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Retrofit Manual

For Reference Only

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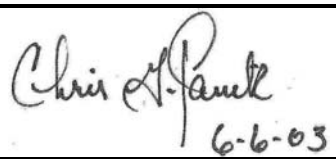
Manual No.S2100-AAA-00001

Document Approval

Rev	Date	Description	ECO #	Approved
0.0	10-21-02	Initial Release		
1.0	06-06-03	Changed name to Telvent, general update	11266	

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CHAPTER 1

CDC 44-500 RTUs

1.1 Status – Obsolete CDC Boards of Various Styles

Figure 1-1 CDC 8-Point Status Board – No Isolation

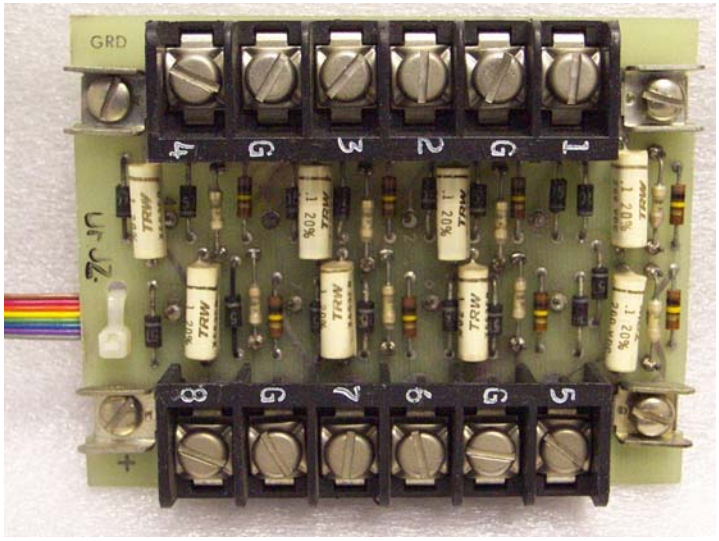


Figure 1-2 CDC 8-Point Status Board – With Opto-Coupler Isolation

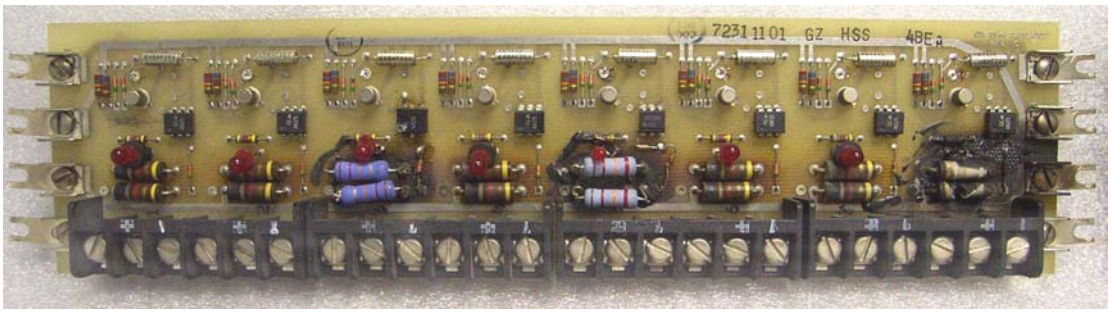
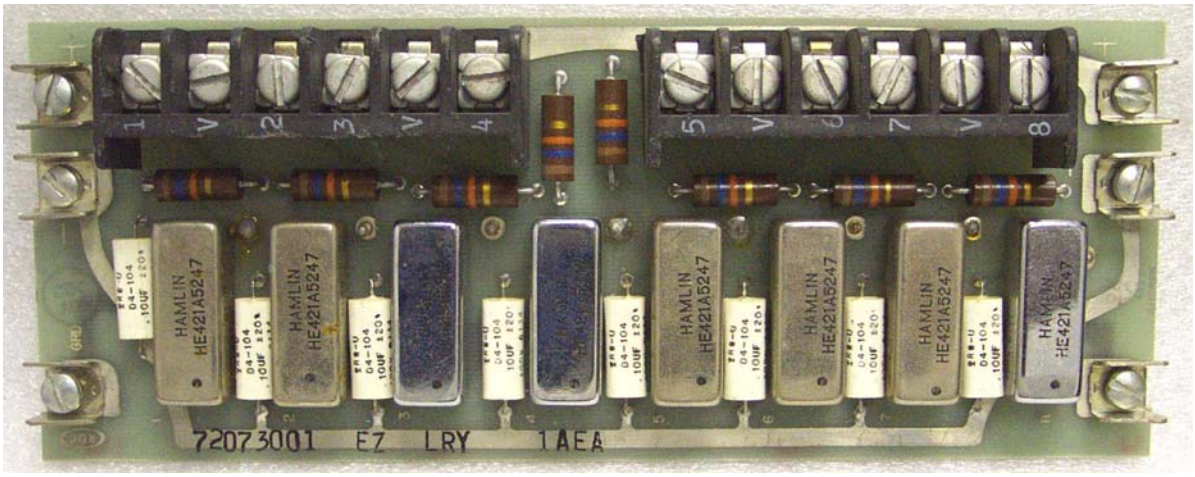


Figure 1-3 CDC 8-Point Status Board – With Reed Relay Isolation



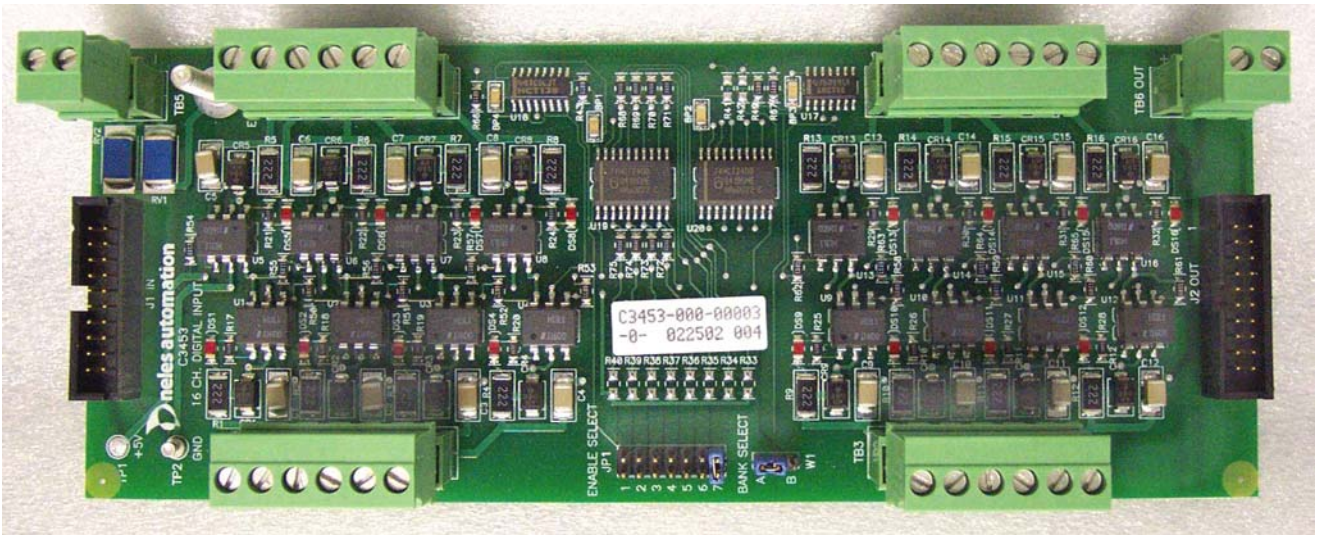
1.2 Status – Replacement Telvent Boards

Telvent offers several footprints of Status Input boards that replace legacy CDC 44-500 input cards for retrofit purposes. These cards have the same form factor and field wiring inputs as the legacy cards to minimize retrofit time. All Telvent Status input boards offer 1500V opto-coupler protection, dry contact operation, and isolated status loop voltage capabilities of 24V, 48V or 125VDC inputs. An earth-grounding stud is provided on each board to facilitate proper grounding and shield connection, if required. Connection to the SAGE 2000 baseboard, and subsequent Status Input boards are made using standard 20-pin ribbon cables. All boards utilize Surface Mount Technology (SMT) for space savings and ease of manufacturing. Circuit board theory and operation for each card is described in the next section.

C3453 16-Point Status Input Board

The Telvent C3453 (Figure 1-4) board replaces 2 of the 8-point boards illustrated in Figure 1-2. Due to space limitations, removable Phoenix terminations are used in place of the 8-32 terminal block. These terminations can accept up to and including 12 AWG wire.

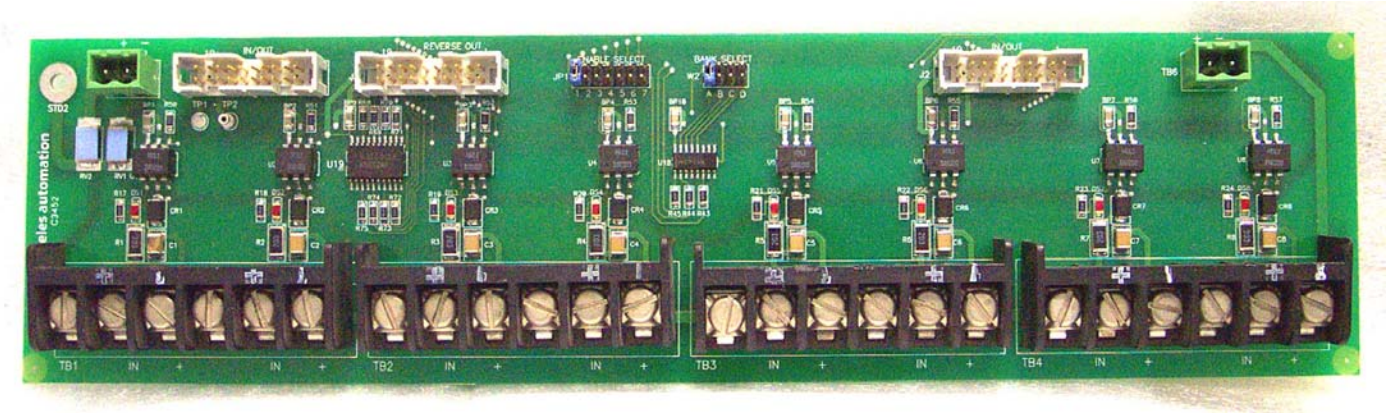
Figure 1-4 Telvent C3453 16-Point Status with Phoenix Connectors



C3452 8-Point Status Input Board

The Telvent C3452 (Figure 1-5) board replaces the 8-point boards illustrated in Figure 1-2. This board provides 8-32 type barrier terminations.

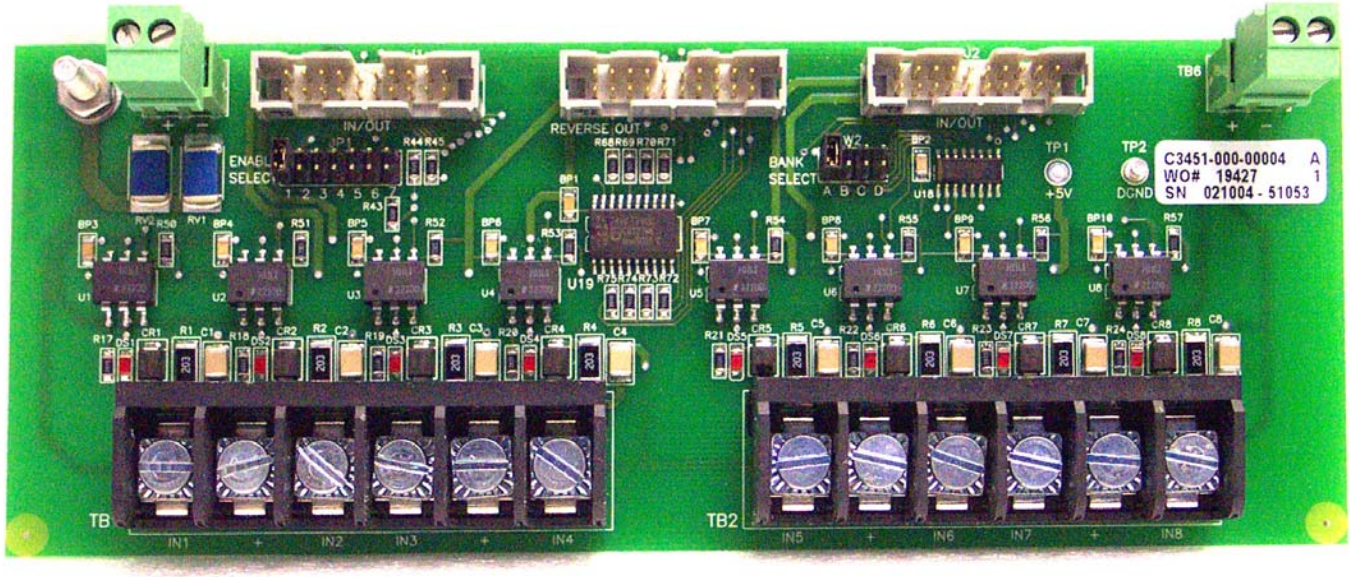
Figure 1-5 Telvent C3452 16-Point Status with Barrier Terminal Block



C3451 8-Point Status Input Board

The Telvent C3451 (Figure 1-6) board replaces the 8-point boards illustrated in Figure 1-3. This board provides 8-32 type barrier terminations.

Figure 1-6 Telvent C3451



1.2.1 Status Theory

C3451 & C3452

The C3451 and the C3452 are electrically identical. Each has two IN/OUT ribbon connectors that can be used for either IN or OUT. Also, these two boards have a Reverse Out ribbon connector to accommodate reverse-ordered ribbon connections. This aids in the installation of the boards as will be shown in the installation section.

Each of the boards has Enable Select and Bank Select jumpers to select the particular bank of I/O points needed for the board. Since each Board Enable can handle 32 status inputs,

jumpers must be set to accommodate which bank of 8 are present on that board. The jumpers follow the table below:

Table 1-1 C3451 and C3452 Jumper Table

XT-DI Points	Enable Select JP1	Bank Select W2
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D

Each DI input is optically isolated (1500V isolation) and provided with an input RC filter. Additional debounce filtering is done in firmware. The firmware waits 20 milliseconds after an initial change of state (COS) to see if the COS is still there. If it is, the input is considered valid and processed.

The variations for the C3451 and C3452 boards are loop resistors that determine the loop wetting voltage. The variations are as follows:

VARIANCE STRUCTURE :

-00003 = 2.2K RESISTORS, 24VDC.

-00004 = 20.0K RESISTORS, 129VDC.

-00005 = 6.2K RESISTORS, 48VDC.

C3453

The C3453 board has a fixed IN ribbon connector and a fixed OUT ribbon connector. This board also has an Enable Select and a Bank Select. Since each status board Enable can

handle 32 points, jumpers must be set to accommodate which bank of 16 points are present on the board. The Jumpers follow the table below:

Table 1-2 C3453 Jumper Table

I/O Points	Enable Select JP1	Bank Select W1
1 – 16	1	A
17 – 32	1	B
33 – 48	2	A
49 – 64	2	B
65 – 80	3	A
81 – 96	3	B
97 – 112	4	A
113 – 128	4	B
129 – 144	5	A
145 – 160	5	B
161 – 176	6	A
177 – 192	6	B
193 – 208	7	A
209 – 224	7	B

Optical isolation and debounce are identical to the C3452 and C3452 boards.

The variations for the C3453 board are loop resistors that determine the loop wetting voltage. The variations are as follows:

VARIANCE STRUCTURE :

-00003 = 2.2K RESISTORS, 24VDC.

-00004 = 20.0K RESISTORS, 129VDC.

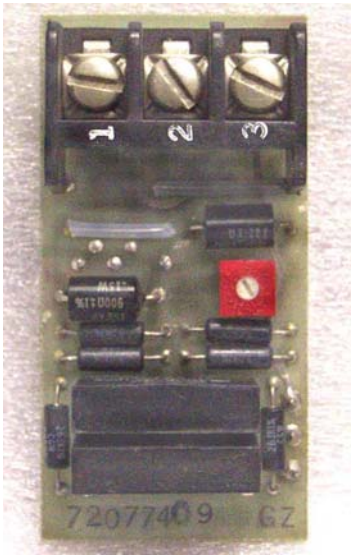
-00005 = 6.2K RESISTORS, 48VDC.

-00006 = 820ohm RESISTORS, 12VDC.

For complete theory details, please see the Status Input XT section in the Theory of Operation chapter of the SAGE 2100 Operation & Maintenance manual.

1.3 Analog – Legacy CDC 44-500 Analog Board

Figure 1-7 CDC 1-Point Analog Input Board



1.4 Analog – Replacement Telvent Board

The Telvent C3442 is a 4 point DC Analog Input board (Figure 1-8) that replaces four of the CDC 1-Point Analog boards illustrated in Figure 1-7. Two versions of terminations are available, Figure 1-8 shows the #8-32 barrier type termination, while Figure 1-9 shows the removable Phoenix termination.

The Telvent Analog Input board can be ordered to accept one of the following input types: +/-5V, +/-1Ma, 4-20Ma. All analog inputs utilize precision resistors for analog accuracy.

An earth-grounding stud is provided on each board to facilitate proper grounding and a shield connection is provided for each analog Point. Connection to the SAGE 2000 baseboard, and subsequent Analog input boards, are made using standard 20-pin ribbon cables. The Analog input board utilizes Surface Mount Technology (SMT) for space savings and ease of manufacturing. Circuit board theory and operation is described in the following section.

Figure 1-8 Telvent 4-Point Analog with Barrier Terminal Block

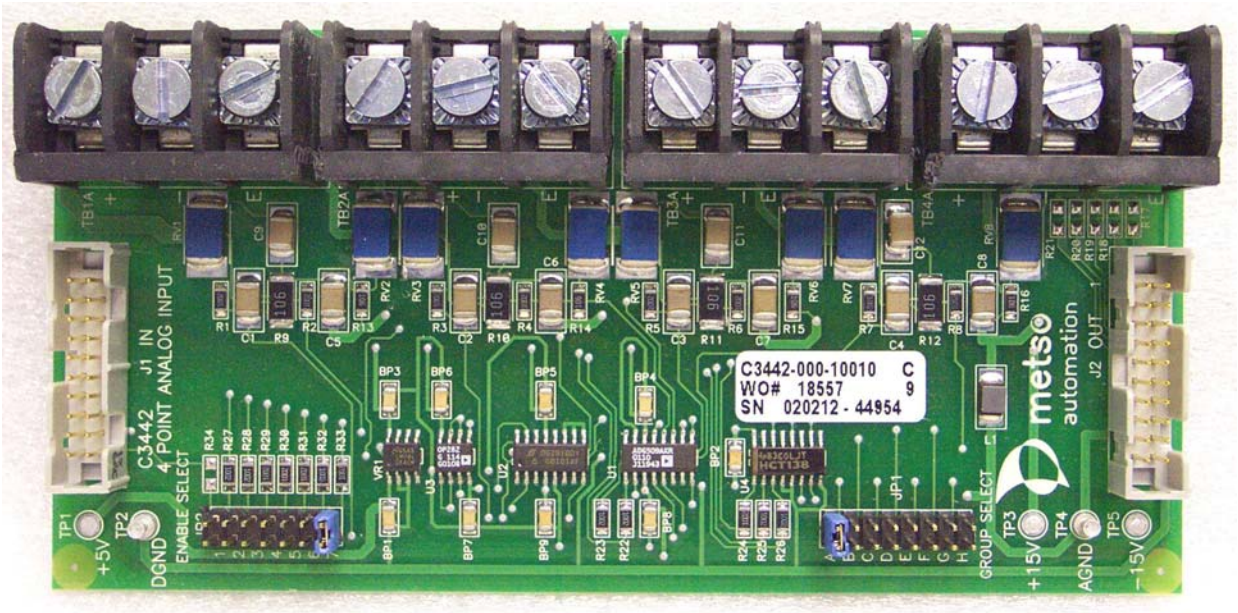
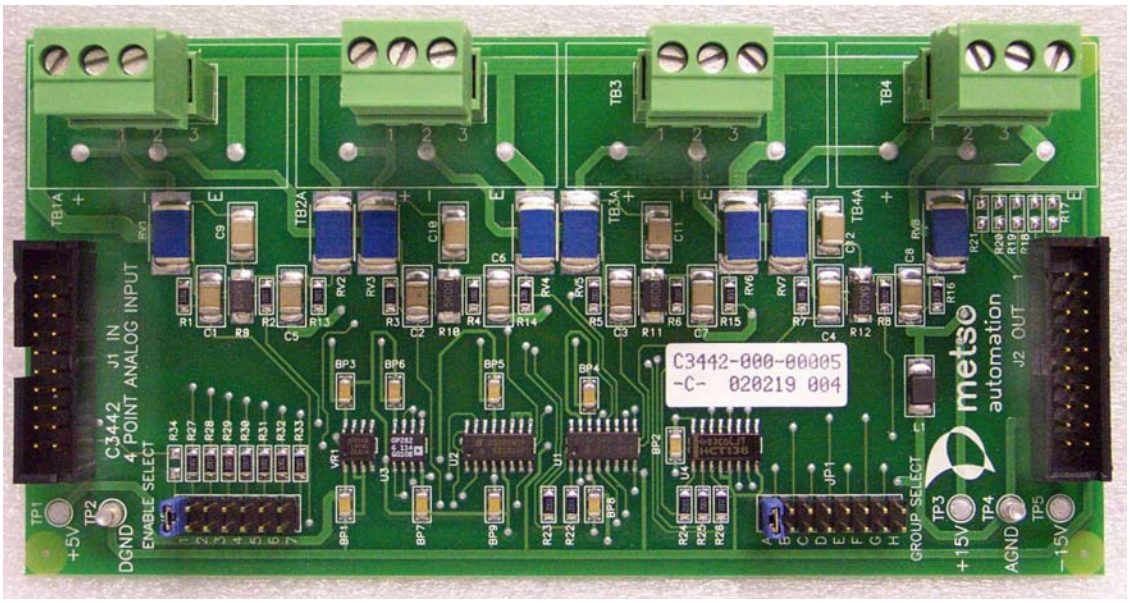


Figure 1-9 Telvent 4-Point Analog with Phoenix Connectors



1.4.1 Analog Theory

For complete theory details, please see the Analog Input XT section in the Theory of Operation chapter of the SAGE 2100 Operation & Maintenance manual.

The C3442 Analog Input XT board has Enable Select and Group Select jumpers. Enable Select and Group Select determine which set of AI points will be scanned, as shown below:

Table 1-3 C3442 Jumper Table

JUMPER CHART :

XT–AI POINTS	JP2	JP1
1 – 4	1	A
5 – 8	1	B
9 – 12	1	C
13 – 16	1	D
17 – 20	1	E
21 – 24	1	F
25 – 28	1	G
29 – 32	1	H

XT–AI POINTS	JP2	JP1
65 – 68	3	A
69 – 72	3	B
73 – 76	3	C
77 – 80	3	D
81 – 84	3	E
85 – 88	3	F
89 – 92	3	G
93 – 96	3	H

XT–AI POINTS	JP2	JP1
129 – 132	5	A
133 – 136	5	B
137 – 140	5	C
141 – 144	5	D
145 – 148	5	E
149 – 152	5	F
153 – 156	5	G
157 – 160	5	H

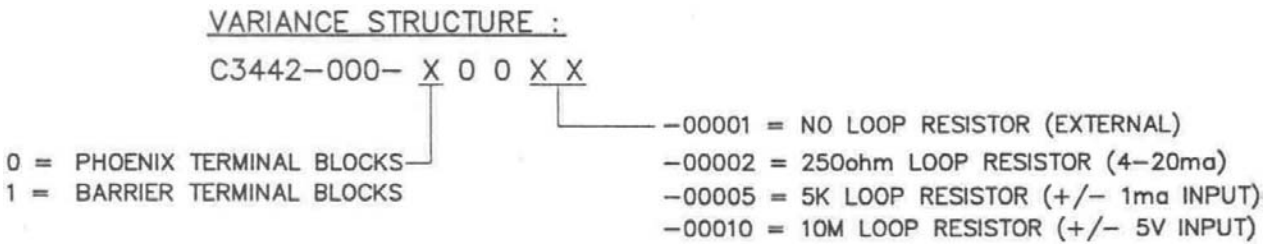
XT–AI POINTS	JP2	JP1
193 – 196	7	A
197 – 200	7	B
201 – 204	7	C
205 – 208	7	D
209 – 212	7	E
213 – 216	7	F
217 – 220	7	G
221 – 224	7	H

XT–AI POINTS	JP2	JP1
33 – 36	2	A
37 – 40	2	B
41 – 44	2	C
45 – 48	2	D
49 – 52	2	E
53 – 56	2	F
57 – 60	2	G
61 – 64	2	H

XT–AI POINTS	JP2	JP1
97 – 100	4	A
101 – 104	4	B
105 – 108	4	C
109 – 112	4	D
113 – 116	4	E
117 – 120	4	F
121 – 124	4	G
125 – 128	4	H

XT–AI POINTS	JP2	JP1
161 – 164	6	A
165 – 168	6	B
169 – 172	6	C
173 – 176	6	D
177 – 180	6	E
181 – 184	6	F
185 – 188	6	G
189 – 192	6	H

The C3442 has a number of variations that are detailed below:



The input channel is selected according to the Enable Select and Group Select jumpers, then scanned by the baseboard. Conversion from analog to digital signal is done on the baseboard. As shown in the table, each Analog Enable Select (JP2) can handle 32 analog inputs; the Group Select (JP1) must be set to accommodate which set of 4 points are enabled per board.

1.5 SBO Control

The Telvent C3454 48 Point SBO driver board is illustrated in Figure 1-10. Figure 1-11 shows the 16-point expansion board to allow up to 64 SBO controls in an existing retrofit RTU. The C3454 accepts the existing 18 Pin Relay panel cables from the original CDC 44-500 RTU. This allows the RTU to be retrofitted without replacing the SBO controls already wired to the field devices. The C3454 board contains a diode matrix and LED indication for up to 48 SBO points. The 16-Point Expansion is a depopulated version of the C3454 board, and allows 2 additional groups of eight controls to be connected to the RTU. A standard 26-pin ribbon cable connects the C3454 board to the SAGE 2000 Baseboard and also to the 16-Point expansion board if required.

Figure 1-10 Telvent C3454 48-Point SBO Driver Board

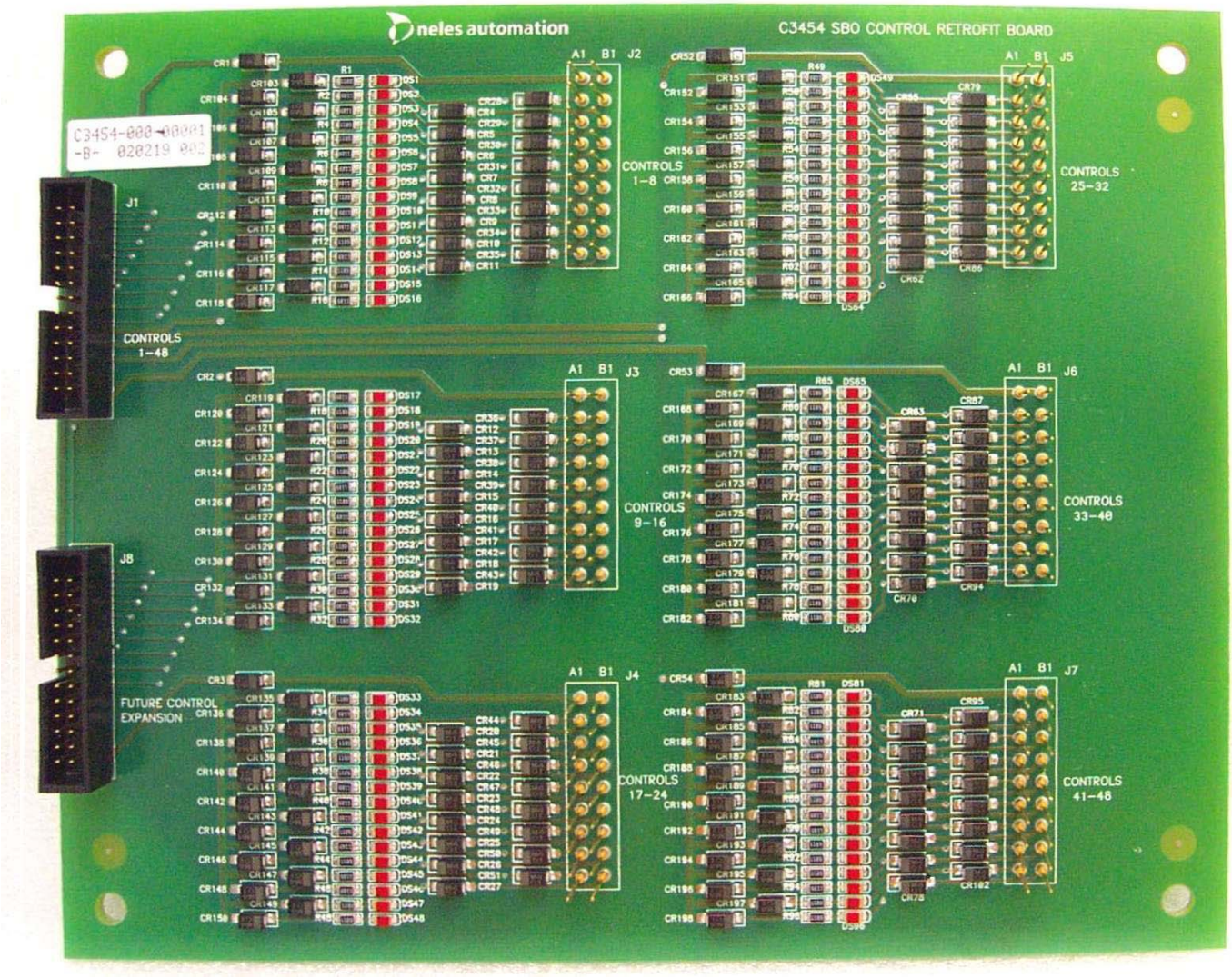
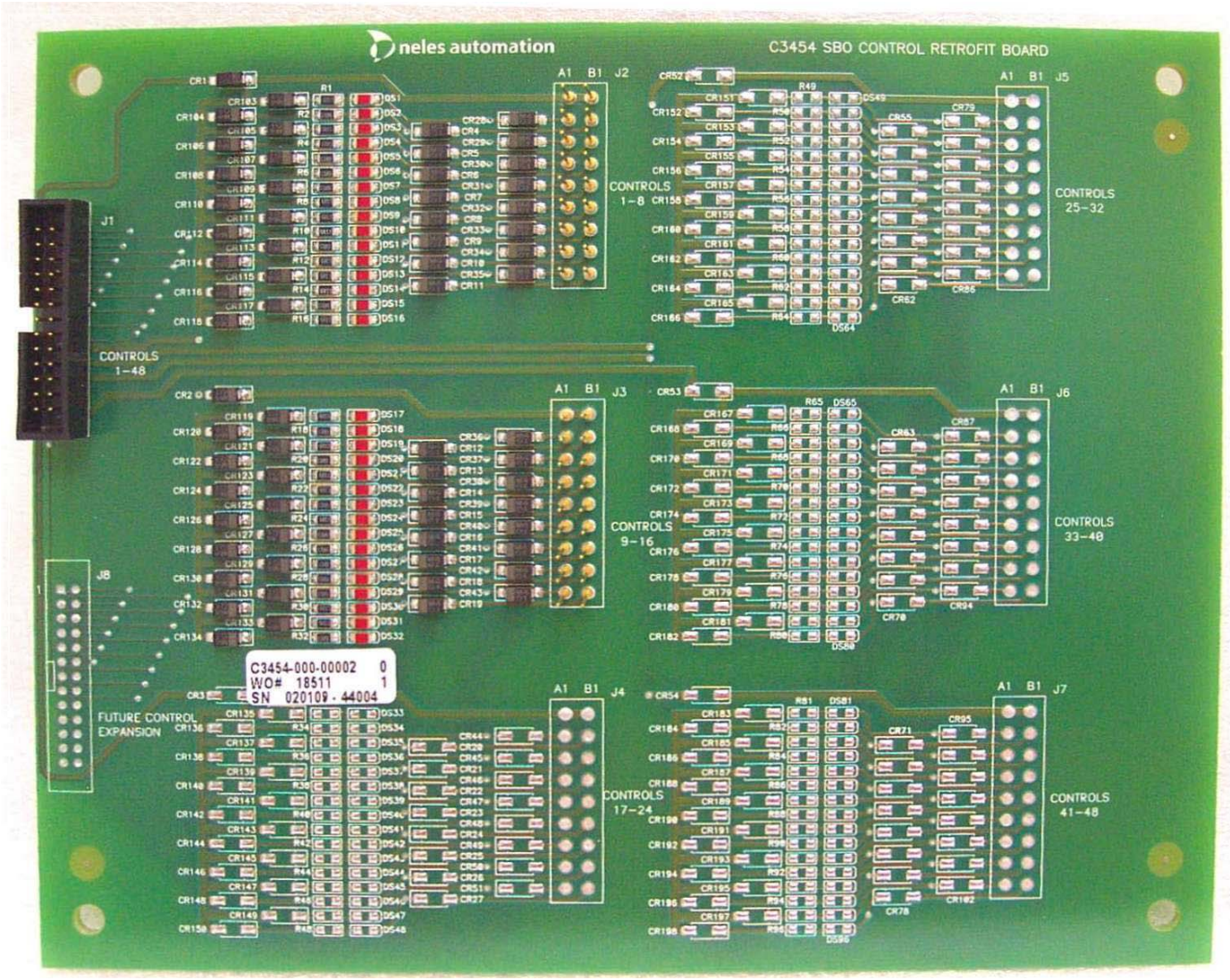


Figure 1-11 Telvent 16-Point SBO Expansion Board



1.5.1 SBO Control Theory

For complete theory details, please see the Select Before Operate XT section in the Theory of Operation chapter of the SAGE 2100 Operation & Maintenance manual.

1.6 Retrofit: Removal of Old RTU

A retrofit RTU is one that utilizes the original enclosure and field wiring of an RTU, but replaces 90% of the hardware, thus updating and adding more functionally to the RTU. A Telvent SAGE 2000 RTU is installed and connected to I/O boards designed especially to connect directly to the field wiring, thus eliminating the need for external field wiring. Most installations have the RTU / Substation offline for less than a day. The RTU adds functionally such as increased protocol support for IED installations and multiple master stations, 1MSSOE time stamping, and runtime applications.

Remove power to the RTU, and start removing the legacy RTU card cages from the swing rack. Remove the Control cables from the legacy RTU card cage and place out of the way as these will be used later. Remove all card cages and ribbon cables to the Status and Analog boards. Once the swing rack is clean of the old RTU, start removing the ribbon cable and

wetting voltage wiring from the Status and Analog boards. When only the field wiring is connected to the Status and Analog boards, start replacing the old Input boards with the new Telvent boards by removing individual boards from the snap track and installing the new card in its place. Remove the field wiring and replace them on the same terminal point of the new card. For the board with Phoenix connectors (C3453, and C3442), remove any wire lugs that may be on the end of the wire from the old termination. When finished, the new Status and Analog boards will be installed in the snaptrack with the field wiring attached.

1.6.1 Status Installation

C3454

With all the Input boards in place, install the SAGE 2000 RTU panel on the swing rack and bolt into place. Connect ribbon cables between the SAGE baseboard and the I/O cards. Control cables that were removed from the old RTU card cage can now be installed in the C3454 board.

Table 1-4 C3454 Installation Table

Control Points	C3454
1 - 8	J2
9-16	J3
17-24	J4
25-32	J5
33-40	J6
41-48	J7
49-56	J2 (C3454 Expansion)
57-64	J3 (C3454 Expansion)

Connect the 20-pin ribbon cable from the Status expansion bus from the SAGE 2000 baseboard to the first Status input board. Connect additional status boards by connecting the "OUT" of the previous board to the "IN" of the next board. Continue until all status boards are connected. Connect Status Wetting voltage to the boards. Once all of the Status boards are installed and connected, set each board jumper to its correct setting to properly program the status board.

Each status board has an "Enable Select" and a "Bank Select" jumper. Each "enable select" can accommodate 32 points of status. The "Bank Select" defines which group of 8 or 16 points are active on that card. A chart below will assist in the placement of jumpers for each card.

C3453

Table 1-5 C3453 Installation Table

Enable Select Jumper JP1	Bank Select W1	
	Position A	Position B
1	Status Point 1-16	Status Point 17-32
2	Status Point 33-48	Status Point 49-64
3	Status Point 65-80	Status Point 81-96
4	Status Point 97-112	Status Point 113-128
5	Status Point 129-144	Status Point 145-160
6	Status Point 161-176	Status Point 177-192
7	Status Point 193-208	Status Point 209-224

C3452, C3451

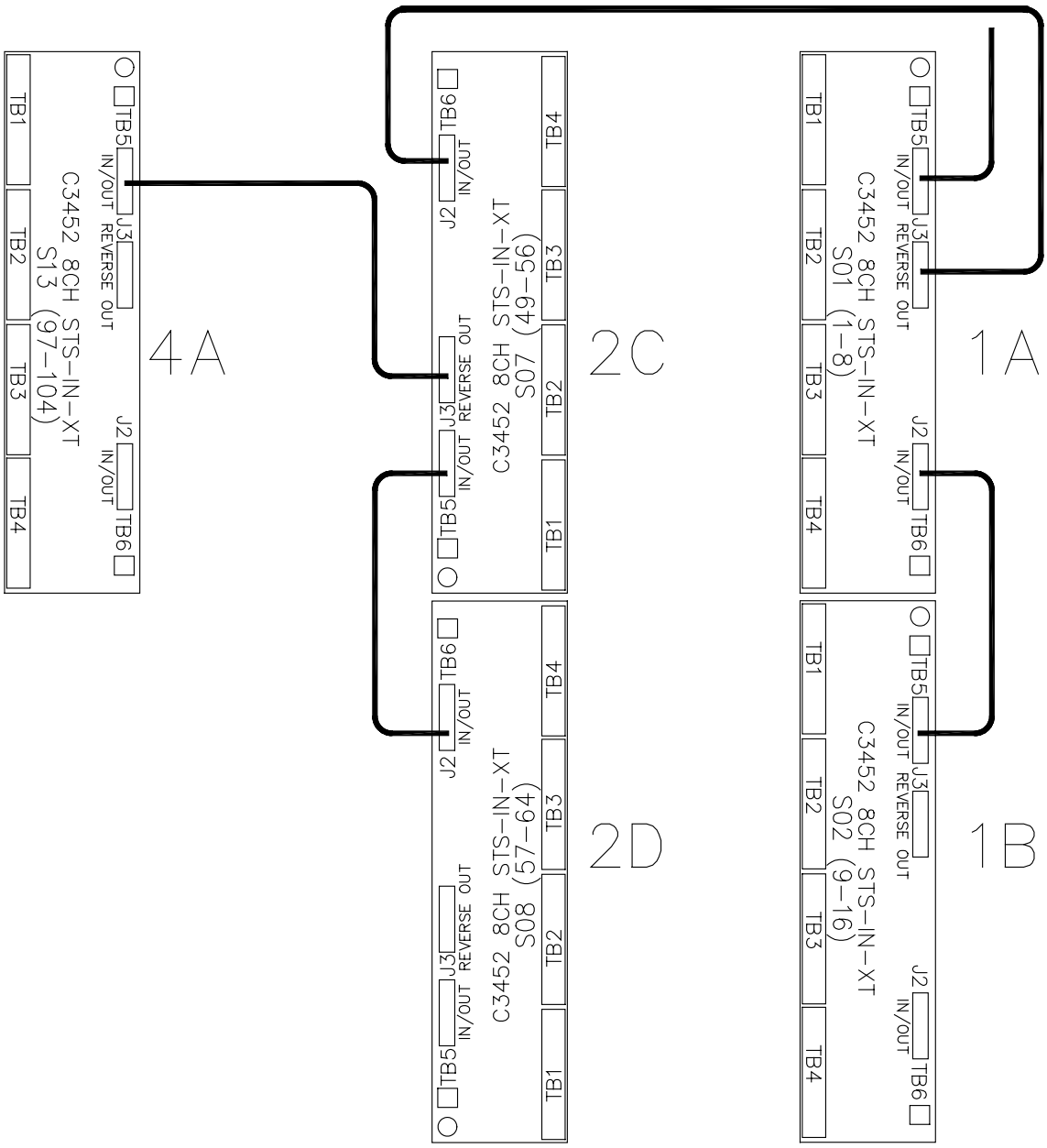
Table 1-6 C3452 & C3451 Installation Table

Enable Jumper JP1	Bank Select W2			
	Position A	Position B	Position C	Position D
1	Status Point 1-8	Status Point 9-16	Status Point 17-24	Status Point 25-32
2	Status Point 33-40	Status Point 41-48	Status Point 49-56	Status Point 57-64
3	Status Point 65-72	Status Point 73-80	Status Point 81-88	Status Point 89-96
4	Status Point 97-104	Status Point 105-112	Status Point 113-120	Status Point 121-128
5	Status Point 129-136	Status Point 137-144	Status Point 145-152	Status Point 153-160
6	Status Point 161-168	Status Point 169-176	Status Point 177-184	Status Point 185-192
7	Status Point 193-200	Status Point 201-208	Status Point 209-216	Status Point 217-224

1.6.2 Reverse Out Connector

The C3452 and C3451 boards have three 20-pin ribbon cable connectors, two labeled In/Out, and one labeled Reverse Out. The In/Out connectors are the input and output of the Status input bus between the input boards and the SAGE 2000 Baseboard. The Reverse Out connector rotates the data lines of the Status bus to accommodate two adjacent rows of status boards that have the field wiring terminal blocks facing each other. The reverse output connector maintains the point numbering from row to row. See Figure 1-12.

Figure 1-12 Reverse Out Connector Wiring



1.6.3 Analog Boards C3442

Connect the Analog boards to the Cable from the SAGE 2000 RTU, and connect 20 pin ribbon cables in similar fashion as the status.

The analog board as mentioned earlier replaces four of the legacy RTU input boards. The Analog board has similar "Enable Select" and "Group Select" jumpers as the Status Boards. Since there are only four points per board, the "Group Select" jumper positions are 8 instead of 2 or 4 as with the Status board.

Table 1-7 C3442 Installation Table

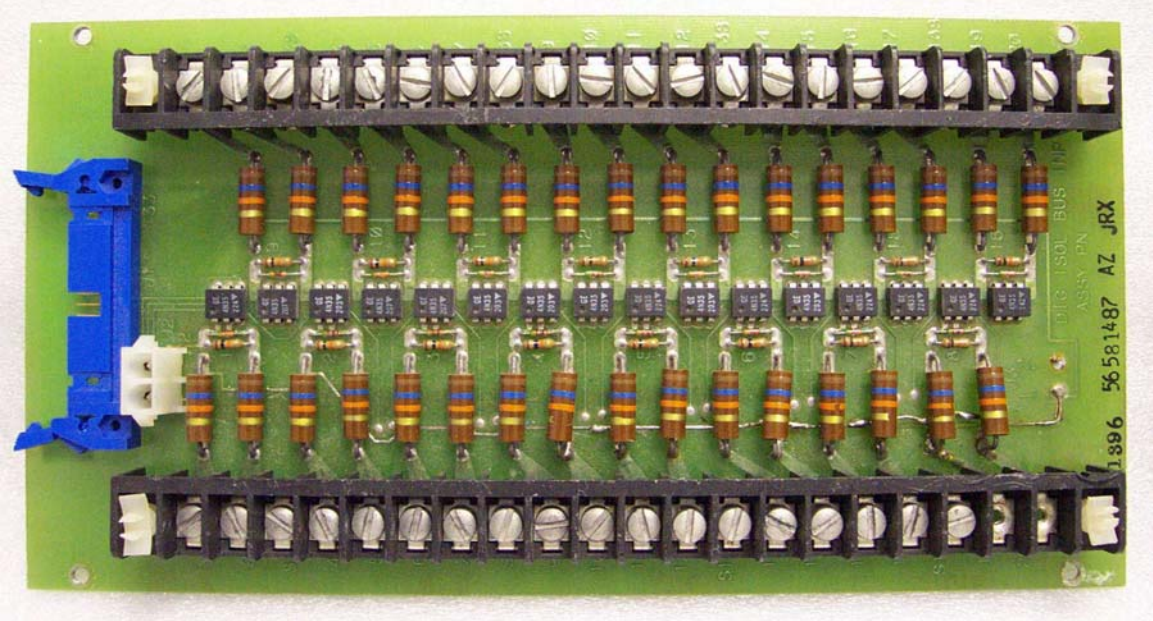
Enable Select JP2	Group Select JP1							
	A	B	C	D	E	F	G	H
1	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32
2	33-36	37-40	41-44	45-48	49-52	53-56	57-60	61-64
3	65-68	69-72	73-76	77-80	81-84	85-88	89-92	93-96
4	97-100	101-104	105-108	109-112	113-116	117-120	121-124	125-128
5	129-132	133-136	137-140	141-144	145-148	149-152	153-156	157-160
6	161-164	165-168	169-172	173-176	177-180	181-184	185-188	189-192
7	193-196	197-200	201-204	205-208	209-212	213-216	217-220	221-224

CHAPTER 2

CDC 44-550 RTUs

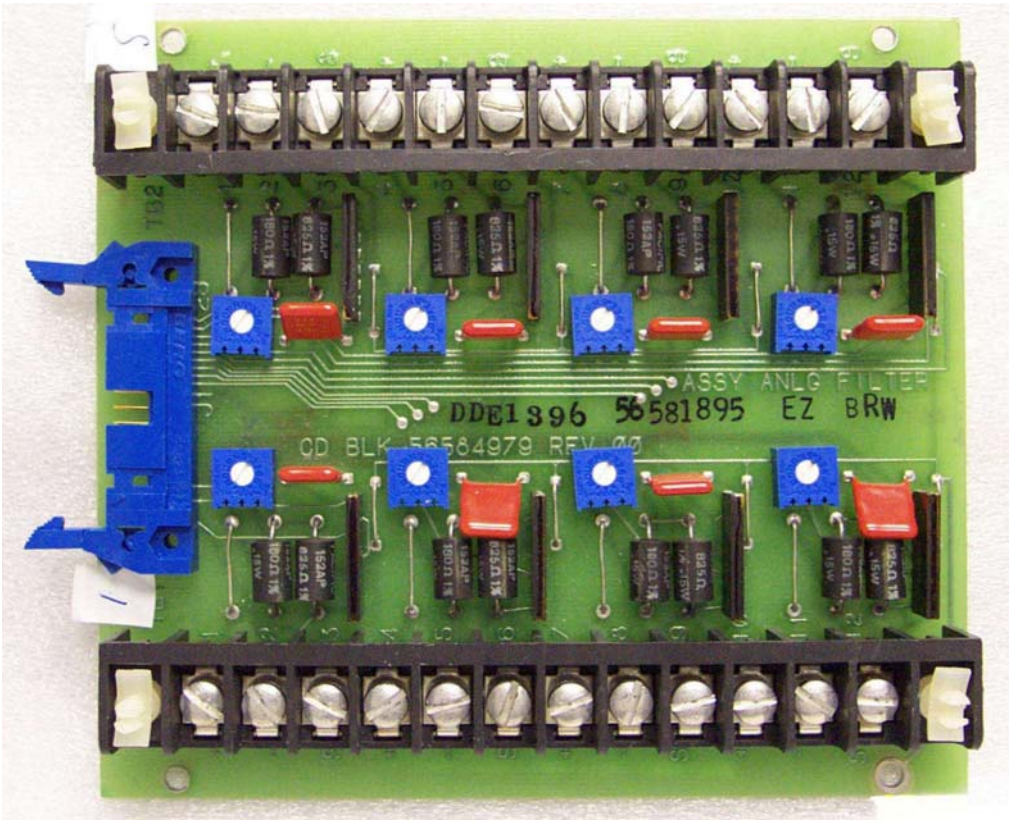
2.1 Status – Obsolete CDC Board

Figure 2-1 Obsolete CDC 16-Point Status with Barrier Terminal Block



2.2 Analog – Obsolete CDC Board

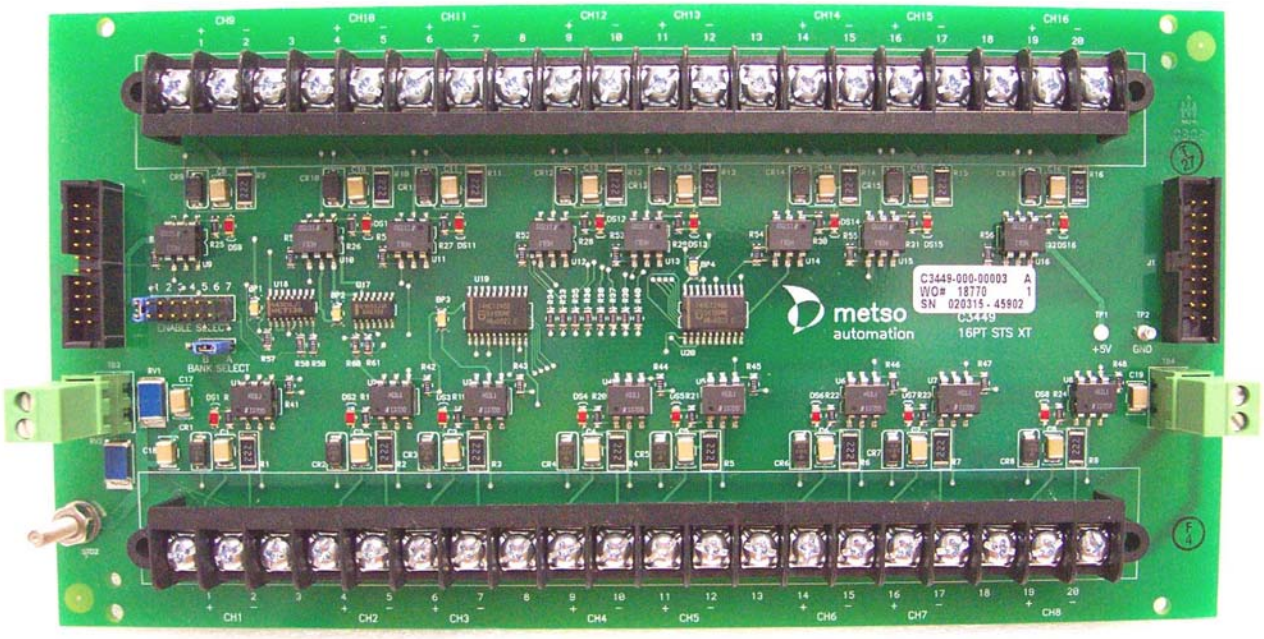
Figure 2-2 Obsolete CDC 8-Point Analog with Barrier Terminal Block



2.3 Status – Telvent Replacement Board

The Telvent C3449 (see Figure 2-3) replaces the 16 point Digital In board shown in Figure 2-1. The C3449 provides 6-32 type barrier terminations and identical pinout as the obsolete original.

Figure 2-3 Telvent C3449 16-Point Status



2.3.1 Status Theory

The C3449 board has a fixed IN ribbon connector and a fixed OUT ribbon connector. This board also has an Enable Select and a Bank Select. Since each status board Enable can handle 32 points, jumpers must be set to accommodate which bank of 16 points are present on the board. The Jumpers follow the table below:

Table 2-1 C3449 Jumper Table

I/O Points	Enable Select JP1	Bank Select W1
1 – 16	1	A
17 – 32	1	B
33 – 48	2	A
49 – 64	2	B
65 – 80	3	A
81 – 96	3	B
97 – 112	4	A
113 – 128	4	B
129 – 144	5	A
145 – 160	5	B
161 – 176	6	A
177 – 192	6	B
193 – 208	7	A
209 – 224	7	B

Proprietary and Confidential to Telvent

Each DI input is optically isolated (1500V isolation) and provided with an input RC filter. Additional debounce filtering is done in firmware. The firmware waits 20 milliseconds after an initial change of state (COS) to see if the COS is still there. If it is, the input is considered valid and processed.

The variations for the C3449 board are loop resistors that determine the loop wetting voltage. The variations are as follows:

VARIANCE STRUCTURE :

VARIANCE	VOLTAGE	QTY	RES R1–R16	
–00001 =	129VDC	16	B0000–821–B2002	20K
–00002 =	12–24VDC	16	B0000–821–B2201	2.2K
–00004 =	48VDC	16	B0000–821–B6201	6.2K
–00005 =	5VDC	16	B0000–821–B8200	820ohm

For complete theory details, please see the Status Input XT section in the Theory of Operation chapter of the SAGE 2100 Operation & Maintenance manual.

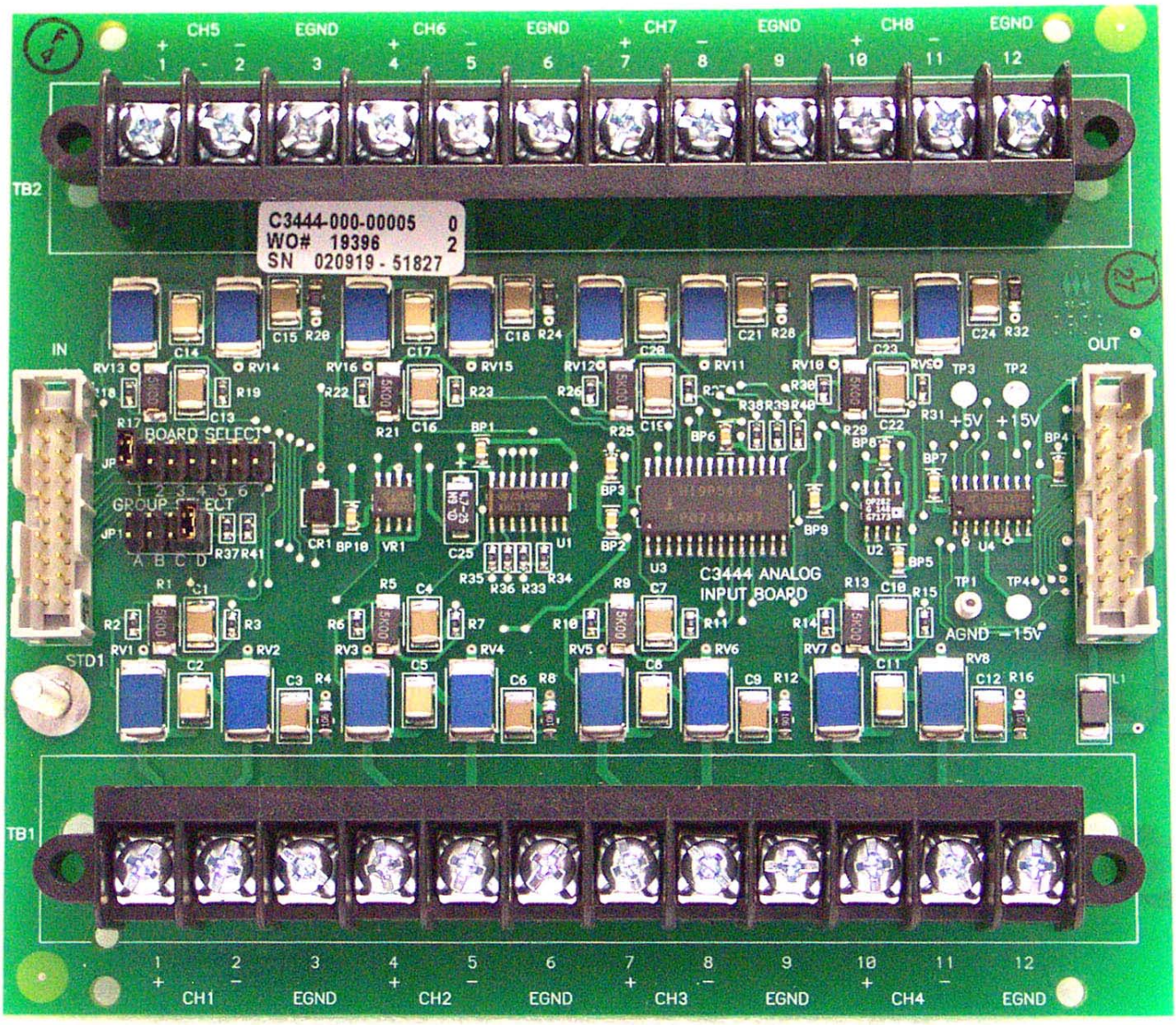
2.4 Analog – Telvent Replacement Board

The Telvent C3444 (Figure 2-4) is an 8 point DC Analog Input board that replaces the CDC 8-Point Analog board Figure 2-2.

The Telvent Analog Input board can be ordered to accept one of the following input types: +/-5V, +/-1Ma, 4-20M. All analog inputs utilize precision resistors for analog accuracy.

An earth-grounding stud is provided on each board to facilitate proper grounding and a shield connection is provided for each analog Point. Connection to the SAGE 2000 baseboard, and subsequent Analog input boards, are made using standard 20-pin ribbon cables. The Analog input board utilizes Surface Mount Technology (SMT) for space savings and ease of manufacturing. Circuit board theory and operation is described in the following section.

Figure 2-4 Telvent C3444 8-Point Analog



2.4.1 Analog Theory

For complete theory details, please see the Analog Input XT section in the Theory of Operation chapter of the SAGE 2100 Operation & Maintenance manual.

The C3444 Analog Input XT board has Board Select and Group Select jumpers. Board Select and Group Select determine which set of AI points will be scanned, as shown below:

Table 2-2 C3444 Jumper Table (JP2 is Board Select, JP1 is Group Select)

JUMPER CHART :

XT–AI POINTS	JP2	JP1
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D

The C3444 has a number of variations that are detailed below:

VARIANCE STRUCTURE :

C3444–000– 0 0 0 X X

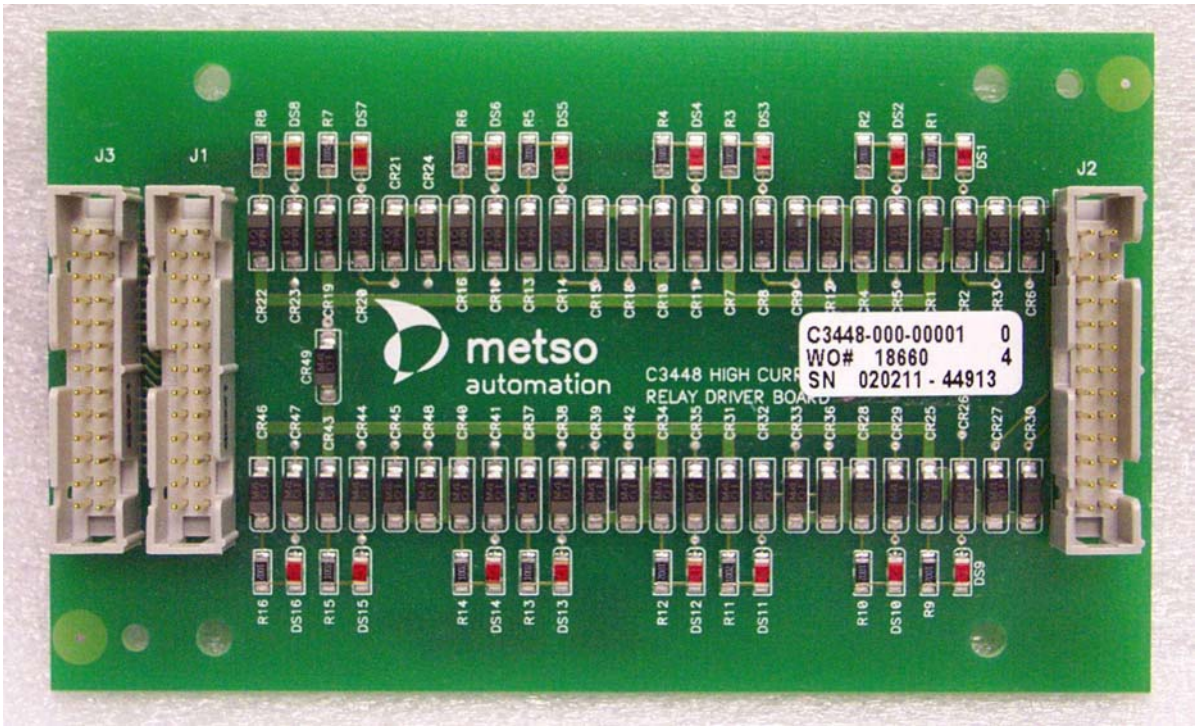
	RANGE	QTY.	RES R1,R5,R9,R13,R17,R21,R25,R29	
–00000 =	1–5V	8	B0000–821–B1005	10.00M
–00002 =	4–20mA	8	B0000–823–00251	250ohm
–00003 =	0–1mA W/OVER RANGE	8	B0000–823–3012K	3.012K
–00004 =	0–1mA W/OVER RANGE	8	B0000–823–00452	4.5K
–00005 =	0–1mA	8	B0000–823–00502	5K

The input channel is selected according to the Board Select and Group Select jumpers, then scanned by the baseboard. Conversion from analog to digital signal is done on the baseboard. As shown in the table, each Analog Board Select (JP2) can handle 32 analog inputs; the Group Select (JP1) must be set to accommodate which set of 8 points are enabled per board.

2.5 Controls – Replacement Telvent Board

The Telvent C3448 High Current SBO Driver board (Figure 2-5) replaces the CDC 44-550 High Current Driver board (picture not available). This board installs in the same location as the obsolete board and accepts the relay panel wiring connections at J2. J1 is the input connector for the control cabling. The control cabling comes from either the SAGE 2000 baseboard or from another C3448 board. J3 is the Out connector; this cable will connect to the In (J1) of the next board in line. The driver board handles 8 pairs of High Current panel mounted relays. The board offers diode steering and kickback protection, as well as LED indication for control operation.

Figure 2-5 Telvent C3448 High Current Control Driver



CHAPTER 3

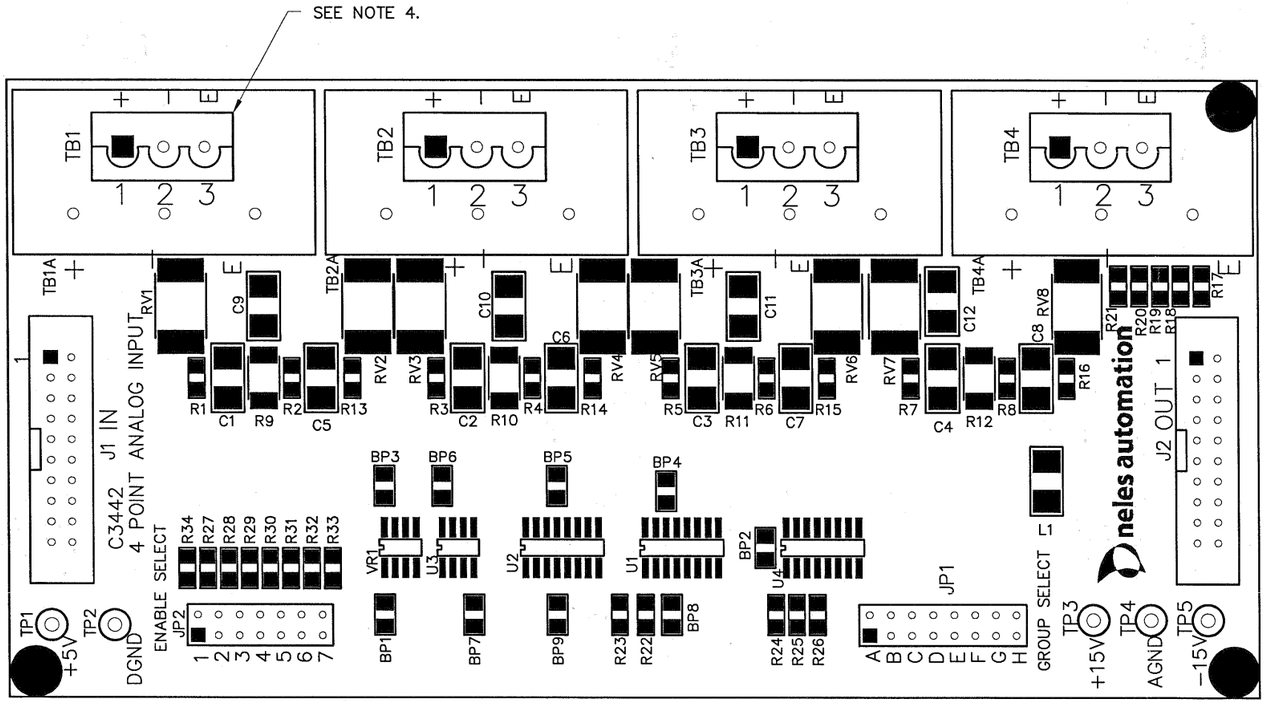
Drawings

The following schematic and assembly drawings are included in this manual as a convenience to allow for troubleshooting.

C3442-000-X00XX	Assembly Drawing, 4PT Analog Input XT Board	1 pages
C3442-002-REV-D	Circuit Diagram, 4PT Analog Input XT Board	1 page
C3443-000-0000X	Assembly Drawing, 8PT Analog Input XT Board	1 pages
C3443-002-REV-B	Circuit Diagram, 8 Channel Snaptrack Analog In	2 pages
C3444-000-000XX	Assembly Drawing, 8PT Analog Input XT Board	1 page
C3444-002-REV-A	Circuit Diagram, 8PT Analog Input XT Board	2 page
C3448-000-00001	Assembly Drawing, 8PT High Current Relay Driver	1 page
C3448-002-REV-A	Circuit Diagram, 8PT High Current Relay Driver	1 page
C3449-000-0000X	Assembly Drawing, 16PT Digital Input XT Board	1 page
C3449-002-REV-A	Circuit Diagram, 16PT Digital Input XT Board	1 page
C3451-000-0000X	Assembly Drawing, 8PT Digital Input XT Board	1 page
C3451-002-REV-A	Circuit Diagram, 8PT Digital Input XT Board	1 page
C3452-000-0000X	Assembly Drawing, 8PT Digital Input XT Board	1 page
C3452-002-REV-B	Circuit Diagram, 8PT Digital Input XT Board	1 page
C3453-000-0000X	Assembly Drawing, 16PT Digital Input XT Board	1 page
C3453-002-REV-A	Circuit Diagram, 16PT Digital Input XT Board	1 page
C3454-000-00001	Assembly Drawing, SBO Control Board	1 page
C3454-000-00002	Assembly Drawing, SBO Control Board	1 page
C3454-002-REV-B	Circuit Diagram, SBO Control Board	2 pages

NOTES :

1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
3. NELES SUPPLIED ITEM.
4. ITEM #17 (TB1 TO TB4) SHOULD BE INSTALLED WITH THE SCALLOPES TOWARD THE INSIDE OF BOARD.
5. FACTORY INSTALLED POSITION FOR ITEM #21 IS "JP1–A", & "JP2–1".
6. R17–R21 AND R34 ARE NOT POPULATED.



QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	1	1	1	1	1	1	1	C3442–001–REV–B	PCB 4PT SNAPTRACK ANALOG IN BD	
0	0	0	0	0	0	0	0	2	C3442–002–REV–C	SCH 4PT SNAPTRACK ANALOG IN BD	SEE NOTE 3.
1	1	1	1	1	1	1	1	3	B0001–363–S0004	ICL OP282GS OPAMP DUAL SMT	U3
1	1	1	1	1	1	1	1	4	B0001–233–S0001	ICL HI–547 8CH DIFF ANA MUX SM	U1
1	1	1	1	1	1	1	1	5	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U4
1	1	1	1	1	1	1	1	6	B0001–886–S0005	ICL 78L05ACM POS V–REG SMT	VR1
1	1	1	1	1	1	1	1	7	B0001–462–S0201	ICD DG201 QUAD SPST ANA SW SMT	U2
8	8	8	8	8	8	8	8	8	B0002–476–S0000	VARISTOR 240V 268V MO	RV1–RV8
4	4	4	4	4	4	4	4	9	B0000–821–A1005	RES SMT MF 05.00P .12W M010.00	R13–R16
20	20	20	20	20	20	20	20	10	B0000–821–C1002	RES SMT MF 01.00P .12W K010.0	R1–R8,R22–R33
1	1	1	1	1	1	1	1	11	J0000–635–S0100	INDUCTOR 100.0UH 160MA SMT	L1
4	4	4	4	4	4	4	4	12	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C9–C12
9	9	9	9	9	9	9	9	13	B0000–678–5104M	CAP–N CE 050V M0.1000 20P SMT	BP1–BP9
8	8	8	8	8	8	8	8	14	B0000–679–S0105	CAP–N CE 050V M001.00 20P SMT	C1–C8
2	2	2	2	2	2	2	2	15	B0002–521–10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2
–	–	–	–	4	4	4	4	16	B0001–882–CHR03	CONN PLG PCB 03P .197 FHV	TB1–TB4
–	–	–	–	4	4	4	4	17	B0001–882–VHC03	CONN HDR PCB 03P .197 VSH	TB1–TB4(SEE NOTE 4)
4	4	4	4	–	–	–	–	18	B0000–318–00003	TB PCB S.438 8–32 BE 03POS	TB1A – TB4A
2	2	2	2	2	2	2	2	19	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP2,TP4
1	1	1	1	1	1	1	1	20	B0001–861–00072	CONN PCB PC 2X36 M DUAL	USED IN JP1,JP2
2	2	2	2	2	2	2	2	21	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	USED IN JP1,JP2 SEE NOTE 5.
–	–	4	–	–	–	4	–	22	B0000–823–00251	RES SMT WW .025% H250 10PPM	R9–R12
–	4	–	–	–	4	–	–	22	B0000–823–00502	RES SMT WW .025% K05.0 10PPM	R9–R12
4	–	–	–	4	–	–	–	22	B0000–821–B1005	RES SMT MF 05.00P 1W M010.00	R9–R12
								23			
								24			
								25			
								26			
								27			
								28			
									-10010		
									-10005		
									-10002		
									-10001		
									-00010		
									-00005		
									-00002		
									-00001		

JUMPER CHART :

XT–AI POINTS	JP2	JP1
1 – 4	1	A
5 – 8	1	B
9 – 12	1	C
13 – 16	1	D
17 – 20	1	E
21 – 24	1	F
25 – 28	1	G
29 – 32	1	H

XT–AI POINTS	JP2	JP1
65 – 68	3	A
69 – 72	3	B
73 – 76	3	C
77 – 80	3	D
81 – 84	3	E
85 – 88	3	F
89 – 92	3	G
93 – 96	3	H

XT–AI POINTS	JP2	JP1
129 – 132	5	A
133 – 136	5	B
137 – 140	5	C
141 – 144	5	D
145 – 148	5	E
149 – 152	5	F
153 – 156	5	G
157 – 160	5	H

XT–AI POINTS	JP2	JP1
193 – 196	7	A
197 – 200	7	B
201 – 204	7	C
205 – 208	7	D
209 – 212	7	E
213 – 216	7	F
217 – 220	7	G
221 – 224	7	H

XT–AI POINTS	JP2	JP1
33 – 36	2	A
37 – 40	2	B
41 – 44	2	C
45 – 48	2	D
49 – 52	2	E
53 – 56	2	F
57 – 60	2	G
61 – 64	2	H

XT–AI POINTS	JP2	JP1
97 – 100	4	A
101 – 104	4	B
105 – 108	4	C
109 – 112	4	D
113 – 116	4	E
117 – 120	4	F
121 – 124	4	G
125 – 128	4	H

XT–AI POINTS	JP2	JP1
161 – 164	6	A
165 – 168	6	B
169 – 172	6	C
173 – 176	6	D
177 – 180	6	E
181 – 184	6	F
185 – 188	6	G
189 – 192	6	H

VARIANCE STRUCTURE :

C3442–000– X 0 0 X X

0 = PHOENIX TERMINAL BLOCKS
1 = BARRIER TERMINAL BLOCKS

–00001 = NO LOOP RESISTOR (EXTERNAL)
–00002 = 250ohm LOOP RESISTOR (4–20ma)
–00005 = 5K LOOP RESISTOR (+/– 1ma INPUT)
–00010 = 10M LOOP RESISTOR (+/– 5V INPUT)

PH (PHOENIX TB)
TB (BARRIER TB)

NO/RES
5K
250ohm
10M

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
C	10634	4–11–01	P.P		ITEM 4 WAS B0002–472–S0000
B	10602	2–6–01	P.P	D.M	ITEM 2 WAS REV–B, ADDED NOTE 6, B.O.M CORRECTED.
A	10445	8–4–00	P.P	CJ	ITEM 1 & 2 WAS –RAV–A, ADDED NEW VAR. –00001,–00002,
–	–	–	–	–	00010,–10001,–10002,–10005,–10010

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ACAD P/N: C3442–000–X00XX

MPL PCA 4PT S/T ANALOG IN XXXXXXXX

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010
ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

metso automation

APPROVALS	DATE
DWN PRAVIN	11–4–99
CHK C.JANIK	11–4–99
APP C.JANIK	11–4–99

PCA MICRO 1C/SAGE 2100,
4PT ANALOG INPUT XT BOARD
DRAWING
ASSEMBLY

SIZE B | C3442–000–X00XX | REV C
SCALE NONE | SHEET 1 OF 1

TYPICAL VAR RESISTOR
5K = +/- 1MA
250H = 4MA TO 20MA

REV	ECO#	DATE	BY	CHK	DESCRIPTION
D	11003	2-22-02	DM		CHANGED HI-509 TO HI-549
C	10601	3/2/01	TOOKER	TOOKER	CORRECT SERIES RESISTANCE VALUES
B	10444	7/17/00	CJ	TOOKER	REVISE VARIANCE CHART
A	NA	11/23/99	CJ	TOOKER	PRODUCTION RELEASE

FIDUC1 FIDUC2 FIDUC3

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APPROVALS		DATE
DWN	CJ	11/23/99
CHK	CJ	11/23/99
APP	CJ	11/23/99

MPL SCH 4PT SNAPTRACK ANALOG IN BD

4 POINT ANALOG INPUT BOARD

PART # C3442-002-REV-D

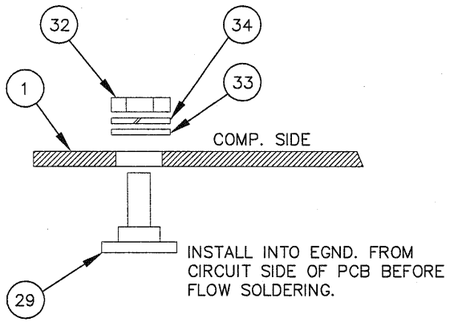
SIZE B

NOTES :

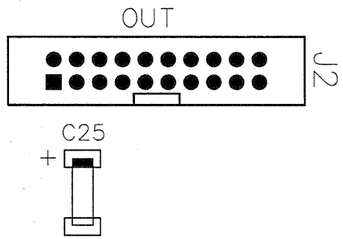
1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY AND BEFORE INSPECTION.
3. ITEM #29 INSTALLED INTO EGND FROM CIRCUIT SIDE OF PCB BEFORE FLOW SOLDERING.
4. ITEM #27 FACTORY INSTALLED IN JP1–A, JP2–1
5. FOR ITEM 1, REV–A HAS SILKSCREEN REVERSED FOR JP1. SHOULD READ "D C B A"

QTY -00005	QTY -00004	QTY -00003	QTY -00002	QTY -00000	ITEM	PART NUMBER	DESCRIPTION	NOTES
					36			
					37			
					38			
					39			
-	-	-	-	8	40	B0000-821-B1005	RES SMT MF 05.00P 1W M010.00	R1,R5,R9,R13,R17,R21,R25,R29
-	-	-	8	-	40	B0000-823-00251	RES SMT WW .025% H250 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
-	-	8	-	-	40	B0000-823-3012K	RES SMT WW .025% K03.012 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
-	8	-	-	-	40	B0000-823-00452	RES SMT WW .025% K04.5 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
8	-	-	-	-	40	B0000-823-00502	RES SMT WW .025% K05.0 10PPM	R1,R5,R9,R13,R17,R21,R25,R29

QTY -0000X	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	C3443-001-REV-B	8 CH ANA-IN SNPTRC M9000	PCB
0	2	C3443-002-REV-B	8 CH ANA-IN SNPTRC M9000	SUPPLIED
	3			
1	4	B0001-849-S0138	ICD 74HCT138 3-8 DECODER SMT	U1
1	5	B0001-363-S0004	ICL OP282GS OPAMP DUAL SMT	U2
1	6	B0001-233-S0001	ICL HI-547 8CH DIFF ANA MUX SM	U3
1	7	B0001-462-S0201	ICD DG201 QUAD SPST ANA SW SMT	U4
1	8	B0001-886-S0005	ICL 78L05ACM POS V-REG SMT	VR1
	9			
1	10	B0001-247-S0018	DIODE SMBJ18C 18V Z 0600W	CR1
16	11	B0002-476-S0000	VARISTOR 240V 268V MO	RV1-RV16
1	12	J0000-635-S0100	INDUCTOR 100.0UH 160MA SMT	L1
	13			
	14			
16	15	B0000-821-C6811	RES SMT MF 01.00P .12W K06.81	R2,R3,R6,R7,R10,R11,R14,R15,R18, R19,R22,R23,R26,R27,R30,R31
8	16	B0000-821-A1005	RES SMT MF 05.00P .12W M010.00	R4,R8,R12,R16,R20,R24,R28,R32
8	17	B0000-821-D1002	RES SMT MF 01.00P.063W K010.0	R33-R40
	18			
10	19	B0000-675-S0104	CAP-N CE 050V M0.1000 20P SMT	BP1-BP10
16	20	B0000-679-S0105	CAP-N CE 050V M001.00 20P SMT	C1,C3,C4,C6,C7,C9,C10,C12,C13, C15,C16,C18,C19,C21,C22,C24
8	21	B0001-694-S0000	CAP-N CE 1KV M000.022 20P SMT	C2,C5,C8,C11,C14,C17,C20,C23
1	22	B0000-680-K4752	CAP-P TA 020V M004.700 10P SM	C25
	23			
1	24	B0000-318-00024	TB PCB S.438 8-32 BE 24POS	TB1
2	25	B0002-521-10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2
1	26	B0002-291-00036	CONN HDR PC 36P S.100 .120	JP1,JP2
2	27	B0002-290-00000	JUMPER MINI 0.100 1R 2P GOLD	USED ON JP1,JP2
	28			
1	29	B0001-955-00832	FASTENER PCB EXT 8-32 TD TIN	STD1 (SEE NOTE 3)
1	30	B0000-740-00000	TERM PIN TURRET H .062D/.094T	TP1
	31			
1	32	B0001-044-00000	NUT HEX LG PAT 8-32 SS	EG.STUD (SEE DETAIL "A")
1	33	J4001-240-00000	WASHER LOCK INT NO. 8 SS	EG.STUD (SEE DETAIL "A")
1	34	B0000-006-00000	WASHER LOCK SPLIT NO. 8 SS	EG.STUD (SEE DETAIL "A")
	35			



DETAIL "A"

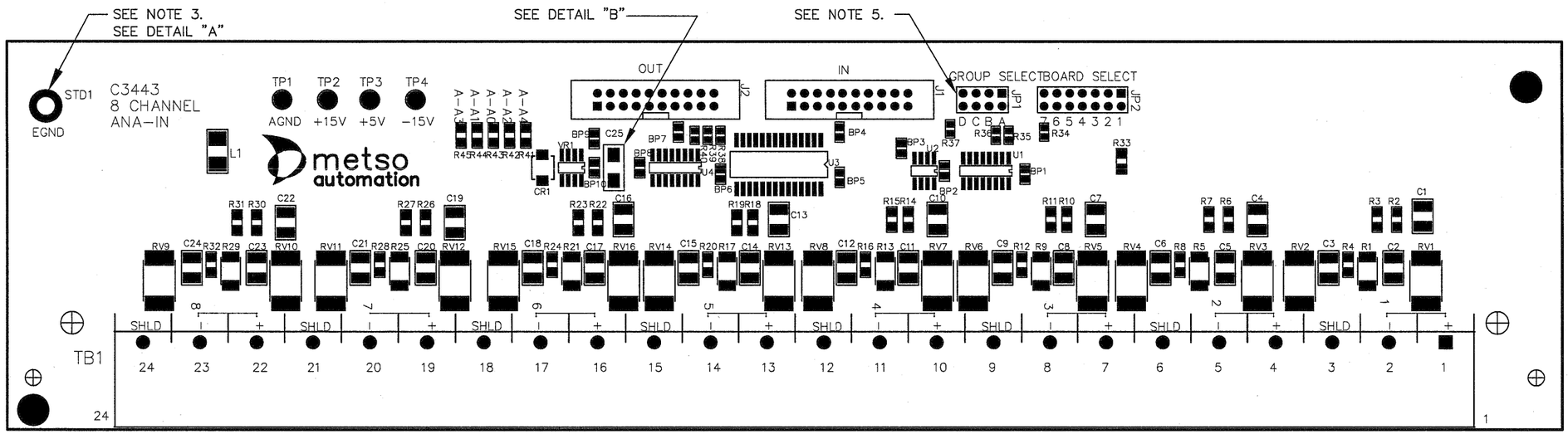


DETAIL "B"

JUMPER CHART :

XT–AI POINTS	JP2	JP1
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D

XT–AI POINTS	JP2	JP1
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D



VARIANCE STRUCTURE :

C3443–000–0000X

- –00000 = 10M RESISTORS
- –00002 = 250ohm RESISTORS
- –00003 = 3.012K RESISTORS
- –00004 = 4.52K RESISTORS
- –00005 = 5K RESISTORS

–00000 = 10M
–00002 = 250ohm
–00003 = 3.012K
–00004 = 4.52K
–00005 = 5K

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
C	10956	1–30–02	P.P		ITEM 17 QTY. WAS 7
B	10826	9–19–01	P.P	D.M	ADDED DETAIL "B"
A	10691	5–14–01	P.P	D.M	ITEM 1 & 2 WAS –REV–A, AND ITEM 12 QTY. WAS 2

REVISIONS

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ACAD P/N: C3443–000–0000X

MPL P C A 8 P T S/T A N A I N X X X X X M 9 K

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010
ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

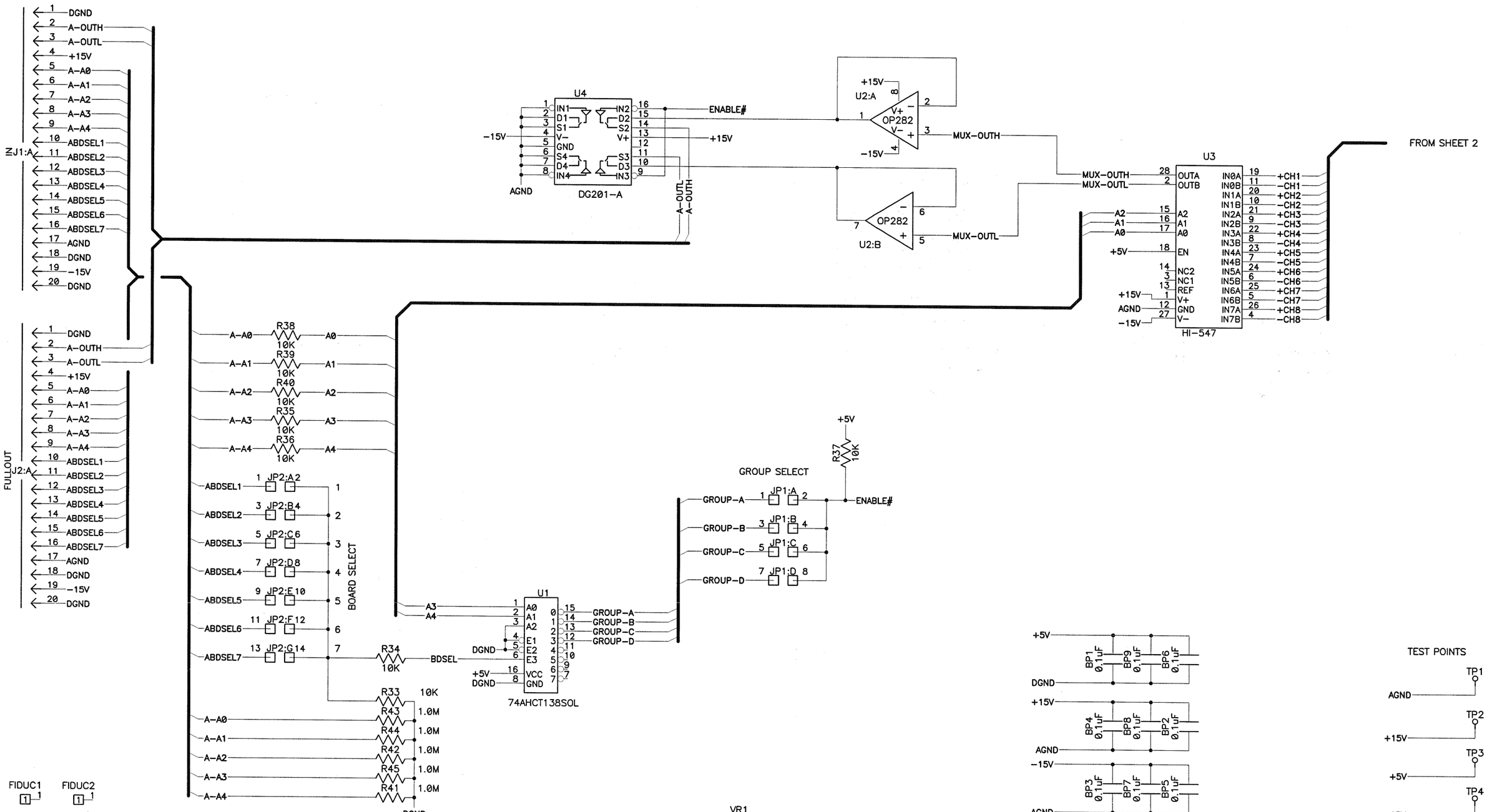
metso automation

APPROVALS	DATE
DWN PRAVIN	2–6–01
CHK D.M	4–17–01
APP K.TOOKER	4–17–01

PCA MICRO 1C/SAGE 2000
8PT ANALOG INPUT XT BOARD
ASSEMBLY DRAWING

SIZE B | C3443–000–0000X | REV C

SCALE NONE | SHEET 1 OF 1



REV	ECO#	DATE	BY	CHK	DESCRIPTION
B	NA	04/16/01	TOOKER		PRODUCTION RELEASE
A	NA	11/23/99	TOOKER	TOOKER	PROTOTYPES

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APPROVALS	DATE
DWN TOOKER	12/07/00
CHK	
APP	

metso automation

MPL 8 CH ANA-IN SNPTRC M9000

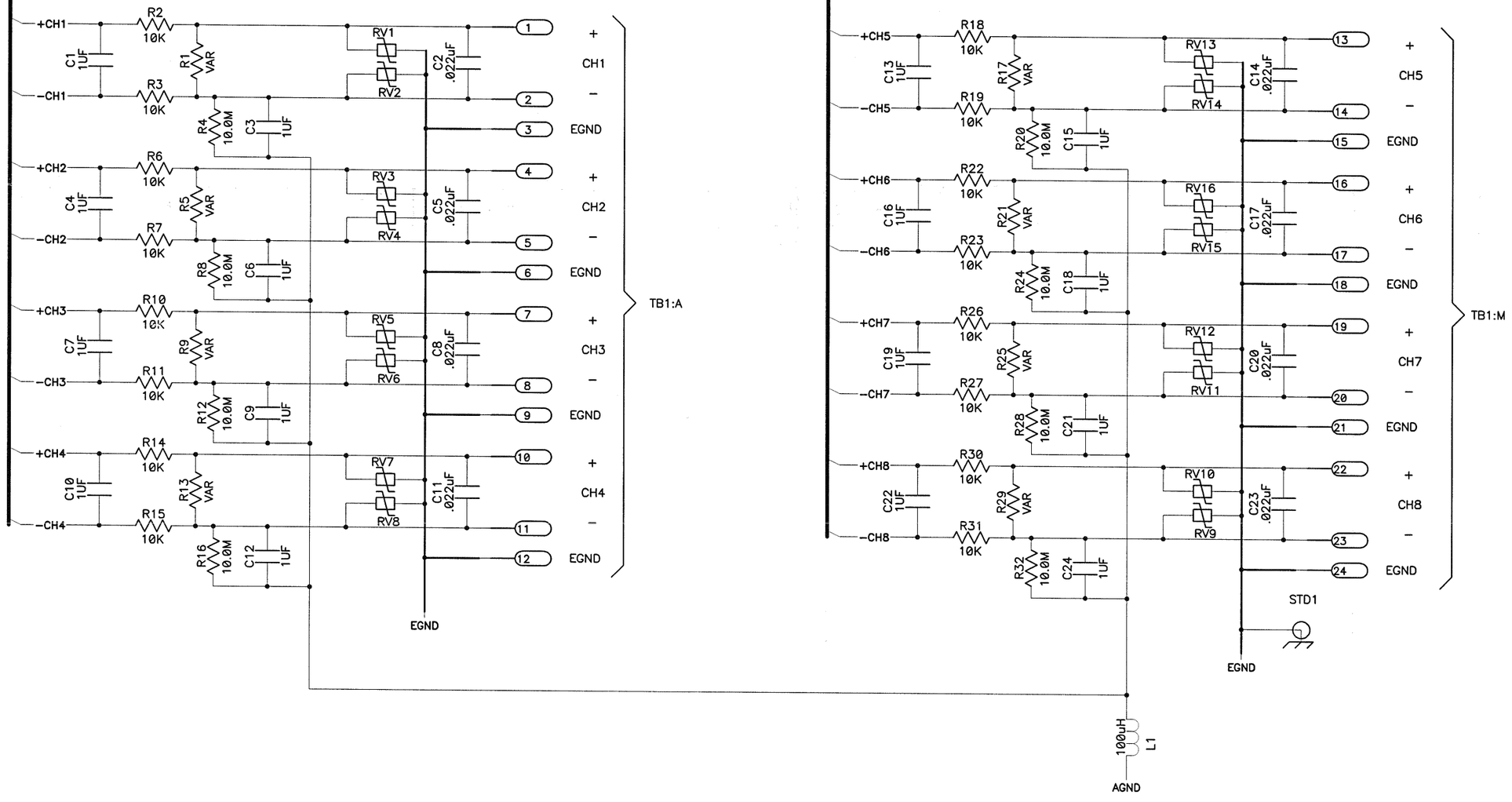
8 CHANNEL SNAPTRACK
ANALOG-IN M9000

PART # C3443-002-REV-B

SIZE B SHEET 1 OF 2

TYPICAL VAR RESISTOR
5K = +/- 1MA
250H = 4MA TO 20MA

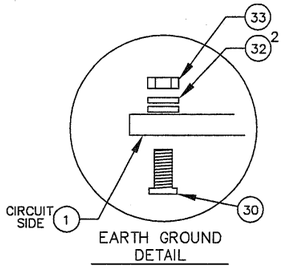
TO SHEET 1

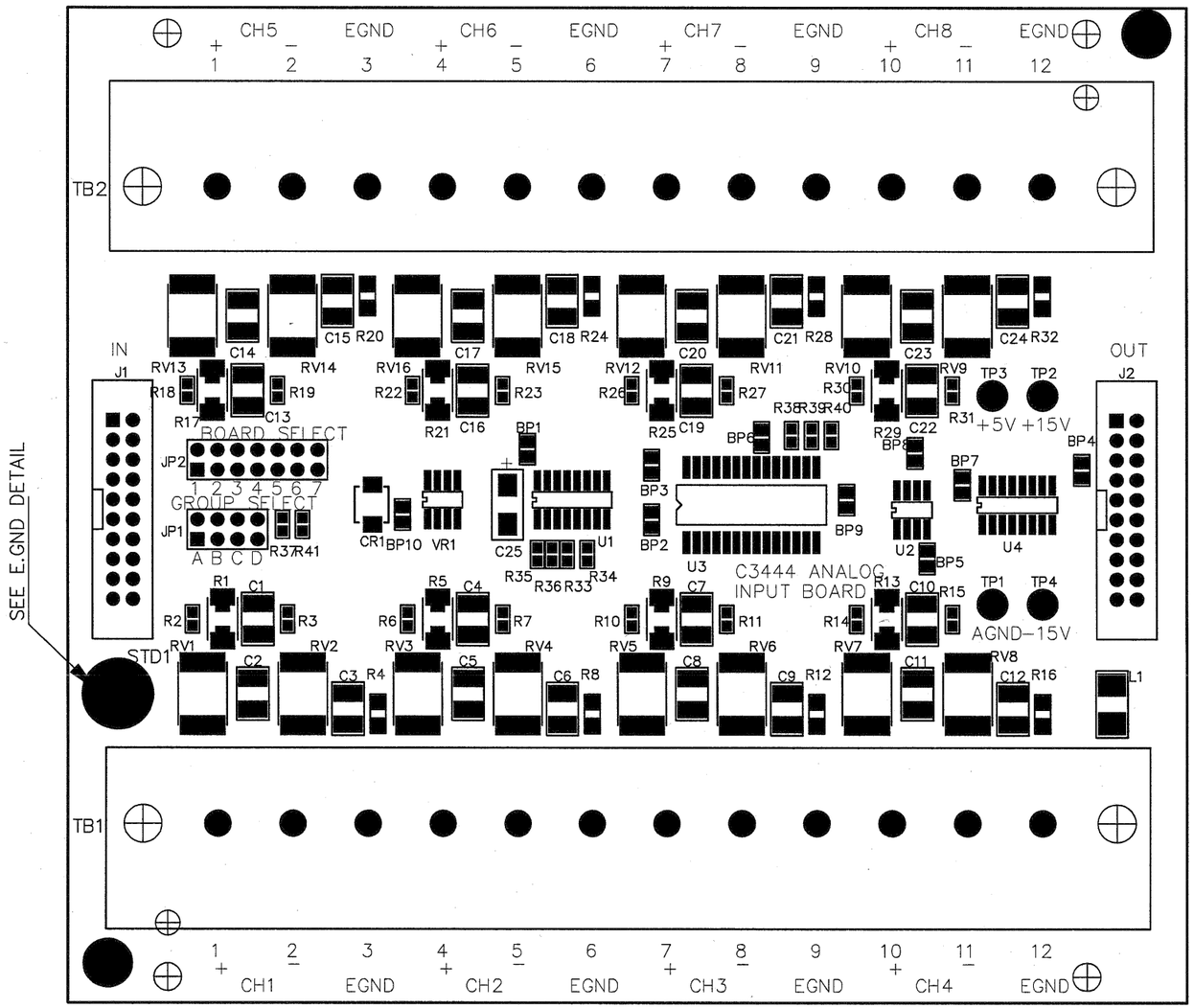


PART #	C3443-002-REV-B	
SIZE	B	SHEET 2 OF 2

NOTES :

1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
3. FACTORY INSTALLED POSITION FOR ITEM #25 IS "JP1–A", & "JP2–1".





QTY	QTY	QTY	QTY	QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	1	1	1	1	C3444–001–REV–A	PCB 8PT ANA XT 5K 1MACDC44–550	PCB
0	0	0	0	0	2	C3444–002–REV–A	SCH 4PT SNAPTRACK ANALOG IN BD	SCH
1	1	1	1	1	3	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U1
1	1	1	1	1	4	B0001–363–S0004	ICL OP282GS OPAMP DUAL SMT	U2
1	1	1	1	1	5	B0001–233–S0001	ICL HI–547 8CH DIFF ANA MUX SMT	U3
					6			
1	1	1	1	1	7	B0001–886–S0005	ICL 78L05ACM POS V–REG SMT	VR1
					8			
1	1	1	1	1	9	B0001–247–S0018	DIODE SMBJ18C 18V Z 0600W	CR1
16	16	16	16	16	10	B0002–476–S0000	VARISTOR 240V 268V MO	RV1–RV16
1	1	1	1	1	11	J0000–635–S0100	INDUCTOR 100.0UH 160MA SMT	L1
					12			
–	–	–	–	8	13	B0000–821–B1005	RES SMT MF 05.00P 1W M010.00	R1,R5,R9,R13,R17,R21,R25,R29
–	–	–	8	–	13	B0000–823–00251	RES SMT WW .025% H250 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
–	–	8	–	–	13	B0000–823–3012K	RES SMT WW .025% K03.012 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
–	8	–	–	–	13	B0000–823–00452	RES SMT WW .025% K04.5 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
8	–	–	–	–	13	B0000–823–00502	RES SMT WW .025% K05.0 10PPM	R1,R5,R9,R13,R17,R21,R25,R29
					14			
25	25	25	25	25	15	B0000–821–D1002	RES SMT MF 01.00P .063W K010.0	R2,R3,R6,R7,R10,R11,R14,R15,R18 R19,R22,R23,R26,R27,R30,R31,R33,R41
8	8	8	8	8	16	B0000–821–A1005	RES SMT MF 05.00P .12W M010.00	R4,R8,R12,R16,R20,R24,R28,R32
					17			
10	10	10	10	10	18	B0000–675–S0104	CAP–N CE 050V M0.1000 20P SMT	BP1–BP10
16	16	16	16	16	19	B0000–679–S0105	CAP–N CE 050V M001.00 20P SMT	C1,C3,C4,C6,C7,C9,C10,C12,C13,C15,C16 C18,C19,C21,C22,C24,
8	8	8	8	8	20	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C2,C5,C8,C11,C14,C17,C20,C23
1	1	1	1	1	21	B0000–680–K4752	CAP–P TA 020V M004.700 10P SMT	C25
					22			
2	2	2	2	2	23	B0002–521–10020	CONN HDR PCB SH4 2X10 .125	J1,J2
1	1	1	1	1	24	B0001–861–00072	CONN PCB PC 2X36 M DUAL	JP1–JP2 (CUT TO FIT)
2	2	2	2	2	25	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	USED ON JP1–JP2
					26			
2	2	2	2	2	27	B0001–685–10012	TB PCB S.375 6–32 12 ME	TB1,TB2
					28			
1	1	1	1	1	29	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP1
1	1	1	1	1	30	B0001–955–00832	FASTENER PCB EXT 8–32 TB TIN	STD1
					31			
2	2	2	2	2	32	J4001–240–00000	WASHER LOCK INT NO 8 SS	STD1 (SEE E.GND DETAIL)
1	1	1	1	1	33	B0001–331–00000	NUT HEX SM PAT 8–32 SS	STD1 (SEE E.GND DETAIL)
-00005	-00004	-00003	-00002	-00000				

JUMPER CHART :

XT–AI POINTS	JP2	JP1
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D

XT–AI POINTS	JP2	JP1
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D

XT–AI POINTS	JP2	JP1
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D

XT–AI POINTS	JP2	JP1
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D

XT–AI POINTS	JP2	JP1
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D

XT–AI POINTS	JP2	JP1
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D

XT–AI POINTS	JP2	JP1
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D

VARIANCE STRUCTURE :

C3444–000– 0 0 0 X X

	RANGE	QTY.	RES R1,R5,R9,R13,R17,R21,R25,R29
-00000 =	1–5V	8	B0000–821–B1005 10.00M
-00002 =	4–20mA	8	B0000–823–00251 250ohm
-00003 =	0–1mA W/OVER RANGE	8	B0000–823–3012K 3.012K
-00004 =	0–1mA W/OVER RANGE	8	B0000–823–00452 4.5K
-00005 =	0–1mA	8	B0000–823–00502 5K

-00000 = 1–5V 10.0M
-00002 = 4–20MA
-00003 = 0–1MA 3.012K
-00004 = 0–1MA 4.5K
-00005 = 0–1MA 5K

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
					REVISIONS

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MPL | P C A | 8 P T | A I – X T | X X X X X X X X X X X C D C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010 ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

metso automation

APPROVALS	DATE
DWN PRAVIN	1–10–02
CHK D.MCGREGER	2-12-02
APP	2-12-02

PCA MICRO 1C/SAGE 2100, 2200
8PT ANALOG INPUT XT BOARD
DRAWING
ASSEMBLY

ACAD P/N C3444–000–000XX

SIZE B | C3444–000–000XX | REV 0

SCALE NONE | SHEET 1 OF 1

J1:A
1 DGND
2 A–OUTH
3 A–OUTL
4 +15V
5 A–A0
6 A–A1
7 A–A2
8 A–A3
9 A–A4
10 ABDSEL1
11 ABDSEL2
12 ABDSEL3
13 ABDSEL4
14 ABDSEL5
15 ABDSEL6
16 ABDSEL7
17 AGND
18 DGND
19 –15V
20 DGND

J2:A
FULLOUT
1 DGND
2 A–OUTH
3 A–OUTL
4 +15V
5 A–A0
6 A–A1
7 A–A2
8 A–A3
9 A–A4
10 ABDSEL1
11 ABDSEL2
12 ABDSEL3
13 ABDSEL4
14 ABDSEL5
15 ABDSEL6
16 ABDSEL7
17 AGND
18 DGND
19 –15V
20 DGND

U4
DG201–A
1 IN1
2 D1
3 S1
4 V–
5 GND
6 S4
7 D4
8 IN4
16 IN2
15 D2
14 S2
13 V+
12
11 S3
10 D3
9 IN3
AGND
–15V
+15V
ENABLE#
A–OUTL
A–OUTH

U2:A
OP282
+15V
–15V
MUX–OUTH

U2:B
OP282
MUX–OUTL

U3
HI–547
MUX–OUTH
MUX–OUTL
A2
A1
A0
+5V
EN
NC2
NC1
REF
V+
GND
V–
AGND
–15V
OUTA
OUTB
IN0A +CH1
IN0B –CH1
IN1A +CH2
IN1B –CH2
IN2A +CH3
IN2B –CH3
IN3A +CH4
IN3B –CH4
IN4A +CH5
IN4B –CH5
IN5A +CH6
IN5B –CH6
IN6A +CH7
IN6B –CH7
IN7A +CH8
IN7B –CH8

FROM SHEET 2

A–A0 R38 10K A0
A–A1 R39 10K A1
A–A2 R40 10K A2
A–A3 R35 10K A3
A–A4 R36 10K A4

BOARD SELECT
ABDSEL1 JP2:A 1
ABDSEL2 JP2:B 2
ABDSEL3 JP2:C 3
ABDSEL4 JP2:D 4
ABDSEL5 JP2:E 5
ABDSEL6 JP2:F 6
ABDSEL7 JP2:G 7

R34 10K BDSEL
R33 10K DGND

U1
74AHCT138SOL
A3
A4
DGND
+5V
DGND
A0
A1
A2
E1
E2
E3
VCC
GND
0 GROUP–A
1 GROUP–B
2 GROUP–C
3 GROUP–D

GROUP SELECT
+5V
R37 10K
GROUP–A JP1:A
GROUP–B JP1:B
GROUP–C JP1:C
GROUP–D JP1:D
10K R41 ENABLE#

FIDUC1
FIDUC2

+5V
BP1 0.1uF
BP9 0.1uF
BP6 0.1uF
DGND
+15V
BP4 0.1uF
BP8 0.1uF
BP2 0.1uF
AGND
–15V
BP3 0.1uF
BP7 0.1uF
BP5 0.1uF
AGND

TEST POINTS
TP1 AGND
TP2 +15V
TP3 +5V
TP4 –15V

+15V
CR1 18V
0.1uF BP10
DGND
VR1
78L05ACD
VIN
VOUT
GND
GND
GND
+5V
4.7uF C25
DGND

REV	ECO#	DATE	BY	CHK	DESCRIPTION
A	NA	—	—	—	PROTOTYPES

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metso automation

APPROVALS	DATE
DWN MOTSINGER	12/07/00
CHK	1-4-01
APP	

MPL SCH 8PT ANA–IN XT 5K 1MA

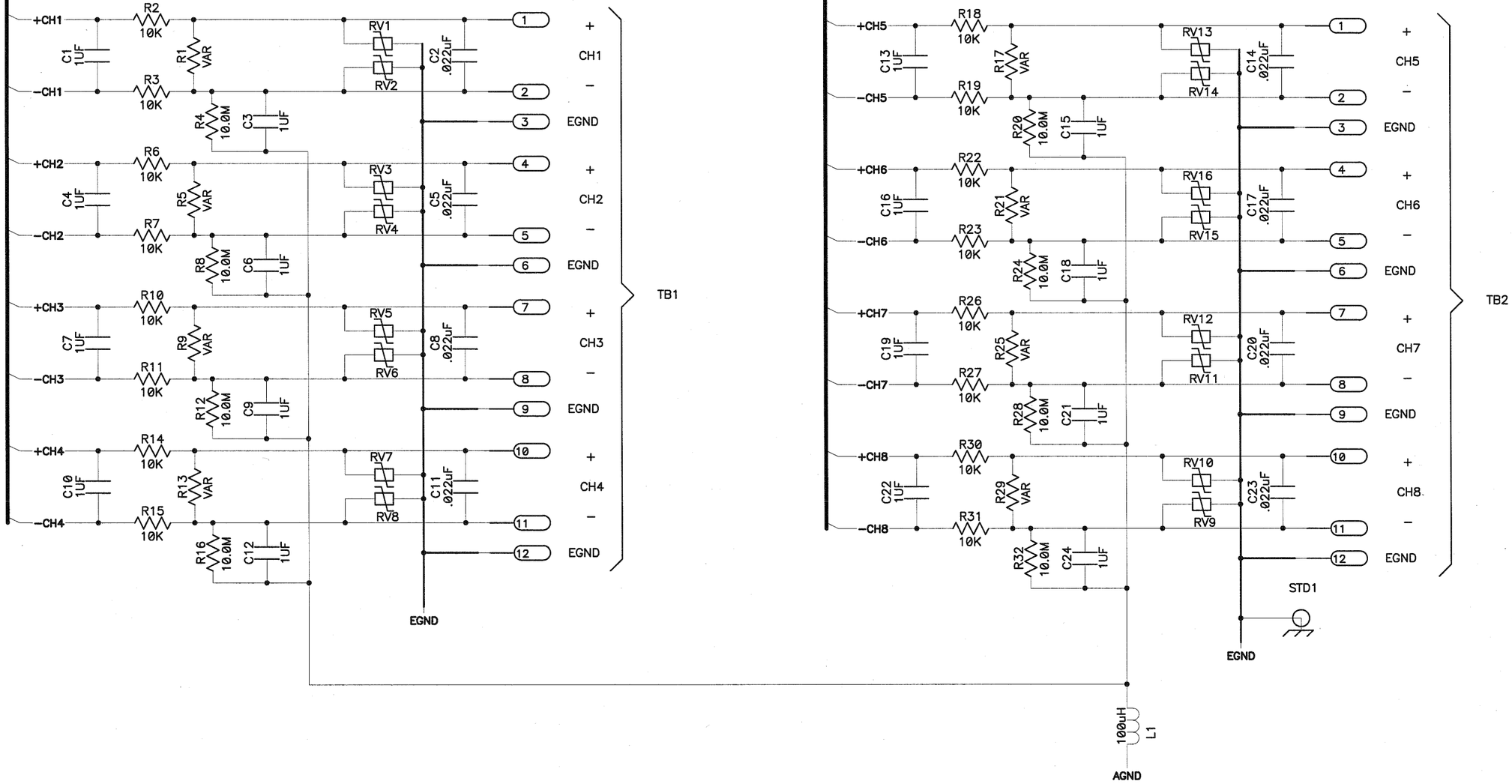
8 CHANNEL
ANALOG–IN
FOR CDC 44–550

PART # C3444-002-REV-A

SIZE B

TYPICAL VAR RESISTOR
5K = +/- 1MA
250H = 4MA TO 20MA

TO SHEET 1

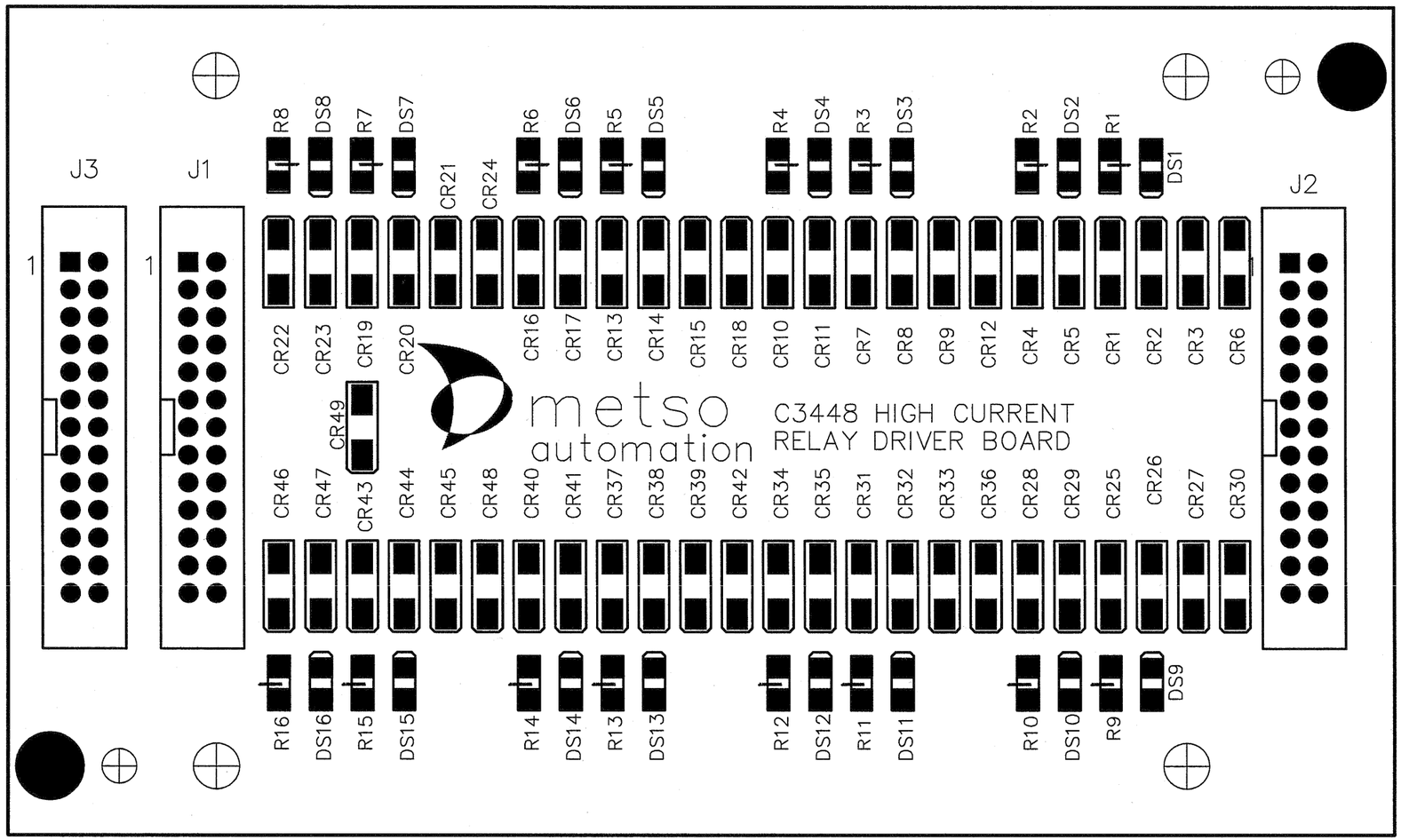


PART #	C3444-002-REV-A	
SIZE	B	SHEET 2 OF 2

NOTES:

1. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LETTER AND SERIAL NUMBER AFTER FINAL ASSEMBLY. PLACE LABEL ON OUTSIDE OF P2.
2. SCHEMATIC DIAGRAM IS A METSO SUPPLIED ITEM.

QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	C3448-001-REV-A	PCB HIGH CURRENT RLY DRVR BD	PCB
0	2	C3448-002-REV-A	SCH HIGH CURRENT RLY DRVR BD	SCH
	3			
16	4	B0000-821-C1002	RES SMT MF 01.00P .12W K010.0	R1-R16
	5			
49	6	J1160-016-S0000	DIODE 1N4004 RS 400V 01.00ASMT	CR2-CR49
	7			
16	8	B0000-871-S0001	LED RED SMT 1.6V T-3/4	DS1-DS16
	9			
3	10	B0002-521-10026	CONN HDR PCB SH4 SLT 2X13 .125	J1-J3
	11			
	12			
	13			
	14			
	15			



SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION

REVISIONS

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ACAD P/N: C3448-000-00001

MPL PCA HIGH CURRENT RLY DRV CDC

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010
ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

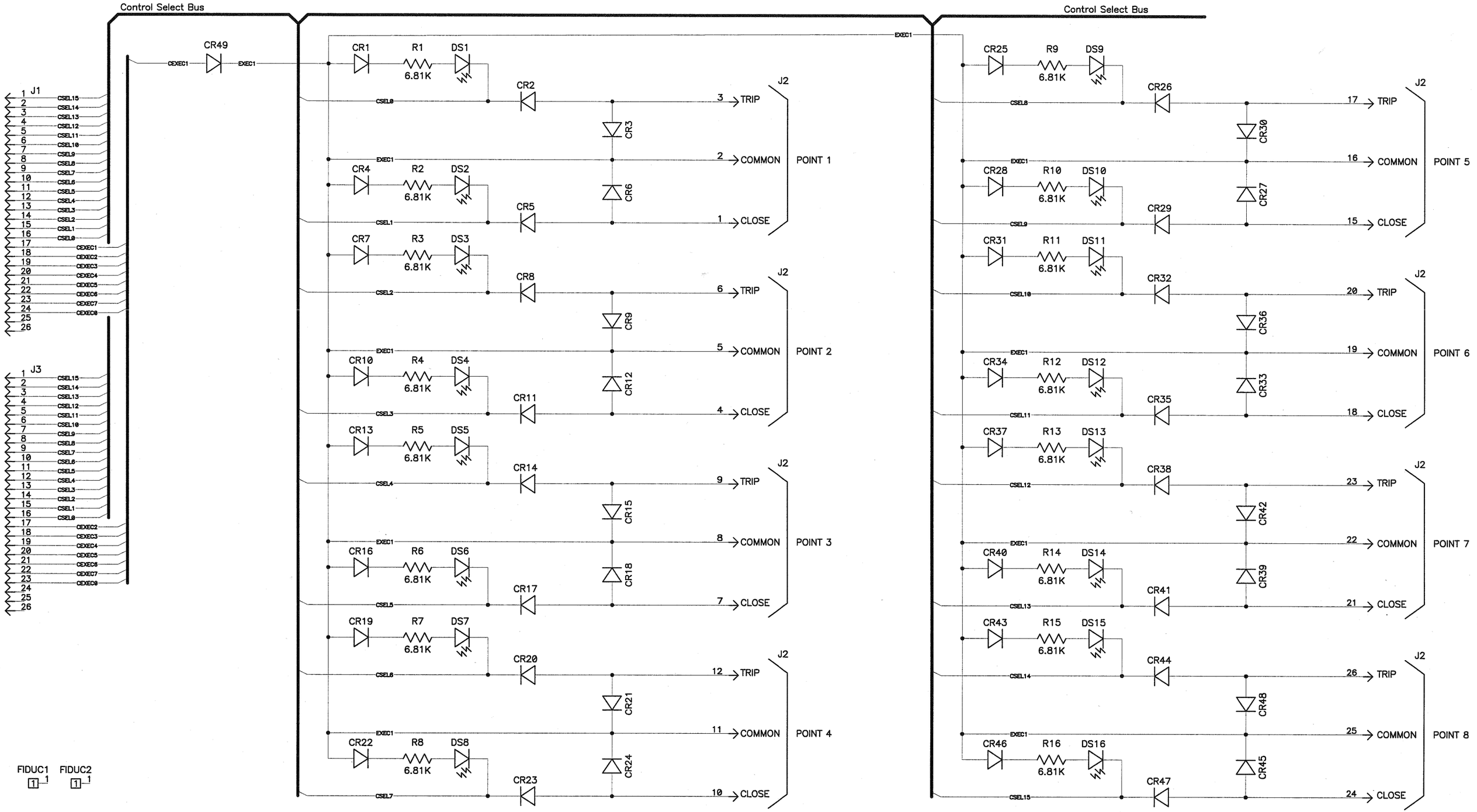
metso automation

APPROVALS	DATE
DWN PRAVIN	1-11-02
CHK D.MOTSINGER	2-4-02
APP	2/5/02

PCA SBO CONTROL BOARD, 8PT
HIGH CURRENT RELAY DRIVER
CDC 44-550

SIZE B | C3448-000-00001 | REV 0

SCALE NONE | SHEET 1 OF 1



REV	ECO#	DATE	BY	CHK	DESCRIPTION

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APPROVALS	DATE
DWN PPC	12-20-01
CHK	12-20-01
APP	2/5/02

MPL | SCH HIGH CURRENT RLY DRVR BD

SBO CONTROL RETROFIT BOARD

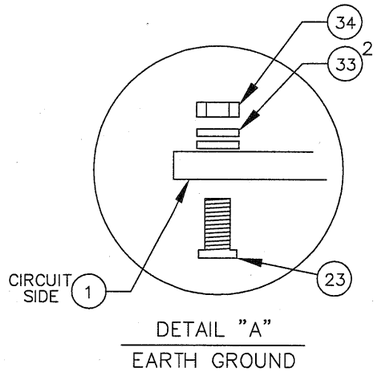
FOR CDC 44-550

PART # C3448-002-REV-A

SIZE B | SHEET 1 OF 1

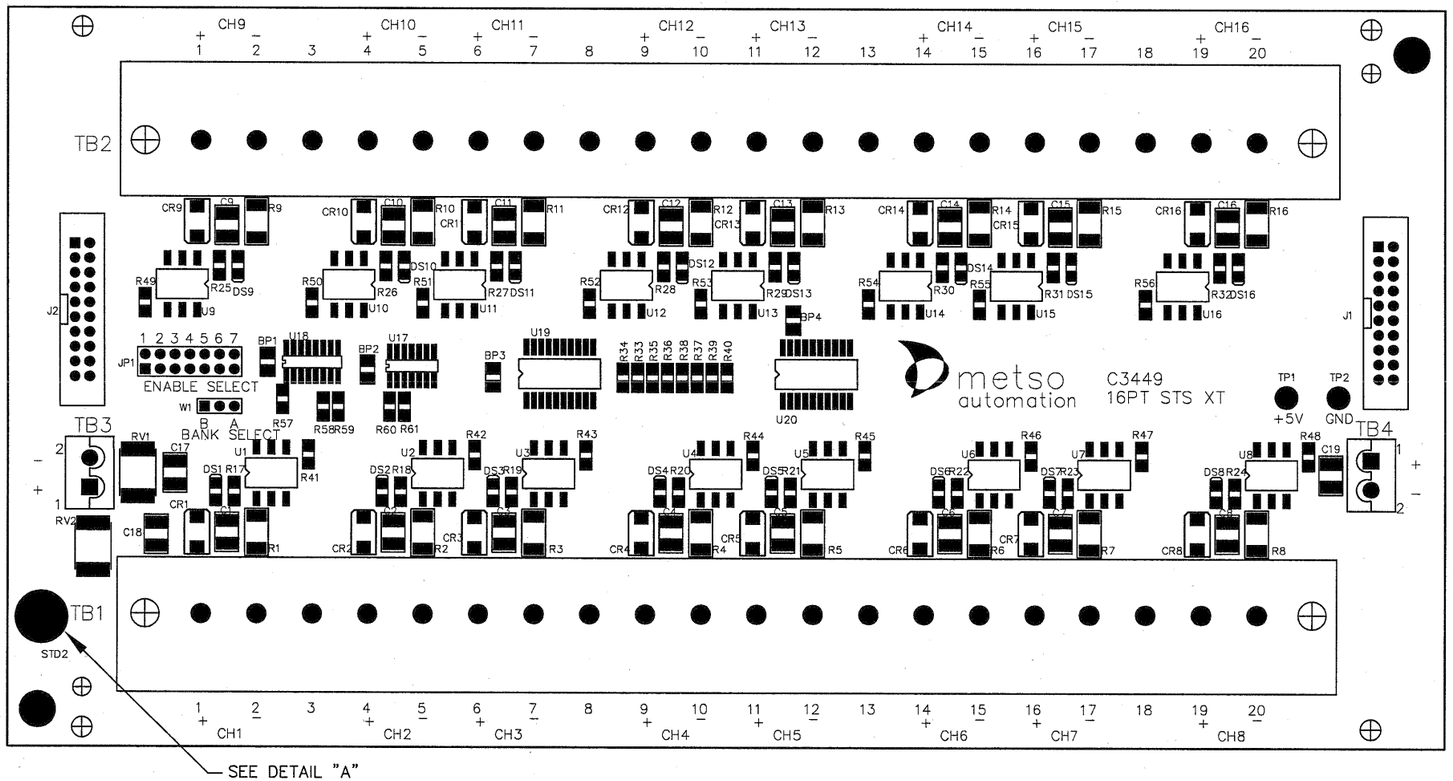
NOTES :

1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
2. ITEM #27 FACTORY INSTALLED IN JP1–1, W1–A.



DETAIL "A"

EARTH GROUND



QTY	QTY	QTY	QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	1	1	1	C3449–001–REV–A	PCB 16PT STS–XT XXXVDCCDC44500	PCB
0	0	0	0	2	C3449–002–REV–A	SCH 16PT STS XT XXXVDC	SCH
				3			
16	16	16	16	4	B0002–419–S0000	ICD H11L3/H11L1 OPTO ISO SMT	U1–U16
1	1	1	1	5	B0001–849–S0086	ICD 74AHCT86 X OR QUAD SMT	U17
1	1	1	1	6	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U18
2	2	2	2	7	B0001–849–S0240	ICD 74AHCT240 BUFFER SMT	U19,U20
				8			
16	16	16	16	9	B0001–247–S0008	DIODE SMB8.0 8.0V Z 0600W	CR1–CR16
16	16	16	16	10	B0000–871–S0001	LED RED SMT 1.6V T–3/4	DS1–DS16
2	2	2	2	11	B0002–476–S0000	VARISTOR 240V 268V MO	RV1,RV2
				12			
–	–	–	16	13	B0000–821–B2002	RES SMT 5.00P 1W K020.00	R1–R16
–	–	16	–	13	B0000–821–B2201	RES SMT 5.00P 1W K002.20	R1–R16
–	16	–	–	13	B0000–821–B6201	RES SMT 5.00P 1W K006.20	R1–R16
16	–	–	–	13	B0000–821–B8200	RES SMT 5.00P 1W K820.00	R1–R16
24	24	24	24	14	B0000–821–C3920	RES SMT MF 01.00P .12W H0392.0	R17–R40
21	21	21	21	15	B0000–821–C6811	RES SMT MF 01.00P .12W K06.81	R43,R49–R67
				16			
4	4	4	4	17	B0000–678–5104M	CAP–N CE 050V M0.1000 20P SMT	BP1–BP4
19	19	19	19	18	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C1–C19
				19			
2	2	2	2	20	B0002–521–10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2
				21			
1	1	1	1	22	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP2
1	1	1	1	23	B0001–955–00832	FASTENER PCB EXT 8–32 TB TIN	STD2 (SEE DETAIL "A")
				24			
1	1	1	1	25	B0002–291–00036	CONN HDR PC 36P S.100 .120	W1 (CUT TO FIT)
1	1	1	1	26	B0001–861–00072	CONN PCB PC 2X36 M DUAL	JP1 (CUT TO FIT)
2	2	2	2	27	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	USED ON JP1, W1
							SEE NOTE 2.
				28			
2	2	2	2	29	B0001–685–10020	TB PCB S.375 6–32 20 ME	TB1–TB2
2	2	2	2	30	B0001–882–VCH02	CONN HDR PCB 02P .197 VSH	TB3–TB4
2	2	2	2	31	B0001–882–CHR02	CONN PLG PCB 02P .197 FHV	USED ON TB3–TB4
				32			
2	2	2	2	33	J4001–240–00000	WASHER LOCK INT NO 8 SS	STD2 (SEE DETAIL "A")
1	1	1	1	34	B0002–331–00000	NUT HEX SM PAT 8–32 SS	STD2 (SEE DETAIL "A")

–00005 005VDC
–00004 048VDC
–00002 024VDC
–00001 129VDC

JUMPER CHART :

I/O POINTS	JP1	W1
1 – 16	1	A
17 – 32	1	B
33 – 48	2	A
49 – 64	2	B
65 – 80	3	A
81 – 96	3	B
97 – 112	4	A
113 – 128	4	B
129 – 144	5	A
145 – 160	5	B
161 – 176	6	A
177 – 192	6	B
193 – 208	7	A
209 – 224	7	B

VARIANCE STRUCTURE :

VARIANCE	VOLTAGE	QTY	RES R1–R16	
–00001 =	129VDC	16	B0000–821–B2002	20K
–00002 =	12–24VDC	16	B0000–821–B2201	2.2K
–00004 =	48VDC	16	B0000–821–B6201	6.2K
–00005 =	5VDC	16	B0000–821–B8200	820ohm

–00001 = 129VDC.
–00002 = 024VDC.
–00004 = 48VDC.
–00005 = 005VDC.

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION

REVISIONS

PROPERTY OF NELES AUTOMATION
THIS DOCUMENT, WHETHER PATENTABLE OR NON–PATENTABLE SUBJECT MATTER, EMBODIES CONFIDENTIAL INFORMATION OF NELES AUTOMATION, HOUSTON, TEXAS, AND IS LOANED WITH THE UNDERSTANDING THAT IT WILL NOT BE REPRODUCED NOR BE USED FOR ANY PURPOSE EXCEPT THAT FOR WHICH IT IS LOANED UNLESS WRITTEN PERMISSION IS GRANTED BY NELES AUTOMATION, AND IT SHALL BE RETURNED ON DEMAND.

ACAD P/N: C3449–000–0000X

MPL P C A 1 6 P T S T S – X T X X X V D C C D C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010
ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

metso automation

PCA MICRO 1C/SAGE 2100,
16PT DIGITAL INPUT XT BOARD
CDC 44–550,
ASSEMBLY DRAWING

APPROVALS	DATE
DWN PRAVIN	1–11–02
CHK D.DESINGER	2–12–02
APP	2–12–02

SIZE B | C3449–000–0000X | REV 0
SCALE NONE | SHEET 1 OF 1

BANK SELECT
W1
B
A
+5V
R60 6.81K
DGND
S-A1
R61 6.81K
U17:A
74AHCT86SOL
S-A0
R57 6.81K
U18
74AHCT138SOL
+5V
DGND
EN0#
EN1#
R58 6.81K
R59 6.81K
DGND
J1:A
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND
JP1:A
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
ENABLE SELECT
J2:A
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND
U19
74AHCT240SOL
U20
74AHCT240SOL
CH-1
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
CH-12
CH-13
CH-14
CH-15
CH-16
D0
D1
D2
D3
D4
D5
D6
D7
R33 392
R34 392
R35 392
R36 392
R37 392
R38 392
R39 392
R40 392
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
+5V
R41 6.81K
R42 6.81K
R43 6.81K
R44 6.81K
R45 6.81K
R46 6.81K
R47 6.81K
R48 6.81K
R49 6.81K
R50 6.81K
R51 6.81K
R52 6.81K
R53 6.81K
R54 6.81K
R55 6.81K
R56 6.81K
CH-1
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
CH-12
CH-13
CH-14
CH-15
CH-16
FIDUC1
FIDUC2
U17:C
U17:D
74AHCT86SOL
U17:B
74AHCT86SOL
+5V
U17:A
7 74AHCT86SOL
DGND
TP1
+5V
DGND
TP2
BP1 .1uF
BP2 .1uF
BP3 .1uF
BP4 .1uF
LOOPRET1
LOOP+
TB4
STATUS EXCITATION OUTPUT
TB4
C17 .022uF
C19 .022uF
C18 .022uF
RV1 V240CH8
RV2 V240CH8
STD2
EARTH GROUND
TB3
STATUS EXCITATION INPUT
+5V
DGND
U1 H11L1S
U2 H11L1S
U3 H11L1S
U4 H11L1S
U5 H11L1S
U6 H11L1S
U7 H11L1S
U8 H11L1S
U9 H11L1S
U10 H11L1S
U11 H11L1S
U12 H11L1S
U13 H11L1S
U14 H11L1S
U15 H11L1S
U16 H11L1S
CH-1
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
CH-12
CH-13
CH-14
CH-15
CH-16
R17 392
R18 392
R19 392
R20 392
R21 392
R22 392
R23 392
R24 392
R25 392
R26 392
R27 392
R28 392
R29 392
R30 392
R31 392
R32 392
DS1
DS2
DS3
DS4
DS5
DS6
DS7
DS8
DS9
DS10
DS11
DS12
DS13
DS14
DS15
DS16
CR1 SMBJ8.0
CR2 SMBJ8.0
CR3 SMBJ8.0
CR4 SMBJ8.0
CR5 SMBJ8.0
CR6 SMBJ8.0
CR7 SMBJ8.0
CR8 SMBJ8.0
CR9 SMBJ8.0
CR10 SMBJ8.0
CR11 SMBJ8.0
CR12 SMBJ8.0
CR13 SMBJ8.0
CR14 SMBJ8.0
CR15 SMBJ8.0
CR16 SMBJ8.0
VAR R1
VAR R2
VAR R3
VAR R4
VAR R5
VAR R6
VAR R7
VAR R8
VAR R9
VAR R10
VAR R11
VAR R12
VAR R13
VAR R14
VAR R15
VAR R16
C1 .022uF
C2 .022uF
C3 .022uF
C4 .022uF
C5 .022uF
C6 .022uF
C7 .022uF
C8 .022uF
C9 .022uF
C10 .022uF
C11 .022uF
C12 .022uF
C13 .022uF
C14 .022uF
C15 .022uF
C16 .022uF
TB1
2 IN_1
1 COMMON
5 IN_2
4 COMMON
7 IN_3
6 COMMON
10 IN_4
9 COMMON
12 IN_5
11 COMMON
15 IN_6
14 COMMON
17 IN_7
16 COMMON
20 IN_8
19 COMMON
TB2
2 IN_9
1 COMMON
5 IN_10
4 COMMON
7 IN_11
6 COMMON
10 IN_12
9 COMMON
12 IN_13
11 COMMON
15 IN_14
14 COMMON
17 IN_15
16 COMMON
20 IN_16
19 COMMON

REV	ECO#	DATE	BY	CHK	DESCRIPTION

metso automation

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APPROVALS	DATE
DWN Dmoody	1-4-02
CHK Dmoody	1-4-02
APP	2/7/02

MPL | SCH 16PT STS XT XXXVDC

16 CH. STATUS INPUT XT

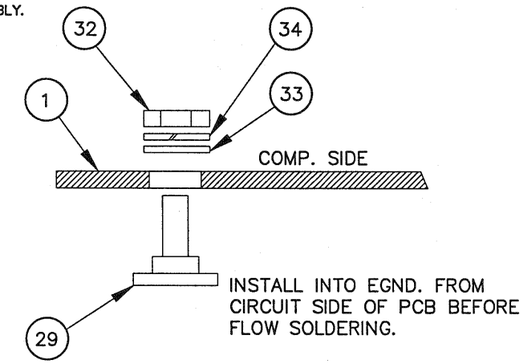
FOR CDC 44-550

PART # C3449-002-REV-A

SIZE B | SHEET 1 OF 1

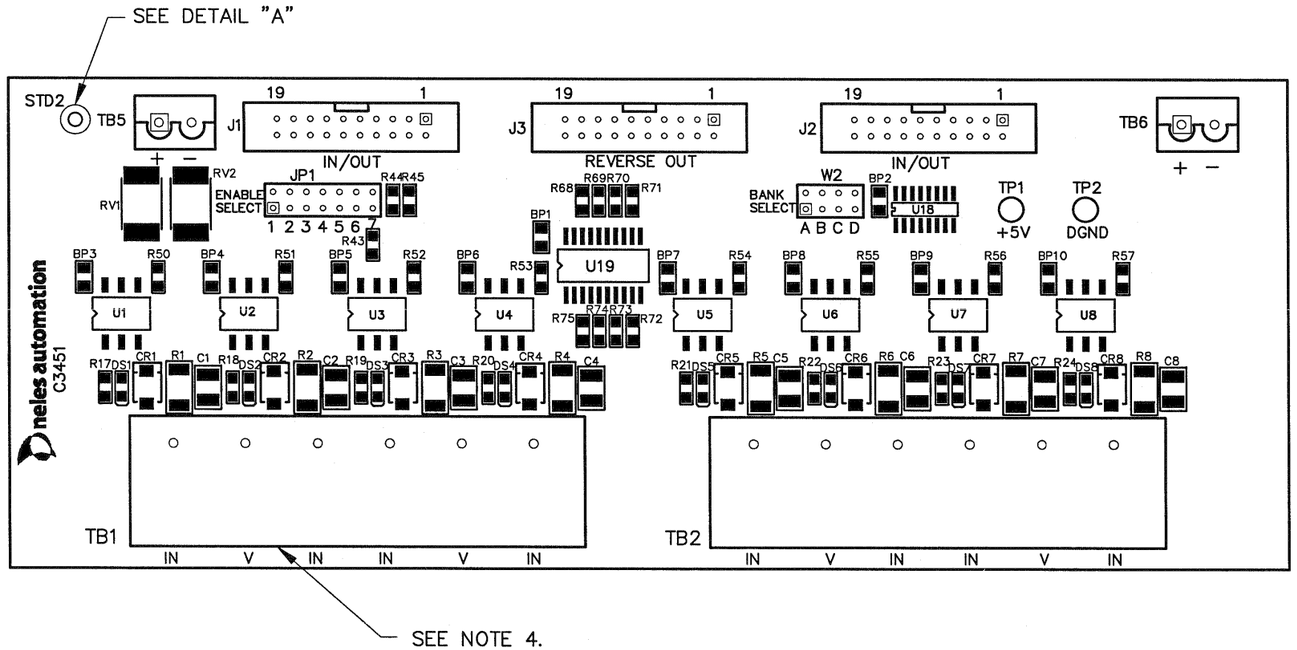
NOTES :

1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
3. NELES SUPPLIED ITEM.
4. TB1 TO TB6 SHOULD BE INSTALLED WITH THE SCALLOPES TOWARD THE INSIDE OF BOARD.
5. ITEM #22 FACTORY INSTALLED IN JP1–1, W2–A.



DETAIL "A"

QTY	QTY	QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	1	1	C3451–001–REV–A	PCB 8PT SNPTRAC D–IN XT	
0	0	0	2	C3451–002–REV–A	SCH 8PT SNPTRAC D–IN XT	SEE NOTE 3
			3			
1	1	1	4	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U18
1	1	1	5	B0001–849–S0240	ICD 74AHCT240 BUFFER SMT	U19
8	8	8	6	B0002–419–S0000	ICD H11L3/H11L1 OPTO ISO SMT	U1–U8
			7			
8	8	8	8	B0000–871–S0000	LED RED SMT 1.6V T–3/4	DS1–DS8
8	8	8	9	B0001–247–S0008	DIODE SMB8.0 8.0V Z 0600W	CR1–CR8
			10			
2	2	2	11	B0002–476–S0000	VARISTOR 240V 268V MO	RV1,RV2
–	–	8	12	B0000–821–B2201	RES SMT MF 5.00P 1W K002.20	R1–R8
–	8	–	13	B0000–821–B2002	RES SMT MF 5.00P 1W K020.00	R1–R8
8	–	–	14	B0000–821–B6201	RES SMT MF 5.00P 1W K006.20	R1–R8
			15			
			16			
8	8	8	17	B0000–821–C1002	RES SMT MF 01.00P .12W K010.00	R50–R57
19	19	19	18	B0000–821–C3920	RES SMT MF 01.00P .12W H0392.0	R17–R24,R43–R45,R68–R75
			19			
10	10	10	20	B0000–678–5104M	CAP–N CE 050V M0.1000 20P SMT	BP1–BP10
8	8	8	21	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C1–C8
2	2	2	22	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	JP1, W2 SEE NOTE 5.
2	2	2	23	B0001–882–VHC02	CONN HDR PCB 02P .197 VSH	TB5,TB6
2	2	2	24	B0001–882–CHR02	CONN PLG PCB 02P .197 FHV	TB5,TB6
2	2	2	25	B0000–318–00006	TB PCB S.438 8–32 BE 06POS	TB1–TB4
			26			
3	3	3	27	B0002–521–10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2,J3
1	1	1	28	B0002–291–00036	CONN HDR PC 36P S.100 .120	W2
1	1	1	29	B0001–955–00832	FASTENER PCB EXT 8–32 TB TIN	EGND STUD SEE DETAIL "A"
1	1	1	30	B0001–861–00072	CONN PCB PC 2X36 M DUAL	JP1
1	1	1	31	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP2
1	1	1	32	B0001–044–00000	NUT HEX LG PAT 8–32 SS	EG.STUD (SEE DETAIL "A")
1	1	1	33	J4001–240–00000	WASHER LOCK INT NO 8 SS	EG.STUD (SEE DETAIL "A")
1	1	1	34	B0000–006–00000	WASHER LOCK SPLIT NO 8 SS	EG.STUD (SEE DETAIL "A")
			35			



JUMPER CHART :

I/O POINTS	JP1	W1
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D

I/O POINTS	JP1	W1
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D

VARIANCE STRUCTURE :

–00003 = 2.2K RESISTORS, 24VDC.
–00004 = 20.0K RESISTORS, 129VDC.
–00005 = 6.2K RESISTORS, 48VDC.

–00003 = 024VDC
–00004 = 129VDC
–00005 = 48VDC

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION

REVISIONS

PROPERTY OF NELES AUTOMATION
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ACAD P/N: C3451–000–0000X

MPL PCA 08PT S/T DIGITAL IN XXXXXX

neles automation
A member of Metso Corporation

PCA MICRO 1C/SAGE 2100,
8PT DIGITAL INPUT XT BOARD
DRAWING
ASSEMBLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	APPROVALS	DATE
TOLERANCES DECIMALS .XX = ±.02 .XXX= ±.010 ANGLES ±.5°	DWN PRAVIN	8–16–00
MATERIAL: NONE	CHK C.JANIK	10/11/00
FINISH: NONE	APP	10/11/00

SIZE B | C3451–000–0000X | REV 0
SCALE NONE | SHEET 1 OF 1

J1:A
In / Out
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND

R45 392
R44 392
R43 392

U18
74HC138SOL
A0 A1 A2 E1 E2 E3 VCC GND
Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7
EN0 EN1 EN2 EN3

JP1:A
ENABLE SELECT

W2:A
Bank Select
A B C D

U19
74AHCT240SOL
ENABLE

D0 D1 D2 D3 D4 D5 D6 D7
R68 R69 R70 R71 R72 R73 R74 R75 390
SD0 SD1 SD2 SD3 SD4 SD5 SD6 SD7

R50 R51 R52 R53 R54 R55 R56 R57 10K
CH-1 CH-2 CH-3 CH-4 CH-5 CH-6 CH-7 CH-8

U1 U2 U3 U4 U5 U6 U7 U8
H11L1S
R17 R18 R19 R20 R21 R22 R23 R24 392
DS1 DS2 DS3 DS4 DS5 DS6 DS7 DS8
CR1 CR2 CR3 CR4 CR5 CR6 CR7 CR8
SMBJ8.0
VAR R1 VAR R2 VAR R3 VAR R4 VAR R5 VAR R6 VAR R7 VAR R8
C1 .022uF C2 .022uF C3 .022uF C4 .022uF C5 .022uF C6 .022uF C7 .022uF C8 .022uF

TB1:A
TB2:A
TB5:A
LOOP+
LOOPRET1
TB6:A

J2:A
In / Out
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND

J3:A
Reverse Out
SD7
SD6
SD5
SD4
SD3
SD2
SD1
SD0
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND

TP1 +5V
TP2 DGND

Variable Resistors R1–R8
24V Inputs = 2.2K
48V Inputs = 6.2K
129V Inputs = 20K

STD2
EGND
RV2
RV1

FIDUC1 FIDUC2 FIDUC3

BP1 .1uF BP2 .1uF BP3 .1uF BP4 .1uF BP5 .1uF BP6 .1uF BP7 .1uF BP8 .1uF BP9 .1uF BP10 .1uF
+5V
DGND

REV	ECO#	DATE	BY	CHK	DESCRIPTION
A	NA	9-18-00	JANIK		PRODUCTION RELEASE

neles automation
A member of Metso Corporation

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APPROVALS	DATE
DWN JANIK	9-18-00
CHK	9/19/00
APP	9/19/00

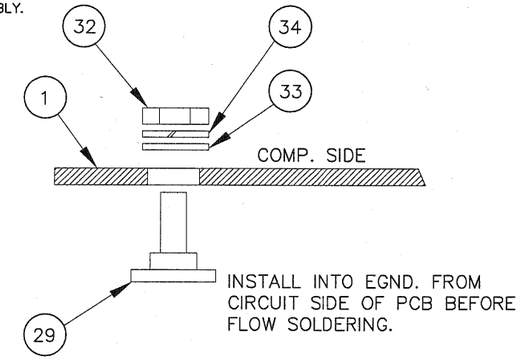
MPL
SCH 8PT SNPTRAC D-IN XT 7.5"

8 CH. STATUS INPUT XT

PART # C3451-002-REV-A
SIZE B
SHEET 1 OF 1

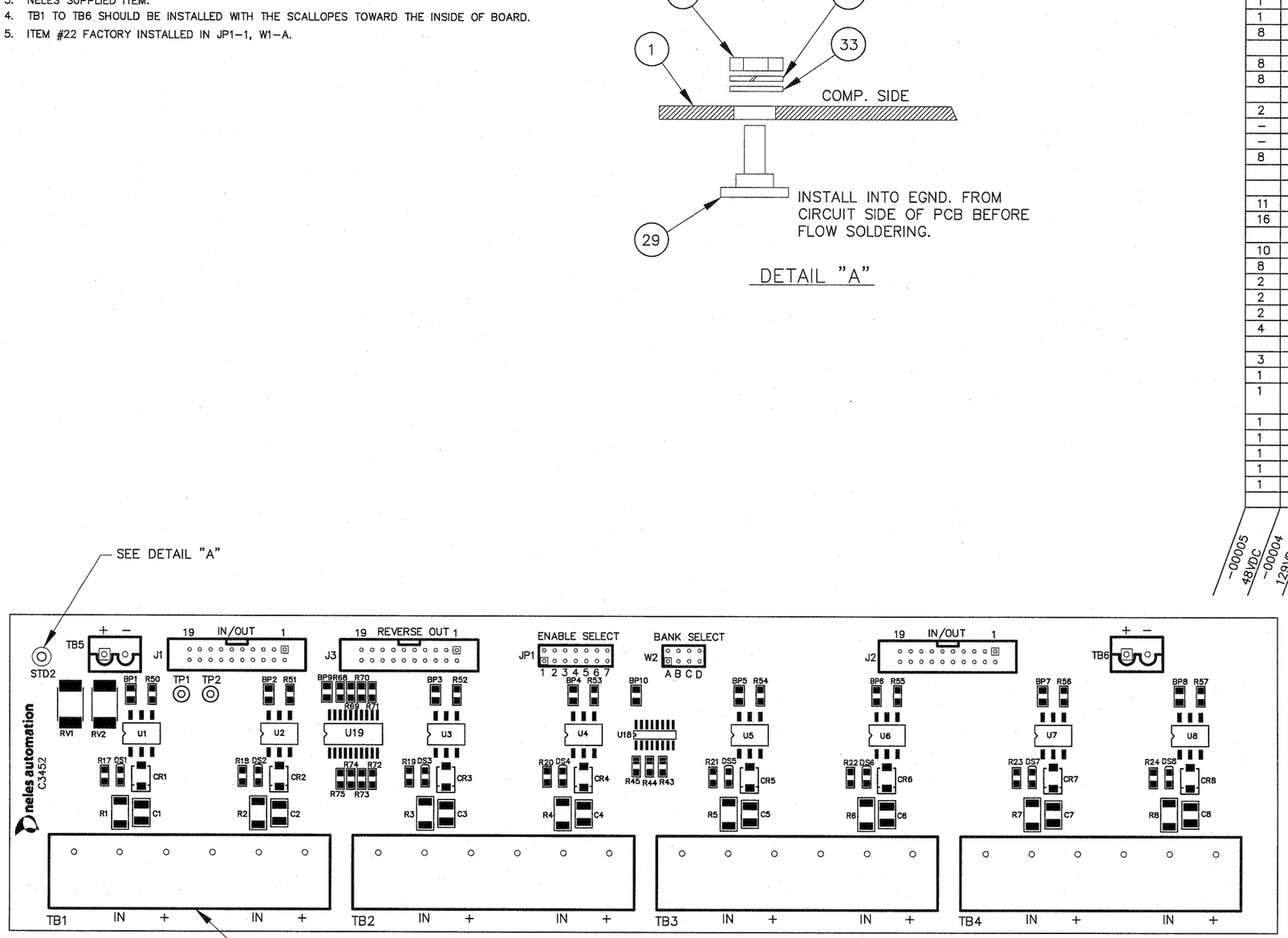
NOTES :

1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
3. NELES SUPPLIED ITEM.
4. TB1 TO TB6 SHOULD BE INSTALLED WITH THE SCALLOPES TOWARD THE INSIDE OF BOARD.
5. ITEM #22 FACTORY INSTALLED IN JP1–1, W1–A.



DETAIL "A"

QTY	QTY	QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	1	1	C3452–001–REV–B	PCB 8PT SNPTRAC D–IN XT	
0	0	0	2	C3452–002–REV–B	SCH 8PT SNPTRAC D–IN XT	SEE NOTE 3
			3			X
1	1	1	4	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U18
1	1	1	5	B0001–849–S0240	ICD 74AHCT240 BUFFER SMT	U19
8	8	8	6	B0002–419–S0000	ICD H11L3/H11L1 OPTO ISO SMT	U1–U8
			7			
8	8	8	8	B0000–871–S0000	LED RED SMT 1.6V T–3/4	DS1–DS8
8	8	8	9	B0001–247–S0008	DIODE SMB8.0 8.0V Z 0600W	CR1–CR8
			10			
2	2	2	11	B0002–476–S0000	VARISTOR 240V 268V MO	RV1,RV2
–	–	8	12	B0000–821–B2201	RES SMT MF 5.00P 1W K002.20	R1–R8
–	8	–	13	B0000–821–B2002	RES SMT MF 5.00P 1W K020.00	R1–R8
8	–	–	14	B0000–821–B6201	RES SMT MF 5.00P 1W K006.20	R1–R8
			15			
			16			
11	11	11	17	B0000–821–C1002	RES SMT MF 01.00P .12W K010.00	R43–R45,R50–R57
16	16	16	18	B0000–821–C3920	RES SMT MF 01.00P .12W H0392.0	R17–R24,R68–R75
			19			
10	10	10	20	B0000–678–5104M	CAP–N CE 050V M0.1000 20P SMT	BP1–BP10
8	8	8	21	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C1–C8
2	2	2	22	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	JP1, W1 SEE NOTE 5.
2	2	2	23	B0001–882–VHC02	CONN HDR PCB 02P .197 VSH	TB5,TB6
2	2	2	24	B0001–882–CHR02	CONN PLG PCB 02P .197 FHV	TB5,TB6
4	4	4	25	B0000–318–00006	TB PCB S.438 8–32 BE 06POS	TB1–TB4
			26			
3	3	3	27	B0002–521–10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2,J3
1	1	1	28	B0002–291–00036	CONN HDR PC 36P S.100 .120	W2
1	1	1	29	B0001–955–00832	FASTENER PCB EXT 8–32 TB TIN	EGND STUD SEE DETAIL "A"
1	1	1	30	B0001–861–00072	CONN PCB PC 2X36 M DUAL	JP1
1	1	1	31	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP2
1	1	1	32	B0001–044–00000	NUT HEX LG PAT 8–32 SS	EG.STUD (SEE DETAIL "A")
1	1	1	33	J4001–240–00000	WASHER LOCK INT NO 8 SS	EG.STUD (SEE DETAIL "A")
1	1	1	34	B0000–006–00000	WASHER LOCK SPLIT NO 8 SS	EG.STUD (SEE DETAIL "A")
			35			



JUMPER CHART :

XT–AI POINTS	JP1	W1
1 – 8	1	A
9 – 16	1	B
17 – 24	1	C
25 – 32	1	D
33 – 40	2	A
41 – 48	2	B
49 – 56	2	C
57 – 64	2	D
65 – 72	3	A
73 – 80	3	B
81 – 88	3	C
89 – 96	3	D
97 – 104	4	A
105 – 112	4	B
113 – 120	4	C
121 – 128	4	D

XT–AI POINTS	JP1	W1
129 – 136	5	A
137 – 144	5	B
145 – 152	5	C
153 – 160	5	D
161 – 168	6	A
169 – 176	6	B
177 – 184	6	C
185 – 192	6	D
193 – 200	7	A
201 – 208	7	B
209 – 216	7	C
217 – 224	7	D

VARIANCE STRUCTURE :

–00003 = 2.2K RESISTORS, 24VDC.
–00004 = 20.0K RESISTORS, 129VDC.
–00005 = 6.2K RESISTORS, 48VDC.

–00005 48VDC
–00004 129VDC
–00003 024VDC

–00003 = 024VDC
–00004 = 129VDC
–00005 = 48VDC

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
B	10853	10–26–01	P.P	DM	ITEM 1 WAS –REV–A
A	10599	2–6–01	P.P	D.M	ITEM 17 QTY WAS 8, ITEM 18 QTY WAS 19, & ITEM 2 WAS REV–A

REVISIONS

PROPERTY OF METSO AUTOMATION
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MPL PCA 08PT S/T DIGITAL IN XXXXXX

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS .XX = ±.02 .XXX= ±.010
ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

metso automation

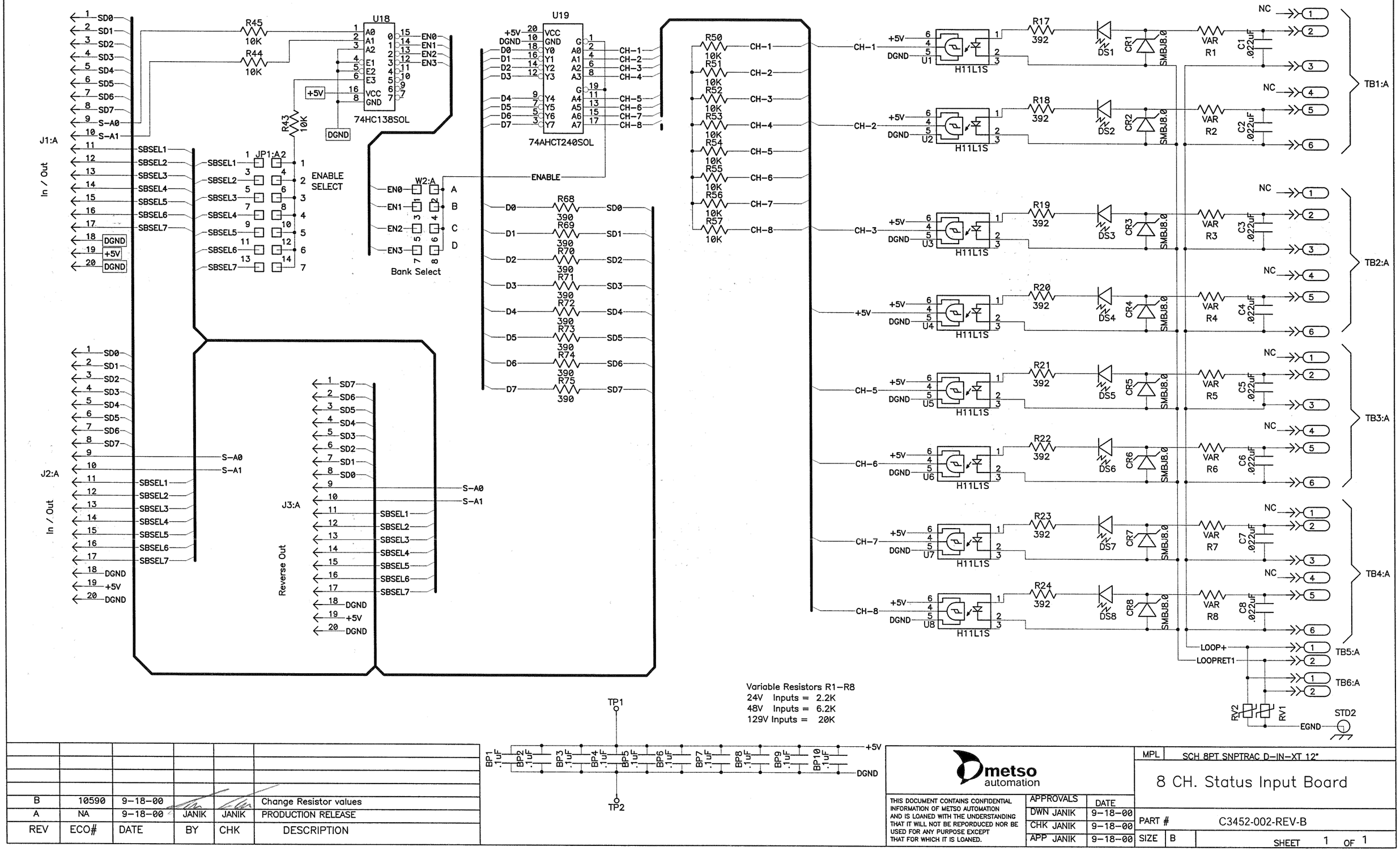
APPROVALS	DATE
DWN PRAVIN	8–14–00
CHK C.JANIK	8–15–00
APP C.JANIK	8–15–00

PCA MICRO 1C/SAGE 2100, 8PT DIGITAL INPUT XT BOARD DRAWING ASSEMBLY

ACAD P/N: C3452–000–0000X

SIZE B | C3452–000–0000X | REV B

SCALE NONE | SHEET 1 OF 1



REV	ECO#	DATE	BY	CHK	DESCRIPTION
B	10590	9–18–00			Change Resistor values
A	NA	9–18–00	JANIK	JANIK	PRODUCTION RELEASE

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APPROVALS	DATE
DWN JANIK	9–18–00
CHK JANIK	9–18–00
APP JANIK	9–18–00

metso automation

MPL SCH 8PT SNPTRAC D-IN-XT 12"

8 CH. Status Input Board

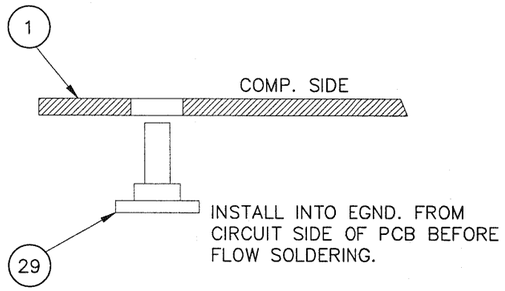
PART # C3452-002-REV-B

SIZE B

SHEET 1 OF 1

NOTES :

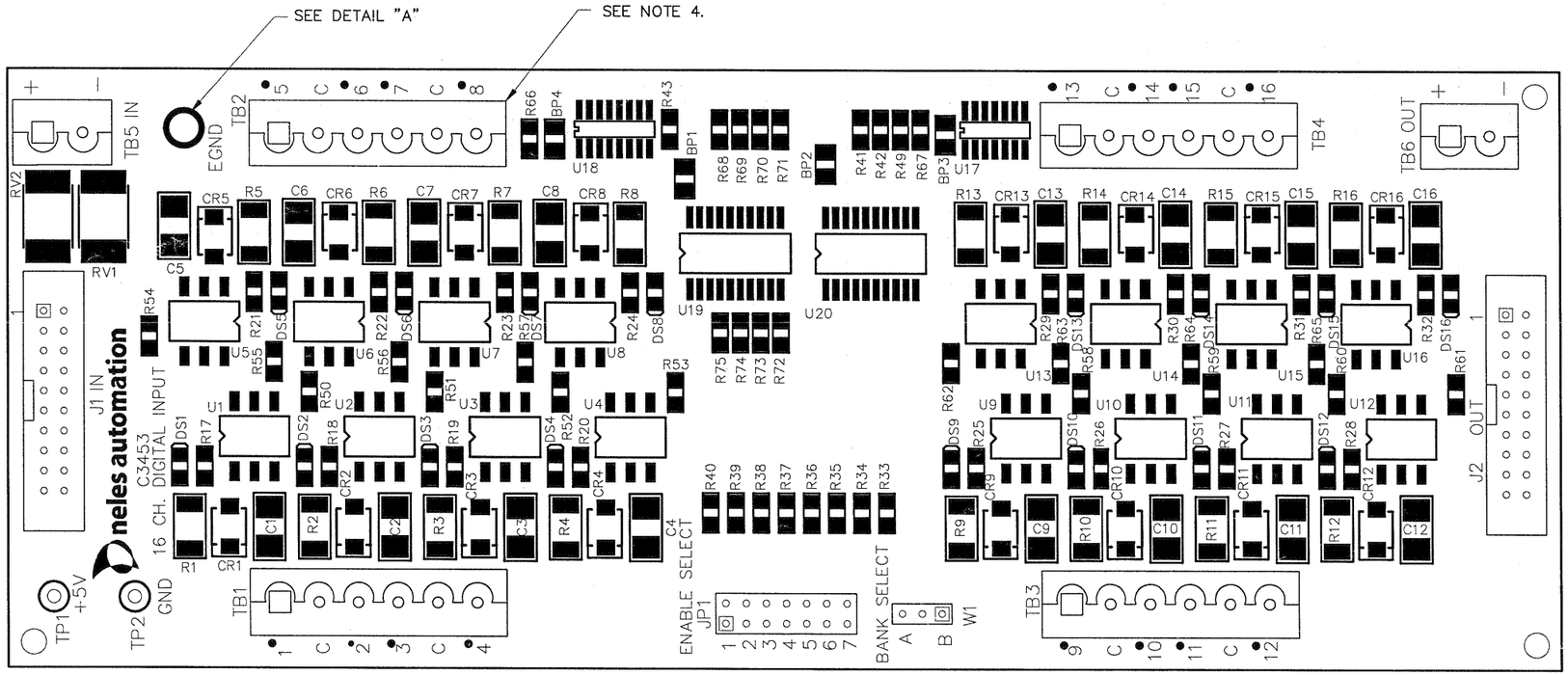
1. CAUTION! CMOS DEVICES INSTALLED – HANDLE AT GROUNDED WORK STATION.
2. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND SERIAL NUMBER AFTER FINAL ASSEMBLY. AND BEFORE INSPECTION.
3. VALMET SUPPLIED ITEM.
4. TB1 TO TB6 SHOULD BE INSTALLED WITH THE SCALLOPES TOWARD THE INSIDE OF BOARD.
5. ITEM #22 FACTORY INSTALLED IN JP1–1, W1–A.



DETAIL "A"

QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	C3453–001–REV–A	PCB 16PT SNPTRAC DIGITAL IN BD	
0	2	C3453–002–REV–A	SCH 16PT SNPTRAC DIGITAL IN BD	SEE NOTE 3
	3			X
1	4	B0001–849–S0138	ICD 74AHCT138 3–8 DECODER SMT	U18
2	5	B0001–849–S0240	ICD 74AHCT240 BUFFER SMT	U19,U20
16	6	B0002–419–S0000	ICD H11L3/H11L1 OPTO ISO SMT	U1–U16
1	7	B0001–849–S0086	ICD 74AHCT86 X OR QUAD SMT	U17
16	8	B0000–871–S0000	LED RED SMT 1.6V T–3/4	DS1–DS16
16	9	B0001–247–S0008	DIODE SMB8.0 8.0V Z 0600W	CR1–CR16
	10			
2	11	B0002–476–S0000	VARISTOR 240V 268V MO	RV1,RV2
16	12	B0000–821–B2201	RES SMT MF 5.00P 1W K002.20	R1–R16
	13			
	14			
	15			
	16			
19	17	B0000–821–C6811	RES SMT MF 01.00P .12W K06.81	R43,R49–R67
24	18	B0000–821–C3920	RES SMT MF 01.00P .12W H0392.0	R17–R32,R68–R75
	19			
4	20	B0000–678–5104M	CAP–N CE 050V M0.1000 20P SMT	BP1–BP4
16	21	B0001–694–S0000	CAP–N CE 1KV M000.022 20P SMT	C1–C16
2	22	B0002–290–00000	JUMPER MINI 0.100 1R 2P GOLD	JP1, W1 SEE NOTE 5.
2	23	B0001–882–VHC02	CONN HDR PCB 02P .197 VSH	TB5,TB6
2	24	B0001–882–CHR02	CONN PLG PCB 02P .197 FHV	TB5,TB6
4	25	B0001–882–VHC06	CONN HDR PCB 06P .197 VSH	TB1–TB4
4	26	B0001–882–CHR06	CONN PLG PCB 06P .197 FHV	TB1–TB4
2	27	B0002–521–10020	CONN HDR PCB SH4 SLT 2X10 .125	J1,J2
1	28	B0002–291–00036	CONN HDR PC 36P S.100 .120	W1
1	29	B0001–955–00832	FASTENER PCB EXT 8–32 TB TIN	EGND STUD SEE DETAIL "A"
1	30	B0001–861–00072	CONN PCB PC 2X36 M DUAL	JP1
1	31	B0000–740–00000	TERM PIN TURRET H .062D/.094T	TP2
	32			

–00003
024VDC



JUMPER CHART :

I/O POINTS	JP1	W1
17 – 32	1	A
33 – 48	1	B
49 – 64	2	A
65 – 80	2	B
81 – 96	3	A
97 – 112	3	B
113 – 128	4	A
129 – 144	4	B
145 – 160	5	A
161 – 176	5	B
177 – 192	6	A
193 – 208	6	B
209 – 224	7	A
225 – 240	7	B

VARIANCE STRUCTURE :

–00003 = 2.2K RESISTORS, 24VDC.
–00004 = 20.0K RESISTORS, 129VDC.
–00005 = 6.2K RESISTORS, 48VDC.
–00006 = 820ohm RESISTORS, 12VDC.

024VDC
129VDC
48VDC
12VDC

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION

REVISIONS

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ACAD P/N	C3453–000–0000X

MPL PCA 16PT S/T DIGITAL IN XXXXXX

neles automation
A member of Metso Corporation

PCA MICRO 1C/SAGE 2100,
16PT DIGITAL INPUT XT BOARD
DRAWING
ASSEMBLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	APPROVALS	DATE
TOLERANCES DECIMALS .XX ± .02 .XXX ± .010 ANGLES ±.5°	DWN PRAVIN	11–4–99
MATERIAL: NONE	CHK C.JANIK	11-5-99
FINISH: NONE	APP	

SIZE B | C3453–000–0000X | REV 0
SCALE NONE | SHEET 1 OF 1

BANK SELECT
W1
B
A
+5V
R49 6.81K
DGND
R67 6.81K
S-A1
U17:A
74AHCT86SOL
R66 6.81K
S-A0
U18
74AHCT138SOL
+5V
DGND
NOT INSTALLED
R41 1.0M
R42 1.0M
DGND
R43 6.81K
JP1:A
ENABLE SELECT
J1:A
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
S-A0
S-A1
SBSEL1
SBSEL2
SBSEL3
SBSEL4
SBSEL5
SBSEL6
SBSEL7
DGND
+5V
DGND
J2:A
EN0#
EN1#
U19
74AHCT240SOL
U20
74AHCT240SOL
D0
D1
D2
D3
D4
D5
D6
D7
R68 392
R69 392
R70 392
R71 392
R72 392
R73 392
R74 392
R75 392
CH-1
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
CH-12
CH-13
CH-14
CH-15
CH-16
R50 6.81K
R51 6.81K
R52 6.81K
R53 6.81K
R54 6.81K
R55 6.81K
R56 6.81K
R57 6.81K
R58 6.81K
R59 6.81K
R60 6.81K
R61 6.81K
R62 6.81K
R63 6.81K
R64 6.81K
R65 6.81K
H11L1S
U1
U2
U3
U4
U5
U6
U7
U8
U9
U10
U11
U12
U13
U14
U15
U16
DS1
DS2
DS3
DS4
DS5
DS6
DS7
DS8
DS9
DS10
DS11
DS12
DS13
DS14
DS15
DS16
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
SMBJ8.0
R17 392
R18 392
R19 392
R20 392
R21 392
R22 392
R23 392
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R26 392
R27 392
R28 392
R29 392
R30 392
R31 392
R32 392
VAR R1
VAR R2
VAR R3
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VAR R5
VAR R6
VAR R7
VAR R8
VAR R9
VAR R10
VAR R11
VAR R12
VAR R13
VAR R14
VAR R15
VAR R16
C1 .022uF
C2 .022uF
C3 .022uF
C4 .022uF
C5 .022uF
C6 .022uF
C7 .022uF
C8 .022uF
C9 .022uF
C10 .022uF
C11 .022uF
C12 .022uF
C13 .022uF
C14 .022uF
C15 .022uF
C16 .022uF
TB1:A
TB2:A
TB3:A
TB4:A
IN_1
COMMON
IN_2
IN_3
COMMON
IN_4
IN_5
COMMON
IN_6
IN_7
COMMON
IN_8
IN_9
COMMON
IN_10
IN_11
COMMON
IN_12
IN_13
COMMON
IN_14
IN_15
COMMON
IN_16
R33 1.0M
R34 1.0M
R35 1.0M
R36 1.0M
R37 1.0M
R38 1.0M
R39 1.0M
R40 1.0M
R41 1.0M
NOT INSTALLED
DGND
U17:C
U17:B
U17:D
74AHCT86SOL
+5V
DGND
TP1
TP2
BP1 .1uF
BP2 .1uF
BP3 .1uF
BP4 .1uF
LOOPRET1
LOOP+
TB5:A
TB6:A
STD2
EGND
RV1
RV2

REV	ECO#	DATE	BY	CHK	DESCRIPTION
A	NA	12/9/99	[illegible]	[illegible]	Production Release

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APPROVALS	DATE
DWN	
CHK	12/9/99
APP	12/9/99

MPL

SCH 16PT SNPTRAC DIGITAL IN BD

16 CH. STATUS INPUT XT

PART # C3453-002-REV-A

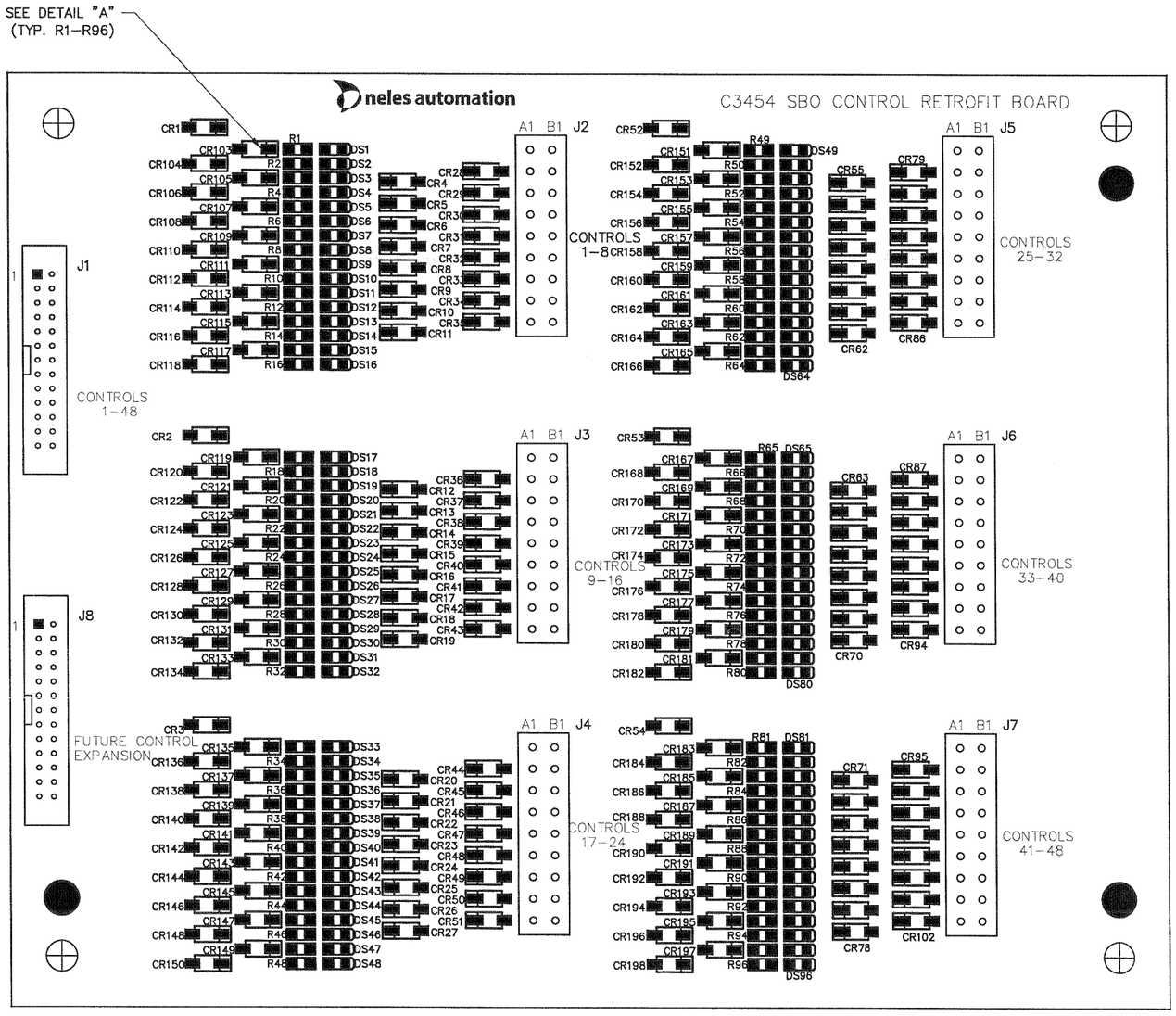
SIZE B

SHEET 1 OF 1

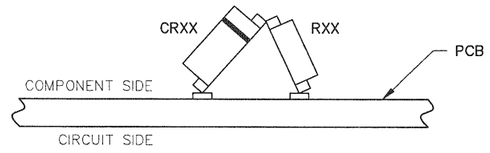
NOTES:

1. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LETTER AND SERIAL NUMBER AFTER FINAL ASSEMBLY. PLACE LABEL ON OUTSIDE OF P2.
2. SCHEMATIC DIAGRAM IS A NELES SUPPLIED ITEM.
3. INSTALL GOLD PINS (ITEM 8) AND HOLD IN PLACE WITH SAMPLE BOARD DURING FLOW SOLDER.

QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	C3454-001-REV-B	PCB SBO CTRL BD CDC 40-500	
0	2	C3454-002-REV-B	SCH SBO STRL BD CDC 40-500	
	3			
198	4	J1160-016-S0000	DIODE 1N4004 RS 400V 01.00ASMT	CR1-CR198
96	5	B0000-871-S0001	LED RED SMT 1.6V T-3/4	DS1-DS96
96	6	B0000-821-C6811	RES SMT MF 01.00P .12W K06.81	R1-R96 (SEE DETAIL "A")
2	7	B0002-521-10026	CONN HDR PCB SH4 SLT 2X13 .125	J1, J8
108	8	B0002-910-00001	PIN GOLD SOLDER .020 DIA X0.437	USED IN J2-J7
	9			
	10			
	11			
	12			
	13			
	14			
	15			



SCHEMATIC



DETAIL "A"

(REQUIRED ON C3454-001-REV-A ONLY)
(TYP. R1-R96)

SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
A	10443	8-3-00	P.P		ITEM 1 & 2 WAS REV-A

REVISIONS

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ACAD P/N	C3454-000-00001

MPL PCA SBO CTRL BD CDC 40-500 48P

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PCA SBO CONTROL BOARD
40-500
CDC

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES DECIMALS .XX = ±.02 .XXX= ±.010 ANGLES ±.5°
MATERIAL: NONE
FINISH: NONE

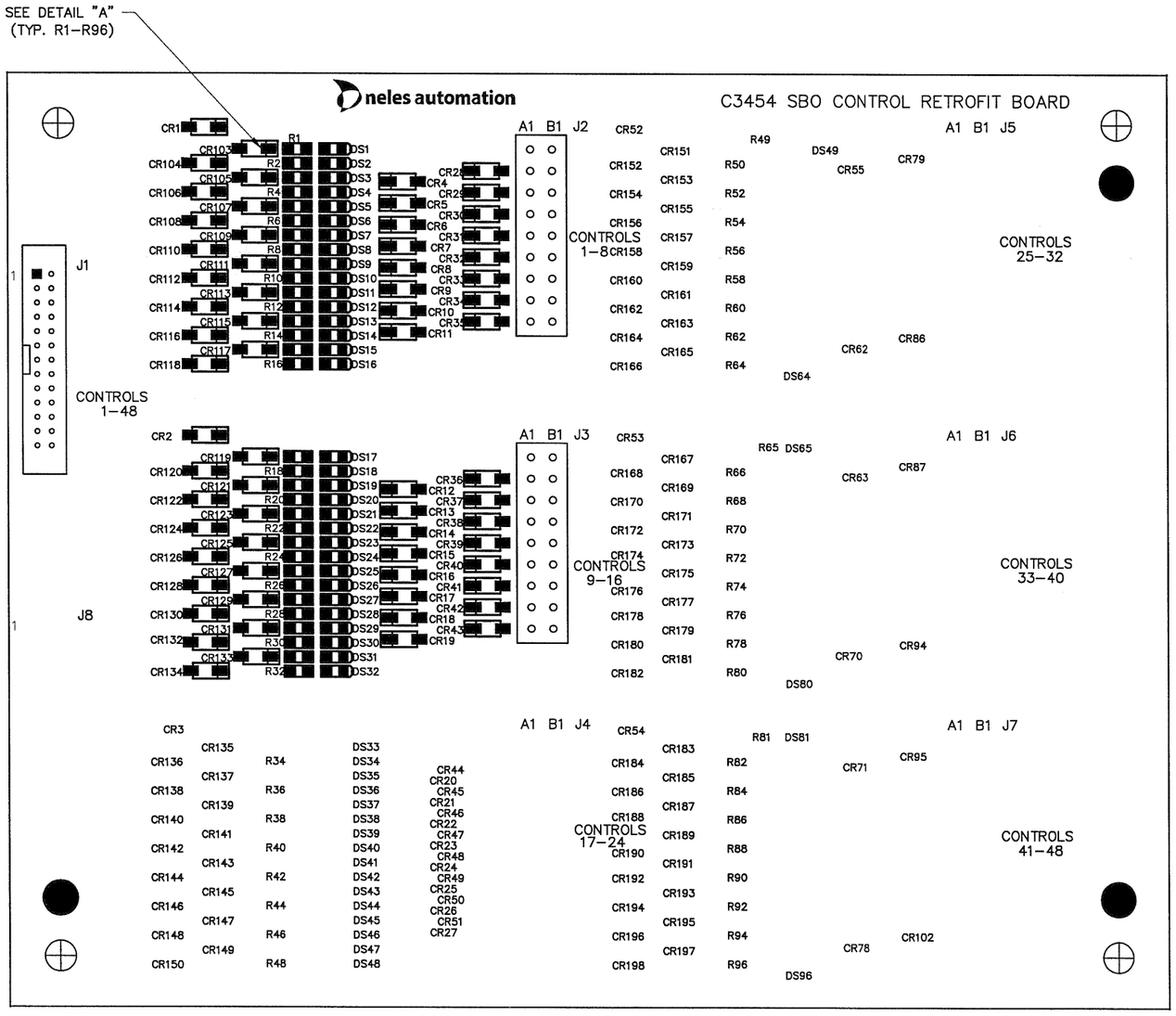
	APPROVALS	DATE
DWN	D.WATKINS	3-22-00
CHK	C.JANIK	4-5-00
APP	C.JANIK	4-5-00

SIZE B | C3454-000-00001 | REV A
SCALE NONE | SHEET 1 OF 1

NOTES:

1. MARK BOARD WITH ASSEMBLY PART NUMBER, REVISION LETTER AND SERIAL NUMBER AFTER FINAL ASSEMBLY. PLACE LABEL ON OUTSIDE OF P2.
2. SCHEMATIC DIAGRAM IS A NELES SUPPLIED ITEM.
3. INSTALL GOLD PINS (ITEM 8) AND HOLD IN PLACE WITH SAMPLE BOARD DURING FLOW SOLDER.

QTY	ITEM	PART NUMBER	DESCRIPTION	NOTES
1	1	C3454-001-REV-B	PCB SBO CTRL BD CDC 40-500	
0	2	C3454-002-REV-B	SCH SBO STRL BD CDC 40-500	
	3			
66	4	J1160-016-S0000	DIODE 1N4004 RS 400V 01.00ASMT	CR1-CR2,CR4-CR43,CR103-CR134
32	5	B0000-871-S0001	LED RED SMT 1.6V T-3/4	DS1-DS32
32	6	B0000-821-C6811	RES SMT MF 01.00P .12W K06.81	R1-R32 (SEE DETAIL "A")
1	7	B0002-521-10026	CONN HDR PCB SH4 SLT 2X13 .125	J1,
36	8	B0002-910-00001	PIN GOLD SOLDER .020 DIA X0.437	USED IN J2,J3
	9			
	10			
	11			
	12			
	13			
	14			
	15			



SYM.	ECO NO.	DATE	BY	CHK	DESCRIPTION
REVISIONS					

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ACAD P/N: C3454-000-00002

MPL PCA SBO CTRL BD CDC 40-500 16P

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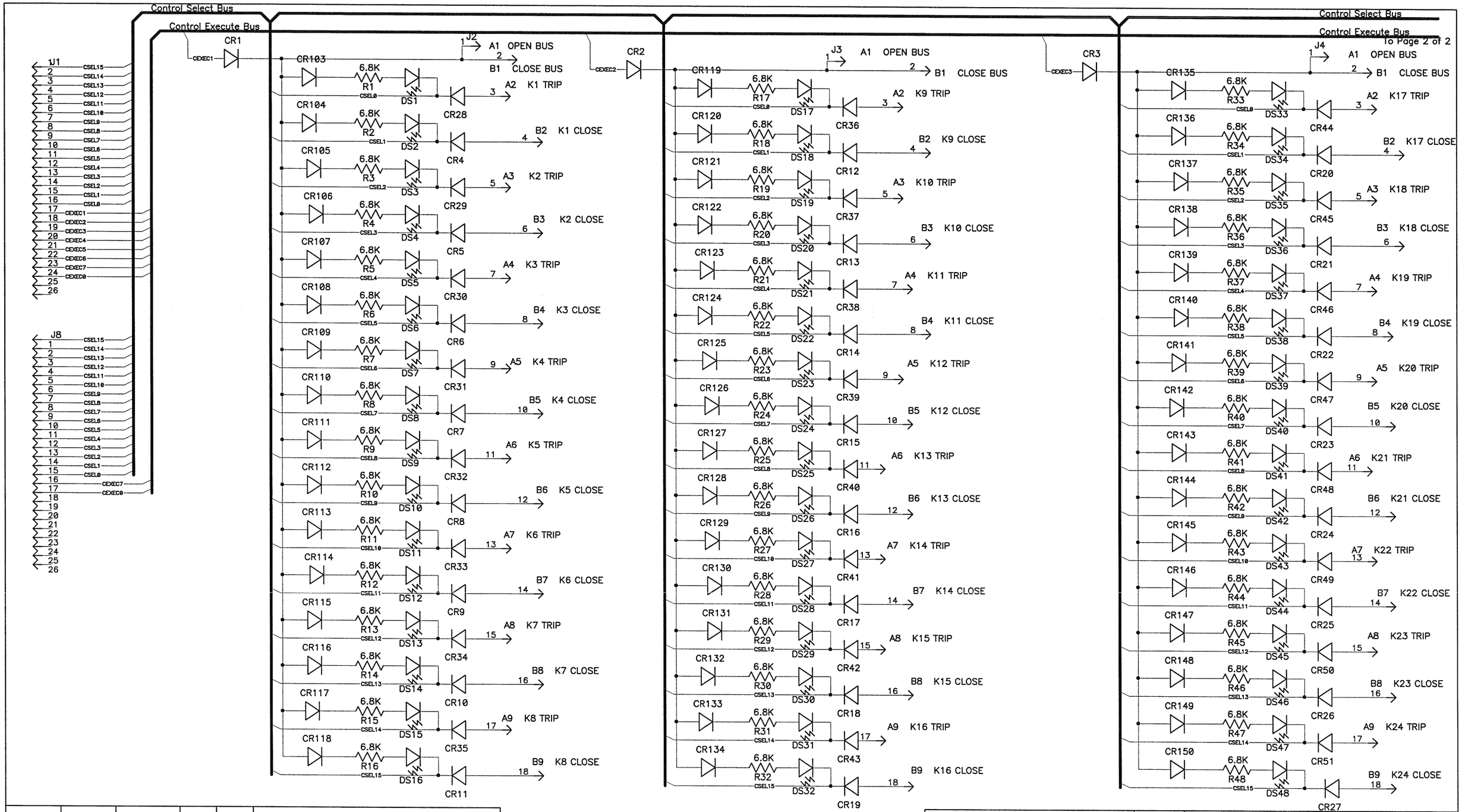
PCA SBO CONTROL BOARD
40-500
CDC

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		APPROVALS	DATE
TOLERANCES DECIMALS	XX = ±.02 XXX= ±.010 ANGLES ±.5°	DWN PRAVIN	8-3-00
MATERIAL:	NONE	CHK C.JANIK	8-4-00
FINISH:	NONE	APP	8-4-00

SIZE B | C3454-000-00002 | REV 0
SCALE NONE | SHEET 1 OF 1



REV	ECO#	DATE	BY	CHK	DESCRIPTION

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APPROVALS	DATE
DWN PPC	04-15-00
CHK	04-15-00
APP	04-15-00

MPL

SCH CDC44-550 Control Driver BD

SBO CONTROL RETROFIT BOARD

PART # C3454-002-REV-B

SIZE B

SHEET 1 OF 2

Control Select Bus
Control Execute Bus

From Page 1 of 2

CR52
CEXEC4

CR151 6.8K R49 CSEL0 DS49 CR79 — 3 A2 K25 TRIP
CR152 6.8K R50 CSEL1 DS50 CR55 — 4 B2 K25 CLOSE
CR153 6.8K R51 CSEL2 DS51 CR80 — 5 A3 K26 TRIP
CR154 6.8K R52 CSEL3 DS52 CR56 — 6 B3 K26 CLOSE
CR155 6.8K R53 CSEL4 DS53 CR81 — 7 A4 K27 TRIP
CR156 6.8K R54 CSEL5 DS54 CR57 — 8 B4 K27 CLOSE
CR157 6.8K R55 CSEL6 DS55 CR82 — 9 A5 K28 TRIP
CR158 6.8K R56 CSEL7 DS56 CR58 — 10 B5 K28 CLOSE
CR159 6.8K R57 CSEL8 DS57 CR83 — 11 A6 K29 TRIP
CR160 6.8K R58 CSEL9 DS58 CR59 — 12 B6 K29 CLOSE
CR161 6.8K R59 CSEL10 DS59 CR84 — 13 A7 K30 TRIP
CR162 6.8K R60 CSEL11 DS60 CR60 — 14 B7 K30 CLOSE
CR163 6.8K R61 CSEL12 DS61 CR85 — 15 A8 K31 TRIP
CR164 6.8K R62 CSEL13 DS62 CR61 — 16 B8 K31 CLOSE
CR165 6.8K R63 CSEL14 DS63 CR86 — 17 A9 K32 TRIP
CR166 6.8K R64 CSEL15 DS64 CR62 — 18 B9 K32 CLOSE

J5:A
1 A1 OPEN BUS
2 B1 CLOSE BUS

Control Select Bus
Control Execute Bus

CR53
CEXEC5

CR167 6.8K R65 CSEL0 DS65 CR87 — 3 A2 K33 TRIP
CR168 6.8K R66 CSEL1 DS66 CR63 — 4 B2 K33 CLOSE
CR169 6.8K R67 CSEL2 DS67 CR88 — 5 A3 K34 TRIP
CR170 6.8K R68 CSEL3 DS68 CR64 — 6 B3 K34 CLOSE
CR171 6.8K R69 CSEL4 DS69 CR89 — 7 A4 K35 TRIP
CR172 6.8K R70 CSEL5 DS70 CR65 — 8 B4 K35 CLOSE
CR173 6.8K R71 CSEL6 DS71 CR90 — 9 A5 K36 TRIP
CR174 6.8K R72 CSEL7 DS72 CR66 — 10 B5 K36 CLOSE
CR175 6.8K R73 CSEL8 DS73 CR91 — 11 A6 K37 TRIP
CR176 6.8K R74 CSEL9 DS74 CR67 — 12 B6 K37 CLOSE
CR177 6.8K R75 CSEL10 DS75 CR92 — 13 A7 K38 TRIP
CR178 6.8K R76 CSEL11 DS76 CR68 — 14 B7 K38 CLOSE
CR179 6.8K R77 CSEL12 DS77 CR93 — 15 A8 K39 TRIP
CR180 6.8K R78 CSEL13 DS78 CR69 — 16 B8 K39 CLOSE
CR181 6.8K R79 CSEL14 DS79 CR94 — 17 A9 K40 TRIP
CR182 6.8K R80 CSEL15 DS80 CR70 — 18 B9 K40 CLOSE

J6:A
1 A1 OPEN BUS
2 B1 CLOSE BUS

CR54
CEXEC6

CR183 6.8K R81 CSEL0 DS81 CR95 — 3 A2 K41 TRIP
CR184 6.8K R82 CSEL1 DS82 CR71 — 4 B2 K41 CLOSE
CR185 6.8K R83 CSEL2 DS83 CR96 — 5 A3 K42 TRIP
CR186 6.8K R84 CSEL3 DS84 CR72 — 6 B3 K42 CLOSE
CR187 6.8K R85 CSEL4 DS85 CR97 — 7 A4 K43 TRIP
CR188 6.8K R86 CSEL5 DS86 CR73 — 8 B4 K43 CLOSE
CR189 6.8K R87 CSEL6 DS87 CR98 — 9 A5 K44 TRIP
CR190 6.8K R88 CSEL7 DS88 CR74 — 10 B5 K44 CLOSE
CR191 6.8K R89 CSEL8 DS89 CR99 — 11 A6 K45 TRIP
CR192 6.8K R90 CSEL9 DS90 CR75 — 12 B6 K45 CLOSE
CR193 6.8K R91 CSEL10 DS91 CR100 — 13 A7 K46 TRIP
CR194 6.8K R92 CSEL11 DS92 CR76 — 14 B7 K46 CLOSE
CR195 6.8K R93 CSEL12 DS93 CR101 — 15 A8 K47 TRIP
CR196 6.8K R94 CSEL13 DS94 CR77 — 16 B8 K47 CLOSE
CR197 6.8K R95 CSEL14 DS95 CR102 — 17 A9 K48 TRIP
CR198 6.8K R96 CSEL15 DS96 CR78 — 18 B9 K48 CLOSE

J7:A
1 A1 OPEN BUS
2 B1 CLOSE BUS

FIDUC1 [1]—1
FIDUC2 [1]—1
FIDUC3 [1]—1
FIDUC4 [1]—1

PART #	C3454-002-REV-B		
SIZE	B	SHEET 2 OF 2	