

## MC4XZGALQD MOUNTING CARD AMC Interface Board for Galil DMC-21x3

### FEATURES:

- Mounts directly onto a Galil DMC-21x3
- Hosts up to 4-axis of Z Series amplifiers
- Pinouts correspond to Galil specifications
- All pluggable connections
- Tightly secured fitting connectors
- Amplifier mounting kits included



### DESCRIPTION:

The MC4XZGALQD mounting card is designed to host up to four analog command Z Series servo amplifiers to interface directly with a Galil DMC-21x3 motion controller. The amplifiers are installed in stacked configurations to keep the overall footprint small while offering convenient pluggable screw terminals for easy connections. Amplifier mounting kits are included to secure the Z Series amplifiers onto the mounting card.

### SPECIFICATIONS:

| <b>MECHANICAL SPECIFICATIONS</b>   |   |
|------------------------------------|---|
| POWER CONNECTOR*                   | 4-position 5.08 mm spaced header                    |
| MOTOR CONNECTORS*                  | 4-position 5.08 mm spaced header                    |
| FEEDBACK CONNECTORS*               | 8-position 3.5 mm spaced headers                    |
| INPUT/OUTPUT CONNECTORS*           | 11-position 3.5 mm spaced headers                   |
| SIZE (without amplifiers)          | 7.09 x 3.74 x 1.48 inches<br>180.0 x 95.0 x 37.5 mm |
| WEIGHT (without mating connectors) | 4.5 oz<br>127.5 g                                   |

\* Mating connectors are not included

**JUMPERS:**

This mounting card allows control of external amplifiers by breaking out the necessary command signals through the 44-terminal I/O connectors (P3). These signals allow the user to command external motors (even different motor types) on another axis while still using the analog command Z Series amplifiers. The types of signals that are brought out are selected through the jumper settings. Note that each motor axis is associated with two jumpers that must be set the same way.

| PIN | A     | B              | C           |
|-----|-------|----------------|-------------|
| 1   | +REFW | PWM-IN / +REFW | PWM / STEPW |
| 2   | INHW  | SIGN / AENW    | SIGN / DIRW |
| 3   | +REFZ | PWM-IN / +REFZ | PWM / STEPZ |
| 4   | INHZ  | SIGN / AENZ    | SIGN / DIRZ |
| 5   | +REFY | PWM-IN / +REFY | PWM / STEPY |
| 6   | INH Y | SIGN / AENY    | SIGN / DIRY |
| 7   | +REFX | PWM-IN / +REFX | PWM / STEPX |
| 8   | INH X | SIGN / AENX    | SIGN / DIRX |

- Notes: 1. Only use analog input Z Series drives (jumper the A's & B's)  
 2. PWM commands can be accessed through P3 (after jumpering B's to C's)

**PIN FUNCTIONS:**

| CONNECTOR             | PIN | NAME     | DESCRIPTION / NOTES                 | I/O     |
|-----------------------|-----|----------|-------------------------------------|---------|
| <b>P1</b><br>Power    | 1   | HV       | DC voltage input                    | I       |
|                       | 2   | GND      | Ground                              | GND     |
|                       | 3   | HV       | DC voltage input                    | I       |
|                       | 4   | GND      | Ground                              | GND     |
| <b>PX1</b><br>Motor X | 1   | MOTOR AX | Motor phase A connection for X-axis | O       |
|                       | 2   | MOTOR BX | Motor phase B connection for X-axis | O       |
|                       | 3   | MOTOR CX | Motor phase C connection for X-axis | O       |
|                       | 4   | CHASSIS  | Chassis                             | Chassis |
| <b>PY1</b><br>Motor Y | 1   | MOTOR AY | Motor phase A connection for Y-axis | O       |
|                       | 2   | MOTOR BY | Motor phase B connection for Y-axis | O       |
|                       | 3   | MOTOR CY | Motor phase C connection for Y-axis | O       |
|                       | 4   | CHASSIS  | Chassis                             | Chassis |
| <b>PZ1</b><br>Motor Z | 1   | MOTOR AZ | Motor phase A connection for Z-axis | O       |
|                       | 2   | MOTOR BZ | Motor phase B connection for Z-axis | O       |
|                       | 3   | MOTOR CZ | Motor phase C connection for Z-axis | O       |
|                       | 4   | CHASSIS  | Chassis                             | Chassis |
| <b>PW1</b><br>Motor W | 1   | MOTOR AW | Motor phase A connection for W-axis | O       |
|                       | 2   | MOTOR BW | Motor phase B connection for W-axis | O       |
|                       | 3   | MOTOR CW | Motor phase C connection for W-axis | O       |
|                       | 4   | CHASSIS  | Chassis                             | Chassis |

| CONNECTOR                         | PIN | NAME      | DESCRIPTION / NOTES             | I/O |
|-----------------------------------|-----|-----------|---------------------------------|-----|
| <b>P4X</b><br>Motor X<br>Feedback | 1   | ENCIX+    | Differential Encoder I+         | I   |
|                                   | 2   | ENCBX+    | Differential Encoder B+         | I   |
|                                   | 3   | ENCAX+    | Differential Encoder A+         | I   |
|                                   | 4   | ENCABX+   | Differential Encoder AB+        | I   |
|                                   | 5   | GND       | Ground                          | GND |
|                                   | 6   | ENCIX-    | Differential Encoder I-         | I   |
|                                   | 7   | ENCBX-    | Differential Encoder B-         | I   |
|                                   | 8   | ENCAX-    | Differential Encoder A-         | I   |
|                                   | 9   | ENCAAX-   | Differential Encoder AA-        | I   |
|                                   | 10  | HALL1X    | Hall 1                          | I   |
|                                   | 11  | ENCAAX+   | Differential Encoder AA+        | I   |
|                                   | 12  | ENCABX-   | Differential Encoder AB-        | I   |
|                                   | 13  | HALL2X    | Hall 2                          | I   |
|                                   | 14  | HALL3X    | Hall 3                          | I   |
|                                   | 15  | 5V Output | +5V Output for feedback devices | O   |
|                                   | 16  | -         | -                               | -   |
| <b>P5Y</b><br>Motor Y<br>Feedback | 1   | ENCIY+    | Differential Encoder I+         | I   |
|                                   | 2   | ENCBY+    | Differential Encoder B+         | I   |
|                                   | 3   | ENCAY+    | Differential Encoder A+         | I   |
|                                   | 4   | ENCABY+   | Differential Encoder AB+        | I   |
|                                   | 5   | GND       | Ground                          | GND |
|                                   | 6   | ENCIY-    | Differential Encoder I-         | I   |
|                                   | 7   | ENCBY-    | Differential Encoder B-         | I   |
|                                   | 8   | ENCAY-    | Differential Encoder A-         | I   |
|                                   | 9   | ENCAAY-   | Differential Encoder AA-        | I   |
|                                   | 10  | HALL1Y    | Hall 1                          | I   |
|                                   | 11  | ENCAAY+   | Differential Encoder AA+        | I   |
|                                   | 12  | ENCABY-   | Differential Encoder AB-        | I   |
|                                   | 13  | HALL2Y    | Hall 2                          | I   |
|                                   | 14  | HALL3Y    | Hall 3                          | I   |
|                                   | 15  | 5V Output | +5V Output for feedback devices | O   |
|                                   | 16  | -         | -                               | -   |

| CONNECTOR                         | PIN | NAME      | DESCRIPTION / NOTES             | I/O |
|-----------------------------------|-----|-----------|---------------------------------|-----|
| <b>P6Z</b><br>Motor Z<br>Feedback | 1   | ENCIZ+    | Differential Encoder I+         | I   |
|                                   | 2   | ENCBZ+    | Differential Encoder B+         | I   |
|                                   | 3   | ENCAZ+    | Differential Encoder A+         | I   |
|                                   | 4   | ENCABZ+   | Differential Encoder AB+        | I   |
|                                   | 5   | GND       | Ground                          | GND |
|                                   | 6   | ENCIZ-    | Differential Encoder I-         | I   |
|                                   | 7   | ENCBZ-    | Differential Encoder B-         | I   |
|                                   | 8   | ENCAZ-    | Differential Encoder A-         | I   |
|                                   | 9   | ENCAAZ-   | Differential Encoder AA-        | I   |
|                                   | 10  | HALL1Z    | Hall 1                          | I   |
|                                   | 11  | ENCAAZ+   | Differential Encoder AA+        | I   |
|                                   | 12  | ENCABZ-   | Differential Encoder AB-        | I   |
|                                   | 13  | HALL2Z    | Hall 2                          | I   |
|                                   | 14  | HALL3Z    | Hall 3                          | I   |
|                                   | 15  | 5V Output | +5V Output for feedback devices | O   |
|                                   | 16  | -         | -                               | -   |
| <b>P7W</b><br>Motor W<br>Feedback | 1   | ENCIW+    | Differential Encoder I+         | I   |
|                                   | 2   | ENCBW+    | Differential Encoder B+         | I   |
|                                   | 3   | ENCAW+    | Differential Encoder A+         | I   |
|                                   | 4   | ENCABW+   | Differential Encoder AB+        | I   |
|                                   | 5   | GND       | Ground                          | GND |
|                                   | 6   | ENCIW-    | Differential Encoder I-         | I   |
|                                   | 7   | ENCBW-    | Differential Encoder B-         | I   |
|                                   | 8   | ENCAW-    | Differential Encoder A-         | I   |
|                                   | 9   | ENCAAW-   | Differential Encoder AA-        | I   |
|                                   | 10  | HALL1W    | Hall 1                          | I   |
|                                   | 11  | ENCAAW+   | Differential Encoder AA+        | I   |
|                                   | 12  | ENCABW-   | Differential Encoder AB-        | I   |
|                                   | 13  | HALL2W    | Hall 2                          | I   |
|                                   | 14  | HALL3W    | Hall 3                          | I   |
|                                   | 15  | 5V Output | +5V Output for feedback devices | O   |
|                                   | 16  | -         | -                               | -   |

| CONNECTOR | PIN | NAME            | DESCRIPTION / NOTES                      | I/O |
|-----------|-----|-----------------|--|-----|
| P3<br>I/O | 1   | PWM-IN / +REFZ  | * Z-axis Analog Command (or PWM Command) | O   |
|           | 2   | OUTPUT6         | Output 6                                 | O   |
|           | 3   | OUTPUT8         | Output 8                                 | O   |
|           | 4   | OUTPUT5         | Output 5                                 | O   |
|           | 5   | OUTPUT2         | Output 2                                 | O   |
|           | 6   | ABORT           | Abort                                    | I   |
|           | 7   | INPUT6          | Input 6                                  | I   |
|           | 8   | LATCHZ / INPUT3 | Z-axis Latch or Input 3                  | I   |
|           | 9   | SIGN / AENY     | * Y-axis Amp Enable (or Sign direction)  | O   |
|           | 10  | Output Compare  | Output Compare                           | O   |
|           | 11  | Reverse Limit X | X-axis Reverse limit                     | I   |
|           | 12  | Reverse Limit Y | Y-axis Reverse limit                     | I   |
|           | 13  | Reverse Limit Z | Z-axis Reverse limit                     | I   |
|           | 14  | Reverse Limit W | W-axis Reverse limit                     | I   |
|           | 15  | Forward Limit W | W-axis Forward limit                     | I   |
|           | 16  | SIGN / AENW     | * W-axis Amp Enable (or Sign direction)  | O   |
|           | 17  | SIGN / AENZ     | * Z-axis Amp Enable (or Sign direction)  | O   |
|           | 18  | OUTPUT7         | Output 7                                 | O   |
|           | 19  | OUTPUT4         | Output 4                                 | O   |
|           | 20  | OUTPUT1         | Output 1                                 | O   |
|           | 21  | OUTPUT3         | Output 3                                 | O   |
|           | 22  | INPUT7          | Input 7                                  | I   |
|           | 23  | LATCHW / INPUT4 | W-axis Latch or Input 4                  | I   |
|           | 24  | LATCHX / INPUT1 | X-axis Latch or Input 1                  | I   |
|           | 25  | PWM-IN / +REFX  | * X-axis Analog Command (or PWM Command) | O   |
|           | 26  | HOMEX           | X-axis Home                              | I   |
|           | 27  | HOMEY           | Y-axis Home                              | I   |
|           | 28  | HOMEZ           | Z-axis Home                              | I   |
|           | 29  | HOMEW           | W-axis Home                              | I   |
|           | 30  | Error Output    | Error Output                             | O   |
|           | 31  | PWM-IN / +REFW  | * W-axis Analog Command (or PWM Command) | O   |
|           | 32  | 5V Output       | 5V Output                                | O   |
|           | 33  | 5V Output       | 5V Output                                | O   |
|           | 34  | GND             | Ground                                   | GND |
|           | 35  | GND             | Ground                                   | GND |
|           | 36  | INPUT8          | Input 8                                  | I   |
|           | 37  | INPUT5          | Input 5                                  | I   |
|           | 38  | LATCHY / INPUT2 | Y-axis Latch or Input 2                  | I   |
|           | 39  | PWM-IN / +REFY  | * Y-axis Analog Command (or PWM Command) | O   |
|           | 40  | SIGN / AENX     | * X-axis Amp Enable (or Sign direction)  | O   |
|           | 41  | Forward Limit X | X-axis Forward Limit                     | I   |
|           | 42  | Forward Limit Y | Y-axis Forward Limit                     | I   |
|           | 43  | Forward Limit Z | Z-axis Forward Limit                     | I   |
|           | 44  | RESET           | Reset                                    | I   |

\* Function depends on jumper setting

**INTERNAL CONNECTIONS:**

The following connectors are for interface between the components (Z Series amplifiers, MC4XZGALQD, DMC-21x3) in the system. They are for your information and not intended for user interface.

**PXA, PXB – Z Series Connectors X**

| PXA |         | PXB |                 |
|-----|---------|-----|-----------------|
| PIN | NAME    | PIN | NAME            |
| 1   | +REF    | 1   | -               |
| 2   | GROUND  | 2   | GROUND          |
| 3   | GROUND  | 3   |                 |
| 4   | -       | 4   | HIGH<br>VOLTAGE |
| 5   | INHIBIT | 5   |                 |
| 6   | -       | 6   | -               |
| 7   | GROUND  | 7   | MOTOR C         |
| 8   | HALL 1  | 8   |                 |
| 9   | HALL 2  | 9   | MOTOR B         |
| 10  | HALL 3  | 10  |                 |
| 11  | -       | 11  | MOTOR A         |
| 12  | -       | 12  |                 |

**PYA, PYB – Z Series Connectors Y**

| PYA |         | PYB |         |
|-----|---------|-----|---------|
| PIN | NAME    | PIN | NAME    |
| 1   | +REF    | 1   | -       |
| 2   | GROUND  | 2   | GROUND  |
| 3   | GROUND  | 3   |         |
| 4   | -       | 4   | HIGH    |
| 5   | INHIBIT | 5   |         |
| 6   | -       | 6   | -       |
| 7   | GROUND  | 7   | MOTOR C |
| 8   | HALL 1  | 8   |         |
| 9   | HALL 2  | 9   | MOTOR B |
| 10  | HALL 3  | 10  |         |
| 11  | -       | 11  | MOTOR A |
| 12  | -       | 12  |         |

**PZA, PZB – Z Series Connectors Z**

| PZA |         | PZB |                 |
|-----|---------|-----|-----------------|
| PIN | NAME    | PIN | NAME            |
| 1   | +REF    | 1   | -               |
| 2   | GROUND  | 2   | GROUND          |
| 3   | GROUND  | 3   |                 |
| 4   | -       | 4   | HIGH<br>VOLTAGE |
| 5   | INHIBIT | 5   |                 |
| 6   | -       | 6   | -               |
| 7   | GROUND  | 7   | MOTOR C         |
| 8   | HALL 1  | 8   |                 |
| 9   | HALL 2  | 9   | MOTOR B         |
| 10  | HALL 3  | 10  |                 |
| 11  | -       | 11  | MOTOR A         |
| 12  | -       | 12  |                 |

**PWA, PWB – Z Series Connectors W**

| PWA |         | PWB |         |
|-----|---------|-----|---------|
| PIN | NAME    | PIN | NAME    |
| 1   | +REF    | 1   | -       |
| 2   | GROUND  | 2   | GROUND  |
| 3   | GROUND  | 3   |         |
| 4   | -       | 4   | HIGH    |
| 5   | INHIBIT | 5   |         |
| 6   | -       | 6   | -       |
| 7   | GROUND  | 7   | MOTOR C |
| 8   | HALL 1  | 8   |         |
| 9   | HALL 2  | 9   | MOTOR B |
| 10  | HALL 3  | 10  |         |
| 11  | -       | 11  | MOTOR A |
| 12  | -       | 12  |         |

**P2 - Auxiliary Encoder**

| PIN | Row A   | PIN | Row B   |
|-----|---------|-----|---------|
| 1   | VCC     | 2   | GND     |
| 3   | ENCAAZ+ | 4   | ENCAAZ- |
| 5   | ENCABZ+ | 6   | ENCABZ- |
| 7   | ENCAAW+ | 8   | ENCAAW- |
| 9   | ENCABW+ | 10  | ENCABW- |

## P8 – I/O Interface to Galil Controller

| PIN | NAME            | PIN | NAME            |
|-----|-----------------|-----|-----------------|
| 1   | GND             | 49  | OUTPUT7         |
| 2   | PWM / STEPW     | 50  | ENCAX-          |
| 3   | PWM / STEPZ     | 51  | ENCIX+          |
| 4   | PWM / STEPY     | 52  | ENCAY-          |
| 5   | PWM / STEPX     | 53  | ENCIY+          |
| 6   | INHW            | 54  | ENCAZ-          |
| 7   | INHX            | 55  | ENCIZ+          |
| 8   | HOMEW           | 56  | ENCAW-          |
| 9   | HOMEZ           | 57  | ENCIW+          |
| 10  | HOMEY           | 58  | GND             |
| 11  | HOMEX           | 59  | ENCAAX-         |
| 12  | LATCHX / INPUT1 | 60  | ENCAAY+         |
| 13  | LATCHW / INPUT4 | 61  | ENCABY-         |
| 14  | INPUT7          | 62  | ENCAAW+         |
| 15  | OUTPUT3         | 63  | RESET           |
| 16  | OUTPUT5         | 64  | 5V Output       |
| 17  | OUTPUT8         | 65  | GND             |
| 18  | ENCAX+          | 66  | +REFW           |
| 19  | ENCBX-          | 67  | +REFZ           |
| 20  | ENCAY+          | 68  | +REFY           |
| 21  | ENCBY-          | 69  | +REFX           |
| 22  | ENCAZ+          | 70  | Output Compare  |
| 23  | ENCBZ-          | 71  | INHZ            |
| 24  | ENCAW+          | 72  | Forward Limit W |
| 25  | ENCBW-          | 73  | Forward Limit Z |
| 26  | GND             | 74  | Forward Limit Y |
| 27  | ENCAAX+         | 75  | Forward Limit X |
| 28  | ENCABX-         | 76  | LATCHZ / INPUT3 |
| 29  | ENCABY+         | 77  | INPUT6          |
| 30  | ENCABZ+         | 78  | ABORT           |
| 31  | -12V Output     | 79  | OUTPUT1         |
| 32  | 5V Output       | 80  | OUTPUT4         |
| 33  | GND             | 81  | OUTPUT6         |
| 34  | SIGN / DIRW     | 82  | ENCBX+          |
| 35  | SIGN / DIRZ     | 83  | ENCIX-          |
| 36  | SIGN / DIRY     | 84  | ENCBY+          |
| 37  | SIGN / DIRX     | 85  | ENCIY-          |
| 38  | GND             | 86  | ENCBZ+          |
| 39  | INHY            | 87  | ENCIZ-          |
| 40  | Reverse Limit W | 88  | ENCBW+          |
| 41  | Reverse Limit Z | 89  | ENCIW-          |
| 42  | Reverse Limit Y | 90  | GND             |
| 43  | Reverse Limit X | 91  | ENCABX+         |
| 44  | LATCHY / INPUT2 | 92  | ENCAAY-         |
| 45  | INPUT5          | 93  | ENCAAZ+         |
| 46  | INPUT8          | 94  | Error Output    |
| 47  | OUTPUT2         | 95  | +12V Output     |
| 48  | GND             | 96  | 5V Output       |

**CONFIGURATION ASSEMBLY:**

This photo shows four Z Series servo amplifiers installed on an MC4XZGALQD mounting card, which is directly interfacing the Galil DMC-2183 motion controller. This can easily expand up to eight axes with the addition of one more MC4XZGALQD mounting card and four more Z Series amplifiers. The mating connectors kit (KIT4XZGALQD) is sold separately.

**ORDERING INFORMATION:**

Model: MC4XZGALQDX

X (at the end) indicates current revision letter

Only use this mounting card with analog input Z Series servo amplifiers.  
(Examples: ZB12A8, ZB6A6, Z12A8, Z6A6)

**MATING CONNECTORS:**

Manufacturer Phoenix Contact ® (Tel: 717-944-1300)

Mating connectors kit (KIT4XZGALQD):

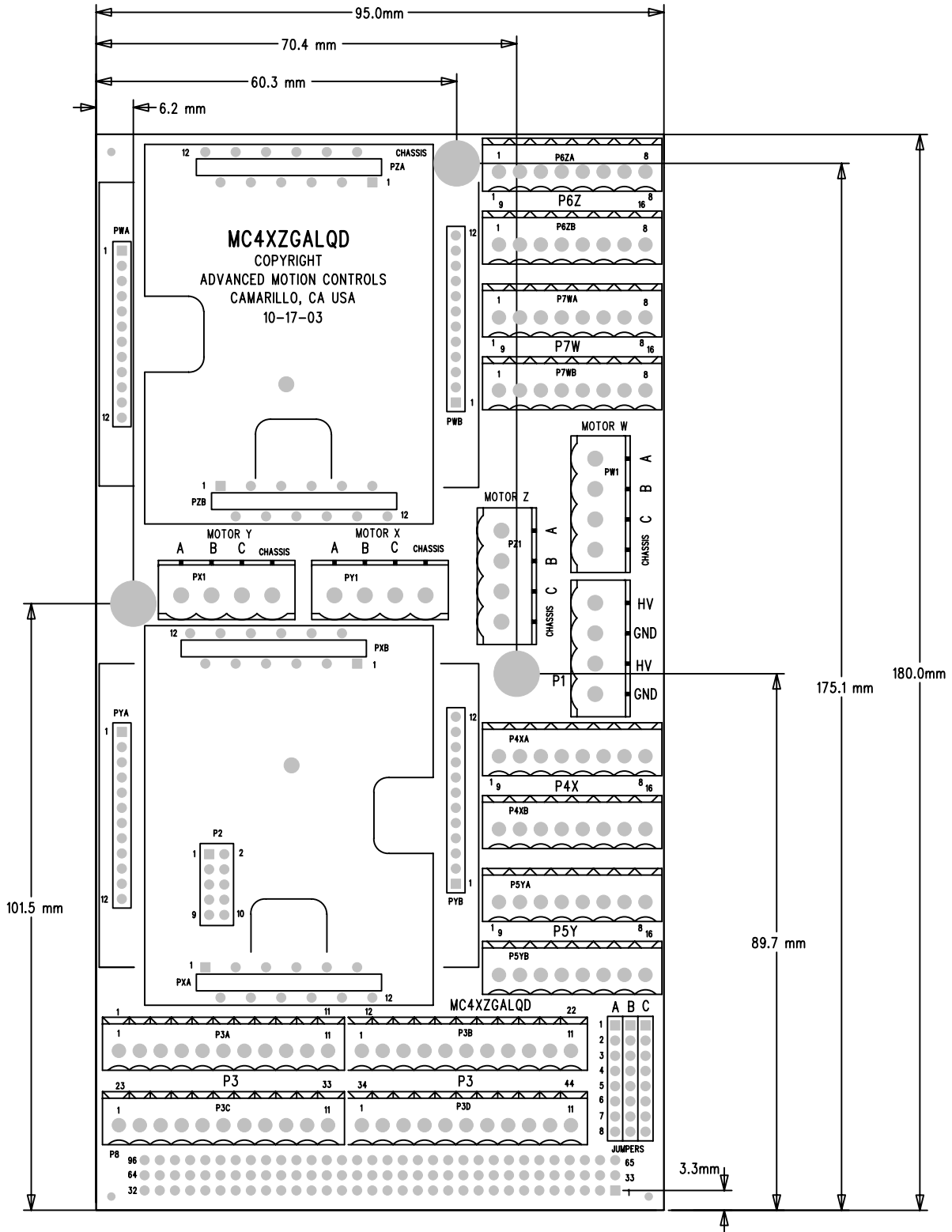
|         |   |
|---------|---|
| 1757035 | 4-position 5.08 mm spaced plug terminal (5 qty) |
| 1840421 | 8-position 3.5 mm spaced plug terminal (8 qty)  |
| 1840450 | 11-position 3.5 mm spaced plug terminal (4 qty) |

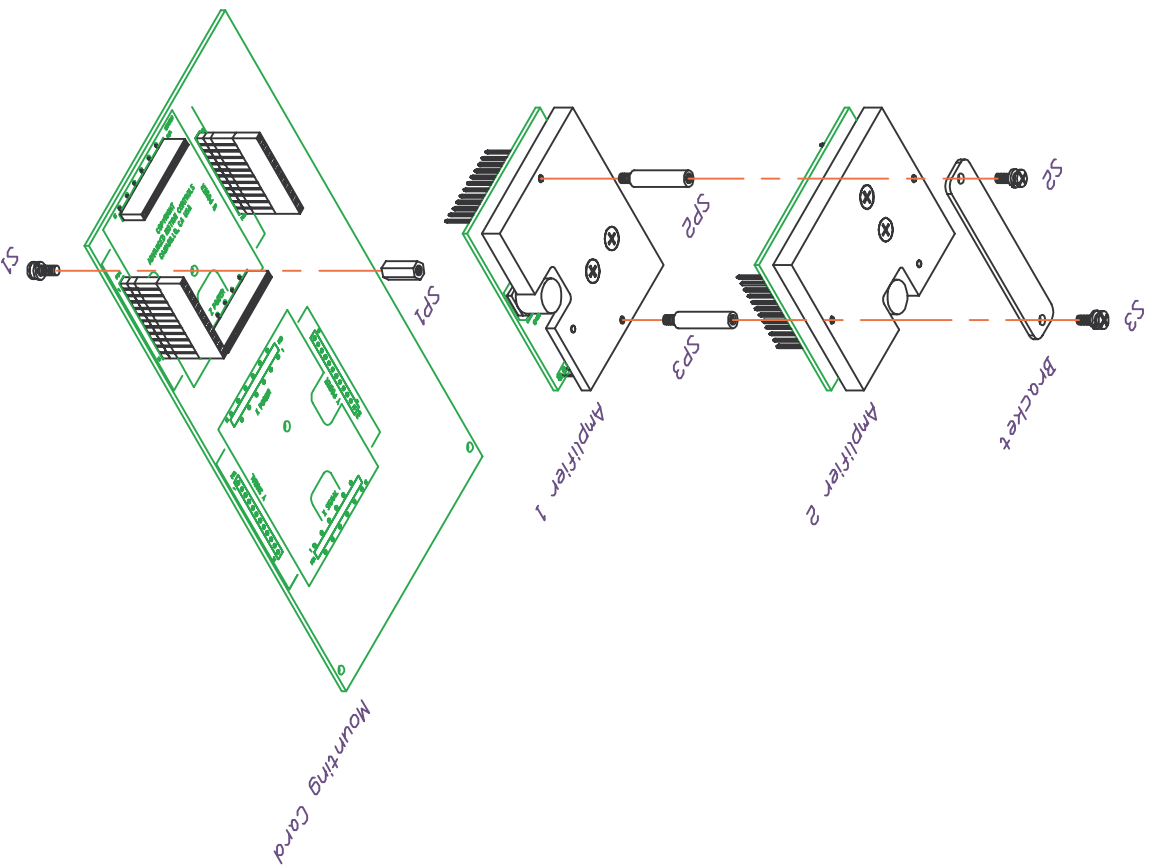
Alternative 5.08 mm spaced plug terminals (vertical screw position)

|         |                 |
|---------|-----------------|
| 1777303 | 4-position plug |
|---------|-----------------|

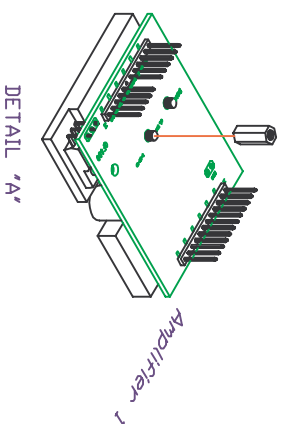
MOUNTING DIMENSIONS

MC4XZGALQD Series





- PARTS LIST:
- S1-SS3; #4-40 X 1/4 panhead phillips screw w/lockwasher,
  - SP1; 3/16 Hex X 7/16 4-40 thread F/F nylon standoff,  
(reference Amatom p/n 8105-N-0440)
  - SP2-SP3; 3/16 Round X 3/4 4-40 thread M/F nylon standoff,  
(reference Amatom p/n 9732-N-0440)
  - Bracket; AMC p/n MBK003A.



- ASSEMBLY SEQUENCE:
1. Install SP1 to baseplate mounting screw of Amp 1. See Detail "A".
  2. Install Amp 1 to mounting card (note orientation) using S1.
  3. Install SP2,SP3 to baseplate of Amp 1.
  4. Install Amp 2 to mounting card (note orientation).
  5. Install bracket to SP2,SP3 using S2,S3.