



ROVER CONNECT

Pump Modem Max Controller Version

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Table of Contents

[A]List of TablesII
[B]List of FiguresII
[0] A Message from The Co-founders1
[1.0] Rover Pump Modem (Max)2
[1.1] System Features2
[1.2] Interchangeable Modem Module2
[1.3] Upgrading to a Mobile Device Application3
[2.0] Mechanical Properties
[2.1] Materials
[3.0] Electrical Specifications
[3.1] Rover Max Base Board Electrical Specification3
[3.2] Single IO Click Board
[3.3] Rover UPS Click Board
[4.0] Physical Dimensions
[5.0] Part Identification
[5.1] Rover Max Controller Base Board5
[5.2] 4G Modem Click Board6
[5.3] UPS Click Board6
[5.4] Single IO Click Board7
[6.0] Mounting the Controller
[7.0] Electrical Installation9
[7.1] Main Board Supply Voltage Wiring9
[7.2] Control Wiring Example10
[7.2] Control Wiring Explanations10
[7.3] Held Control Wiring Example11
[7.4] Pulse Control Wiring Example12
[7.5] 0-10 Singal Output – VFD Speed or Pot Source Reference13
[7.6] Supply Out Power Lamp13
[8.0] Fitting Enclosure Lid14
[9.0] Modem Configuration15
[10.0] Standard Return Messages17
[11.0] Customer Configuration18



[A]List of Tables

No table of figures entries found.

[B]List of Figures

Figure 1: Rover 4g Modem Module	. 2
Figure 2: Max Controller Physical Dimensions	.4
Figure 3: Single Pump Configuration Pump Modem PCB	. 5
Figure 4: Rover Max Base Board	. 5
Figure 5: Rover 4g Modem Click Board	.6
Figure 6: Rover UPS Click Board	.6
Figure 7: Rover Single IP Click Board & Connection Table (Below)	.7
Figure 8: Mounting Rover Max Controller	. 8

[0] A Message from The Co-founders

We are pleased to have you on board and grateful for your support. Rover Systems has been a passion of ours for many years, and the business's focus has always been helping clients solve problems through simple-to-use solutions.

For new and existing clients, please reach out to us if you have any questions, concerns, or ideas; we would be delighted to hear from you.

Welcome to the Rover family

Thank you.

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[1.0] Rover Pump Modem (Max)

Rover Systems – Pump Modem is a simple 4g Text-Based modem designed for the remote management of pumping applications, typically but not limited to irrigation and water transfer.

The [Max] version comes with four dedicated pump control slots located on the top row of the controller. The bottom four slots are used for the modem module, UPS module, and a spare slot, which is not typically used for this system configuration.

[1.1] System Features

- Text Message [Start] and [Stop] commands
- Single Latched Relay Control and Dual Pulsed Start and Stop Relay Control (parallel function)
- Set Runtimer (in message)
- Set Analogue 0-10v (in message)
- Acknowledgement Message
- Running and Stopped Message
- Request Status Message
- Din 1 Safety Input (External Shutdown or System Healthy Control)
- Din 2 Running Message
- Din 3 AUX (configurable)
- Din 4 AUX (configurable)
- Last Gasp UPS message (when fitted)

[1.2] Interchangeable Modem Module

The Rover Pump Modem comes standard with a 4g modem. This modem module is replaceable for futureproofing and serviceability and is connected by two rails of pins; the modem takes up the space of two standard slots and is typically located in the lower right corner of the board.

The Modem takes a standard large-footprint SIM card and inserts it downwards from the top in the slot shown in the green box. The SIM card plan must include Text Messaging, and the Pin must NOT be set.



Figure 1: Rover 4g Modem Module

[1.3] Upgrading to a Mobile Device Application

The Rover Pump Modem is an entry-level product for pumping applications; however, the same hardware is used in the upgraded WebSCADA solution [Rover Pump Lite], meaning the Max hardware used in the Pump Modem is compatible with the upgrade package required to migrate to [Pump Lite] this upgrade package includes the Mobile App, Sensor Kits, Data Sim and Subscription. (Reach out if you are interested in knowing more or upgrading to [Rover Pump Lite]

[2.0] Mechanical Properties

The Max controller has been designed for general use in harsh environments but contact with direct sunlight and prolonged exposure to moisture are not recommended; Rover Systems can offer the Rover Max Shield for applications where the product is to be installed with direct exposure to the elements.

[2.1] Materials

- Enclosure PETG HF (Heat Resistant to 69degC)
- Fasteners G316 Stainless Steel SHCS (low Profile)
 - M4x4 PCB Fixings
 - M4x16 Enclosure Fixings
- Glands, TPE 83A
- Inserts Spirol Brass M4 Thermal Insets (20 Series Long and Short)
- O-Ring Seal NBR

[3.0] Electrical Specifications

System electrical specifications listed below

[3.1] Rover Max Base Board Electrical Specification

- Supply: 12 to 42vdc (48watts min)
- Supply In Fuse: [F1] 1amp Micro Blade Fuse
- Supply Out Fuse: [F2] 1amp Micro Blade Fuse
- Power Consumption: 500ma max
- Temperature Range: -10 to +70deg C

[3.2] Single IO Click Board

- Digital inputs (Active High) 12v to 42v
- Surge: ±2kV tolerant
- Contact ESD: ±8kV
- Air Gap ESD: ±15kV
- Digital Outputs (Switched Low)
- Max V 48vdc
- Max Current: 500ma
- Analogue: 4-20ma 2 wire & 0-10vdc (60ma)

[3.3] Rover UPS Click Board

• Capacitor: 2f (up to 4 messages on Address Book Slot 1)

[4.0] Physical Dimensions



Figure 2: Max Controller Physical Dimensions

[5.0] Part Identification

The standard single pump [Pump Modem] configuration is shown below;



[5.1] Rover Max Controller Base Board

The Rover Max Controller Base Board is suitable for the application of up to four pumps in one controller; the picture below shows the IO Module located in Slot 1, which is dedicated to Pump 1; additional IO modules can be in Slots 2, 3 and 4 and mapped as Pump 2 to Pump 4.



Figure 4: Rover Max Base Board

[5.2] 4G Modem Click Board

The Rover 4g Modem Click Board receives a standard large footprint SIM card; the SIM card is located in the SIM holder shown below and is inserted from the top. The Antenna Jack is SMA female pin.





[5.3] UPS Click Board

When fitted, the Rover UPS Click Board provided power for a short duration during a loss of main supply. This ensures a 'Last Gasp' message can be sent out via the Address Book to inform recipients that the main supply has been removed and the pump has stopped.



Figure 6: Rover UPS Click Board

[5.4] Single IO Click Board

The Single IO Board is the wiring interface to any field connections and includes the following.





Terminal Layout



Rover_IO_Ver_A_Rev2 Single Board

01	4-20ma In 1 Pressure input
02	4-20ma In 2
03	Supply Out
04	Supply Out
05	Din 1 (Switched High) Safety Input
06	Din 2 (Switched High) Pump Running Input
07	Din 3 (Switched High) AUX1 Input
08	Din 4 (Switched High) AUX2 Input
09	Supply Out
10	Supply Out
11	Supply Out
12	Supply Out
13	4-20ma Out 1
14	0-10v Out VFD Speed or PID Reference
15	GND
16	GND
17	DOut 1 (Switched Low) Siren
18	DOut 2 (Switched Low) Held Start Output
19	DOut 3 (Switched Low) Pulse Start Output
20	DOut 4 (Switched Low) Pulse Stop Output
23	Supply Out
22	Supply Out
23	Supply Out
24	Supply Out



[6.0] Mounting the Controller

The provision of through holes in the enclosure base body makes mounting the Rover Max Controller easy.

- Step 1: Locate the controller on a flat, orientated surface, as shown below.
- Step 2: Mark or measure the thru hole locations and pre-drill or tap M5 threads.
- Step 3: Fix the controller to the mounting surface with suitable fixings for the surface. E.g. Stainless-Steel screws or SHCS threaded fasteners for tapped holes.
- Step4: relocate any cap covers provided
- Step 5: Implement wiring installation before fitting the enclosure lid. Using M4x16 G

The mechanical installation is complete; note: Leave adequate area around the enclosure free, and DO NOT locate near surfaces greater than 50degC. Consider using Rover Max Shield for applications where the controller is exposed to the elements for extended periods.



Figure 8: Mounting Rover Max Controller

[7.0] Electrical Installation

[7.1] Main Board Supply Voltage Wiring





Cone on the Left is dedicated to supply cable

Cone second from the left is dedicated to control cable

Cone second from the right is dedicated to the 4g antenna cable

(Note – cut the cone so the cable fits tightly inside the cone and secure it with a cable tie once installed. For added protection – fill the inside cone with neutral cure silicone once the installation of cables has been completed.



[7.2] Control Wiring Example

A common example of wiring options is below; additional wiring options are provided in more detail below.



[7.2] Control Wiring Explanations

The controller will be enabled when [Din 1] Safety Input is [High]

An acknowledged message will;

- 1. Pulse DOut 1 for 10 Seconds (connect this to a siren)
- 2. Then Latch DOut 2 and Pulse DOut 3 for 1 second
 - a. DOut 2 can be wired to a held relay for to run the starter in Remote Modem
 - b. DOut 3 can be wired to pulse an external relay wired [NO] in the start circuit

When the controller is Informed to Stop by;

- 1. Stop Command
- 2. Run Time Stop Command
- 3. Power Loss
 - a. DOut2 Held Relay Drops.
 - b. DOut4 Pulse Relay Drops 10 seconds

When [Din 2] is switched, the return message 'Pump Running' will be sent.

[7.3] Held Control Wiring Example



The above wiring example is for control circuits with an auto/manual/off configuration where the auto mode is held to run and off when the input drops; in this instance, R2 can be used to hold the coil A2 side switched to DOut 2 with common supply to A1 side (DC switched low)

[7.4] Pulse Control Wiring Example



This control method would be used when the control circuit is fitted with a traditional latched control circuit – start and stop button; in this instance, the DOout3 can be wired to a control relay A2 side with the control circuit wired NO on the control side. DOut 4 can be wired to a control relay A2 side with the control wired NO for the stop side; both A1 sides are wired to Supply (DOut 1 and DOut 2 are DC switched low)

Note the inclusion of a bypass switch, its recommended that this circuit is included.

[7.5] 0-10 Singal Output – VFD Speed or Pot Source Reference



A 0-10volt reference can be sent to the controller with the body of the text as a percentage of full scale e.g., 100% = 10volts. This reference will be held for the duration of the pump's run.

The 0-10volt reference has two main use cases.

Use Case 1: Send a value to a VFD to hold a speed reference; this can be used as a 10k POT replacement.

Use Case 2: send a value to a VFD to set the source value for a PID.

The message will be held for the duration of the pump running instance and drop to 0% once cleared. This means a value must be sent each time the remote message to start is sent.

[7.6] Supply Out Power Lamp

	Fused Supply Light
Supply Out	GND GND
	Notes:
	The Rover Max Controller is a closed unit, as such fitting a panel light powered by Supply out can be a simple way to establish if the controller is powered consider fitting this if the client wished to have external information regarding the power status at the controller
	additional information
	Fl fuse blown F2 fuse blown Supply removed

these will all turn the light off.

[8.0] Fitting Enclosure Lid

Once wiring and antenna connections are completed, fit the enclosure lid over the controller enclosure base (note: the lid may be tight and catch the top edge of the PCB. If this is the case, apply light pressure to the bottom of the enclosure lid. This will compress the O-Ring seal and allow the enclosure lid to move clear of the PCB edge.)

Fix 8 x M4x16mm SHCS G316 and Washers in place; do not over-tighten.





[9.0] Modem Configuration

Definitions

'Slot' is the name for the location of an IO module. Up to four modules can be installed. Slot 1 is the far-left module location, incrementing from left to right, for a total of four.

'Line' is an entry line in the phone book; there are 8 lines. The user's number must be stored as a line in the controller to use the modem and receive messages.

'Input' Each IP model has 4 inputs. Input 1 is dedicated as a 'Safety Enable' input, and input 2 is configured as the return message for the Pump Starting. This means the input must be made for the control to continue in the running position.

'RunDelay' is a configurable wait time for Input2 Running to be made. It is configurable to allow other actions in the starting process, such as a Prime Timer to complete the sequence before the Running signal is returned. Dropping the running input resets the modem control.

'PIN' The PIN is a security feature; the administrator can add numbers to the phone book using it, and the PIN can be changed as needed.

'High' refers to the input state being turned on

'Low' refers to the input state being turned off

'hh: mm' means hours and minutes

'mm: ss' means minutes and seconds

Additional Notes

Note 0: Factory PIN is 0000

Note 1: All commands and slots names are matched and case-insensitive

Note 2: Slot names can be entered in any case format

Note 3: Phone numbers stored in local STD format, Eg: 0418123456

Note 4: Slot names cannot contain the following character sequences

- " ?"
- " Start"
- " Update "
- " Stop"
- " Pin "
- "Line "
- " Input "
- " Slot "
- " RunDelay "

Status Commands		
Description	Command	Example
Request Slot Status message	<slot name="" –=""> ?</slot>	Pump1?
Request Phonebook entry message	Lines ?	Lines ?
Request Status of all Slots	Slots ?	

Control Commands		
Description	Command	Example
Start	<slot-name> Start</slot-name>	Pump1 Start
Start & Speed	<slot-name> Start <speed%></speed%></slot-name>	Pump1 Start 33%
Start & Run Timer	<slot-name> Start <hh:mm></hh:mm></slot-name>	Pump1 Start 10:33
Start Speed & Run Timer	<slot-name> Start <speed%> <hh:mm></hh:mm></speed%></slot-name>	Pump1 Start 33% 10:33
Start Run Timer & Speed	<slot-name> Start <hh:mm> <speed%></speed%></hh:mm></slot-name>	Pump1 Start 10:33 33%
Update Speed*	<slot-name> Update <speed%></speed%></slot-name>	Pump1 Update 33%
Update Run Timer*	<slot-name> Update <hh:mm></hh:mm></slot-name>	Pump1 Update 01:24
Update Run Timer & Speed*	<slot-name> Update <hh:mm> <speed%></speed%></hh:mm></slot-name>	Pump1 Update 03:00 52%
Update Speed & Run Timer*	<slot-name> Update <speed%> <hh:mm></hh:mm></speed%></slot-name>	Pump1 Update 55% 04:10
Stop	<slot-name> Stop</slot-name>	Pump1 Stop

Pin Commands		
Description	Command	Example
Change Access Authority Pin	<current-pin> PIN <new-pin></new-pin></current-pin>	0000 PIN 1234

Phone Book Commands			
Description	Command	Example	
Turn Off Phone Book Line**	Line OFF	Line OFF	
Turn On Phone Book Line**	Line ON	Line ON	
Add Line Number	<pin> Line <lineid> <number></number></lineid></pin>	0000 Line 1 0418 123 456	
Remove Line Number	<pin> Line <lineid> REMOVE</lineid></pin>	0000 Line 1 REMOVE	

Input Commands		
Description	Command	Example
Change High Input	<pin> Slot <no> Input <inputid> <high></high></inputid></no></pin>	0000 Slot 1 Input 1 High Top Pump
	<message></message>	ON
Change Low Input	<pin> Slot <no> Input <inputid> <low></low></inputid></no></pin>	0000 Slot 1 Input 1 Low Top Pump
	<message></message>	OFF

This command string is applicable for INPUTS 2,3, and 4 on each Slot Module. Note input 1 is dedicated to Safety Health.

Note the word "Stopping" can not be used in the Input change use "Shutdown" as an alternative

Run Delay Commands		
Description	Command	Example
Change Run Fault Delay	<slot-name> RunDelay <mm:ss></mm:ss></slot-name>	Pump1 RunDelay 01:00

Slot Edit Commands		
Description	Command	Example
Change Slot Name	<pin> Slot <slotid> <slot-name></slot-name></slotid></pin>	0000 Slot 1 River Pump

(*) Only when pump is running.

(**) Only changes the state of the number sending the message to the modem; the phone number must be in the phone book. Tuning off a line is not possible from another number – this would require the owner to delete or replace the line.

[10.0] Standard Return Messages

Command	Return Message Example	
<slot name="" –=""> ?</slot>	<slot-name> NOT RUNNING Speed 100% 10:00</slot-name>	
Lines ?	 0418 123 456 (ON) Empty 	
<slot-name> Start</slot-name>	<slot-name> START at Speed 100% <slot-name> Running</slot-name></slot-name>	
<slot-name> Stop</slot-name>	<slot-name> STOP <slot-name> Shutdown</slot-name></slot-name>	
Slots ?	<slot-name> Speed: 100% Run Delay 2:00 Or Not available displayed for empty slots</slot-name>	
<slot-name. 33%<="" th="" update=""><td><slot-name> NOT Running UPDATED to Speed 33% Message could include Running, and time stored message.</slot-name></td></slot-name.>	<slot-name> NOT Running UPDATED to Speed 33% Message could include Running, and time stored message.</slot-name>	

[11.0] Customer Configuration

Description	Detail
Controller Type	Rover Max
Slot 1 Name	
Slot 2 Name	
Slot 3 Name	
Slot 4 Name	
Sim Number	
PIN number	0000
Phone Book Line 1	
Phone Book Line 2	
Phone Book Line 3	
Phone Book Line 4	
Phone Book Line 5	
Phone Book Line 6	
Phone Book Line 7	
Phone Book Line 8	

Additional or custom configuration notes:



Rover Connect Pump Modem

4G Modem

Designed for Water Management Applications

Sales@Roverconnect.com





Installer information



All Inputs are Switch Supply Voltage High

All Outputs are Switched GND A2 to Controller Output A1 to Supply Voltage

Healthy Must be made for the Modem to be activated, and all controls will drop when Health is deactivated

Running indicates that the pump is running; the control will reset if this is not done before Delay Time out (default 1 min). (Stop Sequence Activated). Likewise removing the Running input will reset the control. (Stop Sequence Activated). The Running Delay Time can be extended – refer to the manual for the message. (used in applications like priming)

The Modem will be connected to the network when the NET LED is lit; it could take a few minutes after power to detect the network. Additionally, once detected the modem clears any stored messages. This could also take a few minutes.

Refer to the Commands list for all control commands.

