

LNR Precision, Inc.  
107 East Central Avenue, Asheboro, NC 27203  
www.LNRPrecision.com

## LD-11 All mode QRP Transceiver



**SDR /DSP technology**

## Quick guide manual

### Description:

At the development base of the digital signal processing unit, an algorithm is embedded for IQ processing of the channels with phase suppression of the unwanted side-band channel!

### Unit CPU \ DSP performs the following functions:

- -----
- Digital signal processing
- Frequency synthesizer
- Full control of the transceiver with direct conversion / SDR /

### Applicaton:

Due to its small dimensions and light weight this transceiver is suitable for any portable or stationary operation .

This unit contains:

- -CPU STM32F407,
- -NS -24 bit ADC PCM1803,
- -NS -16 bit DAC CS4338 low hissing amp
- -HF-generator Si570
- **-128/64 DISPLAY LCD**
- -Matrix of buttons
- -Encoder

The unit has electronic CW Iambic key, SWR meter and output power wattmeter.  
Functions that this unit performs, are separate and switchable for reception / transmission.  
They are displayed on the screen display as RX / TX with symbols.

### Spectrum scope RX with 48kHz resolution

The LD11 is capable of software update via USB port – see LNR web page instructions.

### How to order:

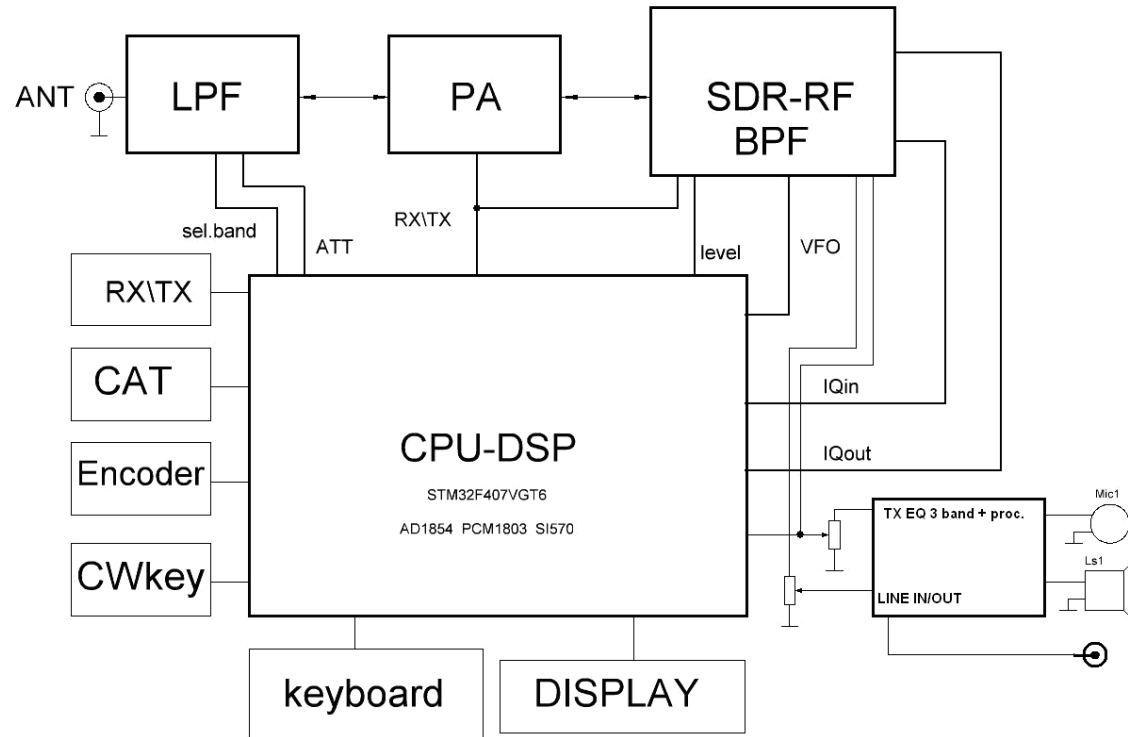
LNR Website [www.LNRPrecision.com](http://www.LNRPrecision.com)

### Features

- Emmission Modes: SSB, CW , DIGITAL ,AM, FM
- 5W output power typ.
- Very low noise floor due to differential input stage
- The unit has an electronic CW Iambic A/B keyer, SWR meter and output power wattmeter.
- High stability Si 570 generator
- Split-frequency operation
- PTT can be switched by connecting PTT to ground
- RX/TX switching:
  - push PTT input to ground
  - AF VOX
- Output SWR indicator
- Optimal output power indicator
- Integrated Sequencer
- TX 3 band EQ – presets for bass, middle and treble boost
- This radio has a virtual intermediate frequency – should be always on!
- Near by frequency spectrum scope helps in finding free frequency
- Very useful feature – rotating speed defining incremental step – the faster turning the faster frequency change.

The firmware in this radio is not an open source and it is a private intellectual property of Serge Macaren Co. through exclusive partnership of LNR Precision.

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**Block diagram**

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<b>Specifications</b>			
<b>General</b>			
<b>Frequency range</b>	<b>1800 kHz – 54 MHz</b>	<b>160, 80, 60, 40, 30, 20, 17, 15, 12, 10 and 6 meter operation</b>	
<b>Modes</b>	<b>USB , LSB , CW , CW-R , DIG , AM , FM</b>	DATA :CAT –USB jack : CW, PSK, RTTY, SSTV – 3,5mm jack	
<b>Power</b>	5W output in CW / SSB		
<b>Frequency Stability</b>	+/- 3 ppm (Si570 defined) typical over 0-50 deg C		
<b>Supply Voltage</b>	10.5V min to 15V max	350Ma receive and 1.5 to 2 A typical in transmit	
<b>Push button operation</b>			
<b>LO temp. Stability</b>		+/- 2.5	
<b>Antenna</b>	50 ohms	BNC	
<b>Dual VFO</b>			
<b>Memory</b>	100 memory storage per band	memorize frequency, mode, VFO's	
<b>Built-in speaker</b>	0.2 watts		
<b>Dimensions</b>	4.724" long X 3.937" wide x 1.957 " tall		
<b>Weight</b>	19.0oz / 0,54kilogram /excluding microphone/		
<b>Iambic key</b>	mode A and mode B		
<b>Pitch CW</b>	Controls CW offset. The sidetone pitch is automatically set to equal the offset		
<b>Notch Filter</b>	Automatic Heterodyne filter for SSB from -6 to -40 db		
<b>Noise reduction</b>	level of attenuation of the noise from 1 to 50- use minimal necessary		
<b>Noise Blanker</b>	adjusted in the range from value 4 to 12 readings depending on interference		

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<b>CW VOX</b>	Break in delay in CW – adjustable from 0.1 seconds to 5 seconds		
<b>CW memory keyer</b>	Choose Iambic Mode A or B		
<b>VOICE VOX</b>	VOX Delay adjustable from 0.1 seconds to 5 seconds		
<b>SSB VOX LEVEL</b>	VOX GAIN 10-100 10 IS MOST SENSITIVE		
<b>Filters</b>	8 different filters – 4 of 4 for CW/ SSB - 1-3 factory presets – No.4 adjustable for CW/50-1000Hz/ and SSB/250-3.6KHz		
<b>Compressor SSB</b>	0-20dB		
<b>SSB TX MUTE</b>	Enable= no monitor Disable= monitor		
<b>Transmitter</b>			
<b>Input Power</b>	8-9		
<b>Output Power</b>	5	4.8	9
<b>Measurement</b>	SWR and Power in numbers or bar		
	supply voltage –real voltage on display		
<b>Two modes CW</b>	Select a hand key or a paddle		
<b>Receiver</b>			
<b>Receive sensitivity</b>	0.2uV	Preamp	
<b>Ant Preamp</b>	+16dB	dB	
<b>Spurious response rejection</b>	IMD3 -48Db/ 5W	IMD5 -43dB	
<b>ATT</b>	-6 db		
<b>Spectrum scope RX</b>	+/- 24KHz		
<b>Spectrum scope TX</b>	After firmware update ver.1.01 TM		

## Front panel indicators and functions



## DESCRIPTION of the command buttons

Command	Meaning
<b>ON/OFF</b>	POWER – ON OFF the transceiver
<b>UP</b>	Change Band higher 7/10/14/18/21. In Menu mode select next menu item
<b>DOWN</b>	Change band lower. In menu mode select previous menu item.
<b>MODE</b>	Select CW/ CWR/ LSB/ USB/DIGI/FM/AM
<b>VFO</b>	Select either VFO A or B
<b>STEP</b>	Sequential pressing of the STEP button or the Tuning encoder steps through the tuning rate. 1 bar- 1Hz 2 bars=10Hz 3 bars=100Hz 4 bars=1KHz tuning rate.
<b>LOCK</b>	Lock/unlock the tuning dial $\mathbb{F}$ symbol appears to the left of the mode designation on LCD
<b>RIT</b>	Receiver Incremental Tuning. This feature allows changing the frequency of the receiver only without effecting the transmit frequency. When RIT is activated an * initially appears to the right of the frequency readout. The * Indicates that currently, RIT=0 or RX=TX While RIT is activated, tuning the VFO BELOW the current frequency is indicated by a < symbol. Similarly, tuning above the center frequency results in a > symbol appearing to the right of the display. RIT remains active until the next ON/OFF power cycle.
<b>PRE/ATT</b>	Sequentially Enables preamp ( $\uparrow$ ) approx. +16dB preamp off= no arrow attenuator ( $\downarrow$ ) approx. -10dB
<b>FILTER</b>	Four filters are available for each mode. Filters 1-3 may be customized in the Service menu.
<b>MEMO STORE</b>	A total of 100 memories are available. All features (e.g. Mode/NB/NR/Preamp etc) are stored along with the frequency. To store a frequency in memory, first tune it in using the VFO. Set Mode and any other features you wish to store. Press MEMO Use the VFO knob to bring up the memory location you wish to store: 0-99 Press the Down Arrow Press MEMO again
<b>MEMO RECALL</b>	To recall a stored memory channel; Press MEMO Use the VFO to dial up the desired memory location Press the Up arrow Press Memo again

## MENU – Settings

**Enter MENU MODE by pressing the MENU button. You also exit menu mode with the same button. Most of the functions, related to receiving or transmitting, can be changed by selecting the values and monitored via monitor in real time.**

MENU	Default menu settings
<b>AGC</b>	AGC speed from 1-20. 1 is the slowest and 20 the fastest / <b>IN DEFAULT 2</b>
<b>PITCH CW</b>	Sidetone and CW offset pitch. Changes take effect when you exit Menu mode
<b>CW SPEED</b>	5 to 60 WPM. Speed change takes effect when you exit Menu mode.
<b>WEIGHT CW KEY</b>	Adjusts the ratio of dash length to dot length: 2> 1; 2.5> 1; 3> 1; 3.5> 1; 4> 1; 4.5> 1 <b>3:1 is standard</b>
<b>CW VOX</b>	Controls break in delay. Steps in 100mSec from 100mSec to 5 seconds
<b>REVERSE CW KEY</b>	Change which side of the paddle is dot and which side is dash.
<b>CW KEY TYPE</b>	Two options: SIMPLE= hand key. AUTO= Paddle.
<b>IAMBIC MODE</b>	Allows user to switch from Iambic mode A to Iambic mode B
<b>NOTCH FILTER</b>	Adjusts notch depth from -6 dB to -40 dB. Changes can be observed while in Menu mode.
<b>NOISE BLANKER</b>	Adjustable using tuning knob from 4 to 12. 4 is maximum blanking, 12 is minimum. Changes can be heard while in Menu mode.
<b>NOISE REDUCTION</b>	Menu range from 1 to 100 with 1 being the least. If NR is activated from the front panel (F + NR) you can observe the effect within the Menu.
<b>S-METER MODE</b>	Two modes: Bar Graph or readout in uV.
<b>TX METER</b>	Two options: Bar Graph (Scaler) or Watts (Number)
<b>SHOW TX</b>	Two options: Power in Watts or VSWR
<b>POWER TX</b>	Adjusts power out. Settings from 10 to 100. Typically, a 10 setting is 1W and a 100 setting is 5W
<b>LED MODE</b>	Two options: Forever= LCD backlight always on. Auto= backlight turns on for 3 seconds whenever a front panel switch or encoder is activated. Backlight off saves 40mA of current drain.
<b>SSB TX MUTE</b>	SSB TX Monitor. Two options: Enable and Disable
<b>SSB COMPRESSOR</b>	SSB Mic compression from 1 to 100.



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<b>SSB VOX</b>	adjustment of VOX delay for SSB – DISABLE is off, Adjustable from 100mSec to 5 seconds in 100mSec steps
<b>VOX LEVEL</b>	Adjusts VOX gain in SSB mode.
<b>TX EQ</b>	3 options: Accentuate the Lows, Highs or Midrange. LowF/ HiF/MediumF
<b>SQUELCH</b>	Settings 0-100. A 0 (zero) setting essentially turns squelch off.
<b>GAIN TX DIG</b>	Setting from 1-9.8 using the VFO knob. This function controls the AF Gain in Digital mode

<b>SQUELCH FM</b>	Settings 0-100. A 0 (zero) setting essentially turns squelch off.
<b>AM/FM MODE</b>	<b>ENABLE /DISABLE FOR EACH BAND</b>
<b>PAN LEVEL / AFTER V1.01/</b>	<b>GAIN LEVEL 0 – 30 /30 = 60DB/</b>

**VFO + F button and then press the MENU button and moving with UP / DOWN and RIT**

<b>Pan scope enable in RX mode: F+ VFO Disable –same way</b>	<b>RX</b>	<b>Valid AFTER V1.01</b>
<b>Pan scope enable in TX mode: F+ VFO Disable –same way</b>	<b>TX</b>	<b>Valid AFTER V1.01</b>

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<b>MENU</b>	Shows the power supply in place of S-meter / SWR / Power – reception and transmission. It remains in this stage until pressed again " <b>F</b> <MENU> "
<b>UP</b>	On Noise Blanker. Direct tuning in real time.
<b>MODE</b>	On Notch Filter (only SSB) pass-CW off and does not affect the display- no indication. Direct setting in real time.
<b>DOWN</b>	On Noise reduction. Direct tuning in real time.
<b>FILTER</b>	Modifying bandwidth of filter 4 – separately for SSB and CW. Direct tuning in real time. Push F button, then FILTER and tune chosen bandwidth with TUNING – for exit push FILTER. Direct setting in real time.

## SERVICE MODE – we strongly recommend contacting LNR before entering service mode

<b>Entry into service mode</b>	To enter into default settings – switch OFF the radio and THEN power it up while F button is pressed. Upon entering the service mode reset all the settings IN DEFAULT <b>EXCEPT "RX IQ", "TX IQ" and fine tuning of the synthesizer.</b> <b>You should not go to factory settings "RX IQ", "TX IQ" THEY ARE</b> set individually for your radio and precisely adjusted for values with additional specialized devices, TRANSMITTING and measuring in certain frequency.
	On each radio in the service menu are recorded INDIVIDUALLY for serial number. Factory settings "RX IQ", "TX IQ" are very difficult to adjust if you are not aware of procedure!!! Again, please contact LNR if you are unsure.

## BASIC SETTINGS

### F button and then press the MENU button and moving with UP / DOWN and RIT

<b>IF DSP</b>	virtual gap frequency from 5006 to 10013 Hz / recommended to use a low-frequency virtual
<b>V PWR</b>	adjustment of the displayed voltage
<b>REF VFO</b>	correcting the VFO frequency
<b>MULT VFO</b>	Divider VFO. For LD-11 = 4 / do not touch it , it is correct by the service menu/
<b>STARTING FREQUENCY</b>	Low end frequency of selected band change with tuning knob
<b>END FREQUENCY</b>	High end frequency of selected band change with tuning knob
<b>S METER</b>	setting S-METER for the range – calibration
<b>RX IQ</b>	Setting the mirror channel correcting the phase and amplitude of IQ for each band separately on RX "- minimum reading – has two modes- fast and slow for quick setting and fine – switched with STEP.
<b>FILTER SSB</b>	Setup filters from 1 to 3 for each type of work. Changing the filter with the push button "Filter"
<b>FILTER CW</b>	Allows user to change the bandwidth of the first three CW filters. While in Service Mode, press Menu. Select Filter 1 CW and redefine the BW with the main tuning knob. Step to the next filter by pressing FILTER etc. Exit Menu mode to save.
<b>AGC DSP</b>	on / off AGC <b>-SHOULD ALWAYS BE ENABLE</b>
<b>SHOW S METER</b>	switches S meter
<b>FILTER TX SSB</b>	Adjustment of bandwidth in the transmit mode /FROM 150 Hz to 3600Hz/ -. Changing adjustment of the upper frequency

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<b>FILTER TX CW</b>	With the push button "RIT/VIF" adjustment of bandwidth in the transmit mode /FROM 50 Hz to 1000Hz/ - soft CW manipulation 50 – 180 Hz. BELL SOUND
<b>LEVEL TX</b>	Adjustment of Power – entries are shown from " <b>Power TX</b> "- First row on Display: TX ADC indications power "when all bands are equal in power" .

## DESCRIPTION of the settings in transmit mode

PWR / VTT	
<b>POWER TX</b>	First row on Display: TX ADC indications power for each band separately. Second row on Display : Power Control for each band separately, shows power of radio on TX – use forward wave of SWR meter settings are made on a 50 ohms dummy load and SWR = 1, setting indication varies around 100 – 4000
<b>TX IQ</b>	Correcting amplitude and phase balance in IQ channel – in the transmit mode for each band separately For this purpose we need to have a separate receiver on the frequency and listen to the unwanted side band channel – set on minimal hearing. Factory setting on all bands is : A 0.0000 F 0,0000
<b>TX EQ</b>	3 band audio presets on transmit only: bass, middle. Treble boost

## DESCRIPTION of the current settings

/ Those settings are directly accessible by pressing MENU /	
<b>AGC SPEED</b>	ADJUSTABLE in levels of delay from 1 to 20
<b>PITCH CW</b>	CW tones from 400 to 1000 Hz when crossing the transmit shift to the same tone
<b>NOTCH FILTER</b>	reject interfering tone only for SSB from -6 to -40 db
<b>NOISE BLANKER</b>	adjusted in the range from value 4 to 12 - readings depending on interference
<b>NOISE REDUCTION</b>	level of attenuation of the noise from 1 to 50- use minimal necessary
<b>S-METER MODE</b>	shows scale bars or S-units in microvolt's

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<b>LED</b>	backlight brightness of the LCD from 0 to 250
<b>CW SPEED</b>	regulating the speed of the automatic key from 20 signs to maximum
<b>WEIGHT CW KEY</b>	dot-dash ratio 2.5> 1 to 4.5> 1 in 0.5
<b>CW VOX</b>	DELAY mode in CW - 100 milliseconds to 5000 milliseconds / 5 seconds /
<b>COMPRESS TX</b>	compression microphone from 0 to 100%
<b>REVERSE CW KEY</b>	reversing dot-dash to paddle
<b>TX METER</b>	shows SWR or power in the transmit mode with bar graph or scale figures
<b>SHOW TX</b>	SWR or power to be displayed in the transmit mode
<b>POWER TX</b>	regulation in mW from 10% to 100%
<b>LED MODE</b>	mode for backlight LCD - constant or relight by pressing any button or rotating of tuning knob
<b>SSB MUTE</b>	on / off microphone - MONITOR mode in transmit

### **DIGITAL MODES**

**VERY IMPORTANT – WITH ANY SOFTWARE APPLICATION THAT YOU PLAN TO USE,  
PLEASE MAKE SURE TO CONFIGURE SOFTWARE FIRST AND SAVE CONFIGURATION  
BEFORE CONNECTING TO THE LD-11.**

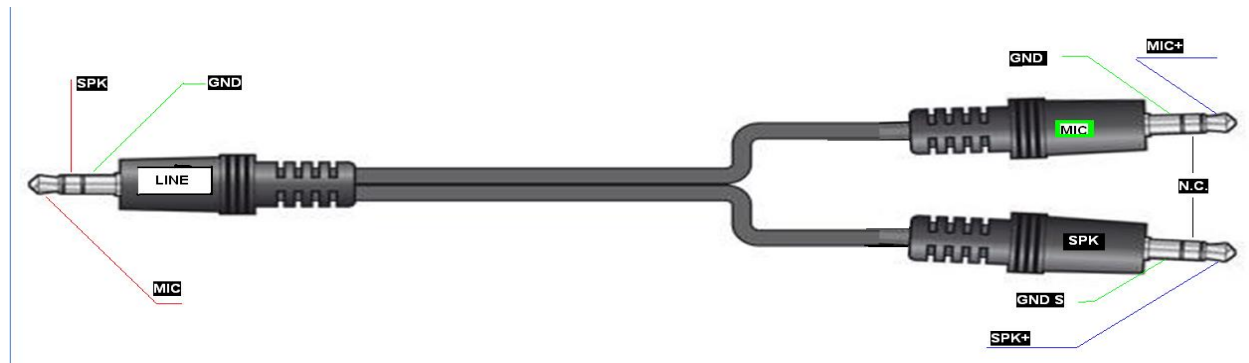
**THEN CONNECT USB CABLE, POWER CORD AND ANTENNA.  
FINALLY, POWER ON THE RADIO.**

**ONCE POWERED ON, LAUNCH SOFTWARE PROGRAM.**

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In order that you be able to operate any digital mode or simply use interface with computer, we supply a Line IN/OUT jack and cable. The radio has typical levels for audio signals as all other amateur radios. Interfacing cable is supplied free.



The radio has a built-in ALC SWR protection when SWR does not exceed 1:1.7 There is no change in output power, but at a greater SWR, the protection gradually lowers the power output, and at SWR = 10 – the output power is only 1watt.

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