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**INFORMATION NOTE**

The EB9533A Reference Design includes electrical and printed circuit board (PCB) data for designing a 16x16 Serial Digital Router based on the new **GENLINX™II** Serial Digital ICs from Gennum Corporation. This Reference Design is provided to assist designers achieve optimal performance of Serial Digital Interface switching over a wide range of data rates.

**GENERAL INFORMATION**

Although the Reference Design PCB includes sufficient crosspoint switches for all the signal paths in a 16x16 configuration, only eight inputs and six outputs are configured on the printed circuit board. By extension and circuit duplication, a complete 16x16 system can be designed using the information provided. In addition, the PCB has space for two additional crosspoint switch ICs, allowing for expansion to a 16x24 matrix. These additional crosspoint ICs are not outfitted, but the layout is used to clearly show the simplicity of matrix expansion using the **BUS-THROUGH™** architecture of the **GENLINX™II** GX9533 8x9 Serial Digital Crosspoint.

**CIRCUIT DESCRIPTION**

The eight SDI input stages use the new **GENLINX™II** GS9024 Equalizer IC. Input Return Loss of the PCB is optimized by using R-L circuits at each input. Each GS9024 performs high quality signal equalization over a wide range of data rates from as low as 30 Mb/s to well over 540 Mb/s. They allow the use of very long cable lengths that not only meet but exceed industry SDI expectations. The Equalizers also boast such features as signal strength indication, output data muting and High Z output control that is useful for multiplexing applications. For clarity, only one of the eight schematic diagrams is shown.

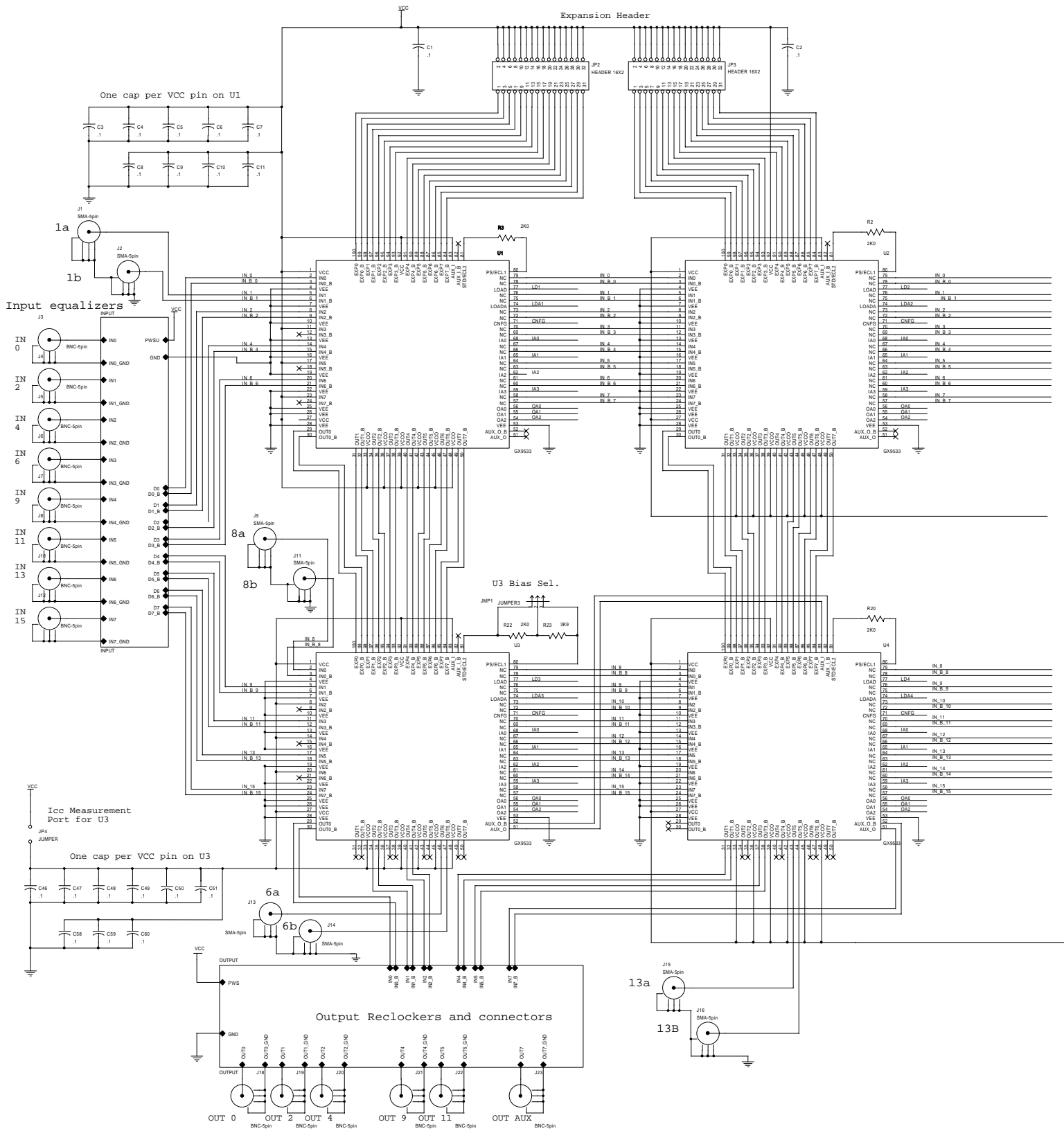
The equalized signals are passed, via controlled impedance strip lines, to the GX9533 8x9 Serial Digital Crosspoint Switch ICs. These ICs have eight standard inputs as well as eight expansion inputs and one auxiliary input. The auxiliary inputs can be daisy-chained with the auxiliary outputs of other crosspoint ICs in order to monitor any SDI input in the entire matrix. All SDI inputs and outputs of the crosspoints are differential resulting in optimal jitter and noise performance. When the outputs of one crosspoint IC are used to feed the expansion inputs of another, the amplitude of the inter-IC signals can be halved resulting in a significant power savings over other switching matrix solutions. These amplitudes are controlled by one resistor connected to control pins on the GX9533.

The switched, differential SDI output signals are then routed by strip lines to the **GENLINX™II** GS9035 Reclocker ICs. Again, the output signal amplitudes going to the reclockers have been set to half, resulting in not only a power savings, but less signal noise and crosstalk on the PCB. The GS9035 Reclockers boast many features that make them ideal for Serial Digital routing and distribution. They have a small footprint, lock automatically to the incoming data rate and require no tuning adjustments. The output of these six GS9035s feed the six **GENLINX™II** GS9028 Cable Drivers. These cable drivers have dual, current mode outputs that are optimized for driving 75ohm co-axial cables. The output amplitude itself is set using a single resistor. Networks on the PCB incorporating L-R circuits are designed to optimize the Output Return Loss in order to exceed existing standards.

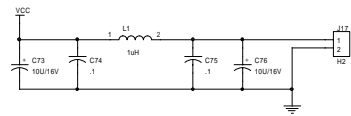
**DOCUMENTATION INCLUDED**

The Reference Design documentation includes an overall schematic diagram with sub blocks for the input equalizer stages and the output reclocker and cable driver stages.

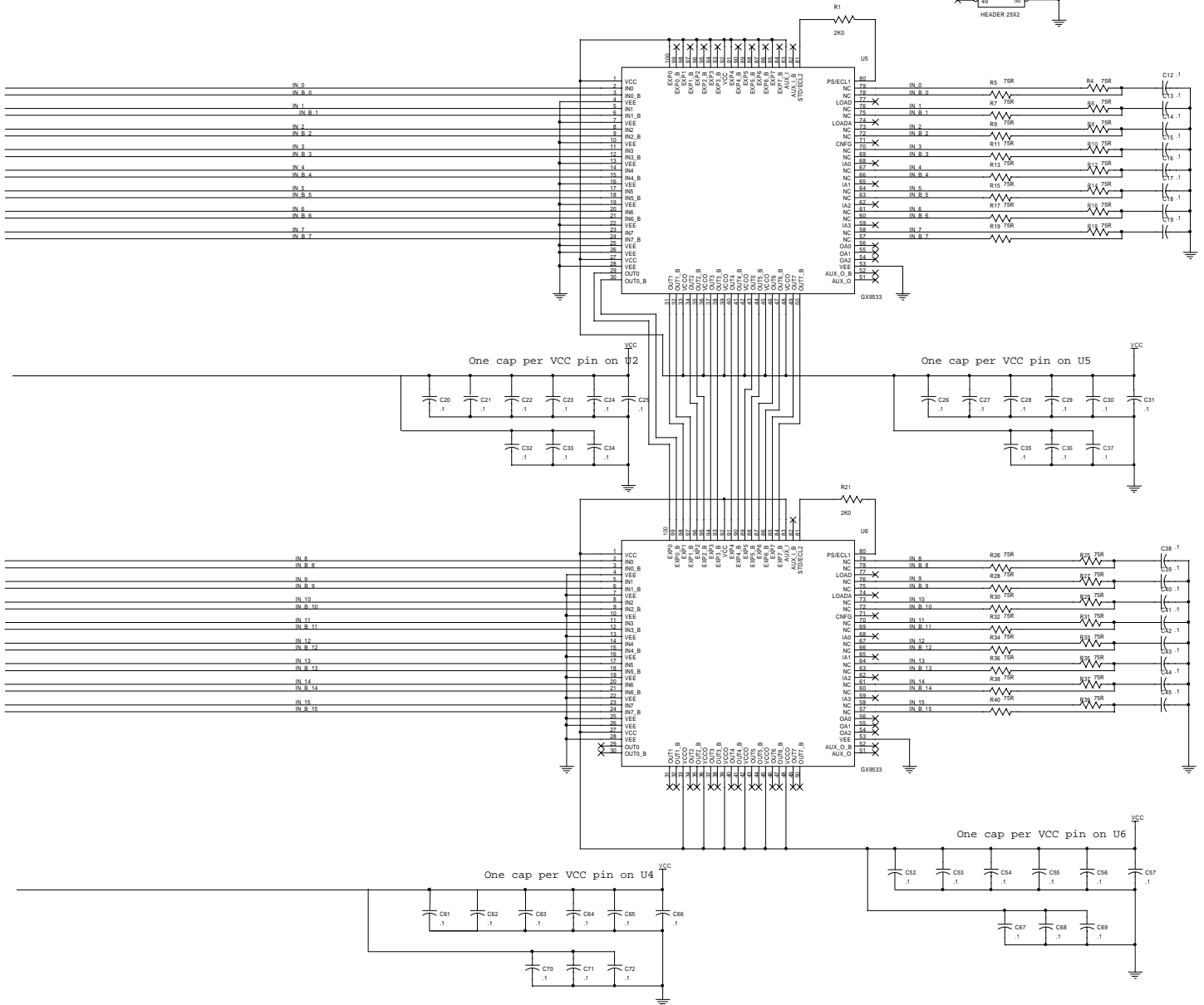
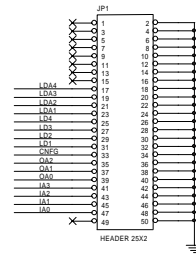
The PCB data includes the Top Layer Silkscreen showing the placement of the components, each of the four electrical layers and a simplified Bill of Material.



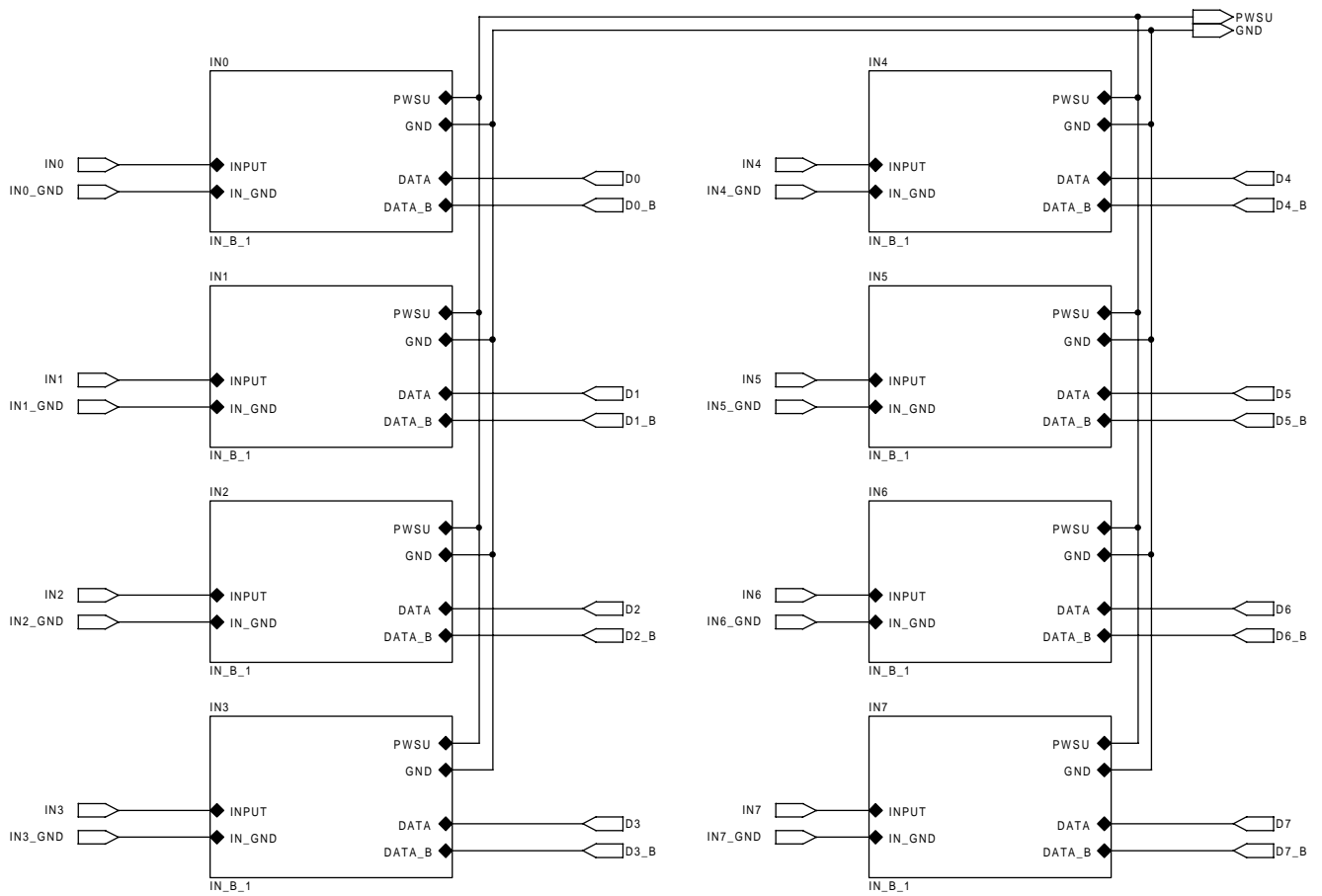
GX9533 Schematic Diagram



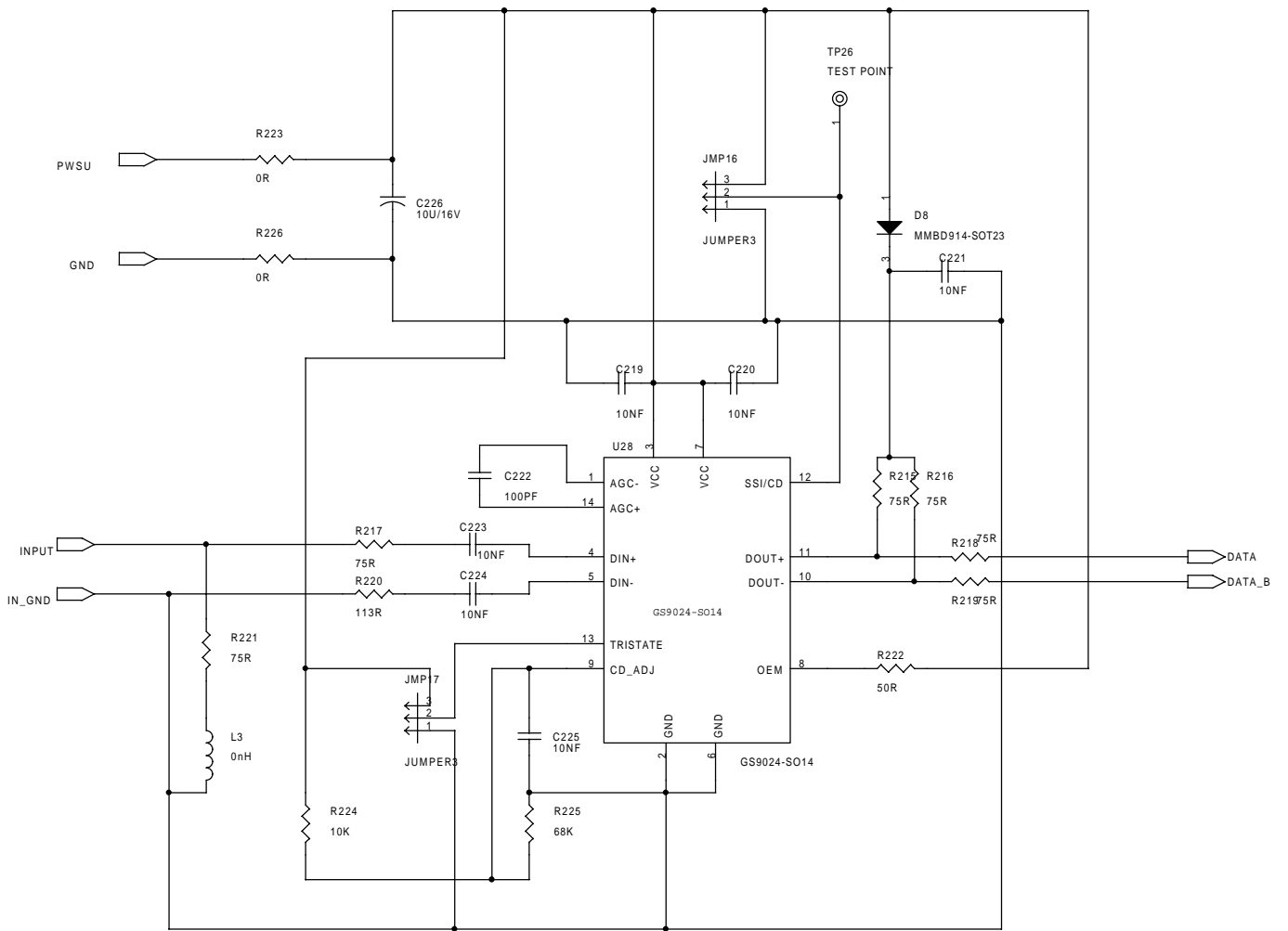
Control Header



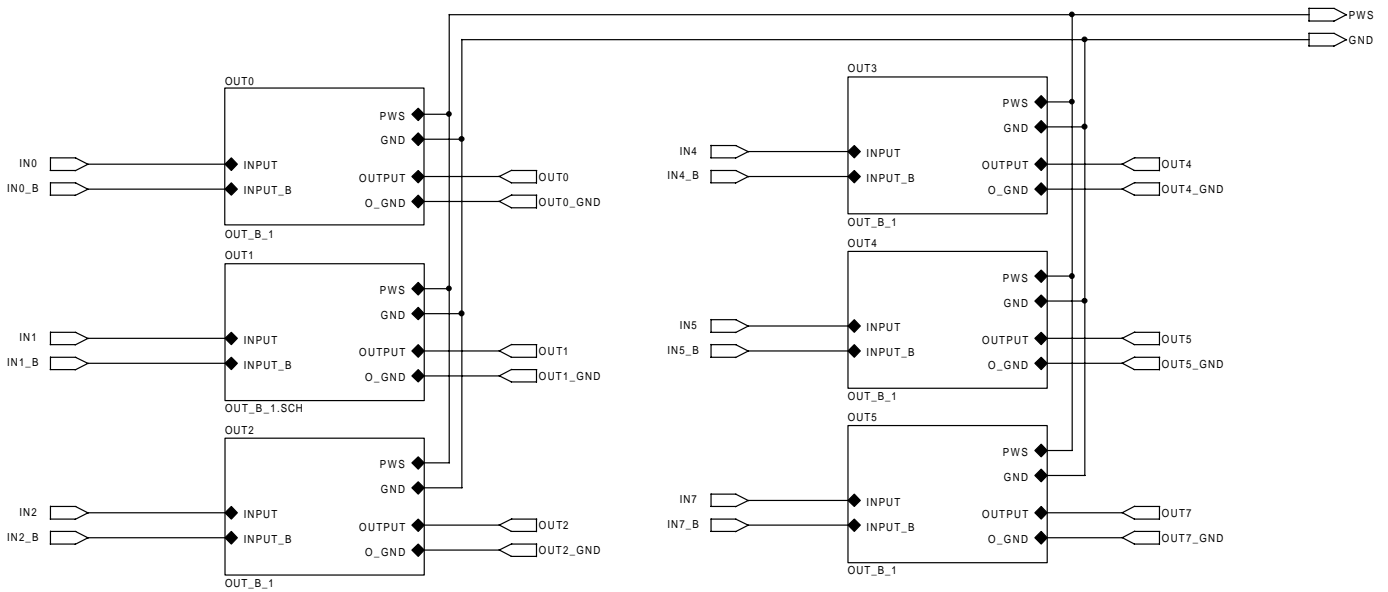
GX9533 Schematic Diagram



Input Equalizer Block Diagram

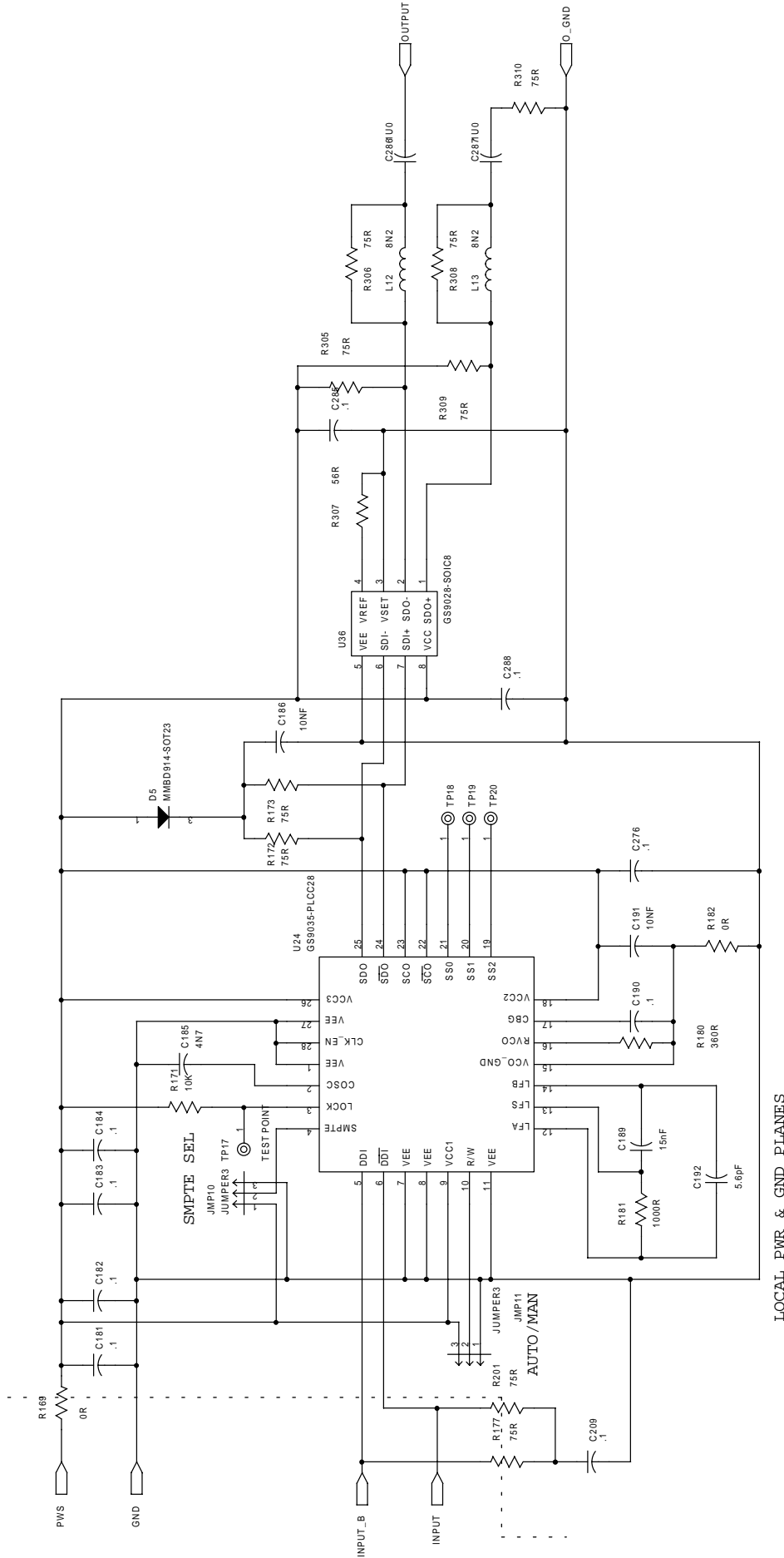


Equalizer Schematic (Typ 1 of 8)



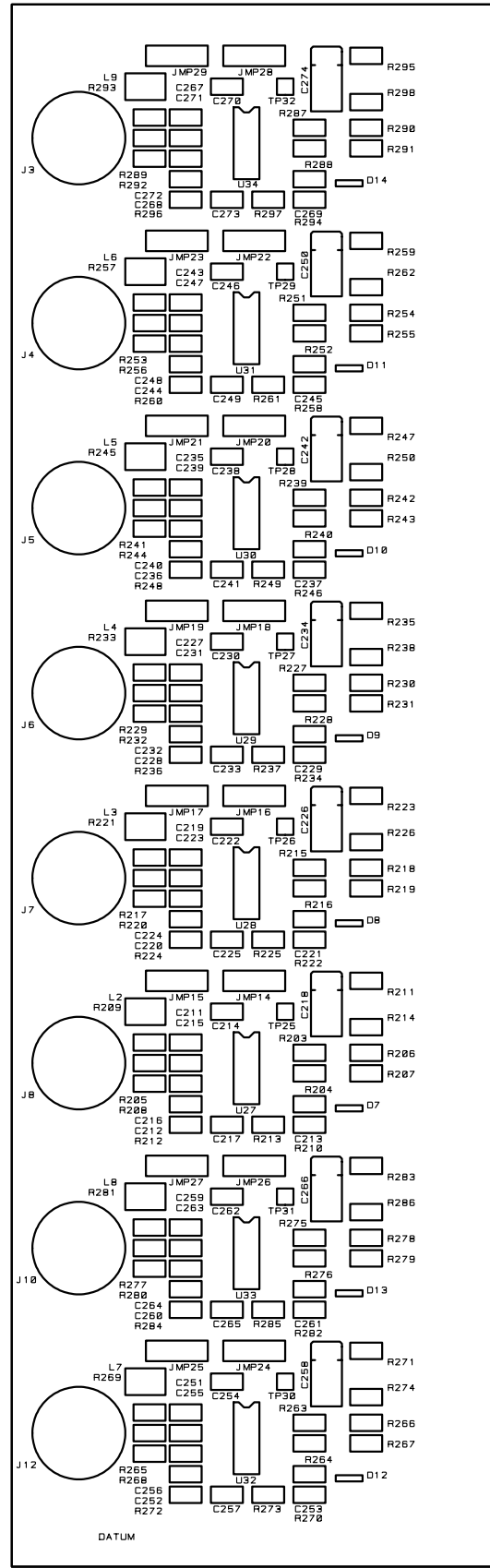
Output Reclockers and Cable Drivers

SYSTEM PWR  
& GND  
PLANES



LOCAL PWR & GND PLANES

Output Reclocker and Cable Driver Schematic (Typ 1 of 6)





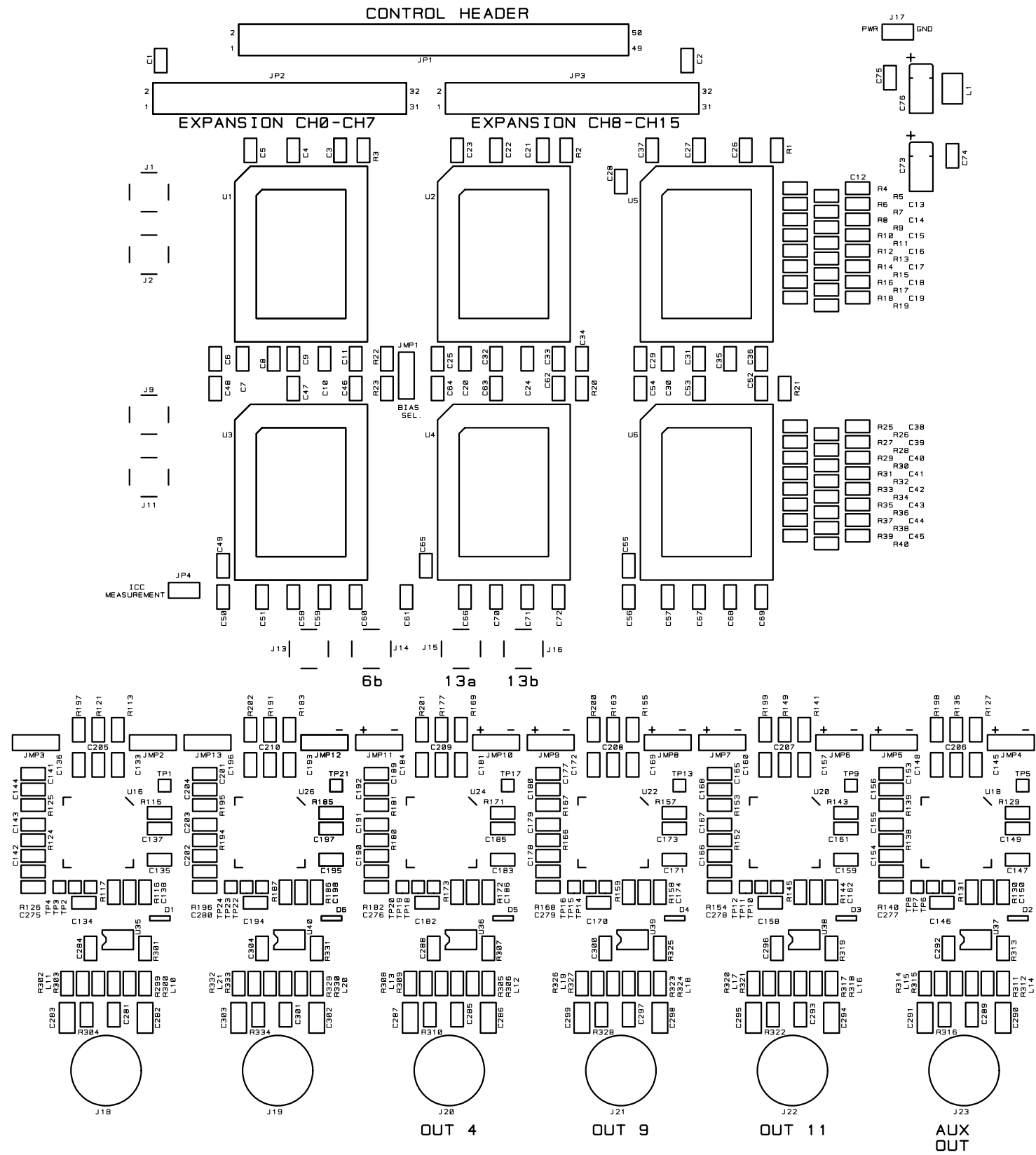
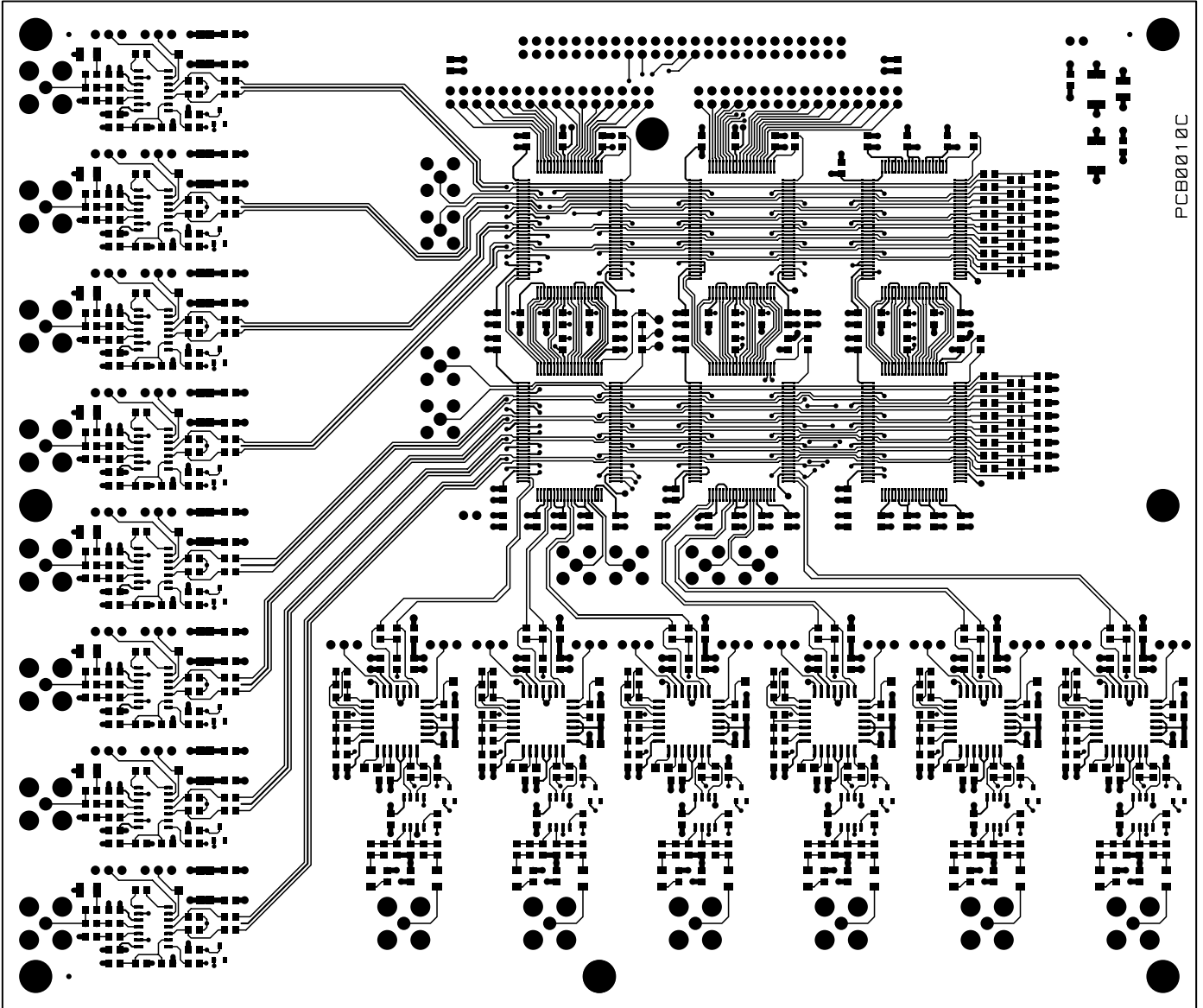
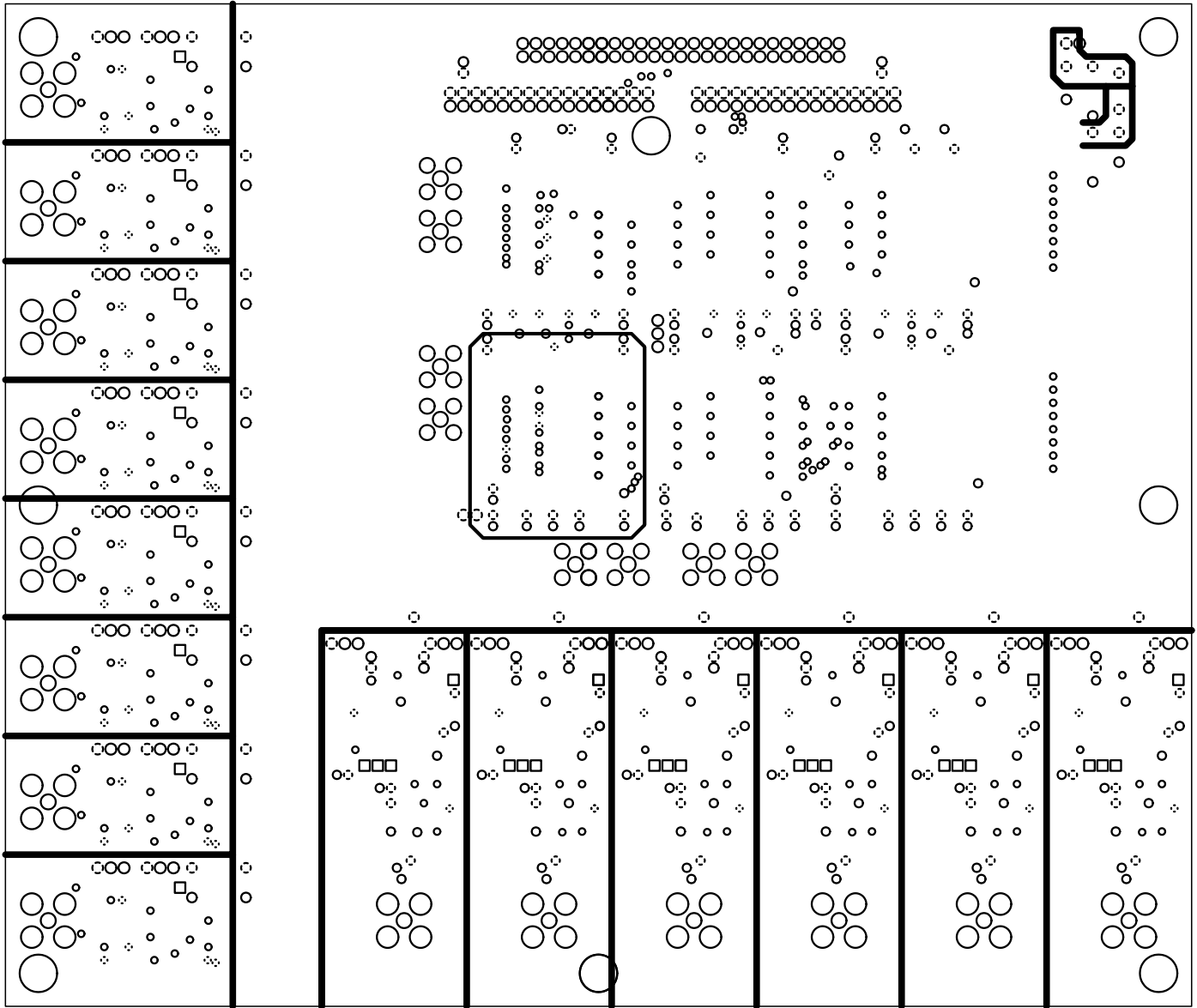


Fig. 5 EB9533A Silkscreen

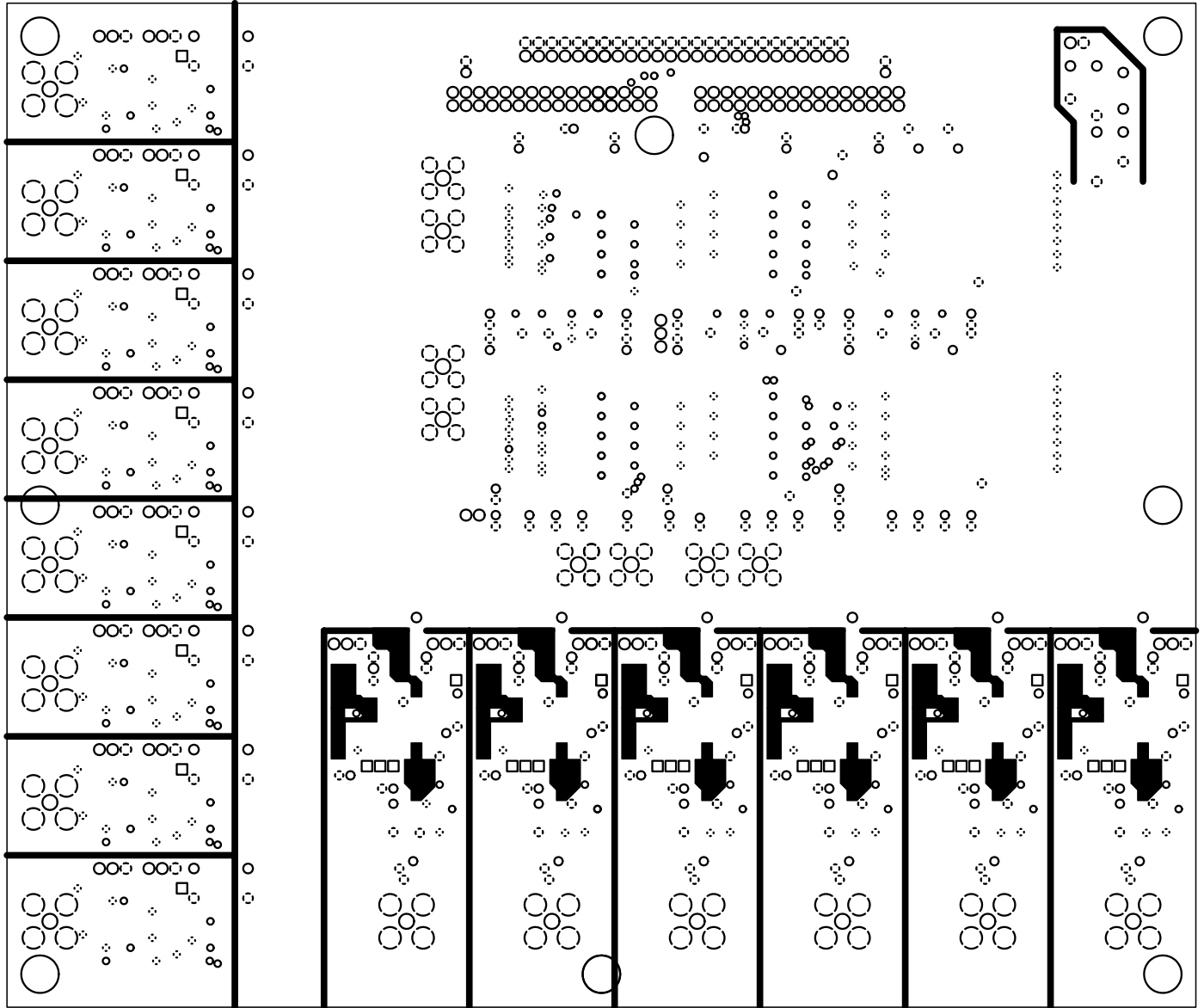


PCB0010C

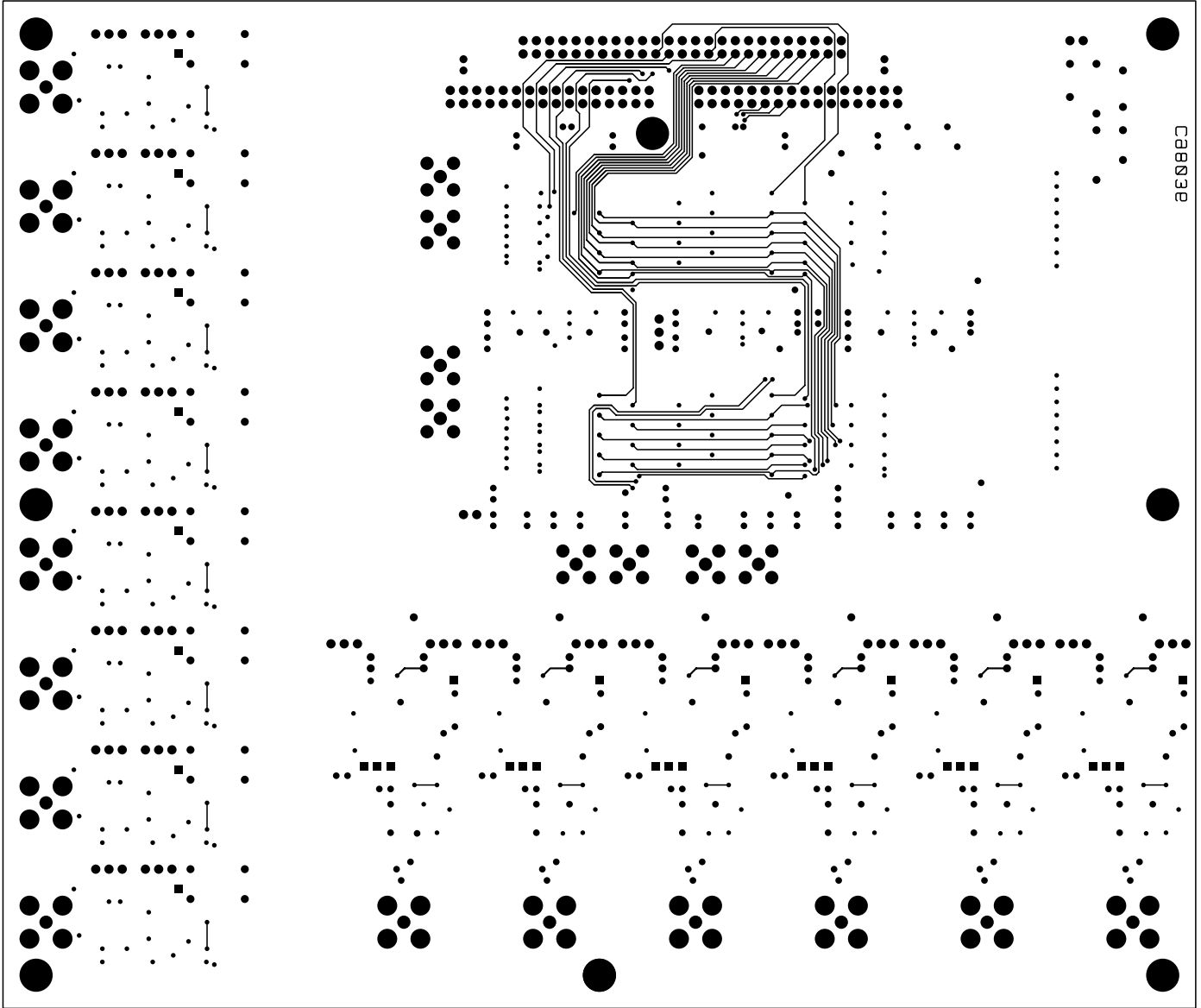
GX9533 DEMO Board, REV C  
COMPONENT SIDE MASK



GX9533 DEMO Board, REV C  
POWER PLANE



GX9533 DEMO Board, REV C  
GROUND PLANE



GX9533 DEMO Board, REV C  
SOLDER SIDE MASK

**Bill Of Materials**

Quantity	Reference	Part
128	C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C13,C14,C15,C16,C17,C18,C19,C20 C27,C28,C29,C30,C31,C32,C33,C34,C35,C36,C37,C38,C39,C40,C41,C42,C43 C44,C45,C46,C47,C48,C49,C50,C51,C52,C53,C54,C55,C56,C57,C58,C59,C60 C61,C62,C63,C64,C65,C66,C67,C68,C69,C70,C71,C72,C74,C75,C133,C134,C135 C136,C142,C145,C146,C147,C148,C154,C157,C158,C159,C160,C166,C169,C170 C171,C172,C178,C181,C182,C183,C184,C190,C193,C194,C195,C196,C202,C205 C206,C207,C208,C209,C210,C275,C276,C277,C278,C279,C280,C281,C284,C285 C288,C289,C292,C293,C296,C297,C300,C301,C304	100nF
6	C141,C153,C165,C177,C189,C201	15nF
10	C73,C76,C218,C226,C234,	10μ/16V
6	C137,C149,C161,C173,C185,	4n7
60	C138,C143,C150,C155,C162,C198,C203,C211,C212,C213,C215,C216,C223,C224 C231,C232,C239,C240,C247,C248,C255,C256,C263,C264,C271,C272	10nF
8	C214,C222,C230,C238,C246,C254,C262,C2701	100pF
6	C144,C156,C168,C180,C192,C204	5.6pF
12	C282,C283,C286,C287,C290,C291,C294,C295,C298,C299,C302,C303	1μ0
14	D1,D2,D3,D4,D5,D6,D7,D8,D9,D10,D11,D12,D13,D14	MMBD914-SOT23
29	JMP1,JMP2,JMP3,JMP4,JMP5,JMP6,JMP7,JMP8,JMP9,JMP10,JMP11,JMP12,JMP13, JMP14,JMP15,JMP16,JMP17,JMP18,JMP19,JMP20,JMP21,JMP22,JMP23,JMP24, JMP25,JMP26,JMP27,JMP28,JMP29	JUMPER3
1	JP1	HEADER 25X2
2	JP2,JP3	HEADER 16X2
1	JP4	JUMPER
8	J1,J2,J9,J11,J13,J14,J15,J16	SMA-5pin
14	J3,J4,J5,J6,J7,J8,J10,J12,J18,J19,J20,J21,J22,J23	BNC-5pin
1	J17	H2
1	L1	1μH
8	L2,L3,L4,L5,L6,L7,L8,L9	0nH
12	L10,L11,L12,L13,L14,L15,L16,L17,L18,L19,L20,L21	8n2
6	R1,R2,R3,R20,R21,R22	2k0
134	R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18,R19,R25,R26,R27, R28,R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R116,R117,R121,R130, R131,R135,R144,R145,R149,R158,R159,R163,R172,R173,R177,R186,R187,R191, R197,R198,R199,R200,R201,R202,R203,R204,R205,R206,R207,R209,R215,R216, R217,R218,R219,R221,R227,R228,R229,R230,R231,R233,R239,R240,R241,R242, R243,R245,R251,R252,R253,R254,R255,R257,R263,R264,R265,R266,R267,R269, R275,R276,R277,R278,R279,R281,R287,R288,R289,R290,R291,R293,R299,R300, R302,R303,R304,R305,R306,R308,R309,R310,R311,R312,R314,R315,R316,R317, R318,R320,R321,R322,R323,R324,R326,R327,R328,R329,R330,R332,R333,R334	75R
1	R23	3k9
28	R113,R126,R127,R140,R141,R154,R155,R168,R169,R182,R183,R196,R211,R214, R223,R226,R235,R238,R247,R250,R259,R262,R271,R274,R283,R286,R295,R298	0R
14	R115,R129,R143,R157,R171,R185,R212,R224,R236,R248,R260,R272,R284,R296	10k
6	R124,R138,R152,R166,R180,R194	360R
6	R125,R139,R153,R167,R181,R195	1k
8	R208,R220,R232,R244,R256,R268,R280,R292	113R
8	R210,R222,R234,R246,R258,R270,R282,R294	50R
8	R213,R225,R237,R249,R261,R273,R285,R297	68k
6	R301,R307,R313,R319,R325,R331	56R
32	TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,TP17 TP18,TP19,TP20,TP21,TP22,TP23,TP24,TP25,TP26,TP27,TP28,TP29,TP30,TP31,TP32	TEST POINT
6	U1,U2,U3,U4,U5,U6	GX9533
6	U16,U18,U20,U22,U24,U26GS9035-PLCC28	
8	U27,U28,U29,U30,U31,U32,U33,U34	GS9024-SO14
6	U35,U36,U37,U38,U39,U40	GS9028-SOIC8