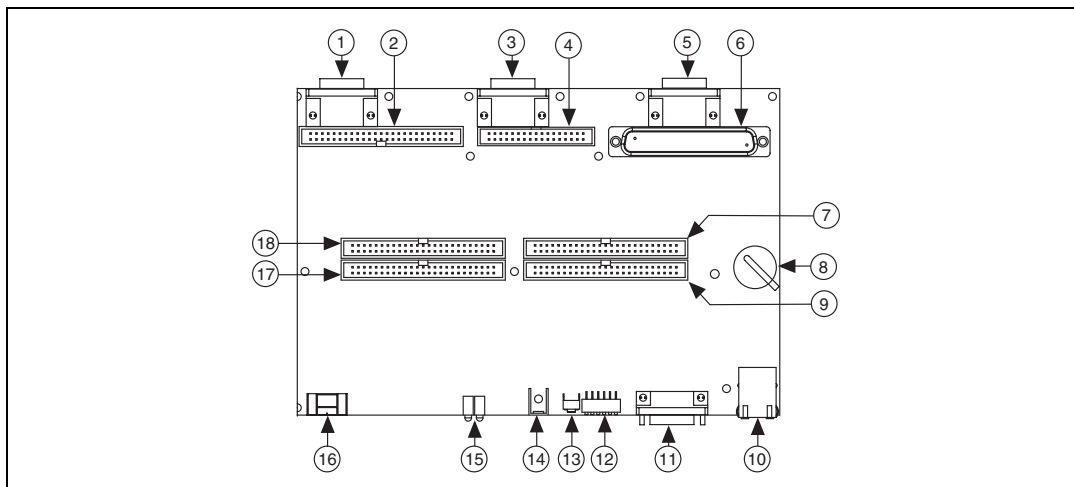# NI SINGLE-BOARD RIO QUICK REFERENCE
# sbRIO-961*x*/963*x*/964*x*

Go to `ni.com/info` and enter the info code `sbriodocs` to locate the user guide for this product.
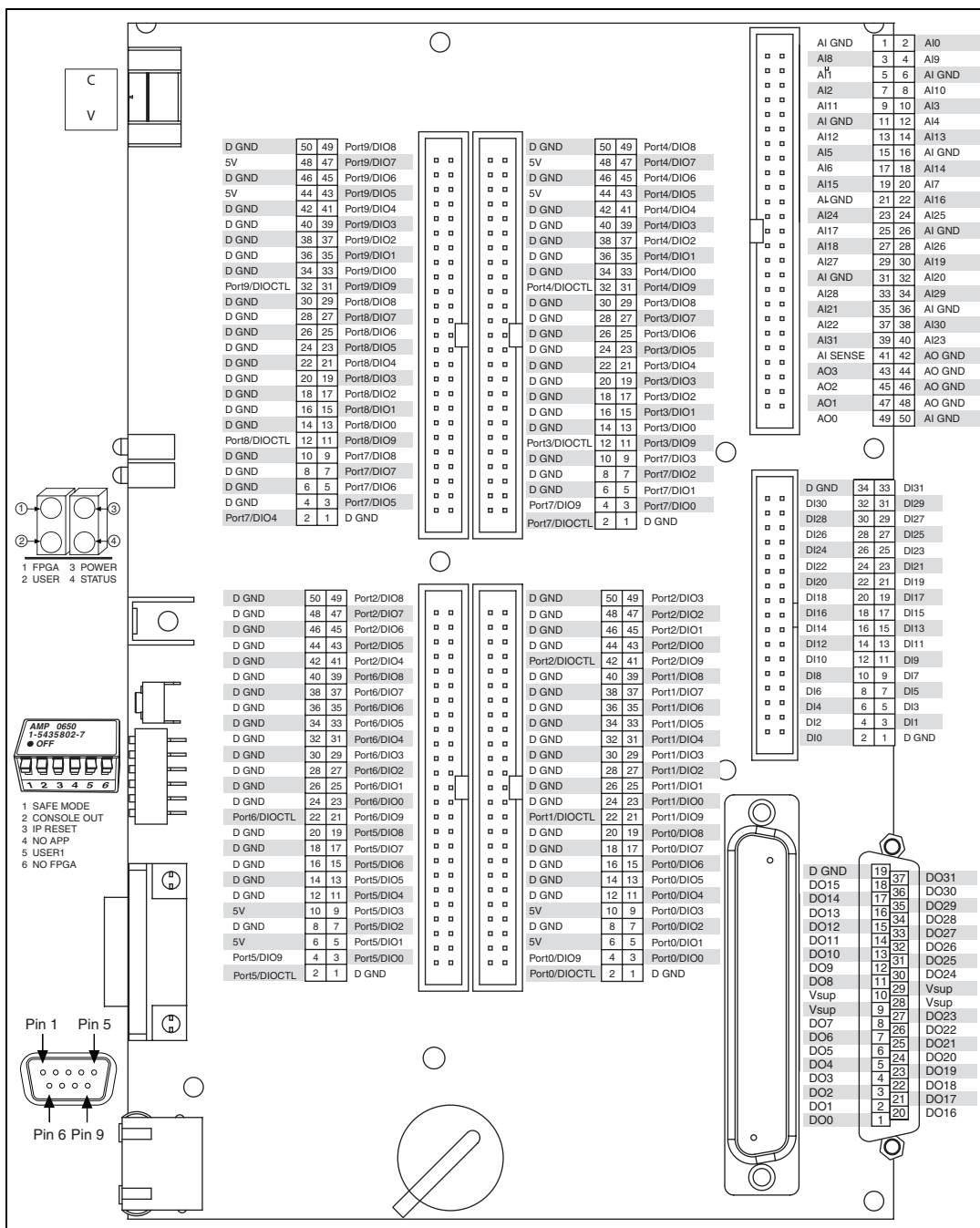


| | | |
|---|---|---|
| 1  J10, Connector for C Series Module | 7  P4, 3.3 V Digital I/O | 13  Reset Button |
| 2  J7, Analog I/O Connector | 8  Backup Battery | 14  P1, Ground Lug |
| 3  J9, Connector for C Series Module | 9  P2, 3.3 V Digital I/O | 15  LEDs |
| 4  J6, 24 V Digital Input (sbRIO-964*x* Only) | 10  J2, RJ-45 Ethernet Port | 16  J3, Power Connector |
| 5  J8, Connector for C Series Module | 11  J1, RS-232 Serial Port | 17  P3, 3.3 V Digital I/O |
| 6  J5, 24 V Digital Output (sbRIO-964*x* Only) | 12  DIP Switches | 18  P5, 3.3 V Digital I/O |

| Signal Pairs for Differential AI on J7 | | | | | |
|---|---|---|---|---|---|
| Channel | Signal+ | Signal− | Channel | Signal+ | Signal− |
| 0 | AI0 | AI8 | 16 | AI16 | AI24 |
| 1 | AI1 | AI9 | 17 | AI17 | AI25 |
| 2 | AI2 | AI10 | 18 | AI18 | AI26 |
| 3 | AI3 | AI11 | 19 | AI19 | AI27 |
| 4 | AI4 | AI12 | 20 | AI20 | AI28 |
| 5 | AI5 | AI13 | 21 | AI21 | AI29 |
| 6 | AI6 | AI14 | 22 | AI22 | AI30 |
| 7 | AI7 | AI15 | 23 | AI23 | AI31 |

| Status LED | |
|---|---|
| # of Flashes | Indication |
| 1 | IP unconfigured |
| 2 | Software installation error |
| 3 | Safe mode on |
| 4 | Check RT VI |
| Solid or continuously flashing | Check network and DHCP or contact NI |

## Enabling Console Out on J1 (Serial Port)

1. Turn DIP switch 2 on.
2. Connect null-modem cable.
3. Configure host settings.
   - 9,600 bps
   - Eight data bits
   - No parity
   - One stop bit
   - No flow control

**NATIONAL INSTRUMENTS™**

**Top-right AI/AO connector**

| | | | |
|---|---|---|---|
| AI GND | 1 | 2 | AI0 |
| AI8 | 3 | 4 | AI9 |
| AI1 | 5 | 6 | AI GND |
| AI2 | 7 | 8 | AI10 |
| AI11 | 9 | 10 | AI3 |
| AI GND | 11 | 12 | AI4 |
| AI12 | 13 | 14 | AI13 |
| AI5 | 15 | 16 | AI GND |
| AI6 | 17 | 18 | AI14 |
| AI15 | 19 | 20 | AI7 |
| AI GND | 21 | 22 | AI16 |
| AI24 | 23 | 24 | AI25 |
| AI17 | 25 | 26 | AI GND |
| AI18 | 27 | 28 | AI26 |
| AI27 | 29 | 30 | AI19 |
| AI GND | 31 | 32 | AI20 |
| AI28 | 33 | 34 | AI29 |
| AI21 | 35 | 36 | AI GND |
| AI22 | 37 | 38 | AI30 |
| AI31 | 39 | 40 | AI23 |
| AI SENSE | 41 | 42 | AO GND |
| AO3 | 43 | 44 | AO GND |
| AO2 | 45 | 46 | AO GND |
| AO1 | 47 | 48 | AO GND |
| AO0 | 49 | 50 | AI GND |

**Port9 / Port8 / Port7 connector**

| | | | |
|---|---|---|---|
| D GND | 50 | 49 | Port9/DIO8 |
| 5V | 48 | 47 | Port9/DIO7 |
| D GND | 46 | 45 | Port9/DIO6 |
| 5V | 44 | 43 | Port9/DIO5 |
| D GND | 42 | 41 | Port9/DIO4 |
| D GND | 40 | 39 | Port9/DIO3 |
| D GND | 38 | 37 | Port9/DIO2 |
| D GND | 36 | 35 | Port9/DIO1 |
| D GND | 34 | 33 | Port9/DIO0 |
| Port9/DIOCTL | 32 | 31 | Port9/DIO9 |
| D GND | 30 | 29 | Port8/DIO8 |
| D GND | 28 | 27 | Port8/DIO7 |
| D GND | 26 | 25 | Port8/DIO6 |
| D GND | 24 | 23 | Port8/DIO5 |
| D GND | 22 | 21 | Port8/DIO4 |
| D GND | 20 | 19 | Port8/DIO3 |
| D GND | 18 | 17 | Port8/DIO2 |
| D GND | 16 | 15 | Port8/DIO1 |
| D GND | 14 | 13 | Port8/DIO0 |
| Port8/DIOCTL | 12 | 11 | Port8/DIO9 |
| D GND | 10 | 9 | Port7/DIO8 |
| D GND | 8 | 7 | Port7/DIO7 |
| D GND | 6 | 5 | Port7/DIO6 |
| D GND | 4 | 3 | Port7/DIO5 |
| Port7/DIO4 | 2 | 1 | D GND |

**Port4 / Port3 / Port7 connector**

| | | | |
|---|---|---|---|
| D GND | 50 | 49 | Port4/DIO8 |
| 5V | 48 | 47 | Port4/DIO7 |
| D GND | 46 | 45 | Port4/DIO6 |
| 5V | 44 | 43 | Port4/DIO5 |
| D GND | 42 | 41 | Port4/DIO4 |
| D GND | 40 | 39 | Port4/DIO3 |
| D GND | 38 | 37 | Port4/DIO2 |
| D GND | 36 | 35 | Port4/DIO1 |
| D GND | 34 | 33 | Port4/DIO0 |
| Port4/DIOCTL | 32 | 31 | Port4/DIO9 |
| D GND | 30 | 29 | Port3/DIO8 |
| D GND | 28 | 27 | Port3/DIO7 |
| D GND | 26 | 25 | Port3/DIO6 |
| D GND | 24 | 23 | Port3/DIO5 |
| D GND | 22 | 21 | Port3/DIO4 |
| D GND | 20 | 19 | Port3/DIO3 |
| D GND | 18 | 17 | Port3/DIO2 |
| D GND | 16 | 15 | Port3/DIO1 |
| D GND | 14 | 13 | Port3/DIO0 |
| Port3/DIOCTL | 12 | 11 | Port3/DIO9 |
| D GND | 10 | 9 | Port7/DIO3 |
| D GND | 8 | 7 | Port7/DIO2 |
| D GND | 6 | 5 | Port7/DIO1 |
| Port7/DIO9 | 4 | 3 | Port7/DIO0 |
| Port7/DIOCTL | 2 | 1 | D GND |

**DI connector**

| | | | |
|---|---|---|---|
| D GND | 34 | 33 | DI31 |
| DI30 | 32 | 31 | DI29 |
| DI28 | 30 | 29 | DI27 |
| DI26 | 28 | 27 | DI25 |
| DI24 | 26 | 25 | DI23 |
| DI22 | 24 | 23 | DI21 |
| DI20 | 22 | 21 | DI19 |
| DI18 | 20 | 19 | DI17 |
| DI16 | 18 | 17 | DI15 |
| DI14 | 16 | 15 | DI13 |
| DI12 | 14 | 13 | DI11 |
| DI10 | 12 | 11 | DI9 |
| DI8 | 10 | 9 | DI7 |
| DI6 | 8 | 7 | DI5 |
| DI4 | 6 | 5 | DI3 |
| DI2 | 4 | 3 | DI1 |
| DI0 | 2 | 1 | D GND |

**Port2 / Port6 / Port5 connector**

| | | | |
|---|---|---|---|
| D GND | 50 | 49 | Port2/DIO8 |
| D GND | 48 | 47 | Port2/DIO7 |
| D GND | 46 | 45 | Port2/DIO6 |
| D GND | 44 | 43 | Port2/DIO5 |
| D GND | 42 | 41 | Port2/DIO4 |
| D GND | 40 | 39 | Port6/DIO8 |
| D GND | 38 | 37 | Port6/DIO7 |
| D GND | 36 | 35 | Port6/DIO6 |
| D GND | 34 | 33 | Port6/DIO5 |
| D GND | 32 | 31 | Port6/DIO4 |
| D GND | 30 | 29 | Port6/DIO3 |
| D GND | 28 | 27 | Port6/DIO2 |
| D GND | 26 | 25 | Port6/DIO1 |
| D GND | 24 | 23 | Port6/DIO0 |
| Port6/DIOCTL | 22 | 21 | Port6/DIO9 |
| D GND | 20 | 19 | Port5/DIO8 |
| D GND | 18 | 17 | Port5/DIO7 |
| D GND | 16 | 15 | Port5/DIO6 |
| D GND | 14 | 13 | Port5/DIO5 |
| D GND | 12 | 11 | Port5/DIO4 |
| 5V | 10 | 9 | Port5/DIO3 |
| D GND | 8 | 7 | Port5/DIO2 |
| 5V | 6 | 5 | Port5/DIO1 |
| Port5/DIO9 | 4 | 3 | Port5/DIO0 |
| Port5/DIOCTL | 2 | 1 | D GND |

**Port2 / Port1 / Port0 connector**

| | | | |
|---|---|---|---|
| D GND | 50 | 49 | Port2/DIO3 |
| D GND | 48 | 47 | Port2/DIO2 |
| D GND | 46 | 45 | Port2/DIO1 |
| D GND | 44 | 43 | Port2/DIO0 |
| Port2/DIOCTL | 42 | 41 | Port2/DIO9 |
| D GND | 40 | 39 | Port1/DIO8 |
| D GND | 38 | 37 | Port1/DIO7 |
| D GND | 36 | 35 | Port1/DIO6 |
| D GND | 34 | 33 | Port1/DIO5 |
| D GND | 32 | 31 | Port1/DIO4 |
| D GND | 30 | 29 | Port1/DIO3 |
| D GND | 28 | 27 | Port1/DIO2 |
| D GND | 26 | 25 | Port1/DIO1 |
| D GND | 24 | 23 | Port1/DIO0 |
| Port1/DIOCTL | 22 | 21 | Port1/DIO9 |
| D GND | 20 | 19 | Port0/DIO8 |
| D GND | 18 | 17 | Port0/DIO7 |
| D GND | 16 | 15 | Port0/DIO6 |
| D GND | 14 | 13 | Port0/DIO5 |
| 5V | 12 | 11 | Port0/DIO4 |
| D GND | 10 | 9 | Port0/DIO3 |
| D GND | 8 | 7 | Port0/DIO2 |
| 5V | 6 | 5 | Port0/DIO1 |
| Port0/DIO9 | 4 | 3 | Port0/DIO0 |
| Port0/DIOCTL | 2 | 1 | D GND |

**DO connector**

| | | | |
|---|---|---|---|
| D GND | 19 | 37 | DO31 |
| DO15 | 18 | 36 | DO30 |
| DO14 | 17 | 35 | DO29 |
| DO13 | 16 | 34 | DO28 |
| DO12 | 15 | 33 | DO27 |
| DO11 | 14 | 32 | DO26 |
| DO10 | 13 | 31 | DO25 |
| DO9 | 12 | 30 | DO24 |
| DO8 | 11 | 29 | Vsup |
| Vsup | 10 | 28 | Vsup |
| Vsup | 9 | 27 | DO23 |
| DO7 | 8 | 26 | DO22 |
| DO6 | 7 | 25 | DO21 |
| DO5 | 6 | 24 | DO20 |
| DO4 | 5 | 23 | DO19 |
| DO3 | 4 | 22 | DO18 |
| DO2 | 3 | 21 | DO17 |
| DO1 | 2 | 20 | DO16 |
| DO0 | 1 | | |

C
V

1 FPGA  3 POWER
2 USER  4 STATUS

AMP 0650
1-5435802-7
● OFF

1 2 3 4 5 6

1 SAFE MODE
2 CONSOLE OUT
3 IP RESET
4 NO APP
5 USER1
6 NO FPGA

Pin 1  Pin 5
Pin 6  Pin 9

375062A-01          Aug08