



OrionMX

Automation Platform



Description

Available in three case sizes, the OrionMX can be configured with a wide range of serial, Ethernet, and I/O expansion cards for automation and metering applications in smaller distribution and unit substations, on pole tops, and in vaults.

Optimized for installations with limited space, all connections and diagnostic LEDs are located on the front face, simplifying mounting and maintenance. The standard OrionMX offers two integrated serial ports, three Ethernet interfaces, eight discrete inputs and three discrete relay outputs. The 2S case accepts up to two expansion cards, while the OrionMX 4S case accepts up to four expansion cards, allowing users to create customized solutions for every application need.

OrionMX uses the same configuration tools, interfaces, software options and protocols as all Orion RTUs, thanks to the common OrionOS.

Key Features

Compact Design

- Small footprint for space-constrained applications
- "Single face" connection and diagnostics
- DIN rail, 19" rack, or surface mount brackets

Flexible Communication and I/O

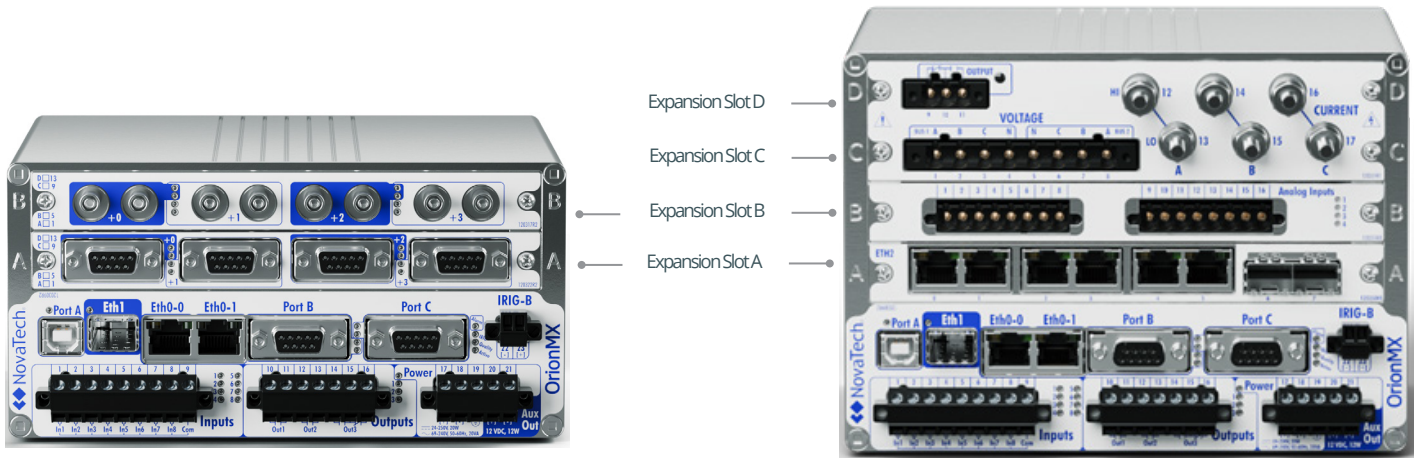
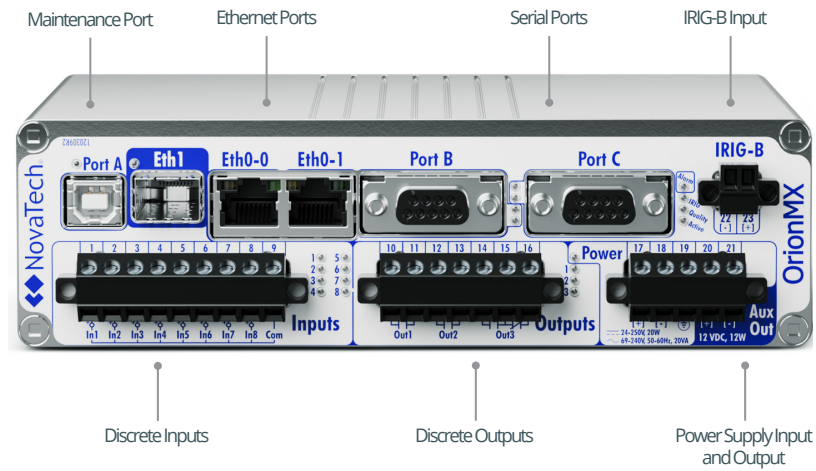
- Onboard Ethernet, serial, and I/O ports
- Optional expansion cards for additional Ethernet, serial, and I/O ports

Wide Range Power and Accessories Support

- Standard wide-range power supply: 24-250V dc and 120-240V ac
- Optional 12-24V dc supply for battery-powered applications
- 12V dc (1A) auxiliary power output for radios, converters, and accessories



Product Diagram





OrionMX Expansion Cards



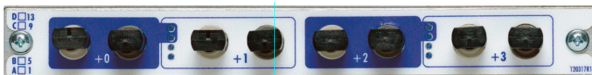
E1

8-port Ethernet card with 6x 10/100/1000Mbps RJ45 and 2x SFP ports



F1

4-port multimode serial fiber (800-850nm) card with ST connectors



S1

4-port RS-232/422/485 card with IRIG-B and pin 1 port power (5V dc/100mA)



D1

Discrete I/O card with 8 inputs and 4 relay outputs



A1

4-channel analog input card, software selectable +/-10V, +/-2mA, 4-20mA, +/-58V



M1

For AC measurement. 6 PT inputs (600V ac) for 2 buses (phases A, B, C), 3 split-core CT inputs for line 1 phases A, B, C.



C1

Auxiliary meter card, requires a matching M1 card.
4 split core CT inputs for line 2 (phases A, B, C, neutral), and 1 split core CT input for line 1 neutral.



M2

For AC measurement. 6 PT inputs (600V ac) for 2 buses (phases A, B, C), 3 CT inputs (20A) for line 1 phases A, B, C.

Technical Data

General Data

Unit Dimensions	Standard Case: 7.0"W x 2.0"H x 6.0"D (177.8 x 50.8 x 152.4mm) 2S Expansion Case: 7.0"W x 3.5"H x 6.0"D (177.8 x 88.1 x 152.4mm) 4S Expansion Case: 7.0"W x 5.0"H x 6.0"D (177.8 x 127.0 x 152.4mm)
Mounting / Front Panel Height	19" Rack, Surface, DIN Rail
Housing Material	Aluminum
Degree of Protection	IP30
Weight	Standard Case: 2.4lbs (1.1kg) 2S Expansion Case: 3.4lbs (1.5kg) 4S Expansion Case: 4.2lbs (1.9kg)



Technical Data

Power Supply

Supply Voltage Range	12-24V dc or 24-250V dc / 69-240V ac (50/60 Hz)
Power Consumption	20W/20VA
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)

Indicators

LED	Power Status (Green) Active Configuration (Green) IRIG (Green) Time Quality (Green) Alarm (Red) Digital Inputs (Green) Digital Outputs (Red) Serial ACT (Bicolor Red/Green) ETH 1 (Bicolor Red/Green) ETH 0-0, 0-1 Link (Green) ETH 0-0, 0-1 Activity (Yellow)
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Environmental

Operating Temperature	-40°C to +70°C (-40°F to +158°F)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity	5% to 95%, non-condensing
Altitude	2000m

Ethernet

Ports	3
Connector Type	2x RJ45 1x SFP
Data Rate	10/100/1000Mbps (RJ45) 1000Mbps (SFP)



Technical Data

Serial	
Ports	2
Signal Type	RS-232, RS-422, RS-485 2-wire, RS-485 4-wire, software selectable
Connector Type	DB9 Female
Baud Rate	1,200-115,200bps
Data Bits	7, 8
Parity	Odd, Even, None
Stop Bits	1, 2
SEL® Relay Interface	Yes
Supply Voltage Output	5V, 50mA on pin 1
IRIG-B Output	Unmodulated on pin 4

Time Synchronization	
Client	IRIG-B, NTP, PTP
IRIG-B Signal Type	Modulated, Unmodulated
IRIG-B Connector Type	Pluggable compression screw terminal (16-28AWG/0.08-1.5mm ²)

Discrete Input	
Number of Inputs	8
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Voltage Input Signal	48V dc or 125V dc, software selectable
Turn-On Voltage Level (48V dc)	9V dc
Turn-Off Voltage Level (48V dc)	5V dc
Maximum Input Voltage (48V dc)	60V dc
Turn-On Voltage Level (125V dc)	81V dc
Turn-Off Voltage Level (125V dc)	75V dc
Maximum Input Voltage (125V dc)	145V dc
Max Current Drain	2.1mA per channel
Isolation (Channel/Channel)	2kV ac



Technical Data

Discrete Output	
Number of Outputs	3
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Output Signal Type	2x Form A relay, electromechanical 1x Form C relay, electromechanical
Nominal switching voltage	250V ac / 24V dc
Max Switching Voltage	400V ac / 300V dc
Load current (resistive)	8A
Max carry current (continuous)	10A

Functional	
Console Port	USB, Type B
CPU	800MHz
RAM	512MB
Flash	2GB
IED/SCADA Points	600 (10,000 optional)
DNP3 Connections To IEDs	128
Event Storage (Non Volatile)	1,000,000 records



Technical Data

Standard Software	
Redundancy Protocols	IEEE 802.1D (STP) IEEE 802.1AX/802.3ad Link Aggregation (LACP and Static) IEC 62439-3 (HSR/PRP)
Layer 2 Switching	IEEE 802.1D MAC Bridges
IP Host Services	Static IPv4 Addressing DHCP Client DNS Client NTP Client (NTPv4) Port Forwarding Static Routing IEEE 1588 PTP Client (E2E, P2P,AUTO) - Power Profile
Network Servers	NTP server (NTPv4)
Management Tools	Web interface (HTTP and HTTPS {TLS1.3/1.2}) with Local and Central Authentication (RADIUS/AD) Command Line Interface (CLI) via console port, SSHv2 and Telnet with Local and Central Authentication (RADIUS/AD) Role Based Access Control (RBAC) Password Compliance Policy SNMPv1/v2c/v3 File management (via HTTPS, HTTP, FTP, SCP, SFTP and console port) RFC5424/RFC3164 Syslog (log files and remote syslog server)

Optional Software	
Client Protocols	DNP3 Serial, DNP3 IP, Modbus Serial, Modbus TCP, PG&E 2179, SEL ASCII/Fast Messaging/Regex, Tejas V, L&G 8979, DF1, SPABus, SEL 2030, Generic ASCII, IEC 60870-5-103, SEL TCP/Regex, IEC 60870-5-101, PML, ABB 10-byte, Harris 5000/6000 Master, IEC 60870-5-104, ICCP (TASE.2) Client, Micro-AT Serial
Server Protocols	DNP3 Serial, DNP3 IP, L&G 8979, Modbus Serial, Modbus TCP, Harris 5000/6000, Pusher, ASCII IED Web, SCADA/HMI (XML Server), IEC 60870-5-101, IEC 60870-5-104, Tejas V, SPS Serial, SES-92 Serial, ICCP (TASE.2) Server, Multispeak Server 3.0, Multispeak Server 4.1
Software Options	LogicPak, PassThru Interface Client (MPASS), iDial, DA Logic, Math and Logic, PassThru Interface Server (SPASS), Relay "Data Logger" or I-Log, Alarm Retentive Archive, Email, Cascaded Orion Client, Cascaded Orion Server, Advanced Math and Logic, Average Archive, IEC 61131-3, IEC 61850 Client/Server/GOOSE, Points Blocking, Configuration Backup Manager, Automatic Changeover Device Logic, Tile Annunciator, Redundancy, Tag Count Expansion (10,000 tags), HSR/PRP, ICCP (TASE.2) Integrated Client/Server, DB Exporter, SNMP Manager, gas density monitor, OPC UA client/server



Technical Data

Expansion Options

2S Expansion Case	Up to 2 expansion cards
4S Expansion Case	Up to 4 expansion cards

S1 RS-232/422/485 Expansion Card

Slot Size	1
LED Indicators	TX (Green) RX (Red)
Serial Ports	4
Signal Type	RS-232, RS-422, RS-485 2-wire, RS-485 4-wire, software selectable
Connector Type	DB9 Female
Baud Rate	1,200-115,200bps
Data Bits	7, 8
Parity	Odd, Even, None
Stop Bits	1, 2
SEL® Relay Interface	Yes
Supply Voltage Output	5V, 50mA on pin 1
IRIG-B Output	Unmodulated on pin 4

F1 Fiber Serial Expansion Card

Slot Size	1
LED Indicators	TX (Green) RX (Red)
Serial Ports	4
Signal Type	Serial
Connector Type	ST
Wavelength	800-850nm
Baud Rate	1,200-115,200bps
Data Bits	7, 8
Parity	Odd, Even, None
Stop Bits	1, 2



Technical Data

D1 Discrete I/O Expansion Card

Slot Size	1
LED Indicators	I/O states (green)

Discrete Inputs

Discrete Inputs	8
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Voltage Input Signal	12-48V dc or 125V dc
Turn-On Voltage level (12/48V dc)	9V dc
Turn-Off Voltage level (12/48V dc)	81V dc
Turn-On Voltage level (125V dc)	5V dc
Turn-Off Voltage level (125V dc)	77V dc
Max Current Drain	2.1mA
Response Time	1ms

Discrete Outputs

Discrete Outputs	4
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Output Signal Type	2x Form A relay, electromechanical 2x Form C relay, electromechanical
Nominal switching voltage	250V ac / 24V dc
Max Switching Voltage	400V ac / 300V dc
Load current (resistive)	8A
Max make current	15A
Max carry current (continuous)	10A



Technical Data

E1 Ethernet Switch Expansion Card

Slot Size	1
LED Indicators	Speed/Link (green) Activity (yellow)
Ethernet Ports	8
Connector Type	6x RJ45 2x SFP
Data Rate	10/100/1000Mbps (RJ45) 1000Mbps (SFP)

A1 Analog Input Expansion Card

Slot Size	1
LED Indicators	Short circuit/over-range
Analog Inputs	4
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Input Signal Type	±2mA, ±10V, 4-20mA, ±58V (channels 3-4 only), software selectable
Input Impedance	<510Ω (±2mA, 4-20mA) 1MΩ (±10V, ±60V)
Resolution	16 bit



Technical Data

M1 AC Measurement Meter Expansion Card	
Slot Size	1
AC Analog Inputs	
Current Inputs (CT)	3 inputs from line 1 for 3 phase currents (A, B, C)
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Nominal Input Current Range	0-5A ac with 1000/1 split core CTs
Maximum Input Current Range	0-10A rms continuous (2x overload)
Input Frequency Range	45-65Hz
Isolation (Channel/Channel)	2.5kV ac
Voltage Inputs (PT)	8 inputs from lines 1 and 2, VA, VB, VC
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Nominal Input Voltage Range	120V ac
Maximum Input Voltage Range	600V rms
Input Frequency Range	20-75Hz
Input Impedance	>12M Ω
Voltage Withstand	2.5kV rms 1min, input-to-case (ground) 2kV rms 1min, input-to-input
Discrete Outputs	
Discrete Outputs	1
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Output Signal Type	Form C, electromechanical
Nominal Switching Voltage	250V dc / 24V dc
Max Switching Voltage	400V ac / 300V dc
Load Current (Resistive)	8A
Max Carry Current (Continuous)	10A



Technical Data

C1 Auxillary Meter Expansion Card

Slot Size	1
LED Indicators	Discrete out (green)

AC Analog Inputs

Current Inputs (CT)	4 inputs from line 2 for 3 phase currents (A, B, C, Neutral) 1 input from line 1 for neutral current
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Nominal Input Current Range	0-5A ac with 1000/1 split core CTs
Maximum Input Current Range	0-10A rms continuous (2x overload)
Input Frequency Range	45-65Hz
Isolation (Channel/Channel)	2.5kV ac

M2 AC Meter Expansion Card

Slot Size	2
LED Indicators	N/A

AC Analog Inputs

Current Inputs (CT)	3 inputs from line 1 for 3 phase currents (A, B, C)
Connector Type	¼-20 studs
Nominal Input Current Range	0-20A ac
Maximum Input Current Range	0-40A rms continuous (2x overload)
Input Frequency Range	45-65Hz
Isolation (Channel/Channel)	2.5kV ac
Voltage Inputs (PT)	8 inputs from lines 1 and 2, VA, VB, VC
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Nominal Input Voltage Range	120V ac
Maximum Input Voltage Range	600V rms
Input Frequency Range	20-75Hz
Input Impedance	>12MΩ
Voltage Withstand	2.5kV rms 1min, input-to-case (ground) 2kV rms 1min, input-to-input

Discrete Outputs

Discrete Outputs	1
Connector Type	Pluggable compression screw terminal (12-24AWG/0.25-3.31mm ²)
Output Signal Type	Form C, electromechanical
Nominal switching voltage	250V ac / 24V dc
Max Switching Voltage	400V ac / 300V dc
Load current (resistive)	8A
Max carry current (continuous)	10A



Technical Data

Conformance/Approvals	
CE	CE-Compliant 2014/30/EU 2014/35/EU
USA/Canada	UL 61010-1 UL 61010-2-201 CSA 22.2 No. 61010-1 CSA 22.2 No. 61010-2-201
FCC	Part 15, Subpart B

EMC Standards	
Harmonic Current Emissions	EN 61000-3-2
Voltage Fluctuations (flicker)	EN 61000-3-3
ESD	EN 61000-4-2 Contact: $\pm 4\text{kV}$ Air: $\pm 8\text{kV}$
Fast Transients	EN 61000-4-4 AC Power Port: $\pm 2\text{kV}$ I/O ports: $\pm 1\text{kV}$
Surge	EN 61000-4-5 Power Port: $\pm 2\text{kV}$ LE, $\pm 1\text{kV}$ LL I/O Port: $\pm 1\text{kV}$ LE
Power Frequency Magnetic Field	EN 61000-4-8 30A/m
AC Voltage Dips	EN 61000-4-11 70%, 25/30 cycles 40%, 10/12 cycles 0%, 1 cycle 0%, 250/300 cycles
Radiated RF Immunity	EN 61000-4-3 10V/m (80-1000MHz) 3V/m (1400-2000MHz) 1V/m (2000-2700MHz)
Conducted RF Immunity	EN 61000-4-6 0.15-80MHz: 10V
Radiated RF Emission	CISPR11 EN 55011 Class A
Conducted RF Emission	CISPR11 EN 55011 CISPR 16-2-3 Class A

Export Information	
Country of Origin	USA
HS Code	8537.10



Ordering Information

Model	Case Size	Slot A Card	Slot B Card	Slot C Card	Slot D Card	Discrete IO	Power Supply	Mounting	Conformal Coat	Description
OrionMX										
	2S	-	-	-	-	-	-	-	-	2 slot expansion case
	4S	-	-	-	-	-	-	-	-	4 slot expansion case
	□	-	-	-	-	-	-	-	-	Standard case
		S1	-	-	-	-	-	-	-	4-port RS-232/422/485 card
		D1	-	-	-	-	-	-	-	Discrete I/O card
		F1	-	-	-	-	-	-	-	4-port multimode serial fiber card
		M1	-	-	-	-	-	-	-	Split core AC meter card
		E1	-	-	-	-	-	-	-	8-port Ethernet card
		A1	-	-	-	-	-	-	-	4-channel analog input card
		M2	M2	-	-	-	-	-	-	20A CT AC meter card (2 slots)
			S1	-	-	-	-	-	-	4-port RS-232/422/485 card
			D1	-	-	-	-	-	-	Discrete I/O card
			F1	-	-	-	-	-	-	4-port multimode serial fiber card
			M1	-	-	-	-	-	-	Split core AC meter card
			A1	-	-	-	-	-	-	4-channel analog input card
			C1	-	-	-	-	-	-	Auxiliary AC meter card, requires M1 card in previous slot
			XX	-	-	-	-	-	-	Empty Slot
			S1	-	-	-	-	-	-	4-port RS-232/422/485 card
			D1	-	-	-	-	-	-	Discrete I/O card
			F1	-	-	-	-	-	-	4-port multimode serial fiber card
			M1	-	-	-	-	-	-	Split core AC meter card
			A1	-	-	-	-	-	-	4-channel analog input card
			C1	-	-	-	-	-	-	Auxiliary AC meter card, requires M1 card in previous slot
			XX	-	-	-	-	-	-	Empty Slot
			M2	M2	-	-	-	-	-	20A CT AC meter card (2 slots)
			S1	-	-	-	-	-	-	4-port RS-232/422/485 card
			D1	-	-	-	-	-	-	Discrete I/O card
			F1	-	-	-	-	-	-	4-port multimode serial fiber card
			M1	-	-	-	-	-	-	Split core AC meter card



Ordering Information

Model	Case Size	Slot A Card	Slot B Card	Slot C Card	Slot D Card	Discrete IO	Power Supply	Mounting	Conformal Coat	Description
					A1	-	-	-	-	4-channel analog input card
					C1	-	-	-	-	Auxiliary AC meter card, requires M1 card in previous slot
					XX	-	-	-	-	Empty Slot
						IO	-	-	-	8 discrete inputs, 3 discrete outputs
							WR	-	-	24-250V dc, 120-240V ac (50/60Hz) power supply
							LV	-	-	12-24V dc power supply
								UNIV	-	Universal mounting ears
								SURF	-	Surface mount plate
								DINR	-	DIN rail mount
								3RU1	-	19" 3RU rack mount
									CC	Conformal coating

Model	Client Protocols	Server Protocols	Software	SFP Transceivers	Description
continued					
	Table 1	-	-	-	Client protocol options
		Table 2	-	-	Server protocol options
			Table 3	-	Software options
				Table 4	SFP transceivers



Table 1: Client Protocols (select all that apply)

-1	DNP3 Serial	-25	L&G 8979	-39	IEC 60870-5-101
-3	DNP3 IP	-28	DF1	-201	PML
-4	Modbus Serial	-30	SPAbus	-202	ABB 10-byte
-7	Modbus TCP	-32	SEL2030®	-203	Harris 5000/6000 Master
-12	PG&E 2179	-33	Generic ASCII	-204	IEC 60870-5-104
-14	SEL® ASCII/Fast Messaging	-36	IEC 60870-5-103	-206	ICCP (TASE.2) Client, includes 10h engineering support
-15	Tejas V	-37	SEL® TCP/Regex	-207	Micro-AT Serial

Table 2: Server Protocols (select all that apply)

-42	DNP3 Serial	-52	Pusher	-70	SPS Serial
-44	DNP3 IP	-55	ASCII IED Web	-71	SES-92 Serial
-46	L&G 8979	-57	SCADA/HMI (XML server)	-72	ICCP (TASE.2) Client, includes 10h engineering support
-47	Modbus Serial	-67	IEC 60870-5-101	-73	MultiSpeak Server 3.0
-49	Modbus TCP	-68	IEC 60870-5-104	-74	MultiSpeak Server 4.1
-51	Harris 5000/6000 Master	-69	Tejas V		

Table 3: Software Options (select all that apply)

-35	LogicPak	-97	Cascaded Orion Client	-108	ICCP (TASE.2) Client, includes 10h engineering support
-80	PassThru Interface Client (MPass)	-98	Cascaded Orion Server	-109	MultiSpeak Server 3.0
-81	iDial	-99	Advanced Math and Logic	-110	MultiSpeak Server 4.1
-82	DA Logic	-100	Average Archive Slave	-111	HSR/PRP
-83	Math and Logic	-101	IEC 61131-3	-113	ICCP (TASE.2) Client/Server, includes 10h engineering support
-93	PassThru Interface Server (SPass)	-103	IEC 61850 Client/Server/Goose	-114	DB Exporter
-94	Relay "Data Logger"	-105	Points Blocking	-115	OPC UA Client/Server
-95	Alarm Archive Retentive	-106	SPS Serial	-116	Gas Density Monitor
-96	Email	-107	SES-92 Serial	-205	SNMP Manager

Table 4: SFP Transceivers (1 per OrionMX, 3 total if E1 card is selected, enter quantity for X)

-MM1X	Multimode, LC, 550m, 850nm, 1Gbps
-SM1X	Single Mode, LC, 10km, 1310nm, 1Gbps
-SM4X	Single Mode, LC, 40km, 1310nm, 1Gbps
-RJ2X	SFP Transceiver, RJ45, 100m, 1Gbps

