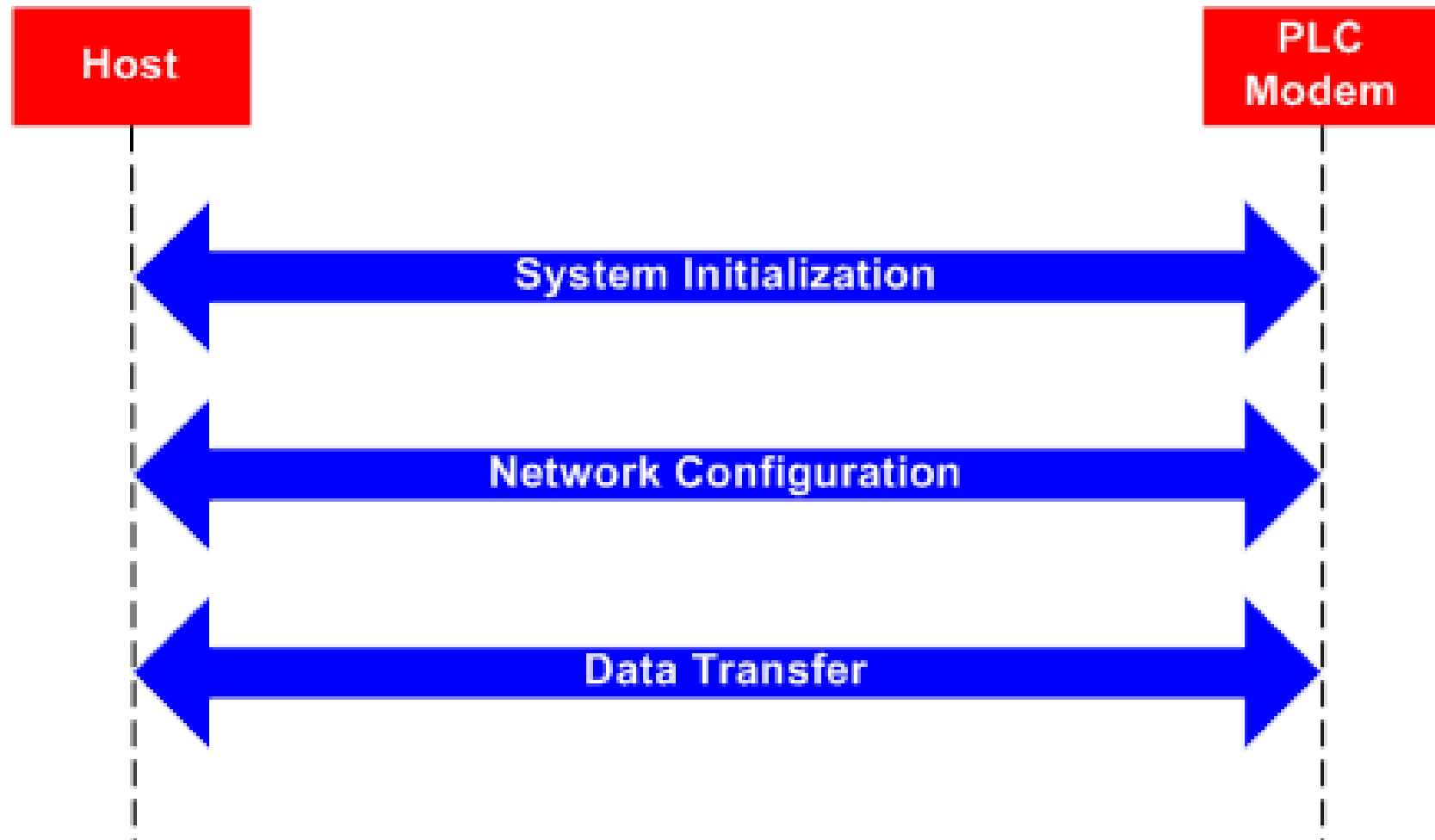


# Host Message Sequence

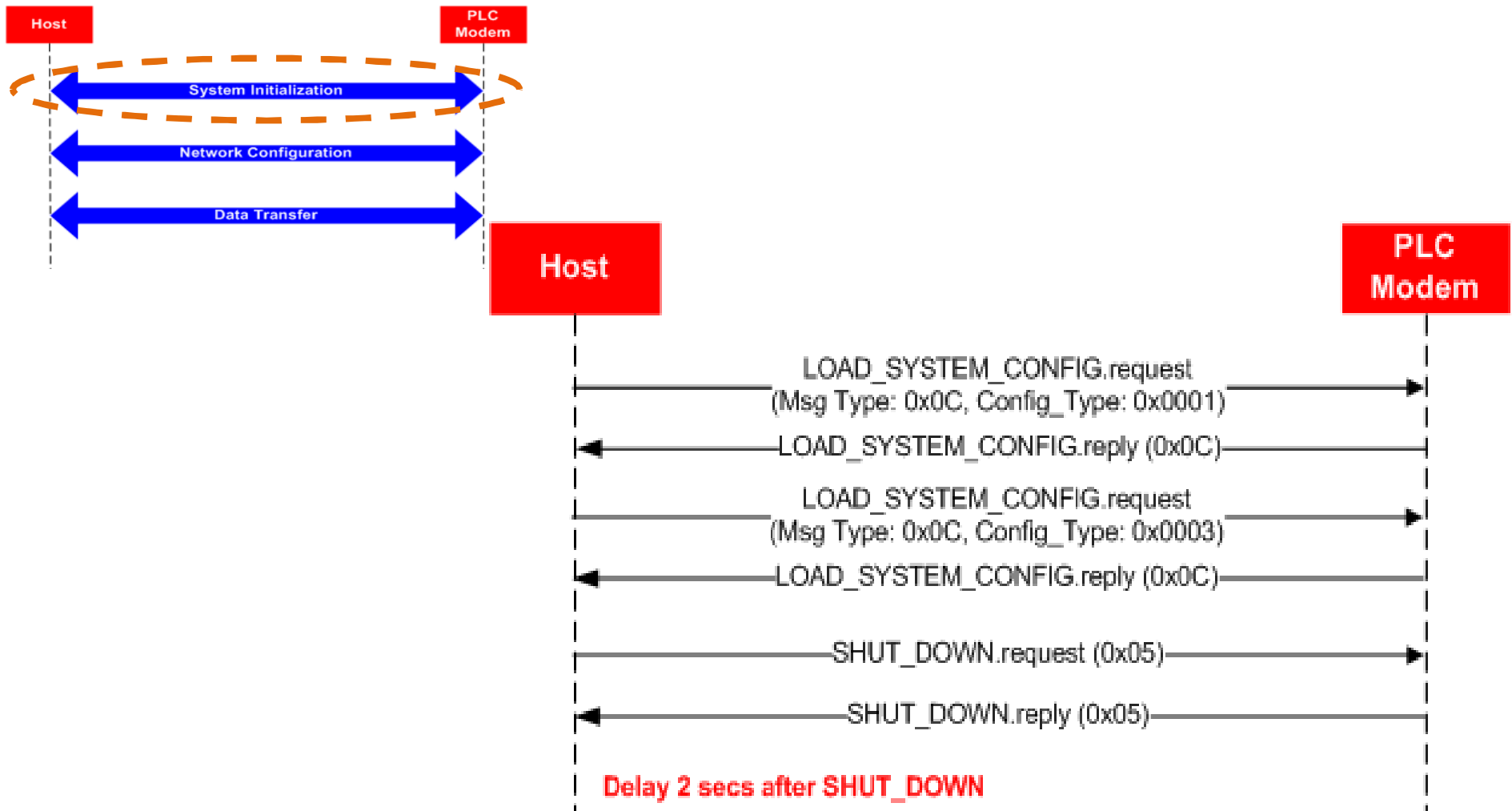
**5/25/2012**

# Overview (G3/PRIME)



# PRIME eMeter

# System Initialization



# System Initialization

- LOAD\_SYSTEM\_CONFIG (Port configuration)**

| Length<br>(octets) | Bits          |   |   |   |           |   |           |   | Comments                        |
|--------------------|---------------|---|---|---|-----------|---|-----------|---|---------------------------------|
|                    | 7             | 6 | 5 | 4 | 3         | 2 | 1         | 0 |                                 |
| 2                  | Config Type   |   |   |   |           |   |           |   | 0x0001 (port configuration)     |
| 2                  | Config Length |   |   |   |           |   |           |   | 0x0001                          |
| 1                  | Reserved      |   |   |   | Diag Port |   | Host Port |   | 0x00 (SCI-A) for both Diag/Host |

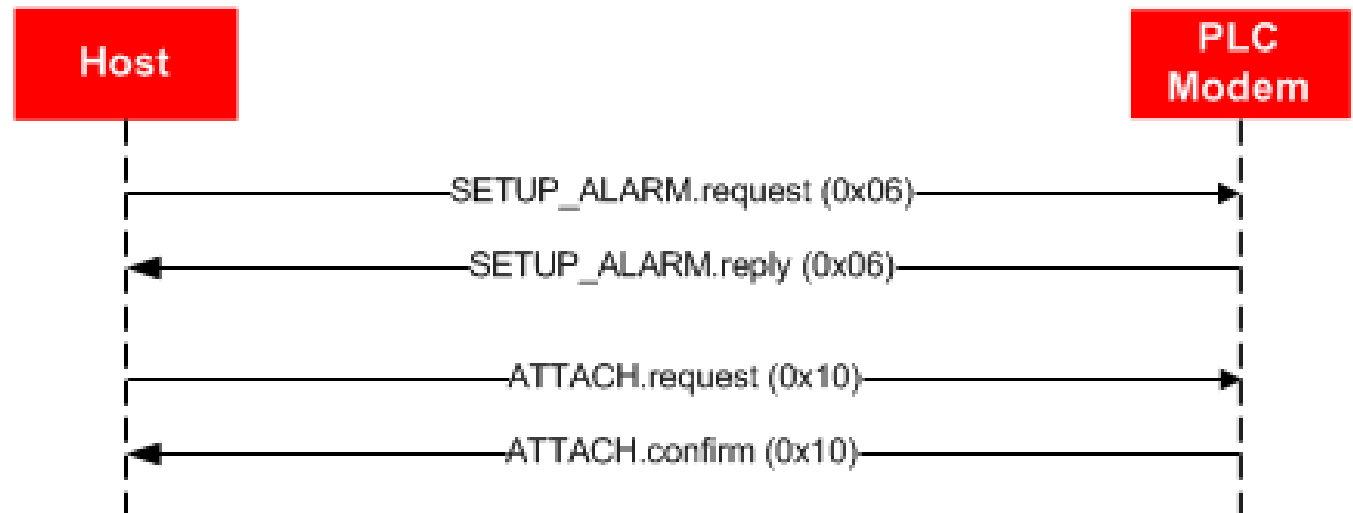
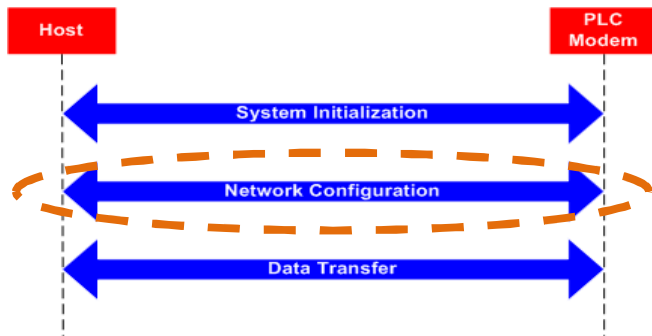
- LOAD\_SYSTEM\_CONFIG (System Configuration)**

| Length<br>(octets) | Bits                 |   |           |   |   |   |   |   | Comments                                                              |
|--------------------|----------------------|---|-----------|---|---|---|---|---|-----------------------------------------------------------------------|
|                    | 7                    | 6 | 5         | 4 | 3 | 2 | 1 | 0 |                                                                       |
|                    | Config Type          |   |           |   |   |   |   |   | 0X0003 (system configuration)                                         |
|                    | Config Length        |   |           |   |   |   |   |   | 0x001A                                                                |
| 2                  | Serial Number Length |   |           |   |   |   |   |   | This specifies how many bytes are valid in the field of Serial Number |
| 16                 | Serial Number        |   |           |   |   |   |   |   | device serial number                                                  |
| 6                  | EUI                  |   |           |   |   |   |   |   | Set unique ID as MAC address (6 bytes)                                |
| 1                  | Device Mode          |   |           |   |   |   |   |   | 0x0000 (PRIME normal mode)                                            |
| 1                  |                      |   | Auto Mode |   |   |   |   |   | Auto Mode: 0 (non-Auto Mode)                                          |

- SHUT\_DOWN**

| Length<br>(octets) | Bits       |   |   |   |   |   |   |   | Comments            |
|--------------------|------------|---|---|---|---|---|---|---|---------------------|
|                    | 7          | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                     |
| 2                  | Reset Type |   |   |   |   |   |   |   | 0x0000 (Soft Reset) |

# Network Configuration



# Network Configuration

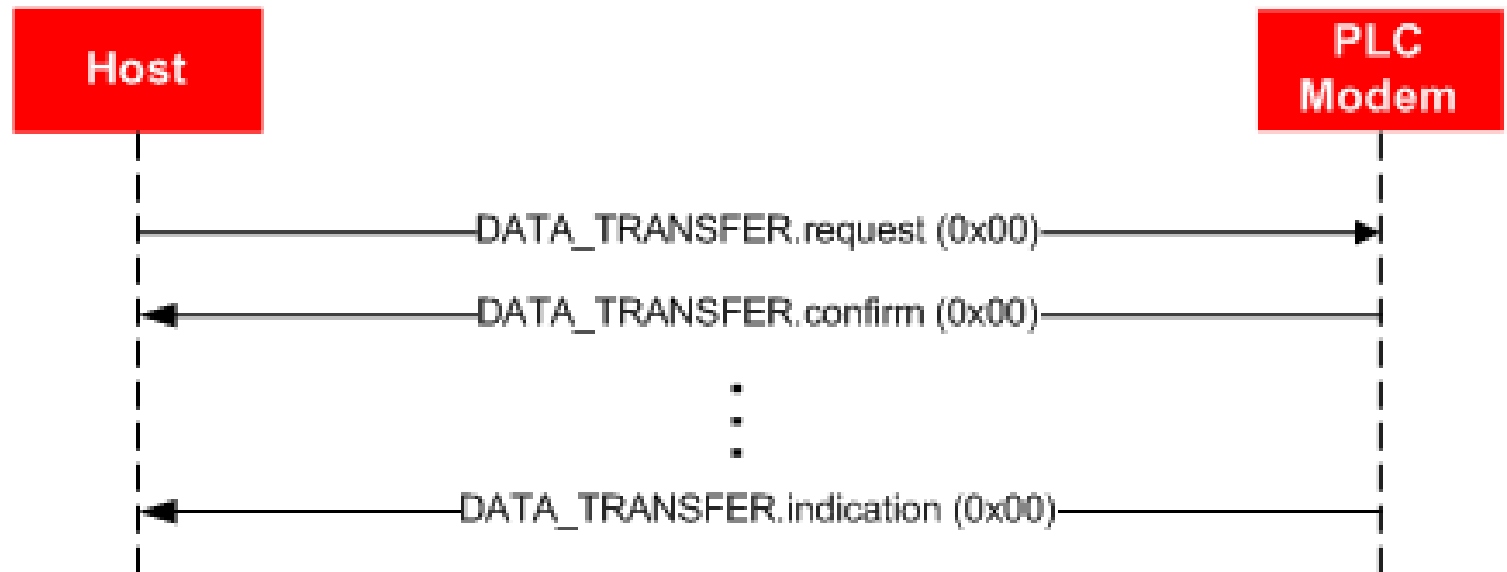
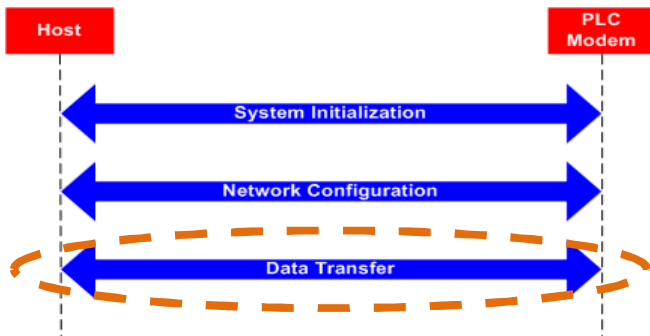
- **SETUP\_ALARM (optional)**

| Length<br>(octets) | Bits         |   |   |   |   |   |   |   | Comments                                                       |
|--------------------|--------------|---|---|---|---|---|---|---|----------------------------------------------------------------|
|                    | 7            | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                |
| 2                  | ALARM TYPE   |   |   |   |   |   |   |   | Depending on alarm message, set up ALARM. Refer Host msg spec. |
| 2                  | ALARM LENGTH |   |   |   |   |   |   |   |                                                                |
| var                | ALARM VALUE  |   |   |   |   |   |   |   |                                                                |

- **ATTACH**

| Length<br>(octets) | Bits                     |   |   |   |   |   |   |   | Comments                                                                                                             |
|--------------------|--------------------------|---|---|---|---|---|---|---|----------------------------------------------------------------------------------------------------------------------|
|                    | 7                        | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                                      |
| 2                  | Device Identifier Length |   |   |   |   |   |   |   | Length of the Device Identifier                                                                                      |
| var                | Device Identifier        |   |   |   |   |   |   |   | Equivalent to COSEM "logical device name" which is defined as an octet-string of up to the Device Identifier Length. |

# Data Transfer



# Data Transfer

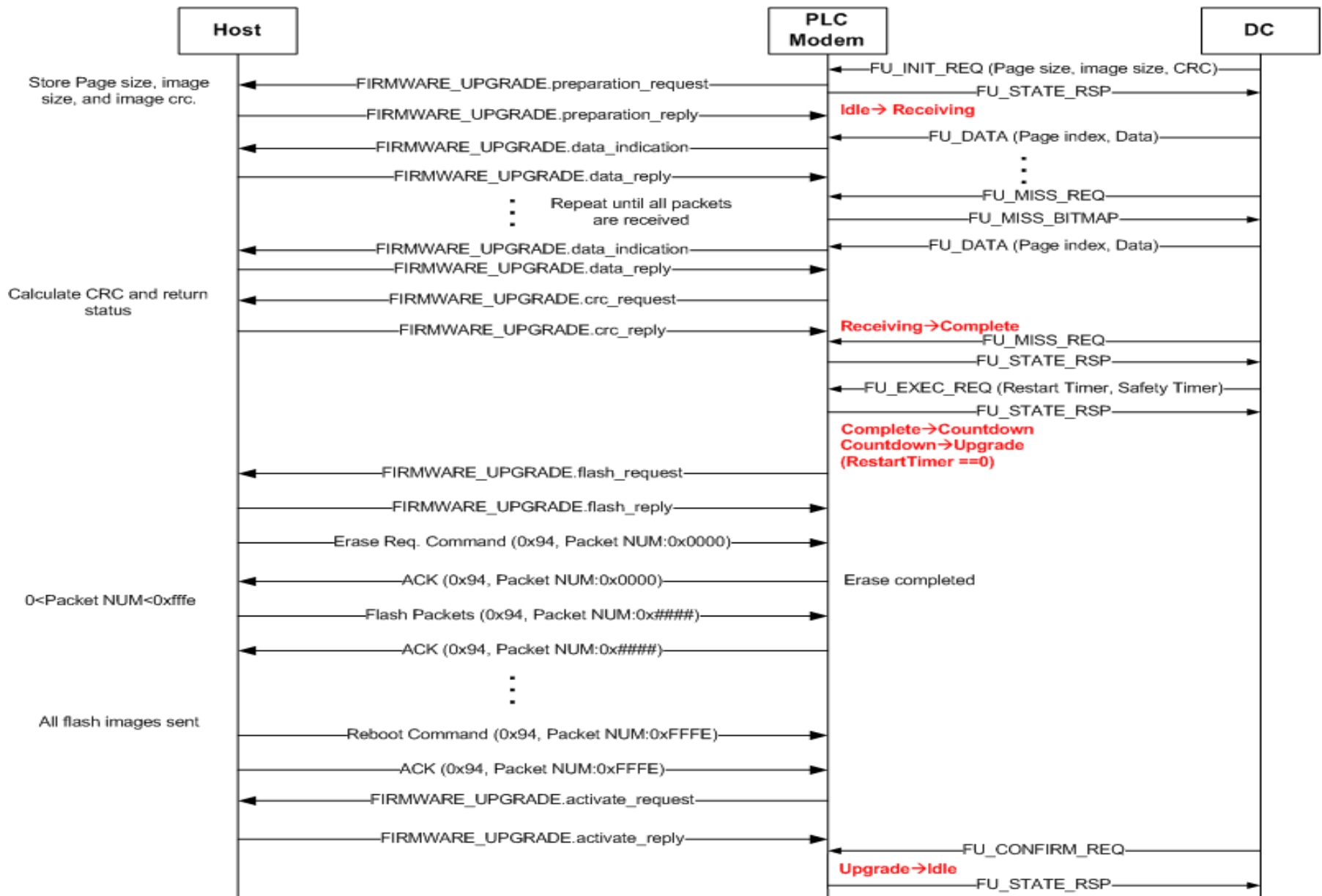
- Data Transfer.request

| Length<br>(octets) | Bits                |   |   |   |   |   |   |   | Comments                                                                                            |
|--------------------|---------------------|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------------------|
|                    | 7                   | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                     |
| 2                  | Mode                |   |   |   |   |   |   |   | 0x0001 (Data Transfer Request)                                                                      |
| 1                  | Destination LSAP    |   |   |   |   |   |   |   | 0x00 or Src SAP from DATA_TRANSFER indication<br>(The Destination LSAP where the data was sent to.) |
| 1                  | Source LSAP         |   |   |   |   |   |   |   | 0x00 or Dst SAP from DATA_TRANSFER indication<br>(The Source LSAP where the data originated from.)  |
| 2                  | Destination Address |   |   |   |   |   |   |   | 12-bit destination address (from "Base Address" in ATTACH.confirm)                                  |
| 4                  | Reserved            |   |   |   |   |   |   |   |                                                                                                     |
| var                | Data                |   |   |   |   |   |   |   |                                                                                                     |

- Data Transfer.indication

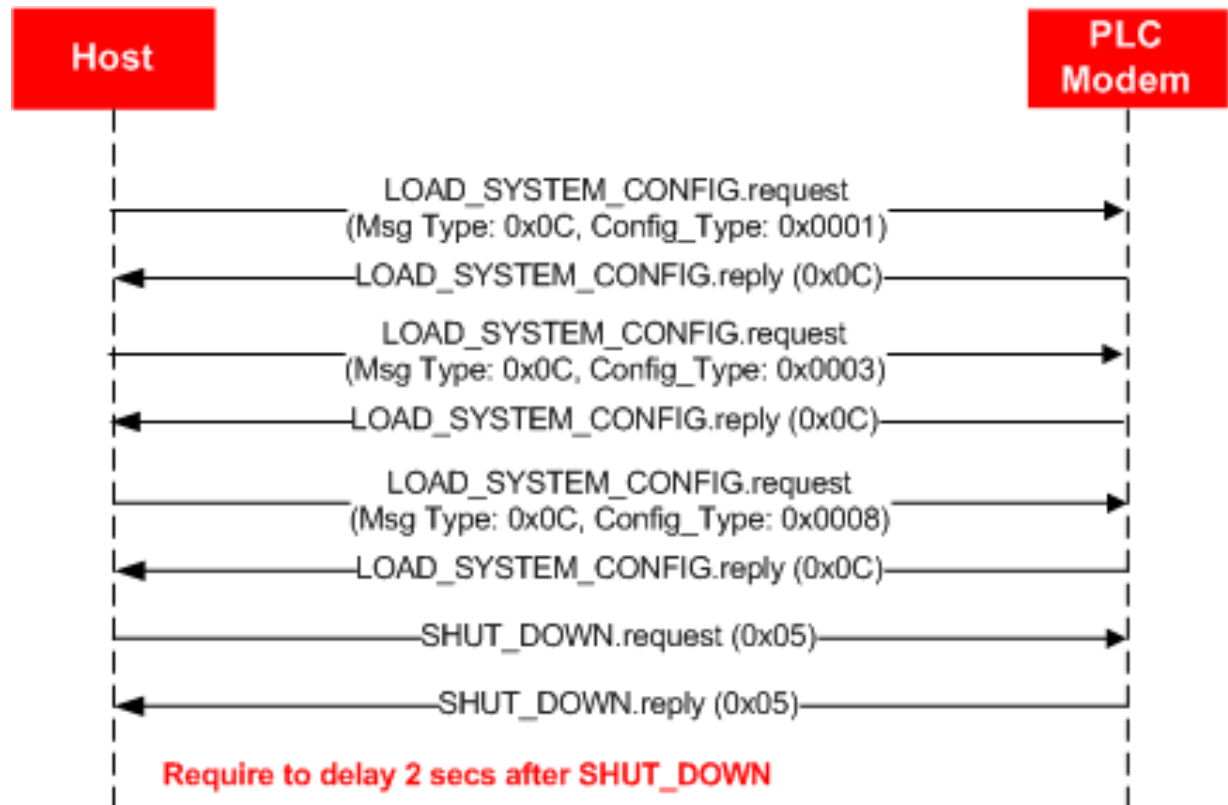
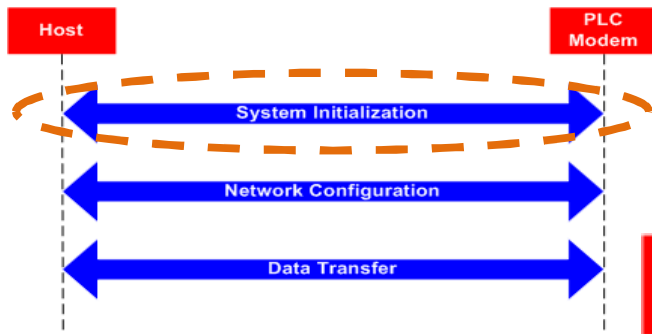
| Length<br>(octets) | Bits                |   |   |   |   |   |   |   | Comments                                         |
|--------------------|---------------------|---|---|---|---|---|---|---|--------------------------------------------------|
|                    | 7                   | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                  |
| 2                  | Mode                |   |   |   |   |   |   |   | 0x0003 (Data Transfer indication)                |
| 1                  | Destination LSAP    |   |   |   |   |   |   |   | The Destination LSAP where the data was sent to. |
| 1                  | Source LSAP         |   |   |   |   |   |   |   | The Source LSAP where the data originated from.  |
| 2                  | Destination Address |   |   |   |   |   |   |   | 12-bit address for me                            |
| 4                  | Reserved            |   |   |   |   |   |   |   |                                                  |
| var                | Data                |   |   |   |   |   |   |   |                                                  |

# Firmware Upgrade



# **G3 eMeter/DC**

# System Initialization



# System Initialization

- **LOAD\_SYSTEM\_CONFIG (Port configuration)**

| Length<br>(octets) | Bits          |   |   |   |           |   |           |   | Comments                        |
|--------------------|---------------|---|---|---|-----------|---|-----------|---|---------------------------------|
|                    | 7             | 6 | 5 | 4 | 3         | 2 | 1         | 0 |                                 |
| 2                  | Config Type   |   |   |   |           |   |           |   | 0x0001 (port configuration)     |
| 2                  | Config Length |   |   |   |           |   |           |   | 0x0001                          |
| 1                  | Reserved      |   |   |   | Diag Port |   | Host Port |   | 0x00 (SCI-A) for both Diag/Host |

- **LOAD\_SYSTEM\_CONFIG (System Configuration)**

| Length<br>(octets) | Bits          |   |           |   |   |   |   |   | Comments                      |
|--------------------|---------------|---|-----------|---|---|---|---|---|-------------------------------|
|                    | 7             | 6 | 5         | 4 | 3 | 2 | 1 | 0 |                               |
|                    | Config Type   |   |           |   |   |   |   |   | 0X0003 (system configuration) |
|                    | Config Length |   |           |   |   |   |   |   | 0x001A                        |
| 2                  | Reserved      |   |           |   |   |   |   |   |                               |
| 16                 | Reserved      |   |           |   |   |   |   |   |                               |
| 6                  | Reserved      |   |           |   |   |   |   |   |                               |
| 1                  | Device Mode   |   |           |   |   |   |   |   | 0x0000 (G3 normal mode)       |
| 1                  |               |   | Auto Mode |   |   |   |   |   | Auto Mode: 0 (non-Auto Mode)  |

# System Initialization

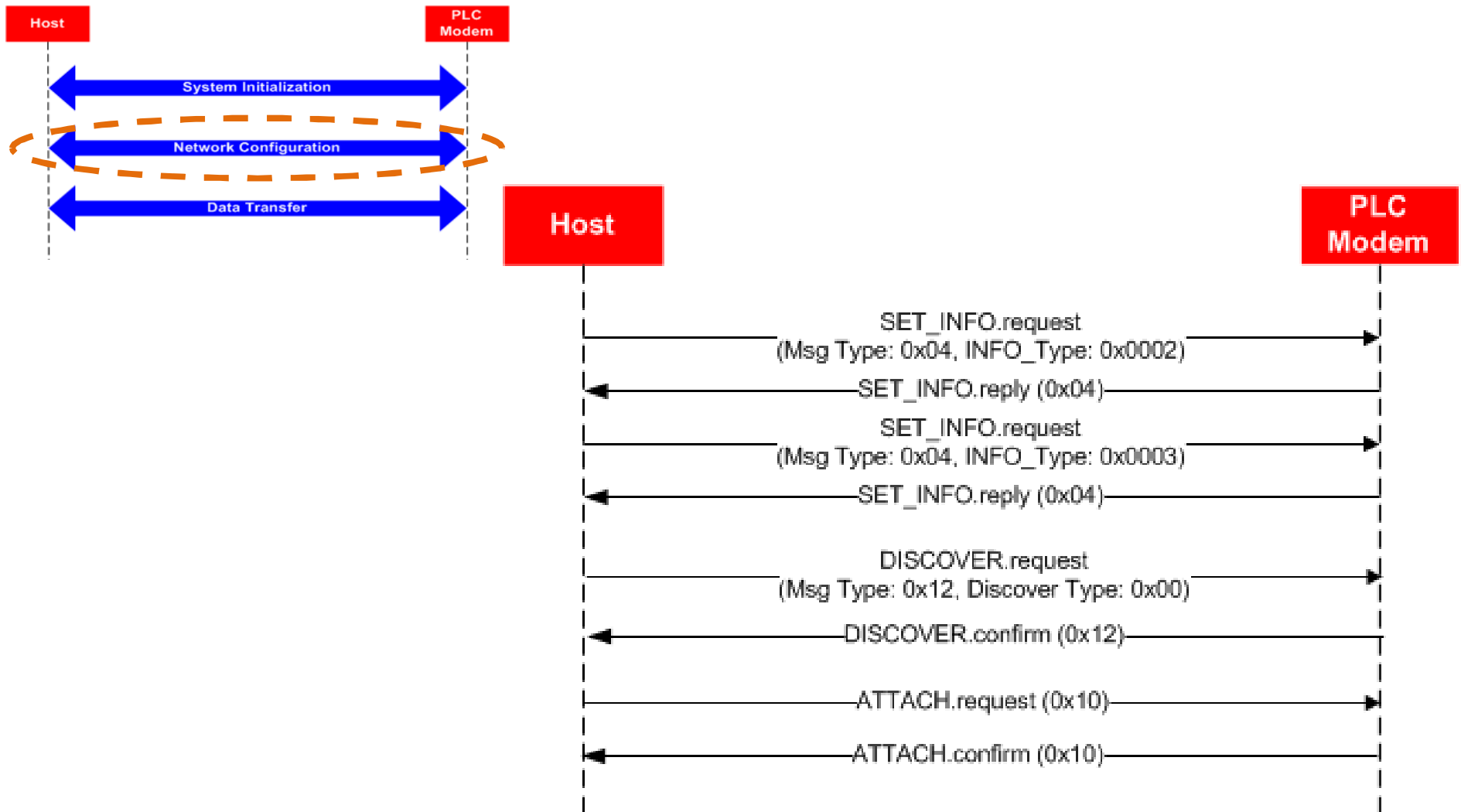
- LOAD\_SYSTEM\_CONFIG (G3 Configuration)

| Length<br>(octets) | Bits            |   |   |   |   |   |     |     | Comments                   |
|--------------------|-----------------|---|---|---|---|---|-----|-----|----------------------------|
|                    | 7               | 6 | 5 | 4 | 3 | 2 | 1   | 0   |                            |
|                    | Config Type     |   |   |   |   |   |     |     | 0X0008 (G3 configuration)  |
|                    | Config Length   |   |   |   |   |   |     |     | 0x0010 (16 bytes)          |
| 1                  |                 |   |   |   |   |   | COH | TMR |                            |
| 1                  | Reserved        |   |   |   |   |   |     |     |                            |
| 8                  | G3 Long Address |   |   |   |   |   |     |     | Unique device long address |
| 4                  | Reserved        |   |   |   |   |   |     |     |                            |
| 2                  | Reserved        |   |   |   |   |   |     |     |                            |

- SHUT\_DOWN

| Length<br>(octets) | Bits       |   |   |   |   |   |   |   | Comments            |
|--------------------|------------|---|---|---|---|---|---|---|---------------------|
|                    | 7          | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                     |
| 2                  | Reset Type |   |   |   |   |   |   |   | 0x0000 (Soft Reset) |

# G3 eMeter: Network Configuration



# G3 eMeter: Network Configuration

- **SET\_INFO (G3 TX PHY Parameters) (optional)**

| Length<br>(octets) | Bits        |          |   |   |     |            |   |     | Comments                                                                |
|--------------------|-------------|----------|---|---|-----|------------|---|-----|-------------------------------------------------------------------------|
|                    | 7           | 6        | 5 | 4 | 3   | 2          | 1 | 0   |                                                                         |
| 2                  | INFO Type   |          |   |   |     |            |   |     | 0X0002 (G3 TX PHY Parameters)                                           |
| 2                  | INFO Length |          |   |   |     |            |   |     |                                                                         |
| 1                  |             | Band Sel |   |   | COH |            |   | TMR | Depending on Band plan, need to set PHY parameters. Refer to Host Spec. |
| 1                  | Reserved    |          |   |   |     | Modulation |   |     |                                                                         |
| 2                  | TX Level    |          |   |   |     |            |   |     |                                                                         |
| 10/12/14           | Tone Mask   |          |   |   |     |            |   |     |                                                                         |

- **SET\_INFO (G3 RX PHY Parameters) (optional)**

| Length<br>(octets) | Bits        |          |   |   |     |     |   |     | Comments                                                                                                                                      |
|--------------------|-------------|----------|---|---|-----|-----|---|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|
|                    | 7           | 6        | 5 | 4 | 3   | 2   | 1 | 0   |                                                                                                                                               |
| 2                  | INFO Type   |          |   |   |     |     |   |     | 0X0003 (G3 RX PHY Parameters)                                                                                                                 |
| 2                  | INFO Length |          |   |   |     |     |   |     |                                                                                                                                               |
| 1                  | Reserved    |          |   |   |     |     |   |     | Depending on Band plan, need to set PHY parameters. Refer to Host Spec. NOTE that Band Sel and Tone Mask should be the same as TX parameters. |
| 1                  |             | Band Sel |   |   | COH | BLI |   | AGC |                                                                                                                                               |
| 2                  | Gain Value  |          |   |   |     |     |   |     |                                                                                                                                               |
| 10/12/14           | Tone Mask   |          |   |   |     |     |   |     |                                                                                                                                               |
|                    |             |          |   |   |     |     |   |     |                                                                                                                                               |

# G3 eMeter: Network Configuration

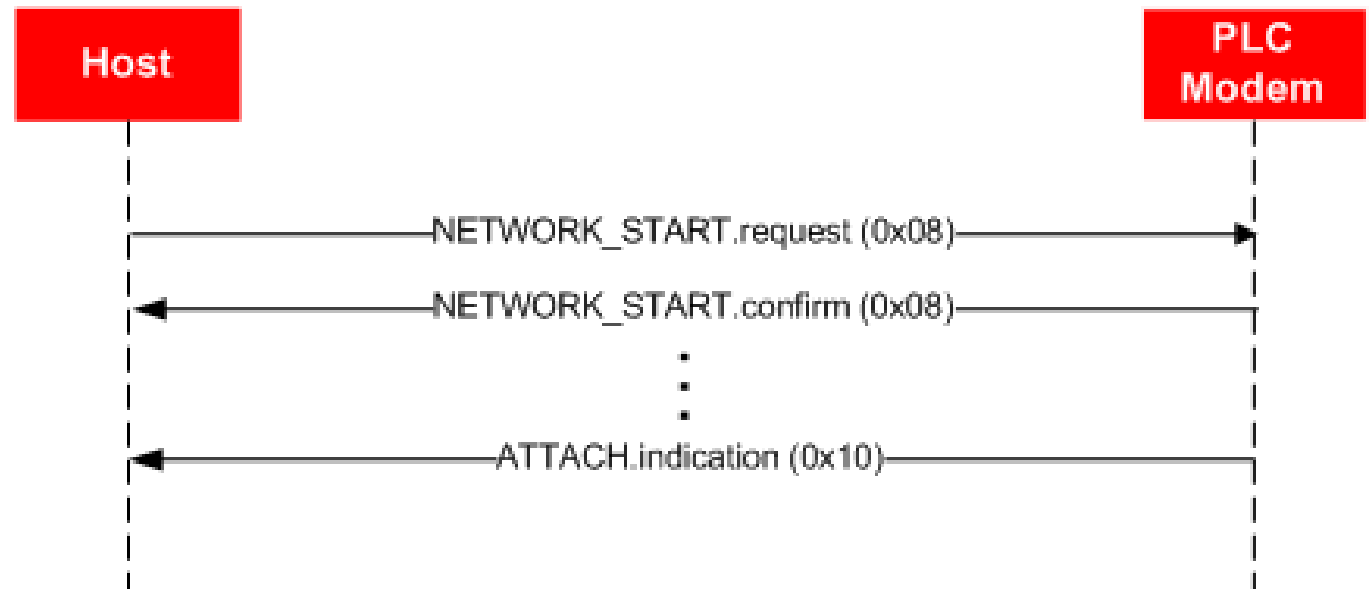
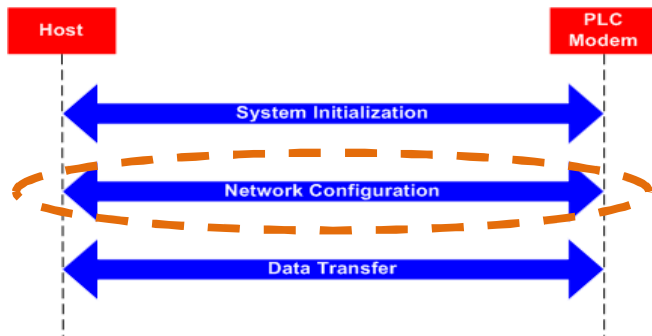
- DISCOVER

| Length<br>(octets) | Bits          |   |   |   |   |   |   |   | Comments                                                                                                  |
|--------------------|---------------|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------------------------|
|                    | 7             | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                           |
| 1                  | Discover Type |   |   |   |   |   |   |   | 0x01 (Network Discover)                                                                                   |
| 1                  | Duration      |   |   |   |   |   |   |   | 0x05 (5 seconds: recommend)<br>* NOTE that the a longer duration may be needed depending on network size. |

- ATTACH

| Length<br>(octets) | Bits     |   |   |   |   |   |   |   | Comments                                                                                             |
|--------------------|----------|---|---|---|---|---|---|---|------------------------------------------------------------------------------------------------------|
|                    | 7        | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                      |
| 2                  | PAN ID   |   |   |   |   |   |   |   | PAN ID to be attached (The host needs to choose a PAN ID from a list of PAN IDs in Discover.confirm) |
| 2                  | Reserved |   |   |   |   |   |   |   |                                                                                                      |

# G3 DC: Network Configuration



# G3 DC: Network Configuration

- NETWORK\_START

| Length<br>(octets) | Bits   |   |   |   |   |   |   |   | Comments                      |
|--------------------|--------|---|---|---|---|---|---|---|-------------------------------|
|                    | 7      | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                               |
| 2                  | PAN ID |   |   |   |   |   |   |   | Ranging from 0x0000 to 0xffff |

- ATTACH.indication

| Length<br>(octets) | Bits              |   |   |   |   |   |   |   | Comments                                              |
|--------------------|-------------------|---|---|---|---|---|---|---|-------------------------------------------------------|
|                    | 7                 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                       |
| 8                  | Network Address 1 |   |   |   |   |   |   |   | The IPv6 Address Prefix                               |
| 8                  | Network Address 2 |   |   |   |   |   |   |   | The IPv6 Address Postfix                              |
| 8                  | Extended Address  |   |   |   |   |   |   |   | 64-bit Device long address                            |
| 1                  | Capability Info   |   |   |   |   |   |   |   | Capability Info as defined in Fig 56 of 802.15.4-2006 |
| 1                  | Reserved          |   |   |   |   |   |   |   |                                                       |

# G3 DC: Network Configuration

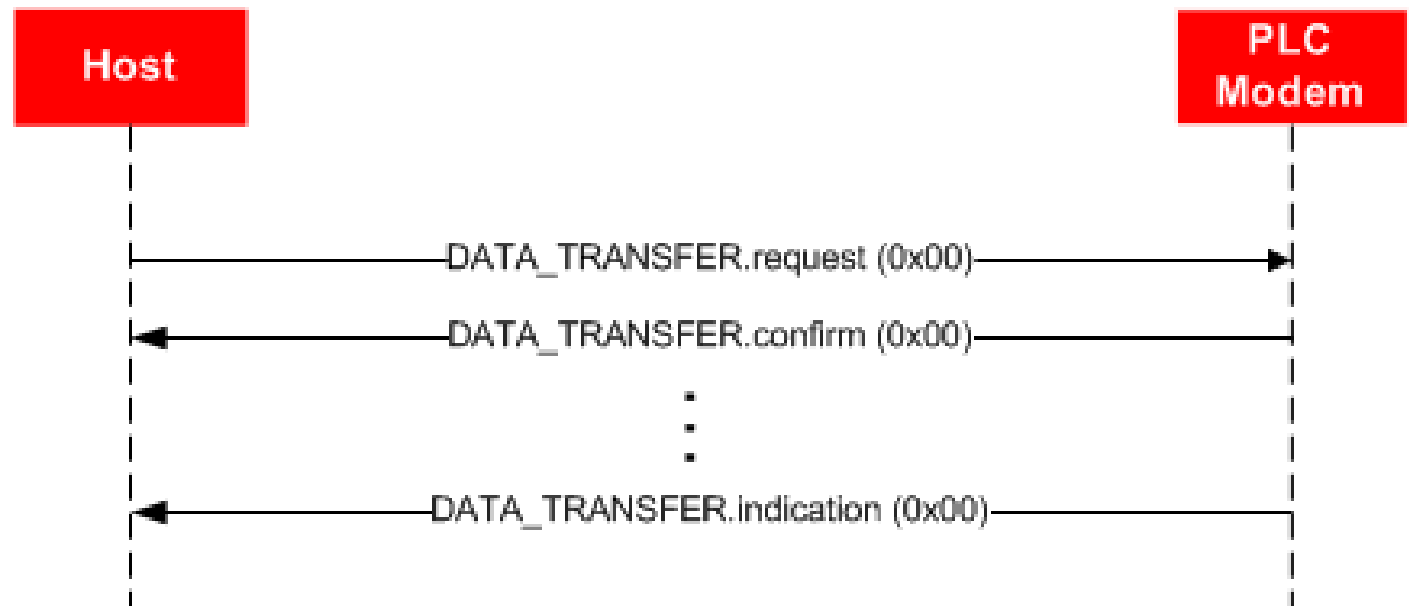
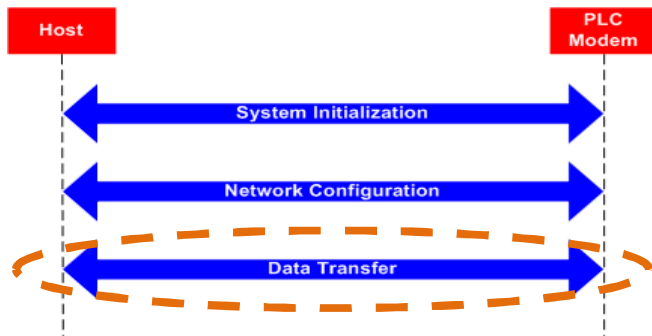
- DISCOVER**

| Length<br>(octets) | Bits          |   |   |   |   |   |   |   | Comments                                                                                                  |
|--------------------|---------------|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------------------------|
|                    | 7             | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                           |
| 1                  | Discover Type |   |   |   |   |   |   |   | 0x01 (Network Discover)                                                                                   |
| 1                  | Duration      |   |   |   |   |   |   |   | 0x05 (5 seconds: recommend)<br>* NOTE that the a longer duration may be needed depending on network size. |

- ATTACH.**

| Length<br>(octets) | Bits     |   |   |   |   |   |   |   | Comments                                                                                             |
|--------------------|----------|---|---|---|---|---|---|---|------------------------------------------------------------------------------------------------------|
|                    | 7        | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                                                                                                      |
| 2                  | PAN ID   |   |   |   |   |   |   |   | PAN ID to be attached (The host needs to choose a PAN ID from a list of PAN IDs in Discover.confirm) |
| 2                  | Reserved |   |   |   |   |   |   |   |                                                                                                      |

# Data Transfer



# Data Transfer

- DATA TRANSFER.request

| Length<br>(octets) | Bits        |   |   |   |   |     |     |         | Comments                        |
|--------------------|-------------|---|---|---|---|-----|-----|---------|---------------------------------|
|                    | 7           | 6 | 5 | 4 | 3 | 2   | 1   | 0       |                                 |
| 1                  | NSDU Handle |   |   |   |   |     |     |         | Random number between 0x00-0xFF |
| 1                  | Reserved    |   |   |   |   | QoS | SEC | D-route | 0x00                            |
| var                | L_SDU Data  |   |   |   |   |     |     |         | IPv6 Packet                     |

- DATA TRANSFER.indication

| Length<br>(octets) | Bits                               |          |   |   |   |   |   |     | Comments             |
|--------------------|------------------------------------|----------|---|---|---|---|---|-----|----------------------|
|                    | 7                                  | 6        | 5 | 4 | 3 | 2 | 1 | 0   |                      |
| 1                  | Link Quality Indicator (0x00-0xFF) |          |   |   |   |   |   |     |                      |
| 1                  | CFM                                | Reserved |   |   |   |   |   | SEC |                      |
| var                | Data Payload                       |          |   |   |   |   |   |     | Received IPv6 Packet |

- IPv6 Address Conversion

| Byte | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8        | 9        | 10   | 11   | 12   | 13   | 14             | 15             |
|------|------|------|------|------|------|------|------|------|----------|----------|------|------|------|------|----------------|----------------|
|      | 0xFE | 0x80 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | PANID[1] | PANID[0] | 0x00 | 0xFF | 0xFE | 0x00 | Short_Addr [1] | Short_Addr [0] |