



# 143MHz - 146 MHz to 27MHz - 30MHz VHF down converter

*Suitable for SDR radios (SDR) and analogue radios.*

**User manual. Rev 03**  
*(April MMXX)*

The Heros Tech 143-146MHz to 27-30MHz VHF Down Converter introduced here expands the frequency range of any Software Define Radio (SDR) or analogue shortwave receivers covering 27MHz to 30MHz (11m-10m bands) allowing reception of the exciting 143MHz-146MHz band (Space Surveillance and 2m band).

The Converter is connected between the antenna and a SDR or analogue HF radio (called IF receiver).

When turned ON the 143MHz-146MHz radio spectrum is mirrored on 27MHz-30MHz. For example, if the IF receiver is tuned on 28.430 MHz, you are receiving the frequency of 144.430 MHz, (allocated segment of frequencies for beacons according to the 2m band plan in some countries.) Tuning to 29MHz you are receiving 145MHz and so on. Some SDR software, as PowerSDR, provides the capability of configure the LO off-set frequency in order to update the dial readings. (see below "Connection to FlexRadios diagram example)

The Converter allows the reception of all amateur radio services assigned to the 2m band such as SSB, CW, FM, RTTY, FAX transmission modes, internet voice gateway, digital communications, repeaters space surveillance and communications, (Meteors and satellites detection, ISS International Space Station, space-Earth link), amateur radio satellites and many more stimulating activities.

The Heros Tech 143-146MHz to 27-30MHz VHF Down Converter is designed taken in account the wide range of signal variability that are expected to be received. Those conditions demand for very low noise, good front end filtering, high dynamic range performance, excellent IMD characteristics and good IF receiver isolation.

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**Technical specifications:**

Compatible with any kind of SDR radios and Analogue radios.

**Converter class:** Superheterodyne. IF output mirrored down.

**Extended frequency range:** 143MHz-146MHz  
(Space Surveillance and 2m amateur band).

**IF output:** 27MHz - 30MHz. (11m-10m bands)

**Input and Output impedance:** 50  $\Omega$

**VHF Front-End preselector:**

ESD protection on antenna input.  
FM broadcast band rejection filtering.  
Dual high dynamic range E-PHEMT preamplifier.  
Gain: 38dB. Noise figure: 0.5dB.  
Dual 143MHz-146MHz helical filter.  
Seven poles Elliptic Low Pass Filter.

**Mixer:**

High L-R/L-I ports isolation double balanced mixer. Diplexer IF output.

**Local Crystal oscillator:**

High stability, very low jitter, 116MHz synthesised crystal oscillator.

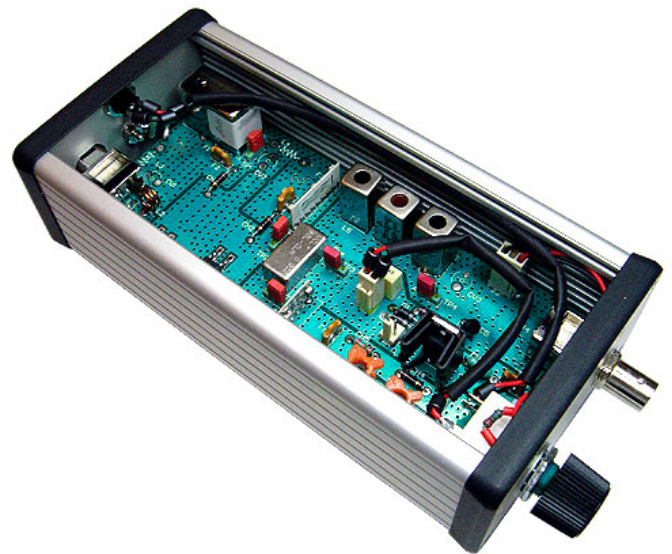
**IF output:**

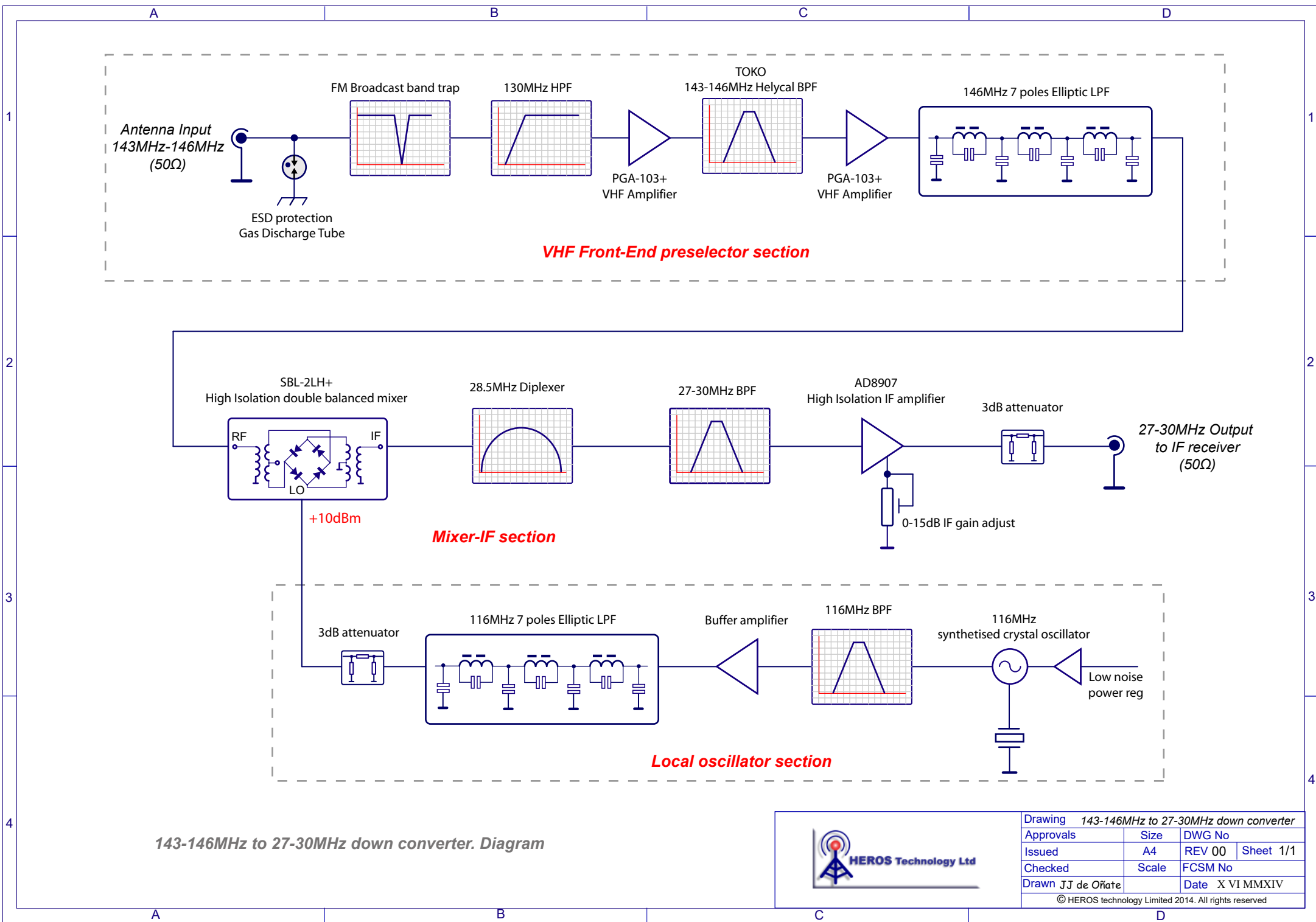
Frequency: 27MHz-30MHz.  
27MHz-30MHz Band Pass Filter.  
IF amplifier:  
80dB Output- Input isolation .  
0dB-15dB range variable gain by user..

**Power supply:** 12volts/350mA

**Enclosure:** Aluminium

**Size:** 165mmx80mmx45mm ( 6.5x3.15x1.78in)

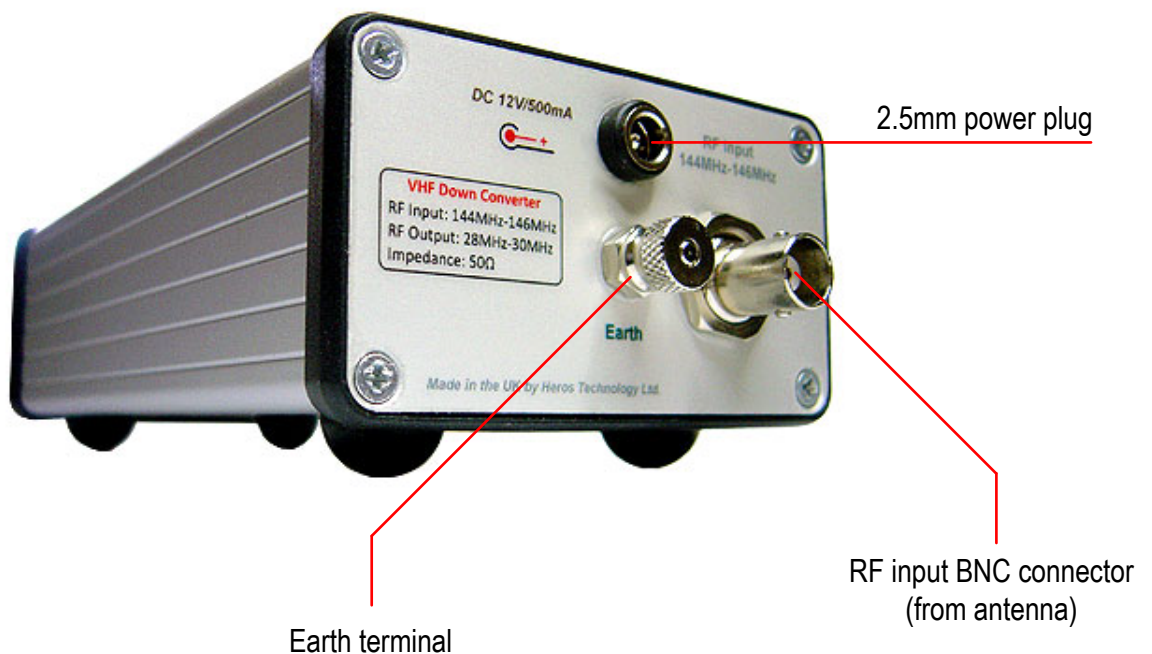




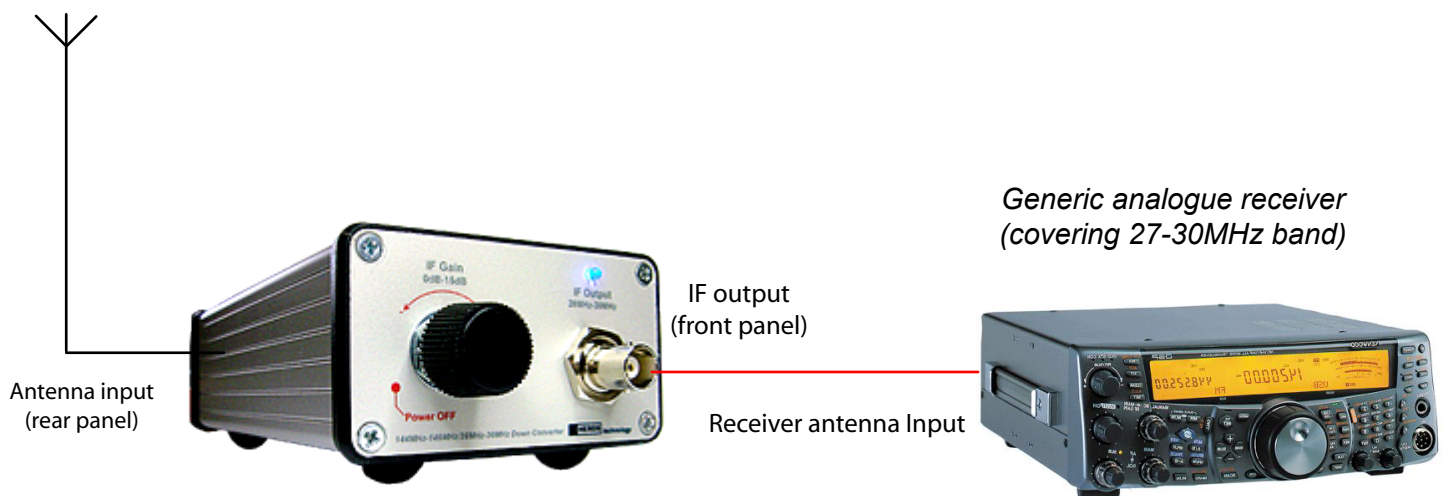
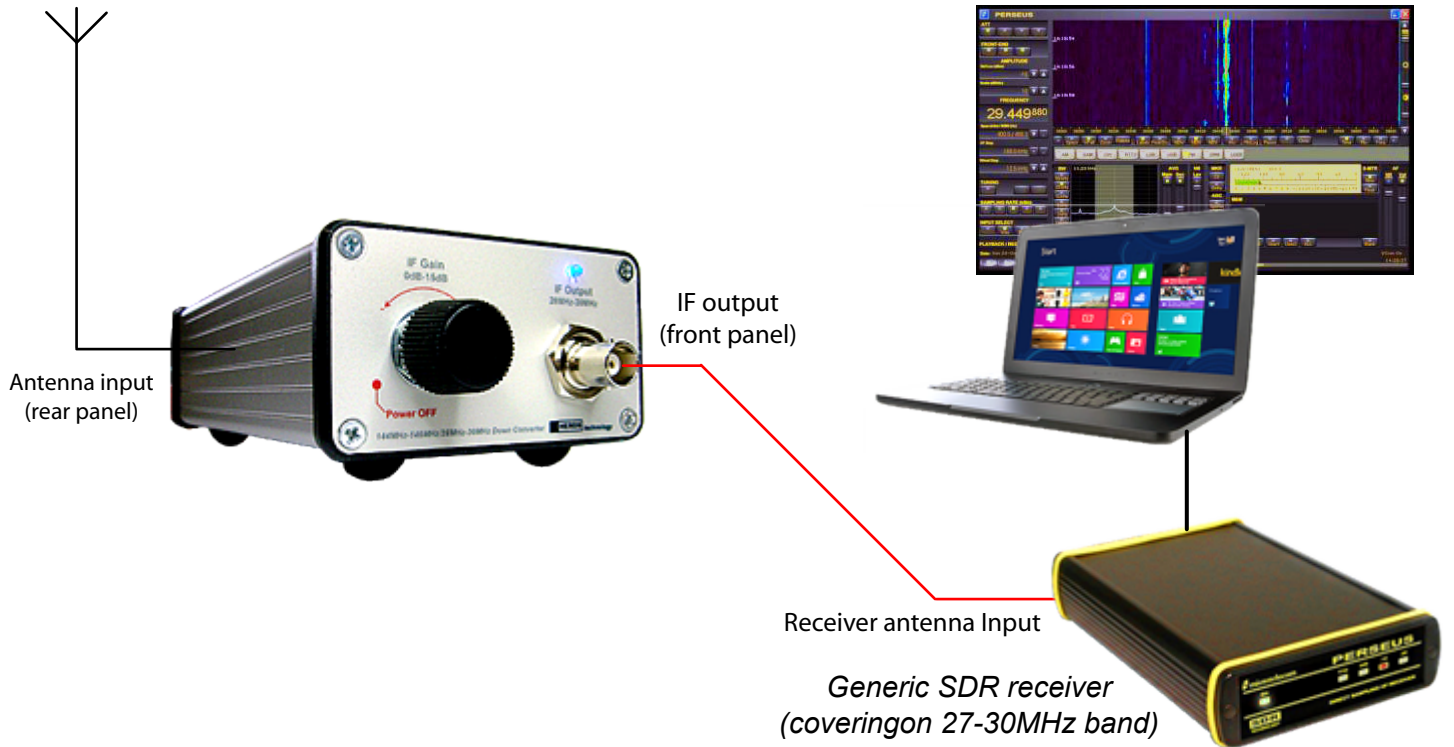
143-146MHz to 27-30MHz down converter. Diagram

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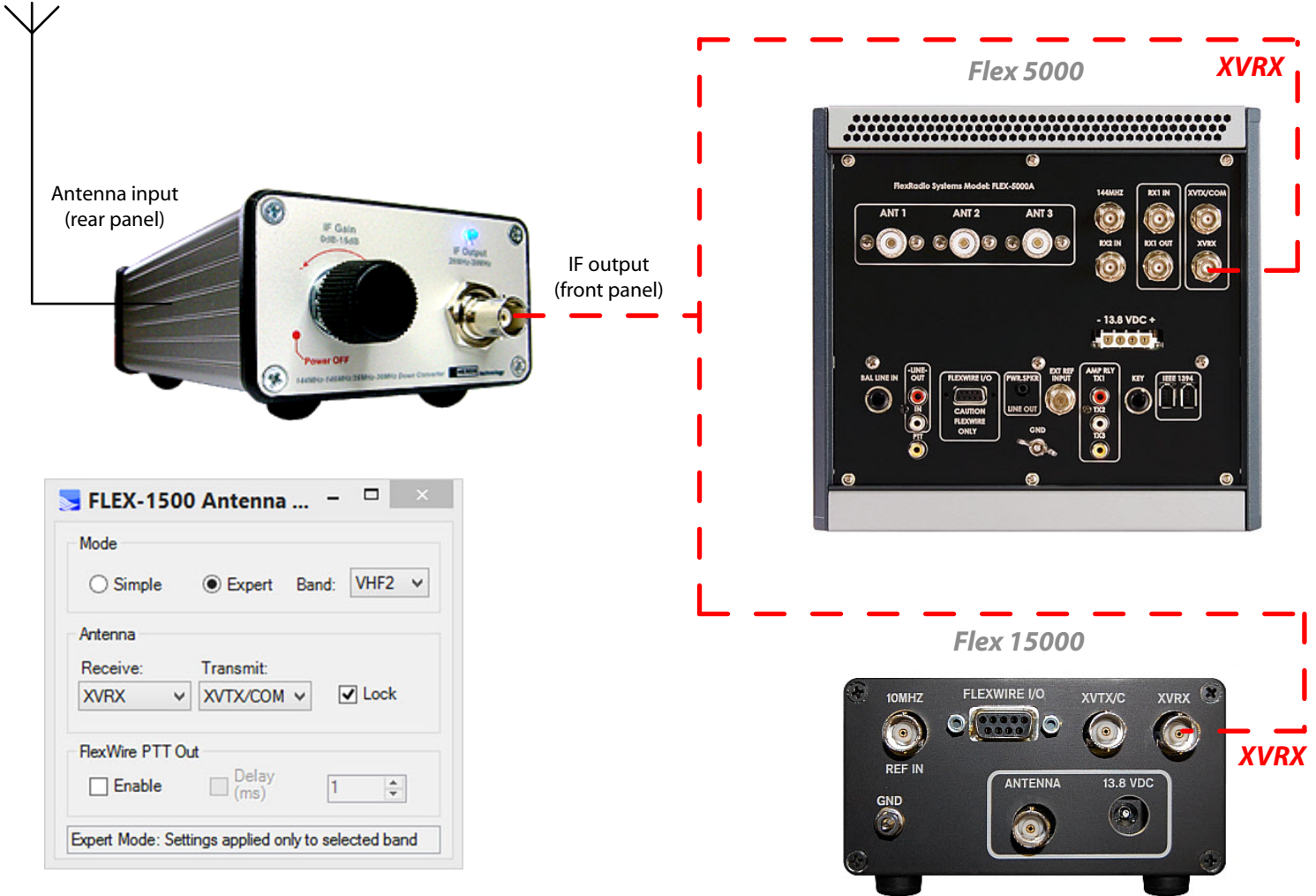
Drawing 143-146MHz to 27-30MHz down converter			
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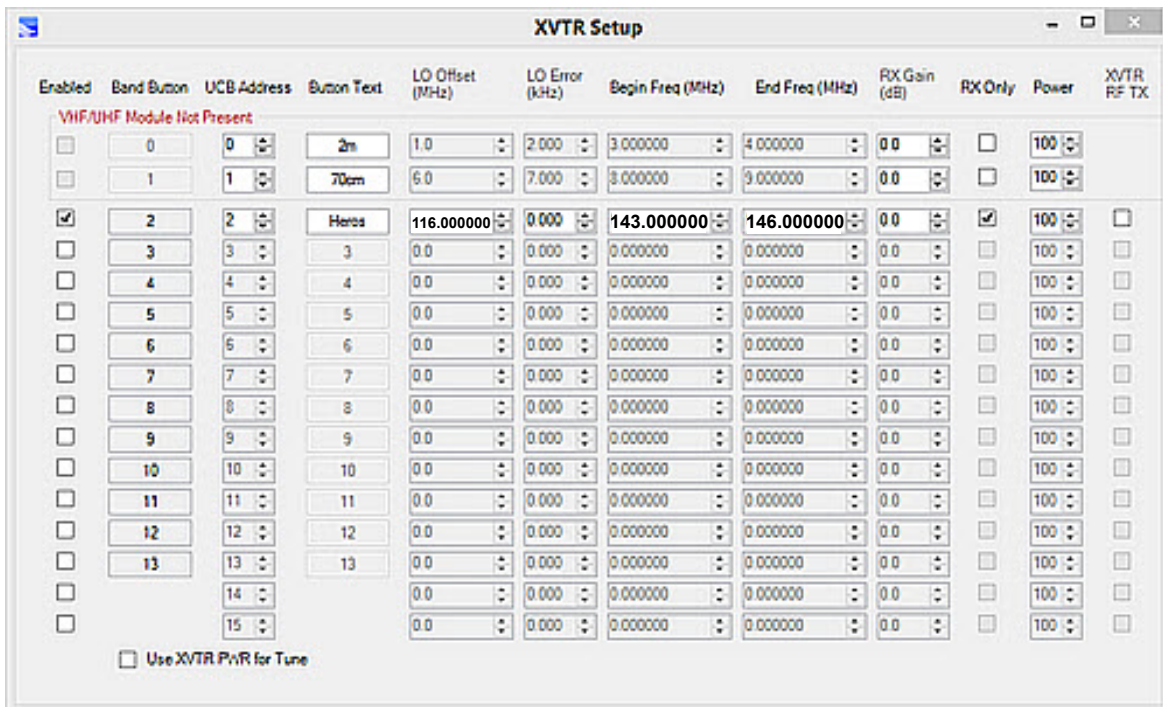
**Illustration of connection to generic radios**



**SDR radio connection example**



**PowerSDR configuration**



Enabled	Band Button	UCB Address	Button Text	LO Offset (MHz)	LO Error (kHz)	Begin Freq (MHz)	End Freq (MHz)	RX Gain (dB)	RX Only	Power	XVTR RF TX
<b>VHF/UHF Module Not Present</b>											
<input type="checkbox"/>	0	0	2m	1.0	2.000	3.000000	4.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	1	1	70cm	6.0	7.000	8.000000	9.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2	2	Heros	116.000000	0.000	143.000000	146.000000	0.0	<input checked="" type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	3	3	3	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	4	4	4	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	5	5	5	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	6	6	6	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	7	7	7	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	8	8	8	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	9	9	9	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	10	10	10	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	11	11	11	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	12	12	12	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	13	13	13	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	14	14	14	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>
<input type="checkbox"/>	15	15	15	0.0	0.000	0.000000	0.000000	0.0	<input type="checkbox"/>	100	<input type="checkbox"/>

Use XVTR PWR for Tune

**NOTES:**

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