ORMEC Troubleshooting

MotionBASIC Ver 4.x & MotionDESK 3.x *Windows 95 or NT application*
Using the direct mode window.
By pressing **three key's < Shift + Alt + Letter >**, a command will be automatically typed.
Troubleshooting example key group are ... < Shift + Alt + F > ... for Fault status.

<Alt+Shift+F> Fault Status

For troubleshooting a system, the most useful <Alt+Shift+ letter> is ... F ... for Fault status. The following example shows the fault status after a machine has experienced a product jam problem.

```
?USING"& 1st of & faulted. FAULT@:& AFAULT@:###
❶  1st of 5 faulted

ALARM@:##";AXIS.FLT1@,AXIS.FAULT@,FAULT@,AFAULT@(AXIS.FLT1@),ALARM@(AXIS.FLT1@)
❷
```

The first line provides the ERROR code, error message, and the program line number where the error occurred. The second line prints the fault information.

System module ..... **FAULT@, ...{7}** .... Axis Fault
Axis that failed 1st ..... **AXIS.FLT1@ .....{2}** .... Axis # two caused the failure.
DSP module ..... **AFAULT@(AXIS.FLT1@) ..... 2** ..... See Servodrive ALARM@
Servodrive ..... **ALARM@(AXIS.FLT1@) ..... 17** .... Motor Overload for E-Series drive.

<Alt+Shift+C> Will attempt to clear faults. You must enter a MODE@ value #.

AFAULT@=0:FAULT@=0:WAIT 300:MODE@=
Available Modes: **0=Disabled**, *1=Pacer,* **2=Standby**, *3=Output, 4=Velocity , 5=Position*

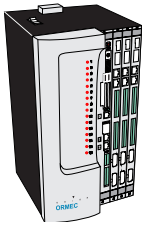
Alt+Shift+Key for MotionDESK 3.x

The "Alt keys" are provided to minimize typing at the command line. **MotionBASIC Ver 4.x -5.x** By pressing this group of keys, **< Alt + Shift + Key >**, a command will be automatically typed in the Direct Mode Window:

Key		
A REPEAT_	I MOVE FOR_ *(Index)*	R Repeat
B -	J MOVE AT_ *(Jog)*	S MODE@ Status
C Clear Faults	K Show Servo Gains	T Torque Status
D Dump Thread	L -	U _UNTIL_
E Error Status	M MP.CONFIG	V Velocity Status
F Fault Status	N Normalize Axes	W WAIT_
G GEAR_	**O Clear Overtravel**	X AXIS.SET@={
H HALT_	P Position Status	Y
	Q Error Stop (Quit)	Z Axis Set Status

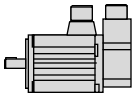
ORMEC ORION Fault Codes for MotionBASIC 4.x

FAULT@ ..... Unit Fault Code. Set of current fault(s) with a motion controller.



Code	Fault Condition	Code	Fault Condition
1	RAM Checksum Error	7	Axis Fault occured
2	Battery Failure	8	User Machine Fault
3	Not used	9	String Space Fault
4	Internal Error	10	MB Extension Fault
5	DSP Axis Module Failure	11	Not used
6	E-Stop (or M-Stop) Input Open	12	Security Key Fault
		13	DSP not Pentium Compatable

AXIS.FLT1@. First Servo in the System that Faulted.

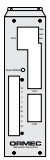
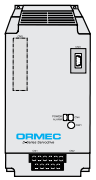


AFAULT@..... Axis Fault Code. Diagnostics determined at the DSP level.


DSP Module

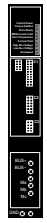
Code	Axis Fault Condition	Code	Axis Fault Condition
0	None	8	MotionDATA Error
1	Position Error > Max	9	Hi Axis Loop Rate
2	See Servodrive ALARM@	10	Hi Pacer Loop Rate
3	Encoder Ch-A Open	11	No MotionDATA
4	Encoder Ch-B Open	12	Command Buffer Overflow
5	Command Overspeed	101	Motion Segment Overspeed
6	Pacer Overspeed	102	Missing Motion Table
7	Encoder Overspeed	901-999	are DSP Software Faults

ALARM@.... Current servodrive alarm code.

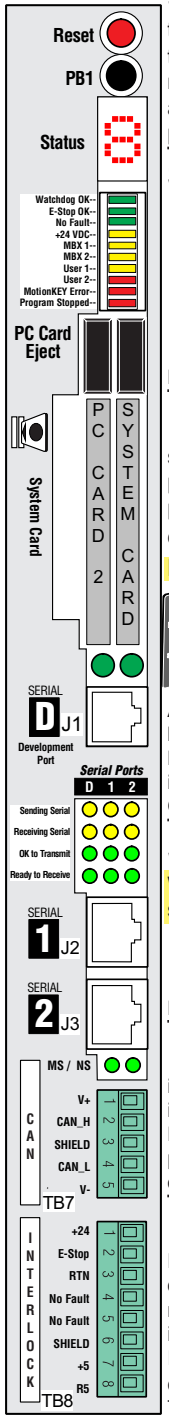



DE & D - SERIES	ALARM@	E - SERIES
No Drive Alarms	0 - 7	No Drive Alarms
Drive Unplugged	10	Drive Unplugged
Drive Overcurrent	11	Drive Overcurrent
Uncoded Alarm	12	Drive CB Tripped
Regeneration Fault	13	Regeneration Fault
Hi Main DC Voltage	14	Hi Main DC Voltage
Motor Overspeed	15	Motor Overspeed
Uncoded Alarm	16	Lo Main DC Voltage
Motor Overload	17	Motor Overload

S - SERIES	ALARM@	F - DRIVE
Normal operation	0 - 7	Normal operation
Drive Unplugged or Uncoded Alarm	10	Drive Unplugged or Uncoded Alarm
Drive Overcurrent	11	Uncoded Alarm
Drive CB Tripped	12	Drive Current Output Fault
Drive Overcurrent & CB Tripped	13	High Bus Voltage Fault
Uncoded Alarm with Motor Moving	14	Over Temp or RMS Current Limit
Drive Overcurrent & Motor Moving	15	Uncoded Alarm
CB Tripped & Motor Moving	16	Alarms 12 and 14
Overcurrent & CB Tripped & Moving	17	Alarms 13 and 14



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 / User2	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™.

MB Ver 4.x	MB Ver 3.2	
FILES "D:*.*"	FILES "1:*.*"	... Display files stored in root dir on RIGHT PC Card™.
FILES "E:*.*"	FILES "2:*.*"	... Display files stored in root dir on LEFT PC Card™.
.MTP	.BAS	... Filename extension (*.ext*) for below function.

... MotionBASIC Versions have different drive names.

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=MotionPRO™ Development, 1= SRL1, 2= SRL2

WARNING: DO NOT connect the MotionPRO™ 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

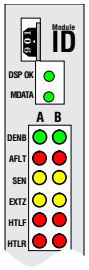
- INTERLOCK (TB8 - No Fault, pins 4&5) ORION controllers have a "No Fault relay", located on the system module. This relay is an isolated "normally-open" output contact. As long as there are No Fault conditions in the controller (LED is ON), the relay will be energized, holding the output contact closed. 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.

ORION Quick Reference

Reset located on the system module is a 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. At power up, if PB1 is held in, 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 Ver 4.0 is (**.MTP**) , MotionBASIC Ver 3.2 is (**.BAS**). PB1LOAD.*ext* on left PC Card will always OVERWRITE an existing PB1LOAD.*ext* on the System Card.



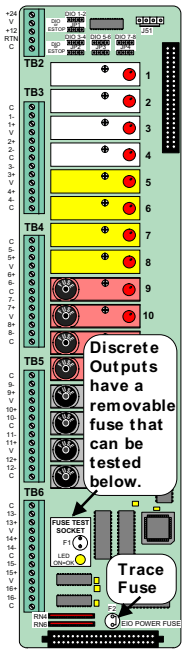
ORION ... Digital Signal Processor ... DSP

DSP Axis Identification The axis rotary switch determines axes number.

DSP Axis A # = DSP rotary switch # * 2 + 1, **DSP Axis B # = Axis A # + 1**
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 power-up.
Note: axis A number will be ODD, axis B number is EVEN.

DSP LED's - when lit, indicates the following:

DSP OK	Green	DSP card is operating properly. No software or internal faults.
MDATA	Green	MotionDATA - 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 an error, With MotionBASIC Ver 3.2 axis motion is prohibited.
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, (for any point)
		R = Rising, **F** = Falling (Only the first 16 points)

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