YIG driver (#526b)

Dick Plambeck, 10/20/05
Circuit designed by Doug Thornton, 1986

Function: buffers coarse and fine tuning signals from Xband synchronizer (phaselock), drives tuning coils on the Xband YIG oscillator in order to control its frequency and phase. The YIG driver is a small circuit mounted very close to the oscillator.

Brief circuit description: The basic Xband oscillator frequency is set by a 0-10 V control voltage on pins 7 and 8 of the 9-pin D connector. U3 serves as a differential amplifier to reject common mode noise on these lines. U2 adds a constant offset voltage to the output of U3 to produce the main tuning coil control voltage. U4 servos the current through the tuning coil in order to keep the voltage drop across 5 ohm power resistor R12 equal to this control voltage.

Potentiometer P1 is used to set the YIG frequency to 8.000 GHz when the coarse tuning voltage (pins 7,8) is 0; potentiometer P2 is used to set the YIG frequency to 12.5 GHz when the coarse tuning voltage is 10.00 V.

The correction signal from the Xband phaselock synchronizer is coupled into the YIG driver on an SMA connector. To limit power dissipation in the FM tuning coil, only the AC component of this signal is coupled to the FM coil through voltage follower U1, while the DC component is summed with the coarse tuning voltage at the input to U2. The component values re chosen so that the frequency/volt correction is comparable for both the AC and DC components, assuming that the coarse tuning coil has a sensitivity of 20 MHz/mA, while the FM coil is 300 kHz/mA.

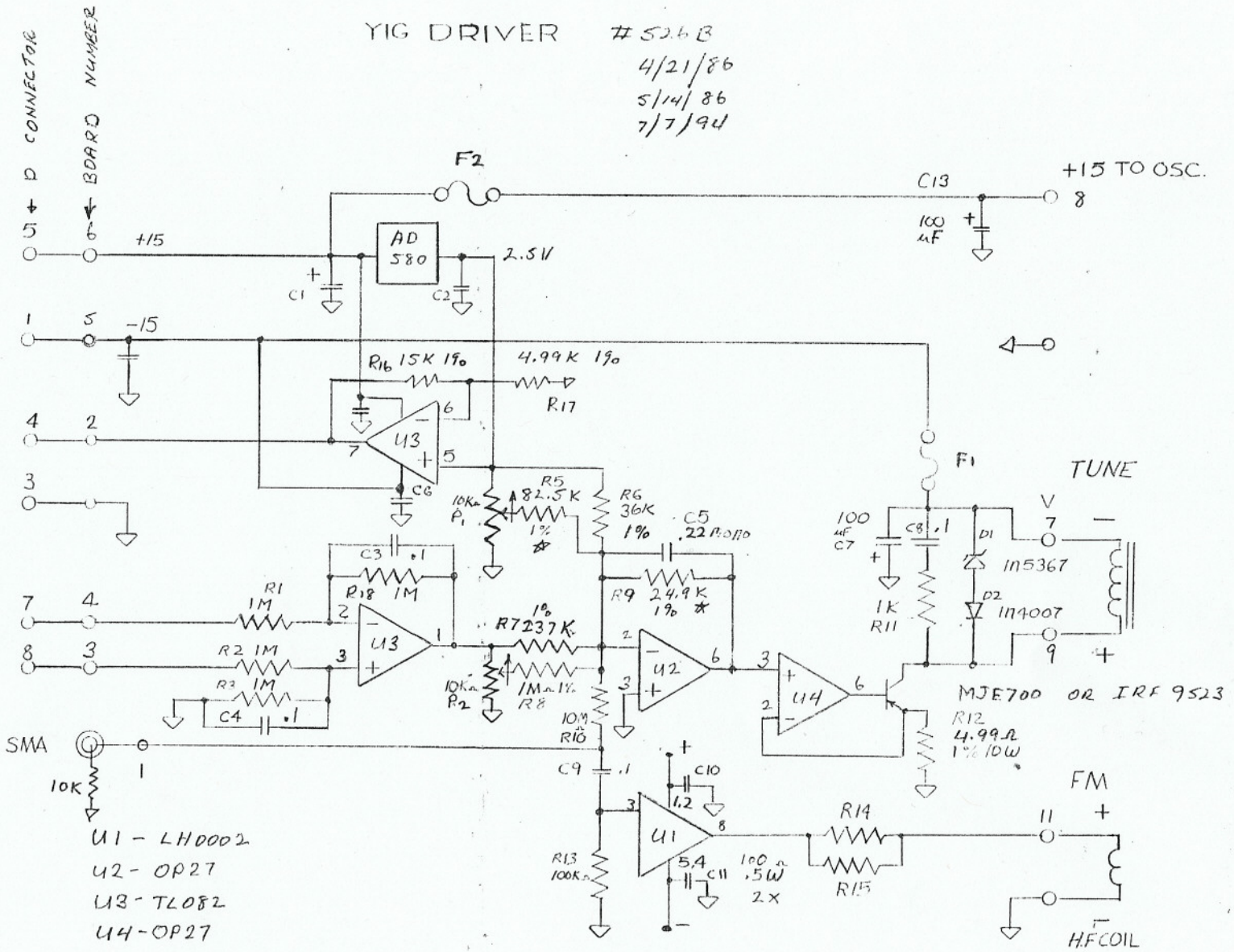**9-pin D connector wiring:**

1	-15 V,
2	NC
3	pwr GND
4	10 V out; normally not used, but could be reference for coarse tuning manual control pot
5	+15 V
6	NC
7	Coarse tune -
8	Coarse tune +
9	NC

YIG DRIVER   #52.6B

4/21/86
5/14/86
7/7/94

D CONNECTOR
BOARD NUMBER

F2

C13
+15 TO OSC.
100 µF
8

5   6   +15

AD 580   2.5V

C1   C2

1   5   −15

R_{16} 15K 1%   4.99K 1% R_{17}

4   2

U3   6   5   7

C6

3

R5 82.5K
10Kα P_1 1%

R6 36K 1%

C5 .22 mono

100 µF C7
C8 .1
F1

100 µF C7

D1 1N5367

TUNE
V 7 −

D2 1N4007

1K R11

7   4   R1 1M R_{18} 1M   C3 .1

U3   1

R7 237K 1%

R9 24.9K 1% *

2   U2   6   3   +   6   U4

MJE700 OR IRF 9523

8   3   R2 1M   3   +

10Kα P_2 1Mα 1% R8

2   U4

R12 4.99Ω 1% 10W

R3 1M   C4 .1

10M R10

9 +

SMA
10K

C9 .1   +   C10 1,2

R12 4.99Ω

FM +

3   U1   8
R13 100Kα   5,4   C11

100 .5W 2X
R14
R15

11

U1 - LH0002
U2 - OP27
U3 - TL082
U4 - OP27

☆ - HIGHEST ORDER TEMPERATURE COEFFICIENT

LH0002

H.F COIL