GW BMS Nx Configuration Manual

San Telequip Pvt. Ltd.
505, Deron Heights, Baner Road,
Pune 411045, India
www.santelequip.com

Revision History

Version	Date	Description	Prepared By	Reviewed By
V1.0	12-03-2019	Draft Document	Sagar	Anant
V1.1	05-04-2019	Modbus Address	Sagar	Anant

Contents:

1 System Overview

The Gateway can provide The fire alarm system information to BMS and SCADA to various protocols such as BACnet, Modbus etc.

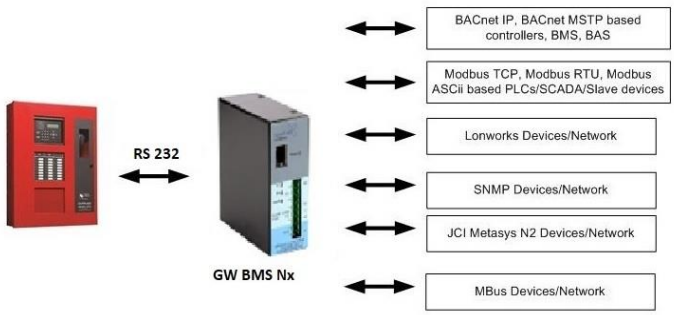

Fig1: various Protocol solutions for Fire Alarm Control panel

As above figure shows that GW BMS Nx support RS232 Interface from fire alarm Panel and converting Fire alarm Panel data in Various BMS/SCADA protocols.

Gateway support BACnet, Modbus and various BMS protocols. . BACnet is typically used by BMS, and Modbus is typically used by SCADA.

2 Connection Outline

2.1 Connection to FACP (Topology)

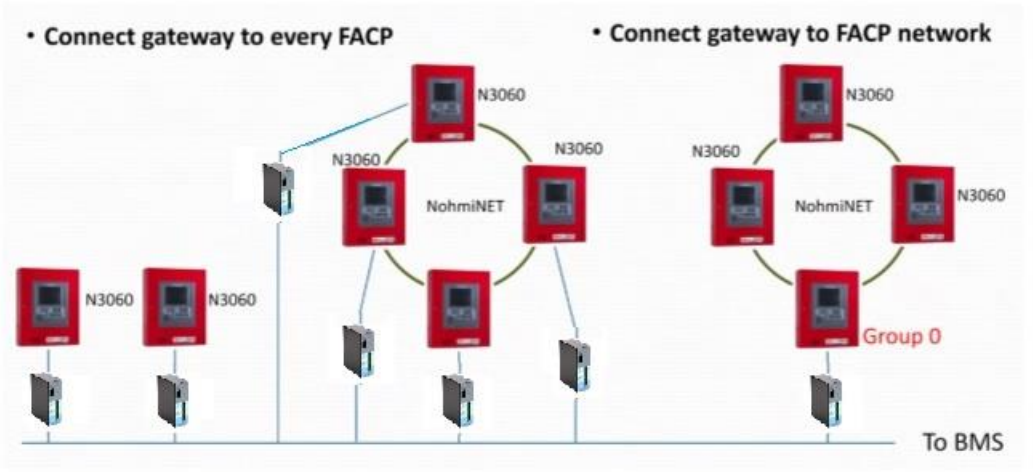

Fig2: Connection topology

- The gateway can be connected each FACP or FACP network.
- The gateway shall be connected to the FACP group 0 in case of FACP network.

The gateway is connected to the RS232C serial port of N3060 FACP.

It is possible to connect the gateway to every FACP and the network. When the gateway is connected to every FACP, only the data of the connected FACP is sent to the BMS network. In this case, each gateway needs only the configuration data of the connected FACP to work.

When the gateway is connected to the FACP network, the gateway is connected to the Group 0 FACP which outputs allthe information of the FACP network.In this case, the Group 0 FACP s hall be configured as ”Display Data from other FACPs” by PCCP.

2.1.1 In case of Large Point Count

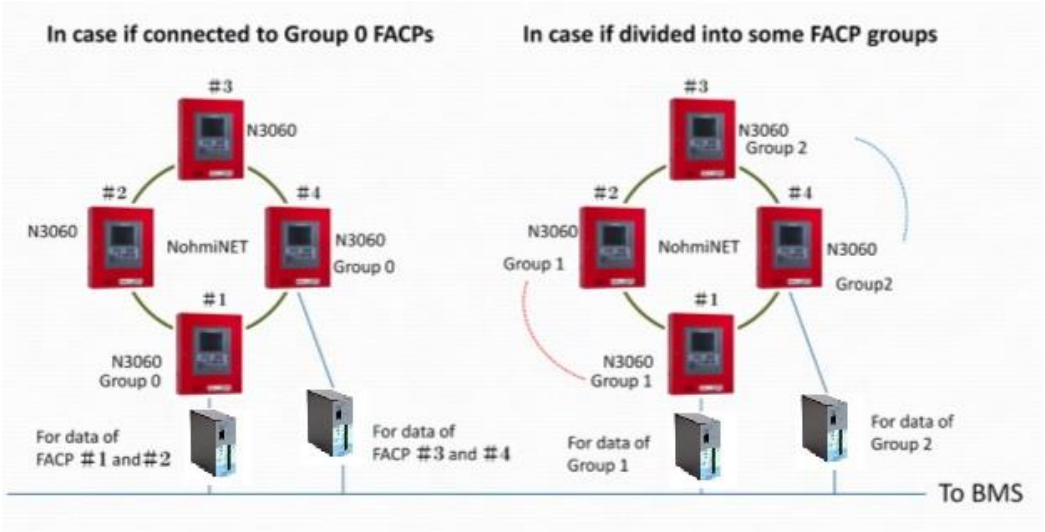

Fig3 : large Point count

GW BMS N1 supports up to 1200 point count and GW BMS N2 supports up to 4000 point count. When the sum of signal point of a FACP network exceeds the point limit of a gateway, it can be divided by multiple gateways. The configuration files for both these gateways will decide how the point count should be split among themselves for reporting to SCADA.

When 2 ormore Group0 FACPs are on the network, the FACPs on the network can be divided by the Group 1 FACPs as desired.

In the meantime, it is possible to connect gatewaysto each group, so that only the information of the group is output from the connected gateway.

3 Gateway Configurtion

GW BMS Nx gateway converts ASCII string data coming from FACP to MODBUS RTU holding register values. The configuration file maps this MDOBUS RTU data to required protocol objects for SCADA interface. Thus first step is to map all devices and system parameters of FACP to MODBUs memory map.

3.1 Choosing the right Gateway model

Model Name	Maximum Point count
GW BMS N1	1200
GW BMS N2	4000

Two models are available as above. Only difference in them is the number of points it supports. Both models support all identical protocols.

To define the total point count of a system, following must be considered.

Parameters	Count
Device Activation Status point count	X
Device Trouble Status point count	Y
Panel Trouble Status point count	Z
Total point count	x+y+z

Above can be easily defined from configuration worksheet.

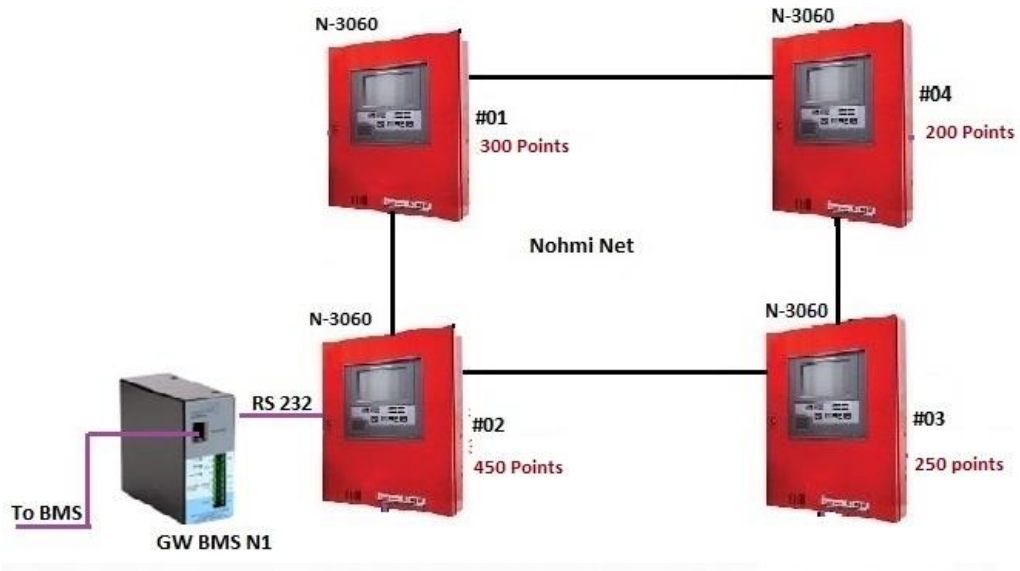

Fig 4: Point distribution for GW BMS N1

We can map 1200 points in GW BMS N1. The Fig 6 shows that four N-3060 panels are connected in single group and which have different number of point counts. The total points must be less that or equal to 1200 to interface GW BMS N1.

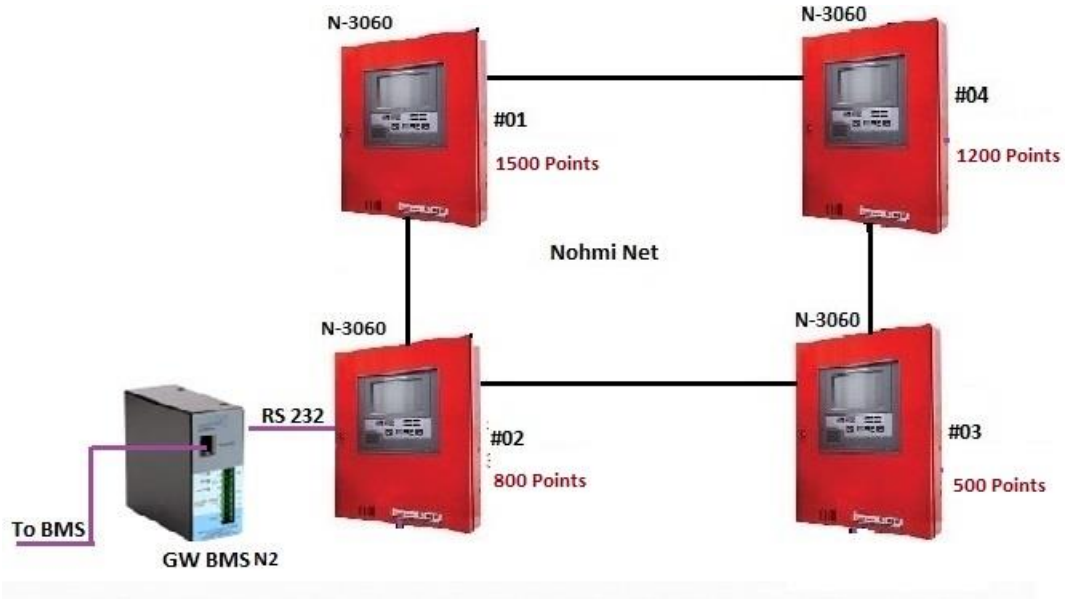

Fig 5: Point distribution for GW BMS N2

We can map 4000 points in GW BMS N2. The Fig 7 shows that four N-3060 panels are connected in single group and Which have different number of point counts. The total points must be less that or equal to 4000.

3.2 Defining information required for SCADA side

Detailed list of status values for each device, which can be sent to SCADA for each SLC as per device classification type is listed in Appendix A.

Similarly detailed list of system status parameters is listed in Appendix B.

The required point count can be defined using Configuration Worksheet and then manually configured in the csv file.

4 Data required for configuration file

Below data required to us for generation configuration for GW BMS Nx.

1. Configuration Worksheet
2. Device Lists: Node Number, Loop Number, Device ID
3. FACP system Status: System troubles and other status as required

The Above data can be input in configuration worksheet. A sample template worksheet is made available. The fields marked yellow are required to be defined and the values that are automatically generated in blue are to be used for writing configuration csv file.

Configuration worksheet is divided into two section.

1. Device Memory mapping
2. System Status Mapping

4.1 Device Memory mapping

Memory mapping for each system point is important for to Generate configuration file for GW BMS Nx. For each device enter following data as shown below in yellow cells of an excel file. The Node Block ID and MODBUS address is automatically generated by the formulae in excel sheet.

To Create Device memory map , copy the rows for as many devices as required. Column E and F are calculated automaically. Just copy the formulae for new rows.
Submit Only yellow section. Do not put any value in Blue section.

Node Number	Loop Name	Device ID	Node Block	Modbus Address
1	1	1	1	515
1	1	2	1	517
1	2	1	1	1027
1	2	255	1	1535
1	12	255	1	6655
8	1	1	1	57859
8	12	255	1	63999
9	1	1	2	515
9	1	255	2	1023
9	2	1	2	1027
16	1	1	2	57859
16	1	255	2	58367
17	1	1	3	515
24	12	255	3	63999
25	1	1	4	515
32	12	255	4	63999
33	1	1	5	515
40	12	255	5	63999
41	1	1	6	515
56	12	255	7	63999
57	1	1	8	515
64	1	1	8	57859
64	12	255	8	63999

Customer need to fill Node Number, Loop Number Device ID according to requirement in Configuration Worksheet the Node block ID and Modbus address will be calculated using predefined formula.

To calculate Modbus address of circuit number need to skip 4 consecutive device numbers. For example: If we use device number 001 (N01-01-001-01) the next device will be 005 N01-01-005-01 In this case device number 002,003 and 004 will be not usable.

5.2 System Status Mapping

To Create Device memory map , copy the colums for as many FACP Node required. The Blue section calculated using predefined formula. Just copy the formulae for new column.
Submit Only yellow section Which is FACP Node numbers. Do not put any value in Blue section.

				FACP Node number	1	2	3	8	12	30	55	57	64
				Node Block ID	1	1	1	1	2	6	7	8	8
				Starting address	1	8193	16385	57345	24577	40961	49153	1	57345
Show Collective FACP Trouble	Show Trouble Categories	Show Trouble Details	offset addr	Bit position									
Panel Output Status		PSU1 contact output1	2	0	3	8195	16387	57345	24579	40963	49155	1	57347
		PSU1 contact output2	4	0	5	8197	16389	57347	24581	40965	49157	3	57349
		PSU1 contact output3	6	0	7	8199	16391	57349	24583	40967	49159	5	57351
		PSU1 NAC output1	10	0	11	8203	16395	57351	24587	40971	49163	7	57355
		PSU1 NAC output2	12	0	13	8205	16397	57355	24589	40973	49165	11	57357
		PSU1 NAC output3	14	0	15	8207	16399	57357	24591	40975	49167	13	57359
		PSU1 NAC output4	16	0	17	8209	16401	57359	24593	40977	49169	15	57361
		PSU2 contact output1	22	0	23	8215	16407	57361	24599	40983	49175	17	57367
		PSU2 contact output2	24	0	25	8217	16409	57367	24601	40985	49177	23	57369
		PSU2 contact output3	26	0	27	8219	16411	57369	24603	40987	49179	25	57371
		PSU2 NAC output1	30	0	31	8223	16415	57371	24607	40991	49183	27	57375
		PSU2 NAC output2	32	0	33	8225	16417	57375	24609	40993	49185	31	57377
		PSU2 NAC output3	34	0	35	8227	16419	57377	24611	40995	49187	33	57379
		PSU2 NAC output4	36	0	37	8229	16421	57379	24613	40997	49189	35	57381
	AC Power Fault	PSU 1 AC Power Fault	64	0	65	8257	16449	57409	24641	41025	49217	65	57409
		PSU 2 AC Power Fault	64	1	65	8257	16449	57409	24641	41025	49217	65	57409
	Battery Fault	PSU 1 Battery Fault	64	2	65	8257	16449	57409	24641	41025	49217	65	57409
		PSU 2 Battery Fault	64	3	65	8257	16449	57409	24641	41025	49217	65	57409
	Ground Fault	PSU 1 Ground Fault	64	4	65	8257	16449	57409	24641	41025	49217	65	57409
		PSU 2 Ground Fault	64	5	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 1 Ground Fault	64	6	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 2 Ground Fault	64	7	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 3 Ground Fault	64	8	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 4 Ground Fault	64	9	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 5 Ground Fault	64	10	65	8257	16449	57409	24641	41025	49217	65	57409
		SCU 6 Ground Fault	64	11	65	8257	16449	57409	24641	41025	49217	65	57409

In System Status Mapping Customer only need to submit FACP node number for Panel Output status and system status. The Blue section defines the memory map of all status information. Only required information of the FACP system can be used to limit the point count for the gateway.

5 Configuration File

5.1 Configuration File Overview

Reference to the the Worksheet information submitted by customer configuration file generated. The default driver configuration file (CONFIG.CSV) for any driver combination ordered is loaded into the GW BMS Nx and can be retrieved using the Graphical User Interface Utility (see the GW BMS nx User Manual). Use this file as a template when editing configuration files to ensure that the edited file takes the correct form. A detailed explanation of the configuration file follows:

5.2 Structure of Configuration file

```
//=============================================================================
//
//    Date : 12-10-2018
//   Customer: Nohmi Boasi India Ltd
//   Device: N3060
//
//=============================================================================
//,,,,,,,,,
//    Common Information,,,,,,,,
//,,,,,,,,,
,,,,,,,,,
Bridge,,,,,,,,
Title               ,FieldServer_Name    , System_Node_Id , Network_Number
San Telequip v1.01a ,San Telequip v1.01a ,          1000  ,       5
,,,,,,,,,
//=============================================================================
//
//    Data Arrays
// Defining data Arrays for system application
//
Data_Arrays
Data_Array_Name , Data_Format , Data_Array_Length
DA_P1L1_01      ,   Packed_Bit,         16
,,,,,,,,,
//=============================================================================
//
//    Client Side Connections
// Defining Communication parameters for modbus communication
//
Connections
Port , Baud , Parity , Data_Bits , Stop_Bits , Protocol
R1   ,9600  ,  None  ,      8    ,      1    , Modbus_RTU

//=============================================================================
//
//    Client Side Nodes
//
Nodes
Node_Name , Node_ID , Protocol   , Port  , Address_Type
Panel 1   ,    1    , Modbus_RTU ,   R1  ,   ADU
,,,,,,,,,
//=============================================================================
//
//    Client Side Map Descriptors
//  Loop_1
//
Map_Descriptors,,,,,,,,
Map_Descriptor_Name  , Data_Array_Name , Data_Array_Offset , Function , Node_Name ,     Data_Type     , Address , Length , Scan_Interval,
CMD_Loop_01_01       ,DA_P1L1_01      ,        0          , Rdbc     ,   Panel 1 , Holding_Register  ,    515   ,   1   , 1.000s,
CMD_Loop_01_02       ,DA_P1L1_02      ,        0          , Rdbc     ,   Panel 1 , Holding_Register  ,    516   ,   1   , 1.000s,

//=============================================================================,,,,,,,,
```

```
//================================================================================,,,,,,,,
//
//    Server Side Connections - BACnet IP
//

Connections
Adapter , Protocol
N1      , Bacnet_IP

//================================================================================
//
//    Server Side Nodes
//

Nodes
Node_Name , Node_ID , Protocol  , Srv_Offline_Method
PANEL_01  ,   1001  , Bacnet_IP , Always_Respond
,,,,,,,,
//================================================================================
//
//    Server Side Map Descriptors
//,,,,,,,,
Map_Descriptors,,,,,,,,
Map_Descriptor_Name            , Data_Array_Name , Data_Array_Offset , Function , Node_Name    , Data_Type , Object_ID ,Units,,
P1_Loop1_D1_Missing Device     ,  DA_P1L1_01     ,        0          ,   Server  ,PANEL_01     ,    BI     ,    1      ,No-Units
P1_Loop1_D1_Multiple Address   ,  DA_P1L1_01     ,        1          ,   Server  ,PANEL_01     ,    BI     ,    2      ,No-Units
P1_Loop1_D1_Device Mismatch    ,  DA_P1L1_01     ,        2          ,   Server  ,PANEL_01     ,    BI     ,    3      ,No-Units
P1_Loop1_D1_Sensor Fault       ,  DA_P1L1_01     ,        3          ,   Server  ,PANEL_01     ,    BI     ,    4      ,No-Units
P1_Loop1_D1_Device Bypass      ,  DA_P1L1_01     ,        4          ,   Server  ,PANEL_01     ,    BI     ,    5      ,No-Units
P1_Loop1_D1_Device Fault       ,  DA_P1L1_01     ,        5          ,   Server  ,PANEL_01     ,    BI     ,    6      ,No-Units
P1_Loop1_D1_Device Dirty       ,  DA_P1L1_01     ,        6          ,   Server  ,PANEL_01     ,    BI     ,    7      ,No-Units
P1_Loop1_D1_Low Temp           ,  DA_P1L1_01     ,        7          ,   Server  ,PANEL_01     ,    BI     ,    8      ,No-Units
P1_Loop1_D1_Alert              ,  DA_P1L1_02     ,        0          ,   Server  ,PANEL_01     ,    BI     ,    9      ,No-Units
P1_Loop1_D1_Action             ,  DA_P1L1_02     ,        1          ,   Server  ,PANEL_01     ,    BI     ,    10     ,No-Units
P1_Loop1_D1_Verified Alarm     ,  DA_P1L1_02     ,        2          ,   Server  ,PANEL_01     ,    BI     ,    11     ,No-Units
P1_Loop1_D1_Confirm            ,  DA_P1L1_02     ,        3          ,   Server  ,PANEL_01     ,    BI     ,    12     ,No-Units
P1_Loop1_D1_Alarm / Alarm F1   ,  DA_P1L1_02     ,        4          ,   Server  ,PANEL_01     ,    BI     ,    13     ,No-Units
P1_Loop1_D1_Alarm F2           ,  DA_P1L1_02     ,        5          ,   Server  ,PANEL_01     ,    BI     ,    14     ,No-Units
P1_Loop1_D1_Supervisory        ,  DA_P1L1_02     ,        6          ,   Server  ,PANEL_01     ,    BI     ,    15     ,No-Units
P1_Loop1_D1_Gas Delay          ,  DA_P1L1_02     ,        7          ,   Server  ,PANEL_01     ,    BI     ,    16     ,No-Units
P1_Loop1_D1_Active             ,  DA_P1L1_02     ,        8          ,   Server  ,PANEL_01     ,    BI     ,    17     ,No-Units
P1_Loop1_D1_Pre Discharge      ,  DA_P1L1_02     ,        9          ,   Server  ,PANEL_01     ,    BI     ,    18     ,No-Units
P1_Loop1_D1_Discharge          ,  DA_P1L1_02     ,        10         ,   Server  ,PANEL_01     ,    BI     ,    19     ,No-Units
P1_Loop1_D1_Discharge Confirm  ,  DA_P1L1_02     ,        11         ,   Server  ,PANEL_01     ,    BI     ,    20     ,No-Units
```

6.3 Description of Configuration file

The file begins with some general information.

```
//================================================================================
//
//    Date : 12-10-2018
//   Customer: Nohmi Boasi India Ltd
//   Device: N3060
//
//================================================================================
```

Common information contain Relevant project information. Lines beginning with // are comments and do not affect the configuration.

The Common Information Section allows for the determination of parameters not directly related to any of the connections.

```
//=============================================================================
//,,,,,,,,,
//    Common Information,,,,,,,,,
//,,,,,,,,,
,,,,,,,,,
Bridge,,,,,,,,,
Title               ,FieldServer_Name    , System_Node_Id , Network_Number
San Telequip v1.01a ,San Telequip v1.01a ,          1000  ,       5
,,,,,,,,,
//=============================================================================
```

The Title appears on the top of FS-GUI line Screen. It may be used to indicate the configuration version loaded and the relevant Customer/project.

Data Arrays: Data Arrays are “protocol neutral” data buffers for storage of data to be passed between protocols. It is necessary to declare the data format of each of the Data Arrays to facilitate correct storage of the relevant data.

Data Types:

Float Bit, Packed Bit, SInt16, UInt16, SInt32, UInt32, Byte etc.

```
.........
//=============================================================================
//
//    Data Arrays
// Defining data Arrays for system application
//
Data_Arrays
Data_Array_Name , Data_Format , Data_Array_Length
DA_P1L1_01      ,   Packed_Bit,         16
,,,,,,,,,
//=============================================================================
```

The Client Side Connections Section contains the parameters that describe the nature of the physical connection to the Server Nodes.

```
.........
//=============================================================================
//
//    Client Side Connections
// Defining Communication parameters for modbus communication
//
Connections
Port , Baud , Parity , Data_Bits , Stop_Bits , Protocol
R1   ,9600  ,  None  ,      8    ,      1    , Modbus_RTU

//=============================================================================
```

Port: The port to be connected to, defined in terms of connection speed and properties.

Protocol: The protocol for the network connected to this port.

The Client Side Nodes Section defines the logical connection parameters for the Server Nodes communicating with the GW BMS Nx.

```
//================================================================================
//
//    Client Side Nodes
//
Nodes
Node_Name , Node_ID , Protocol   , Port  , Address_Type
Panel 1   ,    1    , Modbus_RTU ,   R1  ,   ADU
,,,,,,,,,
//================================================================================
//
```

Node Name: A name allocated to the node for reference by the Map Descriptors.
Node ID: The Node ID of the Server.
Port: The Server Node is attached to this connection.

The Map Descriptor Section contains parameters that describe the address details required to move data between the Field Server and an external device and the nature of the data transfer.

```
//================================================================================
//
//    Client Side Map Descriptors
//  Loop_1
//
Map_Descriptors,,,,,,,,
Map_Descriptor_Name  , Data_Array_Name , Data_Array_Offset , Function , Node_Name ,     Data_Type     , Address , Length , Scan_Interval,
CMD_Loop_01_01       ,DA_P1L1_01       ,        0          , Rdbc     ,   Panel 1 , Holding_Register  ,    515   ,   1   , 1.000s,
CMD_Loop_01_02       ,DA_P1L1_02       ,        0          , Rdbc     ,   Panel 1 , Holding_Register  ,    516   ,   1   , 1.000s,

//================================================================================,,,,,,,,
```

Map Descriptor Name: Name assigned to the Map Descriptor. In some protocols the name becomes the variable name.
Data Array Name: Offset in relevant Data Array to start data access/storage.
Data Array Offset: Data Array to be used for storage of data being passed between protocols.
Function: Determines how data is to be fetched/written. The GW BMS Nx is either reading, being read, or writing data. This can be continuous, or on change.
Node Name: Node being accessed.
Address: First point address accessed.
Length: Number of points in poll request.
Scan Interval: Timing parameters assist with pacing of data.

The Server Side Sections are functionally the same as their Client Side equivalents, except that Server parameters are being defined.

```
//================================================================================
//
//    Server Side Nodes
//

Nodes
Node_Name , Node_ID , Protocol  , Srv_Offline_Method
PANEL_01  ,   1001  , Bacnet_IP , Always_Respond
,,,,,,,,,
//================================================================================
```

Adapter: Adapter definition applies to defining network and GW BMS Nx connections .
Protocol: The protocol for the network connected to this port.

```
//================================================================================,,
//
//    Server Side Connections - BACnet IP
//

Connections
Adapter , Protocol
N1      , Bacnet_IP

//================================================================================
```

Node Name: A Node name for reference by the Map Descriptors.

Node ID: Since the GW BMS Nx is a Server here, this is the ID of the GW BMS Nx (virtual) Node. The GW BMS Nx can represent multiple Virtual Node ID's in most protocols.

```
.........
//================================================================================
//
//    Server Side Map Descriptors
//,,,,,,,,,
Map_Descriptors,,,,,,,,,
Map_Descriptor_Name            , Data_Array_Name , Data_Array_Offset , Function , Node_Name    , Data_Type , Object_ID ,Units,,
P1_Loop1_D1_Missing Device     ,  DA_P1L1_01     ,        0          ,   Server  ,PANEL_01     ,    BI     ,    1      ,No-Units
P1_Loop1_D1_Multiple Address   ,  DA_P1L1_01     ,        1          ,   Server  ,PANEL_01     ,    BI     ,    2      ,No-Units
P1_Loop1_D1_Device Mismatch    ,  DA_P1L1_01     ,        2          ,   Server  ,PANEL_01     ,    BI     ,    3      ,No-Units
P1_Loop1_D1_Sensor Fault       ,  DA_P1L1_01     ,        3          ,   Server  ,PANEL_01     ,    BI     ,    4      ,No-Units
P1_Loop1_D1_Device Bypass      ,  DA_P1L1_01     ,        4          ,   Server  ,PANEL_01     ,    BI     ,    5      ,No-Units
P1_Loop1_D1_Device Fault       ,  DA_P1L1_01     ,        5          ,   Server  ,PANEL_01     ,    BI     ,    6      ,No-Units
P1_Loop1_D1_Device Dirty       ,  DA_P1L1_01     ,        6          ,   Server  ,PANEL_01     ,    BI     ,    7      ,No-Units
P1_Loop1_D1_Low Temp           ,  DA_P1L1_01     ,        7          ,   Server  ,PANEL_01     ,    BI     ,    8      ,No-Units
P1_Loop1_D1_Alert              ,  DA_P1L1_02     ,        0          ,   Server  ,PANEL_01     ,    BI     ,    9      ,No-Units
P1_Loop1_D1_Action             ,  DA_P1L1_02     ,        1          ,   Server  ,PANEL_01     ,    BI     ,    10     ,No-Units
P1_Loop1_D1_Verified Alarm     ,  DA_P1L1_02     ,        2          ,   Server  ,PANEL_01     ,    BI     ,    11     ,No-Units
P1_Loop1_D1_Confirm            ,  DA_P1L1_02     ,        3          ,   Server  ,PANEL_01     ,    BI     ,    12     ,No-Units
P1_Loop1_D1_Alarm / Alarm F1   ,  DA_P1L1_02     ,        4          ,   Server  ,PANEL_01     ,    BI     ,    13     ,No-Units
P1_Loop1_D1_Alarm F2           ,  DA_P1L1_02     ,        5          ,   Server  ,PANEL_01     ,    BI     ,    14     ,No-Units
P1_Loop1_D1_Supervisory        ,  DA_P1L1_02     ,        6          ,   Server  ,PANEL_01     ,    BI     ,    15     ,No-Units
P1_Loop1_D1_Gas Delay          ,  DA_P1L1_02     ,        7          ,   Server  ,PANEL_01     ,    BI     ,    16     ,No-Units
P1_Loop1_D1_Active             ,  DA_P1L1_02     ,        8          ,   Server  ,PANEL_01     ,    BI     ,    17     ,No-Units
P1_Loop1_D1_Pre Discharge      ,  DA_P1L1_02     ,        9          ,   Server  ,PANEL_01     ,    BI     ,    18     ,No-Units
P1_Loop1_D1_Discharge          ,  DA_P1L1_02     ,        10         ,   Server  ,PANEL_01     ,    BI     ,    19     ,No-Units
P1_Loop1_D1_Discharge Confirm  ,  DA_P1L1_02     ,        11         ,   Server  ,PANEL_01     ,    BI     ,    20     ,No-Units
```

Appendix A: Device Activation Status

Sr No	Parameter	Bit Position	Value
1	MODBUS Address Lo		
	Missing Device	0	On – 1, Off - 0
	Multiple Address	1	On – 1, Off – 0
	Device Mismatch	2	On – 1, Off - 0
	Sensor Fault	3	On – 1, Off – 0
	Device Bypass	4	On – 1, Off - 0
	Device Fault	5	On – 1, Off – 0
	Device Dirty	6	On – 1, Off - 0
	Low Temp	7	On – 1, Off – 0
	Classification Type	8 ~ 15	Type Code
2	MODBUS Address Hi		
	Alert	0	On – 1, Off - 0
	Action	1	On – 1, Off – 0
	Verified Alarm	2	On – 1, Off - 0
	Confirm	3	On – 1, Off – 0
	Alarm / Alarm F1	4	On – 1, Off - 0
	Alarm F2	5	On – 1, Off – 0
	Supervisory	6	On – 1, Off - 0
	Gas Delay	7	On – 1, Off – 0
	Active	8	On – 1, Off - 0
	Pre Discharge	9	On – 1, Off – 0
	Discharge	10	On – 1, Off - 0
	Discharge Confirm	11	On – 1, Off – 0
	Spare	12	On – 1, Off - 0
	Spare	13	On – 1, Off – 0
	Spare	14	On – 1, Off - 0
	Spare	15	On – 1, Off – 0

Appendix B System Trouble status

Sr No	System Parameter	CSV file address	Bit Position
	Panel Troubles		
1	PSU 1 AC Power Fault	1	0
2	PSU 2 AC Power Fault	1	1
3	PSU 1 Battery Fault	1	2
4	PSU 2 Battery Fault	1	3
5	PSU 1 Ground Fault	1	4
6	PSU 2 Ground Fault	1	5
7	SCU 1 Ground Fault	1	6
8	SCU 2 Ground Fault	1	7
9	SCU 3 Ground Fault	1	8
10	SCU 4 Ground Fault	1	9
11	SCU 5 Ground Fault	1	10
12	SCU 6 Ground Fault	1	11
13	Network Ground Fault	1	12
14	PSU 1 24V Fault	2	0
15	PSU 2 24V Fault	2	1
16	PSU 1 Charging Circuit Fault	2	2
17	PSU 2 Charging Circuit Fault	2	3
18	PSU 1 Board Trouble	2	4
19	PSU 2 Board Trouble	2	5
20	SLC 01 Open	3	0
21	SLC 02 Open	3	1
22	SLC 03 Open	3	2
23	SLC 04 Open	3	3
24	SLC 05 Open	3	4
25	SLC 06 Open	3	5
26	SLC 07 Open	3	6
27	SLC 08 Open	3	7
28	SLC 09 Open	3	8
29	SLC 10 Open	3	9
30	SLC 11 Open	3	10
31	SLC 12 Open	3	11
32	SLC 01 Short	4	0
33	SLC 02 Short	4	1
34	SLC 03 Short	4	2
35	SLC 04 Short	4	3
36	SLC 05 Short	4	4
37	SLC 06 Short	4	5
38	SLC 07 Short	4	6
39	SLC 08 Short	4	7
40	SLC 09 Short	4	8
41	SLC 10 Short	4	9
42	SLC 11 Short	4	10

43	SLC 12 Short	4	11
44	SLC 01 Power Fault	5	0
45	SLC 02 Power Fault	5	1
46	SLC 03 Power Fault	5	2
47	SLC 04 Power Fault	5	3
48	SLC 05 Power Fault	5	4
49	SLC 06 Power Fault	5	5
50	SLC 07 Power Fault	5	6
51	SLC 08 Power Fault	5	7
52	SLC 09 Power Fault	5	8
53	SLC 10 Power Fault	5	9
54	SLC 11 Power Fault	5	10
55	SLC 12 Power Fault	5	11
56	SLC 01 Trouble	6	0
57	SLC 02 Trouble	6	1
58	SLC 03 Trouble	6	2
59	SLC 04 Trouble	6	3
60	SLC 05 Trouble	6	4
61	SLC 06 Trouble	6	5
62	SLC 07 Trouble	6	6
63	SLC 08 Trouble	6	7
64	SLC 09 Trouble	6	8
65	SLC 10 Trouble	6	9
66	SLC 11 Trouble	6	10
67	SLC 12 Trouble	6	11
68	OCU 1 Trouble	7	0
69	OCU 2 Trouble	7	1
70	OCU 3 Trouble	7	2
71	OCU 4 Trouble	7	3
72	OCU 5 Trouble	7	4
73	OCU 6 Trouble	7	5
74	OCU 7 Trouble	7	6
75	OCU 8 Trouble	7	7
76	OCU 1 Type Error	8	0
77	OCU 2 Type Error	8	1
78	OCU 3 Type Error	8	2
79	OCU 4 Type Error	8	3
80	OCU 5 Type Error	8	4
81	OCU 6 Type Error	8	5
82	OCU 7 Type Error	8	6
83	OCU 8 Type Error	8	7
84	Remote Annunciator #01 Trouble	9	0
85	Remote Annunciator #02 Trouble	9	1
86	Remote Annunciator #03 Trouble	9	2
87	Remote Annunciator #04 Trouble	9	3

88	Remote Annunciator #05 Trouble	9	4
89	Remote Annunciator #06 Trouble	9	5
90	Remote Annunciator #07 Trouble	9	6
91	Remote Annunciator #08 Trouble	9	7
92	Remote Annunciator #09 Trouble	9	8
93	Remote Annunciator #10 Trouble	9	9
94	Remote Annunciator #11 Trouble	9	10
95	Remote Annunciator #12 Trouble	9	11
96	Remote Annunciator #13 Trouble	9	12
97	Remote Annunciator #14 Trouble	9	13
98	Remote Annunciator #15 Trouble	9	14
99	Remote Annunciator #16 Trouble	10	0
100	Remote Annunciator #17 Trouble	10	1
101	Remote Annunciator #18 Trouble	10	2
102	Remote Annunciator #19 Trouble	10	3
103	Remote Annunciator #20 Trouble	10	4
104	Remote Annunciator #21 Trouble	10	5
105	Remote Annunciator #22 Trouble	10	6
106	Remote Annunciator #23 Trouble	10	7
107	Remote Annunciator #24 Trouble	10	8
108	Remote Annunciator #25 Trouble	10	9
109	Remote Annunciator #26 Trouble	10	10
110	Remote Annunciator #27 Trouble	10	11
111	Remote Annunciator #28 Trouble	10	12
112	Remote Annunciator #29 Trouble	10	13

113	Remote Annunciator #30 Trouble	10	14
114	RA Loop-Back	11	0
115	Configuration Data Error	11	1
116	SWM Trouble	11	2
117	Connection Error	11	3
118	CTM Trouble	11	4
119	DACT Trouble	11	5
120	HOST Trouble	11	6
121	BMS Trouble	11	7
122	PRN Trouble	11	8
123	LCD Trouble	11	9
124	CPU Trouble	11	10
125	Voice IC Trouble	11	11
126	Voice IC Power Trouble	11	12
127	RTC Trouble	11	13
128	Fuse Trouble	11	14
129	Speaker Trouble	11	15
130	Telephone jack Trouble	12	0
131	Trouble Input On	12	1
132	Fire Drill	12	2
133	Signal Silence	12	3
134	General Alarm	12	4
135	Configuration Data Download	12	5
136	Configuration Data Upload	12	6
137	Program Data Download	12	7
138	Event Log Data Upload	12	8
139	Maintenance List Data Upload	12	9
140	NIU Board Trouble	12	10
141	Network Failure Port A	12	11
142	Network Failure Port B	12	12
143	Duplicate Node Numbers	12	13
144	Node #01 Network Failure	13	0
145	Node #02 Network Failure	13	1
146	Node #03 Network Failure	13	2
147	Node #04 Network Failure	13	3
148	Node #05 Network Failure	13	4
149	Node #06 Network Failure	13	5
150	Node #07 Network Failure	13	6
151	Node #08 Network Failure	13	7
152	Node #09 Network Failure	13	8
153	Node #10 Network Failure	13	9
154	Node #11Network Failure	13	10
155	Node #12 Network Failure	13	11
156	Node #13 Network Failure	13	12
157	Node #14 Network Failure	13	13
158	Node #15 Network Failure	13	14

159	Node #16 Network Failure	13	15
160	Node #17 Network Failure	14	0
161	Node #18 Network Failure	14	1
162	Node #19 Network Failure	14	2
163	Node #20 Network Failure	14	3
164	Node #21 Network Failure	14	4
165	Node #22 Network Failure	14	5
166	Node #23 Network Failure	14	6
167	Node #24 Network Failure	14	7
168	Node #25 Network Failure	14	8
169	Node #26 Network Failure	14	9
170	Node #27 Network Failure	14	10
171	Node #28 Network Failure	14	11
172	Node #29 Network Failure	14	12
173	Node #30 Network Failure	14	13
174	Node #31 Network Failure	14	14
175	Node #32 Network Failure	14	15
176	Node #33 Network Failure	15	0
177	Node #34 Network Failure	15	1
178	Node #35 Network Failure	15	2
179	Node #36 Network Failure	15	3
180	Node #37 Network Failure	15	4
181	Node #38 Network Failure	15	5
182	Node #39 Network Failure	15	6
183	Node #40 Network Failure	15	7
184	Node #41 Network Failure	15	8
185	Node #42 Network Failure	15	9
186	Node #43 Network Failure	15	10
187	Node #44 Network Failure	15	11
188	Node #45 Network Failure	15	12
189	Node #46 Network Failure	15	13
190	Node #47 Network Failure	15	14
191	Node #48 Network Failure	15	15
192	Node #49 Network Failure	16	0
193	Node #50 Network Failure	16	1
194	Node #51 Network Failure	16	2
195	Node #52 Network Failure	16	3
196	Node #53 Network Failure	16	4
197	Node #54 Network Failure	16	5
198	Node #55 Network Failure	16	6
199	Node #56 Network Failure	16	7
200	Node #57 Network Failure	16	8
201	Node #58 Network Failure	16	9
202	Node #59 Network Failure	16	10
203	Node #60 Network Failure	16	11
204	Node #61 Network Failure	16	12
205	Node #62 Network Failure	16	13
206	Node #63 Network Failure	16	14
207	Node #64 Network Failure	16	15

	Switch Operations		
	Acknowledge On		
1	Fire Drill On	17	0
2	Fire Drill Off	17	1
3	Signal Silence On	17	2
4	Signal Silence Off	17	3
5	System Reset On	17	4
6	General Alarm On	17	5
7	Visual Indicator Test	17	6