# High Reverse Isolation Norton-Rohde Feedback Amplifiers

Dallas Lankford, 11/6/09, rev. 11/7/09

High reverse isolation Norton-Rohde amplifiers with high gains can be developed by taking variants of the circuits in the figures below. In order to obtain the same intercepts as the basic N-R amp, a somewhat higher DC voltage was required. The reverse isolation of a standard N-R amp is about 20 dB, while the reverse isolation of the amp below is about 90 dB. The high reverse isolation amp described below is one of my new N-R feedback amps terminated with 50 ohms real followed by my high performance active whip antenna amp (without, of course, the whip element). The stated +72 dBm 2nd order input intercept in the figure below will not be realized unless it is maximized using the 100 ohms and 10K ohms 2nd order adjustment pots. If the adjustment pots are omitted, then the 2nd order intercept will generally be at least 15 dB less. The amp is optimized for the MW band. Amp gain begins to roll off above 10 MHz.

High Reverse Isolation Push-Pull Norton-Rohde Feedback Amplifiers

Dallas Lankford, 11/5/09
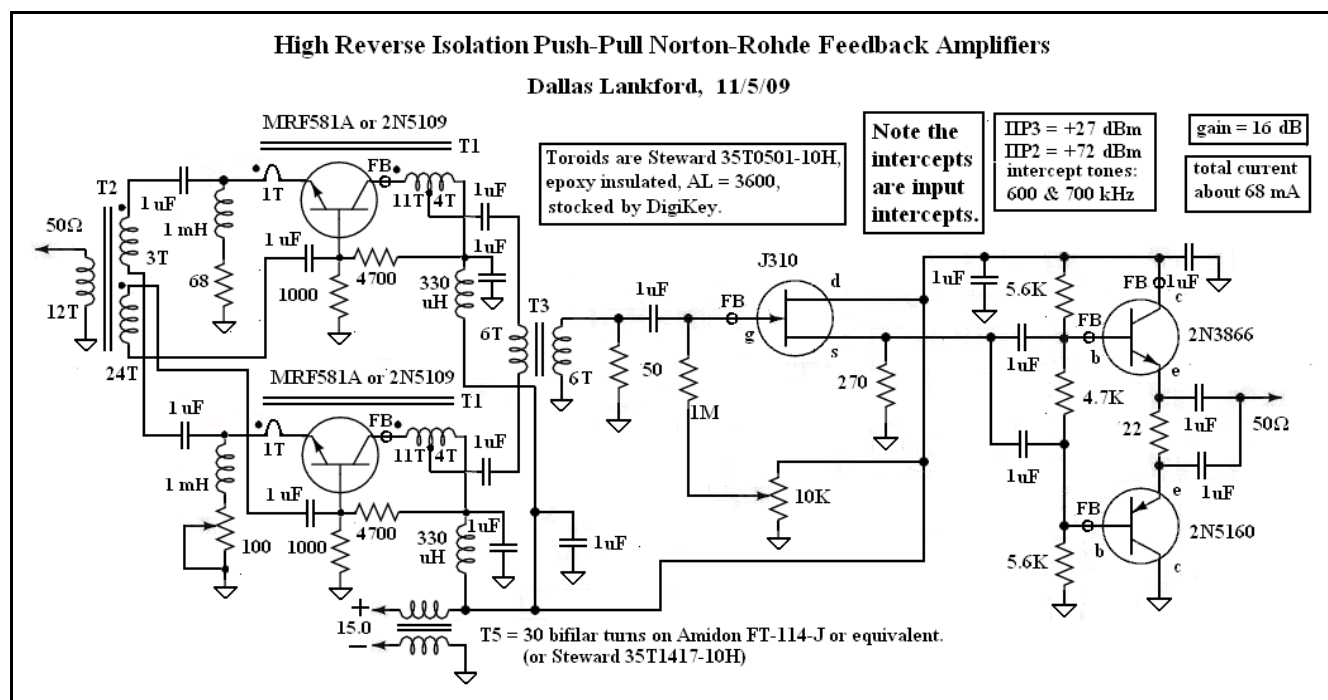
T5 is a common mode choke which was found to be necessary to eliminate undesired man made noise pickup, presumably due to the high input impedances of the FET's in the active whip amp component. Curiously the common mode noise was observed with flag antennas, but not with short whip antennas, another disproof of the myth, still widely believed, that loops are more immune to noise than other antennas. The FT-114-J toroid material is a semiconductor so the toroid should be insulated. A better choice might be an epoxy coated larger Steward toroid with 5000 AL initial permeability, also available from DigiKey.

Lower gain high reverse isolation LINR feedback amplifiers can be developed by the same method as above using variants of the circuit below. Again, in order to obtain the same intercepts as the basic N-R amp, a somewhat higher DC voltage was required. The reverse isolation of a standard LINR amp is about 20 dB, while the reverse isolation of the amp below is about 90 dB. The stated +76 dBm 2nd order input intercept in the figure below will not be realized unless it is maximized using the 100 ohms and 10K ohms 2nd order adjustment pots.

These results suggest that my active whip amp with 50 ohm input termination can be used with a variety of circuits as a high performance 50 ohm driver with high reverse isolation provided a suitable common mode choke is used to decouple the DC line. This high performance 50 ohm driver may have applications elsewhere.

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Toroids are Steward 35T0501-10H, epoxy insulated, AL = 3600, stocked by DigiKey.

Note the intercepts are input intercepts.

IIP3 = +30 dBm
IIP2 = +76 dBm
intercept tones: 600 & 700 kHz

gain = 11 dB
total current about 68 mA

MRF581A or 2N5109

FT-50-75 11:8
T1

1 uF
1 mH
68
1 uF
1 mH
100
1 uF
1000
4700
1000
4700
1T
1T
FB
FB
T3
T4
11T 4T
11T 4T
1 uF
1 uF
1 uF
1 uF
330 uH
330 uH

MRF581A or 2N5109

FT-50-75 8:8
T2
1 uF
50
FB
1M
1 uF

J310
d
g
s
270
10K

1 uF
5.6K
1 uF
4.7K
1 uF
FB
FB
2N3866
b
c
e
22
1 uF
50Ω
1 uF
e
FB
b
c
2N5160
5.6K
1 uF
1 uF

15.0
+
−

T5 = 30 bifilar turns #24 insulated (enameled) on Amidon FT-114-J or equivalent. (or Steward 35T1417-10H)