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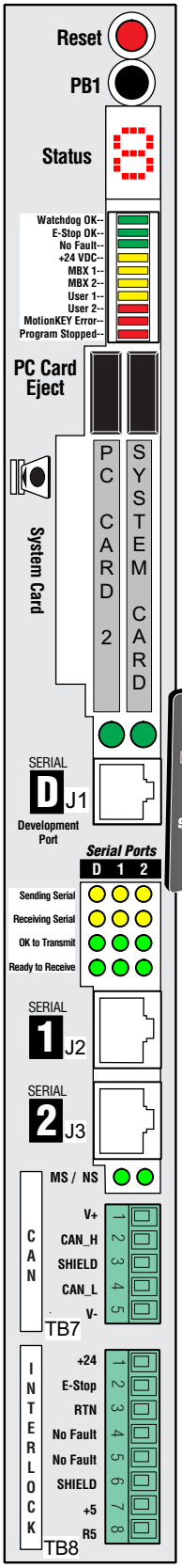
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ORION System Module



5x7 Status Display After initialization, the ORION Status display will print the MotionBASIC® Version and installed MBX's. Once a user program starts execution, the display will be blank. When a user program terminates normally, the display will revert back to the Direct Mode starburst. If a user program terminates due to an error and enters direct mode, the program stopped led will be on and the display shows the pertinent error code. Example: "E", "1" , "9" , "1" , "1" ... for ERROR 1911 Axis fault.

Status LEDs when lit indicates the following:

Watchdog OK	Green	Motherboard Processor is alive, flashes 1/sec.
E-Stop OK	Green	24 Volts is present at Terminal Block TB8 E-Stop.
No-Fault	Green	The controller has no faults. FAULT@=0
+24 VDC	Yellow	Power is present at TB8 +24 and referenced to RTN.
MBX1 & MBX2	Yellow / Yellow	MotionBASIC® Extensions, Under MBX control.
User 1 / User 2	Yellow / Red	User LED's indication, Under program control.
MotionKEY Error	Red	MotionKEY is missing or insufficient credits.
Program Stopped	Red	MotionBASIC® program not running. In Direct Mode.

PC Card™ ATA The required system card (right slot) can contain all the system executable programs, MotionBASIC® Extensions (MBX), user MotionBASIC® program, and data files.
An optional PC Card™ is used for storing user MotionBASIC® program & data files. When the Green LED is ON or Flashing, it indicates that the controller is accessing the PC Card™.

DO NOT REMOVE A PC CARD WHEN THE LED IS ON OR FLASHING.

FILES ..... Display names of files currently stored on the booted SYSTEM Card™.

MotionBASIC V4.x	MotionBASIC V3.2	
FILES "D:*.*"	FILES "1:*.*"	Display files stored in the root dir on RIGHT PC Card™.
FILES "E:*.*"	FILES "2:*.*"	Display files stored in the root dir on LEFT PC Card™.
.MTP	.BAS	Filename extension (*.ext*) for below function.

AUTOLOAD.*ext* ..... File name which is designated to automatically load into the controller from the left PC Card™ on power up. Filename allowed in the left PC Card™ slot ONLY.
PB1LOAD.*ext* ..... File loaded into the controller from the PC Card™ if the PB1 button is held pressed during power up. PB1LOAD.*ext* in the left PC Card™ will always OVERWRITE an existing PB1LOAD.*ext* on the System Card located in the right slot.

Serial Ports **D**=Development, **1**= SRL1, **2**= SRL2

WARNING: DO NOT connect the communications cable to J2 or J3 serial ports. This can cause damage to the ORION serial port or your computer port.

Sending Serial	Yellow	Transmitting a character on serial port.
Receiving Serial	Yellow	Receiving a character on serial port.
OK to Transmit	Green	Handshake from other devices has been established.
Ready to Receive	Green	Handshake from ORION.

E-Stop - (TB8 E-Stop) ORION controllers include an E-Stop monitor input, which is indicated by a green "E-Stop OK" LED above. For normal operation, Emergency Stop input power (+12 to +24VDC or 12 to 24VAC, referenced to TB8-RTN) is applied to TB8 E-Stop input. It is recommended that the input be interlocked with the servodrive main power auxiliary contact. Should that current be interrupted, the "E-Stop OK" LED will go off, causing a controller fault error. Error #1910: "E-Stop OK" Input Open.

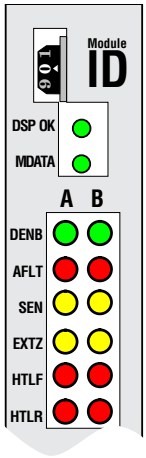
No Fault - INTERLOCK (TB8 - No Fault, pins 4&5) ORION controllers have a "No Fault relay", located on the system module. This relay is an isolated "normally-open" output contact. As long as there are No Fault conditions in the controller (LED is ON), the relay will be energized, holding the output contact closed. The power to the No Fault relay is also hardware interlocked with both the E-Stop monitor input and Watchdog circuitry. It is recommended that the No Fault relay be interlocked in series with the main contactor coil. To reenergize this relay after a fault, "E-Stop OK" and "No Fault" LED's must be ON. The "No Fault" LED is only an indicator and tells you the contact SHOULD be closed.

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ORION Quick Reference

Reset button located on the system module will reboot, like a PC key combination <Ctrl><Alt><Del>. Used to restart the system instead of flipping the power switch. Avoid turning the power on and off frequently.

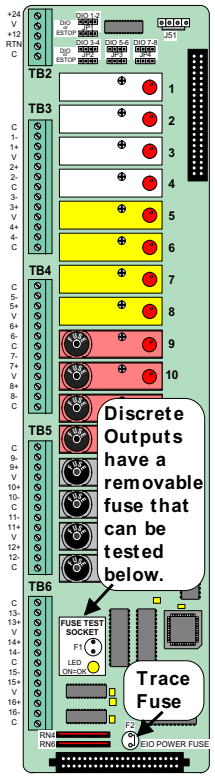
PB1 - Push Button one can be used at power up (boot-up) in two ways:
Inhibits a MotionBASIC® program from running at boot-up.
Load a MotionBASIC® program. If PB1 is held in during boot-up, the controller checks for one of the following program files in this order: PB1LOAD.*ext* on left slot PC Card first, System Card, right slot second.
Filename extension (.*ext*) for MotionBASIC V4.0 is (.MTP) , MotionBASIC V3.2 is (.BAS).
PB1LOAD.*ext* on left PC Card will always OVERWRITE an existing PB1LOAD.*ext* on the System Card.



ORION ... Digital Signal Processor ... ORN-DSP-A2 or AQ

DSP Axis Identification The axis rotary switch determines axes number.
DSP Axis A # = DSP rotary switch # * 2 + 1, DSP Axis B # = Axis A # + 1
You MUST cycle power if you change the DSP axis rotary switch, this will update AXIS.LIST@.
PRINT AXIS.LIST@ - will identify all of the servo axes found in the system at powerup.
Note: axis A number will be ODD, axis B number is EVEN.

DSP LED's - when lit, indicates the following:
DSP OKGreenDSP card is operating properly. No software or internal faults.
MDATAGreenMotionDATA - DSP is receiving MotionDATA communications.
DENB ....Green ....Drive Enabled - Axis torque is enabled for the respective axis.
AFLT ..... Red .....Axis Fault on the respective axis.
SEN ... Yellow ....Sensor hardware (ASEN or BSEN) is asserted (conducting current).
EXTZ ... Yellow ....External ZREF sensor is asserted (conducting current) on the respective axis.
***H**ardware **T**ravel **L**imit **F**orward / **R**everse.* LED ON when there is a error, axis motion is prohibited on MB v3.2,
HTLF ..... Red .....when Jumper "J17" is ENABLED and NOT conducting current at TB9 or TB10.
HTLR ..... Red .....when Jumper "J17" is DISABLED and conducting current at TB9 or TB10.



ORION ... Discrete Input / Output board
Connecting External Field Power Supply at TB2

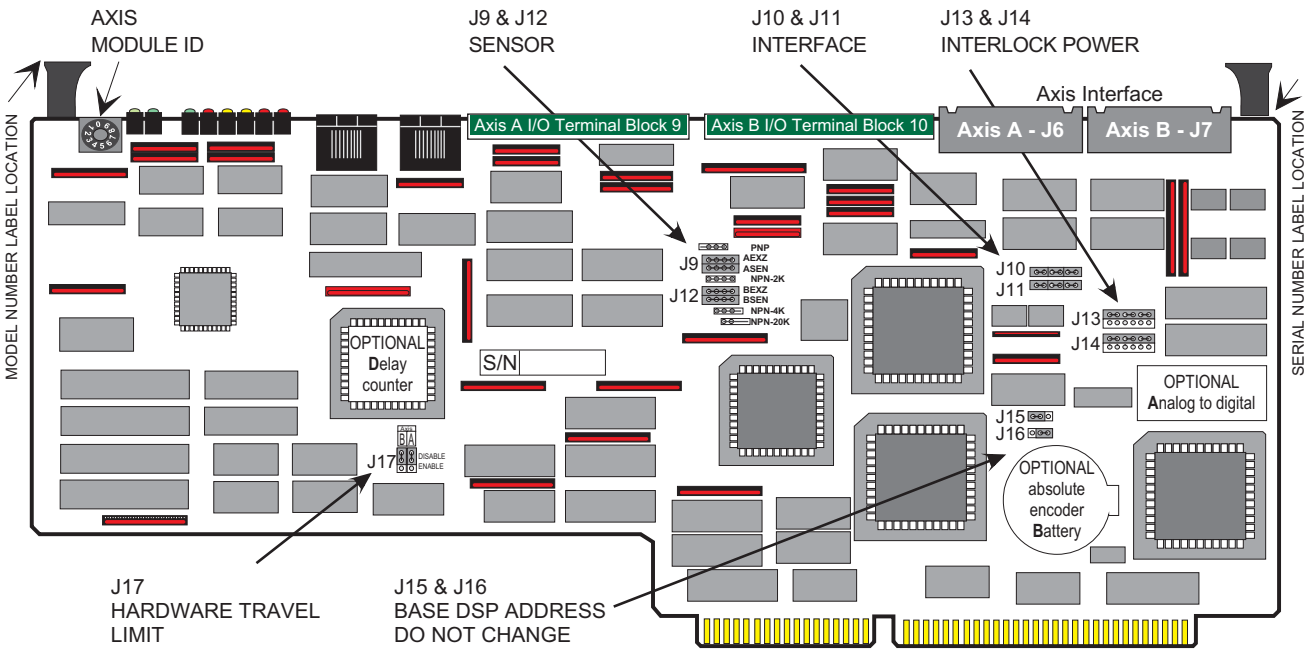
The ORION model number indicates if it has an internal field power supply or not.
The letter "F" = Internal Field supply, The letter "X" = NONE
WARNING: If ORION has an internal 24VDC power supply, DO NOT connect another 24VDC supply to pins (+24, RTN) on TB2 or TB8

Discrete I/O Point - DIO@(*number*) ... number of the I/O point.
Read Input ..... **PRINT DIO@(*number*)** Zero=OFF, minus one (-1)=ON
Clear a Latched Input .. **DIO@(*number*)=OFF**
Write Output ..... **DIO@(*number*)=ON** or OFF or Set time in milliseconds.
Configure I/O point ..... **IO.MODE@(*number*)="*letter*"**
letters are: **I** = input, **O** = output, (I or O used for any point.)
R = rising, **F** = falling (Only the first 16 points use R or F)

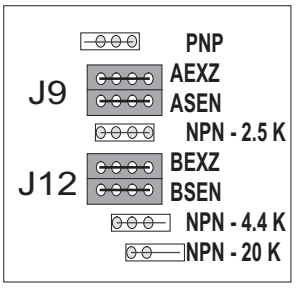
Trace Fuses On the Discrete I/O board is a Fuse Test socket "F1" and spare holder. The below list of fuses are PRE-FUSED by the circuit board trace.
DO NOT USE A REPLACEMENT FUSE UNLESS THE TRACE IS OPENED!
Discrete I/O board: ....."F2" ..... Extended Input /Output , +5VDC power.
System module trace fuses are located on the solder side (back) of board.
System module: ....."F1" ..... +5 VDC test at Interlock TB8 pin 7(+5) and pin 8 (R5)
System module: ....."F2" ..... E-Stop (12 to 24VAC)or(+12 to +24VDC) monitor voltage.
System module: ....."F3" ..... +24 VDC test at Interlock TB8 pin 1(+24) and pin 3 (RTN)
The replacement fuse is Wickman 250V, 4Amps. Part # 19370-062K

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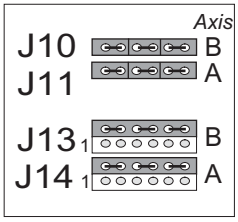
ORION Digital Signal Processor (DSP) Jumpers.



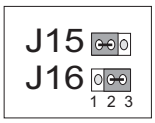
Factory Default Jumpers shown below. **ORN-DSP-A2 or AQ**



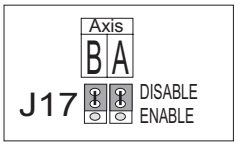
High Speed Sensor Inputs, (ASEN, BSEN, & EXTZ) are default configured for operation with sensors which have NPN type output transistors. The default four pin jumper connects all four pins to provide a 2.5K pull up.
ODD pins are for ASEN & BSEN, EVEN pins are for EXTZ (External Zero Reference).
Wiring to the high speed sensor input should be shielded twisted pair cable, with foil shield. Sensor voltage must be provied at TB9 or TB10, pins (V+S), (V-S).
For proper operation of the sensor inputs, the DC power supply common connected to V-S must also be connected to the Interlock Terminal Block (TB8) common (R5) on the ORION system module.
On the face of the DSP Axis module are status LED's. The sensor LED's will be "ON" when the corresponding axis sensor hardware is conducting current.



Servodrive Interface Configuration Jumpers. ***The DSP Axis Module jumpers must be properly configured for the servodrive type. If these jumpers are not properly configured the servodrive and/or ORION can be damaged.***
The default jumpers are configured for SAC-D, SAC-E, SAC-F, and SAC-S servodrives.
For SAC-DE servodrives move the J13 or J14 jumper, connecting the ODD pins.
For non-standard servodrive, refer to the ORION Motion Control Manual-Sec.(3.4.8)
Note: J10 & J11 use three - two pin jumpers, J13 & J14 use one three-pair jumper.

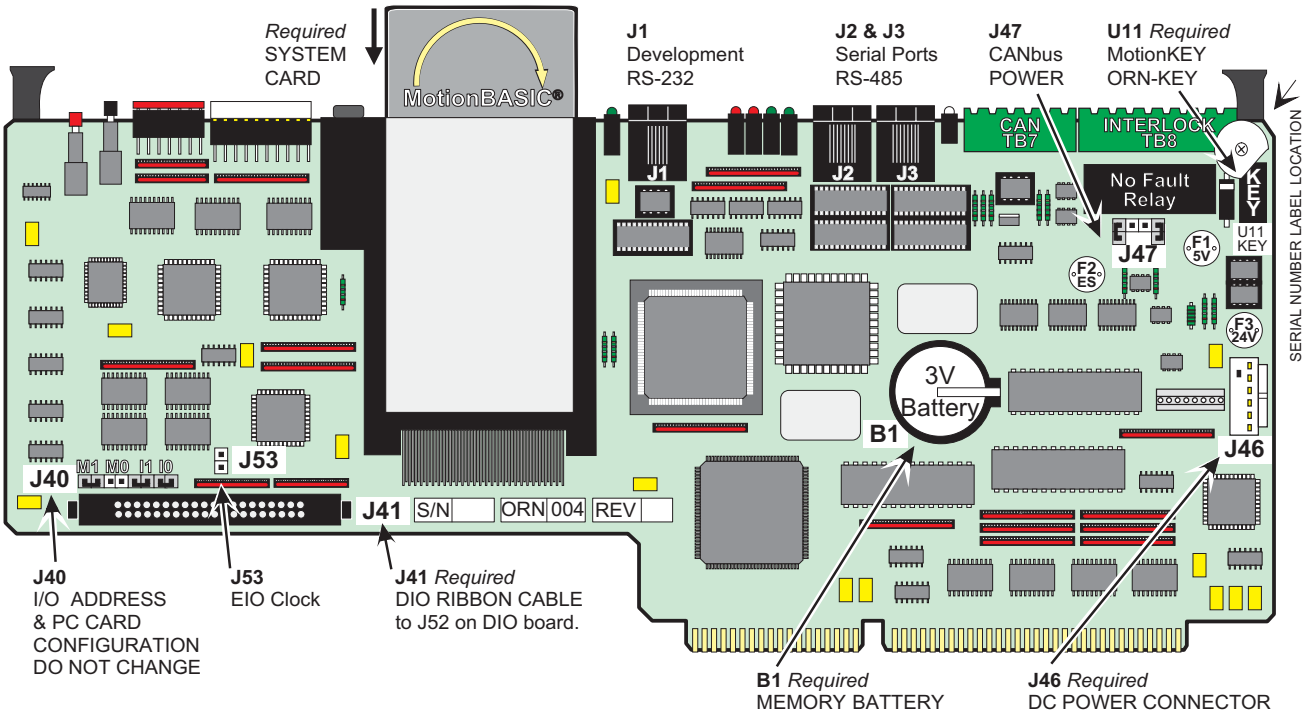


Base DSP Address Jumpers. The base DSP address is fixed, DO NOT CHANGE the configuration of jumper J15 or J16.



Hardware Travel Limits. The factory default jumpers for J17 disables the **H**ardware **T**ravel **L**imit **F**orward / **R**everse for both axis. The DSP, HTLF & HTLR red LED's will be on when there is an ERROR, axis motion is prohibited,
a)------- when Jumper "J17" is ENABLED and HTL inputs are NOT conducting current at TB9 or TB10, a travel limit ERROR will be generated. (ERR=1614, or 1615)
b)------- when Jumper "J17" is DISABLED and HTL inputs are conducting current at TB9 or TB10, configuration ERROR # 1617 will be generated.

ORION System Module Jumpers and component locations.





Default
(No Output)

J47 ... 24 Volt Power Jumpers for CANbus Terminal Block - TB7 Connector
V+, V- TB7 Connector (pins 1, 5) 24 VDC Power and Return. Current Output 1.5A maximum.
WARNING: "NOT FUSED" Power supply available for use by devices connected to CANbus interface.
NOTE: These two jumpers short two pins each. Do not jumper the two middle pins!



DO NOT CHANGE!

J40 ... I/O Address and PC Card Configuration
WARNING:The ORION System Module I/O address and PC Card configuration jumper header, is configured at the factory and must not be changed.

J53 ... Extended Input / Output Clock Jumper (EIOCLK) Only required for Extended I/O Option. On older system modules the EIOCLK signal originated on this board. Newer hardware provides this signal on the Discrete Input/Output board. This jumper is only required when using a newer system module (REV "G" and above) with an older Discrete Input/Output board (REV "C" and below).



U11 ... ORN-KEY MotionKey Power-up FAULT@=12 ... Status display "F","1","2"
The ORION MotionKey is a hardware key which is programmed with a number of MotionCredits, which are required for the operation of MotionBASIC and MotionBASIC Extensions (MBX's).
The MotionKey is located in the upper right hand corner.
Removing or installing a MotionKey with power applied to the ORION will damage the MotionKey!
Do not force the MotionKey into the socket!. Improper insertion will result in damage to the MotionKey.
WARNING: Your ORION motion controller will not enable motor motion if a MotionKey with less than the required number of MotionCredits is installed on the ORION System Module.

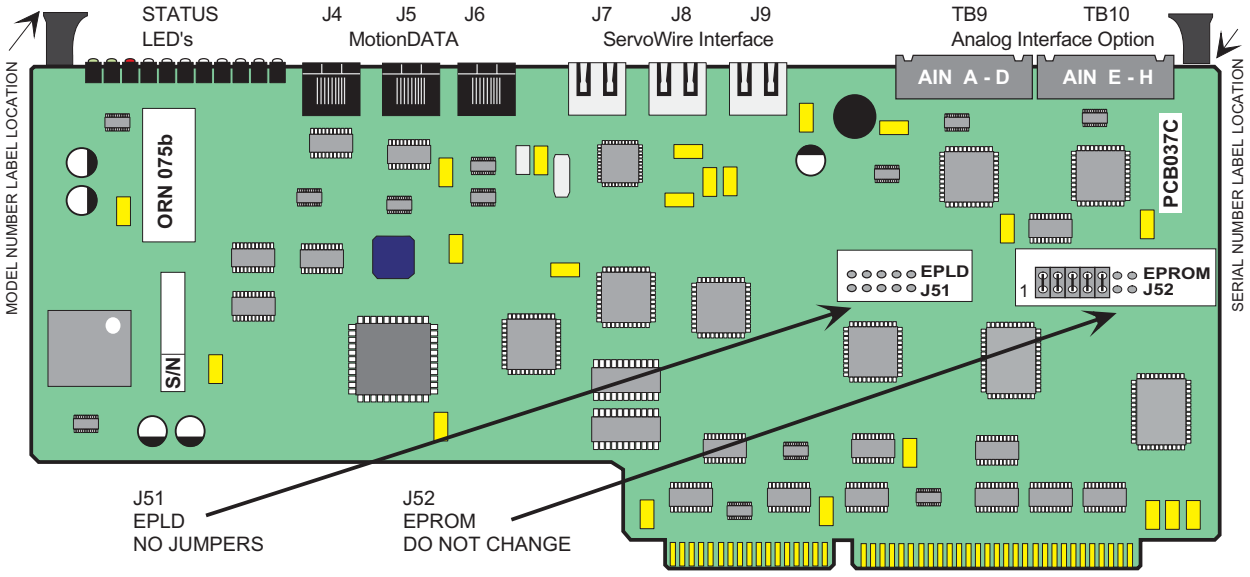


B1 ... Non-Volatile Memory Battery Power-up FAULT@=2 ... Status display "F","2"
The non-volatile variable memory battery is a Lithium battery used to preserve non-volatile variables while the ORION input power is off. Removal of this battery will erase all Non-Volatile memory.
Output Voltage 3.0 to 3.1 VDC when new , 2.75 VDC with 10% life remaining 2.5 VDC with 1% life.
After replacing the battery, you will need to power cycle the controller twice to clear the FAULT@=2.

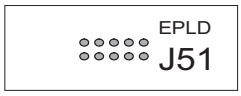
F1, F2, F3 ... Trace Fuses are PRE-FUSED by the circuit board trace.
DO NOT USE A REPLACEMENT FUSE UNLESS THE TRACE IS BLOWN!
System module trace fuses are located on the solder side (back) of board.
F1 ..... +5 VDC test at Interlock TB8 pin 7(+5) and pin 8 (R5)
F2 ..... E-Stop (12 to 24VAC)or(+12 to +24VDC) monitor voltage.
F3 ..... +24 VDC test at Interlock TB8 pin 1(+24) and pin 3 (RTN)
The replacement fuse is Wickman 250V, 4Amps. Part # 19370-062K

The Discrete I/O board has a Fuse Test socket "F1" and spare fuse holder.

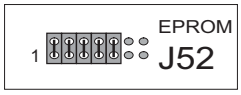
Axis Module Component Location Diagram.



Factory Default Jumpers shown below.



EPLD The ServoWire Axis Module jumper J51 must not have any jumpers installed. EMPTY - NO JUMPERS on J51.



EPROM Configuration Jumpers. ***The ServoWire Axis Module jumper block must be properly configured in the factory setting. If this jumper block is not properly configured the ORION controller will not recognize the servowire axis module.***
Note: J52 uses a jumper block that shorts five pairs of pins. (left side - pin1)

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