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A 28/50 MHz Transverter

With the de-controlling of the 6m band as part of a large-scale experiment, even local radio amateurs can now take an active part in events. In connection with this topical development, the present article describes a 28/50 MHz transverter.

A transverter for the 6m band can be produced on the basis of the tried and trusted concept of the 28/144 MHz transverter, which was described in VHF Communications 4/1993 (2). All that is required is modification of the components determining the frequency. Essentially, the oscillator and the filter need to be adapted.

1. CLARIFICATIONS OF THE CIRCUIT

Fig.1 shows the complete circuit for the 28/50 MHz transverter. Its function has already been described in detail with regard to the 2m version (see issue 4/1993). The instructions for assembly and calibration given there also apply here, of course.

The entire circuit can be assembled on the DJ8ES 019 printed circuit board of the 2m transverter. Only the range of the pi filter at the receiver input needs to be altered. Fig.2 gives the details.

All the coils and some of the capacitors have new values due to the lower frequency range.

To make it easier to produce the 6m version of the transverter, the layout of the DJ8ES 019 printed circuit board with the appropriate components for the 50 MHz version is illustrated in Fig.3 and Fig.4.

1.1. Transverter Component List

IC1	TA78L diameter 9F voltage regulator (SMD)
IC2, IC5	MSA1104 (Avantek)
IC3	MSA0104 (Avantek)
IC4	MSA0304 (Avantek)
T1	U310 (Siliconix)

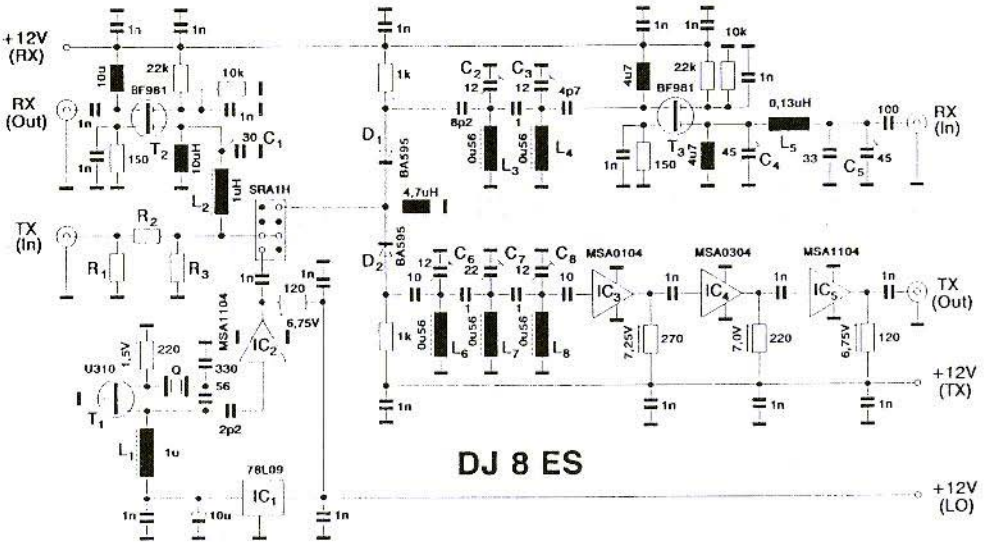

Fig.1: The Transverter Circuit Modified for 50 MHz

T2, T3	BF981 (Siemens)
D1, D2	BA595 PIN diode (SMD)
L1, L2	BV5048 Neosid coil, 1µH, yellow/grey
L3, L4	BV5036 Neosid coil, 0.58µH, orange/blue
L5	BV5063 Neosid coil, 0.58µH, blue-orange
L6, L7, L8	BV5063 Neosid coil, 0.58µH, orange/blue
C1	30pF foil trimmer (red) 7.5 mm grid (Valvo)
C2, C3	12pF foil trimmer (yellow) 7.5 mm grid (Valvo)
C4, C5	45pF foil trimmer (violet) 7.5 mm grid (Valvo)
C6, C8	12pF foil trimmer (yellow) 7.5 mm grid (Valvo)
C7	22pF foil trimmer (green) 7.5 mm grid (Valvo)
Q	22 MHz crystal, HC18U or HC25U
1 x	SRA1H ring mixer
2 x	120Ω / 0.5W Carbon film
1 x	220Ω / 0.5W Carbon film
1 x	270Ω / 0.5 W Carbon layer
4 x	BNC flanged connector (UG-290 A/U)
3 x	Teflon bushing
1 x	Tinplate housing 55.5 x 111x 30 mm
9 x	1.5mm dia. Copper rivets

All other components as SMD format:

3 x	Choke, 4.7µH
2 x	Choke, 10µH
1 x	10µF / 20VTantalum

Ceramic capacitors	Resistors
3 x 1pF	1 x 150Ω
1 x 2.2pF	2 x 220Ω
1 x 4.7pF	2 x 1kΩ
1 x 8.2 pF	2 x 10kΩ
2 x 10nF	2 x 22kΩ
1 x 33pF	
1 x 56pF	
1 x 330pF	
17 x 1nF	

2. HYBRID AMPLIFIER

An M57735 hybrid module is used in the separately assembled amplifier stage for the 6m band. This module has been specially developed for the tuning area around 50 MHz. About 10W can be expected at the output of the PA with the output pre-set from the transverter to 50mW.

The downstream low-pass filter provides the harmonic filtration required. Only components of appropriate quality (e.g. air-core coils and air-spaced trimmers) should be used here.

The 50 MHz amplifier can also be assembled on the printed circuit board of the 2m version of the DJ8ES 020.

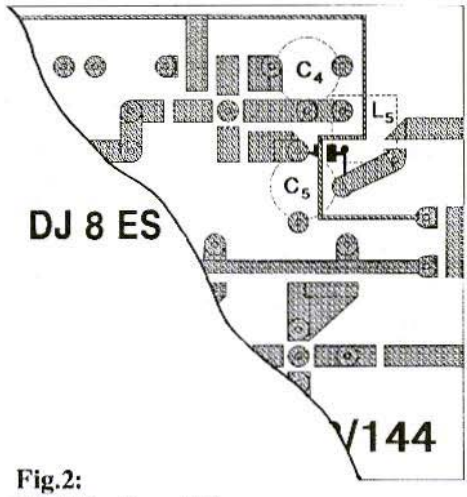

Fig.2: Modification of the Receiver Input

2.1. Hybrid Amplifier Component List

IC1	M57735 (Mitsubishi)
IC2	TA78L09F voltage regulator (SMD)
L1, L2	0.5µH air-core coil
C1, C2	33pF trimmer with soldering lugs
1 x	VK200 UKW wide-band choke
1 x	1nF through-hole type capacitor, solderable
2 x	BNC flanged bush (UG-290 A/U)
1 x	Tinplate housing 55.5 x 111 x 30 mm

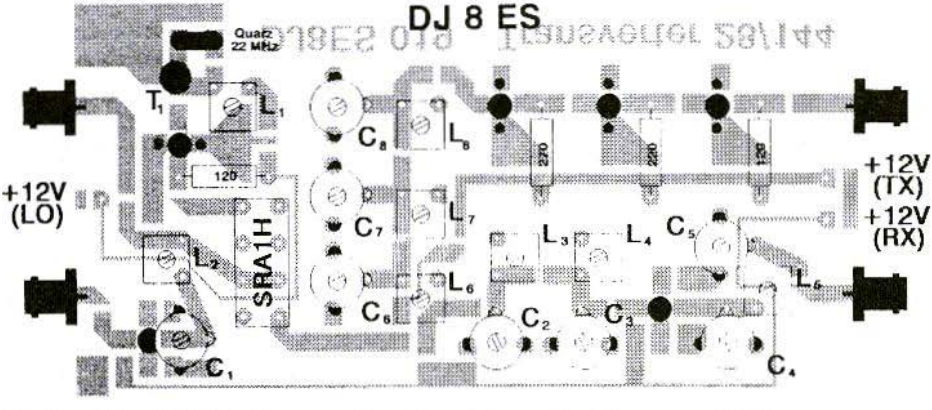

Fig.3: The 50 MHz Transverter viewed from the Component Side

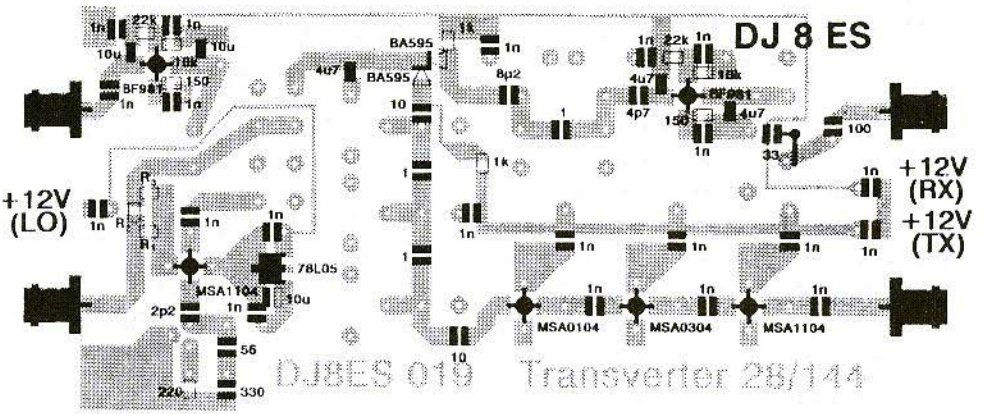

Fig.4: The 50 MHz Transverter viewed from the SMD Component Side

3. CONCLUSION

All other components in SMD format:

1 x	1µF / 20V Tantalum
1 x	10µF / 20V Tantalum
1 x	3.3pF, ATC chip
2 x	82pF, ATC chip
2 x	82pF, ATC chip
3 x	1nF, ceramic capacitor

The advantages of the 50Ω technology are clear and obvious. With only slight changes, an existing circuit can be used for a completely different tuning range. Only the components determining the frequency need to be changed for the new frequency band.

The 25W ERP permitted can certainly be attained with an output of around 10W and a standard 4-element or 5-element Yagi. We hope that the great experiment will end in positive results

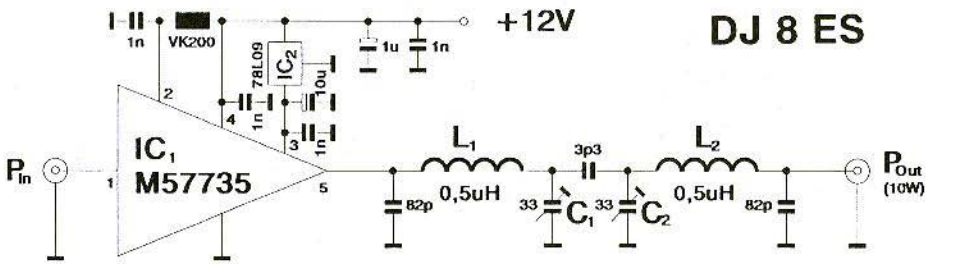

Fig.5: The 50 MHz Amplifier with Downstream Low-Pass Filter

and that, here in this interesting frequency band too, all options will remain open to us.

4. LITERATURE

(1) Wilhelm Schürings, DK4 TJ and Wolfgang Schneider, DJ8ES: Universal Transverter Concept for 28, 50 and 144 MHz VHF Communications 3/1991, pp. 175-187

(2) Wolfgang Schneider, DJ8ES: 28/144 MHz Transverter VHF Communications 4/1993, pp. 221-226

(3) Wolfgang Schneider, DJ8 ES: Hybrid Amplifier for 144 MHz VHF Communications 1/1994, pp. 56-61

(4) Mitsubishi: Data Sheet M57735 Mitsubishi RF Power Modules