X
	MAIN CHASSIS		ML1000010X
	VOL KNOB		PL1000090A
	CHANNEL KNOB		PL1000080A
SPK	RUBBER SPEAKER		QL1000070A

	EAR JACK COVER		PL1000030B
	BATTERY SPRING RUBBER		QL1000170A
	BATTERY SPRING		ML1000A10A
J6	BATTERY CONNECTOR	BATT	EX07B40000
	ANT JACK		EX06B41269
	NUT FOR ANT. JACK		JN301403ZE
SPK	LEAD WIRE BLACK 50MM		WL0006005Z
SPK	LEAD WIRE RED 50MM		WL0206005Z
	FRONT HOUSING		PL1000011A
	LED BAR		PL1000100A
	MIC RUBBER		QL1000270A
	PTT RUBBER		PL1000060A
	REAR COVER		PL1000050A
REAR COVER	SET SCREW M3X0.5PX6 BLACK		JS052206MB
MAIN CHASSIS	SET SCREW M3X0.5PX8		JS052308MN
MAIN PCB	SET SCREW M2X0.5PX4		JS052103MN
	AC ADAPTOR		ETSGS2U009
	ANTENNA		EX10N41858
	MIC RUBBER CAP		QL1000071A
MAIN CHASSIS	INSULATING PLATE (BLACK)		XZZZZ1000C
	HEAT CONDUCTOR 8mmX5mmX2.5tmm		QL1000A10A

## 15 ACCESSORY PORT:

### Speaker Microphone Pin Out

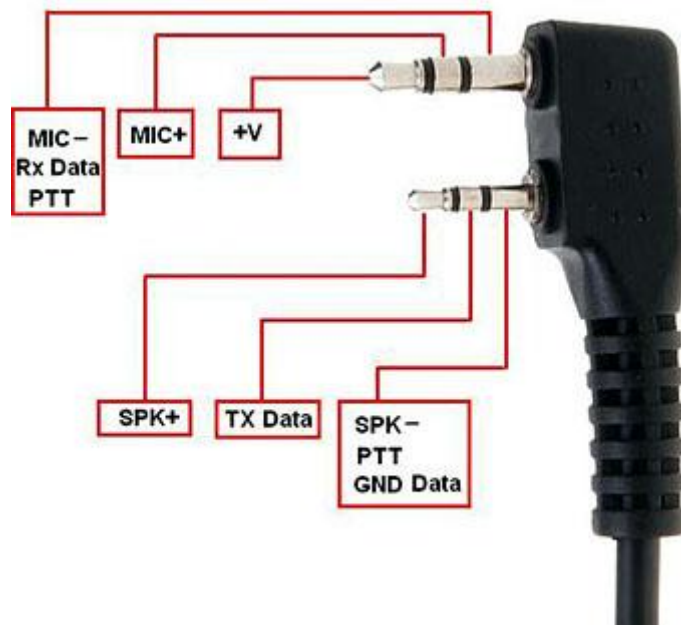
#### 3.5mm Plug

Sleeve	Mic -	PTT	Rx Data	(to the radio)
Ring	Mic +			
Tip	+V		(from the radio)	

#### 2.5mm Plug

Sleeve	Speaker -	PTT	Data	GND
Ring	TX Data		(from the radio)	
Tip	Speaker +			

### Connect Sleeve to Sleeve for PTT







## 16 ST-1000C SERVICE MANUAL REVISIONS

AUTHOR	RELEASE	DATE	REMARKS
DANIEL MARTIN	1.0	AUG-2014	INITIAL RELEASE VERSION

