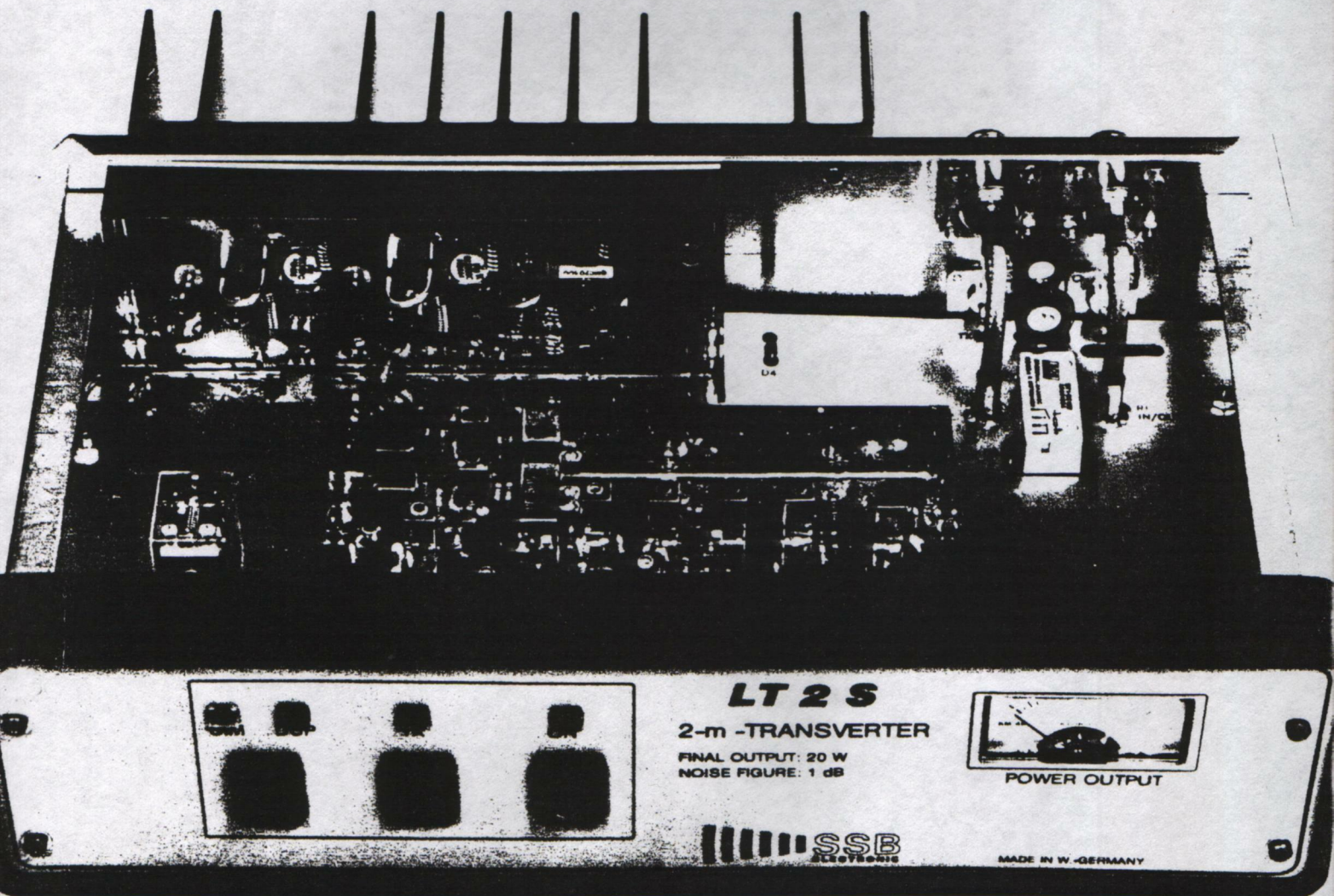


LT 2 S

2m TRANSVERTER



SSB ELECTRONIC USA

"LT2S" 2 Meter LINEAR Transverter

The LT2S is a state-of-the-art linear transverter that was developed using the latest design techniques. It is a transverter of exceptional quality, performance and technical specifications.

The technical specifications speak for themselves:

- * Low-noise GaAsFET receive front-end. NF < 1.0 dB
- * Robust 20 watt final output stage using 50W Valvo transistors
- * 2 Separate - front panel selectable - Local oscillators for RPT offset. Contact SSB Electronic USA for IF QSY modifications
- * Built-in RF IN/OUT switching.
- * Separate IF In / IF out connections
- * Built-in adjustable input attenuator for drive levels of 1mW to 500mW input drive.
- * Manual or PTT control of Rx/Tx switching
- * Sturdy Vinyl Clad steel housing
- * Relative power output meter

In 1985, SSB Electronic GmbH began to design a new series of high performance VHF/UHF linear transverter systems. The overall design goals required that the transverters have very high 3rd order intercept points, very low noise figures, and an ultra clean output spectrum. The LT6S, LT2S, LT220S, and the LT70S is a result of this engineering effort.

Receive section overview

The received signal is amplified by a low noise single stage GaAsFET preamplifier which sets the overall system noise figure. The GaAsFET in the preamplifier operates at a high drain current of approximately .045ma to achieve a 3rd order intercept point at the output of approximately +13dBm. The output of the GaAsFet is matched to a bandpass filter network via a 4:1 ferrite transformer. Following the bandpass filter a high level +17dBm double balanced Shotkky mixer is employed to maintain the 3rd order intercept point. The output of the mixer is terminated by a diplexer filter prior to IF amplification. IF amplification is achieved through a broadband stage designed around a P8002 power J-FET. This combination results in an overall 3rd order intercept point at the output of approximately +28dBm.

It is interesting to note that early experiments were conducted utilizing super high level double balanced mixers (200mW at the LO port) and parallel P8002's. Output 3rd order intercept points of +32dBm were achieved. Since current state of the art amateur HF radios have typical 3rd order intercept points of +15dBm, the use of a high level DBM and a single P8002 still exceeds the capability of the HF transceiver. In reality, the HF radio now becomes the limiting factor. When you consider the alternative of using a modern VHF or UHF transceiver that has a typical 3rd order intercept point (at the input) of -15dBm, the choice becomes quite clear very quickly. The use of your HF radio and one of our LT Series transverter systems will clearly outperform any multi-mode/multi-band transceiver manufactured today.

Transmit section overview

The same care that was given to the design of the receive section, has been carried forward into the design of the transmit section. The 28MHz RF signal is routed via an attenuator network to a low level double balanced Shotkky passive mixer to produce the desired mix of the local oscillator and 28MHz. drive signal. The output of the mixer is amplified by two filter coupled Class A amplifiers which operate at only 20% of their maximum output. These pre-driver amplifiers achieve a 3rd order IMD difference of more than 40 dB. The 5th order IMD product difference is better than 70 dB. This signal is then fed to a two stage power amplifier block to achieve the rated 20 watt output level. The saturation power of this block is approximately 50 watts. Up to the 10 watt PEP level, this amplifier operates in a pure class A mode which is comparable to the best tube amplifiers.

TECHNICAL DATA

Transmit Section

Input Frequency	28	-	30	MHz.
Output Frequency	144	-	146	MHz.
Drive Power (internally adj.)1mW	-	500mW	
Output Power			20W	

Receive Section

Input Frequency	144	-	146	MHz.
IF Frequency	28	-	30	MHz.
Noise figure			1.0	dB
Conversion Gain			typ 20	dB

General

Power requirements.....			13.8VDC
Current drawn on receive (transmit) ..	0.2A	(4.0A)	typ.

LT2S Connection and operating instructions

Front Panel controls:

- Switch "ON" Provides power to the transverter, the LED indicator should light.
- Switch "TX" This switches the transverter to transmit under manual control.
- Switch "SIMS/DUP" In the simplex mode, both the receive and transmit frequencies will be the identical. In the duplex mode, a second local oscillator is selected during transmit thus allowing an RPT transmit offset. This feature is particularly useful in Europe where repeater sub-bands also occupy the low end of each band. To utilize this feature a crystal must be purchased for the second local oscillator. SSB Electronic USA can modify this feature to permit IF QSY for contest operators. Contact us for more information.

Power Output The watt meter indicates the actual power output. (50 Ohm Pure Load)

Rear Panel connections

- ANTENNA (N) An "N" connector is provided for 144MHz RF In/Out
- RF OUT (N) An additional "N" connector is provided that will allow you to split the 144MHz RF In/Out signal paths. This feature can be used to eliminate an external linear amplifier input relay thus avoiding an additional relay along with its associated losses. Before using this feature, a simple modification must be made! Refer to "Splitting the RF IN/OUT signal paths" for additional details.
- +13.8V Connect to your power supply using a large diameter power cable (to avoid voltage drop). To achieve the full 20 watt power output you will need a power supply capable of delivering 13.8 volts @ 5.0 amps.
- Connect to the minus side of your power supply.
- PTT This phono connector provides a connection to the transverters PTT Line. A ground on this line places the transverter into transmit mode.
- 28MHz In (BNC) Apply 28MHz. drive to this connector. Do not exceed 500mW of RF power.
- 28MHz Out (BNC) IF (receive) output is available at this connector. Do not apply RF power to this connector.

Input attenuator adjustment:

The LT2S has a built-in attenuator for matching 28MHz. drive levels up to .5 Watts. Matching to your HF Radio can be accomplished as follows:

Remove the upper half of the case of the LT2S (four screws), and place the back of the transverter toward you. An access hole is provided for attenuator adjustment between the two BNC connectors. Using a suitable trimmer tool, carefully insure that the attenuator rotator is at the maximum counter clock-wise position (Maximum attenuation). Insure that the ANTENNA connector is terminated in a good quality dummy load, then place the transverter and your HF radio in the transmit position. Rotate the attenuator rotor clockwise for 20 watts output as indicated on the power meter.

Using the second Oscillator:

The second Local oscillator can be used for RPT offset by installing an additional crystal into the empty crystal socket. A series resonant 5th overtone crystal is required.

Crystal Frequency = (144.0MHz + or - OFFSET) - 28.0MHz

For example, if a 600KHz plus offset on transmit was required, the a 116.6MHz crystal would be required.

116.6MHz. = (144.0MHz + 600KHz) - 28.0MHz.

Splitting the RF IN/OUT signal paths

As shipped, RF IN/OUT are common to a single type "N" connector labeled - ANTENNA. The following simple modification will allow the type "N" connector labeled - ANTENNA to function as an isolated receive port and the type "N" connector labeled RF-OUT to function as an isolated RF-OUTPUT port. It is essential that a grounded tip soldering iron be used to carry out this modification. Remove the bottom cover, and place the back of the transverter away from you. Notice in the top left corner there are three circuit board traces labelled: "A", "B" & "C". Remove the solder bridge at trace "A", and then bridge across the traces labelled "B" & "C". (A small brass tab works great!) Your transverter will now be functional with separate transmit and receive ports.

Should you ever have any questions concerning your LT2S, please do not hesitate to contact us.

73's
Gerry Rodski K3MKZ
SSB ELECTRONIC USA