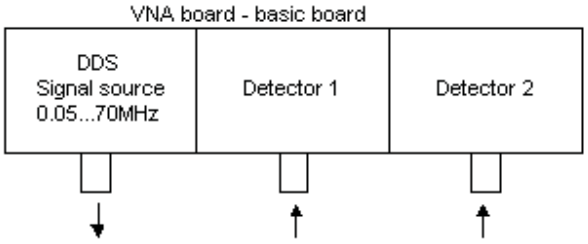
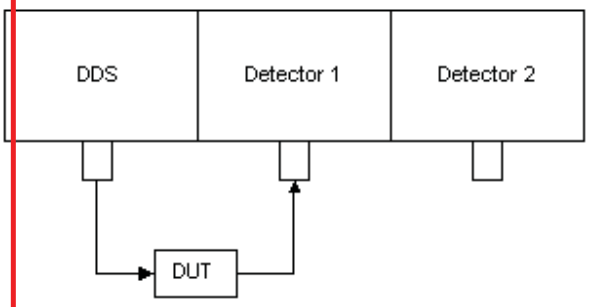
N2PK VNA reference diagrams



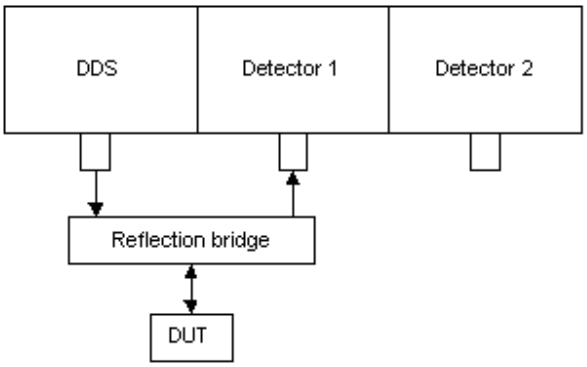
Software:
- DOS-based programs by N2PK
- myVNA by G8KBB
- WiNWA by DG8SAQ
- Exeter by W8WWV
- VNA4Win by GM4PMK and GM3SEK

Decart and Smith Chart plots
Interface: Parallel port and USB

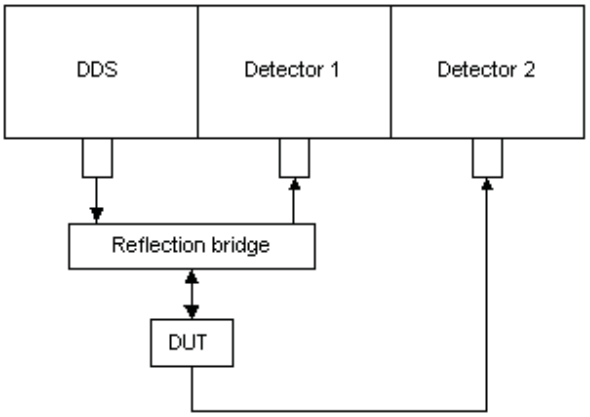
Note: DUT=Device Under Test



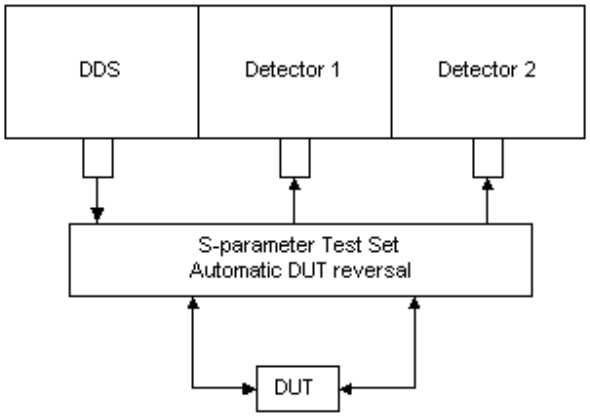
Transmission mode, use Det1 or Det2
Use to measure S21
Transmission characteristics, gain, loss, filters



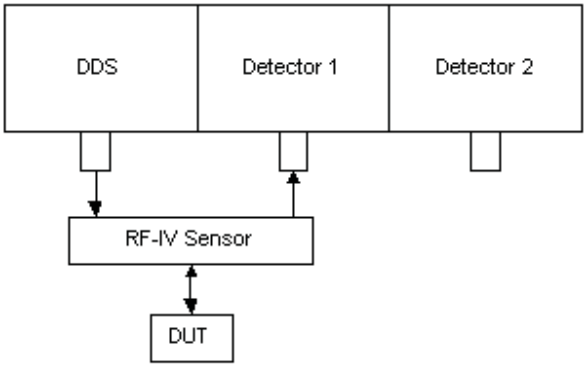
Reflection mode, use Det1 or Det2
Use to measure S11
Reflection Coefficient, Return Loss, Input/Output Z, SWR, antenna measurements



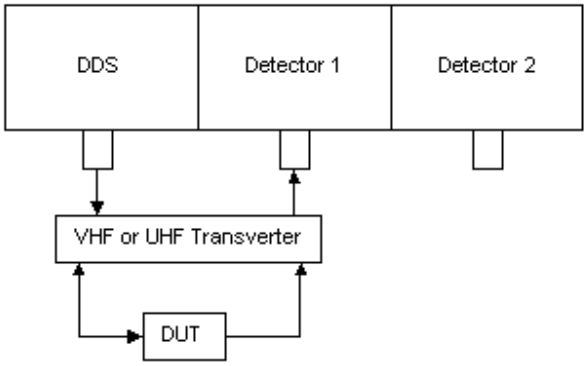
Dual Detector mode, use Det1 and Det2
Use to measure S21 and S11 simultaneously.
Transmission and Reflection characteristics.
Detector 1 measures Reflection, Detector 2 measures Transmission.
To measure S12 and S22 reverse the DUT.



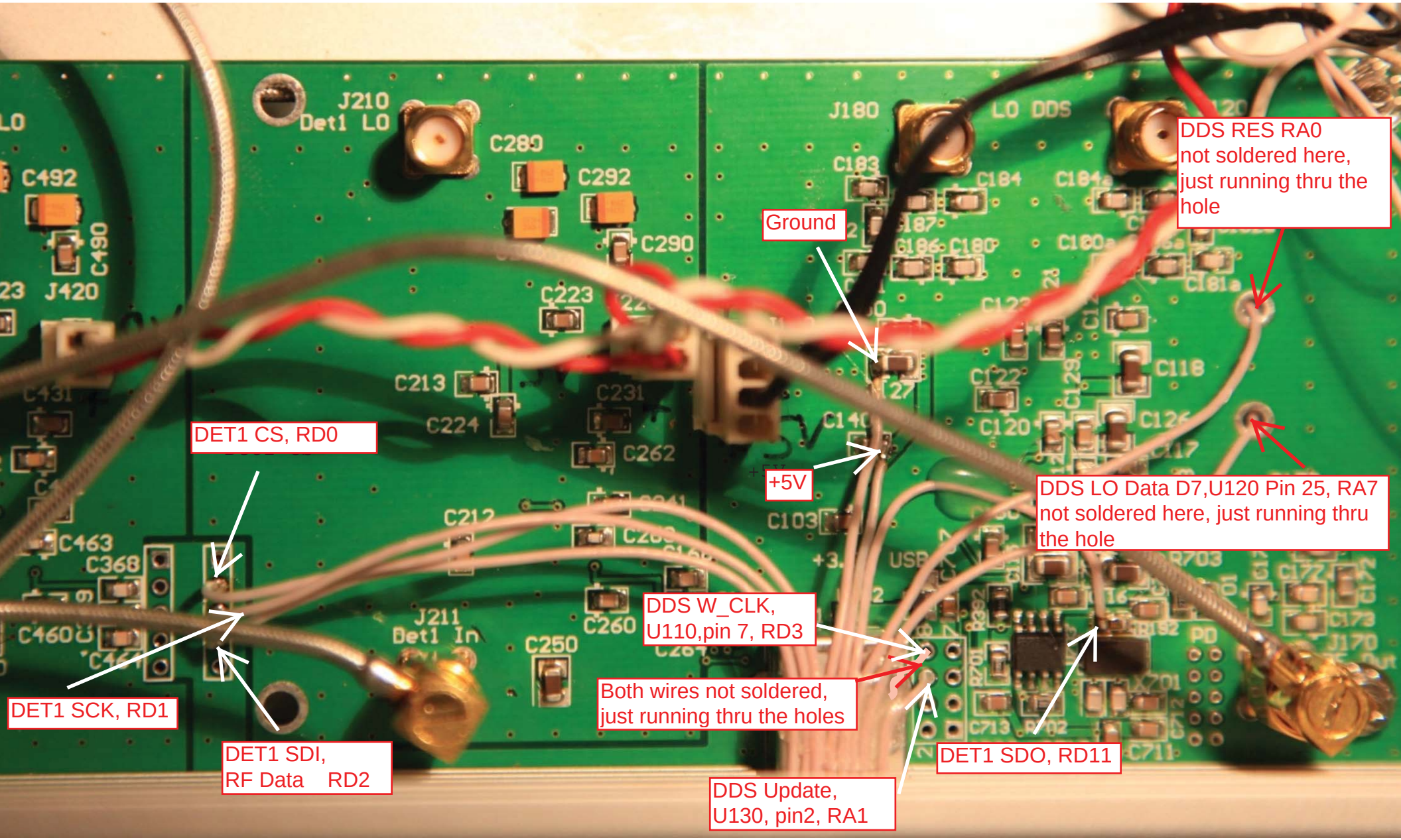
Dual Detector mode with S-parameters Test Set,
Use Det1, Det2, and S-parameter Test Set.
Use to measure S11,S21,S12, and S22 simultaneously.
Full set of Input and Output Transmission and Reflection characteristics.
Detector 1 measures Reflection, Detector 2 measures Transmission.
DUT is reversed automatically.

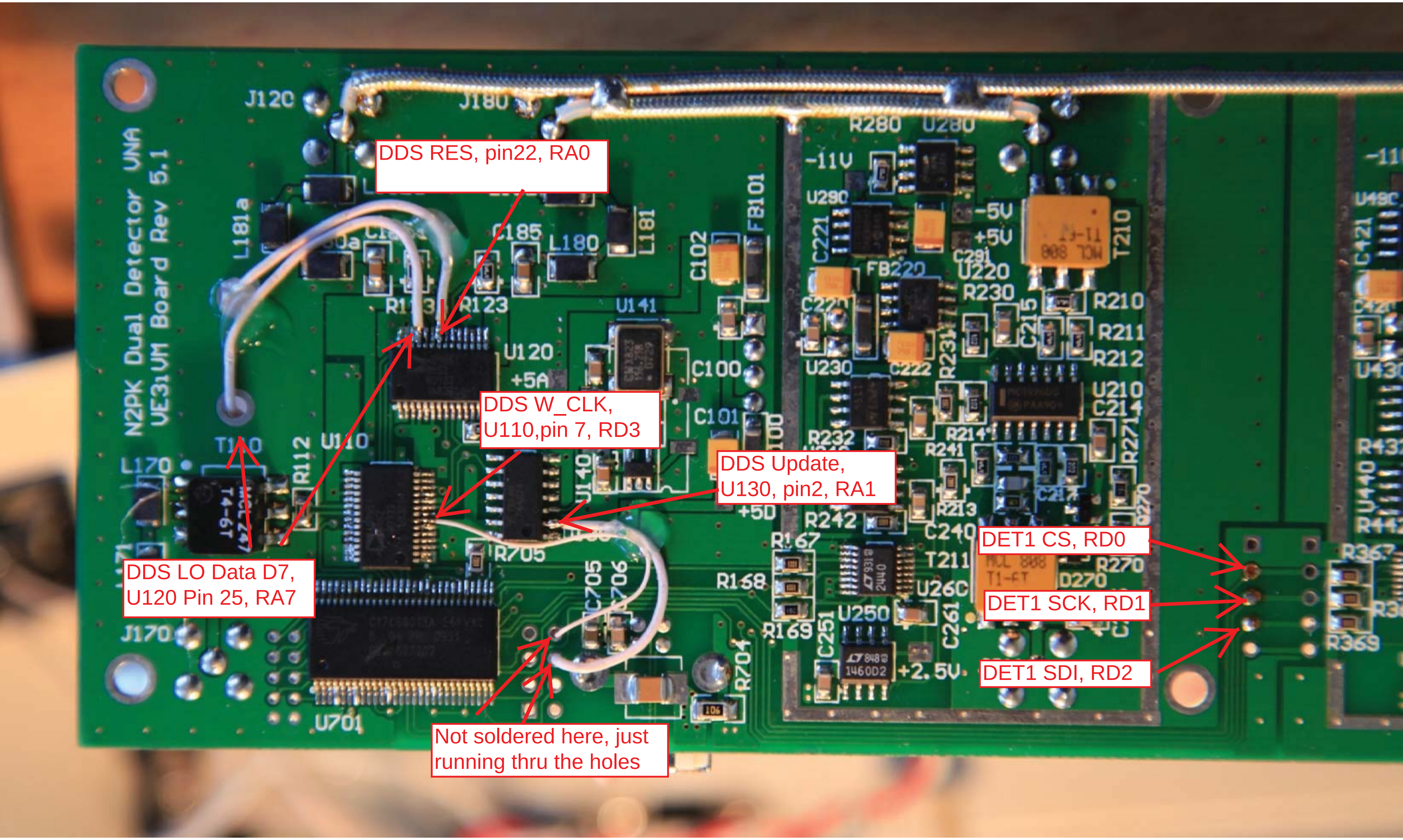


RF-IV mode, use Det1 or Det2
Use to measure S11 and Q
Q, Reflection Coefficient, Return Loss, Input/Output Z, SWR, antenna measurements



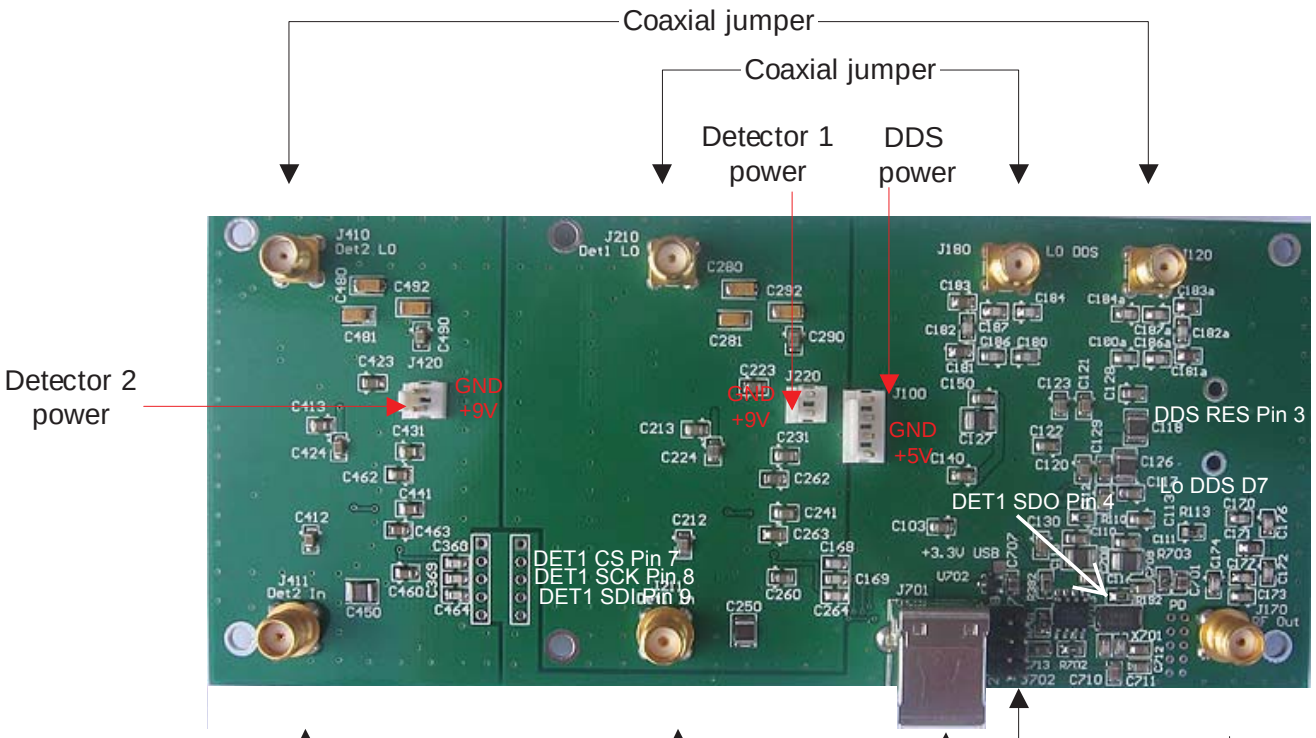
Transverter mode, use 2m or 70cm Transverter
Use to measure S11 and S21
Reflection Coefficient, Return Loss, gain, loss, Input/Output Z, SWR, antenna measurements


DDS RES RA0
not soldered here,
just running thru the
hole
Ground
DET1 CS, RD0
+5V
DDS LO Data D7,U120 Pin 25, RA7
not soldered here, just running thru
the hole
DDS W_CLK,
U110,pin 7, RD3
DET1 SCK, RD1
Both wires not soldered,
just running thru the holes
DET1 SDI,
RF Data RD2
DET1 SDO, RD11
DDS Update,
U130, pin2, RA1


DDS RES, pin22, RA0
DDS W_CLK, U110,pin 7, RD3
DDS Update, U130, pin2, RA1
DDS LO Data D7, U120 Pin 25, RA7
DET1 CS, RD0
DET1 SCK, RD1
DET1 SDI, RD2
Not soldered here, just running thru the holes

N2PK VNA board v5.0 connection diagram

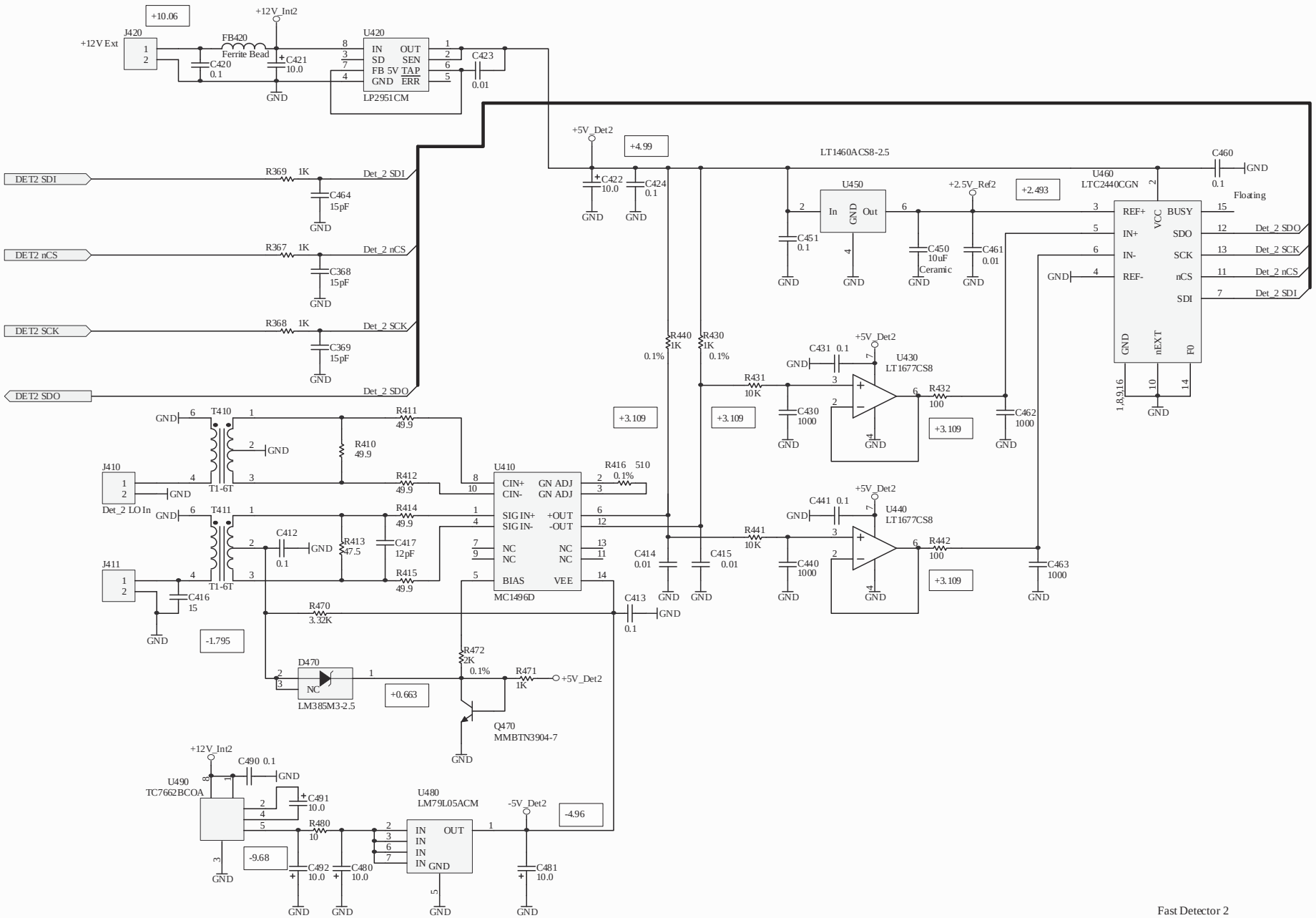
v0.1 May 2009

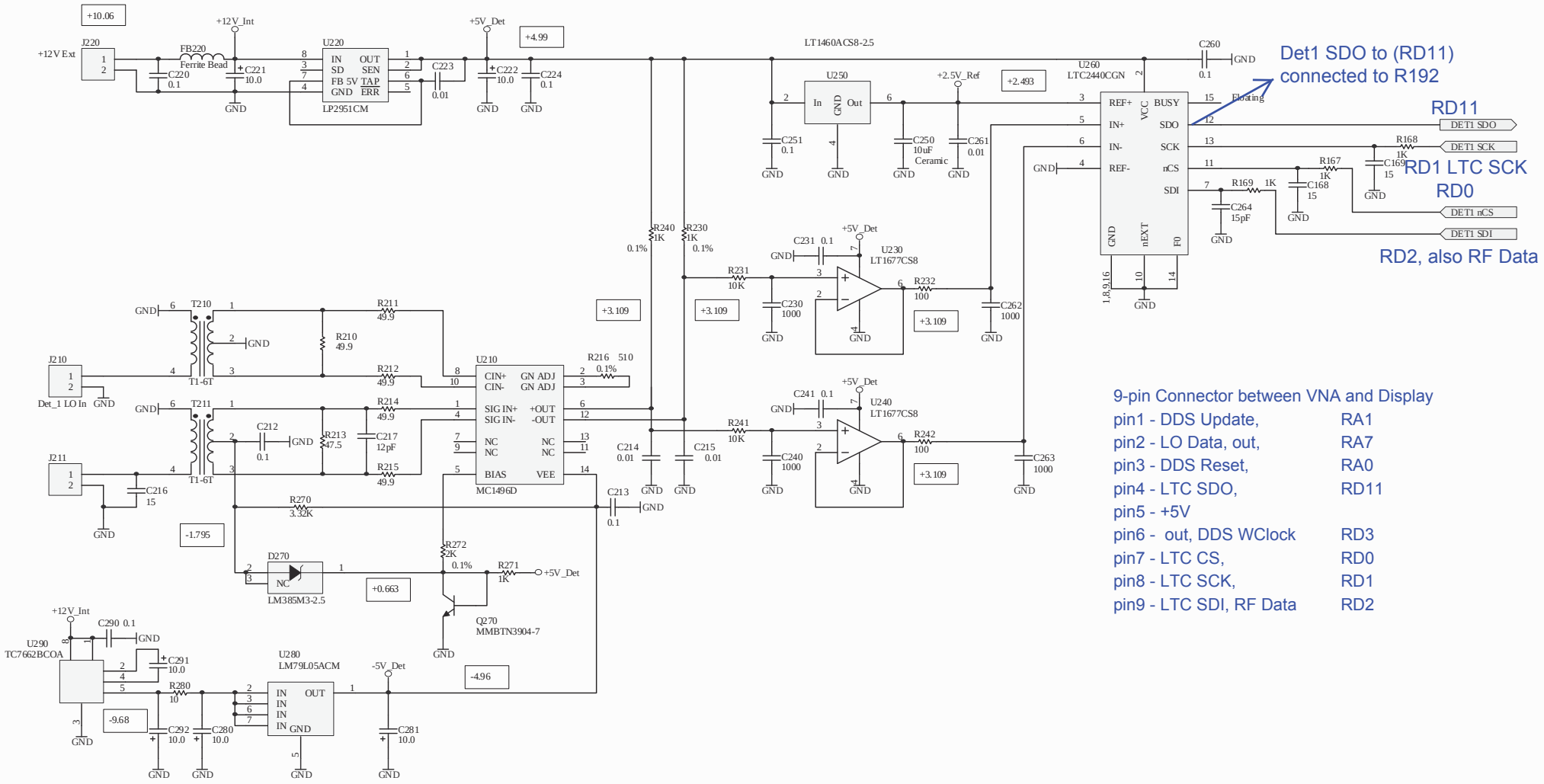


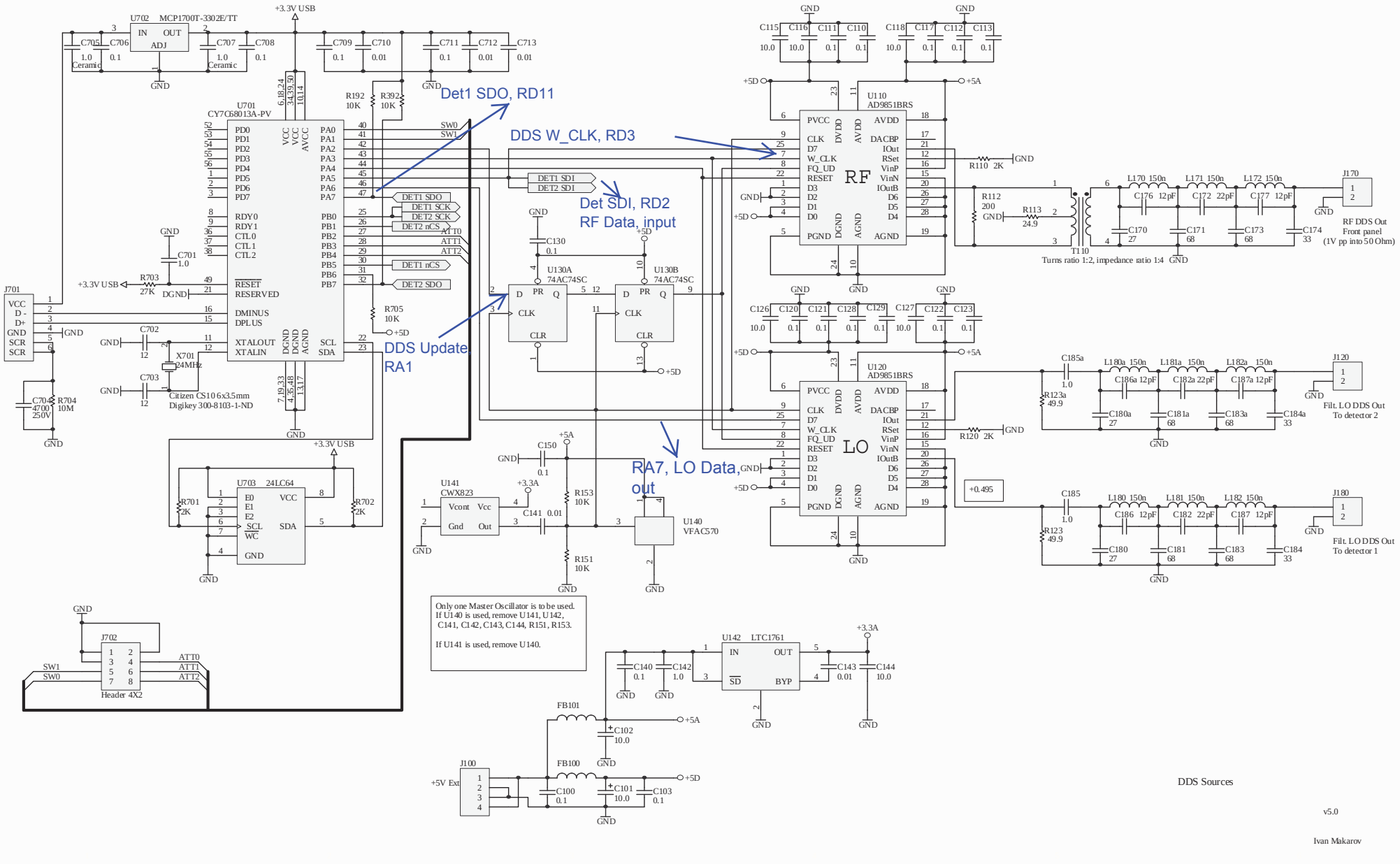
J702 Extension Switch and Attenuator lines for RF I-V sensor, S-Parameters Test Set, and Attenuator.
Active level is +3.3V

Pin	Function
1,2,3	Ground
4	Att0
5	Sw1
6	Att1
7	SW0
8	Att2

Note: J702 lines are non-buffered and connected directly to the USB chip


+10.06
+12V_Int2
J420
+12V Ext
FB420
Ferrite Bead
C420
0.1
C421
10.0
GND
U420
IN OUT
SD SEN
FB 5V TAP
GND ERR
LP2951CM
C423
0.01
+5V_Det2
+4.99
C422
10.0
C424
0.1
LT1460ACS8-2.5
U450
In GND Out
C451
0.1
C450
10uF
Ceramic
+2.5V_Ref2
C461
0.01
+2.493
U460
LTC2440CGN
C460
0.1
Floating
REF+ VCC BUSY
IN+ SDO
IN- SCK
REF- nCS
SDI
GND nEXT F0
Det_2 SDO
Det_2 SCK
Det_2 nCS
Det_2 SDI
DET2 SDI
R369 1K
C464
15pF
DET2 nCS
R367 1K
C368
15pF
DET2 SCK
R368 1K
C369
15pF
DET2 SDO
R440
1K
0.1%
R430
1K
0.1%
C431 0.1
U430
LT1677CS8
R431
10K
C430
1000
R432
100
C462
1000
+3.109
C441 0.1
U440
LT1677CS8
R441
10K
C440
1000
R442
100
C463
1000
T410
T411
R411
49.9
R410
49.9
R412
49.9
R414
49.9
R413
47.5
C417
12pF
R415
49.9
C412
0.1
J410
Det_2 LO In
J411
C416
15
U410
CIN+ GN ADJ
CIN- GN ADJ
SIG IN+ +OUT
SIG IN- -OUT
NC NC
NC NC
BIAS VEE
MC1496D
R416 510
0.1%
C414
0.01
C415
0.01
C413
0.1
R470
3.32K
-1.795
R472
2K
0.1%
D470
NC
LM385M3-2.5
+0.663
R471
1K
Q470
MMBTN3904-7
+12V_Int2
C490 0.1
U490
TC7662BCOA
C491
10.0
R480
10
-9.68
C492
10.0
C480
10.0
U480
LM79L05ACM
IN OUT
IN
IN
IN GND
-5V_Det2
-4.96
C481
10.0
Fast Detector 2


Det1 SDO to (RD11) connected to R192
RD11
RD1 LTC SCK
RD0
RD2, also RF Data
9-pin Connector between VNA and Display
pin1 - DDS Update, RA1
pin2 - LO Data, out, RA7
pin3 - DDS Reset, RA0
pin4 - LTC SDO, RD11
pin5 - +5V
pin6 - out, DDS WClock RD3
pin7 - LTC CS, RD0
pin8 - LTC SCK, RD1
pin9 - LTC SDI, RF Data RD2
Fast Detector 1
Ivan Makarov


Det1 SDO, RD11
DDS W_CLK, RD3
Det SDI, RD2
RF Data, input
DDS Update
RA1
RA7, LO Data, out
U110 AD9851BRS
RF
U120 AD9851BRS
LO
U701 CY7C68013A-PV
U702 MCP1700T-3302E/TT
U703 24LC64
U130A 74AC74SC
U130B 74AC74SC
U140 VFAC570
U141 CWX823
U142 LTC1761
T110
Turns ratio 1:2, impedance ratio 1:4
RF DDS Out Front panel (1V pp into 50 Ohm)
Filt. LO DDS Out To detector 2
Filt. LO DDS Out To detector 1
Citizen CS10 6x3.5mm Digikey 300-8103-1-ND
Only one Master Oscillator is to be used.
If U140 is used, remove U141, U142, C141, C142, C143, C144, R151, R153.
If U141 is used, remove U140.
DDS Sources
v5.0
Ivan Makarov