



LD-5 CW/SSB QRP Transceiver



LD5 – CW/SSB QRP Transceiver

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:

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

Applicaton:

Due to its small dimensions and light weight, 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
- -1602-line 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.

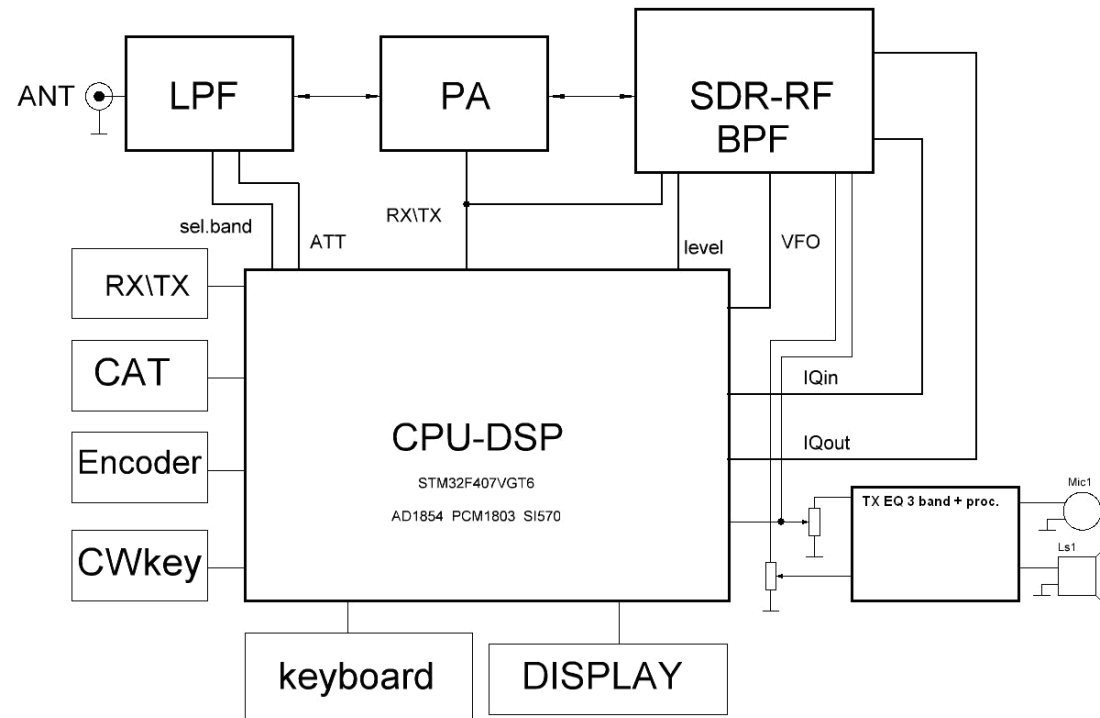
They are displayed on the screen display as RX / TX with symbols.

How to order:

L&R direct www.LNRprecision.com

Features

- Emmission Modes: SSB, CW
- 5W output power typ.
- Very low noise floor due to DDC 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



Block diagram

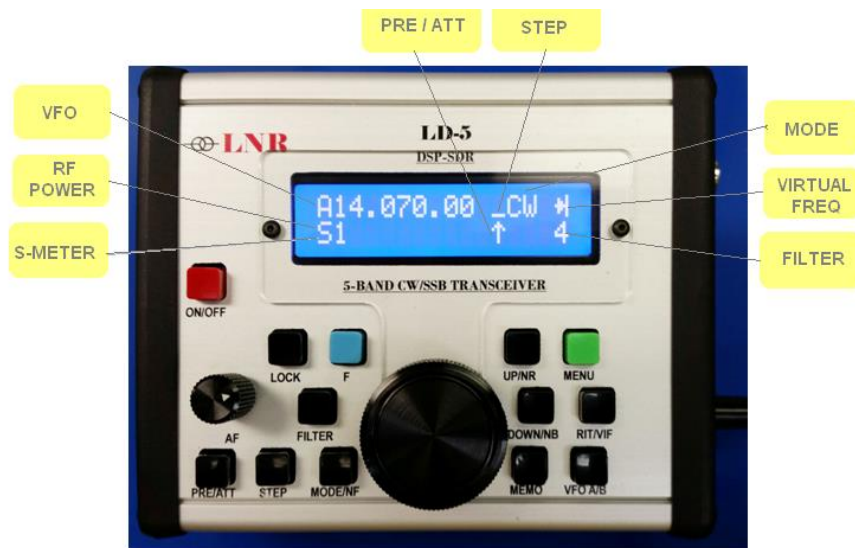
Specifications			
General			
Frequency range	7000 kHz – 22 MHz	40, 30, 20, 17 and 15 meter operation	
Modes	USB , LSB , CW , CW-R	DATA :CAT –USB jack : CW, PSK, RTTY, SSTV – 3,5mm jack	
Power	5 output in CW / SSB		
Frequency Stability	+/- 30 PPM typical over 0-50 deg C		
Supply Voltage	10.5V min to 15V max	350mA receive and 1.5 to 2 A typical in transmit	
Push button operation			

LO temp. Stability		+/- 2.5		
Antenna	50 ohms	BNC		
Dual VFO				
Memory	100 memory storage per band	memorize frequency, mode, VFO's		
Built-in speaker	0.2 watts			
Dimensions	4.724" long X 3.937" wide x 1.957 " tall			
Weight	19.0oz / 0,54kilogram /excluding microphone/			
Iambic key	mode A and mode B			
Pitch CW	adjustable- CW tone from 400 to 1000 Hz when crossing the transmit shift to the same tone			
Notch Filter	reject interfering tone only for SSB from -6 to -40 db			
Noise reduction	level of attenuation of the noise from 1 to 50- use minimal necessary			
Noise Blanker	adjusted in the range from value 4 to 12 readings depending on interference			
CW VOX	retention /delay/ mode in CW – 100 milliseconds to 5000 milliseconds / 5 seconds /			
SSB VOX	max. 0.4 sec.			
Filters	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			
Compressor SSB	0-20dB			
SSB – MONITOR	mode in transmit			
Transmitter				
Input Power	8-9			W
Output Power	5	4.0	6	W
Measurement	SWR and Power in numbers or bar			
	supply voltage –real voltage on display			
Two modes CW	a simple key and AUTO as automatic Morse key			
Receiver				
Receive sensitivity	0.2uV	Preamp		
Ant Preamp	+16	dB		
Spurious response rejection	IMD3 -38Db/ 5W	IMD5 -43dB		dB
ATT	-6 db			

Front panel indicators and functions



DESCRIPTION of the command buttons

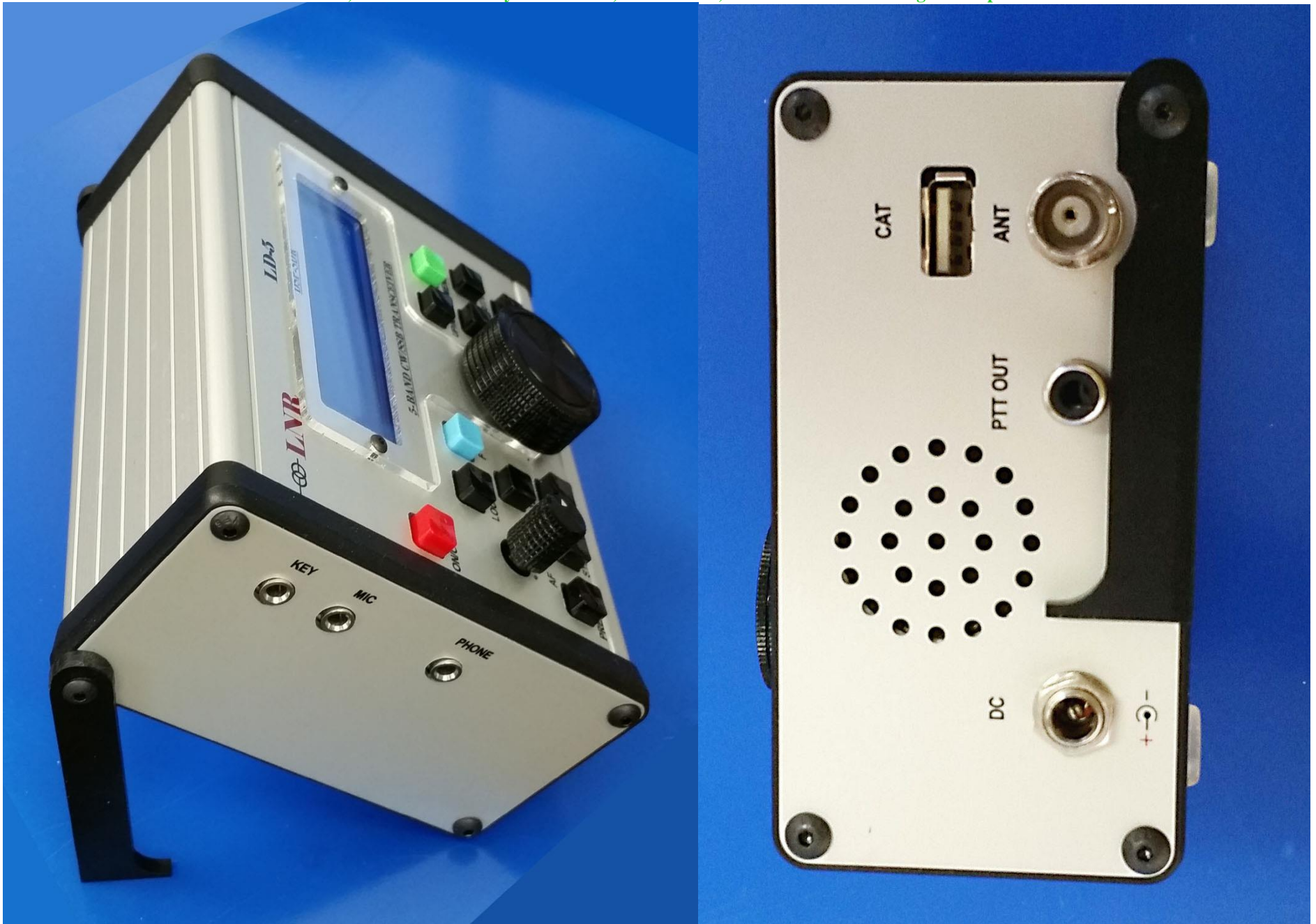


Command	Meaning	Note
ON/OFF	POWER – ON OFF the transceiver	
UP	Switching the ranges or values up	
DOWN	Switching the ranges or values down	
MODE	Switching type of detection	
VFO	VFO A/B switch	
STEP	Switch step between 10Hz 100Hz 1kHz 10kHz (this button is duplicated by pressing the encoder) – a push -10 Hz; two indents- 100 Hz; three pushes -1 KHz ; four pushes 10 kHz	
LOCK	Lock/unlock the encoder” symbol key in place of the step”.	
RIT	On / off :”star” after frequency =0 RIT; Shifting the frequency DOWN – symbol “<”; Shifting the frequency UP – symbol “>”	
PRE/ATT	Switching in three positions: RF preamp “arrow-up”; attenuator and direct reception “arrow down	
FILTER	Switches 8 different filters – 4 of 4 for CW/ SSB, as from 1 to 3 are set by the service menu under default values and 4 separate filters with direct access to adjustments during reception.	
MEMO	100 Memories for all bands with memorizing frequency, type of mode and the filter bandwidth. Memorizing : Press the MEMO button to select the memory number with TUNING, paste it from 0 to 99, then press the DOWN button again and MEMO button again – frequency is stored, MODE, preamp or attenuator, Notch Filter, Noise Blanker, Noise reduction.	
	Memory Recall: Press to select MEMO and with TUNING choose the memory you require from 0 to 99 as the display will show the preset frequency on the bottom line, then press the UP button and it will display the selected frequency and then push memory button again –MEMO – and then you go to: preset frequency, MODE, preamp or attenuator, Notch Filter, Noise Blanker, Noise reduction	

MENU –settings

Enter in MENU MODE while pressing MENU button and exit the menu mode by pressing the MENU again after set up!

MENU	Default menu settings	Note
AGC	Speed adjustable AGC value 1 to 20, with 1 being with a biggest delay and at 20 with fastest one. Direct adjustment in real time	
PITCH CW	tuning range on CW from 400HZ to 1000HZ implemented automatically on both modes- transmitting to a receiving band, no direct adjustment in real time – and then exit this mode	
CW SPEED	5 to 60 WPM. No direct input tuning in real time, only when exit this mode	
WEIGHT CW KEY	point identical to ratio modes with 2> 1; 2.5> 1; 3> 1; 3.5> 1; 4> 1; 4.5> 1 – to switch abruptly? Turning the tuning right and to the left increases the ratio or decreases.	
CW VOX	adjustment of VOX for CW – DISABLE is off, retention of 100 milliseconds to 5000 milliseconds through 100 milliseconds	
REVERSE CW KEY	Reverse of dots and dashes to paddle	
CW KEY TYPE	two modes SIMPLE as a simple key and AUTO as automatic Morse key with a sharp turn of the tuning	
IAMBIC MODE	Two modes: mode A and mode B.	
NOTCH FILTER	Regulation 6 db to 40 db. Direct tuning in real time.	
NOISE BLANKER	Adjustable from 4 to 12. Direct tuning in real time.	
NOISE REDUCTION	Adjustable from 1 to 50 with 1 being the most big noise suppression and decreased with increasing. Direct tuning in real time.	
S-METER MODE	evidence of S-meter – Two modes Scale and micro volts switching with a sharp turn of the tuning	
TX METER	Display mode of transmission in numbers or bar switch with a sharp turn of the tuning	
SHOW TX	display in transmission power or SWR switch with a sharp turn of the tuning	
POWER TX	Adjustment of the output stage of power at rates from 10 to 100%.	
LED MODE	FOREVER or AUTO mode: in AUTO after certain seconds turns off the backlight on the display and by pressing a button or turning the tuning knob lights turned on.	
SSB TX MUTE	to listen to the microphone signal "monitor feedback," two-mode – on and off	
SSB COMPRESSOR	compressor SSB model from 0 to 100	
SSB VOX	adjustment of VOX for SSB – DISABLE is off, retention of 100 milliseconds to 5000 milliseconds through 100 milliseconds	
VOX LEVEL	adjustment level of microphone for VOX SSB	



FUNCION SETTINGS = PUSHING F + :

RIT	On virtual intermediate frequency (VIF) – can be set from the main menu from 5000 to 10000 hertz. Identified as arrows on the upper right corner of the display ->. VIF is working as a main working feature and must be switched on permanently. DIRECT CONVERSION should be used as an option.
MENU	Shows the power supply in place of S-meter / SWR / Power – reception and transmission. It remains in this state until pressed again " F <MENU> "
UP	On Noise Blanker. Direct tuning in real time.
MODE	On Notch Filter (only SSB) pass-CW off and does not affect the display- no indication. Direct setting in real time.
DOWN	On Noise reduction. Direct tuning in real time.
FILTER	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

Entry into service mode	To enter into default settings – switch OFF the radio and THEN power it up while F button is pressed!!!! RADIO IS READY NOW!!!! Upon entering the service mode reset all the settings IN DEFAULT EXCEPT "RX IQ", "TX IQ" and fine tuning of the synthesizer. You should not switch factory settings "RX IQ", "TX IQ" THEY ARE set with additional devices, TRANSMITTING certain frequency.
	On each radio in the service menu are recorded INDIVIDUAL factory settings "RX IQ", "TX IQ"!

BASIC SETTINGS

F button and then press the MENU button and moving with UP / DOWN and RIT	
IF DSP	virtual gap frequency from 5006 to 10013 Hz / recommended to use a low-frequency virtual
V PWR	adjustment of the displayed voltage
REF VFO	correcting the VFO frequency
MULT VFO	Divider VFO. For LD-5 = 4 / do not touch it , it is correct by the service menu/
STARTING FREQUENCY	starting frequency range – can be changed
END FREQUENCY	end of the range, can be varied
S METER	setting S-METER for the range – calibration
RX IQ	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. transceiver is factory default recorded on the accompanying document Each
FILTER SSB	Setup filters from 1 to 3 for each type of work. Changing the filter with the push button "Filter"
FILTER CW	Setup filters from 1 to 3 for each type of work. Changing the filter with the push button "Filter"
AGC DSP	on / off AGC -SHOULD ALWAYS BE ENABLE
SHOW S METER	switches S meter
FILTER TX SSB	Adjustment of bandwidth in the transmit mode /FROM 150 Hz to 3600Hz/ -. Changing adjustment of the upper frequency
FILTER TX CW	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
LEVEL TX	Adjustment of Power – entries are shown from " Power TX "- First row on Display: TX ADC indications power "when all bands are equal in power".

DESCRIPTION of the settings in transmit mode

PWR / VTT	
POWER TX	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
TX IQ	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
TX EQ	3 band audio presets on transmit only: bass, middle. Treble boost

DESCRIPTION of the current settings

/ Those settings are directly accessible by pressing MENU /	
AGC SPEED	ADJUSTABLE in levels of delay from 1 to 20
PITCH CW	CW tones from 400 to 1000 Hz when crossing the transmit shift to the same tone
NOTCH FILTER	reject interfering tone only for SSB from -6 to -40 db
NOISE BLANKER	adjusted in the range from value 4 to 12 - readings depending on interference
NOISE REDUCTION	level of attenuation of the noise from 1 to 50- use minimal necessary
S-METER MODE	shows scale bars or S-units in microvolt's
LED	backlight brightness of the LCD from 0 to 250
CW SPEED	regulating the speed of the automatic key from 20 signs to maximum
WEIGHT CW KEY	dot-dash ratio 2.5> 1 to 4.5> 1 in 0.5
CW VOX	DELAY mode in CW - 100 milliseconds to 5000 milliseconds / 5 seconds /
COMPRESS TX	compression microphone from 0 to 100%
REVERSE CW KEY	reversing dot-dash to paddle
TX METER	shows SWR or power in the transmit mode with bar graph or scale figures
SHOW TX	SWR or power to be displayed in the transmit mode
POWER TX	regulation in mw from 10% to 100%
LED MODE	mode for backlight LCD - constant or relight by pressing any button or rotating of tuning knob
SSB MUTE	on / off microphone - MONITOR mode in transmit

**The radio has a built-in ALC SWR protection, when SWR do not exceed 1:3 – 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 1%.**

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