



GE Interlogix

Micro/5-PXN Open Protocol Messages

Introduction

This reference document provides detailed information on the Micro/5-PXN Open Protocol (MOP) messages and functionality. It also includes specifications for the implementation of the embedded Micro/5-PXN Open Protocol server. Developers of Micro/5-PXN Open Protocol Host clients can also use this document as a reference.

Please note the following:

- The information in this reference document is provided “as is” without any technical or customer support.
- Users who develop software or documents based on this information do so at their own risk.
- The protocol itself is unencrypted and therefore non-secure.
- Any and all source code provided by CASI-RUSCO is for illustration purposes only.
- CASI-RUSCO makes no statements as to the accuracy or functionality of the supplied source code.
- No technical support will be provided for any included source code.
- Micro/5-PXN Open Protocol (MOP) support is currently only provided in Picture Perfect Micro/5-PXN and any Micro/5-PX connected downstream from a Micro/5-PXN with firmware revision 1.7.


NOTE CASI-RUSCO does not guarantee that the protocol will exist in future versions of the firmware or that it will remain unchanged from version to version.



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NOTE  **Supplied source code is provided as a zip file. The code, written in Visual C++ illustrates the primary client and administrator functionality offered by the protocol.**

Definitions

Term	Definition
Micros	Micro/5-PXN systems
MOP	Micro/5-PXN Open Protocol
Control Port	Port 6771 used by MOP Administrator
Data Port	Port 6772 used to received MOP data
Administrator	MOP Administrator connected on port 6771
Client	MOP Host Client connected on port 6772
OPS	Micro/5-PXN Open Protocol Server
OPC	Micro/5-PXN Open Protocol Host Client
OPA	Micro/5-PXN Open Protocol Administrator
Access Host	Picture Perfect™ Access Host

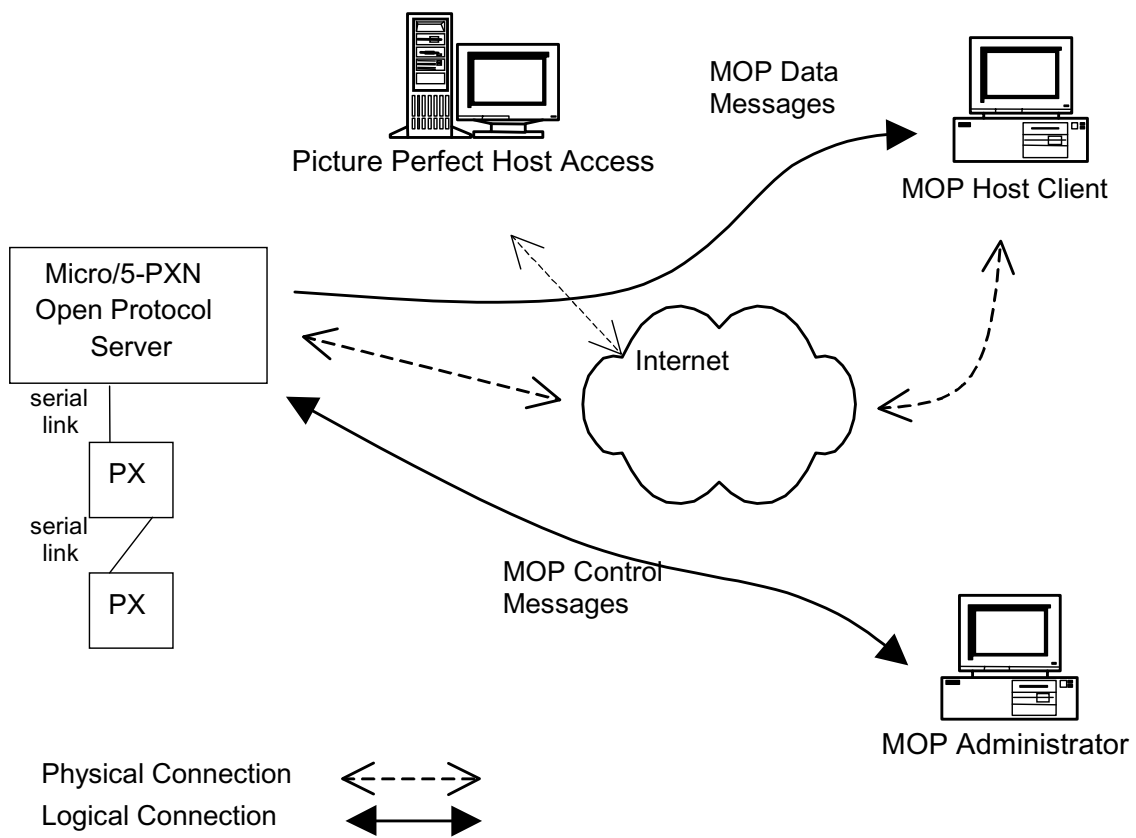
Micro/5-PXN Open Protocol Overview

The Micro/5-PXN Open Protocol allows remote third-party applications to retrieve real-time activity and status data from Micro/5-PXN systems and any Micro/5-PX connected downstream from a Micro/5-PXN with firmware revision 1.7 as shown.

The Client/Server model of communication is used, with the Micro/5-PXN system acting as the server (OPS) and the third-party application acting as a host client (OPC). Host clients can be Data Clients (which receive data messages) or Administrator clients, which control the information that data clients receive.

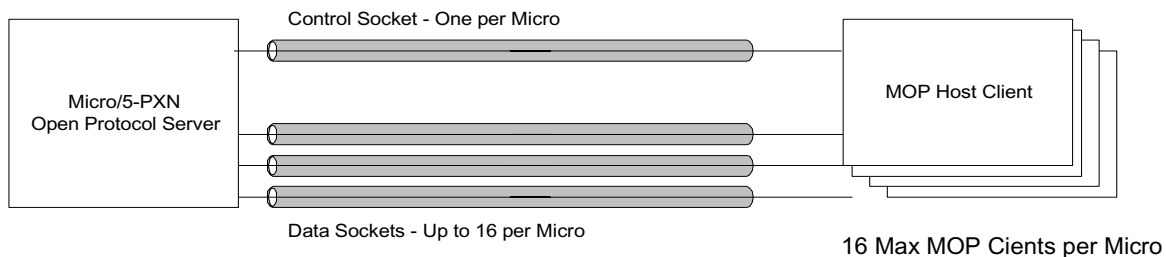
Both types of clients must have registered their IP addresses with the system before being allowed to access the system. The Administrator IP address is registered through the MicTool utility. Data clients IP addresses are registered directly by the Administrator.

The illustration below shows a Micro/5-PXN system with MOP support.



Communications

Communications between the MOP server and clients takes place through TCP/IP stream socket connections. Stream sockets provide for the bi-directional, reliable, sequenced, and unduplicated flow of data without record boundaries. This characteristic of the TCP/IP stream sockets allows MOP servers and clients to reliably exchange information. The MOP server supports a total of 17 socket connections as illustrated below. One connection is dedicated exclusively to control messages (Administrator); the other 16 connections are used for data messages.



When a MOP client connects successfully to the system, it is able to receive information on cardholder events, alarm events, and system status information. The Administrator client controls the information that other MOP clients will receive from the MOP server. The MOP protocol does not allow any client to modify system configuration or perform any schedule or access control functions on the target Micro. Finally, the MOP protocol has provisions to handle broken socket connections between the MOP server and clients. As soon as a broken connection is re-established, the reconnecting client will be notified of the time and length of the disconnection, and a count of the events and alarms that took place during the down period.

Port Assignments


The following TCP/IP socket port numbers have been allocated for MOP use:

- Control Port (Administrator port): 6771 (one connection)
- Data Port (Client port): 6772 (16 connections)

Micro-5/PXN Open Protocol

Message Byte Ordering

Currently, MOP Server messages (from client to server) are expected in little endian and then are converted internally to big endian. MOP client messages (from server to client) are sent in big endian order (if the client runs on an Intel platform, messages need to be converted to little endian).

NOTE  The term “little-endian” refers to a computer architecture in which, within a given 16- or 32-bit word, bytes at lower addresses have lower significance (the word is stored “little-end-first”). With “big-endian”, this is reversed.

Administrator Message Formats

These messages are only sent from the registered Administrator client to the MOP server.

Badge Control Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	1001
2	4	Destination IP	Target client IP
6	2	Micro ID	MOP server micro address
8	2	Reader Bit Mask	See “Badge Reader Bit Mask” on page 12

Physical Alarm Control Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	1002
2	4	Destination IP	Target client
6	2	Micro ID	Server micro address
8	32	Alarm Bit Mask	See “Physical Alarm Bit Mask” on page 13

Logical Alarm Control Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	1003
2	4	Destination IP	Target client
6	2	Micro ID	Server micro address
8	1	Alarm Bit Mask	See "Logical Alarm Bit Mask" on page 14

Status Request Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	1004
2	4	Client IP	See below

Client IP Values:

1. A valid IP address indicates a specific client is the target of message 4001 (See "Client Status Message" on page 10).
2. A value of 0xffffffff indicates all clients are to be matched for 4001 messages.
3. A value of 0 indicates message 4002 is requested (See "Active Client List Message" on page 10).

Add/Remove Client

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	1005
2	4	Client IP	Valid client address
6	1	Add/Remove	See below

Add/Remove Values:

1. A value of 0xaaaa indicates the client IP address is to be added to the client list.
2. A value of 0xdddd indicates the client IP address is to be removed from the client list.

User Client Messages to MOP Server Formats

Client Logoff Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	3001

MOP Server to User Client Message Formats

Badge History Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2001
2	20	Badge ID	Encoded badge ID
22	2	Micro ID	Server micro address
24	2	Transaction Type	See "Badge Transaction Types" on page 15
26	2	Reader No.	See "Badge Reader Bit Mask" on page 12
28	2	Reader Type	See "Reader Types" on page 18
30	2	APB Status	See "Anti-passback (APB) Status" on page 18
32	4	Seconds since 1970	Elapsed time

Elevator History Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2002
2	20	Badge ID	Encoded badge ID
22	2	Micro ID	Server micro address
24	2	Transaction Type	See "Badge Transaction Types" on page 15
26	2	Reader No.	See "Badge Reader Bit Mask" on page 12
28	2	Reader Type	See "Reader Types" on page 18
30	2	APB Status	See "Anti-passback (APB) Status" on page 18
32	4	Seconds since 1970	Elapsed time
36	2	Floor	9999 (if not used)

Physical Alarm History Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2003
2	2	Alarm ID	Alarm types configured by Access Host
4	2	Micro ID	Server micro address
6	2	Host Record ID	Alarm record number from the Access Host
8	2	Alarm Micro Source	See "Physical Alarm Bit Mask" on page 13
10	2	Alarm Flags and State	See "Alarm Flags and States" on page 17
12	4	Seconds since 1970	Elapsed time

Logical Alarm History Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2003
2	2	Alarm ID	Alarm types configured by Access Host
4	2	Micro ID	Server micro address
6	2	Host Record ID	Alarm record number from the Access Host
8	2	Alarm Micro Source	See "Logical Alarm Bit Mask" on page 14
10	2	Alarm Flags and State	See "Alarm Flags and States" on page 17
12	4	Seconds since 1970	Elapsed time

Connected Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2005

Reconnect Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	2006
2	4	Break Time	See below
2	4	Last Message Time	See below
6	4	Physical Alarm Count	See below
10	4	Logical Alarm Count	See below
14	4	Badge Count	See below

Field Name

Definition

Break Time

Time when the connection was lost (UTC)

Last Message Time

Time stamp of last message successful sent to client (UTC)

Physical Alarm Count Number of physical alarms since the connection was lost.

Logical Alarm Count Number of logical alarms since the connection was lost.

Badge Count Number of badge read events since the connection was lost.

MOP Server to Administrator Message Formats

Client Status Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	4001
2	4	Client IP	Valid client address
6	2	Micro ID	Server micro address
8	2	Mask Type	See below
10	32 max	Bit Mask	See below

Mask Type values and Mask lengths:

1. 1001 – Badge Reader Mask (Length 2 bytes)
2. 1002 – Physical Alarm Mask (Length 32 bytes)
3. 1003 – Logical Reader Mask (Length 1 byte)

See “Readers and Alarm Bit Mask Mapping” on page 12.

Active Client List Message

Start Byte No.	Length (bytes)	Field Name	Field Value
0	2	Command	4002
2	2	No. Clients	Number of active clients.
The following fields repeat for No. Clients above			
4	4	Client IP	Target client IP
6	2	State	See below
6	4	Last Sent	See below
10	4	Break Time	See below
14	4	Physical Alarm Count	See below

18	4	Logical Alarm Count	See below
22	4	Badge Reads Count	See below
Repeat starting at Client IP address			

Field Name	Definition
State	Can have any of the following values: CONNECTED 3300 NOT CONNECTED 3301 LOGGED OFF 3302 LOST CONNECTION 3303
Last Sent	Time stamp of last message successful sent to client (UTC)
Break Time	Time when the connection was lost (UTC)
Physical Alarm Count	Number of physical alarms since the connection was lost.
Logical Alarm Count	Number of logical alarms since the connection was lost.
Badge Reads Count	Number of badge read events since connection was lost.

Readers and Alarm Bit Mask Mapping

Badge Reader Bit Mask

MOP DI Mask (left to right)	2RP and 8RP Boards Picture Perfect
0	Board 1 – Reader 0
1	Board 1 – Reader 1
2	Board 2 – Reader 0
3	Board 2 – Reader 1
4	Board 3 – Reader 0
5	Board 3 – Reader 1
6	Board 4 – Reader 0
7	Board 4 – Reader 1
8	Board 5 – Reader 0
9	Board 5 – Reader 1
10	Board 6 – Reader 0
11	Board 6 – Reader 1
12	Board 7 – Reader 0
13	Board 7 – Reader 1
14	Board 8 – Reader 0
15	Board 8 – Reader 1
16-63 (RESERVED)	

Physical Alarm Bit Mask

(2RP and 8RP Boards)

MOP DI Mask (left to right)	2RP and 8RP Boards Picture Perfect Addressing
0	Board 1 – Door DI 0
1	Board 1 – Door DI 1
2	Board 2 – Door DI 0
3	Board 2 – Door DI 1
4	Board 3 – Door DI 0
5	Board 3 – Door DI 1
6	Board 4 – Door DI 0
7	Board 4 – Door DI 1
8	Board 5 – Door DI 0
9	Board 5 – Door DI 1
10	Board 6 – Door DI 0
11	Board 6 – Door DI 1
12	Board 7 – Door DI 0
13	Board 7 – Door DI 1
14	Board 8 – Door DI 0
15	Board 8 – Door DI 1
16-63 (RESERVED)	

Physical Alarm Bit Mask (20 DI Boards)

MOP Bit Mask (left to right)	Picture Perfect
64-83	Board 1: 16-35
84-103	Board 2: 16-35
104-123	Board 3: 16-35
124-143	Board 4: 16-35
144-255	(reserved)

Logical Alarm Bit Mask

(All Boards)

MOP Bit Mask	Picture Perfect
0	AC Fail
1	Micro Tamper
*2	Lost Badge
*2	Invalid Badge
*2	Suspended
*2	Unknown
*2	APB Violation
7-255	(reserved)

*same bit used for all these categories

Appendix

Badge Transaction Types

Transaction Description	Value
VALID NORMAL	0
READER UNKNOWN	1
READER OFFLINE	2
READER TYPE UNKNOWN	3
AREA UNKNOWN	4
AREA OFFLINE	5
CATEGORY NOT MATCH	6
Transaction Description	Value
INVALID APB IN	7
INVALID APB OUT	8
INVALID PIN	9
BADGE UNKNOWN	10
BADGE LOST	11
BADGE SUSPENDED	12
BADGE DELETED	13
LEARN TIMEOUT	14
INVALID TA IN	15
INVALID TA OUT	16
INVALID SHUNT	17
INVALID EXPIRATION	18
VALID APB IN	19
VALID APB OUT	20
VALID TA IN	21
VALID TA OUT	22
PASSIVE APB IN	23
PASSIVE APB OUT	24

INVALID FUNCTION CODE	25
INVALID KEYPAD RESPONSE UNAUTHORIZED BADGE	26
INVALID KEYPAD RESPONSE OPEN DOOR	27
KEYPAD RESPONSE NOT ENABLED	28
NOT COMPLETELY VALIDATED	29
VALID DEGRADED MODE	30
USAGE EXHAUSTED	31
VALID_NO_PASSAGE	32
DBL_BDG_DOOR_LOCKED	33
VALID TOGGLE	34
VALID NOT UNLOCK	35
TOUR BADGE	36
VALID NO DOOR	37
SWIPE AND SHOW	38
ELEVATOR VALID FLOOR	39
ELEVATOR INVALID FLOOR	40
RESERVED	41
VALID TIMED APB IN	42
INVALID TIMED APB IN	43
VALID TIMED APB OUT	44
INVALID TIMED APB OUT	45
ELEVATOR READER DO	46
RESERVED	47-65536

Alarm Flags and States

Alarm Flags

Alarm Flag	Value (hex)
PHYSICAL ALARM INPUT	0
READER ALARM	1
BOARD ALARM	2
INPUT GROUP ALARM	3
EXIT VALUE GROUP ALARM	20
READER VALUE GROUP ALARM	40

Alarm States

Alarm State	Value (hex)	Remarks
LOGICALLY OFF	0	State is logically off (reset).
SHORTED	1	State is shorted (supervised DIs only).
GROUNDING	2	State is grounded (supervised DIs only).
PHYSICALLY ON	4	State is physically on (set).
DELAY LOCK	8	State is delayed while associated door is locked – door sensors only.
DELAY UNLOCK	10	State is delayed while associated door is unlocked – door sensors only.
LOGICALLY ON	20	State logically on.
LOGICAL TYPE	40	Alarms defined as immediate reset – only logical alarms.
DELAYED	80	State change delayed – input states only.

Reader Types

Reader Types	Value (hex)
BADGE ONLY	1
BADGE AND KEYPAD	2
KEYPAD ONLY	4
BADGE OR KEYPAD	8
ANTI-PASSBACK (APB) IN	10
ANTI-PASSBACK (APB) OUT	20
TIME AND ATTENDANCE (T&A) IN/OUT	80
TIME AND ATTENDANCE (T&A) IN	100
TIME AND ATTENDANCE (T&A) OUT	200

NOTE Reader type values are bit mapped into a two-byte word and may appear in combination.



Anti-passback (APB) Status

Status	Value (hex)
NEUTRAL	0
IN	1
OUT	2
PRIVILEGE	3

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