YU5R Beverage Box

by Goran Stankovic dipl.ing.el. – YT2FSG – Date: 12.03.2014.

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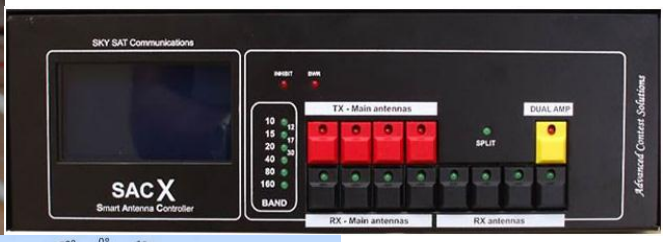
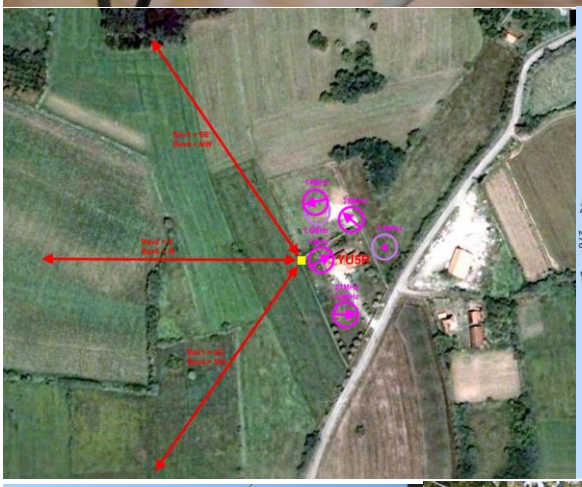
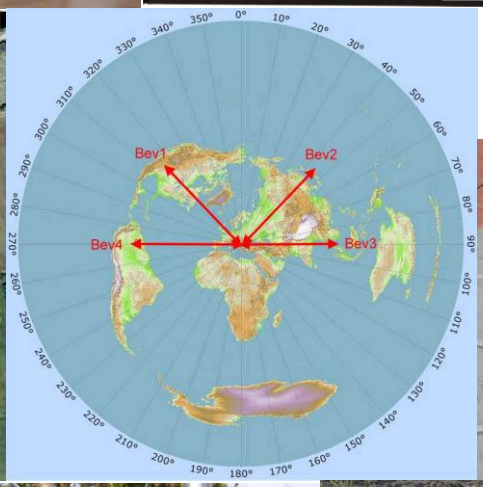
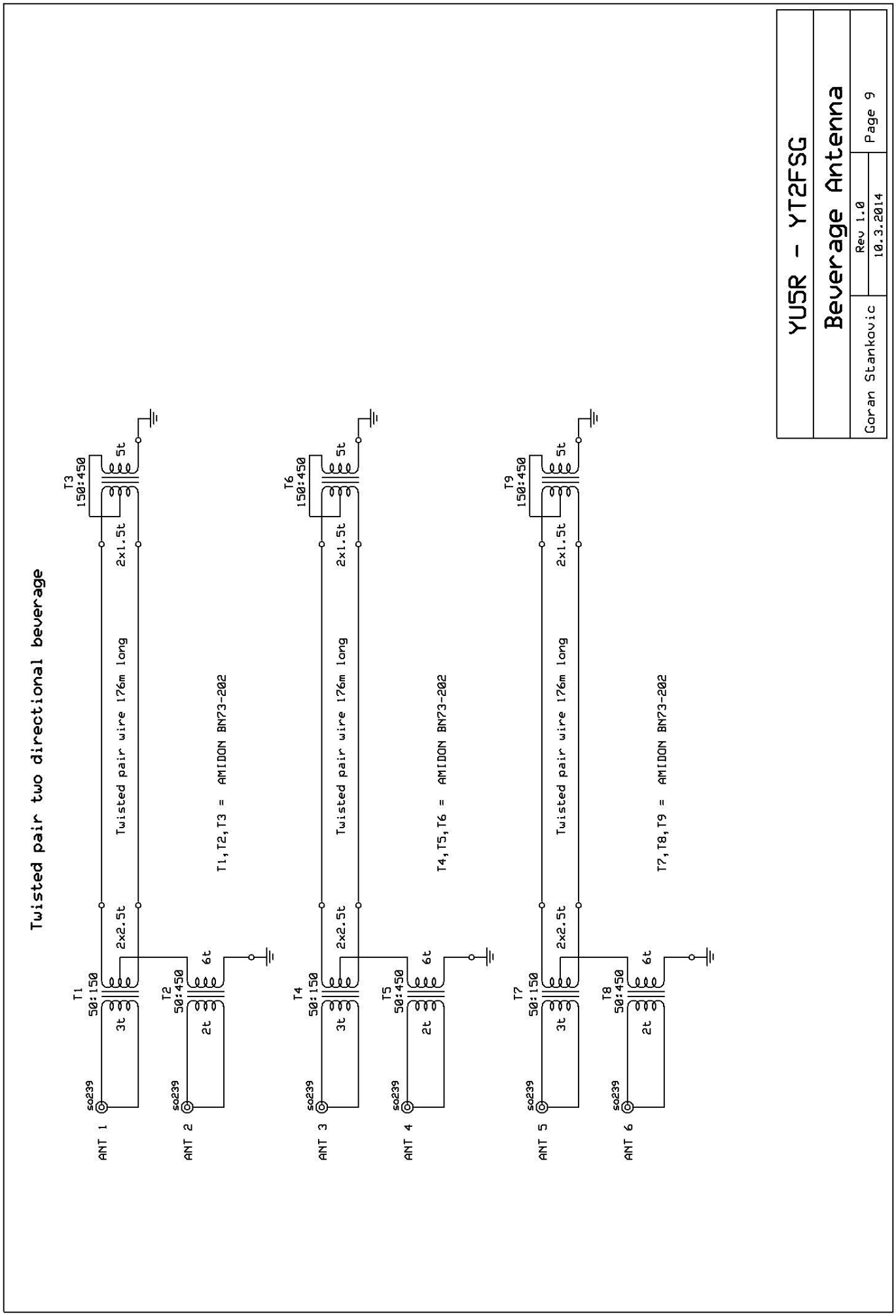
In Resava Valley Contest Club YU5R in Multi-two contest we used two SACX, six-pack and High Power Band Pass Filters products from 4O3A http://www.4o3a.com/. For the 1.8MHz High Power Band Pass Filter we used the product from http://www.dual.rs/.







For Rx antenna we made 3 two-directional beverage antennas from a pair of twisted wires from a military telephone cable (176m long and 2m high) and a Beverage Box.
Beverage Box includes relay swich for 6 Rx antennas and 3 radios, output for each radio have Low Band Pass Filters 1.8MHz, 3.5MHz, 7MHz and a preamplifier. For rig as Yaesu FT857 and FT950 we made an additional relay for switching the antenna.
The transmission line impedance of the twisted wires should be about 150 ohms and the Beverage antenna impedance should be about 450 ohms. We used the transformers of binoculars ferite Amidon BN73-202 and a galvanized water pipe as a ground connection at each termination. We used 4 of the 6 directions, two directions closed with 50 ohm terminator. Terminator is made of the connector PL239 and two parallel resistors of 100 ohm.


Twisted pair two directional beverage
T1
50:150
3t
2x2.5t
T2
50:450
2t
6t
T3
150:450
2x1.5t
5t
Twisted pair wire 176m long
T1,T2,T3 = AMIDON BN73-202
T4
50:150
3t
2x2.5t
T5
50:450
2t
6t
T6
150:450
2x1.5t
5t
Twisted pair wire 176m long
T4,T5,T6 = AMIDON BN73-202
T7
50:150
3t
2x2.5t
T8
50:450
2t
6t
T9
150:450
2x1.5t
5t
Twisted pair wire 176m long
T7,T8,T9 = AMIDON BN73-202
so239
ANT 1
ANT 2
ANT 3
ANT 4
ANT 5
ANT 6
YU5R - YT2FSG
Beverage Antenna
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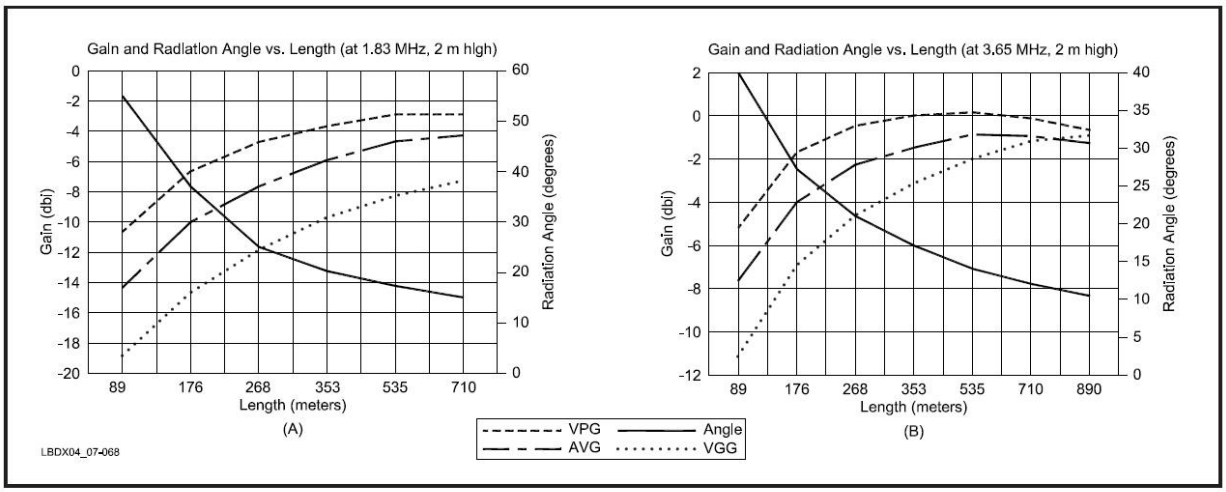
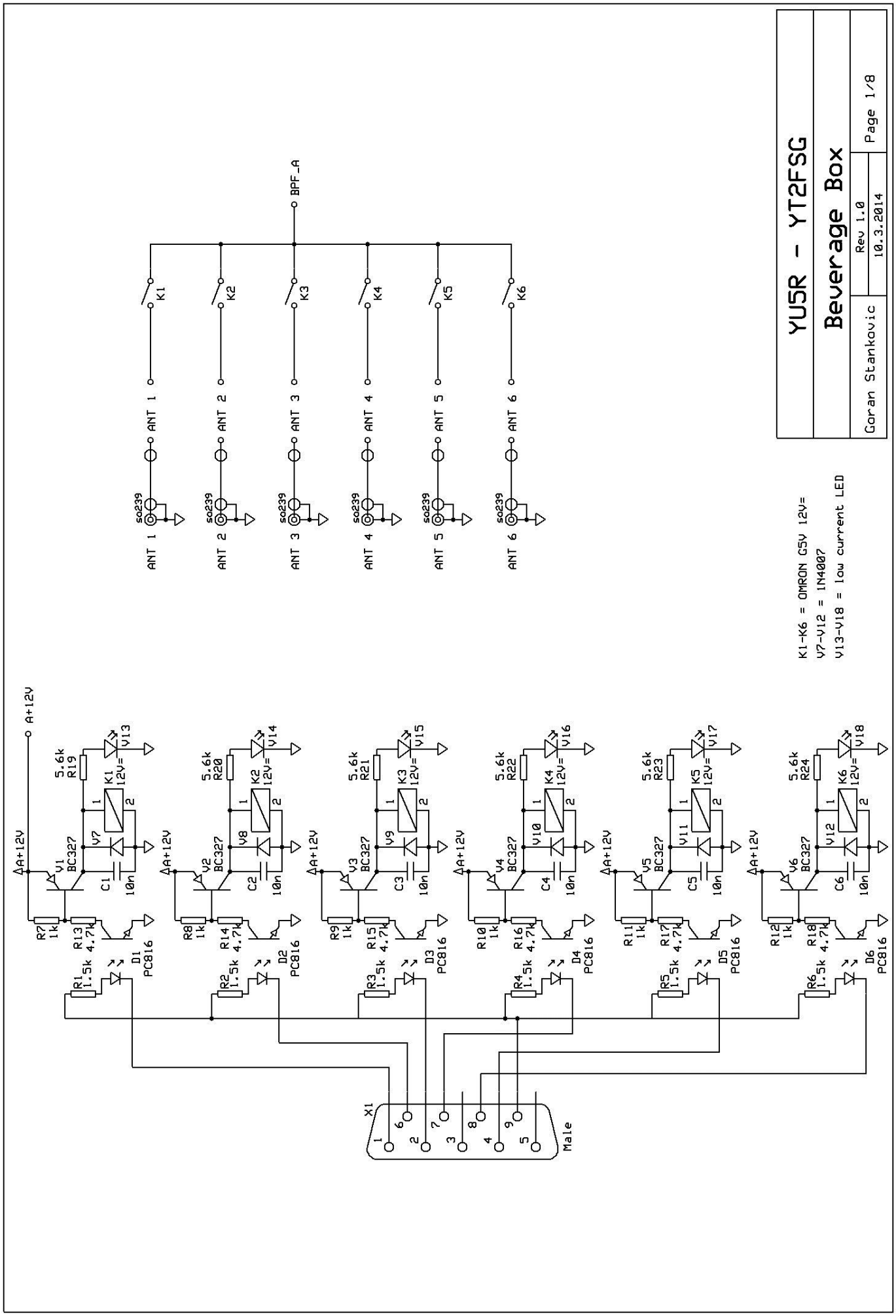


Fig 7-68—Gain and elevation angle for a 2-meter high Beverage antenna for 160 and 80 meters, as a function of the antenna length. Three curves are shows: over Very Poor Ground (VPG), over Average Ground (AVG), and over Very Good Ground (VGG). The radiation angle is computed for Average Ground. This angle only changes marginally between Very Poor and Very Good ground.

REFERENCE:

Book: Low-Band DXing - ON4UN
http://www.w0btu.com/Beverage_antennas.html
http://www.iv3prk.it/user/image/site2-rxant.prk_two-wire-beverage.pdf
http://www.g3xrj.com/RxArray_files/2wire_bev/2wire_bev.htm
http://www.bavarian-contest-club.de/projects/BCC-Projekte;art31,1082


YU5R - YT2FSG
Beverage Box
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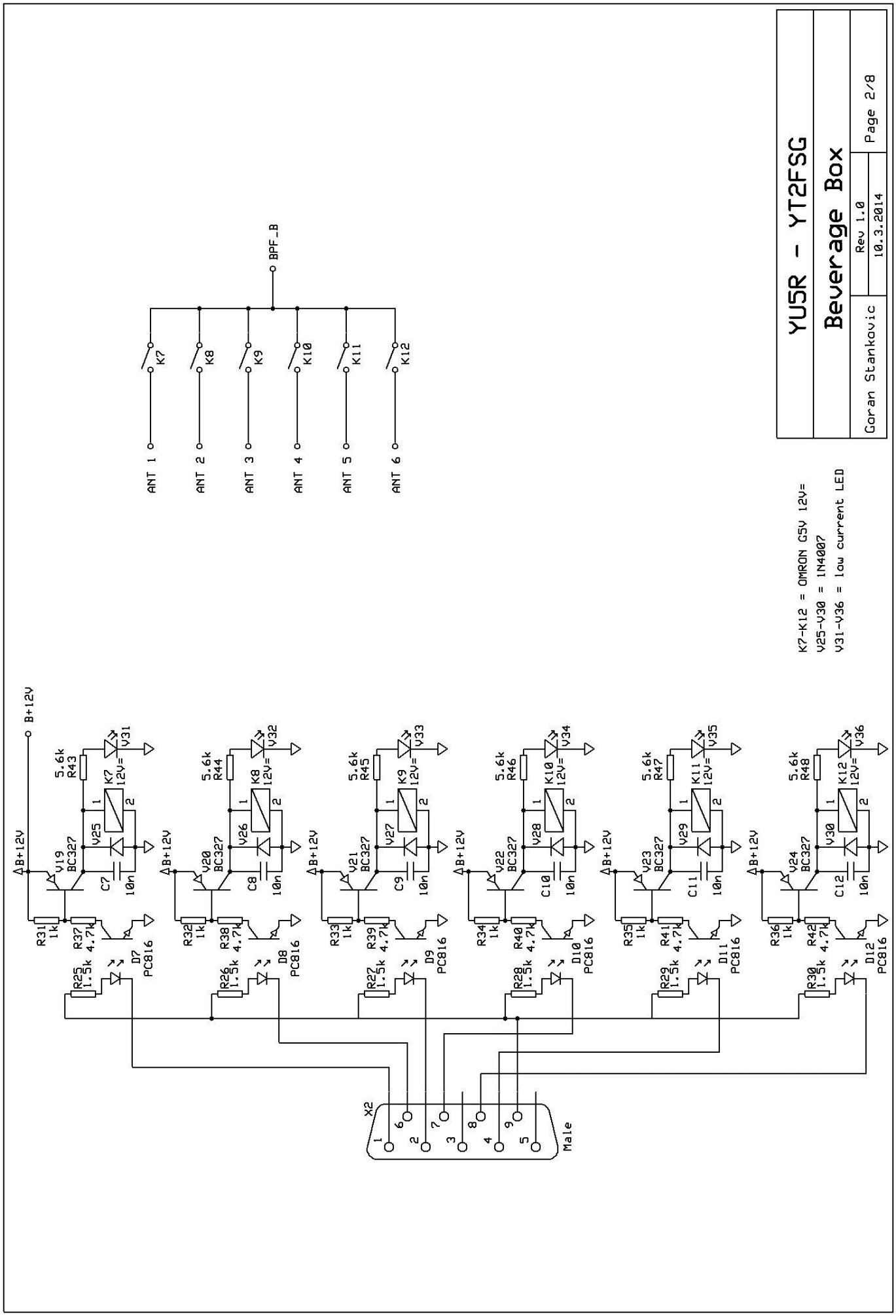
BPF_A
K1
K2
K3
K4
K5
K6
ANT 1
ANT 2
ANT 3
ANT 4
ANT 5
ANT 6
SO239
K1-K6 = OMRON G5V 12V=
V7-V12 = 1N4007
V13-V18 = low current LED
A+12V
BC327
PC816
5.6k
1k
1.5k
4.7k
10n
X1
Male


YU5R - YT2FSG
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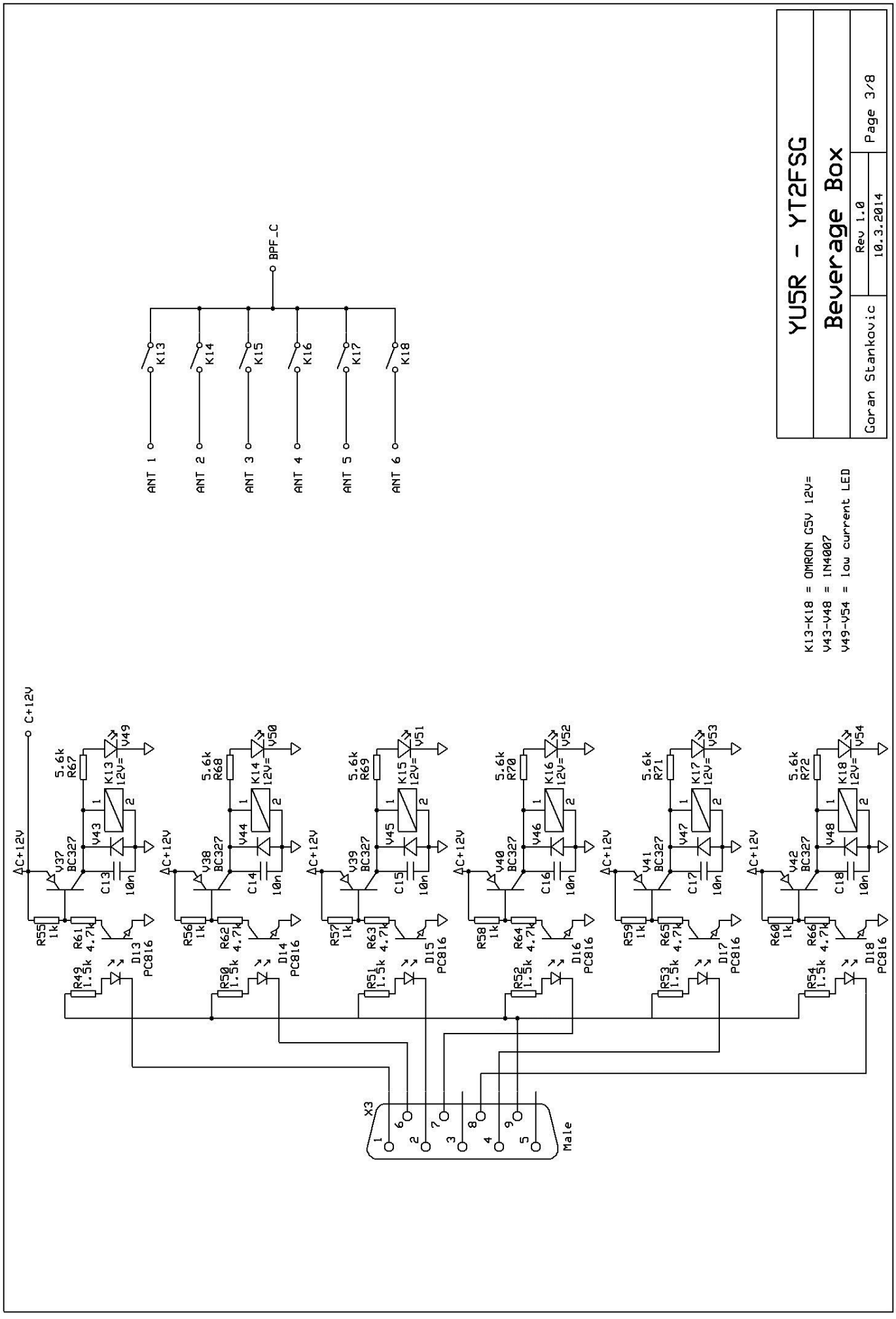
BPF_B
K7
K8
K9
K10
K11
K12
ANT 1
ANT 2
ANT 3
ANT 4
ANT 5
ANT 6
K7-K12 = OMRON G5V 12V=
V25-V30 = 1N4007
V31-V36 = low current LED
B+12V
X2
Male


YU5R - YT2FSG
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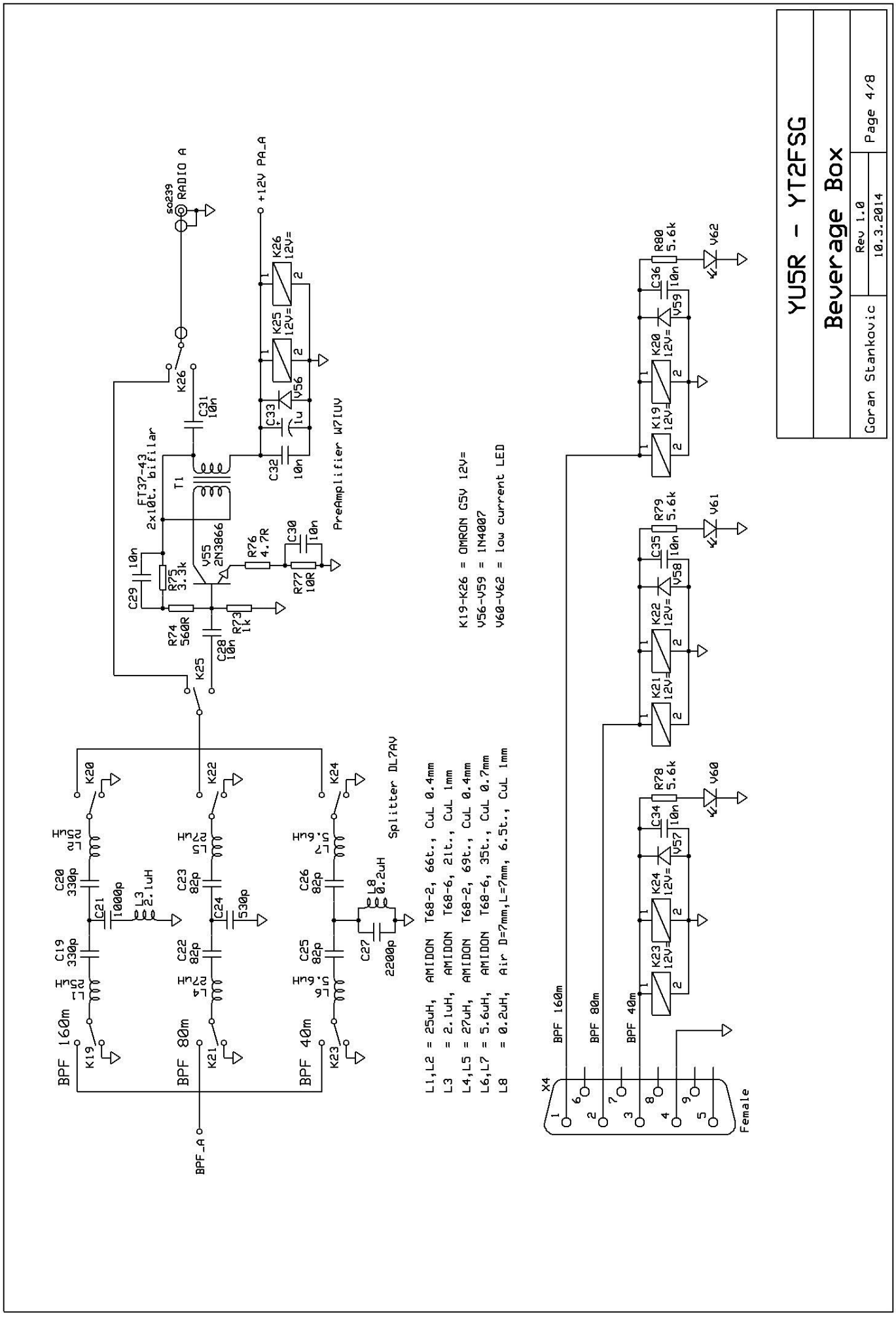
BPF_C
K13
K14
K15
K16
K17
K18
ANT 1
ANT 2
ANT 3
ANT 4
ANT 5
ANT 6
K13-K18 = OMRON G5V 12V=
V43-V48 = 1N4007
V49-V54 = low current LED
C+12V
DC+12V
5.6k
1k
4.7k
1.5k
10n
BC327
PC816
X3
Male


YU5R - YT2FSG
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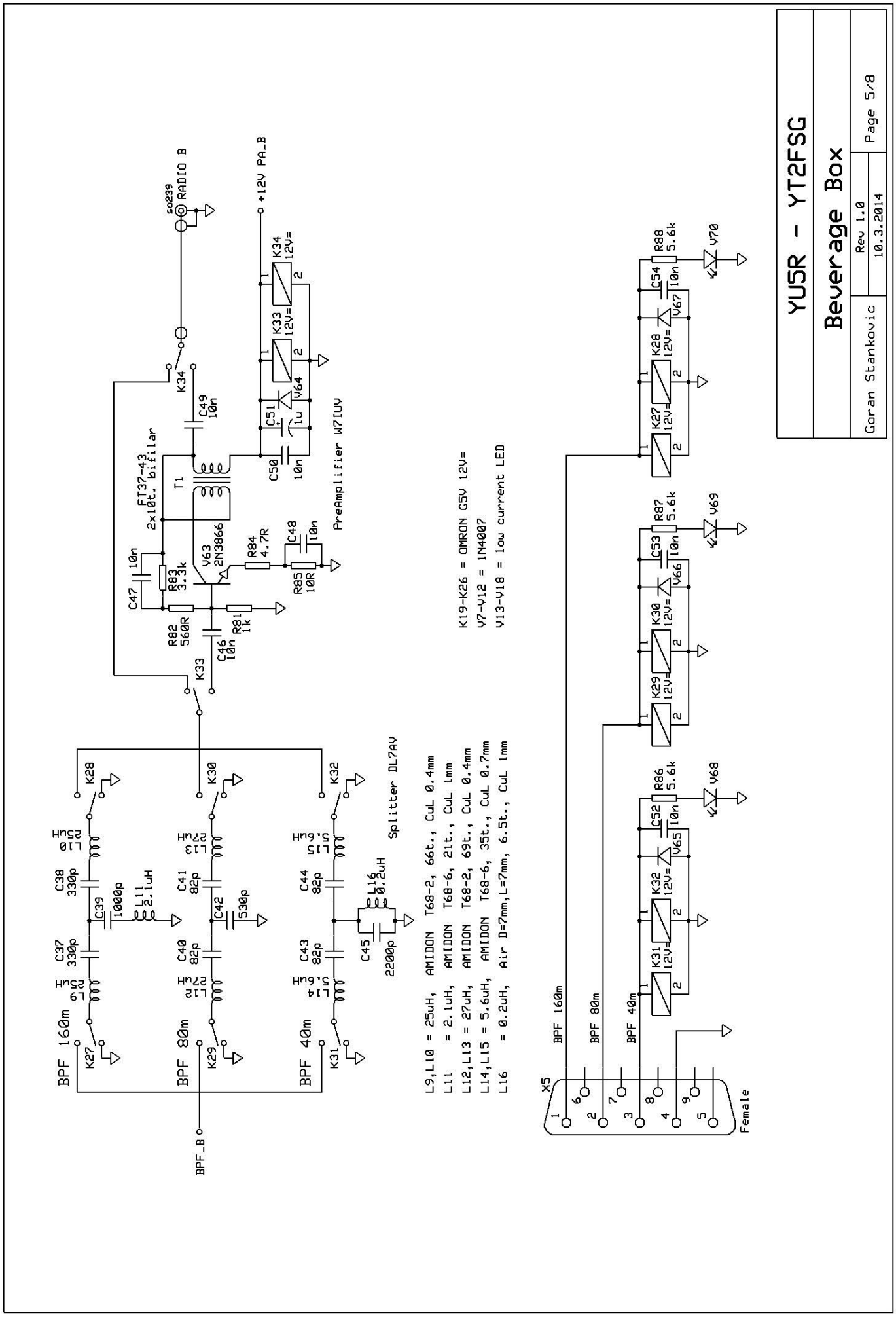
so239
RADIO A
+12V PA_A
K26
K25
K20
K22
K24
K19
K21
K23
BPF 160m
BPF 80m
BPF 40m
BPF_A
C19 330p
C20 330p
C21 1000p
L3 2.1uH
C22 82p
C23 82p
C24 530p
C25 82p
C26 82p
C27 2200p
L8 0.2uH
Splitter DL7AV
T1 FT37-43 2x10t. bifilar
C29 10n
R75 3.3k
V55 2N3866
R74 560R
C28 10n
R73 1k
R76 4.7R
C30 10n
R77 10R
PreAmplifier W7IUV
C31 10n
C32 10n
C33 1u
V56
K25 12V=
K26 12V=
K19-K26 = OMRON G5V 12V=
V56-V59 = 1N4007
V60-V62 = low current LED
L1,L2 = 25uH, AMIDON T68-2, 66t., CuL 0.4mm
L3 = 2.1uH, AMIDON T68-6, 21t., CuL 1mm
L4,L5 = 27uH, AMIDON T68-2, 69t., CuL 0.4mm
L6,L7 = 5.6uH, AMIDON T68-6, 35t., CuL 0.7mm
L8 = 0.2uH, Air D=7mm,L=7mm, 6.5t., CuL 1mm
X4
Female
K19 12V=
K20 12V=
K21 12V=
K22 12V=
K23 12V=
K24 12V=
R78 5.6k
R79 5.6k
R80 5.6k
C34 10n
C35 10n
C36 10n
V57
V58
V59
V60
V61
V62


YU5R - YT2FSG
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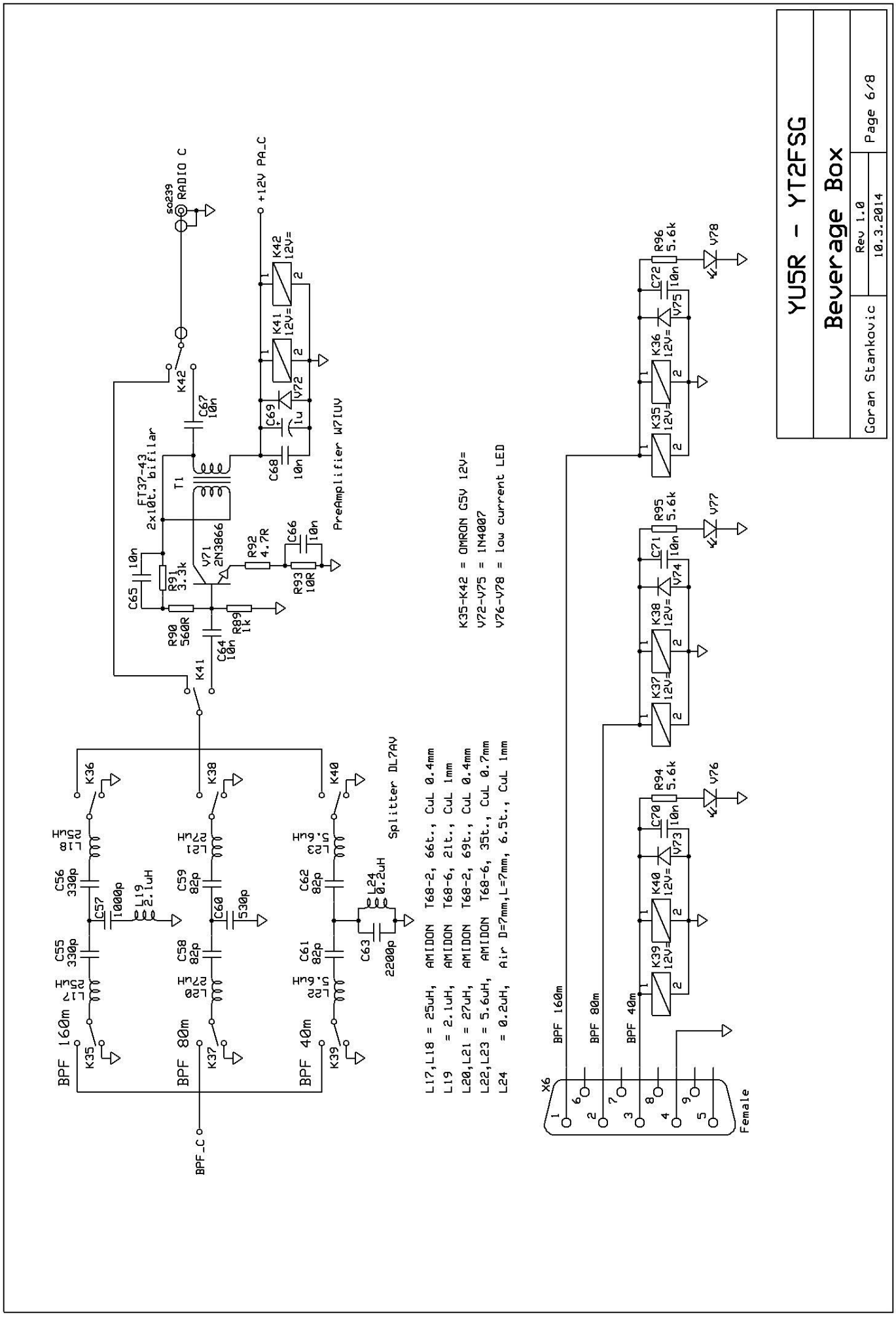
so239 RADIO B
+12V PA_B
K34
K33 12V=
K34 12V=
C49 10n
C51 1u
V64
C50 10n
T1
FT37-43
2x10t. bifilar
C47 10n
R83 3.3k
V63 2N3866
R84 4.7R
C48 10n
R85 10R
PreAmplifier W7IUV
R82 560R
R81 1k
C46 10n
K33
K28
K30
K32
BPF 160m
BPF 80m
BPF 40m
K27
K29
K31
C38 330p
C39 1000p
L11 2.1uH
C37 330p
C40 82p
C42 530p
C41 82p
C43 82p
C44 82p
C45 2200p
L16 0.2uH
Splitter DL7AV
BPF_B
L9,L10 = 25uH, AMIDON T68-2, 66t., CuL 0.4mm
L11 = 2.1uH, AMIDON T68-6, 21t., CuL 1mm
L12,L13 = 27uH, AMIDON T68-2, 69t., CuL 0.4mm
L14,L15 = 5.6uH, AMIDON T68-6, 35t., CuL 0.7mm
L16 = 0.2uH, Air D=7mm,L=7mm, 6.5t., CuL 1mm
K19-K26 = OMRON G5V 12V=
V7-V12 = 1N4007
V13-V18 = low current LED
X5
Female
K27 12V=
K28 12V=
K29 12V=
K30 12V=
K31 12V=
K32 12V=
R86 5.6k
R87 5.6k
R88 5.6k
C52 10n
C53 10n
C54 10n
V65
V66
V67
V68
V69
V70


YU5R - YT2FSG
Beverage Box
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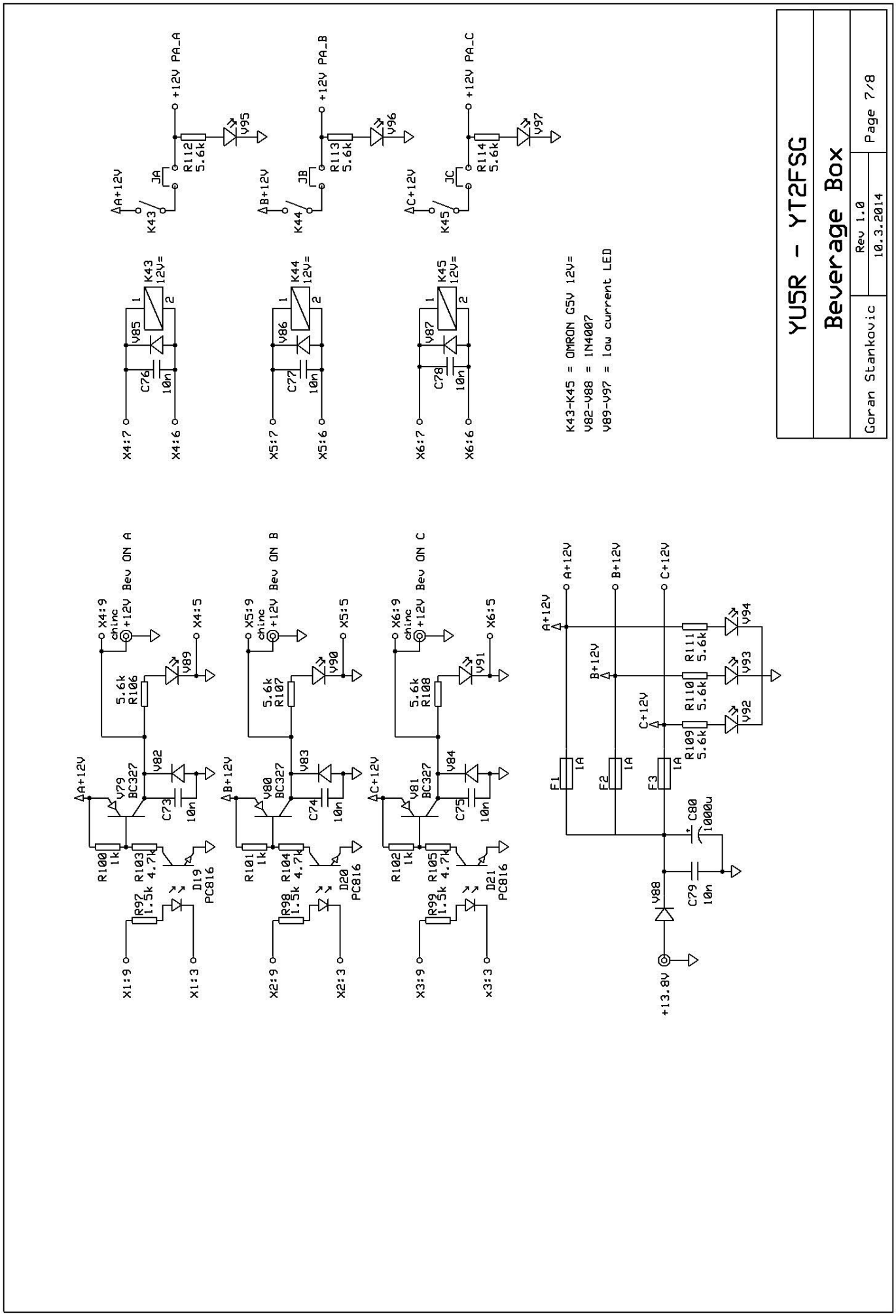
so239 RADIO C
+12V PA_C
K42 12V=
K41 12V=
K36 12V=
K35 12V=
K38 12V=
K37 12V=
K40 12V=
K39 12V=
C67 10n
C69 1u
C68 10n
V72
T1 FT37-43 2x10t. bifilar
C65 10n
R91 3.3k
V71 2N3866
R92 4.7R
C66 10n
R93 10R
PreAmplifier W7IUV
R90 560R
R89 1k
C64 10n
K41
K36
K38
K40
BPF 160m
BPF 80m
BPF 40m
L18 25uH
L21 27uH
L23 5.6uH
C56 330p
C57 1000p
L19 2.1uH
C55 330p
C59 82p
C60 530p
C58 82p
C62 82p
C61 82p
L24 0.2uH
C63 2200p
Splitter DL7AV
BPF_C
L17,L18 = 25uH, AMIDON T68-2, 66t., CuL 0.4mm
L19 = 2.1uH, AMIDON T68-6, 21t., CuL 1mm
L20,L21 = 27uH, AMIDON T68-2, 69t., CuL 0.4mm
L22,L23 = 5.6uH, AMIDON T68-6, 35t., CuL 0.7mm
L24 = 0.2uH, Air D=7mm,L=7mm, 6.5t., CuL 1mm
K35-K42 = OMRON G5V 12V=
V72-V75 = 1N4007
V76-V78 = low current LED
C72 10n
C71 10n
C70 10n
R96 5.6k
R95 5.6k
R94 5.6k
V75
V74
V73
V78
V77
V76
X6
Female


YU5R - YT2FSG
Beverage Box
Goran Stankovic
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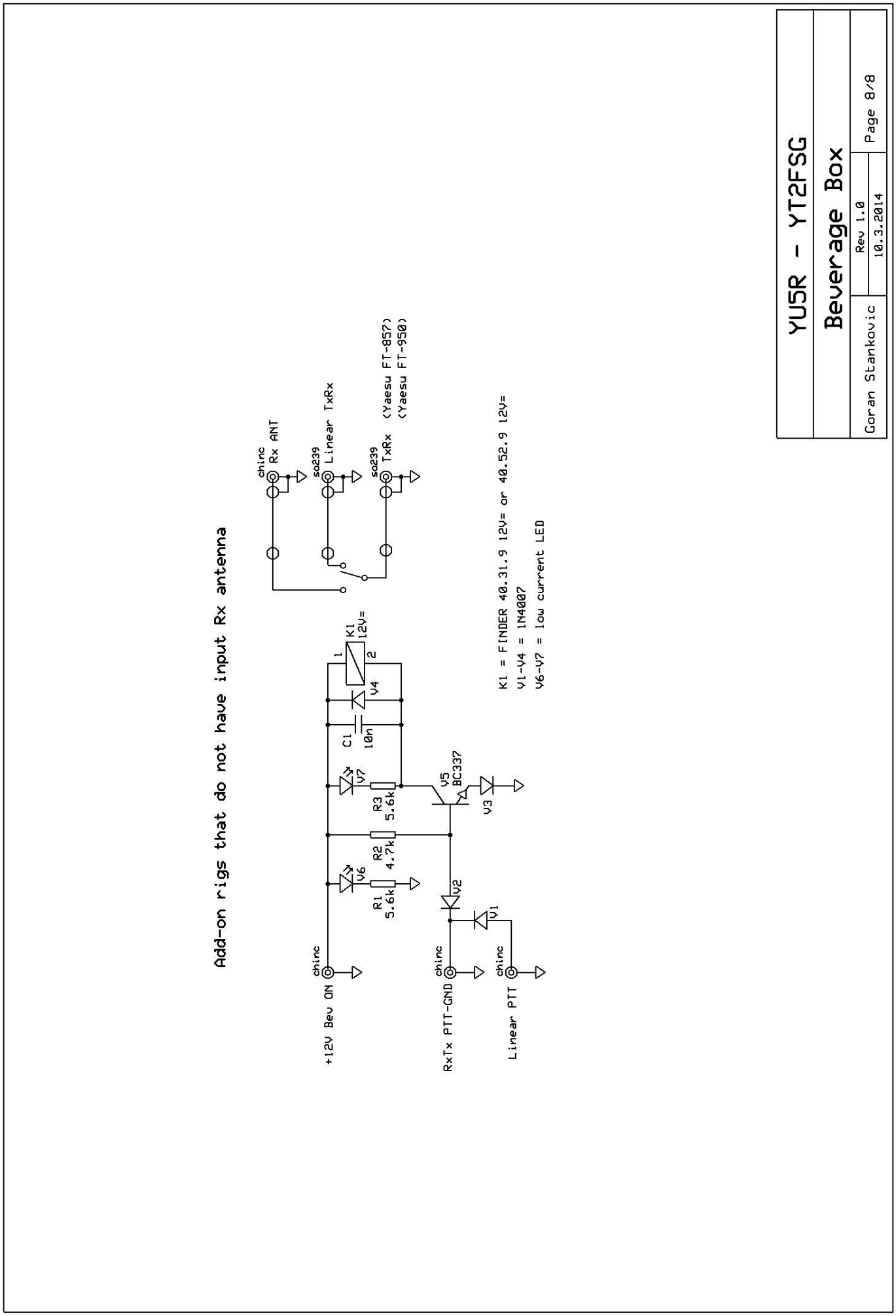
K43-K45 = OMRON G5V 12V=
V82-V88 = 1N4007
V89-V97 = low current LED
+12V PA_A
+12V PA_B
+12V PA_C
Bev ON A
Bev ON B
Bev ON C
+13.8V


Add-on rigs that do not have input Rx antenna
chinc
Rx ANT
so239
Linear TxRx
so239
TxRx
(Yaesu FT-857)
(Yaesu FT-950)
K1
12V=
1
2
V4
C1
10n
V7
R3
5.6k
V5
BC337
V3
R2
4.7k
V6
R1
5.6k
V2
V1
chinc
+12V Bev ON
chinc
RxTx PTT-GND
chinc
Linear PTT
K1 = FINDER 40.31.9 12V= or 40.52.9 12V=
V1-V4 = 1N4007
V6-V7 = low current LED
YU5R - YT2FSG
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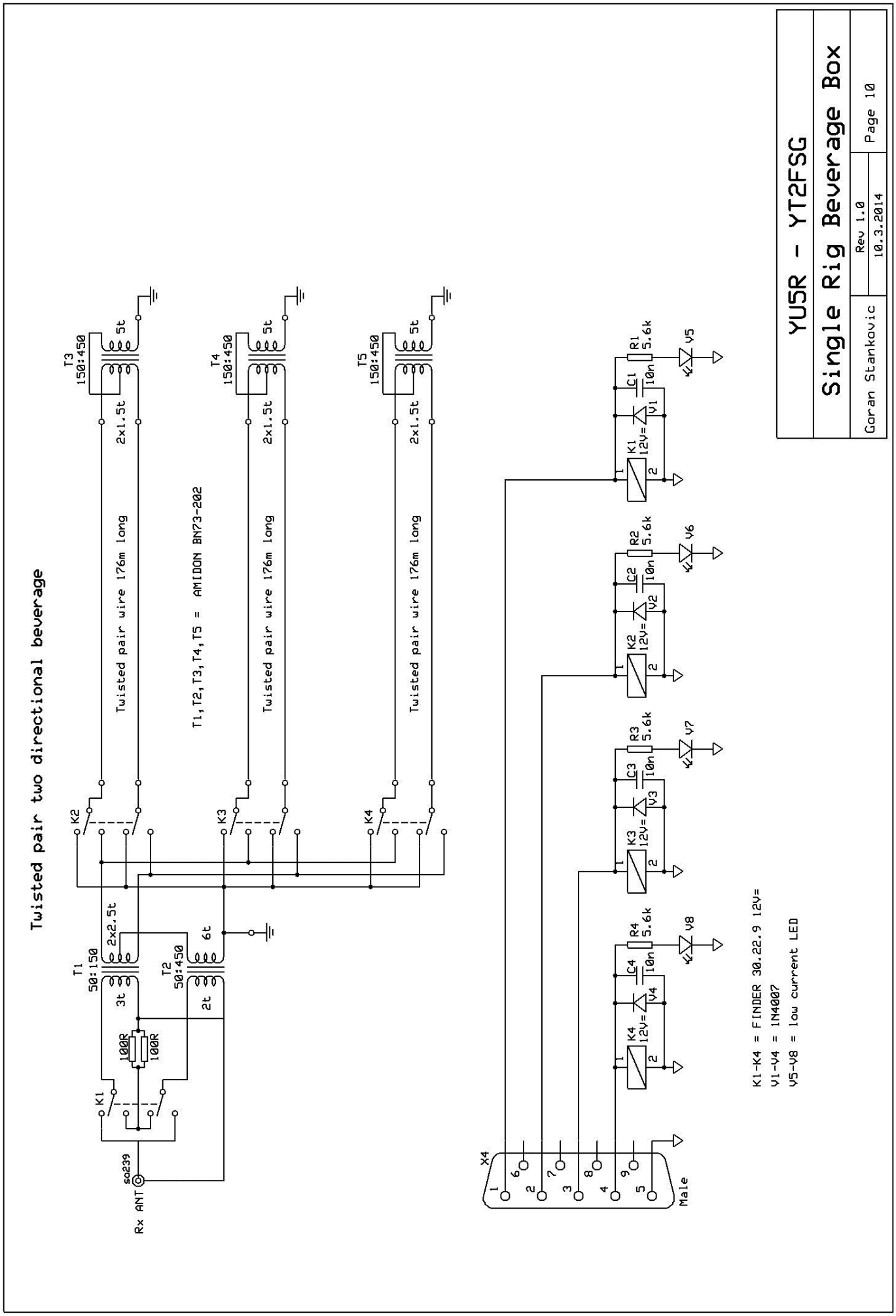
Twisted pair two directional beverage
T1 50:150
T2 50:450
T3 150:450
T4 150:450
T5 150:450
2x2.5t
3t
2t
6t
5t
2x1.5t
100R
100R
K1
K2
K3
K4
so239
Rx ANT
Twisted pair wire 176m long
Twisted pair wire 176m long
Twisted pair wire 176m long
T1,T2,T3,T4,T5 = AMIDON BN73-202
R1 5.6k
R2 5.6k
R3 5.6k
R4 5.6k
C1 10n
C2 10n
C3 10n
C4 10n
V1
V2
V3
V4
V5
V6
V7
V8
12V=
X4
Male
K1-K4 = FINDER 30.22.9 12V=
V1-V4 = 1N4007
V5-V8 = low current LED
YU5R - YT2FSG
Single Rig Beverage Box
Goran Stankovic
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