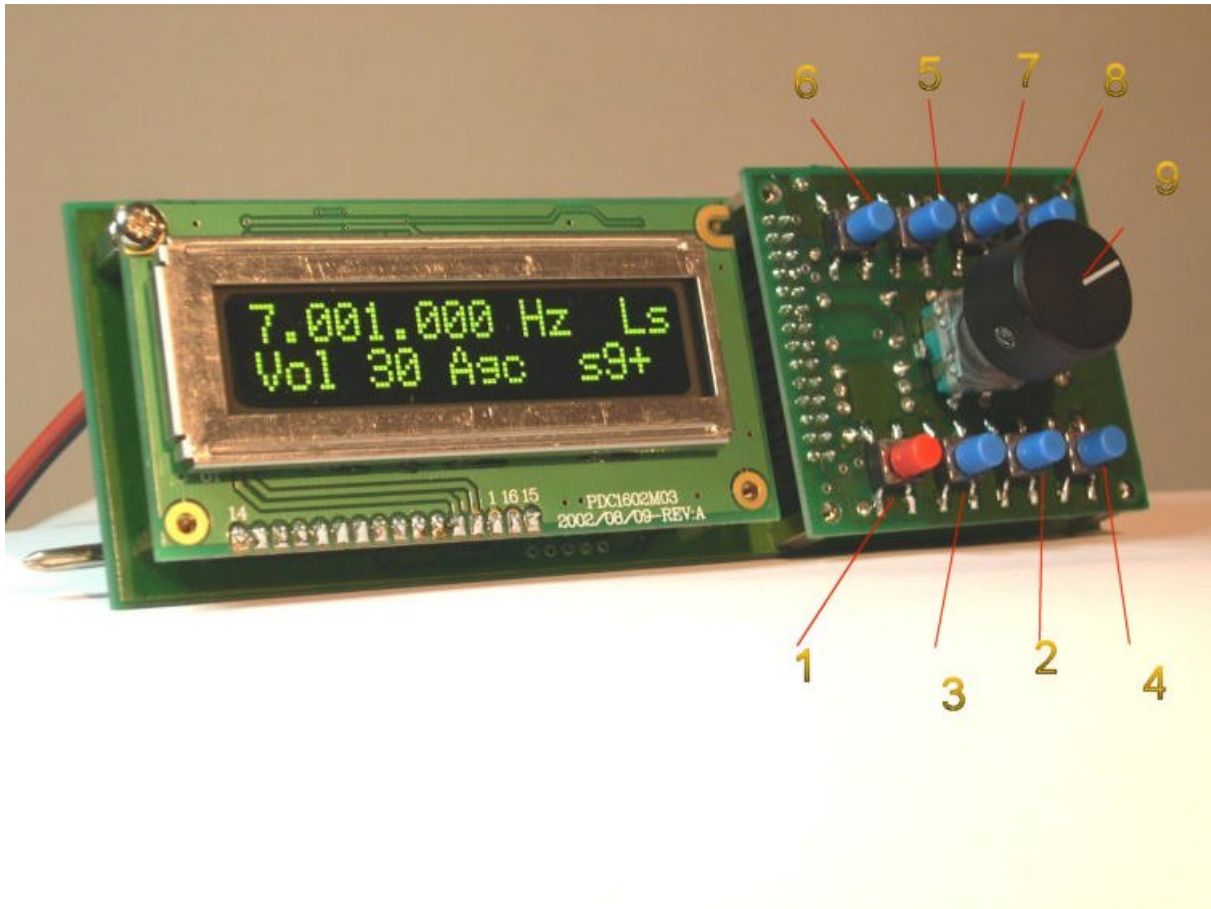


Ten Tec RX320  
**Control Panel**

**Operation Manual**  
**(V1.5.1)**

# RX320 Control Panel



in the photo the Rx320 controller with new PLED display (optional)

## Key functions:

1. Rx Mode key to select LSB, USB, CW, AM
2. Volume Up
3. Volume Down
4. Decreasing Key (for the selected function)
5. Function Mode Down (see Table 1)
6. Frequency/Tuning step/Ham band
7. Function Mode Up
8. Increasing Key (for the selected function)
9. Frequency tuning knob with mechanical encoder

### Description for the N5/7 key (Function mode )

Mnemonic on LCD	Description
AGC	<b>Automatic Gain Control:</b> key 4 and 8 perform Agc Slow,Medium & Fast
AUT	Automode: if ON, to any RX mode, is joined the typical selectivity, and tuning step value. Keys 4 and 8 perform ON and OFF
Flt	<b>Selectivity Filter:</b> Keys 4 and 8 select selectivity: 300 Hz – 8 KHz.34 bandwidth with value displayed in Hz (see table)
MemR	<b>Memory Read:</b> Use Keys 4 (down) and 8 (up) for selecting the memory location from channels 1 to 20 (any location stores Freq. Filter, RX Mode and Tuning Step)
MemW	<b>Memory Write:</b> Key 8 selects memory location 1 to 20; Key 4 stores the channel received
Scan1	<b>Scanning Mode 1:</b> The receiver scans from F1 to F2 frequency. Key 8 stores F1 (F1s on LCD) and F2 (F2s on LCD). Key 4 starts and stops scanning. If field exceede S7 scanning stops.
Scan2	<b>Scanning Mode 2:</b> as Sc1 mode but without stop for squelch
ScanM	<b>Scanning Memory:</b> the receiver scan from channels memory location 1 to 20 ; Key 4 starts and stops scanning. If field exceede S7 scanning stops.
BFO	- / + <b>3000 Hz</b> Frequency tuning for CW mode only. Can be used to receive USB/LSB and to adjust the BFO position manually. With BFO = 0 Hz the carrier is centered in the IF filter . With BFO -/+ 3000Hz the carrier is -/ + 3000 Hz out from filter center. The BFO step is 50 Hz. (For LSB adjust BFO about +1500 Hz, for USB about -1500 Hz) LSB and USB RX mode adjust BFO automatically.
Ham Band (with Key 6)	Use Keys 4 (down) and 8 (up) for selecting the Ham bands
T.Lock	Key 8 perform On and Off tuning lock on the tuning encoder
LineV	Key 8 and 4 perform audio control on the Line out of RX320

### Selectivity table

Filter #	Bandwidth Hz	Filter #	Bandwidth Hz	Filter #	Bandwidth Hz
0	6000	12	2700	24	900
1	5700	13	2550	25	750
2	5400	14	2400	26	675
3	5100	15	2250	27	600
4	4800	16	2100	28	525
5	4500	17	1950	29	450
6	4200	18	1800	30	375

7	3900	19	1650	31	330
8	3600	20	1500	32	300
9	3300	21	1350	33	8000
10	3000	22	1200		
11	2850	23	1050		

### **Scan function**

The frequency scanning function works in two modes:

- Scan1: Scans with stop on channel busy
- Scan2: Scans without stop on channel busy

### **Scanning mode 1 (Scan1 on LCD)**

To set up scanning proceed as follows:

1. Tune the first frequency (F1) with normal key for tuning
2. With function mode Key (key 5) select Sc1
3. With Key N8 store this frequency; LCD displays "F1s". Press the key only once
4. With encoder or with Key 6 (frequency/step) and Keys 4/8 select a new frequency (F2) (F2 must be higher then F1)
5. With function mode key 5 return to Sc1 mode
6. With key N8 store this new frequency; LCD displays "F2s". Press the key only once
7. To start scanning press key 4; LCD displays "Stop"
8. To stop scanning press key 4; LCD displays "Str"
9. When scanning stops you can change frequency up and down with the encoder

Scanning stops if a carrier overcomes a Squelch level S7.

Scanning is performed at the frequency step size selected .

Select the appropriate step size for the reception mode selected as follows:

- 100 Hz step for USB, LSB and CW
- 3KHz for AM

When scanning is running it is possible to change other operating modes: the tuning step, the reception mode and so on.

To stop scanning you must always return to Sc1 or Sc2 and press Key 4.

### **Scanning mode 2 (Scan2 on LCD)**

As for Sc1 mode without stop on channel busy. Start and stop scanning are controlled only with Key 4.

### **Memory scanning (ScanM on LCD)**

Memory scanning is also possible: the receiver scans from channels memory location 1 to 20 ; Key 4 starts and stops scanning. If squelch threshold is exceeded scanning stops.

### **Description for the Key 6 (Frequency/tuning step toggle)**

Key 6 toggles frequency or tuning step. The action of Keys 4 and 8 increases and decreases the frequency or tuning step.

### **Description for the N9 Knob**

The N9 knob performs the frequency tuning with the tuning resolution selected with 6/4/8 key.

Tuning step available: 1 , 10,50, 100,500, 1000 Hz, 2.5,5, 10, 100,500 KHz, 1MHz  
Keys 4 and 8 can be used too.( Key 6 toggle freq. Tuning or step tuning with key 4 and 8)

The knob uses a mechanical encoder.

### **Power-up restore (v 1.2)**

During tuning, the frequency on use and the Rx mode, are stored in the channel memory position M0. When the controller is turned on, the last frequency used is restored.

To preserve the EEPROM memory duration,(1 Millions writing ) the memory write isn't performed during scanning or during fast tuning. (This feature is added up V1.2 version)

### **Sleep mode**

The controller is enough quiet so, normally, if you use an external antenna, any RF interference is received. In any case, if necessary, it is possible put the controller

on “Sleep mode”. To do this it is necessary connect to GND Pin 15 of PIC.  
The sleep mode is displayed with “zzzz” on the S-meter field.  
If you remove GND the controller return on normal functionality.

### **Cables & Connections and dimentions**

Connect the Control Panel unit to the RX320 receiver with an RS-232 cable male/male pin-to-pin DB9 (not supplied with unit).

Power supply is 8-10v DC no polarity or AC.

Power request with new PLED display: 30 mA Max (25 mA during sleep mode)

Power request with normal LCD display: 150 mA with LCD light on, 30 mA with LCD light off, 25 mA with LCD light off and sleep mode on.

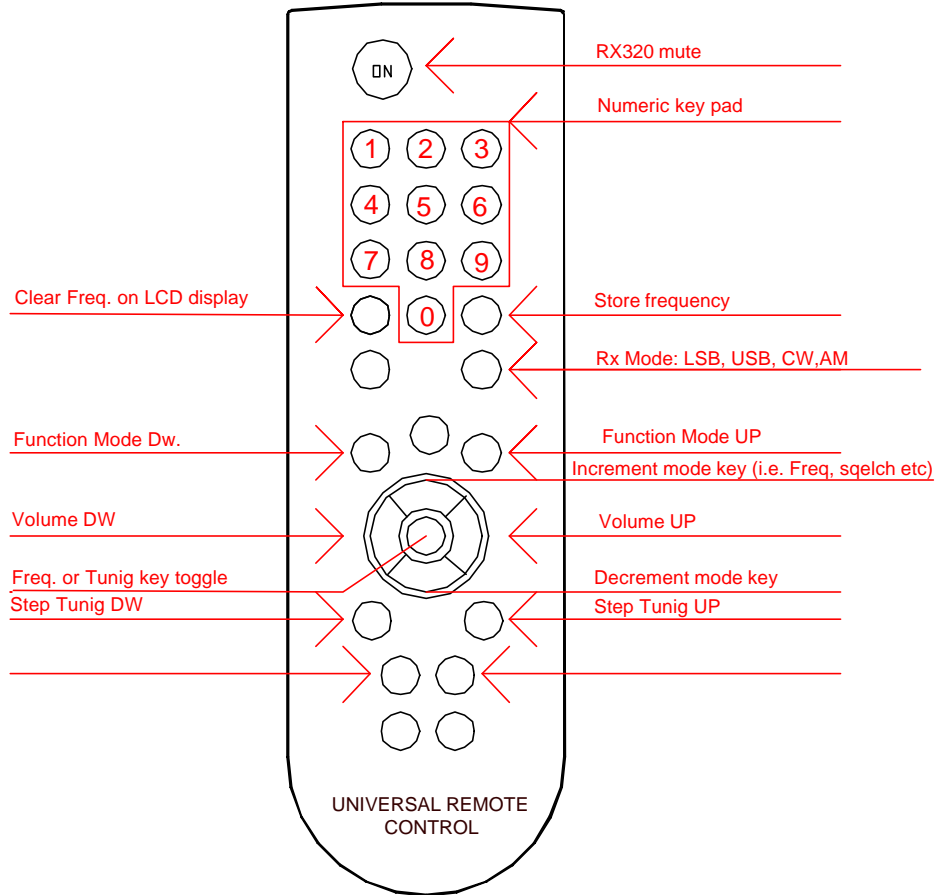
The panel dimentions are 150 x 52 x 40 mm

### Field strength meter

The field strength meter uses "S" scale. In the following table S units, dBm and  $\mu\text{V}$  correspondence.

S unit	dBm	$\mu\text{V}$	note
1	-118	0,28	Faint signal, barely perceptible
2	-112	0,56	Very weak signals
3	-106	1,12	Weak signals
4	-100	2,23	Fair signals
5	-94	4,46	Fairly good signals
6	-88	8,91	Good signals
7	-82	17,7	Moderately strong signals
8	-76	35,5	Strong signals
9	-70	70,7	Extremely strong signals
9+	-60	223	Extremely strong signals
9++	> -50	>700	Extremely strong signals

## RX320 REMOTE CONTROL



### IR controller for T.T. RX320

The RX320 works also with an IR remote controller.

If an infrared sensor is wired to pin 15 of PIC board all the functions are available from the remote controller.

The standard 8 keys or the encoder can also be used.

Because the operation is much easier with the remote controller it is also possible not to install the keyboard and/or the tuning encoder.

The main feature is the possibility to set the frequency directly from the numeric keypad.



## Function Modes/Buttons on Remote Control

Mnemonic on LCD	Description
AGC	<b>Automatic Gain Control:</b> buttons 4 and 7 perform Agc Fast, Med. Or Slow
AUT	<b>Automode:</b> if ON, in any RX mode the typical selectivity, and tuning step value is selected. Buttons 4 and 7 perform ON and OFF
FLT	<b>Selectivity Filter:</b> Buttons 4 and 7 select selectivity: Range 300-8000 Hz.300 Hz – 8 KHz.34 bandwidth with value displayed in Hz (see table)
MemR	<b>Memory Read:</b> Use buttons 4 (down) and 7 (up) for selecting the memory location from channels 1 to 20 (each location stores Freq. Filter, RX mode and Tuning Step)
MemW	<b>Memory Write:</b> Button 7 selects memory location 1 to 20; button 4 stores the channel received
Scan1	<b>Scanning Mode 1:</b> The receiver scans from F1 to F2 frequency. Button 7 stores F1 (F1s on LCD) and F2 (F2s on LCD). Button 4 starts and stops scanning. If field exceeds S7 scanning stops.
Scan2	<b>Scanning Mode 2:</b> as Sc1 mode but without stop for squelch
ScanM	<b>Scanning Memory:</b> the receiver scan from channels memory location 1 to 20 ; Button 4 starts and stops scanning. If field exceeds S7 scanning stops.
BFO	+ / - <b>3000 Hz</b> Frequency tuning for CW mode only. . Can be used to receive USB/LSB and to adjust the BFO position manually. With BFO = 0 Hz the carrier is centered in the IF filter . With BFO -/+ 3000Hz the carrier is -/ + 3000 Hz out from filter center. (For LSB adjust BFO about +1500 Hz, for USB about -1500 Hz) The BFO step is 50 Hz. LSB and USB RX mode adjust BFO automatically.
Ham Band (with Key 6)	Use Keys 4 (down) and 8 (up) for selecting the Ham bands
T.Lock	Key 8 perform On and Off tuning lock on the tuning encoder
LineV	Key 8 and 4 perform audio control on the Line out of RX320

### Scan function

The frequency scanning function works in two modes:

- Scan1: Scans with stop on channel busy
- Scan2: Scans without stop on channel busy

### Scanning mode 1 (Scan1 on LCD)

To set up scanning proceed as follows:

1. Tune the first frequency (F1) with normal key for tuning
2. With function mode (button 5) select Sc1
3. With button 7 store this frequency; LCD displays "F1s". Press the key only once
4. With button 6 (frequency/step) and buttons 4/7 select a new frequency (F2) (F2 must be higher than F1)
5. With function mode button 5 return to Sc1 mode
6. With button 7 store this new frequency; LCD displays "F2s". Press the key only once
7. To start scanning press button 4; LCD displays "Stop"
8. To stop scanning press button 4; LCD displays "Str"
9. When scanning stops you can change frequency up and down with Keys 8

### **Memory scanning (ScanM on LCD)**

Memory scanning is also possible: the receiver scans from channels memory location 1 to 20; Button 4 starts and stops scanning. If squelch threshold is exceeded scanning stops.

1. To start scanning press button 4; LCD displays "Stop"
2. To stop scanning press button 4; LCD displays "Str"

Universal remote controller can also be used.

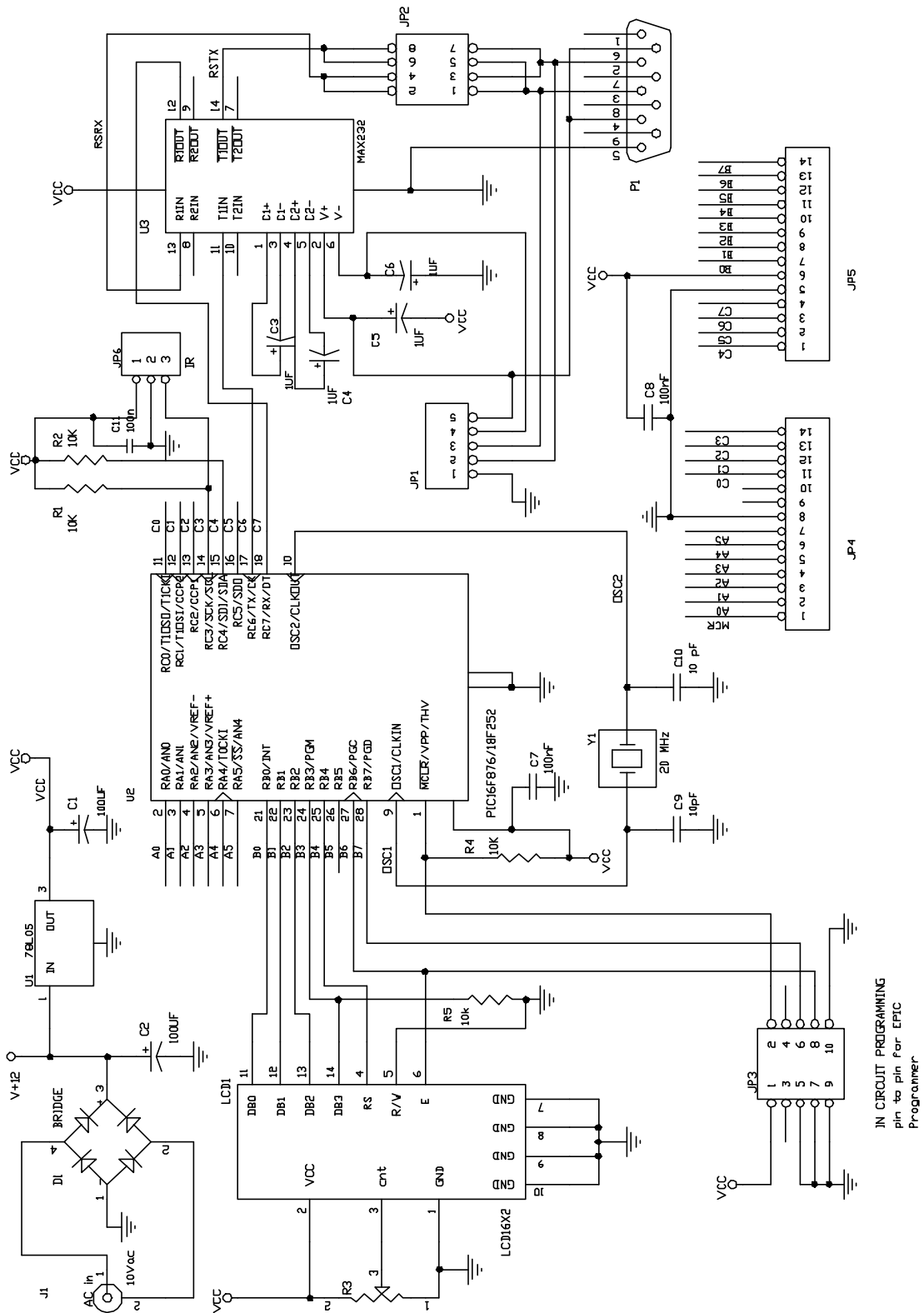
The PHILIPS RC5 standard should be selected.

Be careful to use a controller with the same key dispositions.

An utility help to determine if the controller is set to the correct standard is included.

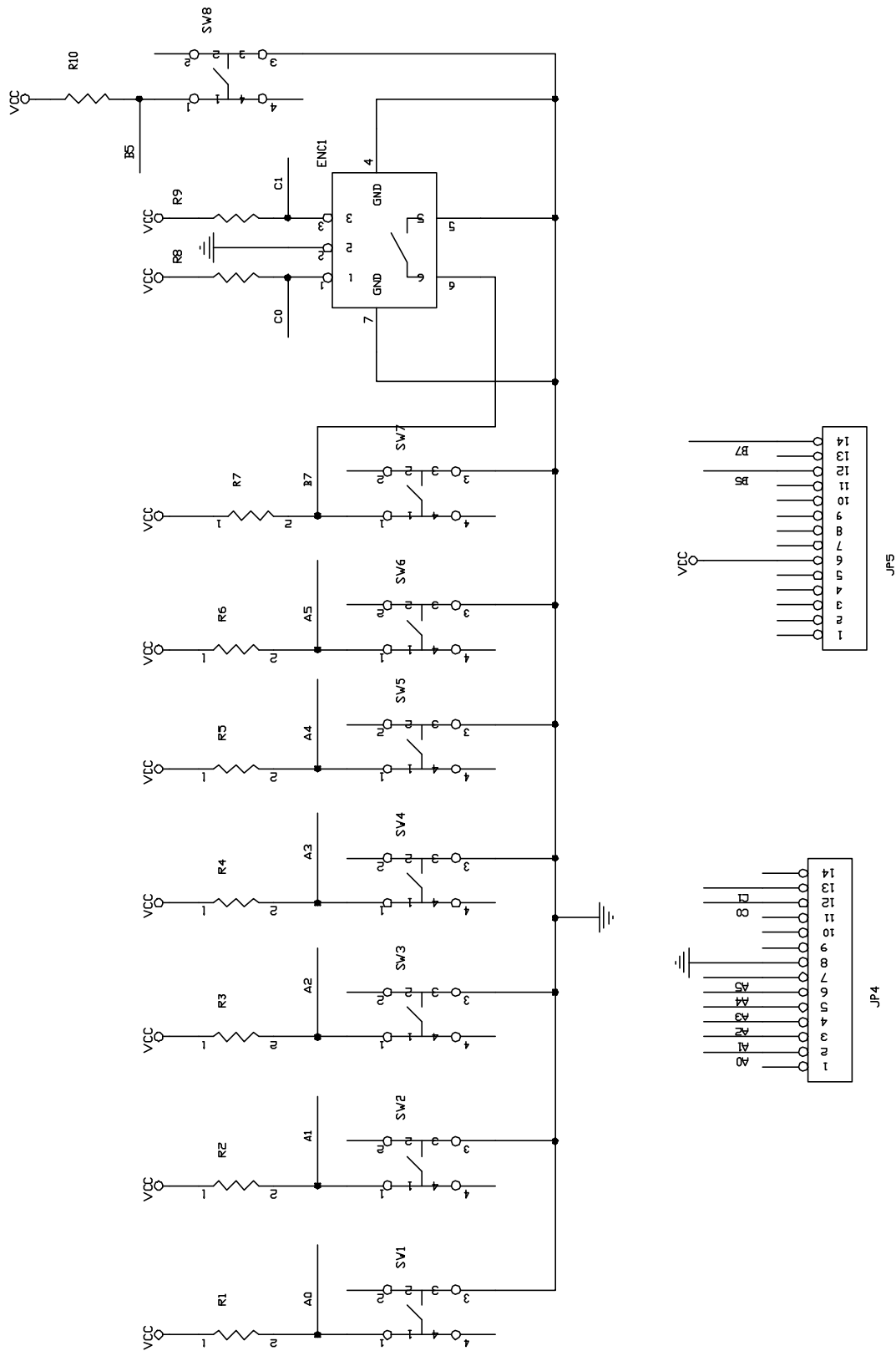
If the standard is correct the key code is displayed on the LCD (in the S-meter field) and must verified in the following table.

<b>Function key</b>	<b>Key code</b>
Rx-320 off key	12
Numeric key pad 0 to 9	0 to 9
Clear frequency on LCD display	56
Store frequency key	34
RX mode	23
Function mode DOWN	60
Function mode UP	41
Volume DOWN	17
Volume UP	16
Increment mode key UP	32
Increment mode key DOWN	33
Freq. tuning step toggle key	13
Step tuning DOWN	43
Step tuning UP	46

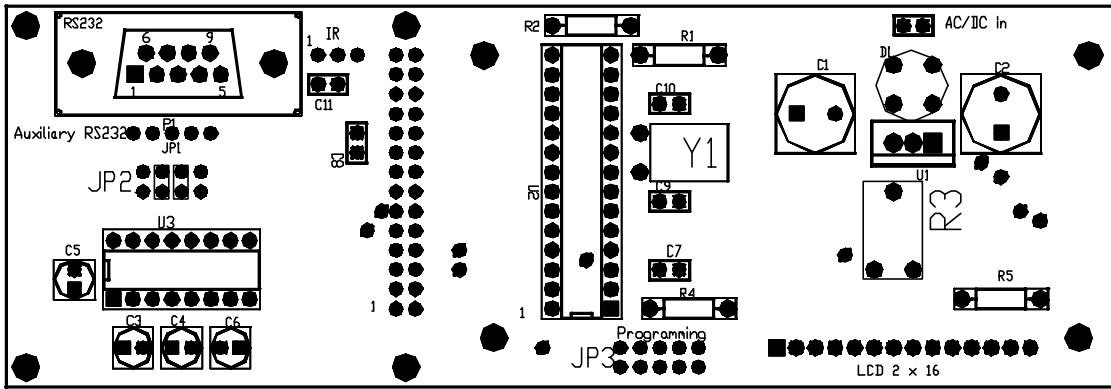


**PIC18F252 board**

IN CIRCUIT PROGRAMMING  
pin to pin for EPIC  
Programmer



**Keyboard**



PIC18F252 board