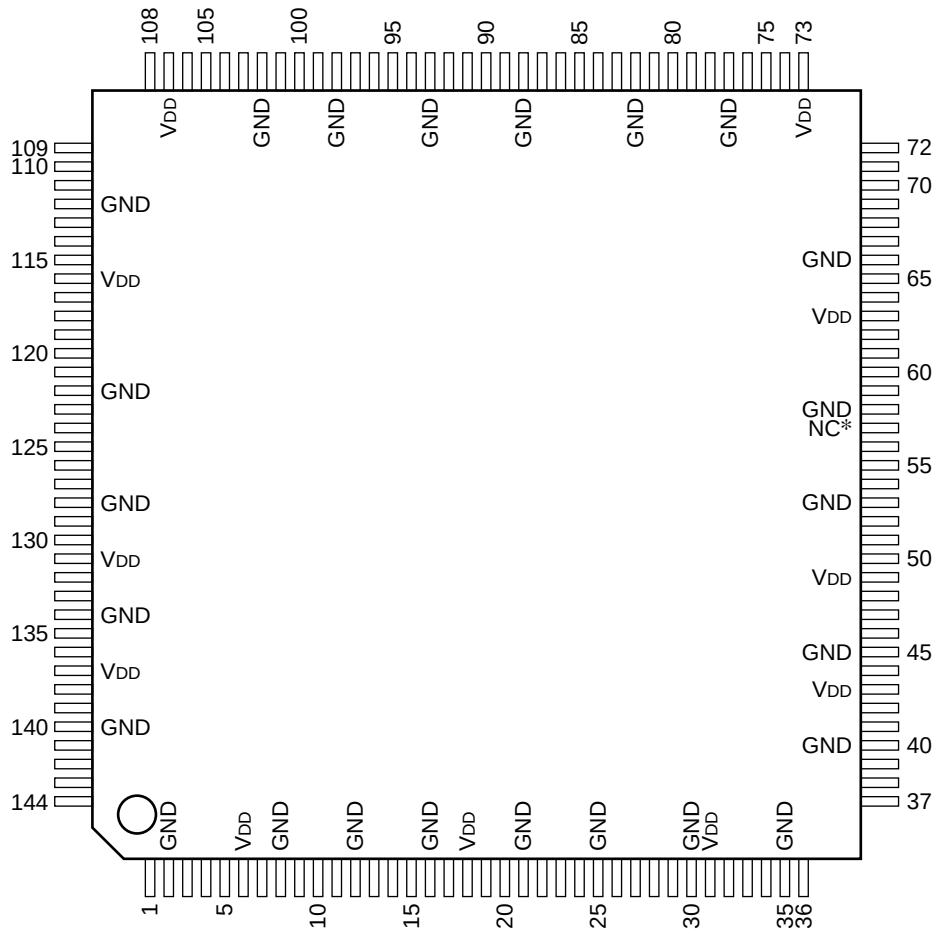


## C-MOS SCSI-2 PROTOCOL CONTROLLER

—TOP VIEW—



\* : PCI BUS INTERFACE MODE

| PIN NO. | 16-BIT BUS MODE |                 |                 |        | PCI BUS MODE     |                 | PIN NO. | 16-BIT BUS MODE |                 |                 |        | PCI BUS MODE     |                 |
|---------|-----------------|-----------------|-----------------|--------|------------------|-----------------|---------|-----------------|-----------------|-----------------|--------|------------------|-----------------|
|         | MODE 0 (68 I/F) |                 | MODE 1 (80 I/F) |        | MODE 3 (PCI I/F) |                 |         | MODE 0 (68 I/F) |                 | MODE 1 (80 I/F) |        | MODE 3 (PCI I/F) |                 |
|         | I/O             | SIGNAL          | I/O             | SIGNAL | I/O              | SIGNAL          |         | I/O             | SIGNAL          | I/O             | SIGNAL | I/O              | SIGNAL          |
| 1       | I/O             | DMD9            |                 |        | I/O              | AD23            | 37      | I/O             | D2              |                 |        | I/O              | C/BE0           |
| 2       | —               | GND             |                 |        | —                | GND             | 38      | I/O             | D1              |                 |        | I/O              | AD7             |
| 3       | I/O             | DMD8            |                 |        | I/O              | AD22            | 39      | I/O             | D0              |                 |        | I/O              | AD6             |
| 4       | I/O             | DMD7            |                 |        | I/O              | AD21            | 40      | —               | GND             |                 |        | —                | GND             |
| 5       | I/O             | DMD6            |                 |        | I/O              | AD20            | 41      | I/O             | LDP             |                 |        | I/O              | AD5             |
| 6       | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> | 42      | I               | UDS             | I               | BHE    | I/O              | AD4             |
| 7       | I/O             | DMD5            |                 |        | I/O              | AD19            | 43      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 8       | —               | GND             |                 |        | —                | GND             | 44      | I               | LDS             | I               | WR     | I/O              | AD3             |
| 9       | I/O             | DMD4            |                 |        | I/O              | AD18            | 45      | —               | GND             |                 |        | —                | GND             |
| 10      | I/O             | DMD3            |                 |        | I/O              | AD17            | 46      | I               | R/W             | I               | RD     | I/O              | AD2             |
| 11      | I/O             | DMD2            |                 |        | I/O              | AD16            | 47      | I               | CS1             |                 |        | I/O              | AD1             |
| 12      | —               | GND             |                 |        | —                | GND             | 48      | I               | CS0             |                 |        | I/O              | AD0             |
| 13      | I/O             | DMD1            |                 |        | I/O              | C/BE2           | 49      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 14      | I/O             | DMD0            |                 |        | I/O              | FRAME           | 50      | O               | INT             |                 |        | O                | INT             |
| 15      | I/O             | LDMDP           |                 |        | I/O              | IRDY            | 51      | I               | A4              |                 |        | O                | PO1             |
| 16      | —               | GND             |                 |        | —                | GND             | 52      | I               | A3              |                 |        | O                | PO0             |
| 17      | I/O             | UDP             |                 |        | I/O              | TRDY            | 53      | —               | GND             |                 |        | —                | GND             |
| 18      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> | 54      | I               | SCLK            |                 |        | I                | SCLK            |
| 19      | I/O             | D15             |                 |        | I/O              | DEVSEL          | 55      | I               | A2              |                 |        | I                | PI1             |
| 20      | I/O             | D14             |                 |        | I/O              | STOP            | 56      | I               | A1              |                 |        | I                | PI0             |
| 21      | —               | GND             |                 |        | —                | GND             | 57      | I               | A0              |                 |        | —                | NC              |
| 22      | I/O             | D13             |                 |        | I/O              | PERR            | 58      | —               | GND             |                 |        | —                | GND             |
| 23      | I/O             | D12             |                 |        | I/O              | PAR             | 59      | I               | MODE1           |                 |        | I                | MODE1           |
| 24      | I/O             | D11             |                 |        | I/O              | C/BE1           | 60      | I               | MODE0           |                 |        | I                | MODE0           |
| 25      | —               | GND             |                 |        | —                | GND             | 61      | I               | S/DSEL          |                 |        | I                | S/DSEL          |
| 26      | I/O             | D10             |                 |        | I/O              | AD15            | 62      | O               | TARG            |                 |        | O                | TARG            |
| 27      | I/O             | D9              |                 |        | I/O              | AD14            | 63      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 28      | I/O             | D8              |                 |        | I/O              | AD13            | 64      | O               | INIT            |                 |        | O                | INIT            |
| 29      | I/O             | D7              |                 |        | I/O              | AD12            | 65      | O               | SELOE           |                 |        | O                | SELOE           |
| 30      | —               | GND             |                 |        | —                | GND             | 66      | —               | GND             |                 |        | —                | GND             |
| 31      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> | 67      | O               | RSTOE           |                 |        | O                | RSTOE           |
| 32      | I/O             | D6              |                 |        | I/O              | AD11            | 68      | O               | BSYOE           |                 |        | O                | BSYOE           |
| 33      | I/O             | D5              |                 |        | I/O              | AD10            | 69      | O               | DBOE11          |                 |        | O                | DBOE11          |
| 34      | I/O             | D4              |                 |        | I/O              | AD9             | 70      | O               | DBOE10          |                 |        | O                | DBOE10          |
| 35      | —               | GND             |                 |        | —                | GND             | 71      | O               | DBOE9           |                 |        | O                | DBOE9           |
| 36      | I/O             | D3              |                 |        | I/O              | AD8             | 72      | O               | DBOE8           |                 |        | O                | DBOE8           |

| PIN NO. | 16-BIT BUS MODE |                 |                 |        | PCI BUS MODE     |                 | PIN NO. | 16-BIT BUS MODE |                 |                 |        | PCI BUS MODE     |                 |
|---------|-----------------|-----------------|-----------------|--------|------------------|-----------------|---------|-----------------|-----------------|-----------------|--------|------------------|-----------------|
|         | MODE 0 (68 I/F) |                 | MODE 1 (80 I/F) |        | MODE 3 (PCI I/F) |                 |         | MODE 0 (68 I/F) |                 | MODE 1 (80 I/F) |        | MODE 3 (PCI I/F) |                 |
|         | I/O             | SIGNAL          | I/O             | SIGNAL | I/O              | SIGNAL          |         | I/O             | SIGNAL          | I/O             | SIGNAL | I/O              | SIGNAL          |
| 73      | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> | 109     | O               | DBOE7           |                 |        | O                | DBOE7           |
| 74      | I/O             | DB11            |                 |        | I/O              | DB11            | 110     | O               | DBOE6           |                 |        | O                | DBOE6           |
| 75      | I/O             | DB10            |                 |        | I/O              | DB10            | 111     | O               | DBOE5           |                 |        | O                | DBOE5           |
| 76      | I/O             | DB9             |                 |        | I/O              | DB9             | 112     | —               | GND             |                 |        | —                | GND             |
| 77      | —               | GND             |                 |        | —                | GND             | 113     | O               | DBOE4           |                 |        | O                | DBOE4           |
| 78      | I/O             | DB8             |                 |        | I/O              | DB8             | 114     | O               | DBOE3           |                 |        | O                | DBOE3           |
| 79      | I/O             | I/O             |                 |        | I/O              | I/O             | 115     | O               | DBOE2           |                 |        | O                | DBOE2           |
| 80      | I/O             | REQ             |                 |        | I/O              | REQ             | 116     | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 81      | I/O             | C/D             |                 |        | I/O              | C/D             | 117     | O               | DBOE1           |                 |        | O                | DBOE1           |
| 82      | —               | GND             |                 |        | —                | GND             | 118     | O               | DBOE0           |                 |        | O                | DBOE0           |
| 83      | I/O             | SEL             |                 |        | I/O              | SEL             | 119     | O               | UDBOEP          |                 |        | O                | UDBOEP          |
| 84      | I/O             | MSG             |                 |        | I/O              | MSG             | 120     | O               | DBOE15          |                 |        | O                | DBOE15          |
| 85      | I/O             | RST             |                 |        | I/O              | RST             | 121     | O               | DBOE14          |                 |        | O                | DBOE14          |
| 86      | I/O             | ACK             |                 |        | I/O              | ACK             | 122     | —               | GND             |                 |        | —                | GND             |
| 87      | I/O             | BSY             |                 |        | I/O              | BSY             | 123     | O               | DBOE13          |                 |        | O                | DBOE13          |
| 88      | —               | GND             |                 |        | —                | GND             | 124     | O               | DBOE12          |                 |        | O                | DBOE12          |
| 89      | I/O             | ATN             |                 |        | I/O              | ATN             | 125     | I               | DMA0            |                 |        | O                | SERR            |
| 90      | I/O             | LDBP            |                 |        | I/O              | LDBP            | 126     | I               | TP              |                 |        | I                | PCLK            |
| 91      | I/O             | DB7             |                 |        | I/O              | DB7             | 127     | I               | RESET           |                 |        | I                | RESET           |
| 92      | I/O             | DB6             |                 |        | I/O              | DB6             | 128     | —               | GND             |                 |        | —                | GND             |
| 93      | —               | GND             |                 |        | —                | GND             | 129     | I               | DACK            |                 |        | I                | GNT             |
| 94      | I/O             | DB5             |                 |        | I/O              | DB5             | 130     | O               | DREQ            |                 |        | O                | PREQ            |
| 95      | I/O             | DB4             |                 |        | I/O              | DB4             | 131     | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 96      | I/O             | DB3             |                 |        | I/O              | DB3             | 132     | I               | DMUDS           | I               | DMBHE  | I/O              | AD31            |
| 97      | I/O             | DB2             |                 |        | I/O              | DB2             | 133     | I               | DMLDS           | I               | DMWR   | I/O              | AD30            |
| 98      | —               | GND             |                 |        | —                | GND             | 134     | —               | GND             |                 |        | —                | GND             |
| 99      | I/O             | DB1             |                 |        | I/O              | DB1             | 135     | I               | DMR/W           | I               | DMRD   | I/O              | AD29            |
| 100     | I/O             | DB0             |                 |        | I/O              | DB0             | 136     | I/O             | UDMDP           |                 |        | I/O              | AD28            |
| 101     | I/O             | UDBP            |                 |        | I/O              | UDBP            | 137     | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> |
| 102     | —               | GND             |                 |        | —                | GND             | 138     | I/O             | DMD15           |                 |        | I/O              | AD27            |
| 103     | I/O             | DB15            |                 |        | I/O              | DB15            | 139     | I/O             | DMD14           |                 |        | I/O              | AD26            |
| 104     | I/O             | DB14            |                 |        | I/O              | DB14            | 140     | —               | GND             |                 |        | —                | GND             |
| 105     | I/O             | DB13            |                 |        | I/O              | DB13            | 141     | I/O             | DMD13           |                 |        | I/O              | AD25            |
| 106     | I/O             | DB12            |                 |        | I/O              | DB12            | 142     | I/O             | DMD12           |                 |        | I/O              | AD24            |
| 107     | —               | V <sub>DD</sub> |                 |        | —                | V <sub>DD</sub> | 143     | I/O             | DMD11           |                 |        | I/O              | C/BE3           |
| 108     | O               | LDBOEP          |                 |        | O                | LDBOEP          | 144     | I/O             | DMD10           |                 |        | I                | IDSEL           |

## 16-BIT BUS INTERFACE MODE

|     |                      |                |     |
|-----|----------------------|----------------|-----|
| 130 | DREQ                 | MSG            | 84  |
| 129 | DACK                 | C/D            | 81  |
| 132 | DMBHE(DMUDS)         | I/O            | 79  |
| 125 | DMA0                 | ATN            | 89  |
| 138 | DMD15                | BSYOE          | 68  |
| 139 | DMD14                | BSY            | 87  |
| 141 | DMD13                | SELOE          | 65  |
| 142 | DMD12                | SEL            | 83  |
| 143 | DMD11                | RSTOE          | 67  |
| 144 | DMD10                | RST            | 85  |
| 1   | DMD9                 | REQ            | 80  |
| 3   | DMD8                 | ACK            | 86  |
| 136 | UDMDP                | INIT           | 64  |
| 4   | DMD7                 | TARG           | 62  |
| 5   | DMD6                 | DB15           | 103 |
| 7   | DMD5                 | DB14           | 104 |
| 9   | DMD4                 | DB13           | 105 |
| 10  | DMD3                 | DB12           | 106 |
| 11  | DMD2                 | DB11           | 74  |
| 13  | DMD1                 | DB10           | 75  |
| 14  | DMD0                 | DB9            | 76  |
| 15  | LDMDP                | DB8            | 78  |
| 133 | DMWR(DMLDS)          | UDBP           | 101 |
| 135 | DMRD(DMR $\bar{W}$ ) | DB7            | 91  |
| 126 | TP                   | DB6            | 92  |
|     |                      | DB5            | 94  |
| 50  | INT                  | DB4            | 95  |
| 19  | D15                  | DB3            | 96  |
| 20  | D14                  | DB2            | 97  |
| 22  | D13                  | DB1            | 99  |
| 23  | D12                  | DB0            | 100 |
| 24  | D11                  | LDBP           | 90  |
| 26  | D10                  | DBOE15         | 120 |
| 27  | D9                   | DBOE14         | 121 |
| 28  | D8                   | DBOE13         | 123 |
| 17  | UDP                  | DBOE12         | 124 |
| 29  | D7                   | DBOE11         | 69  |
| 32  | D6                   | DBOE10         | 70  |
| 33  | D5                   | DBOE9          | 71  |
| 34  | D4                   | DBOE8          | 72  |
| 36  | D3                   | UDBOEP         | 119 |
| 37  | D2                   | DBOE7          | 109 |
| 38  | D1                   | DBOE6          | 110 |
| 39  | D0                   | DBOE5          | 111 |
| 41  | LDP                  | DBOE4          | 113 |
| 44  | WR(LDS)              | DBOE3          | 114 |
| 46  | RD(R $\bar{W}$ )     | DBOE2          | 115 |
| 48  | CS0                  | DBOE1          | 117 |
| 47  | CS1                  | DBOE0          | 118 |
| 51  | A4                   | LDBOEP         | 108 |
| 52  | A3                   | $\bar{S}/DSEL$ | 61  |
| 55  | A2                   |                |     |
| 56  | A1                   |                |     |
| 57  | A0                   |                |     |
| 42  | BHE(UDS)             |                |     |
| 54  | SCLK                 |                |     |
| 59  | MODE1                |                |     |
| 60  | MODE0                |                |     |
| 127 | RESET                |                |     |

## PCI BUS INTERFACE MODE

|     |                |                |     |
|-----|----------------|----------------|-----|
| 130 | PREQ           | MSG            | 84  |
| 129 | GNT            | C/D            | 81  |
| 132 | AD31           | I/O            | 79  |
| 133 | AD30           | ATN            | 89  |
| 135 | AD29           | BSYOE          | 68  |
| 136 | AD28           | BSY            | 87  |
| 138 | AD27           | SELOE          | 65  |
| 139 | AD26           | SEL            | 83  |
| 141 | AD25           | RSTOE          | 67  |
| 142 | AD24           | RST            | 85  |
| 1   | AD23           | REQ            | 80  |
| 3   | AD22           | ACK            | 86  |
| 4   | AD21           | INIT           | 64  |
| 5   | AD20           | TARG           | 62  |
| 7   | AD19           | DB15           | 103 |
| 9   | AD18           | DB14           | 104 |
| 10  | AD17           | DB13           | 105 |
| 11  | AD16           | DB12           | 106 |
| 26  | AD15           | DB11           | 74  |
| 27  | AD14           | DB10           | 75  |
| 28  | AD13           | DB9            | 76  |
| 29  | AD12           | DB8            | 78  |
| 32  | AD11           | UDBP           | 101 |
| 33  | AD10           | DB7            | 91  |
| 34  | AD9            | DB6            | 92  |
| 36  | AD8            | DB5            | 94  |
| 38  | AD7            | DB4            | 95  |
| 39  | AD6            | DB3            | 96  |
| 41  | AD5            | DB2            | 97  |
| 42  | AD4            | DB1            | 99  |
| 44  | AD3            | DB0            | 100 |
| 46  | AD2            | LDBP           | 90  |
| 47  | AD1            | DBOE15         | 120 |
| 48  | AD0            | DBOE14         | 121 |
| 143 | C/ $\bar{B}E3$ | DBOE13         | 123 |
| 13  | C/ $\bar{B}E2$ | DBOE12         | 124 |
| 24  | C/ $\bar{B}E1$ | DBOE11         | 69  |
| 37  | C/ $\bar{B}E0$ | DBOE10         | 70  |
| 23  | PAR            | DBOE9          | 71  |
| 14  | FRAME          | DBOE8          | 72  |
| 17  | TRDY           | UDBOEP         | 119 |
| 15  | IRDY           | DBOE7          | 109 |
| 20  | STOP           | DBOE6          | 110 |
| 19  | DEVSEL         | DBOE5          | 111 |
| 22  | PERR           | DBOE4          | 113 |
| 125 | SERR           | DBOE3          | 114 |
| 144 | IDSEL          | DBOE2          | 115 |
| 126 | PCLK           | DBOE1          | 117 |
|     |                | DBOE0          | 118 |
| 50  | INT            | LDBOEP         | 108 |
| 51  | PO1            | $\bar{S}/DSEL$ | 61  |
| 52  | PO0            |                |     |
| 55  | PI1            |                |     |
| 56  | PI0            |                |     |
| 54  | SCLK           |                |     |
| 59  | MODE1          |                |     |
| 60  | MODE0          |                |     |
| 127 | RESET          |                |     |

**INPUT**

|                                                |                                                                   |
|------------------------------------------------|-------------------------------------------------------------------|
| A0 - A4                                        | ; ADDRESS FOR REGISTER SELECT                                     |
| $\overline{\text{BHE}}$                        | ; UPPER DATA BUS ENABLE                                           |
| $\overline{\text{CS0}}, \overline{\text{CS1}}$ | ; CHIP SELECT                                                     |
| $\overline{\text{DACK}}$                       | ; DMA ACKNOWLEDGE                                                 |
| DMA0                                           | ; ADDRESS DATA A0                                                 |
| $\overline{\text{DMBHE}}$                      | ; UPPER DMA DATA BUS ENABLE                                       |
| $\overline{\text{DMLDS}}$                      | ; LOWER DMA DATA BUS ENABLE                                       |
| $\overline{\text{DMRD}}$                       | ; READ STROBE                                                     |
| $\overline{\text{DMR}/\overline{\text{W}}}$    | ; READ/WRITE                                                      |
| $\overline{\text{DMUDS}}$                      | ; UPPER DMA DATA BUS ENABLE                                       |
| $\overline{\text{DMWR}}$                       | ; WRITE STROBE                                                    |
| $\overline{\text{GNT}}$                        | ; RESPONSE TO REQ                                                 |
| IDSEL                                          | ; CHIP SELECT                                                     |
| $\overline{\text{LDS}}$                        | ; LOWER DATA BUS ENABLE                                           |
| MODE0, MODE1                                   | ; OPERATION MODE                                                  |
| PCLK                                           | ; PCI BUS CLOCK                                                   |
| PI0, PI1                                       | ; DATA INPUTS                                                     |
| $\overline{\text{RD}}$                         | ; READ STROBE                                                     |
| $\overline{\text{RESET}}$                      | ; SYSTEM RESET                                                    |
| $\overline{\text{R}/\overline{\text{W}}}$      | ; READ/WRITE                                                      |
| SCLK                                           | ; 40 MHz SYSTEM CLOCK OF SCSI PROTOCOL CONTROLLER                 |
| $\overline{\text{S}}/\overline{\text{DSEL}}$   | ; OPERATION MODE SELECT (L : SINGLE-ENDED/H : DIFFERENTIAL-ENDED) |
| TP                                             | ; DMA TRANSFER PERMISSION                                         |
| $\overline{\text{UDS}}$                        | ; UPPER DATA BUS ENABLE                                           |
| $\overline{\text{WR}}$                         | ; WRITE STROBE                                                    |

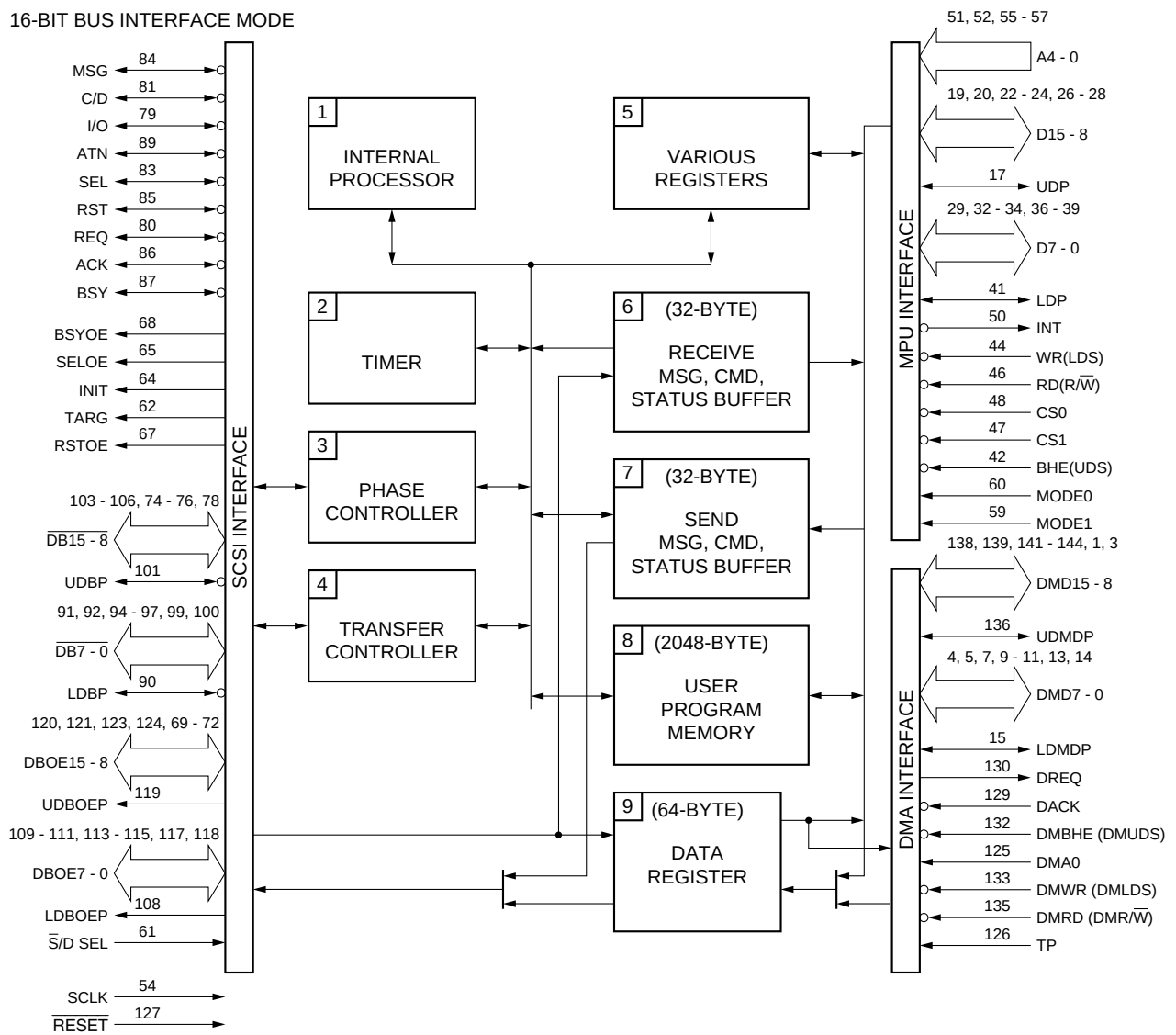
**OUTPUT**

|                          |                                          |
|--------------------------|------------------------------------------|
| BSYOE                    | ; CONTROL OF SCSI CONTROL SIGNAL OUTPUTS |
| DBOE0 - DBOE15           | ; CONTROL OF SCSI DATA BUS OUTPUTS       |
| DREQ                     | ; DATA TRANSFER REQUEST                  |
| INIT                     | ; OPERATION STATUS                       |
| $\overline{\text{INT}}$  | ; INTERRUPT OUTPUT                       |
| LDBOEP                   | ; CONTROL OF SCSI DATA BUS OUTPUTS       |
| PO0, PO1                 | ; DATA OUTPUTS                           |
| $\overline{\text{PREQ}}$ | ; PCI BUS REQUEST                        |
| RSTOE                    | ; CONTROL OF SCSI CONTROL SIGNAL OUTPUTS |
| SELOE                    | ; CONTROL OF SCSI CONTROL SIGNAL OUTPUTS |
| $\overline{\text{SERR}}$ | ; ADDRESS PARITY ERROR                   |
| TARG                     | ; OPERATION STATUS                       |
| UDBOEP                   | ; CONTROL OF SCSI DATA BUS OUTPUTS       |

**INPUT/OUTPUT**

|                      |                                                  |
|----------------------|--------------------------------------------------|
| <u>ACK</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>AD0 - AD31</u>    | ; ADDRESS BUS                                    |
| <u>ATN</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>BSY</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>C/BE0 - C/BE3</u> | ; BUS COMMAND AND BYTE ENABLE MULTIPLEXED SIGNAL |
| <u>C/D</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>D0 - D7</u>       | ; LOWER BITS OF DATA BUS                         |
| <u>D8 - D15</u>      | ; UPPER BITS OF DATA BUS                         |
| <u>DB0 - DB15</u>    | ; SCSI DATA BUS                                  |
| <u>DEVSEL</u>        | ; DEVICE SELECT                                  |
| <u>DMD0 - DMD7</u>   | ; LOWER BITS OF DMA DATA BUS                     |
| <u>DMD8 - DMD15</u>  | ; UPPER BITS OF DMA DATA BUS                     |
| <u>FRAME</u>         | ; DATA BUS BUSY                                  |
| <u>I/O</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>IRDY</u>          | ; MASTER DATA READY                              |
| <u>LDBP</u>          | ; SCSI DATA BUS                                  |
| <u>LDMDP</u>         | ; PARITY OF DMA DATA BUS (LOWER 8-BIT)           |
| <u>LDP</u>           | ; PARITY OF DATA BUS (LOWER 8-BIT)               |
| <u>MSG</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>PAR</u>           | ; PARITY                                         |
| <u>PERR</u>          | ; DATA PARITY ERROR                              |
| <u>REQ</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>RST</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>SEL</u>           | ; SCSI CONTROL SIGNAL                            |
| <u>STOP</u>          | ; STOP DATA TRANSFER FROM TARGET TO MASTER       |
| <u>TRDY</u>          | ; TARGET DATA READY                              |
| <u>UDBP</u>          | ; SCSI DATA BUS                                  |
| <u>UDMDP</u>         | ; PARITY OF DMA DATA BUS (UPPER 8-BIT)           |
| <u>UDP</u>           | ; PARITY OF DATA BUS (UPPER 8-BIT)               |

## 16-BIT BUS INTERFACE MODE



## PCI BUS INTERFACE MODE

