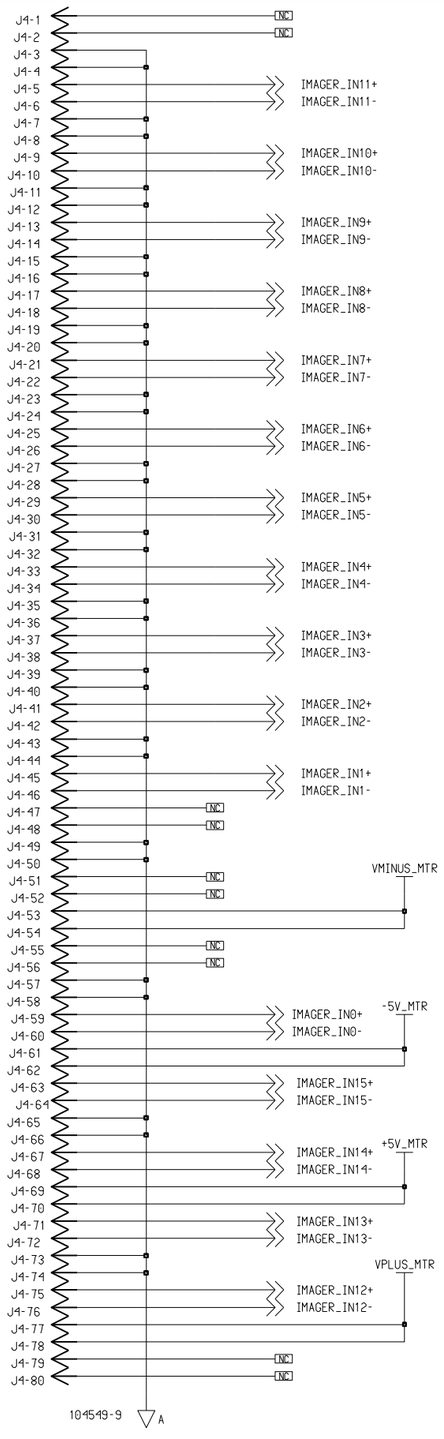


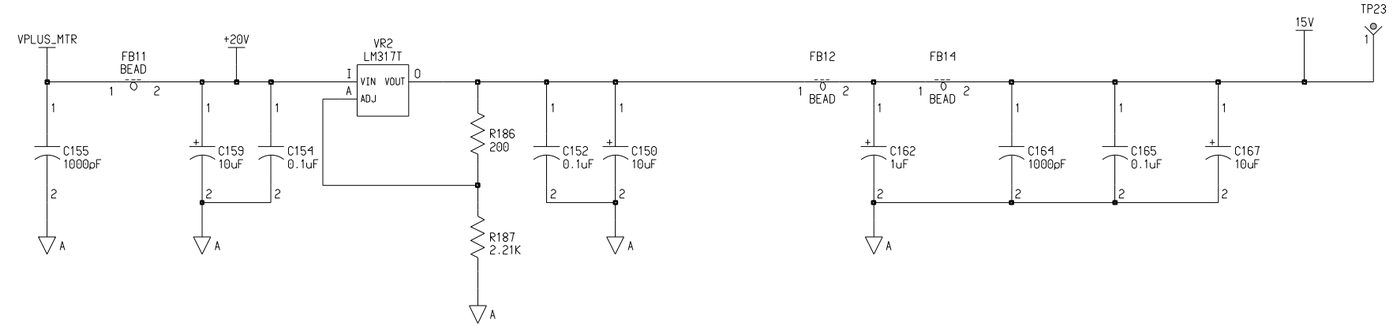


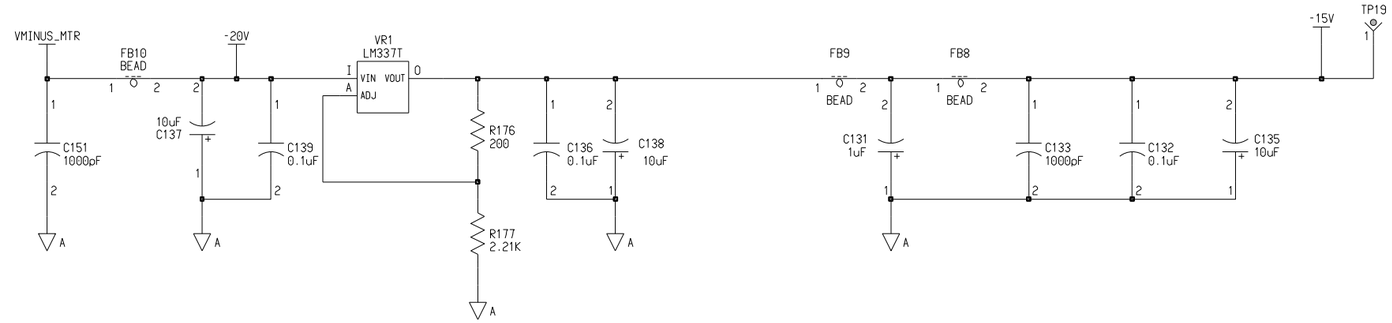


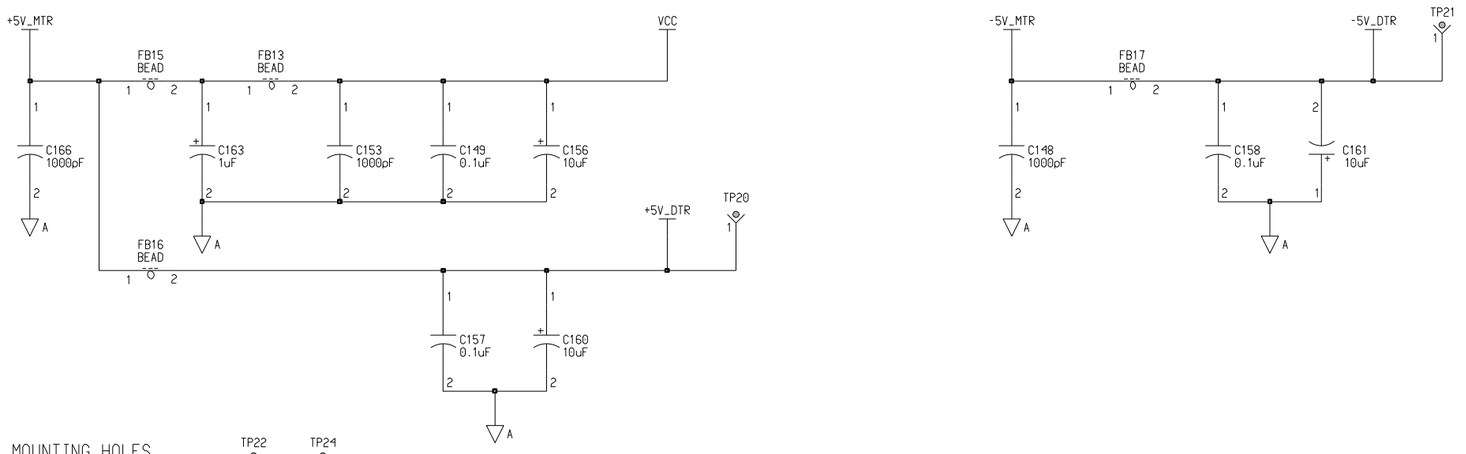





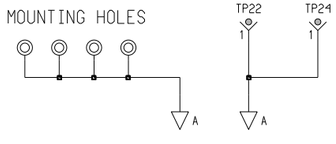


NOTES:

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AUTHENTICATED BLOCK

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| CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D |
|---|---|---|
| | | |

ON Semiconductor

| | |
|---|---|
| DWN R. BROLLY | DATE 10.14.2004 at 09:13 |
| DFTG NONE | DSGN ENGR R. BROLLY |
| CHK NONE | MFG ENGR B. Auerhahn |

ORIG CHG NO BRDN

MTD/PS- 0687, Rev 4
PS-0122, Rev 1

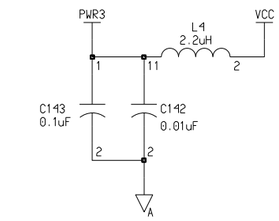
FIRST USED ON

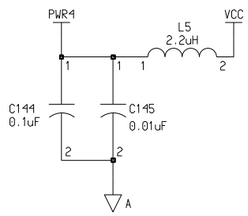
NAME
KAI-2020/KAI-2001/
KAI-2093 Imager Board

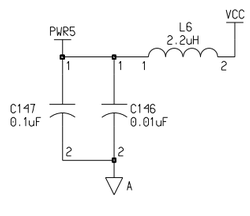
SKETCH NO. 1 DWG SIZE D

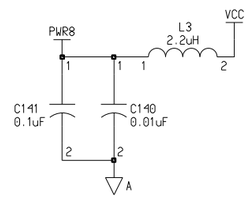
NO.
3F5121

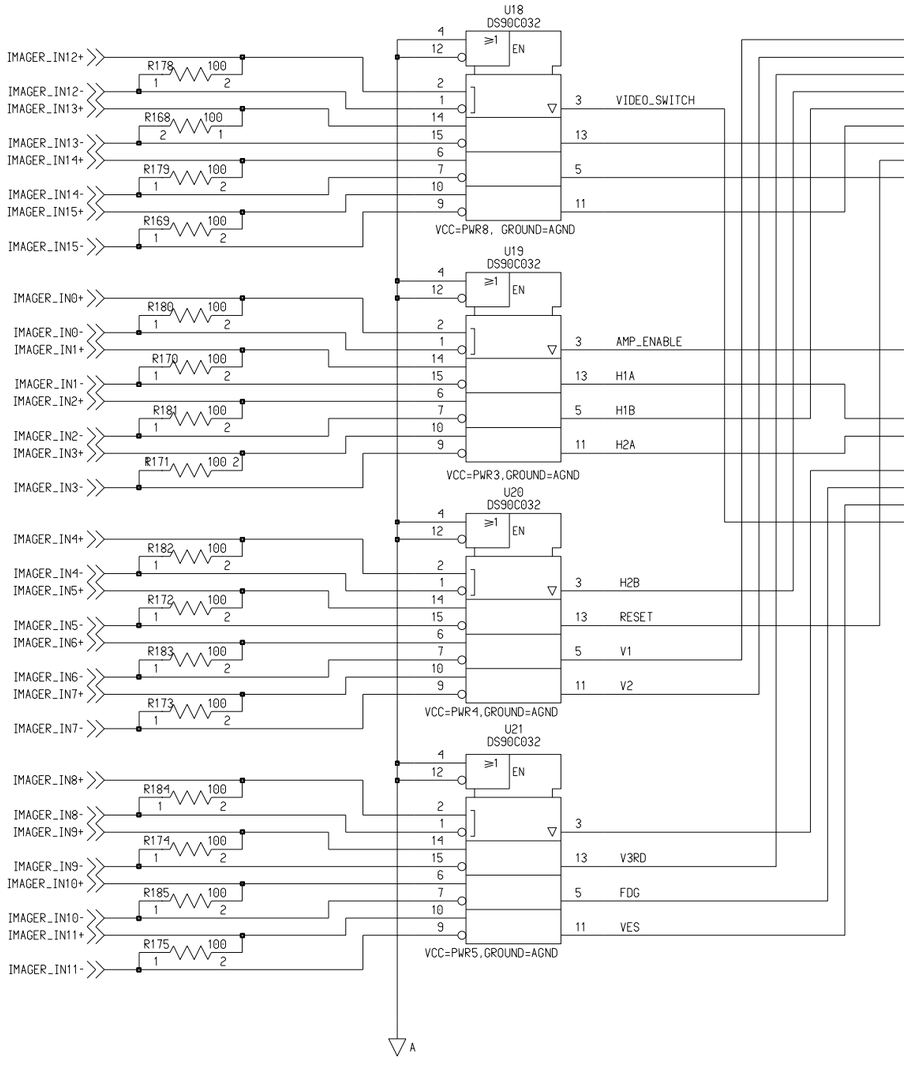
SHEET 1 OF 8

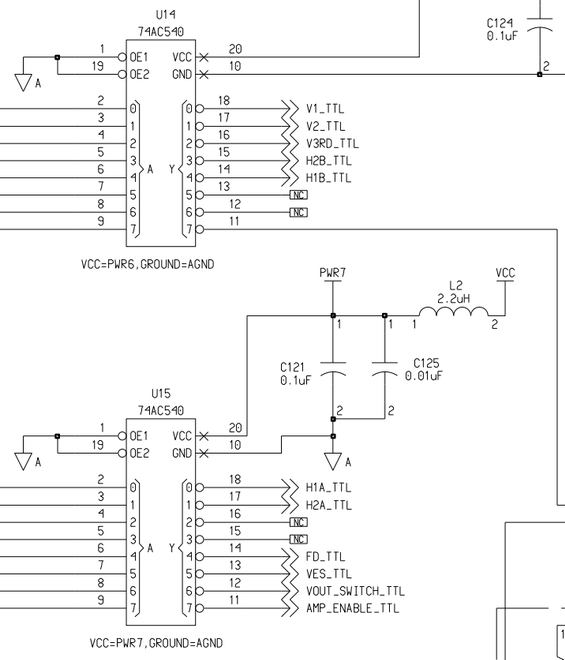


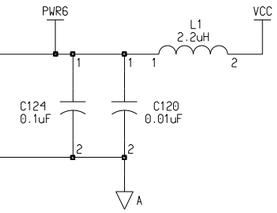



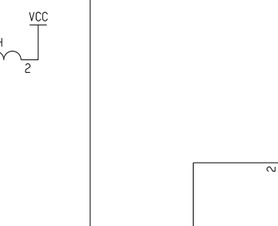




To control RESET pulsewidth,
remove R147 and install U13

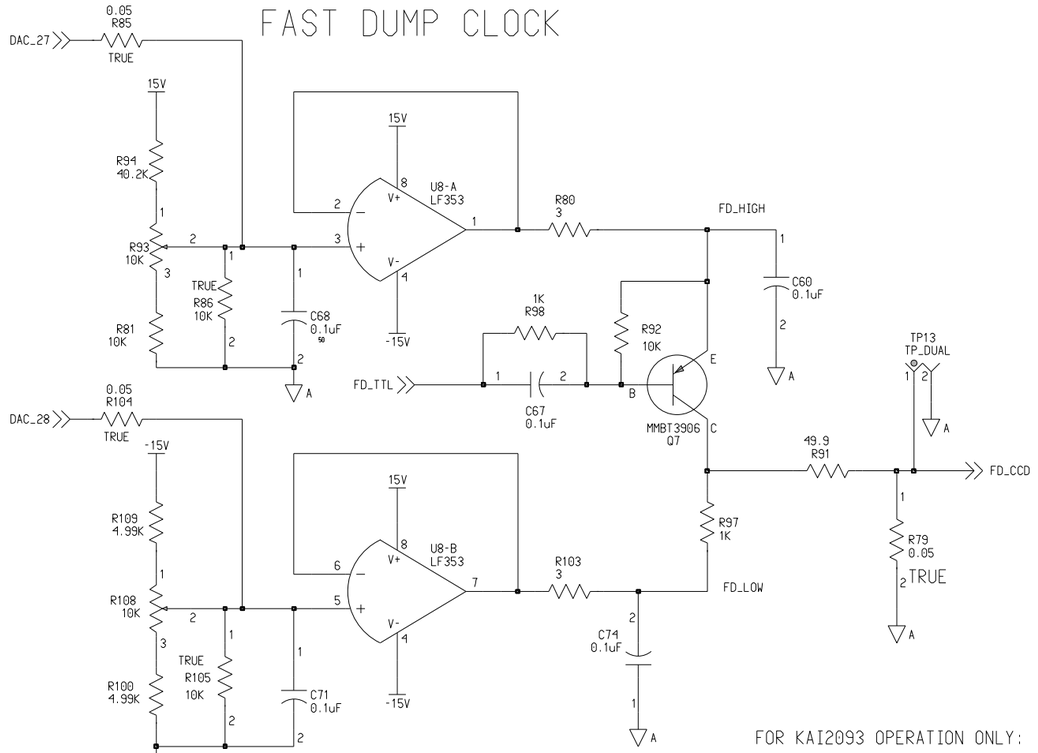
DS1040A-15 Pulsewidth vs. Programmed Value

| | | | | |
|---|---|---|---|---|
| P2 | 0 | 0 | 0 | 0 |
| P1 | 0 | 0 | 1 | 1 |
| P0 | 0 | 1 | 0 | 1 |
| Width (ns) | 15 | 5 | 7.5 | 10 |



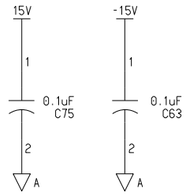

| NOTES: | | | | | | THIS IS A COMPUTER GENERATED DRAWING. IT IS OFFICIAL WHEN THE AUTHENTICATED BLOCK IS FILLED IN. THE MASTER COPY IS AUTHENTICATED IN RED. | AUTHENTICATED BLOCK |
|---|---|---|---|---|---|---|---|
| CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | ON Semiconductor | FIRST USED ON |
| | | | | | | DWN R. BROLLY / DATE 04.02.2004 at 11:38 | NAME KAI-2020/KAI-2001/ KAI-2093 Imager Board |
| | | | | | | DFTG / DSGN ENGR R. BROLLY | SKETCH NO. / DWG SIZE D |
| | | | | | | CHK / MFG ENGR B. Auerhahn | NO. 3F5121 |
| | | | | | | ORIG CHG NO / RELEASED | SHEET 2 OF 8 |

# FAST DUMP CLOCK



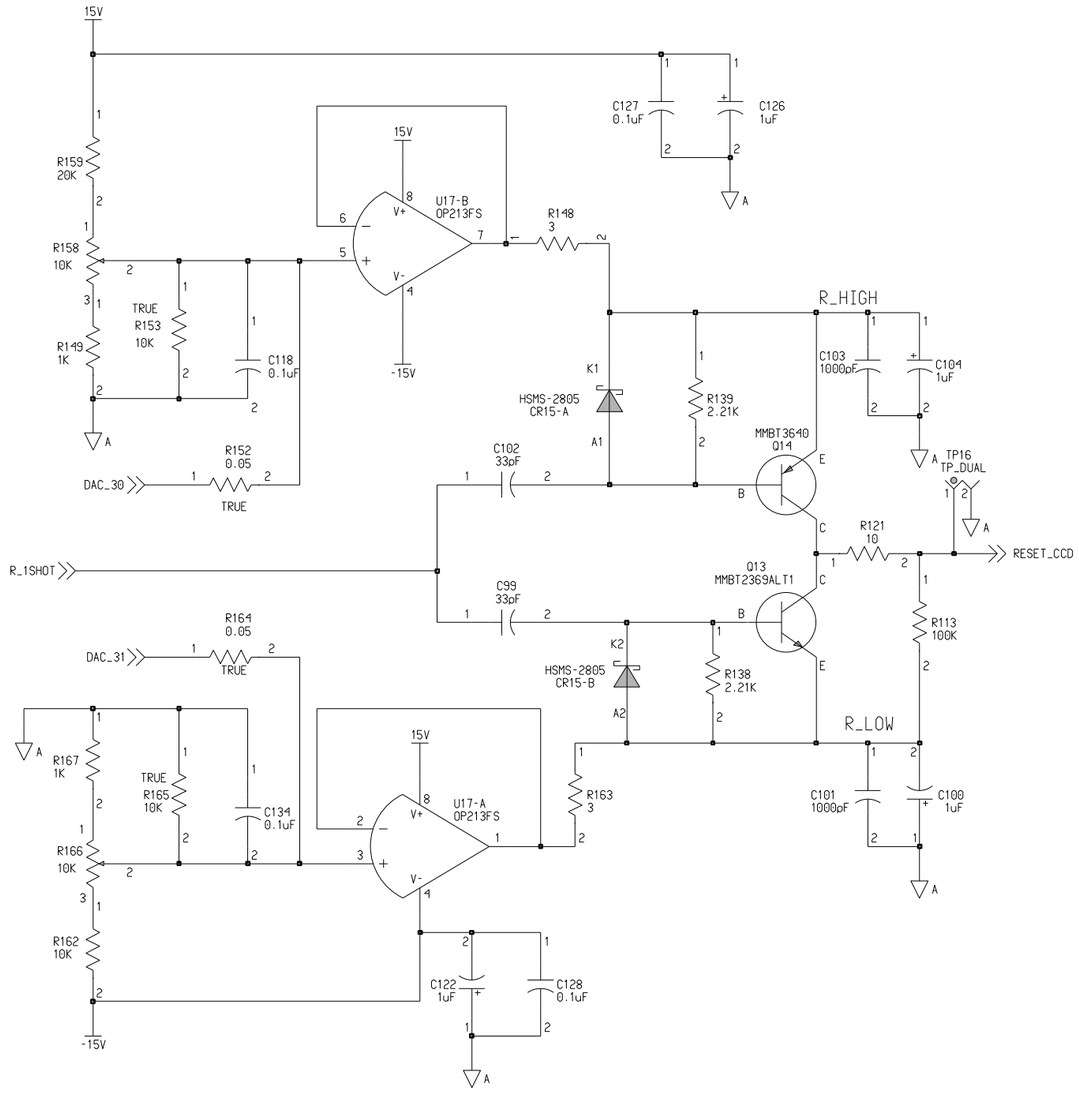

FOR KAI2093 OPERATION ONLY:

REMOVE R91 AND INSTALL R79




U8 Decoupling Caps

# RESET CLOCK




| NOTES: | | | | THIS IS A COMPUTER GENERATED DRAWING. IT IS OFFICIAL WHEN THE AUTHENTICATED BLOCK IS FILLED IN. THE MASTER COPY IS AUTHENTICATED IN RED. | | AUTHENTICATED BLOCK |
|---|---|---|---|---|---|---|
| CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | |
| | | | | | | |

ON Semiconductor

| | |
|---|---|
| DWN RBB | DATE 04.02.2004 at 11:38 |
| DFTG | DSGN ENGR RBB |
| CHK | MFG ENGR B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

FIRST USED ON

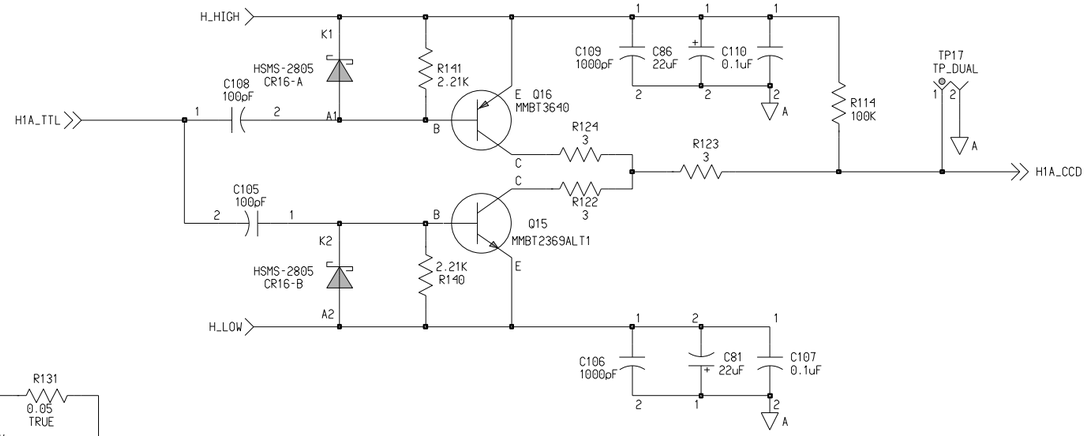
NAME KAI-2020/KAI-2001/ KAI-2093 Imager Board

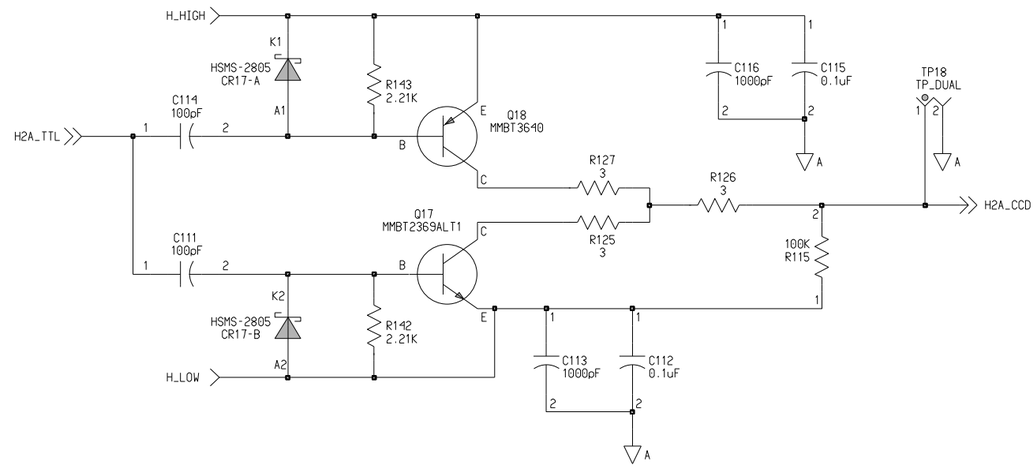
SKETCH NO. | DWG SIZE D

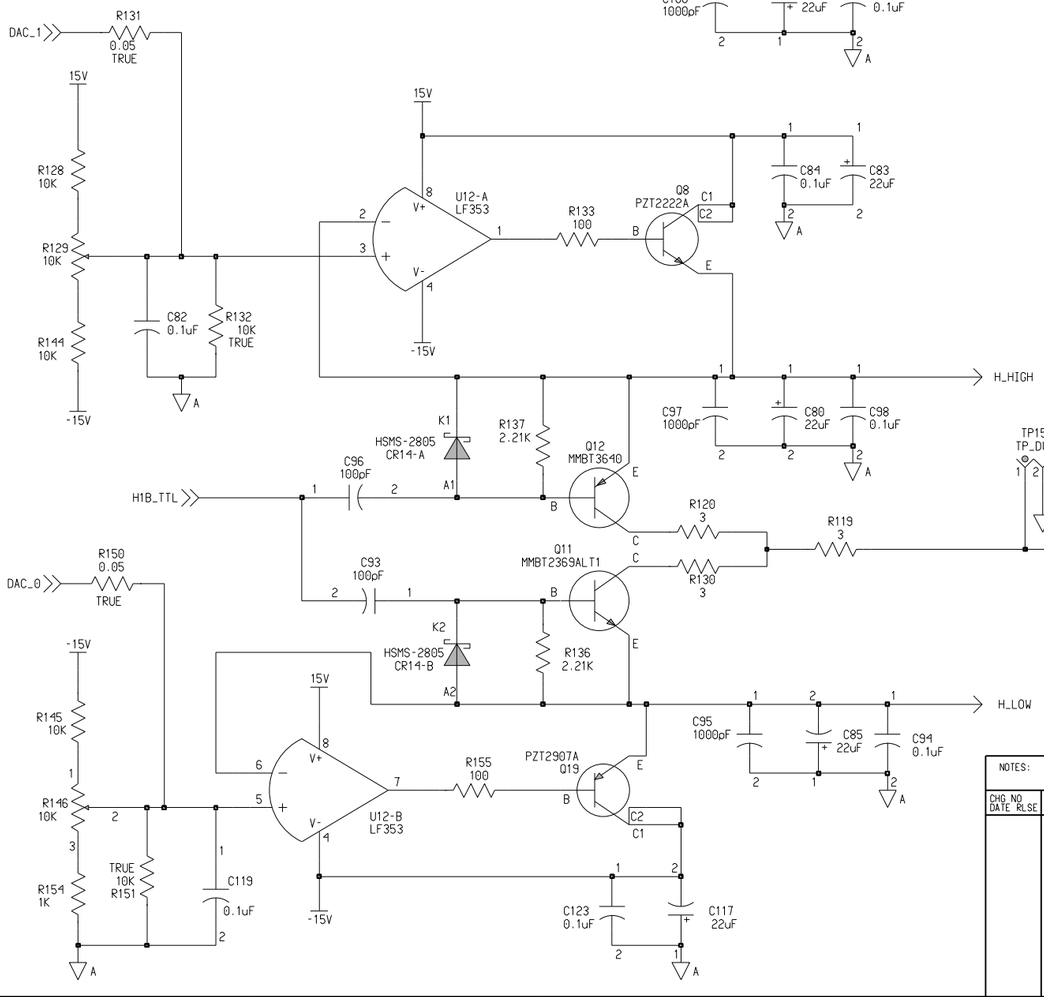
NO. 3F5121

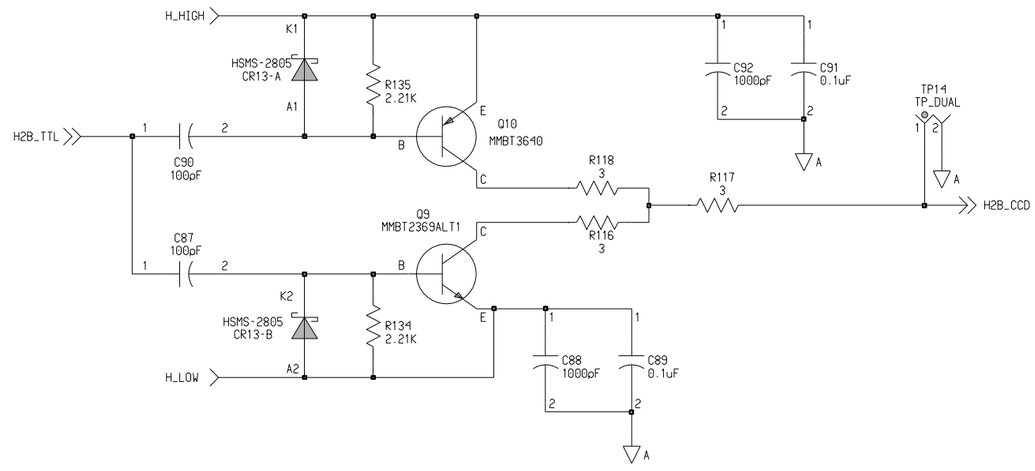
SHEET 3 OF 8

# HORIZONTAL CLOCKS

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AUTHENTICATED BLOCK

| CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D |
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ON Semiconductor

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|---|---|
| DWN RBB | DATE 04.02.2004 at 11:38 |
| DFTG | DSGN ENGR RBB |
| CHK | MFG ENGR B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

FIRST USED ON

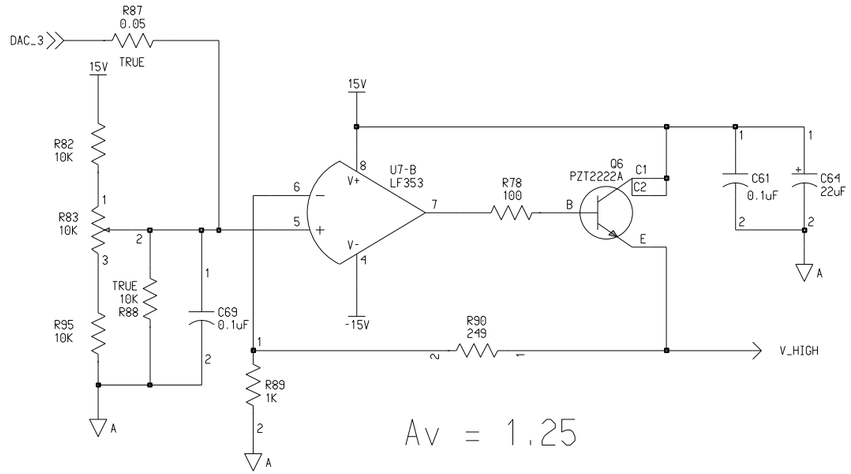
NAME KAI-2020/KAI-2001/ KAI-2093 Imager Board

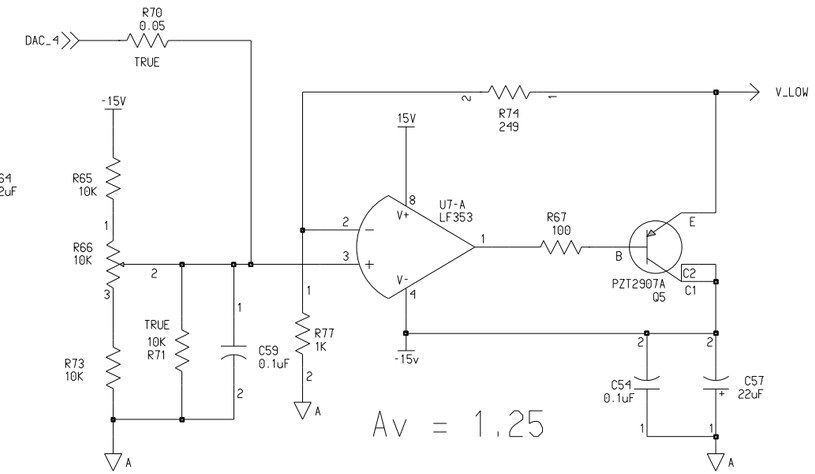
SKETCH NO. | DWG. SIZE D

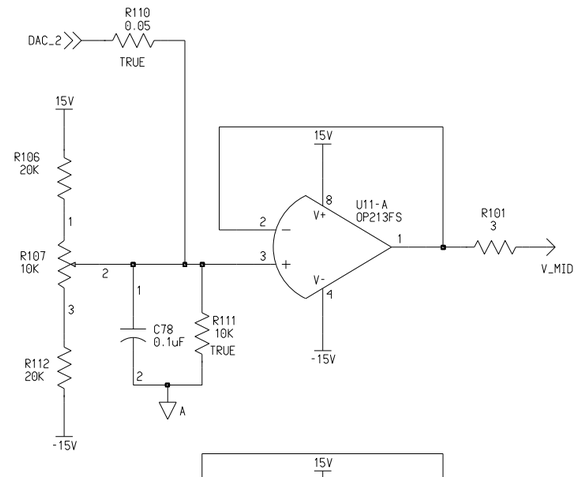
NO. 3F5121

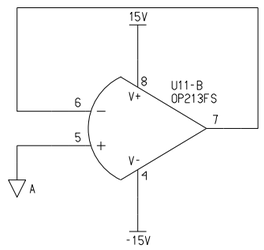
SHEET 4 OF 8

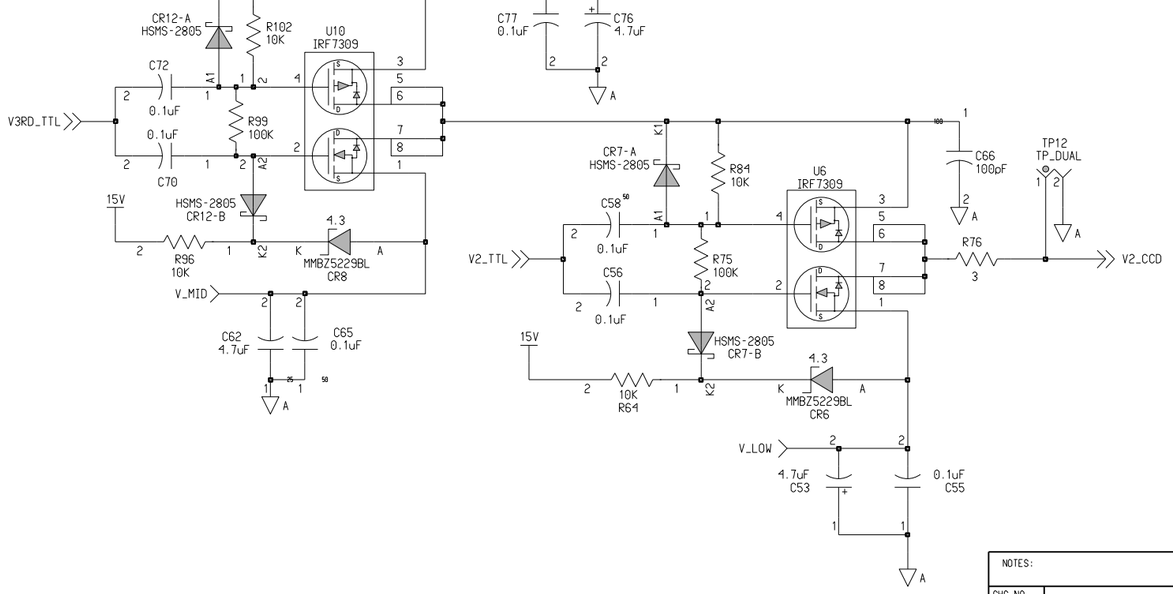
# VERTICAL CLOCKS

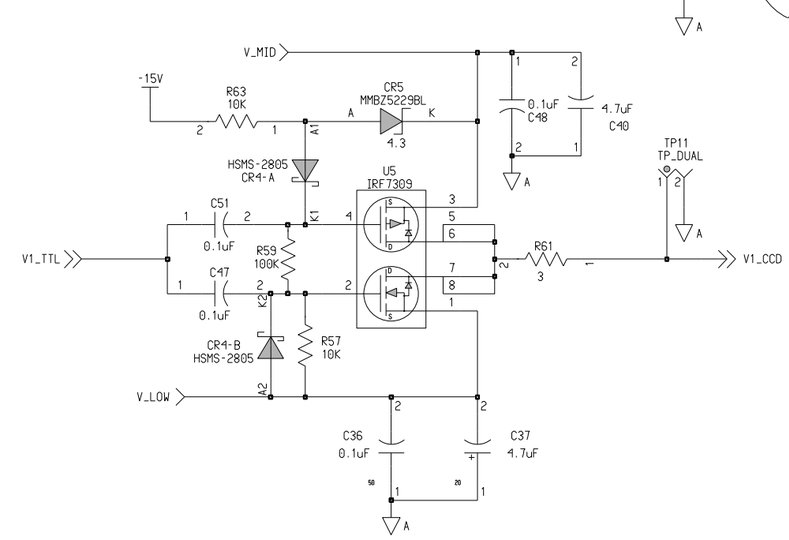


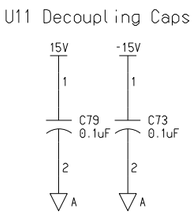

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| CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D | CHG NO DATE RLSE | REVISIONS | DWN BY APPV'D |
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ON Semiconductor

| | |
|---|---|
| DWN RBB | DATE 04.02.2004 at 11:38 |
| DFTG | DSGN ENGR RBB |
| CHK | MFG ENGR B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

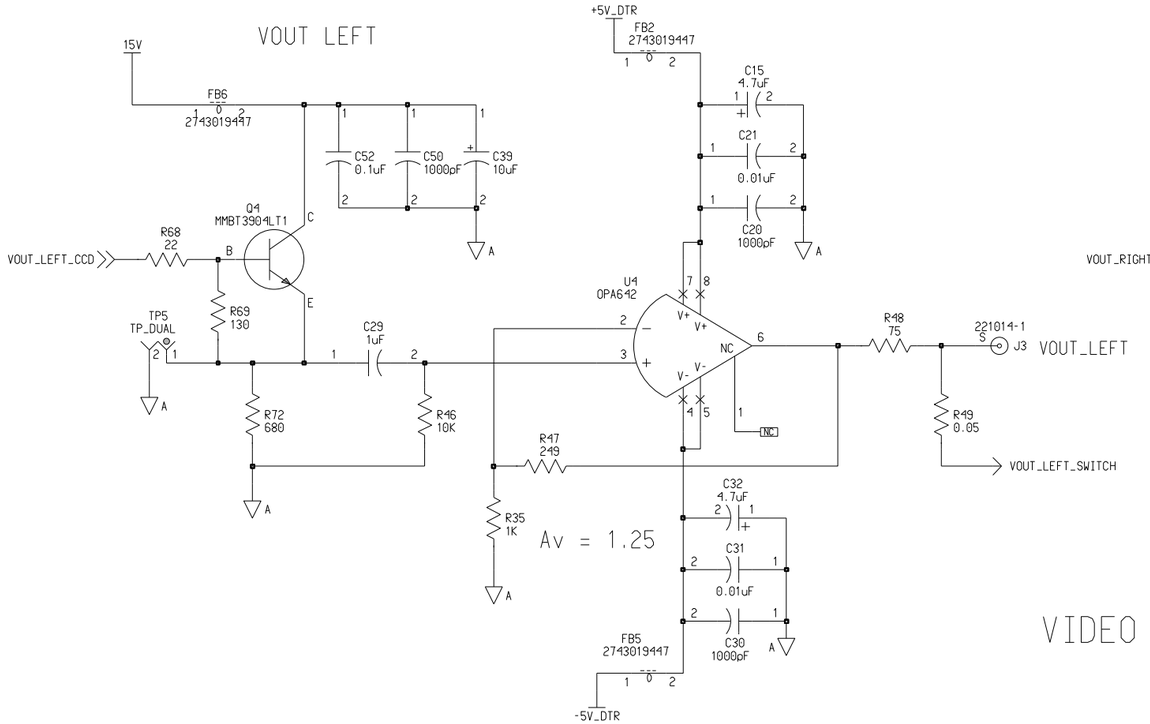
FIRST USED ON

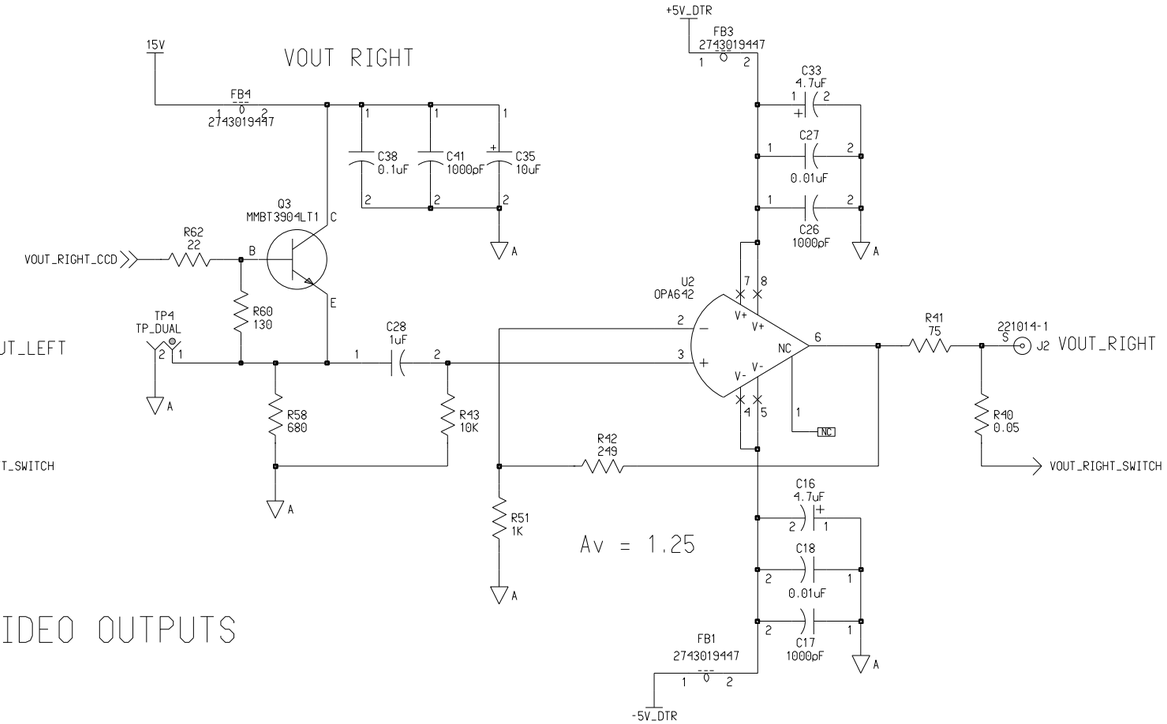
NAME KAI-2020/KAI-2001/ KAI-2093 Imager Board

SKETCH NO. | DWG. SIZE D

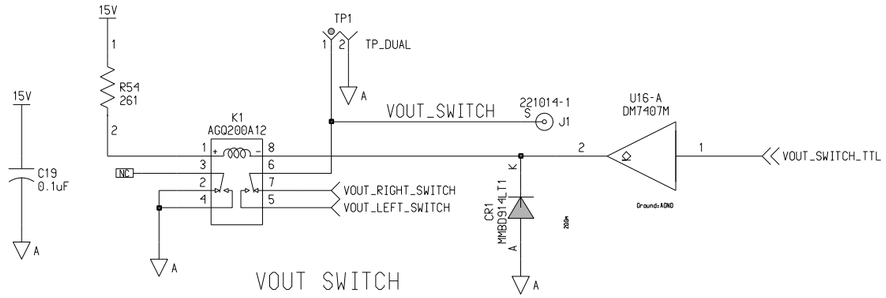
NO. 3F5121

SHEET 5 OF 8

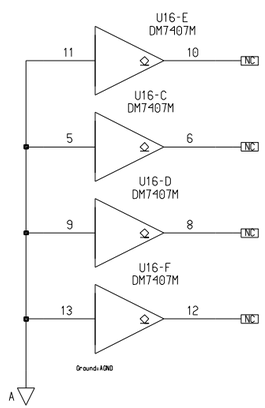



VIDEO OUTPUTS




VOUT SWITCH




| NOTES: | | | | THIS IS A COMPUTER GENERATED DRAWING. IT IS OFFICIAL WHEN THE AUTHENTICATED BLOCK IS FILLED IN. THE MASTER COPY IS AUTHENTICATED IN RED. | | AUTHENTICATED BLOCK |
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ON Semiconductor

| DWN | DATE |
|---|---|
| RBB | 04.02.2004 at 11:39 |
| DFTG | DSGN ENGR |
| | RBB |
| CHK | MFG ENGR |
| | B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

FIRST USED ON

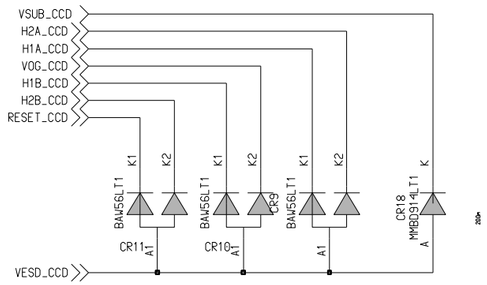
NAME
KAI-2020/KAI-2001/
KAI-2093 Imager Board

SKETCH NO. | DWG SIZE D

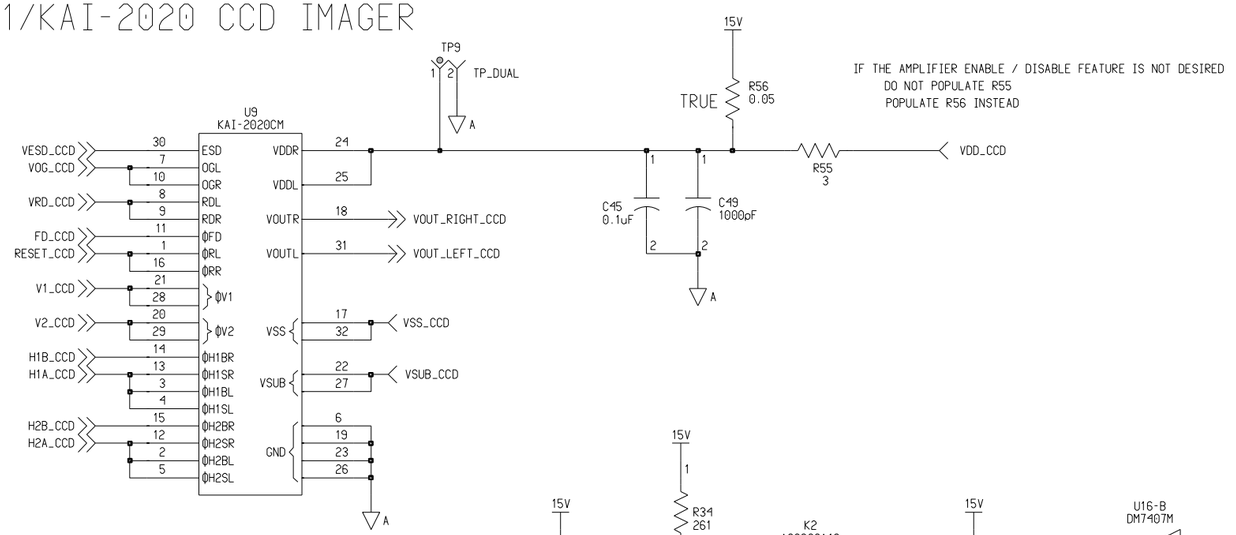
NO.
3F5121

SHEET 6 OF 8

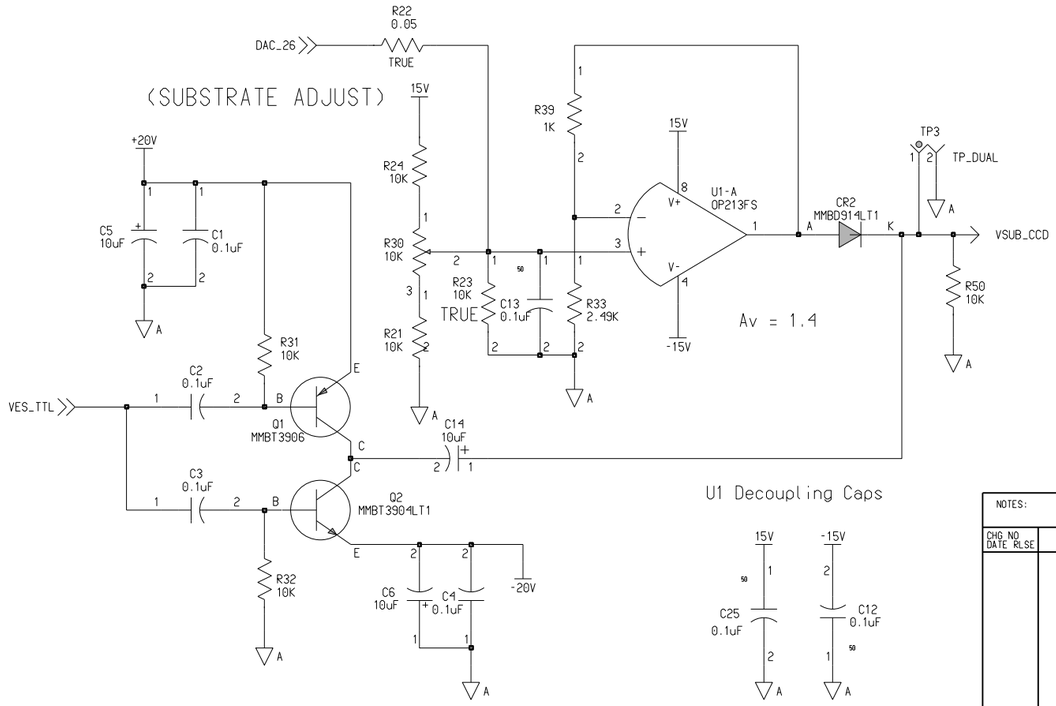
# KAI-2001/KAI-2020 CCD IMAGER




## ESD PROTECTION CIRCUITRY

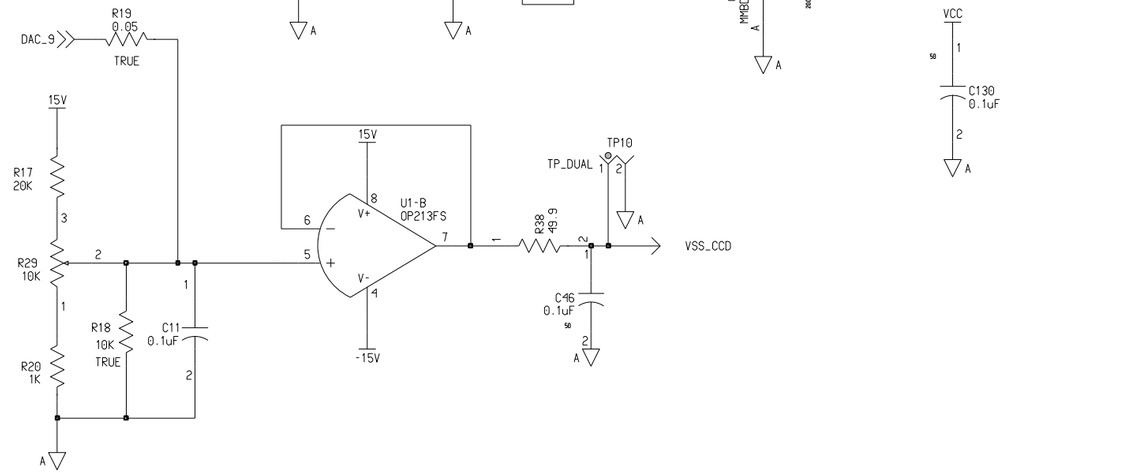


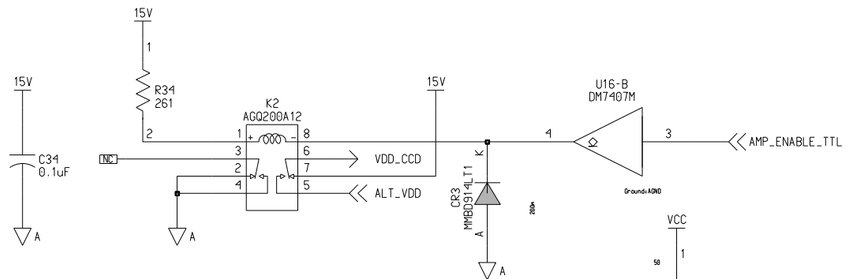

## ELECTRONIC SHUTTER CIRCUIT










NOTES:

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AUTHENTICATED BLOCK

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| | | | | | |

ON Semiconductor

| | |
|---|---|
| DWN R. BROLLY | DATE 04.02.2004 at 11:39 |
| DFTG | DSGN ENGR R. BROLLY |
| CHK | MFG ENGR B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

FIRST USED ON

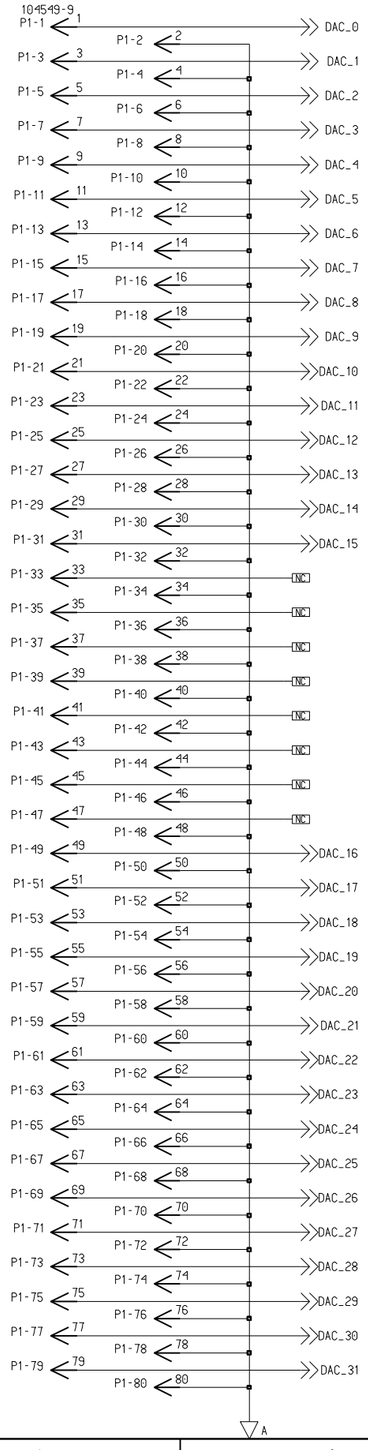
NAME
KAI-2020/KAI-2001/
KAI-2093 Imager Board

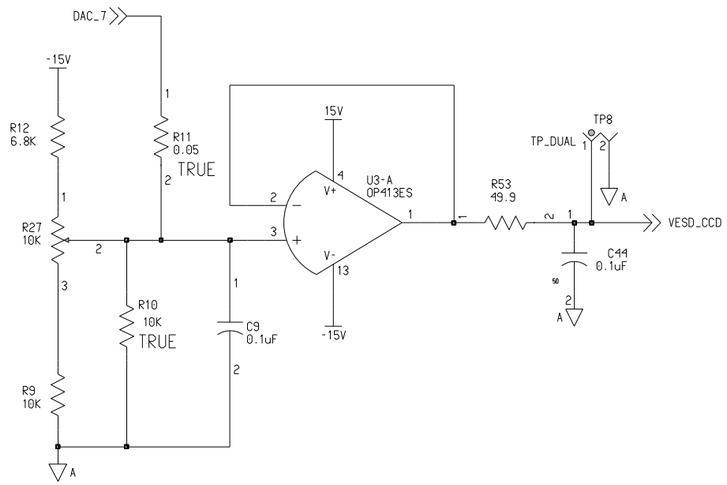
SKETCH NO. | DWG SIZE D

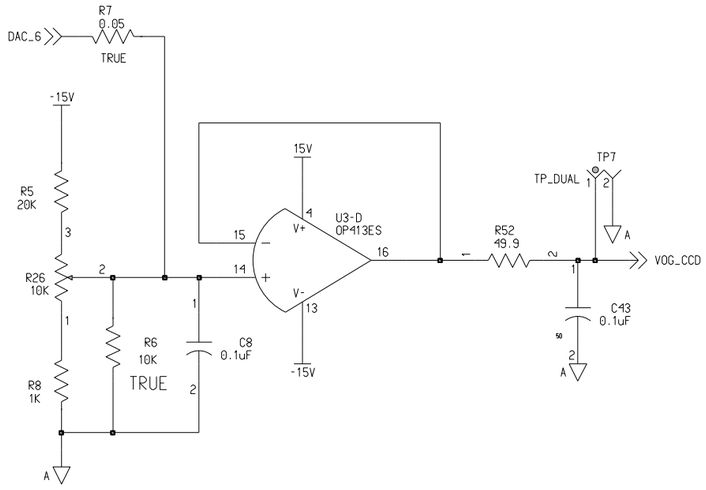
NO.
3F5121

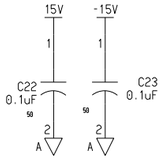
SHEET 7 OF 8

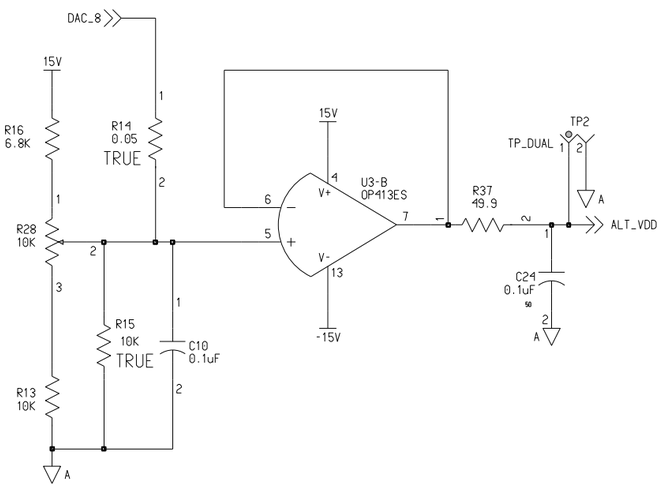
# DAC CONNECTOR

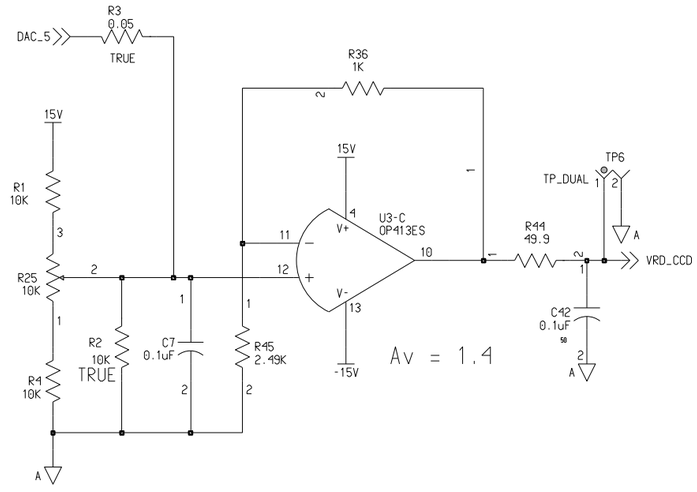



| NOTES: | | | | | | THIS IS A COMPUTER GENERATED DRAWING. IT IS OFFICIAL WHEN THE AUTHENTICATED BLOCK IS FILLED IN. THE MASTER COPY IS AUTHENTICATED IN RED. | AUTHENTICATED BLOCK |
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| | | | | | | | |

ON Semiconductor

| | |
|---|---|
| DWN R. BROLLY | DATE 04.02.2004 at 11:39 |
| DFTG | DSGN ENGR R. BROLLY |
| CHK | MFG ENGR B. Auerhahn |
| ORIG CHG NO | |
| RELEASED | |

FIRST USED ON

NAME KAI-2020/KAI-2001/ KAI-2093 Imager Board

SKETCH NO. | DWG SIZE D

NO. 3F5121

SHEET 8 OF 8

Components
For Circuit Board Assembly

NO. 3F5121

SHEET 1 NEXT SHEET 2

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 1 | 3F5120 | HW-T-1 | BRD1 | 1 | | BARE BOARD REV 1 |
| 2 | 785076 | TOP-2<br>BOT-5 | C126 C163<br>C100 C104 C122 C131 C162 | 7 | case_a_h.075 | 1uF_25V_.20 ELECTROLYTIC, TANTALUM |
| 3 | 4B4495 | TOP-6<br>BOT-1 | C15 C16 C32 C33 C53 C76<br>C37 | 7 | case_b_h.085 | 4.7uF_20V_.20 ELECTROLYTIC TANTALUM CHIP |
| 4 | 254471 | TOP-20<br>BOT-4 | C17 C20 C26 C30 C41 C49 C50 C88 C92 C95 C97 C101 C103 C106 C109 C113 C116 C153 C155 C166<br>C133 C148 C151 C164 | 24 | 0805_h.055 | 1000pF_50V_.05 MONOLITHIC, CERAMIC CHIP |
| 5 | 980646 | TOP-6<br>BOT-4 | C18 C21 C27 C31 C120 C125<br>C140 C142 C145 C146 | 10 | 0805_h.055 | 0.01uF_50V_.10 MONOLITHIC, CERAMIC CHIP |
| 6 | 7B9716 | TOP-51<br>BOT-30 | C2 C3 C7 C8 C9 C10 C11 C12 C13 C25 C34 C38 C42 C43 C44 C45 C46 C47 C51 C52 C54 C55 C56 C58 C59 C60 C65 C67 C68 C69 C70 C71 C72 C73 C74 C77 C78 C79 C82 C118 C119 C121 C124 C127 C130 C134 C139 C149 C154 C157 C158<br>C1 C4 C19 C22 C23 C24 C36 C48 C61 C63 C75 C84 C89 C91 C94 C98 C107 C110 C112 C115 C123 C128 C132 C136 C141 C143 C144 C147 C152 C165 | 81 | 0805_h.055 | 0.1uF_50V_.10 Ceramic Monolithic Chip |
| 7 | 7B9655 | TOP-2 | C28 C29 | 2 | 1206_h.060 | 1uF_16V_.20 MONOLITHIC, CERAMIC |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON

NAME CIRCUIT BOARD ASSEMBLY

KAI-2020 IMAGER BOARD

SKETCH NO. DWG. SIZE B

3F5121

SHEET 1 NEXT SHEET 2

Components
For Circuit Board Assembly

NO. 3F5121
SHEET 2 NEXT SHEET 3

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| | | | | | | CHIP |
| 8 | 258541 | TOP-5<br>BOT-4 | C35 C39 C156 C160 C161<br>C135 C138 C150 C167 | 9 | case_c_h.110 | 10uF_20V_.20 ELECTROLYTIC TANTALUM CHIP |
| 9 | 770251 | TOP-5 | C5 C6 C14 C137 C159 | 5 | case_d_h.130 | 10uF_35V_.10 ELECTROLYTIC, TANTALUM |
| 10 | 7E7251 | TOP-1<br>BOT-1 | C62<br>C40 | 2 | 1210_h.100 | 4.7uF_25V_.10 SMT CERAMIC CHIP |
| 11 | 2B1595 | TOP-9 | C66 C87 C90 C93 C96 C105 C108 C111 C114 | 9 | 0805_h.055 | 100pF_100V_.10 CAPACITOR-CERAMIC MONOLITHIC CHIP (PF) |
| 12 | 8B0987 | TOP-4<br>BOT-4 | C80 C81 C85 C86<br>C57 C64 C83 C117 | 8 | case_c_h.110 | 22uF_20V_.20 ELECTROLYTIC TANTALUM CHIP |
| 13 | 4B3897 | TOP-2 | C99 C102 | 2 | 0805_h.055 | 33pF_50V_.05 CAPACITOR-CERAMIC MONOLITHIC CHIP (PF) |
| 14 | 616293 | TOP-3<br>BOT-1 | CR1 CR2 CR18<br>CR3 | 4 | sot23_akn_sp | MMBD914LT1 DIODE, SWITCHING, 100V, 200mA |
| 15 | 902510 | TOP-5<br>BOT-3 | CR13 CR14 CR15 CR16 CR17<br>CR4 CR7 CR12 | 8 | sot143_kkaa_ | HSMS-2805 DIODE, SCHOTTKY BARRIER, DUAL, 70V, 15mA |
| 16 | 717944 | TOP-1<br>BOT-2 | CR6<br>CR5 CR8 | 3 | zener_sot23_ | MMBZ5229BL DIODE, ZENER, 4.3V, 225mW |
| 17 | 237522 | TOP-3 | CR9 CR10 CR11 | 3 | sot23_kak_sp | BAW56LT1 DIODE, SWITCHING, DUAL, COM ANODE, 70V, 100mA |
| 18 | 233152 | TOP-8<br>BOT-8 | FB4 FB6 FB10 FB11 FB13 FB15 FB16 FB17<br>FB1 FB2 FB3 FB5 FB8 FB9 FB12 FB14 | 16 | fb_274301944 | 2743019447 - FERRITE, SMT BEADS |
| 19 | 911244 | TOP-3 | J1 J2 J3 | 3 | j01ra_221014 | 221014-1 SMB, R/A RF COAXIAL JACK, 75 OHM |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON
NAME CIRCUIT BOARD ASSEMBLY
KAI-2020 IMAGER BOARD
SKETCH NO. DWG. SIZE B
3F5121
SHEET 2 NEXT SHEET 3

Components
For Circuit Board Assembly

NO. 3F5121

SHEET 3 NEXT SHEET 4

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 20 | 999979 | TOP-1 | J4 | 1 | p80s_104549- | 104549-9 SMT, AMPMODU, SHROUDED HEADER CONNECTOR |
| 21 | 5F0204 | TOP-1<br>BOT-1 | K1<br>K2 | 2 | k_agq200a12_ | AGQ200A12 DPDT RELAY, DPDT, 12V |
| 22 | 1E1112 | TOP-2<br>BOT-4 | L1 L2<br>L3 L4 L5 L6 | 6 | ind_1008cs_h | 2.2uH SMT WIREWOUND ENCAPSULATED |
| 23 | 233838 | TOP-2 | Q1 Q7 | 2 | sot23_bce_sp | MMBT3906 TRANSISTOR, PNP, 40V, GENERAL PURPOSE |
| 24 | 236307 | TOP-5 | Q10 Q12 Q14 Q16 Q18 | 5 | sot23_bce_sp | MMBT3640 TRANSISTOR, PNP, 12V, SWITCHING |
| 25 | 616292 | TOP-3 | Q2 Q3 Q4 | 3 | sot23_bce_sp | MMBT3904LT1 TRANSISTOR, NPN, 40V, GENERAL PURPOSE |
| 26 | 960471 | TOP-2 | Q5 Q19 | 2 | sot223_bce_s | PZT2907A TRANSISTOR, PNP, 60V, GENERAL PURPOSE |
| 27 | 960472 | TOP-2 | Q6 Q8 | 2 | sot223_bce_s | PZT2222A TRANSISTOR, NPN, 40V, GENERAL PURPOSE |
| 28 | 4B4317 | TOP-5 | Q9 Q11 Q13 Q15 Q17 | 5 | sot23_bce_sp | MMBT2369ALT1 TRANSISTOR, NPN, 15V, SWITCHING |
| 29 | 233981 | TOP-22<br><br><br><br><br>BOT-5 | R1 R4 R9 R13 R21 R24 R43 R46 R50 R57 R64 R65 R73 R81 R82 R84 R95 R102 R128 R144 R145 R162<br>R31 R32 R63 R92 R96 | 27 | 0805_h.025 | 10K Ohms_.100W_.01 FLAT, THICK METAL FILM CHIP |
| 30 | 992875 | TOP-2 | R100 R109 | 2 | 0805_h.030 | 4.99K Ohms_.100W_.001 SMT CHIP FLAT THIN METAL FILM |
| 31 | 954557 | TOP-2 | R12 R16 | 2 | 0805_h.030 | 6.8K Ohms_.100W_.05 SMT CHIP FLAT THICK METAL FILM |
| 32 | 232841 | TOP-1 | R121 | 1 | 0805_h.030 | 10 Ohms_.100W_.05 FLAT, THICK METAL FILM, CHIP |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON

NAME CIRCUIT BOARD ASSEMBLY

KAI-2020 IMAGER BOARD

SKETCH NO. DWG. SIZE B

3F5121

SHEET 3 NEXT SHEET 4

Components
For Circuit Board Assembly

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 33 | 901770 | BOT-12 | R134 R135 R136 R137 R138 R139 R140 R141 R142 R143 R177 R187 | 12 | 0805_h.030 | 2.21K Ohms_.100W_.01 FLAT, THICK METAL FILM, CHIP |
| 34 | 783957 | BOT-2 | R176 R186 | 2 | 0805_h.030 | 200 Ohms_.100W_.01 FLAT, THICK METAL FILM, CHIP |
| 35 | 770026 | TOP-15 | R25 R26 R27 R28 R29 R30 R66 R83 R93 R107 R108 R129 R146 R158 R166 | 15 | pot_3266w_h. | 10K POT, MULTI-TURN |
| 36 | 901801 | TOP-6 | R37 R38 R44 R52 R53 R91 | 6 | 0805_h.030 | 49.9 Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 37 | 257516 | BOT-5 | R40 R49 R147 R157 R160 | 5 | 0805_h.030 | 0.05 Ohms_.100W_- ZERO OHM CHIP JUMPER |
| 38 | 954554 | TOP-2 | R41 R48 | 2 | 0805_h.030 | 75 Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 39 | 902504 | BOT-4 | R42 R47 R74 R90 | 4 | 0805_h.030 | 249 Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 40 | 902942 | TOP-1 BOT-1 | R45 R33 | 2 | 0805_h.030 | 2.49K Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 41 | 253955 | TOP-5 | R5 R17 R106 R112 R159 | 5 | 0805_h.030 | 20K Ohms_.100W_.05 FLAT, THICK METAL FILM, CHIP |
| 42 | 7B8769 | TOP-1 BOT-1 | R54 R34 | 2 | 0805_h.030 | 261 Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 43 | 903960 | TOP-20 | R55 R61 R76 R80 R101 R103 R116 R117 R118 R119 R120 R122 R123 R124 R125 R126 R127 R130 R148 R163 | 20 | 0805_h.030 | 3 Ohms_.100W_.05 FLAT, THICK METAL FILM, CHIP |
| 44 | 739757 | TOP-2 | R58 R72 | 2 | 1210_h.025 | 680 Ohms_.250W_.05 FLAT, THICK METAL FILM, CHIP |

NO. 3F5121

SHEET 4 NEXT SHEET 5

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON

NAME CIRCUIT BOARD ASSEMBLY
KAI-2020 IMAGER BOARD

SKETCH NO. DWG. SIZE B

3F5121

SHEET 4 NEXT SHEET 5

Components
For Circuit Board Assembly

NO. 3F5121
SHEET 5 NEXT SHEET 6

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 45 | 254478 | TOP-6 | R59 R75 R99 R113 R114 R115 | 6 | 0805_h.030 | 100K Ohms_.100W_.05 FLAT, THICK METAL FILM, CHIP |
| 46 | 941226 | TOP-2 | R60 R69 | 2 | 0805_h.030 | 130 Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 47 | 255345 | TOP-2 | R62 R68 | 2 | 0805_h.030 | 22 Ohms_.100W_.05 FLAT, THICK METAL FILM, CHIP |
| 48 | 980690 | TOP-20 | R67 R78 R133 R155 R168 R169 R170 R171 R172 R173 R174 R175 R178 R179 R180 R181 R182 R183 R184 R185 | 20 | 0805_h.030 | 100 Ohms_.100W_.005 SMT CHIP FLAT THIN METAL FILM |
| 49 | 902564 | TOP-8<br>BOT-5 | R8 R20 R36 R97 R98 R149 R154 R167<br>R35 R39 R51 R77 R89 | 13 | 0805_h.025 | 1K Ohms_.100W_.01 FLAT, THICK METAL FILM CHIP |
| 50 | 2B4344 | TOP-1 | R94 | 1 | 0805_h.030 | 40.2K Ohms_.100W_.01 SMT CHIP FLAT THICK METAL FILM |
| 51 | TPDUAL | TOP-18 | TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8 TP9 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 | 18 | tpdual_.1_p4 | TP_DUAL DUAL TEST PADS (THRU HOLE) |
| 52 | 901614 | TOP-4 | TP19 TP20 TP21 TP23 | 4 | tp_tp104_h.2 | TP-104-01-02 PRESS MOUNT TERMINAL - RED |
| 53 | 901613 | TOP-2 | TP22 TP24 | 2 | tp_tp104_h.2 | TP-104-01-00 PRESS MOUNT TERMINAL - BLACK |
| 54 | 7B8486 | TOP-3 | U1 U11 U17 | 3 | so08_.200_h. | OP213FS OPAMP, DUAL, BIPOLAR, SINGLE-SUPPLY, LOW-NOISE |
| 55 | 5E6841 | TOP-2 | U14 U15 | 2 | so120_.375_h | 74AC540 BUFFER/DRIVER, OCTAL, W/ 3-STATE OUTPUT, INVERTING |
| 56 | 263517 | TOP-1 | U16 | 1 | so14_.210_h. | DM7407M BUFFER, HEX, W/ OPEN-COLLECTOR OUTPUT |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETOF BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON
NAME CIRCUIT BOARD ASSEMBLY
KAI-2020 IMAGER BOARD
SKETCH NO. DWG. SIZE B
3F5121
SHEET 5 NEXT SHEET 6

Components
For Circuit Board Assembly

NO. 3F5121

SHEET 6 NEXT SHEET 7

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 57 | 691935 | TOP-4 | U18 U19 U20 U21 | 4 | so16_.210_h. | DS90C032 DIFFERENTIAL LINE RECEIVER, QUAD |
| 58 | 5C2040 | TOP-2 | U2 U4 | 2 | so08_.210_h. | OPA642 OPAMP, SINGLE, BIPOLAR, WIDEBAND, LOW-DISTORTION |
| 59 | G10861 | TOP-1 | U3 | 1 | so116_.375_h | OP413ES LOW NOISE & DRIFT,SINGLE SUPPLY OPAMP |
| 60 | 5F1246 | TOP-3 | U5 U6 U10 | 3 | so08_.200_h. | IRF7309 TRANSISTOR, DUAL N & P CHANNEL, 30V, MOSFET |
| 61 | 734408 | TOP-3 | U7 U8 U12 | 3 | so08_.210_h. | LF353 OPAMP, DUAL, BIPOLAR, JFET-INPUT |
| 62 | 241054 | TOP-1 | VR1 | 1 | to220_aio_pd | LM337T 1.5A -40V -1.2 to -37V VOLTAGE REGULATOR, NEG ADJ, 1.5A, |
| 63 | 498310 | TOP-1 | VR2 | 1 | to220_aoi_pd | LM317T 1.5A 4.2-40V 1.2-37V VOLTAGE REGULATOR, ADJ, 1.5A, 3-TE |
| 64 | 5E6702 | HW-B-2 | XU9 XU9 | 2 | HDWR | SOCKET 714-93-116-31-018000 MILL-MAX For U9 |
| 65 | 7B9716 | BOT-1 | C129 | 1NL | 0805_h.055 | NO LOAD 0.1uF 50V_.10 Ceramic Monolithic Chip |
| 66 | 233152 | BOT-1 | FB7 | 1NL | fb_274301944 | NO LOAD 2743019447 - FERRITE, SMT BEADS |
| 67 | 999979 | TOP-1 | P1 | 1NL | p80s_104549- | NO LOAD 104549-9 SMT, AMPMODU, SHROUDED HEADER CONNECTOR |
| 68 | 233981 | BOT-15 | R2 R6 R10 R15 R18 R23 R71 R86 R88 R105 R111 R132 R151 R153 R165 | 15NL | 0805_h.025 | NO LOAD 10K Ohms_.100W_.01 FLAT, THICK METAL FILM CHIP |
| 69 | 257516 | TOP-17<br>BOT-2 | R3 R7 R11 R14 R19 R22 R56 R70 R79 R85 R87 R104 R110 R131 R150 R152 R164<br>R156 R161 | 19NL | 0805_h.030 | NO LOAD 0.05 Ohms_.100W_- ZERO OHM CHIP JUMPER |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON

NAME CIRCUIT BOARD ASSEMBLY
KAI-2020 IMAGER BOARD

SKETCH NO. DWG. SIZE B

3F5121

SHEET 6 NEXT SHEET 7

Components
For Circuit Board Assembly

NO. 3F5121

SHEET 7 NEXT SHEET 8

| Item No | Part no | Assy. Side | Item Reference Designators | Qty | Package style | Notes/Comp Description |
|---|---|---|---|---|---|---|
| 70 | 5C2045 | BOT-1 | U13 | 1NL | so08_.210_h. | NO LOAD DS1040 PULSE GENERATOR, PROGRAMMABLE ONE-SHOT |
| 71 | 4H0459 | BOT-1 | U9 | 1NL | socsensor_5E | NO LOAD KAI-2020CM CCD 1600x1200 |

| CHG.NO DATE | REVISIONS | DR. BY APPS. |
|---|---|---|
| REV 1 | INITIAL RELEASE | BPF |
| REV 2 | ECO D0748 | BPF |
| REV 3 | ECO D0754 | BPF |
| REV 4 | ECO D0774 | BPF |

SEE SHEET FOR ADD'L REVISIONS

Notes: 1. REFER TO CIRCUIT DIAGRAM 3F5121

ON Semiconductor

| | |
|---|---|
| DR. XXXX | DATE 1/18/05 |
| DES. ENG. R. BROLLY | PKG. MATL. |
| CK. DETD BPF | MFG. ENG. R. BROLLY |
| ORIG. CHG. NO. RELEASED | |

FIRST USED ON

NAME CIRCUIT BOARD ASSEMBLY

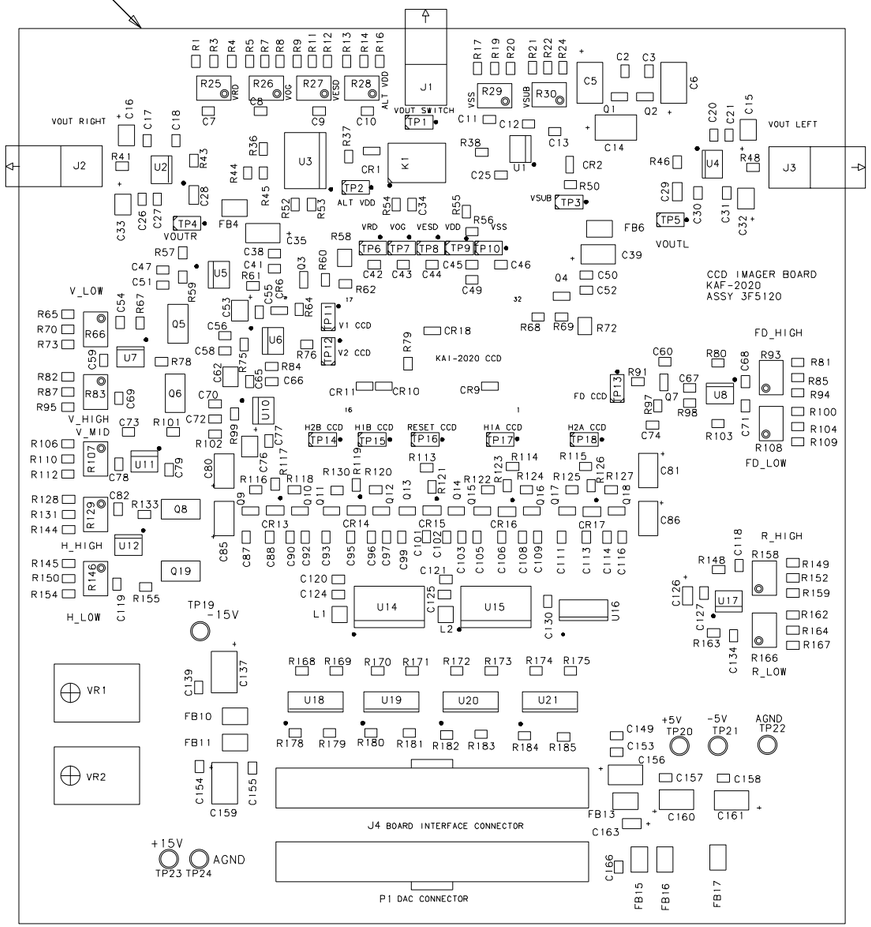
KAI-2020 IMAGER BOARD

SKETCH NO. DWG. SIZE B

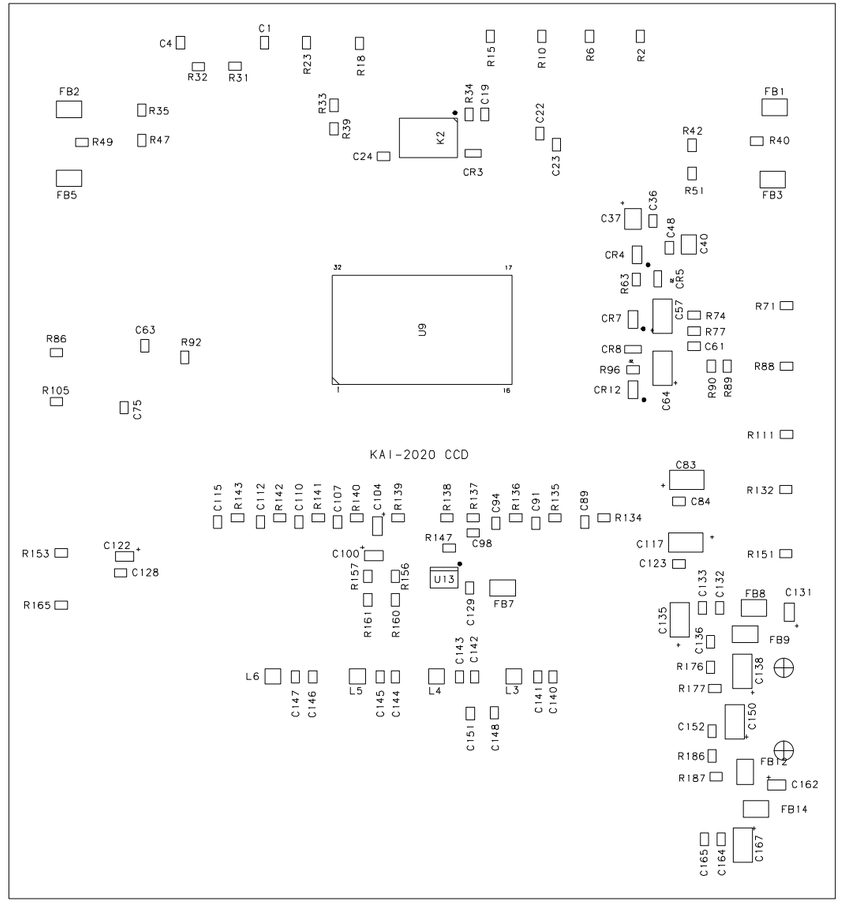
3F5121

SHEET 7 NEXT SHEET 8

| REVISION BLOCK | | | | |
|---|---|---|---|---|
| ZONE | REV. | DESCRIPTION | ESC#/DATE | APVD/DWN |
| | | | | |




PRIMARY SIDE




SECONDARY SIDE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| REF: DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982. | | | | | MATERIAL: | | DWN | ON Semiconductor | | | |
| | | | | | | | DFTG | | | | |
| DIMENSIONS APPLY AFTER FINISH WHERE TOTAL TOLERANCE IS .001 INCHES OR LESS AND ON ALL THREADS. IN ALL OTHER PLACES DIMENSIONS APPLY BEFORE FINISH. | | | | | | | ENGR | | | | |
| | | | | | | | ENGR | | | | |
| | | | | | UNLESS OTHERWISE SPECIFIED | | CHK | TITLE | | | |
| | | | | | DATUM PRECEDENCE PRI A SEC B TER C | | APVD | ASSY, KAI-2001/KAI-2020 IMAGER BOARD | | | |
| DEVIATIONS FROM INTENDED SHAPE (FLATNESS, ROUNDNESS, SQUARENESS ETC); MUST BE WITHIN STATED DIMENSIONAL TOLERANCES | | | | | DIMENSIONS ARE IN INCHES | | APVD | | | | |
| | | | | | TOLERANCES | | APVD | | | | |
| | | | | | ANGLES ± 5° | 1 PL ± N/A | APVD | | | | |
| NEXT ASSY | USED ON | NEXT ASSY | FINAL ASSY | | 2 PL ± .010 | 3 PL ± .005 | CONTRACT # | SIZE | ITEM NO | | REV |
| APPLICATION | | QUANTITY REQD | | | THIRD ANGLE PROJECTION | | | D | 3F5121 | | 4 |
| | | | | | | | | CODE | WT | SCALE 2X | SH 8 OF 8 |

| REVISION BLOCK | | | | |
|---|---|---|---|---|
| ZONE | REV. | DESCRIPTION | ESC#/DATE | APVD/DWN |
| | | | | |

NOTES:

1. PERFORMANCE CLASS
   1.1 MANUFACTURE BOARD IN ACCORDANCE WITH IPC-6011 & 6012, CLASS 2.

2. MATERIAL SPECIFICATIONS:
   2.1 CORE MATERIAL: FR-4, SIZE AND CONSTRUCTION PER DETAIL A.
   2.2 PRE-PREG MATERIAL: FR-4 B STAGE, SIZE AND CONSTRUCTION PER DETAIL A.
   2.3 MODIFICATIONS TO THE LAYER STACKUP AS SHOWN IN DETAIL A ARE PERMISSIBLE WITH THE FOLLOWING CONSTRAINTS:
      2.3.1 CONDUCTIVE LAYERS SHALL BE EVENLY SPACED THROUGHOUT.
      2.3.2 OVERALL THICKNESS SHALL BE UNCHANGED.

3. COPPER PLATE:
   3.1 HOLES: COPPER PLATING ON WALL OF HOLES SHALL BE 0.0015 MIN. UNLESS OTHERWISE SPECIFIED

4. FINISH PLATE:
   4.1 SURFACE AND HOLES: EXPOSED LANDS AND LINES, EXCLUDING CONTACT FINGERS, SHALL BE TIN-LEAD COATED IN ACCORDANCE WITH THE SOLDERABILITY REQUIREMENTS OF J-STD-003.

5. CONDUCTOR WIDTH AND SPACING:
   5.1 WIDTH: 0.005 MIN
   5.2 SPACING: 0.005 MIN
   5.3 DESIGN FABRICATION PATTERN ALIGNMENT ALLOWANCE IS 0.015.

6. HOLE REQUIREMENTS:
   6.1 ANNULAR RING: 0.002 MIN
   6.2 HOLE LOCATIONS TO BE 0.003 (DTP - DIAMETRICAL TRUE POSITION)
   6.3 HOLE SIZES APPLY AFTER SOLDER PLATING, REFLOW OR DEPOSITION

7. SOLDERMASK:
   7.1 SOLDERMASKING OF PRIMARY AND SECONDARY SIDES OF THE BOARD SHALL BE PER MASKING ARTWORK OVER BARE COPPER (SMOBC) USING LIQUID PHOTOIMAGEABLE SOLDER MASK MATERIAL PER IPC-SM-840.
   7.2 RESIZING FOR MINIMAL LAND TO MASK CLEARANCE PERMISSIBLE.

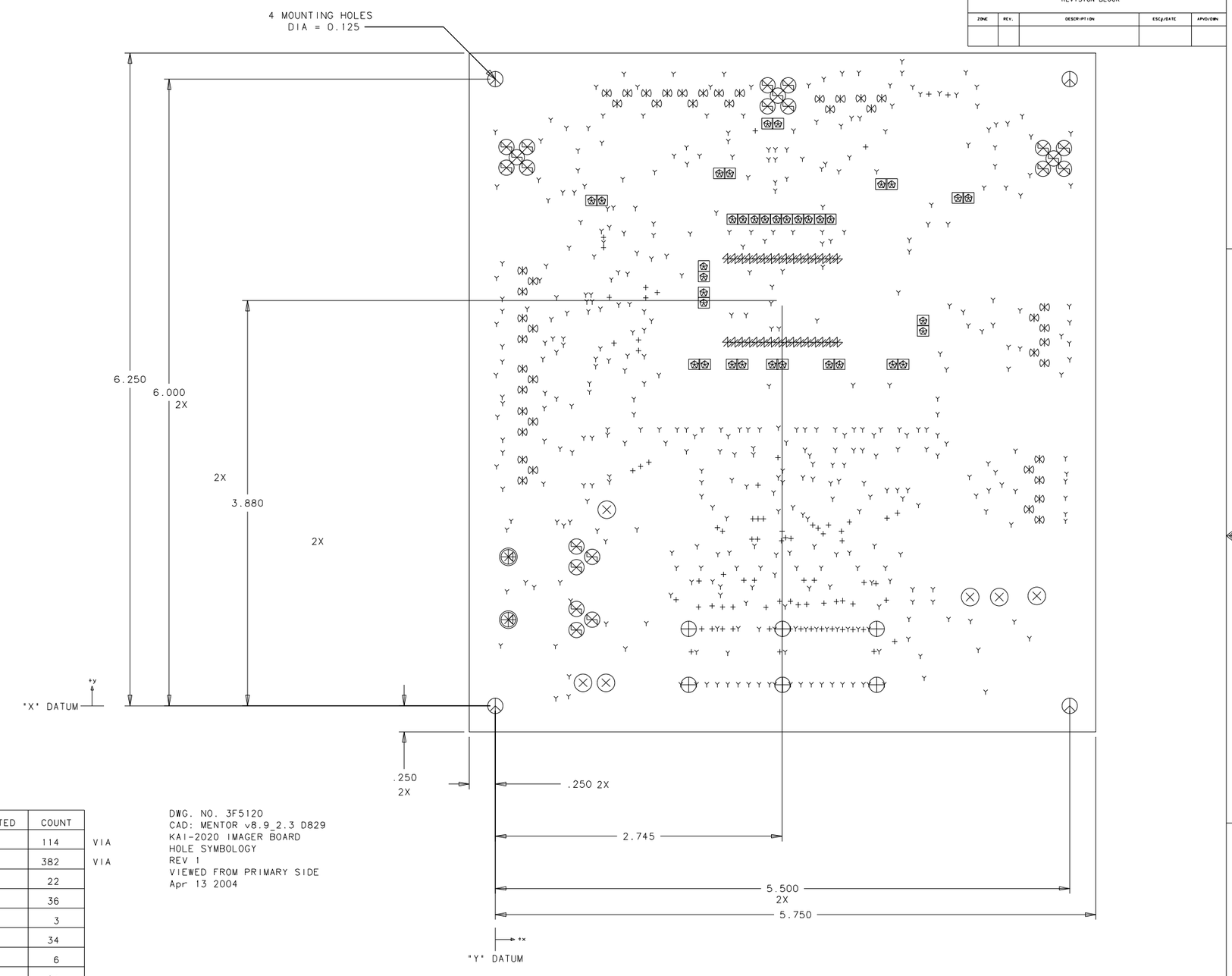
8. MARKING:
   8.1 MARKING OF PRIMARY AND SECONDARY SIDES SHALL BE PER MARKING ARTWORK USING WHITE NON-CONDUCTIVE EPOXY INK.

9. BOARD WARPAGE:
   9.1 BOARD WARPAGE 0.75% MAX.

10. TESTING:
   10.1 BOARDS SHALL BE TESTED USING CAD SUPPLIED IPC-D-356 FORMAT NET LIST. ELECTRICAL TESTING SHALL FOLLOW GUIDELINES ESTABLISHED BY IPC-9252.

11. SIGNAL INTEGRITY / IMPEDANCE REQUIREMENTS
   11.1 NONE REQUIRED

12. MISCELLANEOUS NOTES:
   12.1 X,Y DATUMS INDICATE DRILL ORIGIN
   12.2 TEST COUPONS TO BE MADE AVAILABLE UPON REQUEST




BOARD's DRILL SCHEDULE

| DRILL SIZE | DRILL SYMBOL | PLATED | COUNT | |
|---|---|---|---|---|
| .013 | + | YES | 114 | VIA |
| .015 | Y | YES | 382 | VIA |
| .032 | ⊠ | YES | 22 | |
| .034 | ⊡ | YES | 36 | |
| .038 | ⊹ | YES | 3 | |
| .042 | ⊕ | YES | 34 | |
| .050 | ⊗ | YES | 6 | |
| .054 | ⊗ | YES | 21 | |
| .065 | ☒ | YES | 6 | |
| .100 | ☮ | YES | 4 | |
| .125 | ⊗ | YES | 4 | |
| .144 | ⊡ | NO | 2 | |

TOTAL DRILL COUNT ON BOARD: 634

DWG. NO. 3F5120
CAD: MENTOR v8.9_2.3 D829
KAI-2020 IMAGER BOARD
HOLE SYMBOLOGY
REV 1
VIEWED FROM PRIMARY SIDE
Apr 13 2004

REF: DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.

DIMENSIONS APPLY AFTER FINISH WHERE TOTAL TOLERANCE IS .001 INCHES OR LESS AND ON ALL THREADS. IN ALL OTHER PLACES DIMENSIONS APPLY BEFORE FINISH.

DEVIATIONS FROM INTENDED SHAPE (FLATNESS, ROUNDNESS, SQUARENESS ETC), MUST BE WITHIN STATED DIMENSIONAL TOLERANCES

| NEXT ASSY | USED ON | NEXT ASSY | FINAL ASSY |
|---|---|---|---|
| 3E8422 | | 1 | |
| APPLICATION | | QUANTITY REQD | |

MATERIAL:

UNLESS OTHERWISE SPECIFIED
DATUM PRECEDENCE PRI A SEC B TER C
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ± 5° | 1 PL ± N/A
2 PL ± .010 | 3 PL ± .005
THIRD ANGLE PROJECTION

| | | |
|---|---|---|
| DWN B.FORD | 08-15-03 | |
| DFTG B.NOEL | 08-15-03 | |
| ENGR B.FORD | 08-15-03 | |
| ENGR X.XXXXX | XX-XX-XX | |
| CHK X.XXXXX | XX-XX-XX | |
| APVD X.XXXXX | XX-XX-XX | |
| APVD X.XXXXX | XX-XX-XX | |
| APVD X.XXXXX | XX-XX-XX | |
| CONTRACT # | | |

ON Semiconductor

TITLE: PCB, KAI-2001/KAI-2020 IMAGER

| SIZE | ITEM NO | REV |
|---|---|---|
| D | 3F5120 | 1 |

| CODE | WT | SCALE 2X | SH 1 OF 4 |
|---|---|---|---|