Ultima Modbus

USER MANUAL

January 2020 Version 1.3

Contents

Minimum system requirements

There are several minimum requirements that should be established;

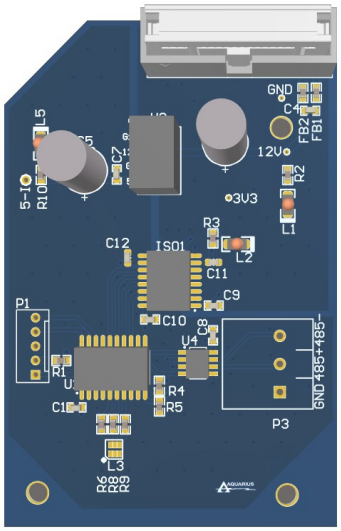
- Ultima release 3 2018 Firmware Version or greater
- Modbus adapter ACB_13_08
- Modbus RTU over RS485 master device supporting:

Baud rate:	9600, 19200 or 38400 bps
Data bits:	8
Parity:	none
Stop bits:	1

- 3 core shielded cable connecting adapter to Modbus Master

Wiring

Turn the Ultima off when connecting cables or removing boards. Connect the RS485+ to the RS485+ input, RS485- to the RS485- input and GND to the GND input. Ensure the ribbon cable is connected between the expansion board and the header in the bottom right corner of the motherboard.



Expansion Board dialog

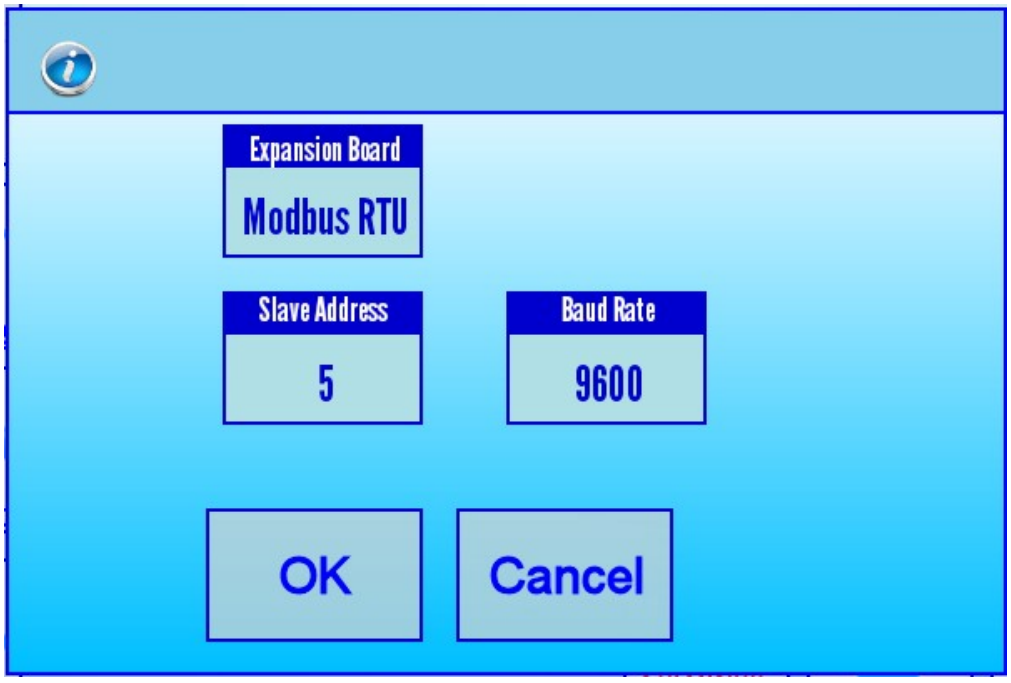
From the main screen, press “System” to access the System Settings Page.

From the System Settings Page, press “Expansion Board” button to access the Expansion board dialog.

In the Expansion Board dialog, you can see three settings.

Expansion Board = {*None, 4-20, Modbus RTU, Corrosion*}
Slave Address = {*1-240*}
Baud Rate = {*9600,19200,38400*}

Choose Modbus RTU, your desired slave address and baud rate to configure the Ultima.



Troubleshooting 2

Status LED

Green – Valid communications to Ultima, valid Modbus requests in last 10 seconds

Purple - Valid communications to Ultima, activity on RS485 in last 10 seconds

Yellow- Valid communications to Ultima, no activity on RS485 in last 10 seconds

Blue - No communications to Ultima, valid Modbus requests in last 10 seconds

White – No communications to Ultima, activity on RS485 in last 10 seconds

Red – No communications to Ultima and no activity on RS485 in last 10 seconds

No communication to Ultima (Blue, White, Red)

Check expansion board on Ultima is set to Modbus RTU.
Check cable is seated properly

No communication to Modbus Master (Red, Yellow)

Check cable is securely connected to master and slave
Check cable is shielded, and shield is connected at Modbus master
Check a supported function is requested, see Modbus Register Map

RS485 activity, but no comms to Modbus Master (Purple, White)

Check slave address on Ultima Expansion board screen matches slave address Modbus master is requesting.
Check a supported function is requested, see Modbus Register Map
Check cable is securely connected to master and slave
Check cable is shielded, and shield is connected at Modbus master

Status LED Green, but incorrect data read by Modbus Master

Master may use an offset or address starting with 0. Try instead of 10001 using address 0 function 01; or instead of using 40001 using address 0 function 03
Check the data type in the register map.
Compare the value on the Ultima screen to the value being read
Check the conversion formula used by the Master.

Function 01 - Coils

Address	Parameter
10001	Output1 active?
10002	Output2 active?
10003	Output3 active?
10004	Output4 active?
10005	Output5 active?
10006	Output6 active?
10007	Output7 active?
10008	Output8 active?
10009	Output9 active?
10010	Output10 active?
10011	Output11 active?
10012	Output12 active?
10013	Output13 active?
10014	Output14 active?
10015	Output8 open=dose?
10016	Output9 open=dose?
10017	Output10 open=dose?
10018	Output11 open=dose?
10019	Output12 open=dose?
10020	Output13 open=dose?
10021	Output14 open=dose?
10022	Generic1 / LevelSensor1 output on?
10023	Generic1 / LevelSensor1 alarm?
10024	Generic1 / LevelSensor1 lockout?
10025	Generic2 / LevelSensor2 output on?
10026	Generic2 / LevelSensor2 alarm?
10027	Generic2 / LevelSensor2 lockout?
10028	Generic3 / LevelSensor3 output on?
10029	Generic3 / LevelSensor3 alarm?
10030	Generic3 / LevelSensor3 lockout?
10031	Generic4 / LevelSensor4 output on?
10032	Generic4 / LevelSensor4 alarm?
10033	Generic4 / LevelSensor4 lockout?
10034	Generic5 / LevelSensor5 output on?
10035	Generic5 / LevelSensor5 alarm?
10036	Generic5 / LevelSensor5 lockout?
10037	Generic6 output on?
10038	Generic6 alarm?

Address	Parameter
10039	Generic6 lockout?
10040	Temperature enabled?
10041	Temperature output on?
10042	Temperature alarm?
10043	pH enabled?
10044	pH output on?
10045	pH alarm?
10046	pH lockout?
10047	pHB enabled?
10048	pHB output on?
10049	pHB alarm?
10050	pHB lockout?
10051	ORP enabled?
10052	ORP output on?
10053	ORP alarm?
10054	ORP lockout?
10055	ORPB enabled?
10056	ORPB output on?
10057	ORPB alarm?
10058	ORPB lockout?
10059	Conductivity enabled?
10060	Conductivity output on?
10061	Conductivity alarm?
10062	Conductivity TDS/nCond
10063	ConductivityB enabled?
10064	ConductivityB output on?
10065	ConductivityB alarm?
10066	ConductivityB TDS/nCond
10067	FacCtrl enabled?
10068	FacCtrl output on?
10069	FacCtrl alarm?
10070	FacCtrl lockout?
10071	FacCtrlB enabled?
10072	FacCtrlB output on?
10073	FacCtrlB alarm?
10074	FacCtrlB lockout?
10075	PreTreat enabled?
10076	PreTreat active?
10077	Dispersant enabled?
10078	Dispersant active?
10079	Timer1 enabled?
10080	Timer1 active?
10081	acc1 active

Address	Parameter
10082	acc2 active
10083	acc3 active
10084	acc4 active
10085	Timer2 enabled?
10086	Timer2 active?
10087	acc1 active
10088	acc2 active
10089	acc3 active
10090	acc4 active
10091	Timer3 enabled?
10092	Timer3 active?
10093	acc1 active
10094	acc2 active
10095	acc3 active
10096	acc4 active
10097	Timer4 enabled?
10098	Timer4 active?
10099	acc1 active
10100	acc2 active
10101	acc3 active
10102	acc4 active
10103	Timer5 enabled?
10104	Timer5 active?
10105	acc1 active
10106	acc2 active
10107	acc3 active
10108	acc4 active
10109	Timer6 enabled?
10110	Timer6 active?
10111	acc1 active
10112	acc2 active
10113	acc3 active
10114	acc4 active
10115	Flow output on?
10116	Flow?
10117	Common Alarm on?
10118	Common Alarm outputOn?
10119	Common Alarm flowAlarmDisabled
10120	Common Alarm alarmRelayDelay
10121	Corrosion 1 Value Alarm on?
10122	Corrosion 1 Pitting Alarm on?
10123	Corrosion 2 Value Alarm on?
10124	Corrosion 2 Pitting Alarm on?

Function 03 - Holding Registers

Address	Type	Parameter	Unit	Scaling
40001	uint16	serialNumber-600000	-	1
40002	uint16	mapVersion	-	1
40003	uint16	Generic1 / LevelSensor1 value	-	1000
40004	uint16	Generic1 / LevelSensor1 voltage	mV	1
40005	uint16	Generic1 / LevelSensor1 setpoint	-	1000
40006	uint16	Generic2 / LevelSensor2 value	-	1000
40007	uint16	Generic2 / LevelSensor2 voltage	mV	1
40008	uint16	Generic2 / LevelSensor2 setpoint	-	1000
40009	uint16	Generic3 / LevelSensor3 value	-	1000
40010	uint16	Generic3 / LevelSensor3 voltage	mV	1
40011	uint16	Generic3 / LevelSensor3 setpoint	-	1000
40012	uint16	Generic4 / LevelSensor4 value	-	1000
40013	uint16	Generic4 / LevelSensor4 voltage	mV	1
40014	uint16	Generic4 / LevelSensor4 setpoint	-	1000
40015	uint16	Generic5 / LevelSensor5 value	-	1000
40016	uint16	Generic5 / LevelSensor5 voltage	mV	1
40017	uint16	Generic5 / LevelSensor5 setpoint	-	1000
40018	uint16	Generic6 value	-	1000
40019	uint16	Generic6 voltage	mV	1
40020	uint16	Generic6 setpoint	-	1000
40021	uint16	Temperature value	degC	10
40022	uint16	Temperature setpoint	degC	10
40023	uint16	pH value	-	1000
40024	uint16	pH setpoint	-	1000
40025	uint16	pH fuzzy	-	1000
40026	uint16	pHB value	-	1000
40027	uint16	pHB setpoint	-	1000
40028	uint16	pHB fuzzy	-	1000
40029	uint16	ORP value	mV	1
40030	uint16	ORP setpoint	mV	1
40031	uint16	ORP fuzzy	mV	1
40032	uint16	ORPB value	mV	1
40033	uint16	ORPB setpoint	mV	1
40034	uint16	ORPB fuzzy	mV	1
40035	uint16	Conductivity value	uS/cm or ppm	1
40036	uint16	Conductivity setpoint	uS/cm or ppm	1
40037	uint16	Conductivity CF	us/cm per ppm	1000
40038	uint16	ConductivityB value	uS/cm or ppm	1
40039	uint16	ConductivityB setpoint	uS/cm or ppm	1

Address	Type	Parameter	Unit	Scaling
40040	uint16	ConductivityB CF	us/cm per ppm	1000
40041	uint16	LSI value		100
40042	uint16	FacCtrl value	ppm	10
40043	uint16	FacCtrl voltage	mV	1
40044	uint16	FacCtrl setpoint	ppm	10
40045	uint16	FacCtrl fuzzy	ppm	1000
40046	uint16	FacCtrlB value	ppm	10
40047	uint16	FacCtrlB voltage	mV	1
40048	uint16	FacCtrlB setpoint	ppm	10
40049	uint16	FacCtrlB fuzzy	ppm	1000
40050	uint16	WaterMeter1 MTD LitrePerPulse	L/pulse	1000
40051	uint32	WaterMeter1 MTD value	kL	1000
40053	uint32	WaterMeter1 YTD value	kL	1000
40055	uint16	PreTreat pumpSize	L/hour	1000
40056	uint16	PreTreat doseRate	L/hour	1000
40057	uint16	PreTreat ppm	ppm	1
40058	uint16	PreTreat concentration	%	1
40059	uint16	PreTreat period	minutes	1
40060	uint16	Dispersant pumpSize	L/hour	1000
40061	uint16	Dispersant doseRate	L/hour	1000
40062	uint16	Dispersant period	minutes	1
40063	uint16	Corrosion 1 Value	mil per year	10
40064	uint16	Corrosion 1 Pitting	mil per year	10
40065	uint16	Corrosion 2 Value	mil per year	10
40066	uint16	Corrosion 2 Pitting	mil per year	10
40067	uint16	Flow Velocity Value	m/s	10
40068	uint16	Flow Velocity Diameter	mm	1