DM18X0 Exerciser

Interactive PC Software

'User Reference Guide'

Rev: 1.3 – Feb 21, 2007 : D. Nelson RFM/Cirronet FAE (Europe)

Preface:

NOTE: The DM18X0Exerciser V1.6 'PC based' software works with **Windows XP** and may or may not work with earlier/other windows operating systems.

This companion document to the "DM18X0exerciser 'interactive PC based software' is provided as a quick reference. The document includes 'Frequently Asked Questions' (FAQ) to highlight features and operations that are not readily apparent.

In addition to DM18X0 Exerciser program and this 'User Reference Guide', it is recommended that the reader have available a copy of the following application notes..

-AN1800-23 "DM1800 V2.3 Application Programming"
-AN1810-23 "DM1810 V2.3 Application Programming"

These application notes can be found at www.rfm.com

This topics discussed within this document are presented in the following order:

-DM18X0 Exerciser Screen Layout
-"Frequently Asked Questions"
-DM18x0 MODES of Operation
-Set Up and Diagnostic Functions
-Device CONFIGURATION
-TEST Options
-Remote I/O Port Enable/Disable Function
-Digital INPUT Operations
-Analogue INPUT Operations
-Digital OUTPUT Operations
-UART I/O Operations
-Power Save Mode Operations
-Remote EVENT message handling

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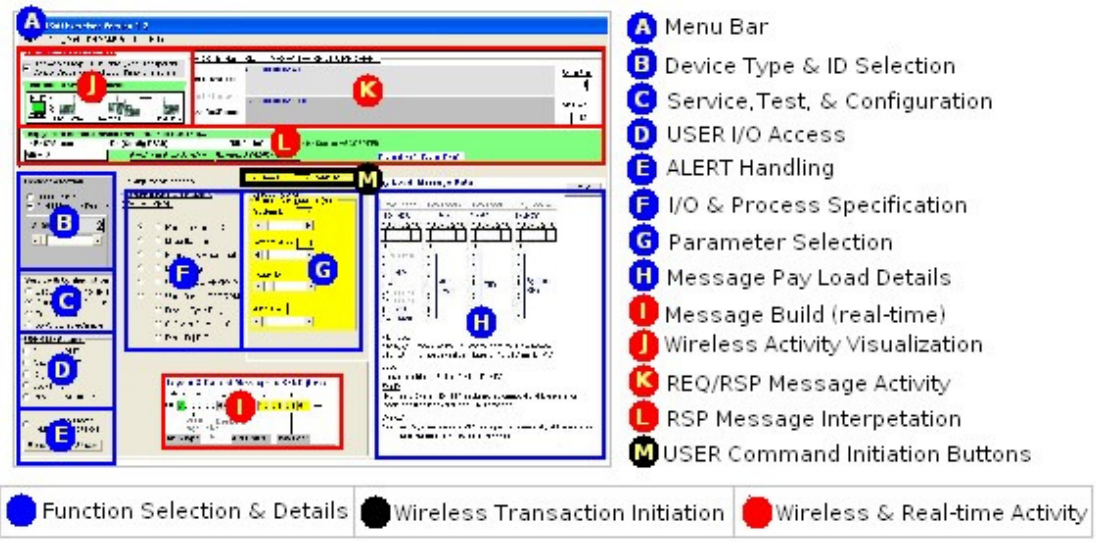
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DM18X0exerciser 'Screen Layout'



LEGEND of Symbols

☑ …check box

…HELP Screen… …HELP information screen

◂ …Menu Bar

⊙ …option button

[⇔] …scroll bar

[????] …User initiated operation

{ ~ User Text ~} …user text entry

EXAMPLE:

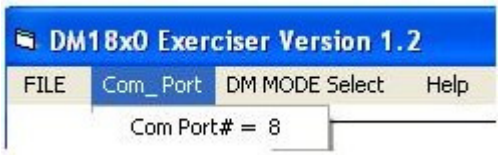
The steps required to perform a Digital 'pulse or signal' Output to a remote Field Node.

⊙Field_Node_or_Router (B) ……Select 'Field Node' ***OPTION*** (window **(B)**)
[⇔] *Alias ID* (B ……***SCROLL*** to select the desired remote ID (window **(B)**)
⊙Digital_OUTPUT (D) ……Select 'Digital OUTPUT ***OPTION*** (window **(D)**)
⊙Output Single or Pulse (F) ..Select 'Output Signal or Pulse ***OPTION*** (window **(F)**)
⊙{*high pulse*} (G) ……Click OPTION to select pulse characteristics
or ⊙{*low pulse*} (G) ***OPTION***'s include: High pulse, Low pulse
or ⊙{*high signal*} (G) High signal level, Low signal level.
or ⊙{*low signal*} (G) (window **(G)**)
[⇔] Pulse Time (G) ……***SCROLL*** to select 'pulse time' if applicable in (window **(G)**)
[SEND] (M) …….. **[SEND]** Output request to target device. (window **(M)**)

M18X0exerciser MENU Bar brief



Com-Port selected:



…identifies the virtual COM_PORT # select at the USB interface.

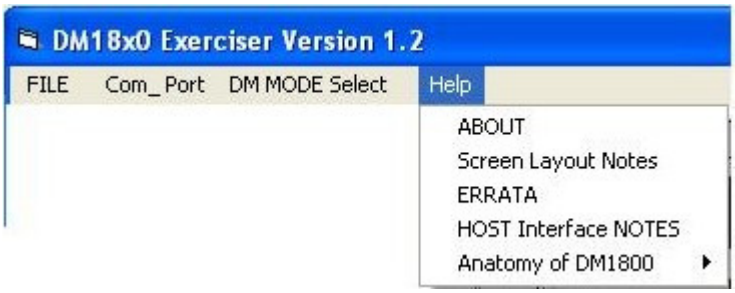
DM 18X0 Mode Selection



DM1800 module (1mW) …DM1810-434 and DM1800-434 mixed system.

DM1810 module (10mW) …DM1810 only system.

HELP



About

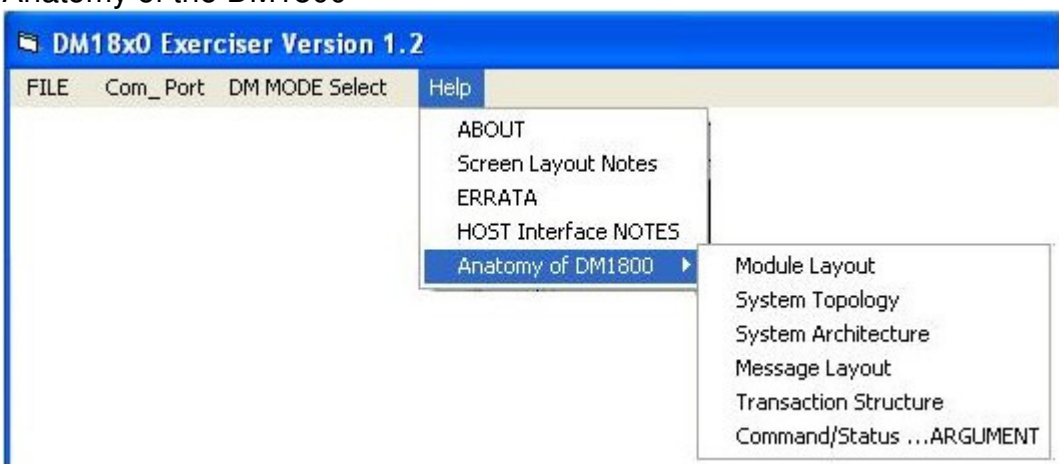
Screen Layout Notes
-general screen layout notes

ERRATA

HOST Interface Notes
-Host to base station message structure

Anatomy of DM1800
-Help screens of the DM1800 Architecture & Protocol

Anatomy of the DM1800



Module Layout > DM1800 PCB module 'top' view with I/O interfaces identified

System Topology > Illustration of DM18X0 system topology and wireless interconnections.

Sytem Architecture > Three (3) Layer DM18X0 MODEL and End User types

Message Layout > Protocol Stack and fields.

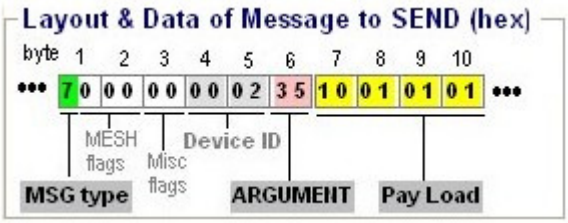
Transaction Structure> Solicited and Unsolicited transaction architecture.

Command/Status {ARGUMENT field} > Application User, Application Management, and System Management processes and related commands.

Real-Time Activity support windows

Output Message build window updated in 'real-time'

(refer to screen window **(I)**)

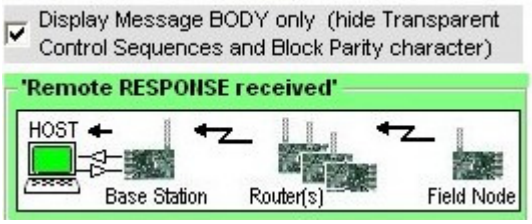


Notes:
-inherent 'tutorial' and 'standard for comparison'
-fields are in hexi-decimal format.
-***Device ID*** identifies target remote (AID)
-***PAY LOAD*** (0 to 5 bytes shown) indicate the details of the operation being created.

The ***Layout & Data Message to Send*** window is updated in 'real-time' as the user selection command options and parameters. Key packet fields include:
MSG TYPE –identifies Sys/App End User type and target destination (base station or remote)
ARGUMENT –identifies the command type and the associated I/O or process.
PAYLOAD –(optional) ..specifies the parameters/data associated with the command type.

Wireless Activity Visualization

(refer to screen window **(J)**)



Pictorial view or system components participating in the message transaction.

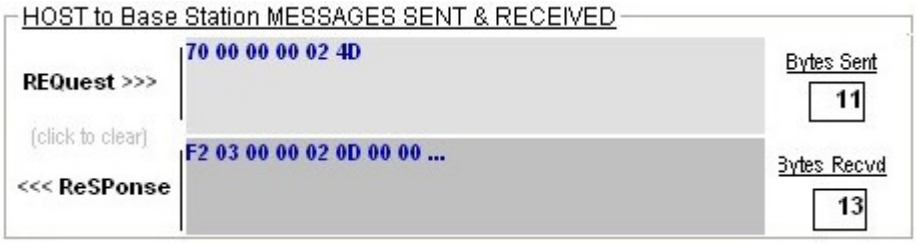
CheckBox (when checked) removes all host to base station handshaking overhead and message block parity character. Only message frame data is displayed as 'REQ/RSP Message Activity **(K).**

Border color indicates:

GREEN	>transaction completed successfully
YELLOW	>transaction in ERROR completion status
RED	>Host/Base Station interface ERROR.
BLACK	>Host/Base Station interface FAULT
BLUE	>Unsolicited transaction completion (ALERT)

REQUEST/RESPONSE Message Activity

(refer to screen window (K))

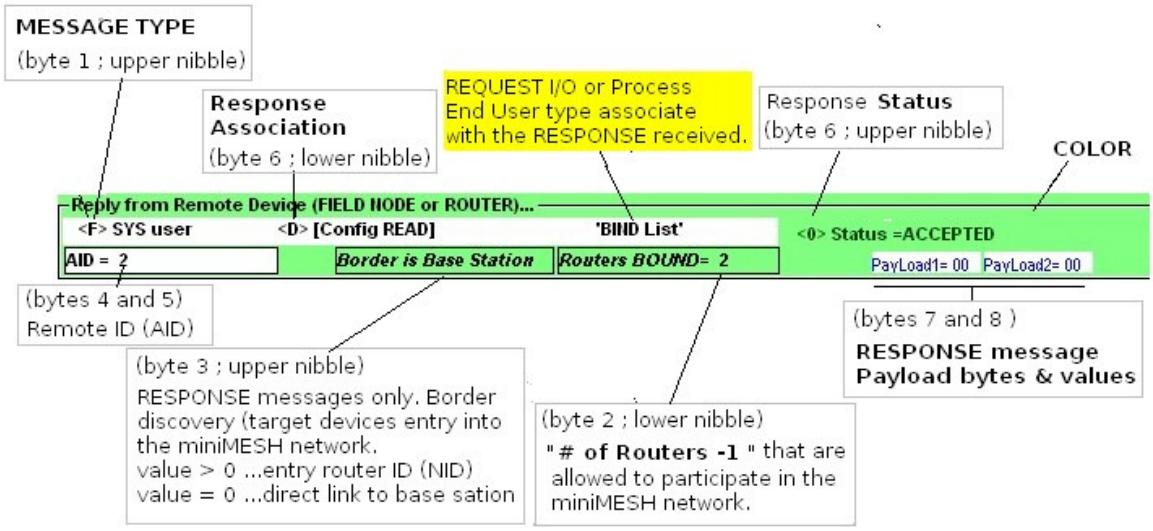


The two shaded areas above identify the **REQuest>>>** (from base station) and **<<<ReSPonse** (from remote) message activity areas. The messages are shown in hexi-decimal notation. The message header (first 6 bytes) conform with the format shown in screen window **(I).**

Three dots (**...**) in the '*response'* message are indicate the end of a message frame and is used as a message divider.

'**Bytes Sent'** and '**Bytes Recvd'** indicate the total number of bytes (including handshaking protocol bytes) exchanged between the Host (PC) and base station device.

Interpreting the RESPONSE Message
(refer to screen window **(L)**)



The message '*response'* (remote's reply to base station) is outlined above in narrative form. The associated message packet field(s) are noted.

Border color identifies how the transaction completed:

GREEN >transaction completed successfully
YELLOW >transaction in ERROR completion status
RED >Host/Base Station interface ERROR.
BLACK >Host/Base Station interface FAULT
BLUE >Unsolicited transaction completion (ALERT)

Frequently Asked Questions (FAQ)

„„Can I use the DM18X0 Exerciser program as an interactive guide or tutorial without having a base station or network attached?

Yes, the Dm18X0 Exerciser 'interactive PC software' and be downloaded (free of charge) and installed on the user's PC. All reference information and HELP screens are accessible without a PC to base station connection.

„„Are all the DM1800/DM1810 features up to and including Version 2.3 supported by the DM18X0 Exerciser program?

No. Accessing RSSI data from remote device and performing HOST controlled BIND operations are not supported in DM18X0Exerciser Version 1.6.

… I am only using '10mw' DM1810 modules in my system. Are there any mode related operations I need to perform?

The DM1810 base station is, by default, in 'DM1810 Mode' . No mode related operations are required.

Further HELP information is available to the user by accessing the DM18X0 Exerciser program and performing: ⊙Base_Station + ⊙MODEL/MODE_Notes

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… I am only using '1mW'' DM1800 modules in my system. Are there any mode related operations I need to perform?

The DM1800 base station always assumes 'DM1800' mode. No mode related operations are required.

Further HELP information is available to the user by accessing the DM18X0 Exerciser program and performing: ⊙Base_Station + ⊙MODEL/MODE_Notes

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… I want mix DM1810 and DM1800 modules in the same system. Will this work and are they compatible?

The '10mW' DM1800-916 operated and '1mw' DM1800-916 modules use different transmission mode techniques and are therefore 'not compatible' and cannot be mixed.

However, the '10mW' DM1810-434 operated and '1mw' DM1800-434 modules use the same transmission mode and therefore can be mixed.

IF the base station is a '1mW' DM1800-434 module no mode related operation is required. The system will inherently assume DM1800 Compatible mode.

IF the base station device is a DM1810-434 it must set to 'DM1800 compatible' mode.

Note: The DM1810-434 base station must be placed in 'DM1800 Compatible' mode prior to BINDing any remote devices to the system

Using the DM18X0 Exerciser program, perform the following.

…On the main MENU bar perform
◂DM_MODE_Select + ◂DM1810_Module_(10mW)
…To select 'DM1800 Compatible' mode perform
⊙Base_Station + ⊙Set_DM1800_Compatible_Mode +**[SEND]**

In 'DM1800 Compatible ' mode the DM1810-434 modules have an RF power output of '10mW', however they will assume networking characteristics of a DM1800 only system.

Further HELP information is available to the user by accessing the DM18X0 Exerciser program and performing: ⊙Base_Station + ⊙MODEL/MODE_Notes

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… How does a DM1810-434 module differ in operation when in 'DM1810 mode' or in 'DM1800 Compatible' mode?

In 'DM1810 mode' the miniMESH routing latency is more efficient and therefore a DM1810 only system can and will support up to fifteen(15) miniMESH routers.

In 'DM1800 Compatible mode' the DM1810-434 modules assume the characteristics and timing inherent to DM1800-434 modules. Because of less efficient routing latency in 'DM1800 Compatible mode' a maximum of seven (7) miniMESH routers are supported

Note: In a 'mixed' DM1810-434 and DM1800-434 system it is recommended that only DM1810-434 '10mW' modules be used as routers, thereby assuring a more robust miniMESH backbone.

… The DM1810 module hardware is identical, as is the DM1800 module hardware. Since the base station, routers, and field nodes all look alike, how can I confirm the module type?

The easiest way is to observe the on-board LEDs when power is applied to the module. The LED sequence will indicate the module type. This is described in detail as HELP screen in the DM18X0 Exerciser software. To access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics + ⊙Power_ON_LED-Sequence_Notes

---

… How do I BIND a remote router or field node into my DM18X0 system?

Field Nodes and Router devices that have not been attached or bound to a system must be bound to the system by a BIND process. This operation can be performed without the support of a host device. To perform a 'manual BIND' operation follow the procedures outlined in the HELP screen located within the DM18X0 Exerciser software. To access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics + ⊙Manual_BIND_Notes

---

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⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics + ⊙Manual_BIND_Notes

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… The DM1800/DM1810 module is installed in an enclosure and I have no access to the BIND switch on the module. Is there a way to put the DM1800 or DM1810 router or field node into BIND mode without pressing the BIND switch or signalling the BIND input pin?

Yes, the DM18X0 embedded software Version 2.3 provides will automatically enter BIND mode within the first 15 seconds after power is applied and then return to normal operating mode. The device will only enter "automatic BIND initiate on power on " if it has NOT been previously bound. A previously bound device will enter into normal operation following power on.

… If I have a DM1800 or DM1810 router or field node that has been previously 'bound' to a system, is there a way to 'unBIND' the module to allow it to 'automatically initiate BIND mode on power up'?

Yes, the desired way is to 'return' the device to its original manufactured configuration.

A DM18X0 Exerciser HELP screen is available that provides helpful hints. To access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics
+ ⊙Notes to return a ROUTER or FIELD NODE to the DEFAULT configuration

---

… Can the DM18X0 devices be placed in a 'sleep' mode to conserve power?

Yes, DM1800/DM1810 remote devices can be configured using online commands to enter sleep or 'power save mode' to conserve battery power.

In sleep mode a DM1810 module will consume on the average 60 micro amps, while the DM1800 module will comsume about 150 micro amps.

… Can the input event awaken a DM1800/DM1810 from sleep mode?

Yes, online configuration commands allow the user to configure the device to awaken on a digital input event (i.e. signal transition or count threshold) or and analogue input threshold.

The DM1800/DM1810 device can also be awakened by signalling the BIND input or pressing the BIND button.

… Can UART data on the remote DM1800/DM1810 'UART input pin' awaken the device from sleep mode?

No, during sleep mode the UART input is ignored by the DM1800/DM1810 device. However the user can first awaken the DM1800/DM1810 and then send UART input once the device is awake. While the digital input pin provides a means to awaken the device, signalling the BIND input for about 500 mS can also awaken the DM1800/DM1810 module and UART input can then be sent.

… When installing the system, what guidelines should I follow in placing to assure that a reliable system is formed?

All systems layouts and operating environments differ and there is no single rule of thumb that applies to all systems equally. However there are some practical hints and guidelines that can be followed.

A DM18X0 Exerciser HELP screen is available that provides helpful hints. To access this HELP screen perform:

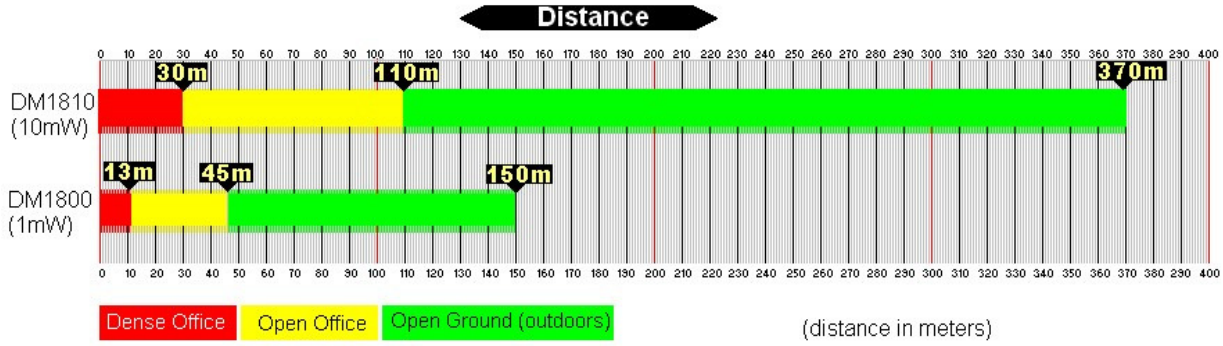
⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics + ⊙miniMESH_Network_SET_UP_Notes

Radio Range Expectations , “a Starting Point”.

As a guideline assume three operating environments:

…***Dense Office*** -dense cubical office space or multi-story building, with line of sight obstructions (partitions, walls, floors, etc.).
…***Open Office*** -typical open office, warehouse, or retail space
…***Open Ground*** - out doors with devices mounted about 1.5 meters above ground /floor level.

Environments may vary significantly as will the radio range expectations. The illustration below outlines ‘a practical starting point’ based on theory and practice. Actual on site testing will be required to determine what can be expected of the radio system.



Achieving Radio Reliability

Eliminating EMI (Electro-Magnetic Interference) is the first step in achieving radio reliability performance. While most of the EMI sources are abrupt causes of EMI and are not continual, however their momentary effects must be considered. Common sources of EMI include.

MAN-MADE EMI	NATURAL EMI CAUSES
-Computer devices -RF equipment -Automobile-ignitions -Electric Motors -Arc Welders -Fluorescent Lighting -Electrical Relays -Switches/Dimmers -Neon Signs -High Voltage Power Lines	-Static Electricity -Lightening

In order to get the maximum effectiveness from the mesh network the position of the radio antenna and height is of utmost importance. In order to assure optimum performance:

...keep the antenna away from interference sources as outlined above.

…keep the antenna well above ground level and free from any nearby obstructions. Indoors keep the antenna well above floor level in office areas, or as high an open as possible in warehousing environments.

...keep the antenna away from other metal in the nearby vicinity. Avoid mounting devices on metal surfaces (i.e. metal siding, foil-wall paper, etc). This is particularly important for the routing devices (mini MESH backbone).It may not be possible due to practical ergonomic and application sensor location requirements; however a compromise may need to be reached.

… Are there procedures or tools I can follow or use to determine if the modules I install have good wireless 'connectivity' with the miniMESH network?

Yes, the miniMESH network and protocol was designed with a focus on simplicity and 'plug and play'. A DM18X0 Exerciser HELP screen is available that provides helpful hints. To access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics + ⊙miniMESH_Network_SET_UP_Notes

During the installation process, the system 'base station' device should be placed in 'AUTO SEND' mode ' as mentioned in the HELP screen above. While in AUTO SEND mode the base station will send wireless request messages at short intervals which are used to exercise the radio network.

To access this HELP screen information in setting up 'AUTO SEND' mode at the base station, perform:

⊙Field_Node_or_Router + ⊙Test_Options
+⊙Notes_to_manually_Set-Up_ 'AutoSend'_Mode

All DM18X0 modules employ a 'network connectivity diagnostics' feature which can be manually accessed by using the on-board BIND switch and the LEDs. A HELP screen is provided assist in using this feature.

For the base station, to access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics
+ ⊙Base_Station_to_Network_Connectivity_Notes

For remote devices (field nodes and routers) , to access this HELP screen perform:

⊙Field_Node_or_Router + ⊙Set_UP_&_Diagnostics
+ ⊙Router_or_Field_Node_to_Network_Connectivity_Notes

Rule of Thumb:

As a 'rule of thumb' to assure good communications reliability and mesh redundancy :

…the base station device has a "***direct link to two or more miniMESH routers***".

…remote devices, either routers or field nodes, :
-"have a direct link to the base station or one or more miniMESH routers"
or…
-"have a direct link with two or more miniMESH routers".

… Does the DM1810/DM1800 hardware include an RSSI circuit?

Yes and No.

The standard DM1810 module does include an onboard RSSI circuit which can be enabled and disabled. The RSSI function is provided as a maintenance, diagnostic, or set-up function and must be disabled for normal system operation.

The DM1800 module does not support an RSSI circuit.

… I have modules installed where I cannot physically access the bind switch or view the LEDs. Is there any way to check which miniMESH routers are within direct radio range by using on-line commands?

Each DM18X0 module retains a LINK MAP which identifies which mesh routers are in direct radio range to the device. This information is maintained at each device automatically and can be retrieved using online commands. With this information the central host/base station device can better understand the wireless network structure, and better diagnose system reliability problems.

For additional information on 'LINK MAP' management use the DM18X0 exerciser software and perform the following:

Base_Station + ⊙READ_Base_Station_LINK_MAP and review the notes provided.

or

⊙Field_Node_or_Router + ⊙TEST_Options + ⊙READ_LINK_MAPand review the notes provided.

… Can a DM18X0 Router also function as a Field Mode?

Yes, in fact a DM18X0 module manufactured as either router or field node can be converted, using online commands, into a 'combination field node and router'. This allows it to share to module personalities at the same time. Using the DM18X0 Exerciser software, HELP information is available and can be accessed by performing:

⊙Field_Node_or_Router + ⊙Set_Up_&_Diagnostics

+ ⊙Convert_FIELD_NODE_to_a_'combination_Router_&_Field_Node'_notes

or

+ ⊙Convert_Router_to_a_'combination_Router_&_Field_Node'_notes

---

… If my base station device fails, and needs to be replaced, can it be replaced with another base station without the need to re-bind every remote device in the system again?

Yes, procedures and commands are available to allow the DM18X0 Exerciser to configure or replicate the network configuration on a replacement base station

device. A HELP screen is available describe this operation. The HELP Screen can be accessed by performing:

⊙Field_Node_or_Router + ⊙Set_Up_&_Diagnostics + ⊙Replace_Base_Station_Notes

---

… My application requires end devices (i.e. field nodes) that can move or roam about the network. Is this possible and is it practical?

While the DM18X0 base station and routers must remain stationary to assure a reliable miniMESH backbone, field nodes may move freely within the network. Managing moving field nodes is inherent to the miniMESH multi-cast protocol at no additional cost in networking overhead.

… Is there a means to track moving field nodes about a miniMESH network?

Yes, this process (known as 'border discovery') is inherent to the miniMESH system. A 'border router' (a router which directly receives/intercepts a field node's '*response/reply'* will attach its router ID to the packet as it participates in routing the *'response '* message onward. If more than one entry router receives the response directly and participates , generally the lowest router ID will prevail.

While not precise and relying on stationary routers (where positions are known), border discovery can provide the host /base station the general area location or zone where the field node entered (or is located) the system.

Base Station DM18X0 MODE Operations

HELP NOTES: DM1800 Compatible / DM1810 MODE Notes

Purpose: to display a HELP screen which describes the mode of operation for DM1810 base station devices. Modes include 'DM1810 only' and 'DM1800 Compatible' mode.

……

Steps:

⊙Base_Station (B)
⊙Model/Mode_Notes (C)
…HELP Screen…

……

READ: DM1810 / DM1800 Compatible MODE Setting

Purpose: provides the user with a means to retrieve DM1810 base station MODE information. Information included Mode setting (i.e. DM1810 mode or DM1800 Compatible mode) as well as DM1800 base station module type (i.e. DM1810-916 or DM1810-434).

……

Steps:

⊙Base_Station (B)
⊙READ_ Model/ Mode (C)
[SEND] (M)

……

WRITE: (SET) ' DM1800 Compatible' Mode

Purpose: provides the user with a means to place the DM1810 base station in 'DM1800 Compatible' mode. DM1800 Compatible mode is used when a mix of DM1810-434 (10 mW) and DM1800-434 (1 mW) devices are in the system..

……

Steps:

⊙Base_Station (B)
⊙Set_DM1800_Compatible_Mode (C)
[SEND] (M

……

WRITE: (SET) ' DM1810' Mode

Purpose: provides the user with a means to place the DM1810 base station into 'DM1810 mode' when the system comprises of DM1810 modules only. Note that this is 'default' DM1810 base station mode during manufacture.

……

Steps:

⊙Base_Station (B)
⊙Set_DM1810_Mode (C
[SEND] (M)

……

Set-Up & Diagnostic Operations

HELP NOTES: User MANUAL BIND Operation

Purpose: to display useful HELP screen information about 'how to perform a Manual BIND operation using the on-board Bind Switch and LEDs.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Set_Up&Diagnostics (C)
⊙Manual BIND Notes (F)
…HELP Screen…

……

HELP NOTES: 'Device Type' LED display on Power Up

Purpose: to display useful HELP screen information about how the on-board LEDs are used to identify the module type (i.e. base station, router, field node) when the device is powered up or reset.

……

Steps:

⊙Field_Node_or_Router (B
⊙Set_Up&Diagnostics (C)
⊙Power ON LED Sequence Notes (F)
…HELP Screen…

……

HELP NOTES: 'Base Station Network Connectivity' LED display

Purpose: to display useful HELP screen information about how the on-board Bind Switch and LEDs can be used to determine the number of system routers with a direct radio link with this base station. This operation is useful during system installation and as a diagnostic tool.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Set_Up&Diagnostics (C)
⊙Base Station to Network Connectivity Notes (F)
…HELP Screen…

……

HELP NOTES: Field Node / Router 'Network Connectivity' LED display

Purpose: to display useful HELP screen information about how the on-board Bind Switch and LEDs can be used to determine if a remote device (field node or router) has a direct link with the Base Station and/or the number of system routers with a direct radio link with this device. This operation is useful during system installation and as a diagnostic tool.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Set_Up&Diagnostics (C)
⊙Router or Field Nod to Network Connectivity Notes (F)
…HELP Screen…

……

HELP NOTES: 'miniMESH Network' Set-Up Guidelines

Purpose: to display useful HELP screen information about 'how to set-up / install the mesh network routers to form the mesh network backbone.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Set_Up&Diagnostics (C)
⊙miniMESH Network Set-Up Notes (F))
…HELP Screen…

……

HELP NOTES: "Replacing the Base Station"

Purpose: to display a HELP screen provides procedural information to allow user to 'replace the existing base station' thereby eliminating the need to re-bind all system devices in the event of a base station failure.

……

Steps:

⊙Field_Node_or_Router (B

⊙Set_Up&Diagnostics (C)

⊙Replace BASE STATION Notes (F)

…HELP Screen…

……

HELP NOTES: Retrieve Bound Router and Field Node Counts

Purpose: to display a HELP screen which describes the procedures needed to retrieve the accumulative BIND information retained by the Base Station device. This information identified the number of remote device and routers attached to the system.

……

Steps:

⊙Field_Node_or_Router (B

⊙Set_Up&Diagnostics (C)

⊙Retrieve BIND CONFIG and BIND LIST data (F)

…HELP Screen…

……

HELP NOTES: Convert Field Node to (Field Node/ Router Combination)

Purpose: to display a HELP screen which describes the procedures needed change a ***field node*** into a 'combination field node and router' device, thereby allowing a manufactured field node to participate in network routing.

……

Steps:

⊙Field_Node_or_Router (B)

[⇔] *Alias ID* (B)

⊙Set_Up&Diagnostics (C)

⊙Convert FIELD NODE to a (combination device) Notes (F)

…HELP Screen…

……

HELP NOTES: Convert Router to (Field Node/ Router Combination)

Purpose: to display a HELP screen which describes the procedures needed to change a ***router*** into a 'combination router and field node' device, thereby allowing a manufactured router to support the Input/Output ports and processes.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Set_Up&Diagnostics (C)
⊙Convert ROUTER to a (combination device) Notes (F)
…HELP Screen…

……

HELP NOTES: RESTORE Field Node or Router to DEFAULT Configuration

Purpose: to display a HELP screen which describes the procedures needed restore a field node or router device 'back to its original manufactured configuration state. Once complete the device is no longer bound or associated with a system.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Set_Up&Diagnostics (C)
⊙Return Field Node or Router to DEFAULT Config Notes (F)
…HELP Screen…

……

CONFIGURATION Access (Base Station)

READ: System BIND Configuration

Purpose: provides the user with a means to retrieve the system identity and the system security Key held by the base station. All devices bound to the base station will be assigned the same SID and KEY.

……

Steps:

⊙Base_Station (B)
⊙BIND_Config Data {READ} (F)
[SEND] (M)

……

NOTES:
….retrieved information includes the System ID (SID or 'Personal Area Network' ID) and the 'low level' system security Key.
…the base station device is programmed with a SID=0 and KEY=0 during the manufacture. A non-zero SID will be automatically assigned by the base station during the first device BIND to the system.

WRITE: System BIND Configuration *(for Advanced user only)*

Purpose: provides the user with a means to change the system identity and the system (SID and Sys Key). The reason for change would include:

-replace a failing base station device with a new base station, thereby eliminating the need to re-bind whole system.

-purge (clear) the BIND configuration in order to free the base station for the purpose of creating a new system.

Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Base_Station (B)
⊙BIND_Config Data {WRITE} (F)
[⇔] Sytem ID (G)
[⇔] System Key (G)
[SEND] (M)
[Device_RESET] (M)

……

NOTES:

Sys ID or SID = Personal Area Network ID which is randomly selected by th Base Station device.

Sys Key = 8 bit 'low level' security key unique and known only to system (bound) devices.

READ: System BIND List

Purpose: provides the user with a means to retrieve the count of the 'number or routers and field nodes' bound to the system. This information identifies how many routers are participating in the mesh network as well as the total number of remote devices (field nodes plus routers) assigned to the system.

……

Steps:

⊙Base_Station (B)
⊙BIND_LIST {READ} (F)
[SEND] (M)

……

WRITE: System BIND List *(for Advanced user only)*

Purpose: provides the user with a means to change the BIND LIST data (# of routers and # of AIDs assigned to the system).). The reason for change would include:
-adjusting router and remote AID counts when a field node or router replacement is necessary.
Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Base_Station (B)
⊙BIND_LIST {WRITED} (F)
[⇔] Router ID (G)
[⇔] Alias (G)
[SEND] (M)
[Device_RESET] (M)

……

NOTES:

Router ID (NID) = Personal Area Network ID which is randomly selected by th Base Station device.
Alias ID (AID) = 8 bit 'low level' security key unique and known only to system (bound) devices.

READ: System MESH Flags

Purpose: provides the user with a means to retrieve the MESH flags. This flag identifies the maximum number of routers allowed in the system. Mesh flag values include:
-DM1810 mode (15 routers max)
-DM1800 Compatible or DM1800 devices (7 routers max).

……

Steps:

⊙Base_Station (B)
⊙MESH_Flags {READ} (F)
[SEND] (M)

……

WRITE: System MESH Flags (NOT IMPLEMENTED)

Purpose: provides the user with a means to alter base station MESH Flag data..

……

Steps:

⊙Base_Station (B)
⊙MESH_Flags {WRITE} (F)
[SEND] (M)

……

READ: Base Station DEVICE TYPE Data

Purpose: provides the user with a means to retrieve the DEVICE TYPE flag from the base station device. The device type bits (bit 7 and 6) equal 00 to indicate the device was manufactured as base station module.

……

Steps:

⊙Base_Station (B)
⊙Device_Type_Flag (F) {read}
[SEND] (M)

……

READ: Base Station SOFTWARE VERSION #

Purpose: provides the user with a means to retrieve the Software Version number of the base station firmware.

……

Steps:

⊙Base_Station (B)
⊙Software_Version_# (F) {read}
[SEND] (M)

……

READ: Base Station REAL ID (RID)

Purpose: provides the user with a means to retrieve the base station's 'Real ID or RID' which is unique to the product line. The RID is a 32-bit value that can be compared to a MAC ID.

……

Steps:

⊙Base_Station (B)
⊙Real_ID_[RID] (F) {read}
[SEND] (M)

……

CONFIGURATION Access (Field Node or Router)

READ: Remote Device CONFIGURATION Data

Purpose: provides the user with a means to retrieve the system ,security, and device identity from the target device

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Remote_Config Data {READ} (F)
[SEND] (M)

……

NOTES:
….retrieved information includes the System ID, System Key, Router ID (NID), and the Alias ID (AID).

WRITE: Remote Device CONFIGURATION Data *(for Advanced user only)*

Purpose: provides the user with a means to modify/change the system ID (SID), System Key, router identity (NID), and remote device identity (AID). The reason for change would include:

-replicating the identities of a faulty field node or router into a replacement device.
-altering the router ID (NID) of a field node or router device in order enable or disable routing support by the device.

Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Remote_Config Data {WRITE} (F)
[⇔] Sytem ID (G)
[⇔] System Key (G)
[⇔] Router ID (G)
[⇔] Alias (G)
[SEND] (M)
[Device_RESET] (M)

……

READ: Remote MISCELLANEOUS Flag Settings

Purpose: provides the user with a means to retrieve the 'report event on Power On' flag. This flag, when set, will prevent the device from sending a 'power on report' messages. The manufactured 'default' setting of this flag bit is 0 (enable reporting Power Up event messages).

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Miscellaneous {READ} (F)
[SEND] (M)

……

WRITE: Remote MISCELLANEOUS Flag Settings

Purpose: provides the user with a means to enable or disable 'power up event' message reporting by the target remote device. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Miscellaneous {WRITE} (F)
[SEND] (M)
[Device_RESET] (M)

……

READ: Remote Device MESH Flags

Purpose: provides the user with a means to retrieve the MESH flags from the target remote field node or router device.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙MESH_Flags {READ} (F)
[SEND] (M)

……

WRITE: Remote Device MESH Flags (Not Implemented)

Purpose: provides the user with a means to alter base station MESH Flag data..

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙MESH_Flags {WRITE} (F)
[SEND] (M)

……

READ: User A EEPROM Data Area

Purpose: provides the user with a means to retrieve a string of 24 bytes of non-volatile memory from User **A** EEPROM.

……

Steps:
⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙User**A**_data_EEPROM {READ} (F)
[SEND] (M)

……

WRITE: User A EEPROM Data Area

Purpose: provides the user with a means of writing (storing) 24 bytes of desired data to the target device's EEPROM data memory (non-volatile).
Usage: …user data can include calibration information relevant to the remote devices I/O.
…user data can include narrative position or location information of the device.
…other ?

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙UserA_data_EEPROM {WRITE} (F)
{ ~ 24 bytes of User text ~} (G)
[SEND] (M)

……

NOTE: *User text data bytes can include any 8 bit binary bit pattern.*

READ: User B EEPROM Data Area

Purpose: provides the user with a means to retrieve a string of 24 bytes of non-volatile memory from User **B** EEPROM.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙UserB_data_EEPROM {READ} (F)
[SEND] (M)

……

WRITE: User B EEPROM Data Area

Purpose: provides the user with a means of writing (storing) 24 bytes of desired data to the target device's EEPROM data memory (non-volatile).
Usage: …user data can include calibration information relevant to the remote devices I/O.
…user data can include narrative position or location information of the device.
… other ?

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙UserB_data_EEPROM {WRITE} (F)
{ ~ 24 bytes of User text ~} (G)
[SEND] (M)

……

NOTE: *User text data bytes can include any 8 bit binary bit pattern.*

READ: Remote DEVICE TYPE I/O Settings

Purpose: provides the user with a means to retrieve the DEVICE TYPE flag from the remote device identified by the AID. The device type bits (bit 7 and 6) are assigned when the module is manufactured and cannot be changed (although the module personality can be changed via on-line commands). Bit 7 and 6 have a value of 01 for a module manufactured as a router and a value of 10 for a field node device.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Device_Type_Flag (F) {read}
[SEND] (M)

……

READ: Remote Device SOFTWARE VERSION #

Purpose: provides the user with a means to retrieve the Software Version number of the target field node or router device.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Software_Version_# (F) {read}
[SEND] (M)

……

NOTE:
Remote devices will also include their Software Version number in a Power Up report message (if Power Up event reporting is enabled)

READ: Remote Device REAL ID (RID)

Purpose: provides the user with a means to retrieve the target remote (router or field node) device's 'Real ID' or RID.. The RID is a unique 32 bit product line identification that can be compared to a MAC ID .

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Real_ID_[RID] (F) {read}
[SEND] (M)

……

TEST Option Selection

WRITE: Set Base Station 'AUTOSEND' MODE.

Purpose: provides the user with a means to place the base station device into 'AUTOSEND' mode, where the base station will periodically poll the radio network without further Host (DM18X0exerciser) support. **Steps:**

……

Steps:

⊙Field_Node_or_Router (B)
⊙Test_Options (C)
⊙Set_BASE_Station_'AUTOSEND'_Mode (F)
[SEND] (M)

……

NOTE:
AUTOSEND mode will cease on a subsequent REQ message from the host. The AUTOSEND operation is the same as the Manual AUTOSEND operation performed by the user.

HELP NOTES: Manual Set-up of Base Station 'AUTOBIND' Mode

Purpose: to display a HELP screen which describes the procedures needed for the user to place the base station into AUTOSEND mode without requiring any host support.

……

Steps:

⊙Field_Node_or_Router (B)
⊙Test_Options (C)
⊙Notes to manually set-up Base Station 'AutoSend' Mode (F)
…HELP Screen…

……

PURGE: Remote LINK MAP Data

Purpose: provides the user with a means to purge or clear the target device's LINK MAP data.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Test_Options (C)
⊙Purge_LINK_MAP (F)
[SEND] (M)

……

NOTE:
…once a bit entry in the LINK MAP is set (1), it can only be cleared by:
-Power cycling or resetting the Device.
-by issuing a PURGE_LINK_MAP message.

READ: Remote LINK MAP Data

Purpose: provides the user with a means to retrieve the MESH flags from the target remote field node or router device.

The LINK MAP for all devices is 'inherently' updated upon receipt of a valid message received from:

- the base station
- a nearby routing device participating in the routing process.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Test_Options (C)
⊙Retrieve_LINK_MAP (F)
[SEND] (M)

……

NOTE:
…The LINK MAP is a bit map that is maintained by all devices. A bit position in the LINK MAP is directly related to a nearby router For example: bit 6 of the LINK map being set will indicate that the device has a direct link with Router #6.
… Bit 0 (not a valid router ID) is associated with the remote devices direct link to the base station device. Example, bit 0 of the LINK MAP is set to 0 it the target device has a direct radio link with the base station device..

Remote I/O Port Enable/Disable Selection

WRITE: Remote I/O Enable / Disable Settings

Purpose: provides the user with a means to enable or disable router and field node I/O ports. This function allows the user to enable I/O port support on routing devices thereby permitting a router to have 'field node personality' also. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙I/O_Port_Enable/Disable (C)
☑ LED Activate
☑ Digital INPUT
☑ Analogue INPUT
☑ Digital OUTPUT
☑ UART I/O
[SEND] (M)
[Device_RESET] (M)

……

NOTE:
…Default Router I/O has 'LED ACTIVE' only enable. User access to disabled I/O ports will result in a 'reject' response from the target device.
…Default Field Node I/O have all I/O ports enabled. 'LED Active' is disabled to minimize their use and to conserve power.

User Access "Digital INPUT"

READ: Digital INPUT (signal / Counter)

Purpose: provides the user with a means to retrieve the current Digital INPUT parameters, signal level, and count.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital INPUT (C)
⊙READ digital_INPUT (D)
[SEND] (M)

……

PURGE: Clear Digital INPUT Counter

Purpose: provides the user with a to clear, on demand, the current value held in the 24 bit Digital INPUT Counter.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital INPUT (C)
⊙Purge/Free Input Counter (C)
[SEND] (M)

……

READ: Digital INPUT CONFIGURATION

Purpose: provides the user with a means to retrieve Digital INPUT Configuration held in EEPROM.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital INPUT (C)
⊙INPUT Configuration {WRITE} (F)
[SEND] (M)

……

WRITE: Digital INPUT CONFIGURATION

Purpose: provides the user with a means to change the Digital INPUT Configuration. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital INPUT (C)
⊙INPUT Configuration {WRITE} (F)
☑ Report EVENT Immediately (G)
⊙ *{high transition}* or ⊙ *{low transition}* or ⊙ *{ANY} transition* (G)
☑ Counter (enable) (G)
[⇔] Count Threshold (G)
☑ RESET Cont on Threshold (G)
[⇔] DeBounce filter (G)
[SEND] (M)
[Device_RESET] (M)

……

USER Access: "Analogue INPUT"

READ: 10 Bit Analog INPUT

Purpose: provides the user with a means to immediate sample and read of Analogue INPUT and return as an 10-bit analogue value. The information returned also includes high and low threshold flags which are set if the respective threshold has been reached or exceeded.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Analog_INPUT (D)
⊙READ 10 Bit Analog IN (F)
[SEND] (M)

……

READ: 8 Bit Analog INPUT

Purpose: provides the user with a means to immediate sample and read of Analogue INPUT and return as an 8-bit analogue value. The information returned also includes high and low threshold flags which are set if the respective threshold has been reached or exceeded.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Analog_INPUT (D)
⊙READ 8 Bit Analog IN (F)
[SEND] (M)

……

PURGE: Analog Threshold Flags

Purpose: provides the user with a means purge the Analogue INPUT high and low threshold flags. These flags, once set will remain set until either Purged (this function) or power on or device_reset occurs.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Analog_INPUT (D)
⊙Purge Threshold Flags (F)
[SEND] (M)

READ: Analog Configuration

Purpose: provides the user with a means to retrieve Analogue INPUT Configuration held in EEPROM. .

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Analog_INPUT (D
⊙Analog Configuration {READ} (F)
[SEND] (M)

……

WRITE: Analog Configuration

Purpose: provides the user with a means to change the Analogue INPUT Configuration. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Analog_INPUT (D
⊙Analog Configuration {WRITE} (F)
☑ Report EVENT Immediately (G)
☑ 10-BIT Analog Input (G)

⊙ {No threshold check }
or ⊙ *{high & low threshold check}*
or ⊙ *{high threshold ONLY threshold check)*
or ⊙ *{low threshold ONLY threshold check)* (G)

[⇔] Low Threshold value (G)
[⇔] High Threshold value (G)

[SEND] (M)
[Device_RESET] (M)

……

READ: Analog PERIODIC Sample Time value

Purpose: provides the user with a means to retrieve the PERIOD time value (or Analogue sample time interval) from the target device. This time is used only when the device is AWAKE. During SLEEP, the analogue input sample time is fixed at approximately 15 second intervals.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Configuration_Access (C)
⊙Periodic&Heartbeat {READ} (F)
[SEND] (M)

……

USER Access: "Digital OUTPUT"

WRITE: Digital OUTPUT Signal or Pulse

Purpose: provides the user with a means send a Digital OUTPUT signal to the target device. The Digital OUTPUT can be a change of OUTPUT signal state or initiating a timed pulse. Signal pulses widths of a few milliseconds to over 35 seconds are possible.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital_OUTPUT (D)
⊙Output Single or Pulse (F)
☑ Output Signal = High (G)

⊙{*high pulse*}
or ⊙{*low pulse*}
or ⊙{*high signal*}
or ⊙{*low signal*} (G)

[⇔] Pulse Time (G
[SEND] (M)

……

READ: Digital OUTPUT State

Purpose: provides the user with a means to retrieve the current Digital OUTPUT state of the target device. General digital output parameters are also returned with the requested digital output state.

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital_OUTPUT (D)
⊙READ Output State (F)
[SEND] (M)

READ: Digital OUTPUT Configuration

Purpose: provides the user with a means to retrieve Digital Output Configuration held in EEPROM. .

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital_OUTPUT (D)
⊙OUTPUT Configuration {READ} (F)
☑ Output Signal = High (G)

⊙{*high pulse*}
or ⊙{*low pulse*}
or ⊙{*high signal*}
or ⊙{*low signal*} (G)

[⇔] Pulse Time (G
[SEND] (M)

WRITE: Digital OUTPUT Configuration

Purpose: provides the user with a means to change the Digital OUTPUT Configuration. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Digital_OUTPUT (D)
⊙OUTPUT Configuration {WRITE} (F
☑ Output Signal = High (G)

⊙{*high pulse}*
or ⊙{*low pulse}*
or ⊙{*high signal}*
or ⊙{*low signal}* (G)

[⇔] Pulse Time (G
[SEND] (M)
[Device_RESET] (M)

……

USER Access: "UART INPUT/OUTPUT"

READ: UART Input Buffer

Purpose: provides the user with a means to retrieve UART INPUT data that is being held in the target devices UART buffer. The UART Input data is returned in the Pay Load area of the Response message.. A Pay Load length of zero (0) bytes (no UART INPUT data returned) to a maximum of sixty-four (64) data bytes can be returned.
Note: The external UART Input equipment connected to the target device is blocked from transferring additional input until the remote target devices UART buffer is released, by a UART OUTPUT message sent by the host/base station or the target device is power cycled or a device_reset is issued.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙UART Input/Output (D)
⊙READ UART Input/Output (F
[SEND] (M)

……

PURGE: UART Input Buffer

Purpose: provides the user with a means release or free a target devices UART INPUT buffer, thereby allowing UART equipment connected to the target device to transfer additional UART data that is destined for the host/base station. The PURGE UART INPUT buffer command is simply an standard UART OUTPUT command with not data (Pay Load length is zero (0))

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙UART Input/Output (D)
⊙UART Input/Output (F
[SEND] (M)

……

WRITE: UART Output

Purpose: provides the user with a means send UART OUTPUT data to the target device for immediate transfer to connected the external UART equipment at the remote. The UART INPUT buffer is inherently purged or free upon receipt of a UART OUTPUT message at the target device.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙UART Input/Output (D)
⊙UART Input/Output (F)
{ ~ 0 to 64 bytes of User text ~} (G)
[SEND] (M)

READ: UART Configuration

Purpose: provides the user with a means to retrieve UART I/O Configuration held in EEPROM. .

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙UART Input/Output (D)
⊙UART Configuration {READ} (F
[SEND] (M)

……

WRITE: UART Configuration

Purpose: provides the user with a means to change the UART I/O Configuration. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙UART Input/Output (D)
⊙UART Configuration {WRITE} (F
⊙{9600 bits per second (DEFAULT)
or ⊙4800 bits per second
or ⊙2400 bits per second
or ⊙1200 bits per second (G)
[SEND] (M)
[Device_RESET] (M)

……

USER Access: "Power Save Mode"

READ: Power Save Parameters (dynamic-RAM)

Purpose: provides the user with a means to retrieve the dynamic Power Save parameter Configuration held in working RAM.. .

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Power Save Mode (D)
⊙READ Power Save Parameters (F
[SEND] (M)

……

WRITE: Power Save Parameters (dynamic –RAM)

Purpose: provides the user with a means to change the Power Save Mode Configuration. Configuration data is written into working RAM , causing immediate synchronization with the command parameters.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Power Save Mode (D)
⊙WRITE Power Save Parameters (dynamic) (F)
☑ Router (else Field Node) (F)
☑ Power Save Mode ENABLE (F)

☑ Report Immediate on Awake (G)
☑ Awaken and REPORT Analog or Digital INPUT EVENT (G)

⊙Sleep,Awaken,Send-Report on awake…and remain Awake
or ⊙Sleep,Awaken and remain Awake (NO Reporting)
or ⊙*Cycle Sleep & Awake. Report on Awake.*
or ⊙*Cycle Sleep & Awake. NO Report on Awake.*
or ⊙*Sleep & Awake on Analog or Digital INPUT EVENT. Remain Awake.*

[⇔] Awake Time [min:sec] (G
[⇔] Sleep Time [hours:min:sec] (G
[SEND] (M)

READ: Power Save Configuration (static-EEPROM)

Purpose: provides the user with a means to retrieve static Power Save Mode Configuration held in non-volatile EEPROM... .

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Power Save Mode (D)
⊙ Power Save CONFIGURATION(dynamic) {READ} (F
[SEND] (M)

……

WRITE: Power Save Configuration (static -EEPROM)

Purpose: provides the user with a means to change the Power Save Mode Configuration. Configuration data is written into EEPROM and a 'Device_Reset' is required in order to activate.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙Power Save Mode (D)
⊙ Power Save CONFIGURATION(dynamic) {WRITE} (F)
☑ Router (else Field Node) (F)
☑ Power Save Mode ENABLE (F)

☑ Report Immediate on Awake (G)
☑ Awaken and REPORT Analog or Digital INPUT EVENT (G)

⊙Sleep,Awaken,Send-Report on awake…and remain Awake
or ⊙Sleep,Awaken and remain Awake (NO Reporting)
or ⊙*Cycle Sleep & Awake. Report on Awake.*
or ⊙*Cycle Sleep & Awake. NO Report on Awake.*
or ⊙*Sleep & Awake on Analog or Digital INPUT EVENT. Remain Awake.*

[⇔] Awake Time [min:sec] (G
[⇔] Sleep Time [hours:min:sec] (G
[SEND] (M)
[Device_RESET] (M)

……

USER Access: ALERT Status

Digital INPUT ALERT Handling

Purpose: provides the user with a means to acknowledge an unsolicited Digital INPUT ALERT Report. Subsequent reports in the reporting sequence are ceased

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙Digital Input ALERT (F
[SEND] (M)

……

Analog INPUT ALERT Handling

Purpose: provides the user with a means to acknowledge an unsolicited Analogue INPUT ALERT Report. Subsequent reports in the reporting sequence are ceased

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙Analog Input ALERT (F
[SEND] (M)

……

UART INPUT ALERT Handling

Purpose: provides the user with a means to acknowledge and halt the unsolicited UART INPUT status ALERT reporting sequence from the target Field Node

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙UART Input ALERT (F
[SEND] (M)

……

Power Save Mode AWAKE ALERT Handling

Purpose: provides the user with a means to acknowledge a unsolicited Power Save mode awake ALERT Report. Subsequent reports in the reporting sequence are ceased.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙AWAKE (Power Save) (F
[SEND] (M)

EVENT Condition (notes)

Purpose: to display a HELP screen notes which describe EVENTs and the anatomy of the unsolicited EVENT messages.

……

Steps:

⊙Field_Node_or_Router (B)
[⇔] *Alias ID* (B)
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙AWAKE (Power Save) (F
⊙EVENT Report notes (ALERT & EXCEPTION) (D)
⊙EVENT Conditions (F)
…HELP NOTES… (G)

……