

***LaMARCHE***<sup>®</sup>

**I-UPS**  
**Modbus TCP and Serial**  
**SCADA INTERFACE**  
**OPTION 21Q / 21S**

**INSTRUCTIONS**

This manual is valid for I-UPS equipped RS-485 serial port.

Option 21Q - TCP/IP and RS-232 serial provided on 383S Communication Board  
Option 21S – RS-232 serial provided via RS-485 to RS-232 converter.

ECN/DATE

**CPN 147722**

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ISSUE DATE: ECN 23295 11/2022

INSTRUCTION DRAWING NUMBER:  
P25-**LOPT21QS-I-UPS-01**

## ***Default Settings***

The LaMarche Communications Card is shipped with the following settings.

**Settings CANNOT be changed.**

**Port: RS485 (RS-232 port and TCP/IP communication can be selected).**

**Baud Rate: 115200**

**Data Bits: 8**

**Stop Bits: 1**

**Parity: None**

**Address: 0**

## ***Board Configuration***

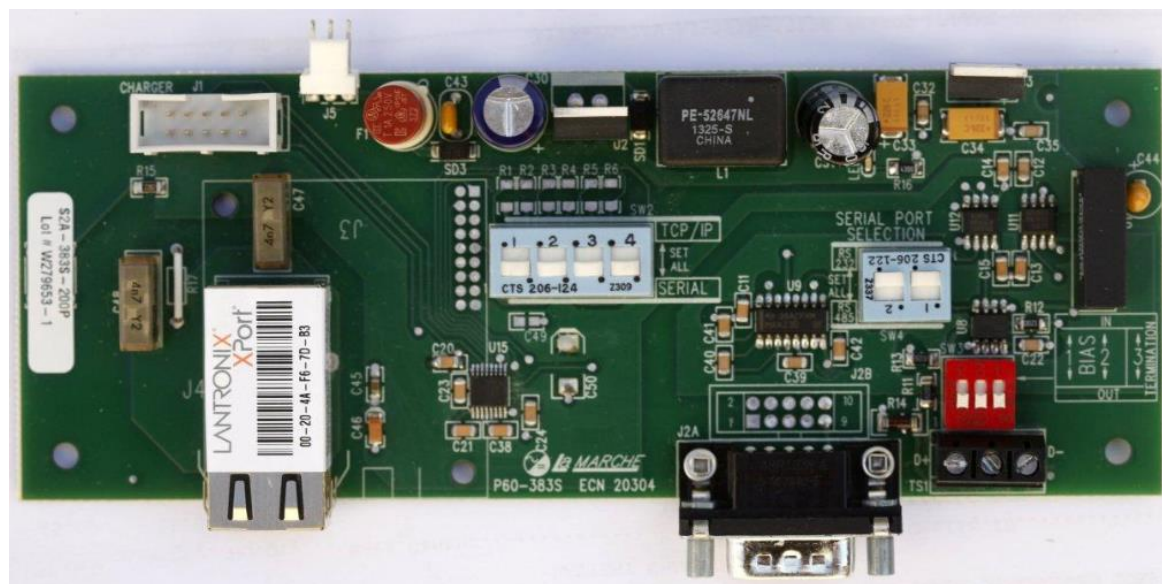
The communications card may be configured for RS232, TCP communications.

SW2 configures the board for either Serial or TCP/IP communications.

SW4 – leave in RS-232 communication. For RS-485 communication – connect directly to the RS-485 port in the unit. The RS-485 port on the communication card is not used.

SW3 – not used in this version of the board.

The photo below shows the location of the dipswitches of the communications board.

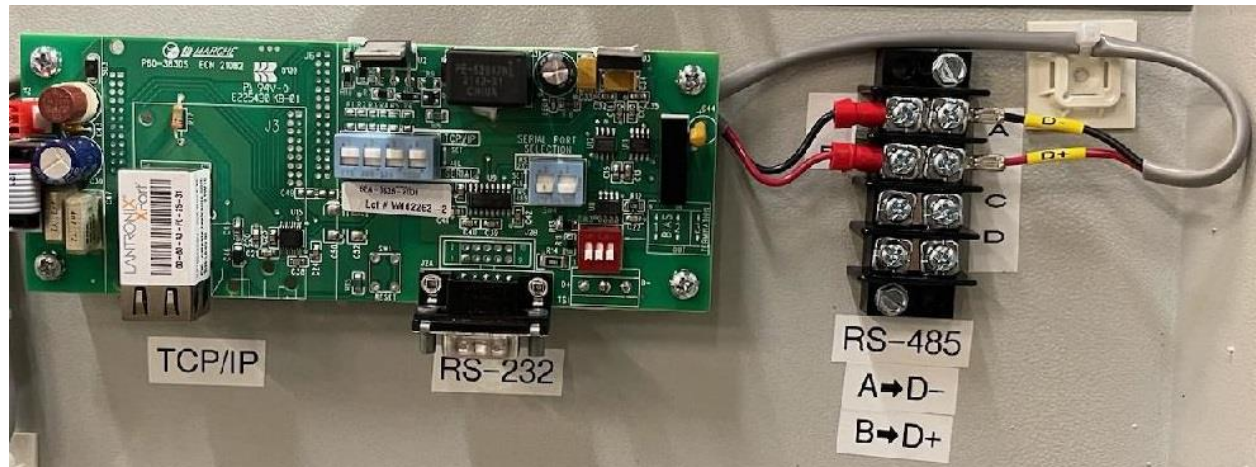


## ***Setting the Modbus Address, Baud Rate & Parity***

**Serial settings cannot be changed.**

## ***RS232 & RS485 Serial Applications***

For RS-232 – connect to the S2A-383S-20D1 PCB. Make sure the dip switch SW4 is set to RS-232. For RS-485 communication, connect directly to the RS-485 port in the unit – positions A (D-) and B (D+). Disconnect the serial converter wired to this port. Move the Red and Black wires labeled D+ and D- from A and B positions to positions C and D. The converter is used to communicate to the S2A-383S-20D1 PCB)



### ***TCP/IP Applications***

To configure the card for TCP/IP applications you need to configure the boards dipswitches on the S2A-383S-20D1 PCB.

You will also likely want to change the IP, Subnet and Gateway. To accomplish this please refer to the next section.

### ***Changing the TCPIP Settings***

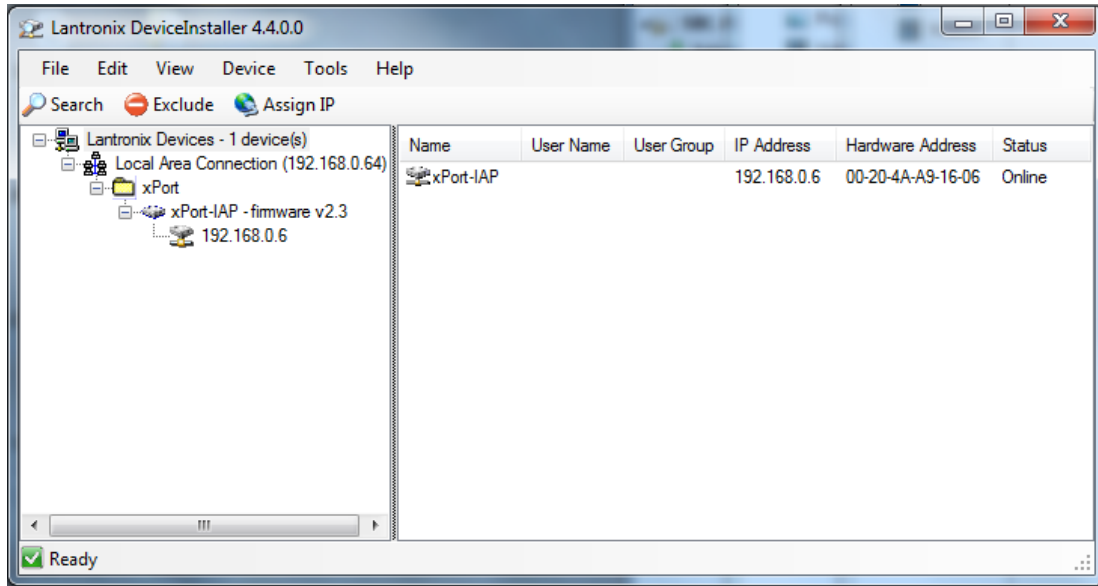
The RTU to TCP/IP module is set at the factory as follows:

IP Address: 192.168.0.6  
Netmask: 255.255.255.0  
Gateway: 192.168.0.1  
TCP Port Number: 502

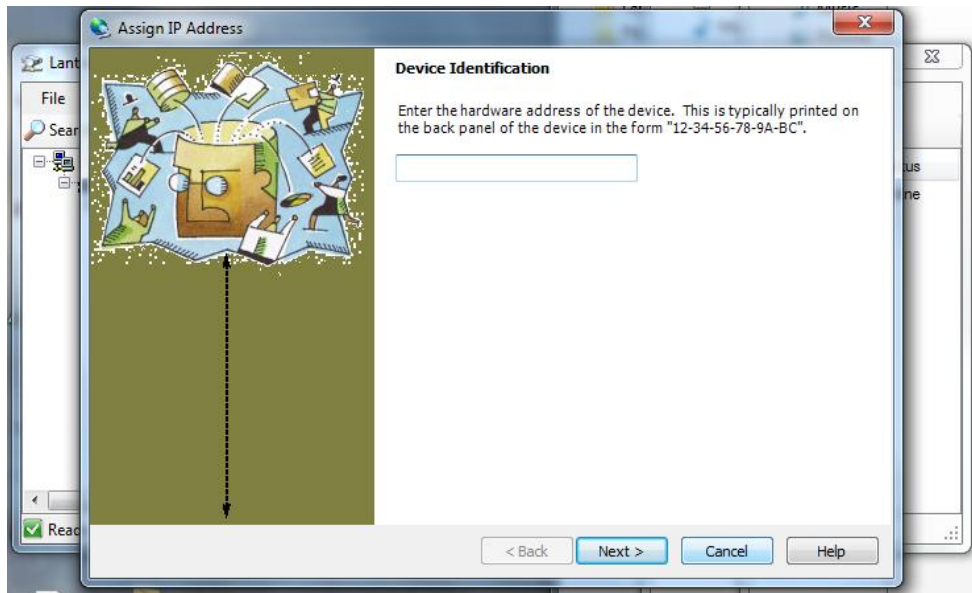
To change the TCPIP settings it is necessary to load and install the DeviceInstaller Software provided by Lantronix Inc. from the following URL:

<http://www.lantronix.com/device-networking/utilities-tools/device-installer.html>

Once this software is installed you should reconfigure your Network Adaptor to the same subnet (see default settings above) as the Lantronix device. Connect the device to your laptop/PC using a null-modem for a direct connection. Use a straight through if connecting through a switch or hub. If the device is powered when you run the DeviceInstaller it will automatically begin a search and find the device. If DeviceInstaller is running when the device is connected the Search command on the Toolbar Menu will locate the device. Once the device is located, the screen should appear as pictured below.



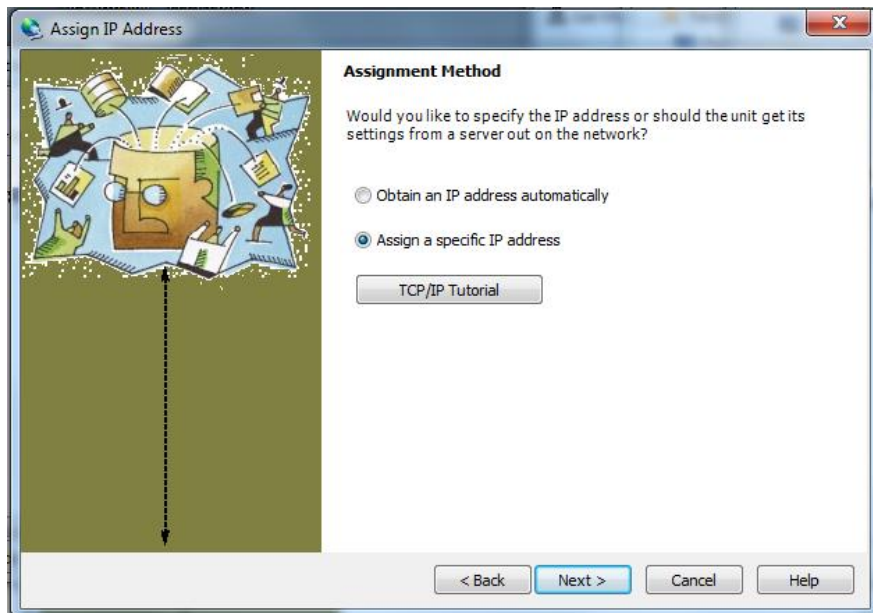
To assign the desired IP settings press the Assign IP button on the Toolbar. This will bring up the following screen:



The Device Identification is located on the device itself as described in the dialog text above. An example of the Lantronix device is pictured below.

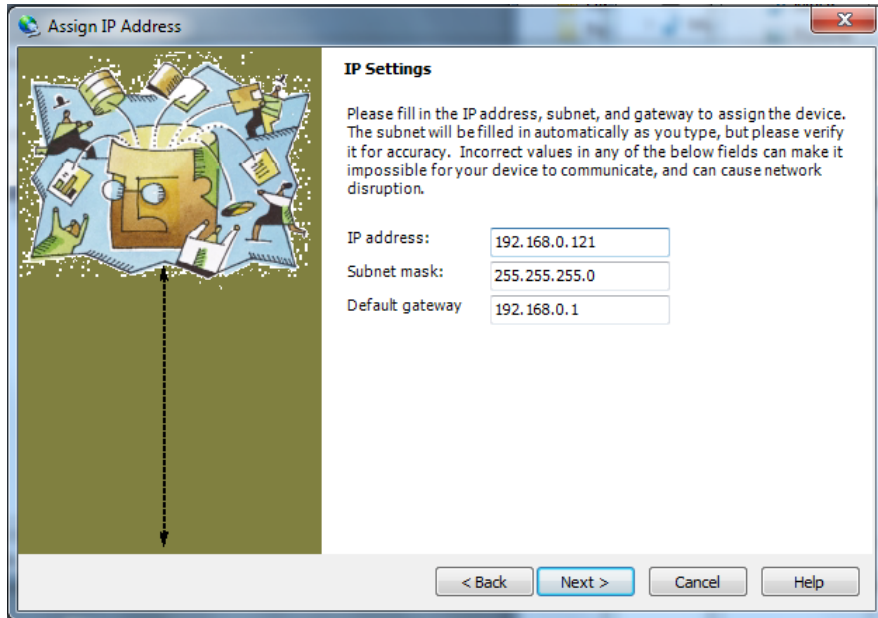


In the example above the Device Identification would be 00-20-4A-C4-DF-E8. Note this is unique to each device. After entering the ID press Next.

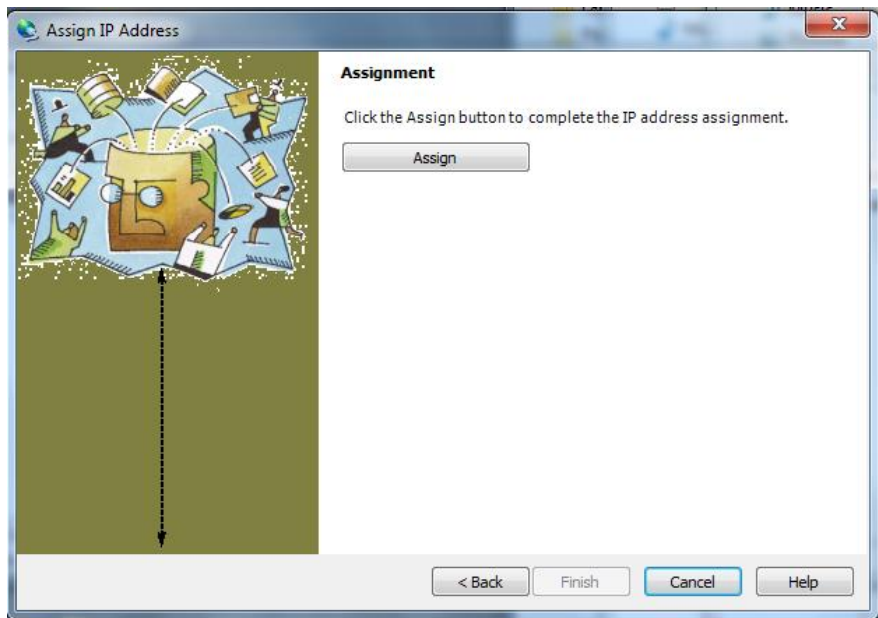


This dialog presents a choice between assigning an IP dynamically which would allow the device to operate on a network with a DHCP server however it is recommended that a specific IP address be assigned so it can be referenced directly on a SCADA Network.

Selecting "Assign a specific IP address" will bring up the following dialog:



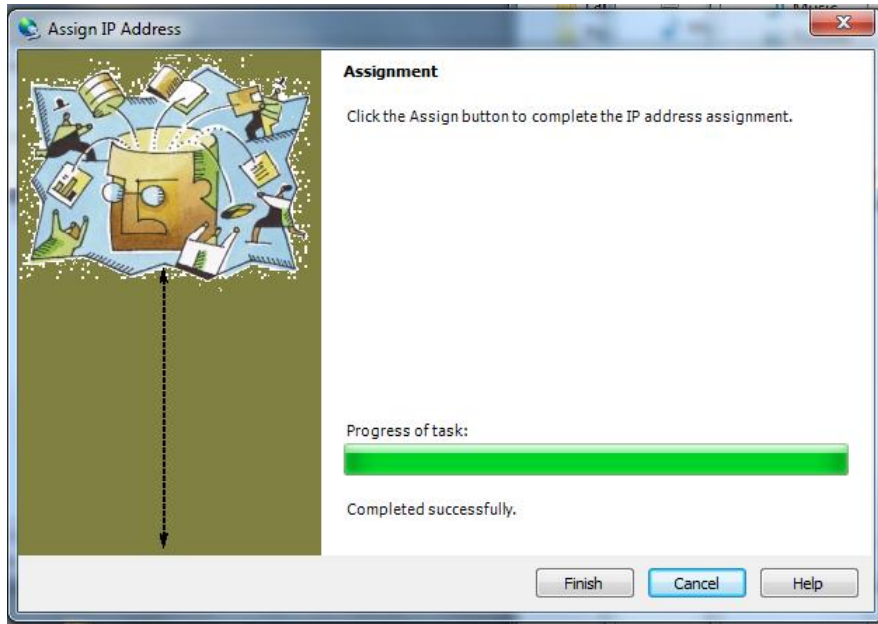
Enter your desired IP settings and press Next.



Pressing Assign will start the process of programming the device to the new IP Settings.

A progress bar and Status will appear indicating a successful operation as shown below:





Pressing Finish will complete the IP setting change process. The DeviceInstaller Application can now be closed.

### ***LaMarche Modbus Implementation***

| <b>MODBUS - RTU, BAUD RATE - 115200, PARITY - NONE,<br/>SLAVE ID - 0, STOP BIT - 1 BIT</b> |                                      |                                |                      |             |              |
|--|--------------------------------------|--------------------------------|----------------------|-------------|--------------|
| <b>Sr No.</b>  | <b>PARAMETER DETAIL</b>              |                                |                      |             |              |
|  | <b>MAIN CARD</b>                     | <b>Modbus Register Address</b> | <b>Variable Type</b> | <b>UNIT</b> | <b>Range</b> |
| 1  | M_HT_TEST_LOAD_KVA                   |                                |                      |             |              |
| 2  | M_HT_TEST_START_VOL                  | 30002                          | unsigned int         | kva         |              |
| 3  | M_HT_TEST_END_VOL                    | 30003                          | unsigned int         | volt/cell   |              |
| 4  | <a href="#">M_BATT_HEALTH_STATUS</a> | 30004                          | unsigned int         | volt/cell   |              |
| 5  | M_CT_TEST_LOAD_KVA                   | 30005                          | unsigned int         | %           |              |
| 6  | M_CT_TEST_START_VOL                  | 30006                          | unsigned int         | kva         |              |
| 7  | M_CT_TEST_END_VOL                    | 30007                          | unsigned int         | volt/cell   |              |
| 8  | M_CT_TEST_PERCENTAGE                 | 30008                          | unsigned int         | volt/cell   |              |

|    |   |       |              |         |                   |
|----|---|-------|--------------|---------|-------------------|
| 9  | M_BATT_test_RESULTS                               | 30009 | unsigned int | %       |                   |
| 10 | M_CONFIG_ACKNOWLEDGEMENT                          | 30010 | unsigned int | NA      |                   |
| 11 | M_PHASE_SHIFT                                     | 30011 | unsigned int | NA      | 0x1111/<br>0x1357 |
| 12 | M_BATT DISCHARGE ELAPSED TIME                     | 30012 | unsigned int | NA      |                   |
| 13 | M_REMOVED AH                                      | 30013 | unsigned int | Minutes |                   |
| 14 | M_BATTERY SOC                                     | 30014 | unsigned int | AH      |                   |
| 15 | M_AH RATING                                       | 30015 | unsigned int | %       |                   |
| 16 | M_VERSION   | 30016 | unsigned int | AH      |                   |
| 17 | M_GRID_VOLTAGE_PH1                                | 30017 | unsigned int | NA      |                   |
| 18 | M_GRID_CURRENT_PH1                                | 30018 | unsigned int | V       |                   |
| 19 | M_GRID_FREQUENCY_PH1                              | 30019 | unsigned int | A       |                   |
| 20 | M_GRID_VOLTAGE_PH2                                | 30020 | unsigned int | Hz      |                   |
| 21 | M_GRID_CURRENT_PH2                                | 30021 | unsigned int | V       |                   |
| 22 | M_GRID_FREQUENCY_PH2                              | 30022 | unsigned int | A       |                   |
| 23 | M_GRID_VOLTAGE_PH3                                | 30023 | unsigned int | Hz      |                   |
| 24 | M_GRID_CURRENT_PH3                                | 30024 | unsigned int | V       |                   |
| 25 | M_GRID_FREQUENCY_PH3                              | 30025 | unsigned int | A       |                   |
| 26 | M_GRID_TOTAL_ENERGY                               | 30026 | unsigned int | Hz      |                   |
| 27 | M_GRID_TOTAL_POWER                                | 30027 | unsigned int | Kwh     |                   |
| 28 | M_GRID_AVG_POWER_FACTOR                           | 30028 | unsigned int | Kw      |                   |
| 29 | M_BATTERY_VOLTAGE                                 | 30029 | unsigned int | NA      |                   |
| 30 | M_BATTERY_CHG_CURRENT<br>M_BATTERY_DISCHG_CURRENT | 30030 | unsigned int | V       |                   |
| 31 | M_BATTERY_CKWH                                    | 30031 | unsigned int | A       |                   |
| 32 | M_BATTERY_DKWH                                    | 30032 | unsigned int | Kwh     |                   |
| 33 | M_RECTIFIER_VOLTAGE                               | 30033 | unsigned int | Kwh     |                   |
| 34 | M_RECTIFIER_CURRENT                               | 30034 | unsigned int | V       |                   |
| 35 | M_INVERTER_VOLTAGE                                | 30035 | unsigned int | A       |                   |
| 36 | M_INVERTER_LOAD                                   | 30036 | unsigned int | V       |                   |
| 37 | M_INVERTER_FREQUENCY                              | 30037 | unsigned int | A       |                   |
| 38 | M_INVERTER_ENERGY                                 | 30038 | unsigned int | Hz      |                   |
| 39 | M_INVERTER_POWER                                  | 30039 | unsigned int | Kwh     |                   |
| 40 | M_INVERTER_POWER_FACTOR                           | 30040 | unsigned int | Kw      |                   |
| 41 | M_BYPASS_VOLTAGE                                  | 30041 | unsigned int | NA      |                   |
| 42 | M_BYPASS_FREQUENCY                                | 30042 | unsigned int | V       |                   |
| 43 | M_SYSTEM_TEMP                                     | 30043 | unsigned int | Hz      |                   |
| 44 | M_TEMPERATURE2                                    | 30044 | unsigned int | *C      |                   |
| 45 | M_CHARGER_STATUS[0]                               | 30045 | unsigned int | *C      |                   |
| 46 | M_CHARGER_STATUS[1]                               | 30046 | unsigned int | NA      |                   |
| 47 | M_CHARGER_STATUS[2]                               | 30047 | unsigned int | NA      |                   |
| 48 | M_INVERTER_STATUS[0]                              | 30048 | unsigned int | NA      |                   |
| 49 | M_INVERTER_STATUS[1]                              | 30049 | unsigned int | NA      |                   |



|    |                               |       |              |     |                 |
|----|-------------------------------|-------|--------------|-----|-----------------|
| 50 | <u>M_SYSTEM_STATUS[0]</u>     | 30050 | unsigned int | NA  |                 |
| 51 | <u>M_SYSTEM_STATUS[1]</u>     | 30051 | unsigned int | NA  |                 |
| 52 | <u>M_SYSTEM_STATUS[2]</u>     | 30052 | unsigned int | NA  |                 |
| 53 | <u>M_BYPASS_STATUS[0]</u>     | 30053 | unsigned int | NA  |                 |
|    |                               | 30054 | unsigned int | NA  |                 |
|    | <b>HMI</b>                    |       |              |     |                 |
| 55 | P_BATTERY_TEMP                |       |              |     |                 |
| 56 | P_AMBIENT_TEMP                | 30055 | unsigned int |     |                 |
| 57 | P_COMMUNICATION_STATUS        | 30056 | unsigned int |     |                 |
|    | <b>STATIC SWITCH CARD</b>     | 30057 | unsigned int |     |                 |
| 59 | S_INVERTER_VOLTAGE,           |       |              |     |                 |
| 60 | S_INVERTER_LOAD,              | 30058 | unsigned int | V   |                 |
| 61 | S_INVERTER_FREQUENCY,         | 30059 | unsigned int | A   |                 |
| 62 | S_UPS_OUTPUT_ACTIVE POWER     | 30060 | unsigned int | Hz  |                 |
| 63 | S_UPS_OUTPUT_APPARENT POWER   | 30061 | unsigned int | Kwh |                 |
| 64 | S_UPS_OUTPUT_POWER_FACTOR     | 30062 | unsigned int | Kw  |                 |
| 65 | S_BYPASS_VOLTAGE,             | 30063 | unsigned int | NA  |                 |
| 66 | S_BYPASS_LOAD,                | 30064 | unsigned int | V   |                 |
| 67 | S_BYPASS_FREQUENCY,           | 30065 | unsigned int | A   |                 |
| 68 | S_FINAL_OUTPUT_VOLTAGE,       | 30066 | unsigned int | Hz  |                 |
| 69 | S_FINAL_OUTPUT_CURRENT,       | 30067 | unsigned int | V   |                 |
| 70 | S_FINAL_OUTPUT_FREQUENCY,     | 30068 | unsigned int | %   |                 |
| 71 | S_TEMPERATURE1,               | 30069 | unsigned int | Hz  |                 |
| 72 | S_TEMPERATURE2,               | 30070 | unsigned int | *C  |                 |
| 73 | S_VERSION,                    | 30071 | unsigned int | *C  |                 |
| 74 | S_CONFIG_ACKNOWLEDGEMENT      | 30072 | unsigned int | NA  |                 |
| 75 | P_Peripheral_version          | 30073 | unsigned int | NA  | 0x2222 / 0x2468 |
| 76 | <u>S_INVERTER_STATUS[0]</u> , | 30074 | unsigned int | NA  |                 |
| 77 | <u>S_SYSTEM_STATUS[0]</u> ,   | 30075 | unsigned int | NA  |                 |
| 78 | <u>S_SYSTEM_STATUS[1]</u> ,   | 30076 | unsigned int | NA  |                 |
| 79 | <u>S_BYPASS_STATUS[0]</u> ,   | 30077 | unsigned int | NA  |                 |
| 80 | <u>S_BYPASS_STATUS[1]</u> ,   | 30078 | unsigned int | NA  |                 |
|    |                               | 30079 | unsigned int | NA  |                 |

| FLAG BYTE | DESCRIPTION | BIT NO |
|-----------|-------------|--------|
|-----------|-------------|--------|

|                      |   |       |
|----------------------|---|-------|
| M_CHARGER_STATUS[0]  | ChargerFlags.Charger_off_SHORT_CKT        | Bit 8 |
|                      | ChargerFlags.Charger_off_CV_HIGH          | Bit 7 |
|                      | ChargerFlags.Charger_off_MAINS_FAULT      | Bit 6 |
|                      | ChargerFlags.Charger_off_OVERHEAT         | Bit 5 |
|                      | ChargerFlags.MAINS_ABSENT                 | Bit 4 |
|                      | ChargerFlags.MAINS_1_PHASE_ABSENT         | Bit 3 |
|                      | ChargerFlags.ALARM_CHARGER_OVERHEAT       | Bit 2 |
| M_CHARGER_STATUS[1]  | ChargerFlags.CHARGER_ON_STATUS            | Bit 1 |
|                      | ChargerFlags.FREQ_OUT                     | Bit 8 |
|                      | ChargerFlags.MAINS_HIGH_PH3               | Bit 7 |
|                      | ChargerFlags.MAINS_HIGH_PH2               | Bit 6 |
|                      | ChargerFlags.MAINS_HIGH_PH1               | Bit 5 |
|                      | ChargerFlags.MAINS_LOW_PH3                | Bit 4 |
|                      | ChargerFlags.MAINS_LOW_PH2                | Bit 3 |
|                      | ChargerFlags.MAINS_LOW_PH1                | Bit 2 |
| M_CHARGER_STATUS[2]  | ChargerFlags.BATTERY_CAPACITY_TEST_RESULT | Bit 1 |
|                      | ChargerFlags.BATTERY_CAPACITY_TEST        | Bit 8 |
|                      | ChargerFlags.BATTERY_HEALTH_TEST_RESULT   | Bit 7 |
|                      | ChargerFlags.BATTERY_HEALTH_TEST          | Bit 6 |
|                      | ChargerFlags.FLOAT_EQ_MODE                | Bit 5 |
|                      | ChargerFlags.CHARGING_DONE_STATUS         | Bit 4 |
|                      | ChargerFlags.BATTERY_CAPACITY_END         | Bit 3 |
|                      | ChargerFlags.Rectifier_Drive_is_on        | Bit 2 |
| M_INVERTER_STATUS[0] | InverterFlags.Inv_off_OPEN_CKT            | Bit 1 |
|                      | InverterFlags.Inv_off_SHORT_CKT           | Bit 8 |
|                      | InverterFlags.Inv_off_OVERLOAD            | Bit 7 |
|                      | InverterFlags.Inv_off_OUTPUT_HIGH         | Bit 6 |
|                      | InverterFlags.Inv_off_OUTPUT_LOW          | Bit 5 |
|                      | InverterFlags.Inv_off_BATT_HIGH           | Bit 4 |
|                      | InverterFlags.Inv_off_BATT_LOW            | Bit 3 |
|                      | InverterFlags.Inv_off_OVERHEAT            | Bit 2 |
| M_INVERTER_STATUS[1] | InverterFlags.Alarm_OVERLOAD              | Bit 1 |
|                      | InverterFlags.Alarm_BATT_HIGH             | Bit 8 |
|                      | InverterFlags.Alarm_BATT_LOW              | Bit 7 |
|                      | InverterFlags.ALARM_INVERTER_OVERHEAT     | Bit 6 |
|                      | InverterFlags.INVERTER_ON_STATUS          | Bit 5 |
|                      | InverterFlags.OutputZeroXingError         | Bit 4 |
|                      | SWFlag.SwitchIsON                         | Bit 3 |
|                      | End_of_discharge                          | Bit 2 |
| M_SYSTEM_STATUS[0]   | Flags2.FinalVoltageRefOK                  | Bit 1 |

|                    |  |                 |       |
|--------------------|--|-----------------|-------|
|                    | Flags2.BypassVoltageRefOK                      |                 | Bit 8 |
|                    | Flags2.InvCurrentRefOK                         |                 | Bit 7 |
|                    | Flags2.InvFBVoltageRefOK                       |                 | Bit 6 |
|                    | Flags2.MainsVoltageRefOK                       |                 | Bit 5 |
|                    | Flags2.MainsCurrentRefOK                       |                 | Bit 4 |
|                    | Flags2.LoadCurrentRefOK                        |                 | Bit 3 |
|                    | INVERTER NTC OPEN                              |                 | Bit 2 |
| M_SYSTEM_STATUS[1] | Flags2.DC_AUX_SWITCH                           |                 | Bit 1 |
|                    | flage2.Flag reset done                         |                 | Bit 8 |
|                    | Flags2.INPUT_AUX_SWITCH                        |                 | Bit 7 |
|                    | Flags2.DC_contractor_ON                        |                 | Bit 6 |
|                    | Flags2.UPPER_INV_FAN_FAIL                      |                 | Bit 5 |
|                    | Flags2.LOWER_INV_FAN_FAIL                      |                 | Bit 4 |
|                    | Flags2.FUSE_FAIL                               |                 | Bit 3 |
|                    | Flags2.PhaseInSync                             |                 | Bit 2 |
|                    |  |                 | Bit 1 |
|                    |  |                 |       |
|                    |  |                 |       |
| M_SYSTEM_STATUS[2] | Flags2.SYSTEM_3PH_1PH_OUT                      | 0-              |       |
|                    | 3Phase, 1-1Phase                               |                 |       |
|                    | Flags2.VOLTAGE_220V_OR_120V                    | 0-220,<br>1-120 | Bit 8 |
|                    | Flags2.FREQUENCY_50HZ_OR_60HZ                  | 0-50,<br>1-60   | Bit 7 |
|                    | Battery_not_connected<br>battery not connected | 1               | Bit 6 |
|                    | Inverter_output_breaker                        |                 | Bit 5 |
|                    | HT_IN_PROGRESS                                 |                 | Bit 4 |
|                    | ABORT_HT                                       |                 | Bit 3 |
|                    | START_HT                                       |                 | Bit 2 |
| M_BYPASS_STATUS[0] | ChargerFlags.BYPASS_FREQ_OUT                   |                 | Bit 1 |
|                    | ChargerFlags.BYPASS_HIGH                       |                 | Bit 8 |
|                    | ChargerFlags.BYPASS_LOW                        |                 | Bit 7 |
|                    | ChargerFlags.BYPASS_ABSENT                     |                 | Bit 6 |
|                    | NA   |                 | Bit 5 |
|                    | Battery test in Progress                       |                 | Bit 4 |
|                    | Battery Test Complete                          |                 | Bit 3 |
|                    | Start_CT                                       |                 | Bit 2 |
|                    |  |                 | Bit 1 |

|                      |                                  |       |
|----------------------|----------------------------------|-------|
| S_INVERTER_STATUS[0] | Flags2.INVERTER_FAULT            |       |
|                      | InverterFlags.Inv_off_OVERLOAD   | Bit 8 |
|                      | Flags2.INVERTER_FAULT_FAST_SENSE | Bit 7 |
|                      | Flags2.INVERTER_FREQ_OUT         | Bit 6 |
|                      | Flags2.INVERTER_VOLTAGE_HIGH     | Bit 5 |
|                      | Flags2.INVERTER_VOLTAGE_LOW      | Bit 4 |
|                      | Flags2.INVERTER_ABSENT           | Bit 3 |
|                      | Flags2.system in inverter        | Bit 2 |
| S_SYSTEM_STATUS[0]   | Flags2.OPCurrentRefOK            | Bit 1 |
|                      | Flags2.OPVoltageRefOK            | Bit 8 |
|                      | Flags2.BypassCurrentRefOK        | Bit 7 |
|                      | Flags2.BypassVoltageRefOK        | Bit 6 |
|                      | Flags2.InvFBVoltageRefOK         | Bit 5 |
|                      | TransferTestResult[2]            | Bit 4 |
|                      |                                  | Bit 3 |
| M_BATT_HEALTH_STATUS | Value -0 to 100                  |       |
|                      | Load Insufficient - 155          |       |
|                      | Battery Low During Test - 156    |       |
|                      | Utility Absent During Test - 157 |       |
|                      | Rectifier Fail - 158             |       |
|                      | Inverter Fail - 159              |       |
|                      | Battery Over Heat - 160          |       |
|                      | 162- Operation Manually Aborted  |       |
|                      | 163 - Load Change                |       |
| M_BATT_CT_RESULTS    | Fail -0 Pass -1                  |       |
|                      | Load Insufficient - 155          |       |
|                      | Battery Low During Test - 156    |       |
|                      | Utility Absent During Test - 157 |       |
|                      | Rectifier Fail - 158             |       |
|                      | Inverter Fail - 159              |       |
|                      | Battery Over Heat - 160          |       |
| TransferTestResult > | 0- Successful                    |       |
|                      | 1- Inverter Fail                 |       |
|                      | 2- bypass source fail            |       |
|                      |                                  |       |
|                      |                                  |       |