User Manual

Monew Control Program

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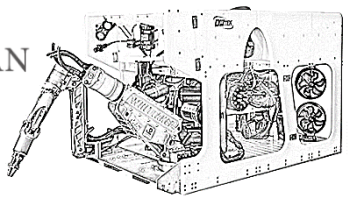

Revision information

Issue	Revisions	Date	Revised	Approver
A	First edition	2024/4/17	Matthew Chen	Jerome Huang

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1. General

A. Introduction

This manual is about the control software for the Monew ROV. For information about the Monew System hardware or components, please see the User's Manual of the Monew system. If you are looking for the recording software TiDVR, please see the User Manual of the TiDVR.
This manual will go through the basic setup and how each page functions. It will also include a quick-start guide for users who want to get going with the ROV right out of the box.

If the purchaser or the end user is not familiar with underwater ROV systems, it is recommended to receive product and system maintenance trainings for operation from the manufacturer.

This manual is written assuming that the operator has competent knowledge of electricity, electronic and hydraulic principles and fully understands ROV operation.

B. Important Notices

DWTEK reserves the right to change the specification at any time without prior notice and without incurring any obligation whatsoever to incorporation any new features in any of its previous products.

Each new product is carefully examined, inspected, and checked before dispatch. It should be carefully examined and operationally tested on receipt by the receiving party. If the product is damaged in any way, then a claim should be lodged with the carrier. New or repaired products damaged in transit should not be returned to DWTEK without prior specific shipping instruction from DWTEK.

Faults or errors may arise in Monew system in any conditions. It is necessary to notify DWTEK of faults or errors in details and model type and serial number of the particular system that encounters functional difficulties. On receipt of the notification, DWTEK would offer troubleshooting solutions to the faulty parts or errors. The client has the responsibility to describe the faulty part or errors in actual condition and report the result after implementing troubleshooting.

2. Program Overview

A. General Descriptions

The Monew Control Program is currently in its early stages of development, but it has already proven itself in multiple offshore projects. The Monew Control Program serves as the main control interface of the Monew System and allows the users to interact with the vehicle. Despite the fact that the Monew Control Program can run as a standalone software, it is design with the integration of the Monew System in mind. Running the software with the DWTEK 20' Container Surface Unit will guarantee the best performance and optimization for the Monew System.

A brief diagram description of the system is shown below. Please refer to the appropriate section of the manual for detailed descriptions of each system and components.

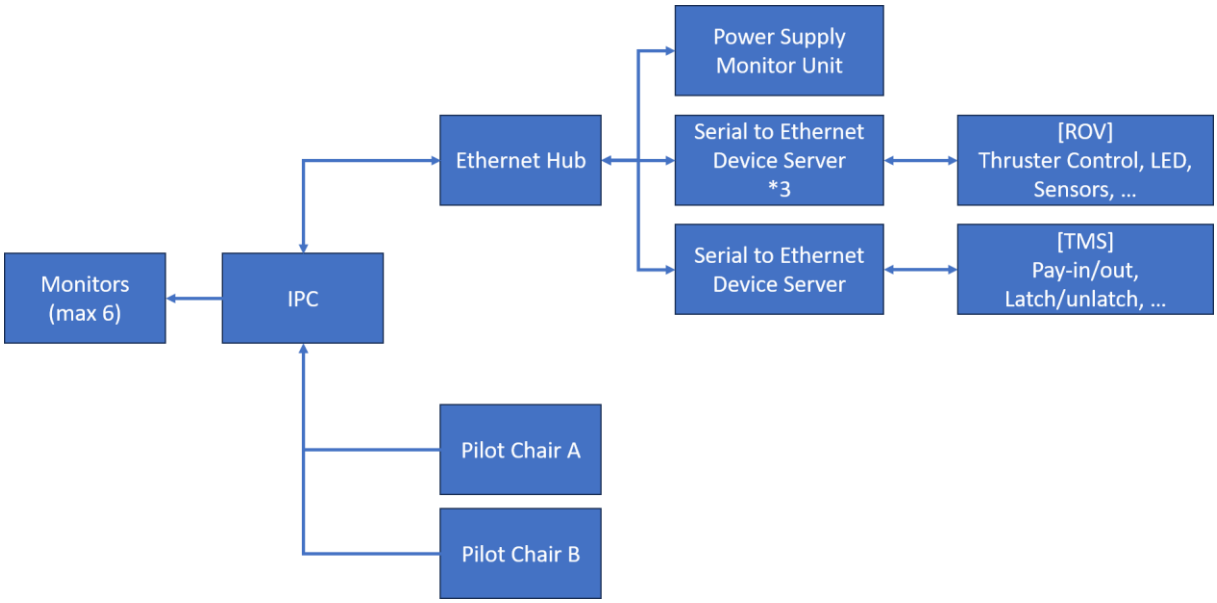


Figure 1 - Monew Control Program hardware structure overview

B. Monew Control Program Minimum Specifications

System Hardware Requirements	
CPU	Intel Core i5-8500 or higher
RAM	8 GB or higher

Table 1 -System Hardware Requirements

Operational System Requirements	
OS	Windows 10
.Net Framework	Microsoft .Net Framework 4.8

Table 2 - Operational System Requirements

3. Getting Started

A. General

The software comes pre-installed on the Monew System. Future updates will come with an installation readme file, which will guide the user through the setup procedure.

B. ROV Control Tab

When the software finishes loading, the screen shown in the following figure will be first displayed.

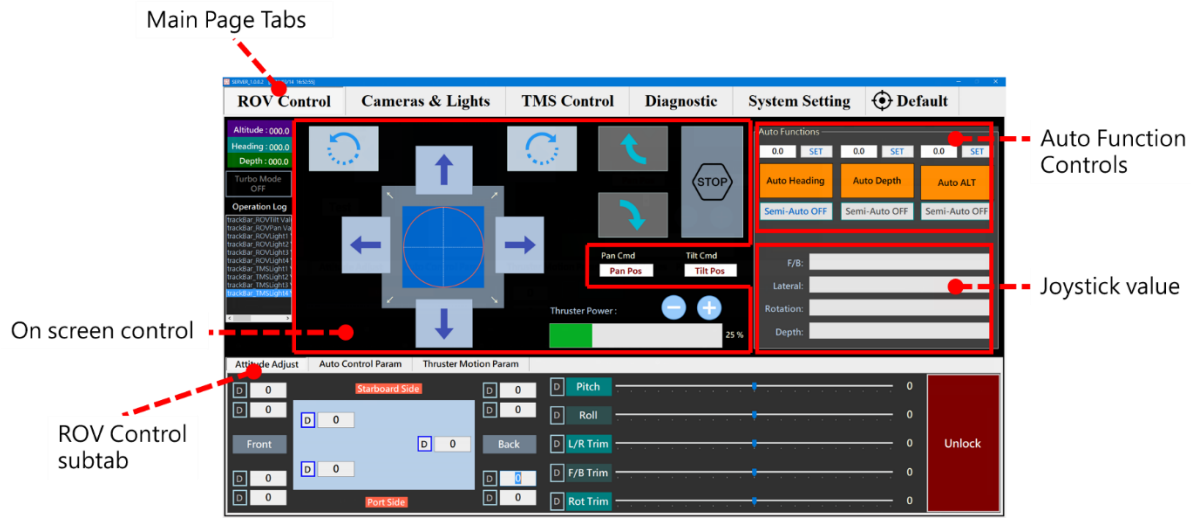


Figure 2 - ROV Control Tab Description

The upper row consists of the “Main Page Tabs”. Clicking on the tab will switch the screen accordingly. See the later sections for more detailed descriptions of the different tabs.

1. On Screen Control

The “On Screen Control” is where the user can control the ROV without using the pilot chair. Pressing the arrow button corresponds to different movement directions. The “Thruster Power” is how fast the thruster will spin when using the “On Screen Control”. Clicking the “+” or “-” button will increase or decrease the thruster power. Note that the “Thruster Power” only affects the “On Screen Control” movement speed and does not change the thruster power for the joystick control.

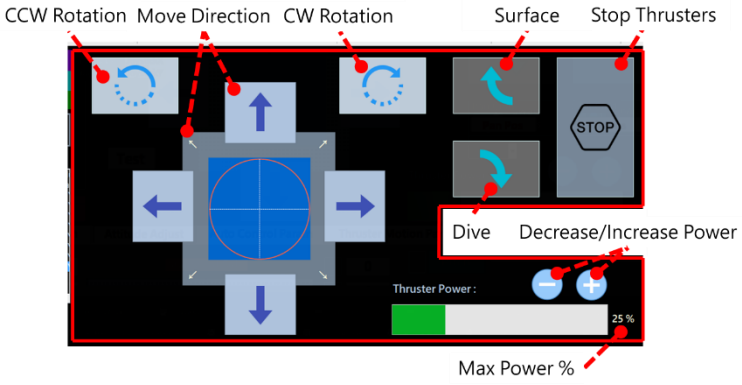


Figure 3 - On Screen Control Description

2. Auto Function Control

This version of the Monew Control Program provides 3 different auto functions: Auto Heading, Auto Depth, and Auto Altitude. The user can set the target values for the auto functions. The units for the values are degrees for Auto Heading and meters for both Auto Depth and Auto Altitude.

The Semi-Auto functions can still let the user control the ROV with the joysticks. For example, if the Semi-Auto Heading is turned on, the user can still use the joystick to control the ROV, and the heading will be fixed at the last heading position when the joystick is released.

Note:

1. **In order for the auto function to work, it will need the corresponding inputs from the sensors.**
2. **Auto Depth and Auto Altitude is mutually exclusive, meaning they can't be turned on at the same time.**

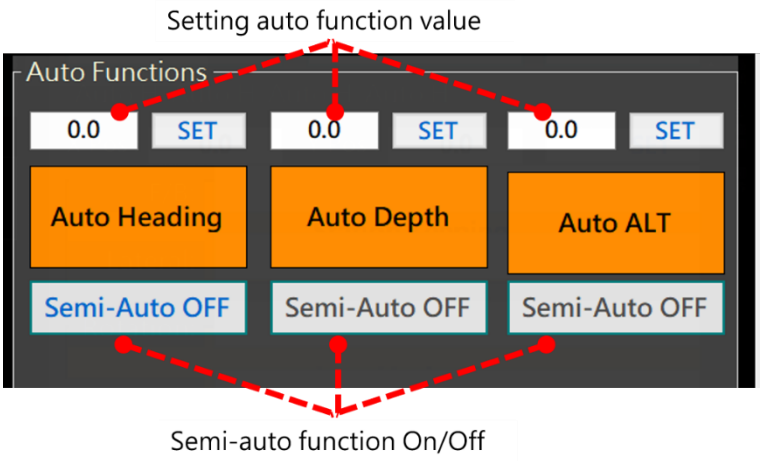


Figure 4 - Auto functions description

3. Joystick value

The bars will reflect the value given by the joysticks. "F/B" is forward and backward; "Lateral" is port and starboard; Rotation is heading; "Depth" is vertical movement. If the rotation direction is too strong for some circumstances, there is the rotation gain knob on the right armrest to tune the rotation power. See Appendix 1 for the actual position of the rotation gain knob.

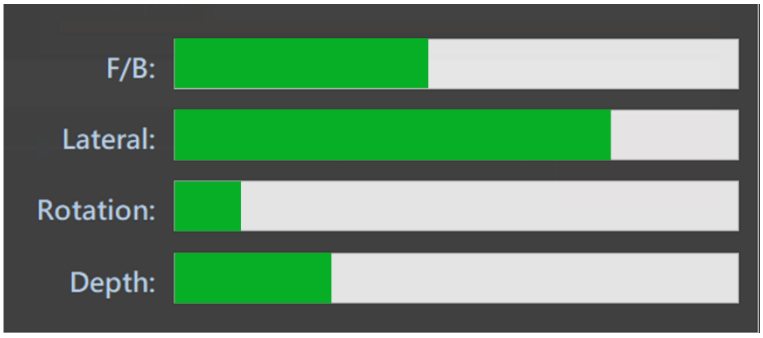


Figure 5 - Joystick value bars

C. ROV Control Subtab

1. Attitude Adjust

In this subtab, the user can adjust the attitude. From adjusting only one thruster to adding a constant trim to a certain direction. To use the functions in this subtab, the user will have to click “Unlock”.

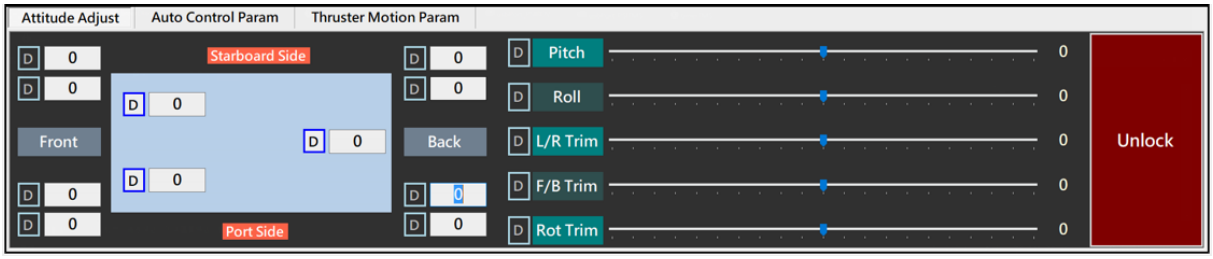


Figure 6 - Attitude Adjust Locked

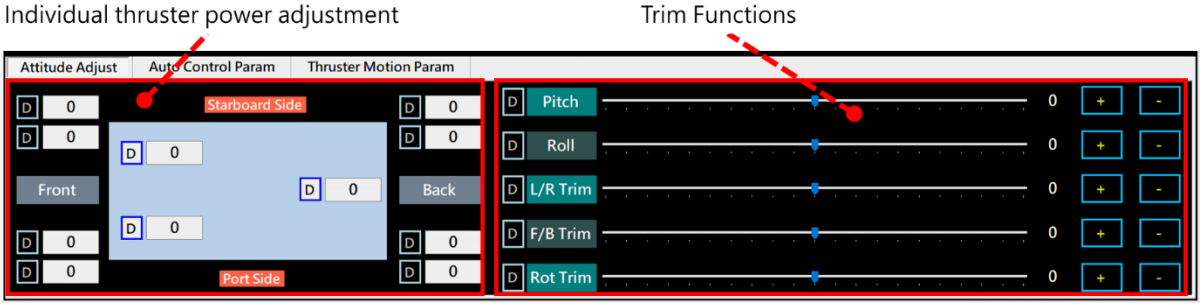


Figure 7 - Attitude Adjust Unlocked

The “Individual thruster power adjustment” can change the max power of a single thruster. The input value will have to be between 0~100 with 100 being the max power (100%) the thruster can operate up to. Clicking “D” will revert back to the factory setting (100%).

As for the “Trim Functions”, L/R Trim is left (negative) and right (positive); F/B Trim is forward (positive) and backward (negative); Rot Trim/Pitch/Roll is the CW (positive) and CCW (negative) rotation. The “D” button is back to default value (0). The trim functions can be controlled via the knobs on the right armrest of the pilot chairs. See Appendix 1 for the actual positions of the trim knobs.

2. Auto Control Param

This is where the user can adjust the parameters for the auto controls. The program uses a form of PI control as the algorithm, and the user can adjust the Kp and Ki parameters. The “In Pos Dec Ratio” is the braking time sensitivity when reaching close to the target value. It is recommended to leave these parameters as the factory settings.

Figure 8 - Auto Control Param Subtab

3. Thruster Motion Param

This is where the user can individually adjust the power ratio of each horizontal thruster. “L” is the ratio for non-turbo mode, while “H” is the ratio for turbo mode. 6A is front-port; 6B is front-starboard; 6E is back-port; 6F is back-starboard. Enter a value between 0~1.

The “Left” and “Right” boxes are where the user can set the offset for all left (port) or right (starboard) side thrusters for forward (F), backward(B), CCW rotation (LR), and CW rotation (RR) movement. Enter a value between 0~1. It is recommended to leave these parameters as the factory settings.

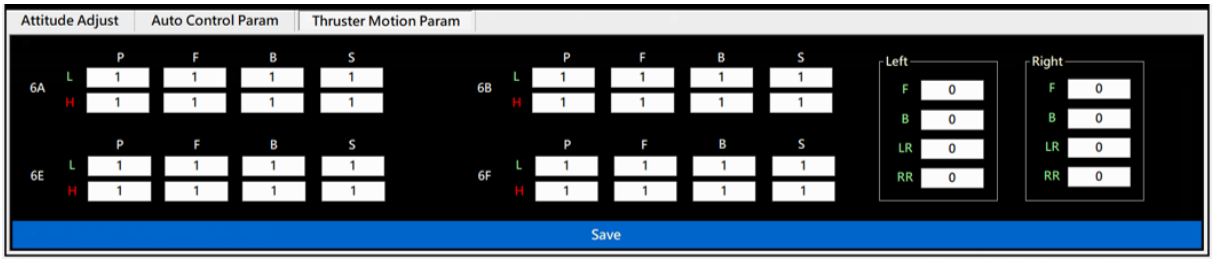


Figure 9 - Thruster Motion Param Subtab

D. Cameras & Lights Tab

This tab controls the camera and lights. The camera controls are only for the DWTEK HD Camera. When the pilot chair is connected, the user can use the wheel sliders on the left armrest of the pilot chair to control the zoom in/out and focus of the HD Camera. The auto focus will be on by default, and if the user changes the focus, it will be turned off. To turn auto focus back on, click the “Auto” label on top of the “Focus” slider.

The light controls can only be controlled via the monitor. There are 3 ways the lights can be controlled: clicking the “Light 1/2/3/4” label, dragging the slider, or typing in the target brightness percentage. Clicking on the “Light 1/2/3/4” label will turn on to the default of 50% brightness or the last set brightness. Clicking it again will turn the light off.

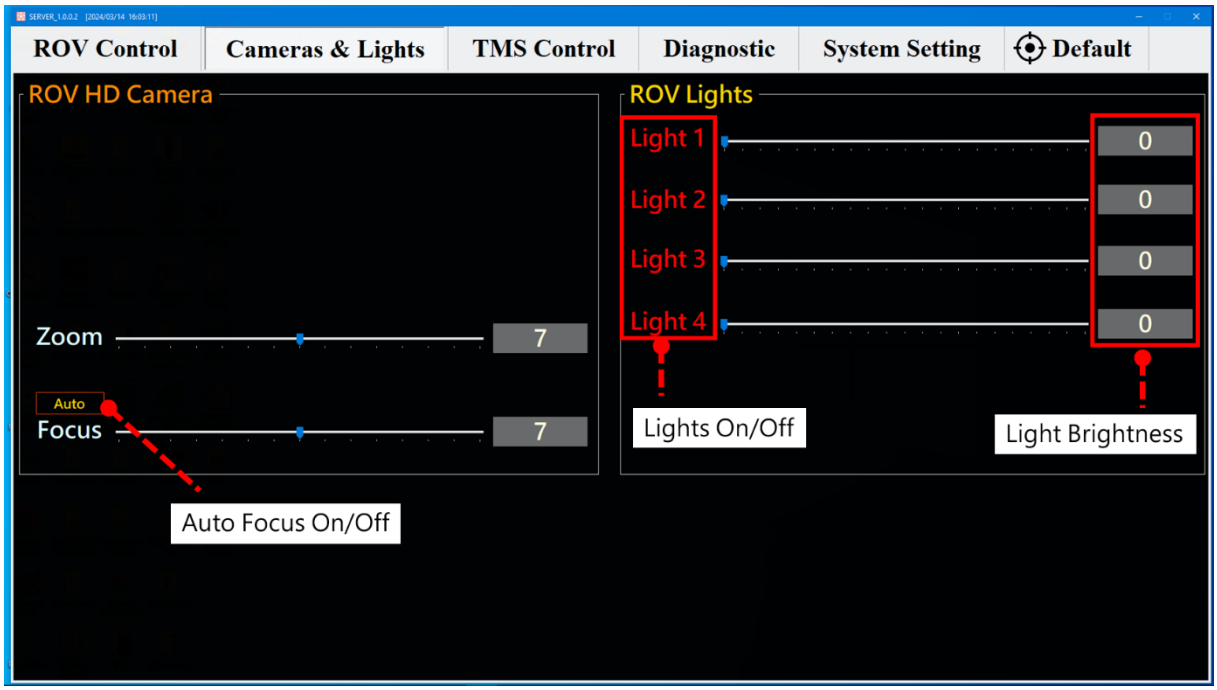


Figure 10 - Camera & Lights Tab

E. TMS Control Tab

In this tab, TMS related controls are listed here. Both the on-screen control and the pilot chair can control the TMS pay in/out and latch/unlatch functions. The default speed for pay in/out is 500 rpm. If the user wishes to change the speed, click the textbox and enter the target speed. The pay in/out moves both the drum and pinch. If the user wishes to control the pinch or drum individually, they would need to click the “Override” button and wait for it to turn green. Click the “Override” button again to resume simultaneous drum and pinch movement.

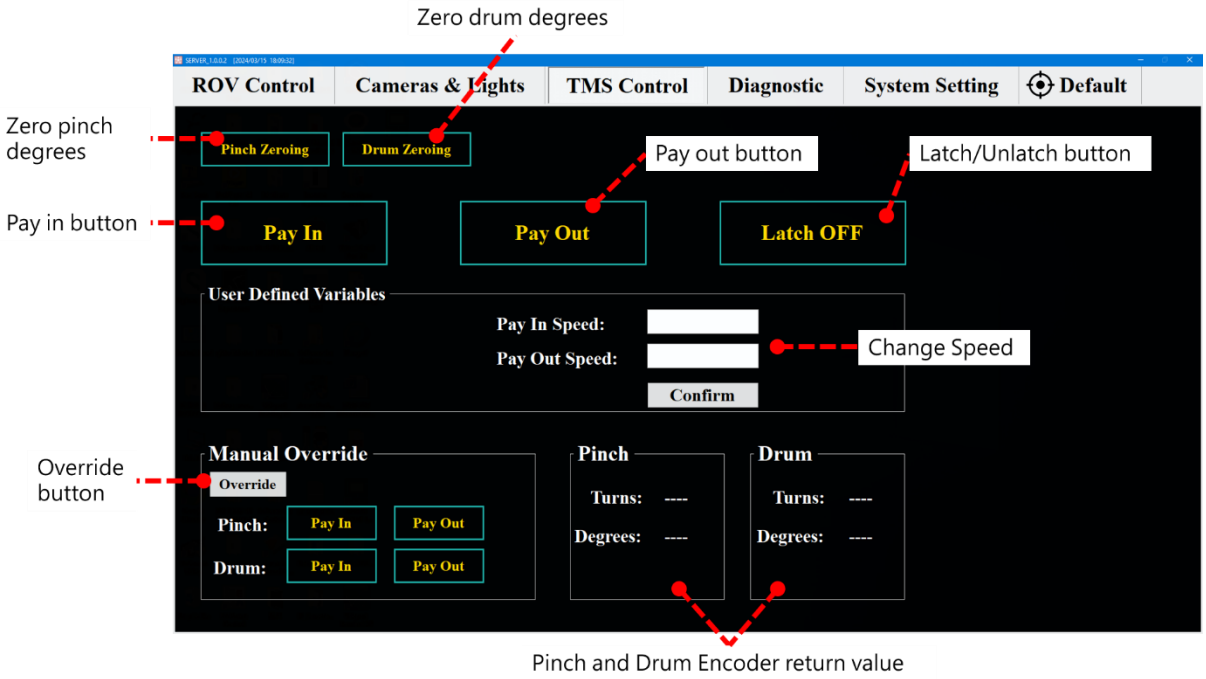


Figure 11 - TMS Control Tab

F. Diagnostic Tab

In this tab, the user can monitor the current status from the Power Supply Monitor Unit. It includes the input/output voltage, input current, Insulation Resistance monitor, and LIM bypass. If all power supply is ON, the Current Status (Warning, Alarm, Fault) should be all OFF. For more detailed descriptions of the tab, please see the following figure.

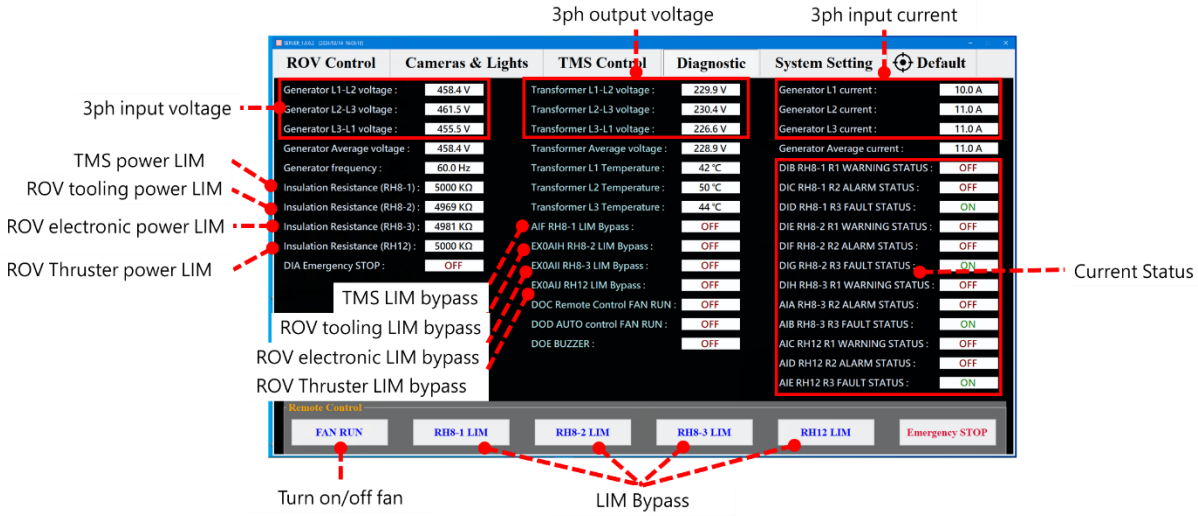


Figure 12 - Diagnostic of the Power Supply Monitor Unit

G. System Settings Tab

This tab should be the first tab the user should go to when starting the program. If the equipment on the Monew System is its factory setting, then the user would just need to click all the “Open” buttons in the “COM Port Settings”. The dark green labels are COM ports for the ROV and the bright blue are the COM ports for the TMS. If the COM port has successfully opened, then the “Open” button will turn green with “Close” labeled.

If the user wants to check if the COM port is sending the correct data stream, they can use the “COM Port Preview” to view the data. They can also send data down to the COM port.

The software also provides on-screen control for the Pan-Tilt. Future updates will be brought to the currently greyed out buttons.

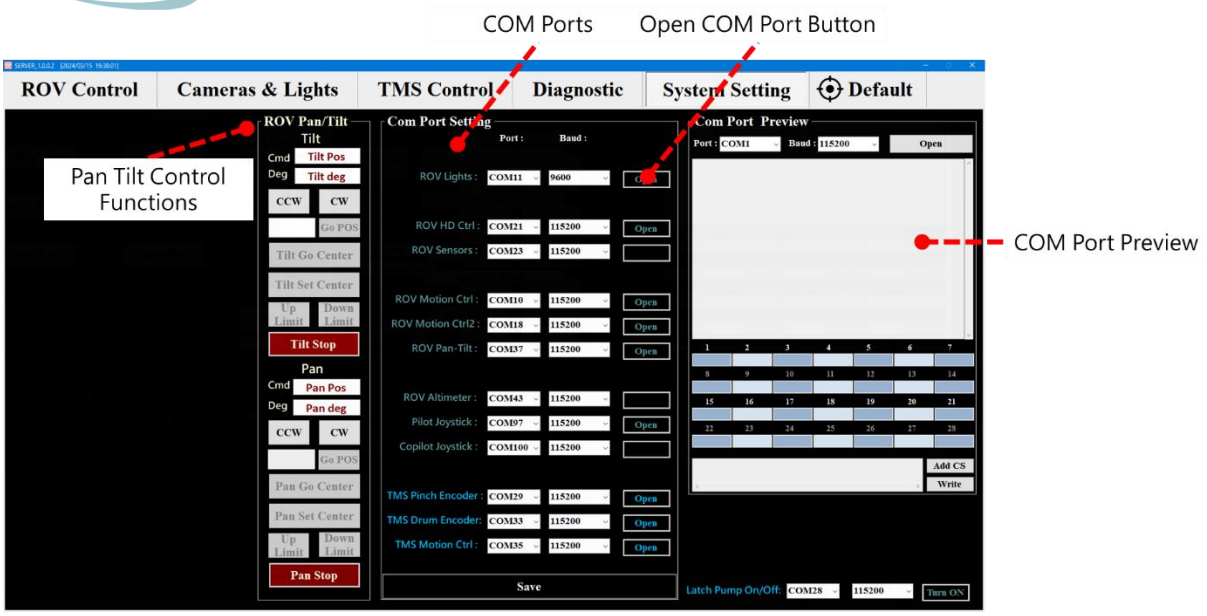


Figure 13 - System Settings

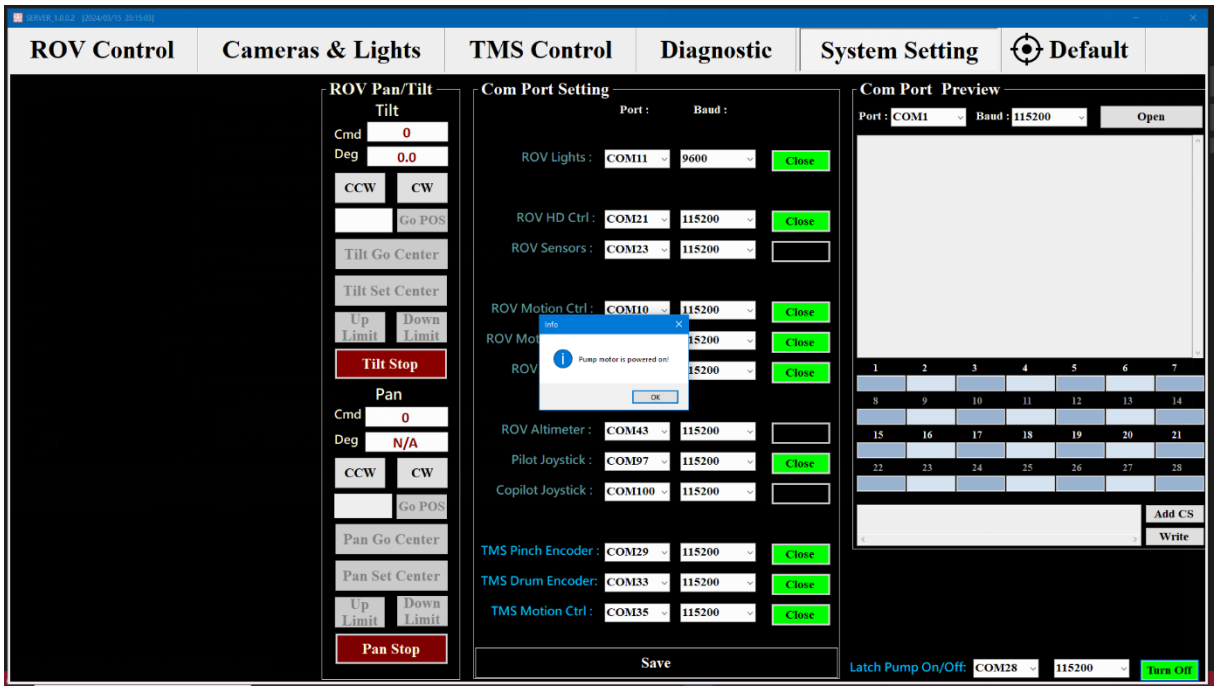


Figure 14 - System Settings: Latch Pump On

Note:

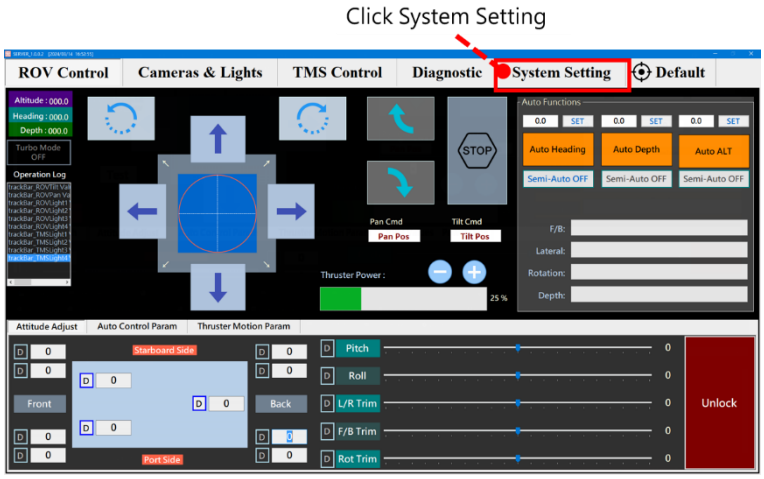
The Latch Pump On/Off will need to wait until a window pops up that says "Pump motor is powered on!".

H. Default Tab

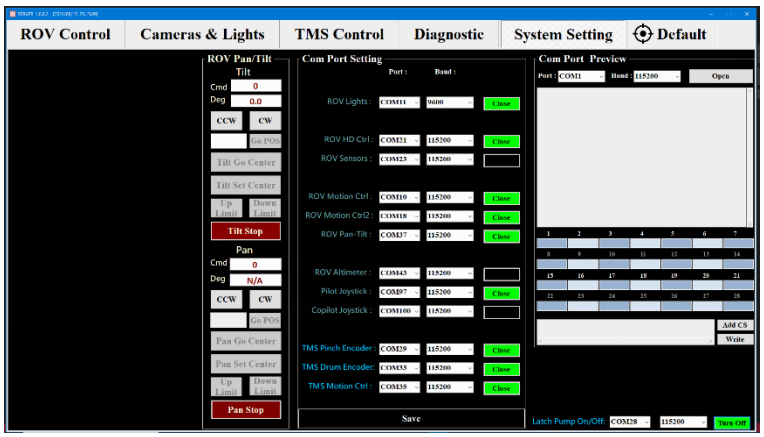
This is more like a button than a tab. Clicking this tab will bring the window back to the default location on the monitor.

4. Quick Start Guide

1. Click “System Setting” in the Main Page Tabs.



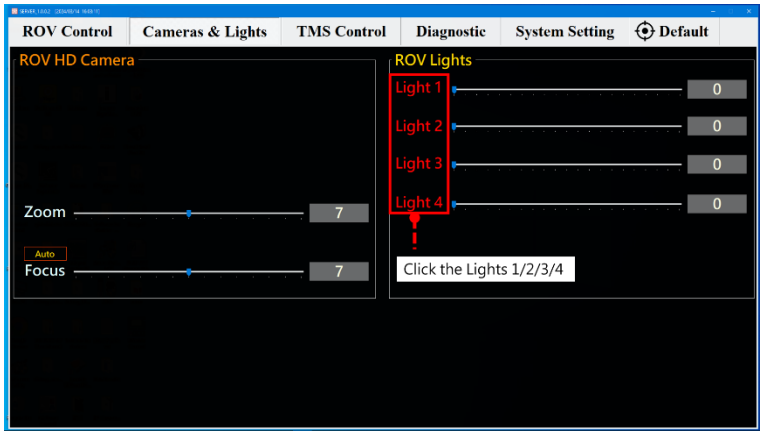
2. Check the power supply. They should be all turned on.
3. Click the “Open” button for all of the COM Port. They should turn green and be labeled as “Close” or “Turn Off” for successful connection.



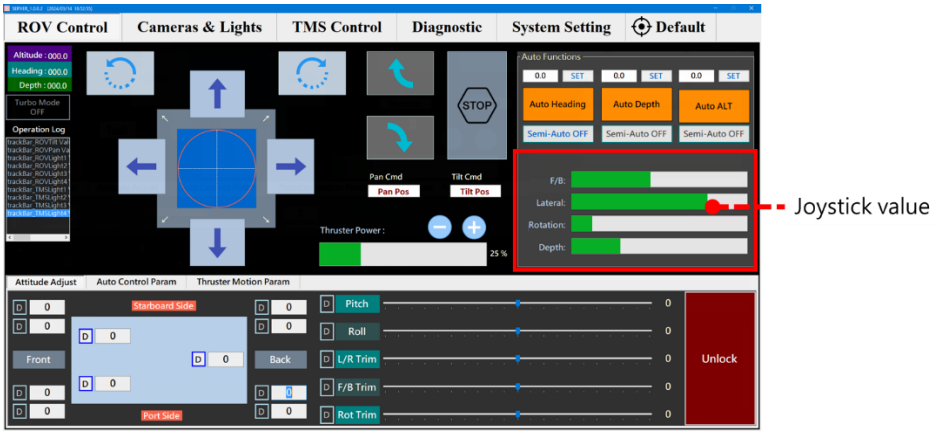
4. Do a pre-dive check for the Monew System.

5. Turn on the lights when necessary. Be aware of bright lights.
   a. Click the “Camera & Lights” Tab.

   b. Click Lights 1/2/3/4.



6. The user can switch back to the ROV Control Tab and view the joystick value for flying.



5. General Troubleshooting

A. Cannot open COM Port in the “System Setting” tab.

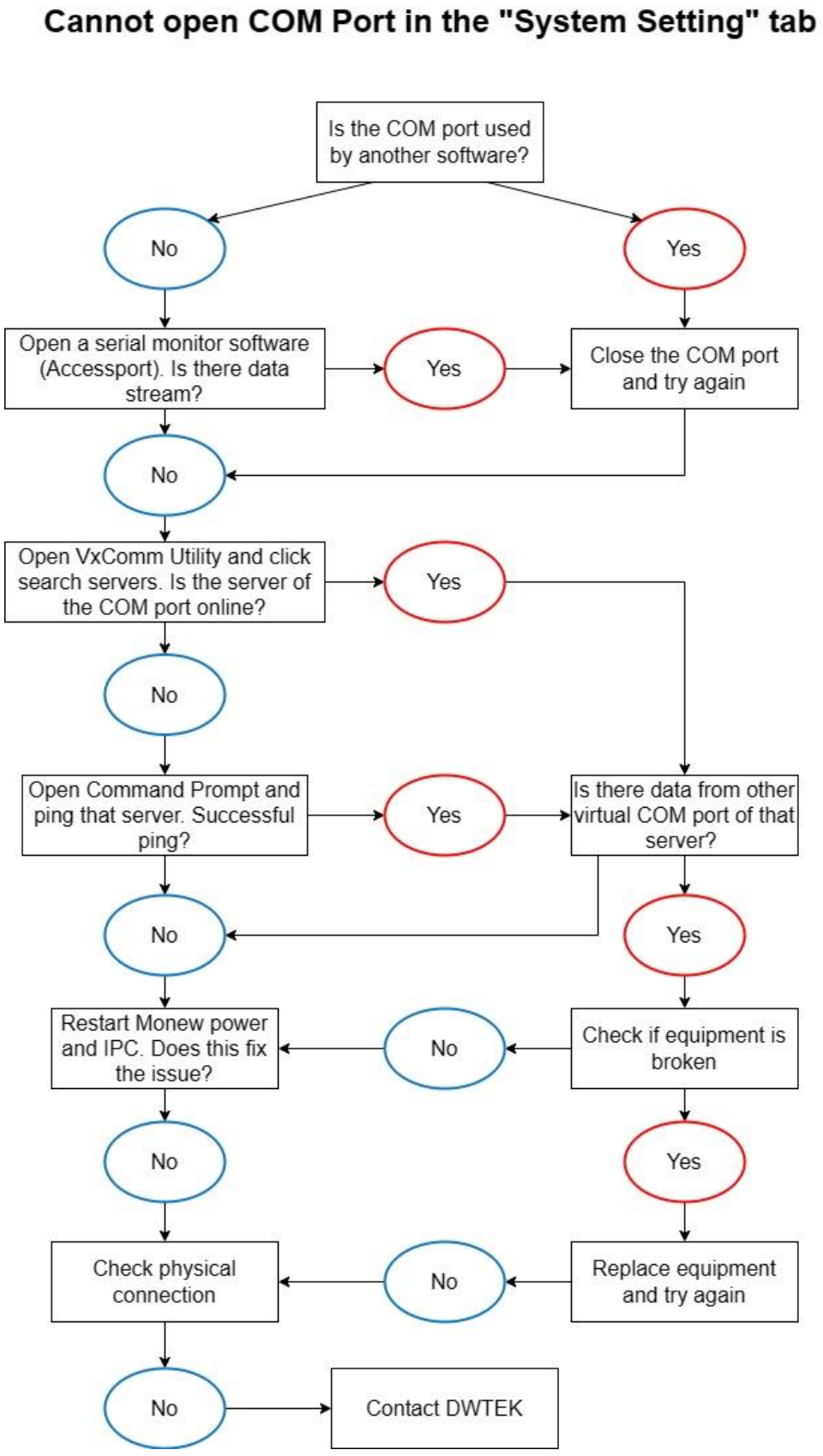


Figure 15 - COM Port Troubleshooting

B. No reaction from the pilot joystick

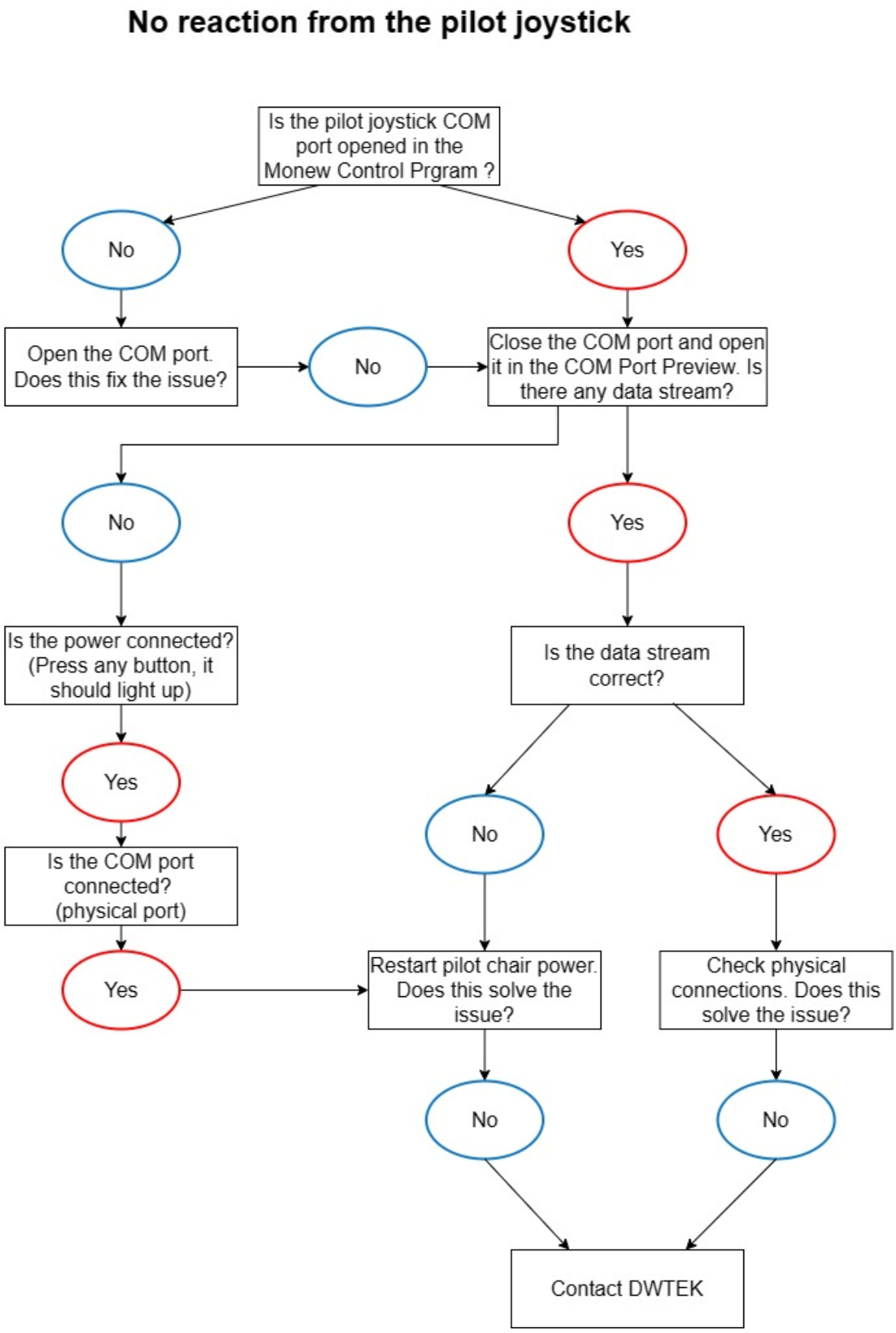


Figure 16 - Pilot Joystick Troubleshooting

C. Manipulator not responding

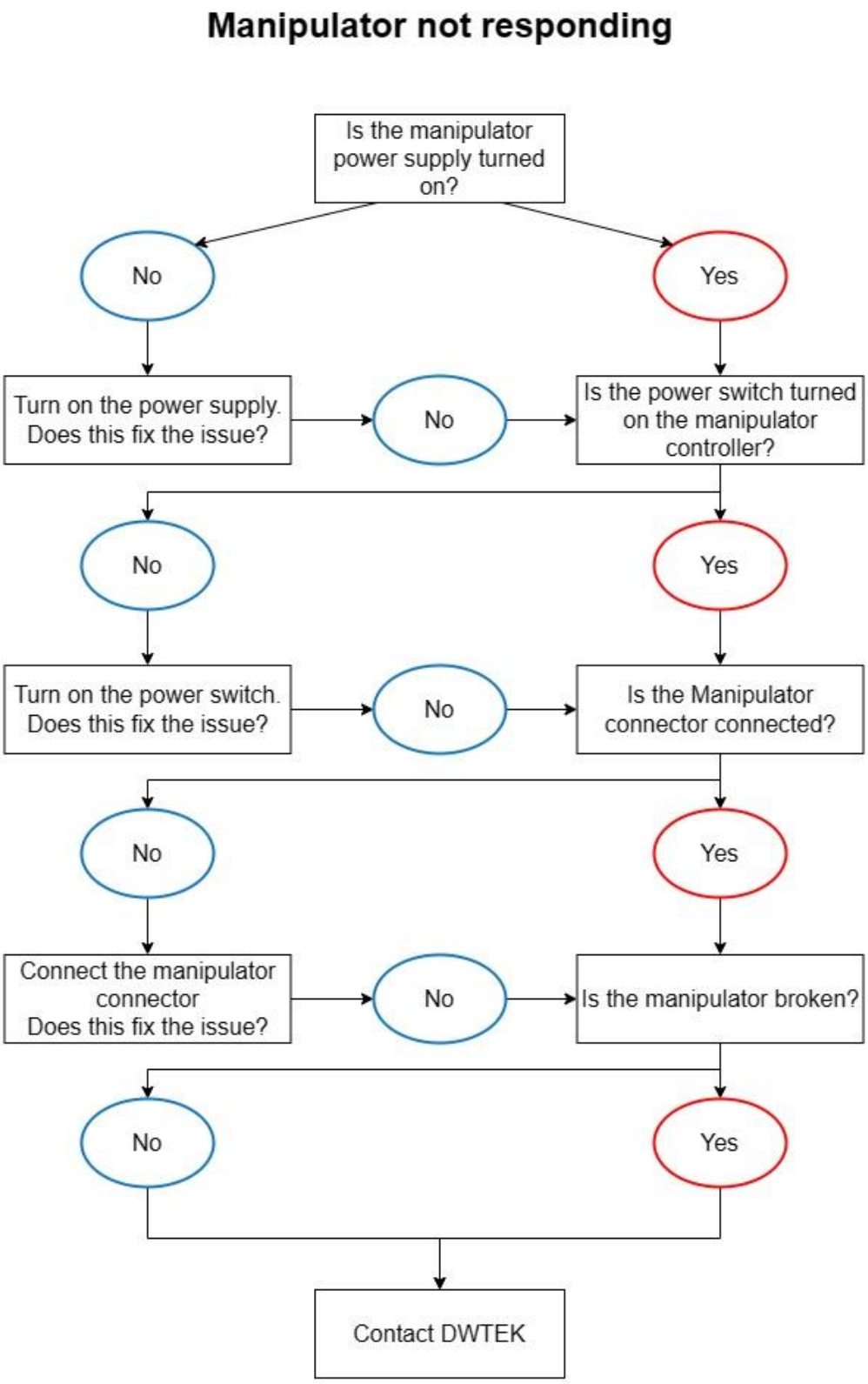


Figure 17 - Manipulator not responding troubleshooting

6. Appendix 1 – Pilot Chair Controls

The following are the controls layout on the Pilot Chair.

Left Armrest

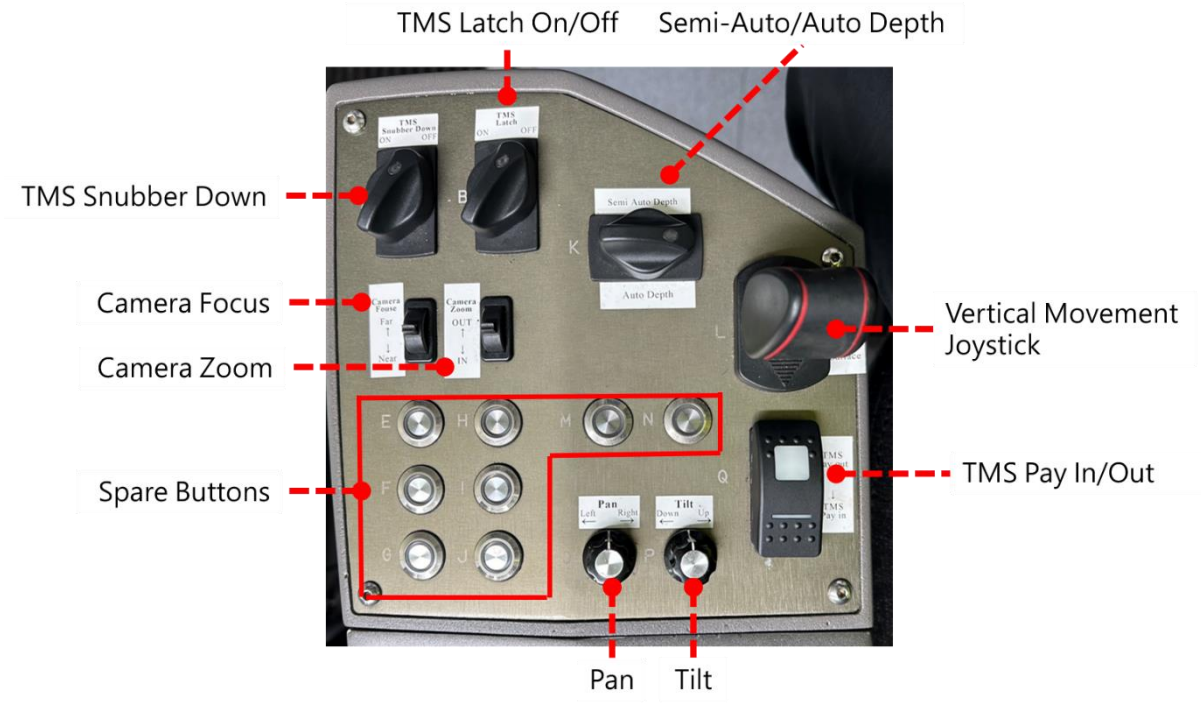


Figure 18 - Left Armrest Control Layout

Right Armrest

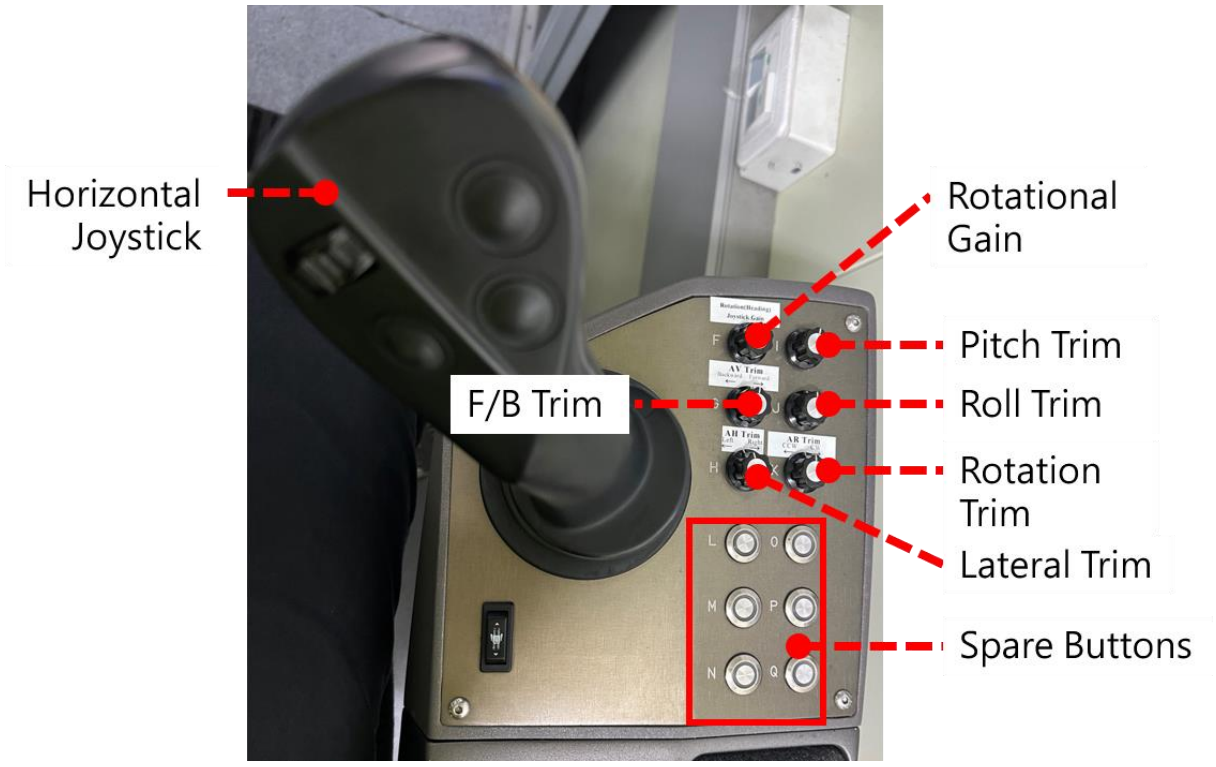


Figure 19 - Right Armrest Control Layout

7. Appendix 2 – COM Port Setup

The COM ports in the Monew System are virtual COM ports, which are generated by the Serial to Ethernet Device Server (PDS-782). The virtual COM ports may vary between system or IPC, so this guide aims to provide a general setup procedure for the user to follow. For more information about the VxComm Utility Software, please see “VxComm_Utility_User_Manual_en” or “PDS-700_quick_start_en”.

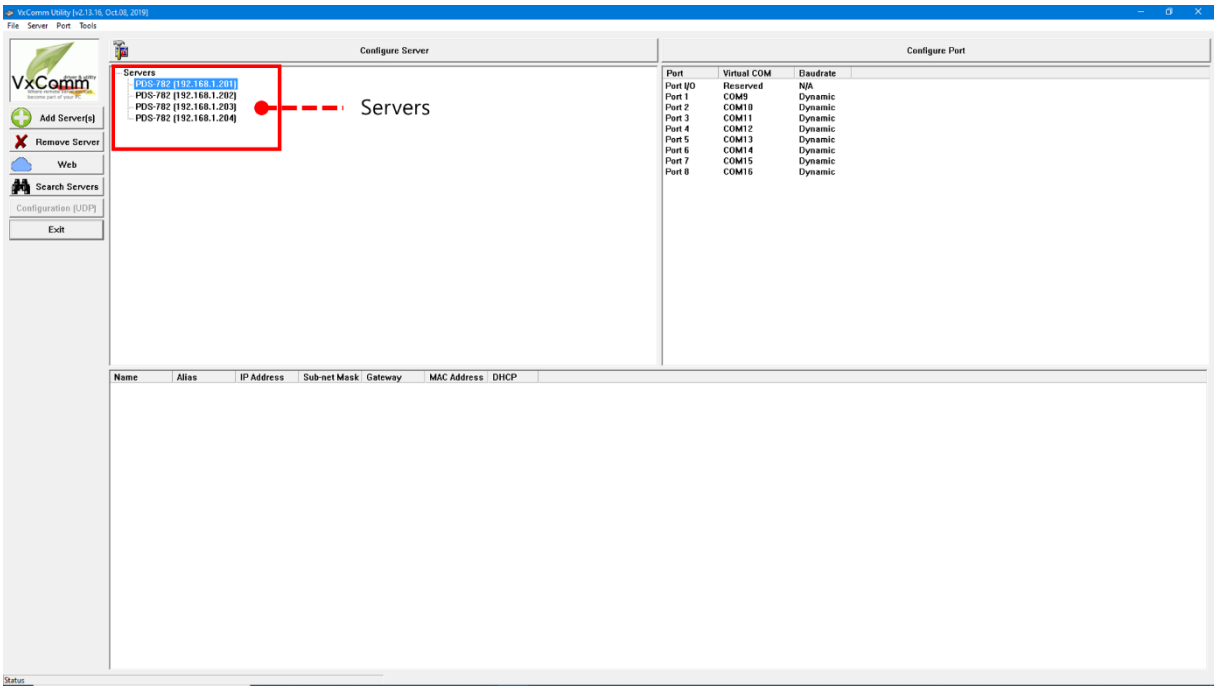
Prerequisites

- Install VxComm Utility software.
- Power on the Monew System.

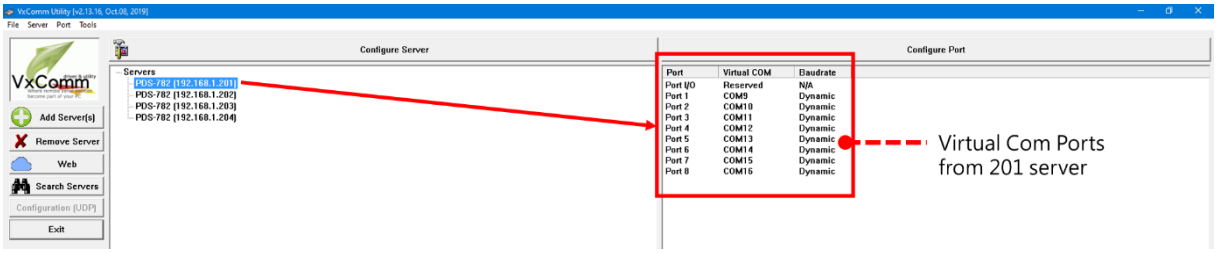
General Procedure

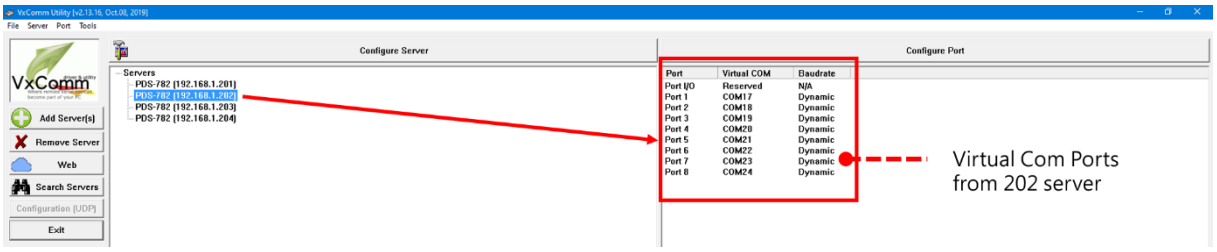
1. Open VxComm Utility software.

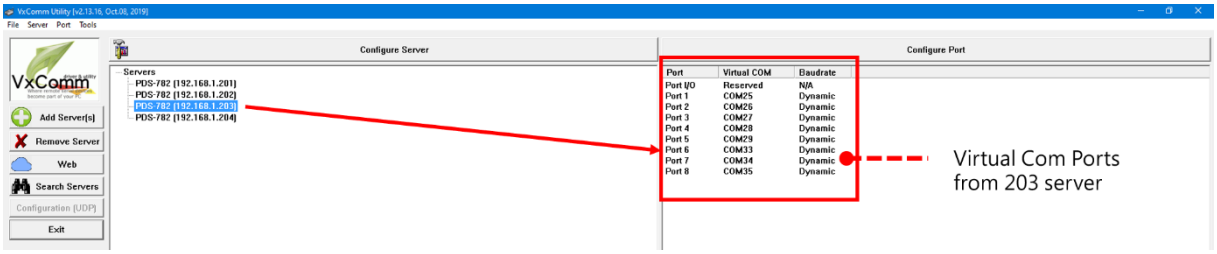
2. In the “Configure Server” section, there should be 4 servers listed as per factory settings.

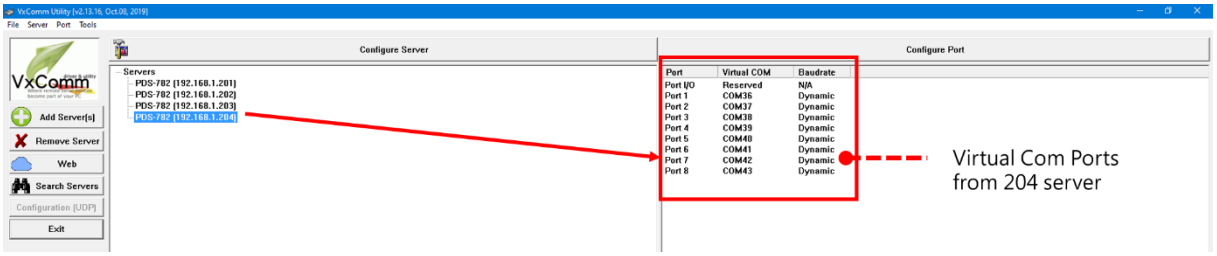


3. Click on the servers. The “Configure Port” section should appear with Port number, Virtual COM and Baudrate.









4. Check the pin assignment of the pods and see which port the equipment is connected to.

Server	Ports	Function	Pod Connector
201	1	-	
	2	Thruster Ch1	MCC PM
	3	LED lights	MCC PJ/PK/PL/PQ
	4	-	
	5	-	
	6	-	
	7	-	
	8	-	
202	1	-	
	2	Thruster Ch2	MCC PM
	3	-	
	4	-	
	5	HD Camera	MCC PR
	6	-	
	7	PCG	MCC PF
	8	-	
203	1	-	
	2	-	
	3	LED lights	TMCC
	4	Latch Pump	TTLC
	5	Pinch Encoder	TMCC
	6	Drum Encoder	TMCC
	7	-	
	8	TMS Control	TMCC
204	1	User Define	Signal Housing CH1
	2	PTZ	Signal Housing CH2
	3	User Define	Signal Housing CH3
	4	User Define	Signal Housing CH4
	5	User Define	Signal Housing CH5
	6	User Define	Signal Housing CH6
	7	User Define	Signal Housing CH7
	8	Altimeter	Signal Housing CH8

5. Check the Virtual COM port of the equipment's port.
   For example, Altimeter is connected to CH8 of Signal Housing, which is port 8 of server 204. Looking at the virtual COM ports of server 204, port 8 equals virtual com port COM43.

6. Check the "System Setting" tab from the Monew Control Program, and see if the COM port matches the Virtual COM port. If they don't match, please select the correct COM port settings in the "System Setting" tab and click "Save".
7. Click "Search Servers" to see if the servers are online. Check the bottom half of the window where the 4 servers should be listed.

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