10. XBee Command Reference Tables

Addressing

Addressing Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
DH	**Destination Address High**.Set/Get the upper 32 bits of the 64-bit destination address. When combined with DL, it defines the 64-bit destination address for data transmission. Special definitions for DH and DL include 0x000000000000FFFF (broadcast) and 0x0000000000000000 (coordinator).	CRE	0 - 0xFFFFFFFF	0
DL	**Destination Address Low**. Set/Get the lower 32 bits of the 64-bit destination address. When combined with DH, it defines the 64-bit destination address for data transmissions. Special definitions for DH and DL include 0x000000000000FFFF (broadcast) and 0x0000000000000000 (coordinator).	CRE	0 - 0xFFFFFFFF	0xFFFF(Coordinator) 0 (Router/End Device)
MY	**16-bit Network Address**. Read the 16-bit network address of the module. A value of 0xFFFE means the module has not joined a ZigBee network	CRE	0 - 0xFFFE [read-only]	0xFFFE
MP	1**6-bit Parent Network Address**. Read the 16-bit network address of the module's parent. A value of 0xFFFE means the module does not have a parent.	E	0 - 0xFFFE [read-only]	0xFFFE
NC	**Number of Remaining Children**. Read the number of end device children that can join the device. If NC returns 0, then the device cannot allow any more end device children to join.	CR	0 - MAX_CHILDREN (maximum varies)	read-only
SH	**Serial Number High**. Read the high 32 bits of the module's unique 64-bit address.	CRE	0 - 0xFFFFFFFF [read-only]	factory-set
SL	**Serial Number Low**. Read the low 32 bits of the module's unique 64-bit address.	CRE	0 - 0xFFFFFFFF [read-only]	factory-set
NI	**Node Identifier.** Stores a string identifier. The register only accepts printable ASCII data. In AT Command Mode, a string can not start with a space. A carriage return ends the command. Command will automatically end when maximum bytes for the string have been entered. This string is returned as part of the ND (Node Discover) command. This identifier is also used with the DN (Destination Node) command. In AT command mode, an ASCII comma (0x2C) cannot be used in the NI string	CRE	20-Byte printable ASCII string	ASCII space character (0x20)
SE	**Source Endpoint**. Set/read the ZigBee application layer source endpoint value. This value will be used as the source endpoint for all data transmissions. SE is only supported in AT firmware.The default value 0xE8 (Data endpoint) is the Digi data endpoint	CRE	0 - 0xFF	0xE8
DE	**Destination Endpoint**. Set/read Zigbee application layer destination ID value. This value will be used as the destination endpoint all data transmissions. DE is only supported in AT firmware.The default value (0xE8) is the Digi data endpoint.	CRE	0 - 0xFF	0xE8
CI	**Cluster Identifier**. Set/read Zigbee application layer cluster ID value. This value will be used as the cluster ID for all data transmissions. CI is only supported in AT firmware.The default value0x11 (Transparent data cluster ID).	CRE	0 - 0xFFFF	0x11
NP	**Maximum RF Payload Bytes**. This value returns the maximum number of RF payload bytes that can be sent in a unicast transmission. If APS encryption is used (API transmit option bit enabled), the maximum payload size is reduced by 9 bytes. If source routing is used (AR < 0xFF), the maximum payload size is reduced further. **Note**: NP returns a hexadecimal value. (e.g. if NP returns 0x54, this is equivalent to 84 bytes)	CRE	0 - 0xFFFF	[read-only]
DD	**Device Type Identifier**. Stores a device type value. This value can be used to differentiate different XBee-based devices. Digi reserves the range 0 - 0xFFFFFF. For example, Digi currently uses the following DD values to identify various ZigBee products: 0x30001 - ConnectPort X8 Gateway 0x30002 - ConnectPort X4 Gateway 0x30003 - ConnectPort X2 Gateway 0x30005 - RS-232 Adapter 0x30006 - RS-485 Adapter 0x30007 - XBee Sensor Adapter 0x30008 - Wall Router 0x3000A - Digital I/O Adapter 0x3000B - Analog I/O Adapter 0x3000C - XStick 0x3000F - Smart Plug 0x30011 - XBee Large Display 0x30012 - XBee Small Display	CRE	0 - 0xFFFFFFFF	0x30000

Node types that support the command: C=Coordinator, R=Router, E=End Device

Networking

Networking Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
CH	**Operating Channel**. Read the channel number used for transmitting and receiving between RF modules. Uses 802.15.4 channel numbers. A value of 0 means the device has not joined a PAN and is not operating on any channel.	CRE	**XBee** 0, 0x0B - 0x1A (Channels 11-26) **XBee-PRO (S2)** 0, 0x0B - 0x18 (Channels 11-24) **XBee-PRO (S2B)** 0, 0x0B - 0x19 (Channels 11-25)	[read-only]
ID	**Extended PAN ID**. Set/read the 64-bit extended PAN ID. If set to 0, the coordinator will select a random extended PAN ID, and the router / end device will join any extended PAN ID. Changes to ID should be written to non-volatile memory using the WR command to preserve the ID setting if a power cycle occurs.	CRE	0 - 0xFFFFFFFFFFFFFFFF	0
OP	**Operating Extended PAN ID**. Read the 64-bit extended PAN ID. The OP value reflects the operating extended PAN ID that the module is running on. If ID > 0, OP will equal ID.	CRE	0x01 - 0xFFFFFFFFFFFFFFFF	[read-only]
NH	**Maximum Unicast Hops**. Set / read the maximum hops limit. This limit sets the maximum broadcast hops value (BH) and determines the unicast timeout. The timeout is computed as (50 * NH) + 100 ms. The default unicast timeout of 1.6 seconds (NH=0x1E) is enough time for data and the acknowledgment to traverse about 8 hops.	CRE	0 - 0xFF	0x1E
BH	**Broadcast Hops.** Set/Read the maximum number of hops for each broadcast data transmission. Setting this to 0 will use the maximum number of hops.	CRE	0 - 0x1E	0
OI	**Operating 16-bit PAN ID**. Read the 16-bit PAN ID. The OI value reflects the actual 16-bit PAN ID the module is running on.	CRE	0 - 0xFFFF	[read-only]
NT	**Node Discovery Timeout**. Set/Read the node discovery timeout. When the network discovery (ND) command is issued, the NT value is included in the transmission to provide all remote devices with a response timeout. Remote devices wait a random time, less than NT, before sending their response.	CRE	0x20 - 0xFF [x 100 msec]	0x3C (60d)
NO	**Network Discovery options.** Set/Read the options value for the network discovery command. The options bitfield value can change the behavior of the ND (network discovery) command and/or change what optional values are returned in any received ND responses or API node identification frames. Options include: 0x01 = Append DD value (to ND responses or API node identification frames) 002 = Local device sends ND response frame when ND is issued.	CRE	0 - 0x03 [bitfield]	0
SC	**Scan Channels**. Set/Read the list of channels to scan. ***Coordinator*** - Bit field list of channels to choose from prior to starting network. ***Router/End Device*** - Bit field list of channels that will be scanned to find a Coordinator/ Router to join. Changes to SC should be written using WR command to preserve the SC setting if a power cycle occurs. Bit (Channel): 0 (0x0B) 4 (0x0F) 8 (0x13) 12 (0x17) 1 (0x0C) 5 (0x10) 9 (0x14) 13 (0x18) 2 (0x0D) 6 (0x11) 10 (0x15) 14 (0x19) 3 (0x0E) 7 (0x12) 11 (0x16) 15 (0x1A)	CRE	**XBee** 1 - 0xFFFF [bitfield] **XBee-PRO (S2)** 1 - 0x3FFF [bitfield] (bits 14, 15 not allowed) **XBee-PRO (S2B)** 1-0x7FFF (bit 15 is not allowed)	1FFE
SD	**Scan Duration**. Set/Read the scan duration exponent. Changes to SD should be written using WR command. ***Coordinator*** - Duration of the Active and Energy Scans (on each channel) that are used to determine an acceptable channel and Pan ID for the Coordinator to startup on. ***Router / End Device*** - Duration of Active Scan (on each channel) used to locate an available Coordinator / Router to join during Association. Scan Time is measured as:(# Channels to Scan) * (2 ^ SD) * 15.36ms - The number of channels to scan is determined by the SC parameter. The XBee can scan up to 16 channels (SC = 0xFFFF). Sample Scan Duration times (13 channel scan): If SD = 0, time = 0.200 sec SD = 2, time = 0.799 sec SD = 4, time = 3.190 sec SD = 6, time = 12.780 sec **Note**: SD influences the time the MAC listens for beacons or runs an energy scan on a given channel. The SD time is not a good estimate of the router/end device joining time requirements. ZigBee joining adds additional overhead including beacon processing on each channel, sending a join request, etc. that extend the actual joining time.	CRE	0 - 7 [exponent]	3
ZS	**ZigBee Stack Profile**. Set / read the ZigBee stack profile value. This must be set the same on all devices that should join the same network.	CRE	0 - 2	0

Networking Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
NJ	**Node Join Time**. Set/Read the time that a Coordinator/Router allows nodes to join. This value can be changed at run time without requiring a Coordinator or Router to restart. The time starts once the Coordinator or Router has started. The timer is reset on power-cycle or when NJ changes.	CR	0 - 0xFF [x 1 sec]	0xFF (always allows joining)
JV	**Channel Verification**. Set/Read the channel verification parameter. If JV=1, a router will verify the coordinator is on its operating channel when joining or coming up from a power cycle. If a coordinator is not detected, the router will leave its current channel and attempt to join a new PAN. If JV=0, the router will continue operating on its current channel even if a coordinator is not detected.	R	0 - Channel verification disabled 1 - Channel verification enabled	0
NW	**Network Watchdog Timeout**. Set/read the network watchdog timeout value. If NW is set > 0, the router will monitor communication from the coordinator (or data collector) and leave the network if it cannot communicate with the coordinator for 3 NW periods. The timer is reset each time data is received from or sent to a coordinator, or if a many-to-one broadcast is received.	R	0 - 0x64FF [x 1 minute] (up to over 17 days)	0 (disabled)
JN	**Join Notification**. Set / read the join notification setting. If enabled, the module will transmit a broadcast node identification packet on power up and when joining. This action blinks the Associate LED rapidly on all devices that receive the transmission, and sends an API frame out the UART of API devices. This feature should be disabled for large networks to prevent excessive broadcasts.	RE	0 - 1	0
AR	**Aggregate Routing Notification**. Set/read time between consecutive aggregate route broadcast messages. If used, AR should be set on only one device to enable many-to-one routing to the device. Setting AR to 0 only sends one broadcast	CR	0 - 0xFF	0xFF

Security

Security Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
EE	**Encryption Enable**. Set/Read the encryption enable setting.	CRE	0 - Encryption disabled 1 - Encryption enabled	0
EO	**Encryption Options.** Configure options for encryption. Unused option bits should be set to 0. Options include: 0x01 - Send the security key unsecured over-the-air during joins 0x02 - Use trust center (coordinator only	CRE	0 - 0xFF	
NK	**Network Encryption Key**. Set the 128-bit AES network encryption key. This command is write-only; NK cannot be read. If set to 0 (default), the module will select a random network key.	C	128-bit value	0
KY	**Link Key**. Set the 128-bit AES link key. This command is write only; KY cannot be read. Setting KY to 0 will cause the coordinator to transmit the network key in the clear to joining devices, and will cause joining devices to acquire the network key in the clear when joining.	CRE	128-bit value	0

RF Interfacing

RF Interfacing Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
PL	**Power Level**. Select/Read the power level at which the RF module transmits conducted power. For XBee-PRO (S2B) Power Level 4 is calibrated and the other power levels are approximate.	CRE	**XBee** (boost mode disabled) 0 = -8 dBm 1 = -4 dBm 2 = -2 dBm 3 = 0 dBm 4 = +2 dBm **XBee-PRO (S2)** 4 = 17 dBm **XBee-PRO (S2) (International Variant)** 4 = 10dBm **XBee-PRO (S2B)** (Boost mode enabled) 4 = 18dBM 3 = 16dBm 2 = 14dBm 1 = 12dBm 0 = 10dBm **XBee-PRO (S2B) (International Variant)** (Boost mode enabled) 4 = 10dBm 3 = 8dBm 2 = 6dBm 1 = 4dBm 0 = 2dBm	4
PM	**Power Mode**. Set/read the power mode of the device. Enabling boost mode will improve the receive sensitivity by 1dB and increase the transmit power by 2dB Note: Enabling boost mode on the XBee-PRO (S2) will not affect the output power. Boost mode imposes a slight increase in current draw. See section 1.2 for details.	CRE	0-1, 0= -Boost mode disabled, 1= Boost mode enabled.	1
DB	**Received Signal Strength**. This command reports the received signal strength of the last received RF data packet. The DB command only indicates the signal strength of the last hop. It does not provide an accurate quality measurement for a multihop link. DB can be set to 0 to clear it. The DB command value is measured in -dBm. For example if DB returns 0x50, then the RSSI of the last packet received was -80dBm. As of 2x6x firmware, the DB command value is also updated when an APS acknowledgment is received.	CRE	0 - 0xFF Observed range for XBee-PRO: 0x1A - 0x58 For XBee: 0x 1A - 0x5C	
PP	**Peak Power.** Read the dBm output when maximum power is selected (PL4).	CRE	0x0-0x12	[read only]

1. Node types that support the command: C = Coordinator, R = Router, E = End Device

Serial Interfacing (I/O)

Serial Interfacing Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
AP	API Enable. Enable API Mode. The AP command is only supported when using API firmware: 21xx (API coordinator), 23xx (API router), 29xx (API end device).	CRE	1 - 2 1 = API-enabled 2 = API-enabled (w/escaped control characters)	1
AO	**API Options**. Configure options for API. Current options select the type of receive API frame to send out the Uart for received RF data packets.	CRE	0 - Default receive API indicators enabled 1 - Explicit Rx data indicator API frame enabled (0x91) 3 - enable ZDO passthrough of ZDO requests to the UART which are not supported by the stack, as well as Simple_Desc_req, Active_EP_req, and Match_Desc_req.	0
BD	**Interface Data Rate**. Set/Read the serial interface data rate for communication between the module serial port and host. Any value above 0x07 will be interpreted as an actual baud rate. When a value above 0x07 is sent, the closest interface data rate represented by the number is stored in the BD register.	CRE	0 - 7 (standard baud rates) 0 = 1200 bps 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200 0x80 - 0xE1000 (non-standard rates up to 921kbps)	3
NB	**Serial Parity**. Set/Read the serial parity setting on the module.	CRE	0 = No parity 1 = Even parity 2 = Odd parity 3 = Mark parity	0
SB	**Stop Bits**. Set/read the number of stop bits for the UART. (Two stop bits are not supported if mark parity is enabled.)	CRE	0 = 1 stop bit 1 = 2 stop bits	0
RO	**Packetization Timeout**. Set/Read number of character times of inter-character silence required before packetization. Set (RO=0) to transmit characters as they arrive instead of buffering them into one RF packet The RO command is only supported when using AT firmware: 20xx (AT coordinator), 22xx (AT router), 28xx (AT end device).	CRE	0 - 0xFF [x character times]	3
D7	**DIO7 Configuration**. Select/Read options for the DIO7 line of the RF module.	CRE	0 = Disabled 1 = CTS Flow Control 3 = Digital input 4 = Digital output, low 5 = Digital output, high 6 = RS-485 transmit enable (low enable) 7 = RS-485 transmit enable (high enable)	1
D6	**DIO6 Configuration.** Configure options for the DIO6 line of the RF module.	CRE	0 = Disabled 1 = RTS flow control 3 = Digital input 4 = Digital output, low 5 = Digital output, high	0

1. Node types that support the command: C = Coordinator, R = Router, E = End Device

I/O Commands

I/O Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
IR	**IO Sample Rate**. Set/Read the IO sample rate to enable periodic sampling. For periodic sampling to be enabled, IR must be set to a non-zero value, and at least one module pin must have analog or digital IO functionality enabled (see D0-D8, P0-P2 commands). The sample rate is measured in milliseconds.	CRE	0, 0x32:0xFFFF (ms)	0
IC	I**O Digital Change Detection**. Set/Read the digital IO pins to monitor for changes in the IO state. IC works with the individual pin configuration commands (D0-D8, P0-P2). If a pin is enabled as a digital input/output, the IC command can be used to force an immediate IO sample transmission when the DIO state changes. IC is a bitmask that can be used to enable or disable edge detection on individual channels. Unused bits should be set to 0. Bit (IO pin): 0 (DIO0)4 (DIO4)8 (DIO8) 1 (DIO1) 5 (DIO5) 9 (DIO9) 2 (DIO2) 6 (DIO6) 10 (DIO10) 3 (DIO3) 7 (DIO7) 11 (DIO11)	CRE	: 0 - 0xFFFF	0
P0	**PWM0 Configuration**. Select/Read function for PWM0.	CRE	0 = Disabled 1 = RSSI PWM 3 - Digital input, monitored 4 - Digital output, default low 5 - Digital output, default high	1
P1	**DIO11 Configuration**. Configure options for the DIO11 line of the RF module.	CRE	0 - Unmonitored digital input 3- Digital input, monitored 4- Digital output, default low 5- Digital output, default high	0
P2	**DIO12 Configuration**. Configure options for the DIO12 line of the RF module.	CRE	0 - Unmonitored digital input 3- Digital input, monitored 4- Digital output, default low 5- Digital output, default high	0
P3	**DIO13 Configuration**. Set/Read function for DIO13. This command is not yet supported.	CRE	0, 3-5 0 – Disabled 3 – Digital input 4 – Digital output, low 5 – Digital output, high	
D0	**AD0/DIO0 Configuration**. Select/Read function for AD0/DIO0.	CRE	1 - Commissioning button enabled 2 - Analog input, single ended 3 - Digital input 4 - Digital output, low 5 - Digital output, high	1
D1	**AD1/DIO1 Configuration**. Select/Read function for AD1/DIO1.	CRE	0, 2-5 0 – Disabled 2 - Analog input, single ended 3 – Digital input 4 – Digital output, low 5 – Digital output, high	0
D2	AD2/DIO2 Configuration. Select/Read function for AD2/DIO2.	CRE	0, 2-5 0 – Disabled 2 - Analog input, single ended 3 – Digital input 4 – Digital output, low 5 – Digital output, high	0

I/O Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
D3	**AD3/DIO3 Configuration**. Select/Read function for AD3/DIO3.	CRE	0, 2-5 0 – Disabled 2 - Analog input, single ended 3 – Digital input 4 – Digital output, low 5 – Digital output, high	0
D4	**DIO4 Configuration**. Select/Read function for DIO4.	CRE	0, 3-5 0 – Disabled 3 – Digital input 4 – Digital output, low 5 – Digital output, high	0
D5	**DIO5 Configuration**. Configure options for the DIO5 line of the RF module.	CRE	0 = Disabled 1 = Associated indication LED 3 = Digital input 4 = Digital output, default low 5 = Digital output, default high	1
D8	**DIO8 Configuration**. Set/Read function for DIO8. This command is not yet supported.	CRE	0, 3-5 0 – Disabled 3 – Digital input 4 – Digital output, low 5 – Digital output, high	
LT	**Assoc LED Blink Time**. Set/Read the Associate LED blink time. If the Associate LED functionality is enabled (D5 command), this value determines the on and off blink times for the LED when the module has joined a network. If LT=0, the default blink rate will be used (500ms coordinator, 250ms router/end device). For all other LT values, LT is measured in 10ms.	CRE	0, 0x0A - 0xFF (100 - 2550 ms)	0
PR	**Pull-up Resistor**. Set/read the bit field that configures the internal pull-up resistor status for the I/O lines. "1" specifies the pull-up resistor is enabled. "0" specifies no pullup.(30k pull-up resistors) Bits:" 0 - DIO4 (Pin 11) 1 - AD3 / DIO3 (Pin 17) 2 - AD2 / DIO2 (Pin 18) 3 - AD1 / DIO1 (Pin 19) 4 - AD0 / DIO0 (Pin 20) 5 - RTS / DIO6 (Pin 16) 6 - DTR / Sleep Request / DIO8 (Pin 9) 7 - DIN / Config (Pin 3) 8 - Associate / DIO5 (Pin 15) 9 - On/Sleep / DIO9 (Pin 13) 10 - DIO12 (Pin 4) 11 - PWM0 / RSSI / DIO10 (Pin 6) 12 - PWM1 / DIO11 (Pin 7) 13 - CTS / DIO7 (Pin 12)	CRE	0 - 0x3FFF	0 - 0x1FFF
RP	**RSSI PWM Timer.** Time the RSSI signal will be output on the PWM after the last RF data reception or APS acknowledgment.. When RP = 0xFF, output will always be on.	CRE	0 - 0xFF [x 100 ms]	0x28 (40d)
%V	**Supply Voltage.** Reads the voltage on the Vcc pin. Scale by 1200/1024 to convert to mV units. For examplee, a %V reading of 0x900 (2304 decimal) represents 2700mV or 2.7OV.	CRE	-0x-0xFFFF [read only]	-
V+	**Voltage Supply Monitoring.** The voltage supply threshold is set with the V+ command. If the measured supply voltage falls below or equal to this threshold, the supply voltage will be included in the IO sample set. V+ is set to 0 by default (do not include the supply voltage). Scale mV units by 1024/1200 to convert to internal units. For example, for a 2700mV threshold enter 0x900. Given the operating Vcc ranges for different platforms, and scaling by 1024/1200, the useful parameter ranges are: XBee 2100-3600 mV 0,0x0700-0x0c00 PRO 3000-3400 mV, 0,0x0a00-0x0b55 S2B 2700-3600 mV, 0,0x0900-0x0c00	CRE	0-0xFFFF	0
TP	Reads the module temperature in Degrees Celsius. Accuracy +/- 7 degrees. 1° C = 0x0001 and -1° C = 0xFFFF. Command is only available in PRO S2B.	CRE	0x0-0xFFFF	-

Diagnostics

Diagnostics Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
VR	**Firmware Version**. Read firmware version of the module. The firmware version returns 4 hexadecimal values (2 bytes) "ABCD". Digits ABC are the main release number and D is the revision number from the main release. "B" is a variant designator. XBee and XBee-PRO ZB modules return: 0x2xxx versions. XBee and XBee-PRO ZNet modules return: 0x1xxx versions. ZNet firmware is not compatible with ZB firmware.	CRE	0 - 0xFFFF [read-only]	Factory-set
HV	**Hardware Version**. Read the hardware version of the module.version of the module. This command can be used to distinguish among different hardware platforms. The upper byte returns a value that is unique to each module type. The lower byte indicates the hardware revision. XBee ZB and XBee ZNet modules return the following (hexadecimal) values: 0x19xx - XBee module 0x1Axx - XBee-PRO module	CRE	0 - 0xFFFF [read-only]	Factory-set
AI	**Association Indication**. Read information regarding last node join request: 0x00 - Successfully formed or joined a network. (Coordinators form a network, routers and end devices join a network.) 0x21 - Scan found no PANs 0x22 - Scan found no valid PANs based on current SC and ID settings 0x23 - Valid Coordinator or Routers found, but they are not allowing joining (NJ expired) 0x24 - No joinable beacons were found 0x25 - Unexpected state, node should not be attempting to join at this time 0x27 - Node Joining attempt failed (typically due to incompatible security settings) 0x2A - Coordinator Start attempt failed‘ 0x2B - Checking for an existing coordinator 0x2C - Attempt to leave the network failed 0xAB - Attempted to join a device that did not respond. 0xAC - Secure join error - network security key received unsecured 0xAD - Secure join error - network security key not received 0xAF - Secure join error - joining device does not have the right preconfigured link key 0xFF - Scanning for a ZigBee network (routers and end devices) **Note**: New non-zero AI values may be added in later firmware versions. Applications should read AI until it returns 0x00, indicating a successful startup (coordinator) or join (routers and end devices)	CRE	0 - 0xFF [read-only]	--

1. Node types that support the command:C = Coordinator, R = Router, E = End Device

AT Command Options

AT Command Options Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
CT	**Command Mode Timeout.** Set/Read the period of inactivity (no valid commands received) after which the RF module automatically exits AT Command Mode and returns to Idle Mode.	CRE	2 - 0x028F [x 100 ms]	0x64 (100d)
CN	**Exit Command Mode.** Explicitly exit the module from AT Command Mode.	CRE	--	--
GT	**Guard Times**. Set required period of silence before and after the Command Sequence Characters of the AT Command Mode Sequence (GT + CC + GT). The period of silence is used to prevent inadvertent entrance into AT Command Mode.	CRE	1 - 0x0CE4 [x 1 ms] (max of 3.3 decimal sec)	0x3E8 (1000d)
CC	**Command Sequence Character**. Set/Read the ASCII character value to be used between Guard Times of the AT Command Mode Sequence (GT + CC + GT). The AT Command Mode Sequence enters the RF module into AT Command Mode. The CC command is only supported when using AT firmware: 20xx (AT coordinator), 22xx (AT router), 28xx (AT end device).	CRE	0 - 0xFF	0x2B (‘+’ ASCII)

1. Node types that support the command: C = Coordinator, R = Router, E = End Device

Sleep Commands

Sleep Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
SM	**Sleep Mode** Sets the sleep mode on the RF module. An XBee loaded with router firmware can be configured as either a router (SM set to 0) or an end device (SM > 0). Changing a device from a router to an end device (or vice versa) forces the device to leave the network and attempt to join as the new device type when changes are applied.	RE	0-Sleep disabled (router) 1-Pin sleep enabled 4-Cyclic sleep enabled 5 - Cyclic sleep, pin wake	0 - Router 4 - End Device
SN	**Number of Sleep Periods.** Sets the number of sleep periods to not assert the On/Sleep pin on wakeup if no RF data is waiting for the end device. This command allows a host application to sleep for an extended time if no RF data is present	CRE	1 - 0xFFFF	1
SP	**Sleep Period.** This value determines how long the end device will sleep at a time, up to 28 seconds. (The sleep time can effectively be extended past 28 seconds using the SN command.) On the parent, this value determines how long the parent will buffer a message for the sleeping end device. It should be set at least equal to the longest SP time of any child end device.	CRE	0x20 - 0xAF0 x 10ms (Quarter second resolution)	0x20
ST	**Time Before Sleep** Sets the time before sleep timer on an end device.The timer is reset each time serial or RF data is received. Once the timer expires, an end device may enter low power operation. Applicable for cyclic sleep end devices only.	E	1 - 0xFFFE (x 1ms)	0x1388 (5 seconds)
SO Command	**Sleep Options**. Configure options for sleep. Unused option bits should be set to 0. Sleep options include: 0x02 - Always wake for ST time 0x04 - Sleep entire SN * SP time Sleep options should not be used for most applications. See chapter 6 for more information.	E	0 - 0xFF	0
WH	**Wake Host**. Set/Read the wake host timer value. If the wake host timer is set to a non-zero value, this timer specifies a time (in millisecond units) that the device should allow after waking from sleep before sending data out the UART or transmitting an IO sample. If serial characters are received, the WH timer is stopped immediately.	E	0 - 0xFFFF (x 1ms)	
SI	**Sleep Immediately**. See Execution Commands table below..			
PO	**Polling Rate**. Sets the polling rate for the end device.	E	0 - 0x1770 (10msec)	0x00 (100 msec)

Execution Commands

Where most AT commands set or query register values, execution commands cause an action to be executed on the module. Execution commands are executed immediately and do not require changes to be applied.

Execution Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
AC	**Apply Changes**. Applies changes to all command registers causing queued command register values to be applied. For example, changing the serial interface rate with the BD command will not change the UART interface rate until changes are applied with the AC command. The CN command and 0x08 API command frame also apply changes.	CRE	-	
WR	**Write**. Write parameter values to non-volatile memory so that parameter modifications persist through subsequent resets. Note: Once WR is issued, no additional characters should be sent to the module until after the "OK\r" response is received. The WR command should be used sparingly. The EM250 supports a limited number of write cycles.“	CRE	--	--
RE	**Restore Defaults**. Restore module parameters to factory defaults.	CRE	--	--
FR	**Software Reset.** Reset module. Responds immediately with an OK status, and then performs a software reset about 2 seconds later.	CRE	--	--
NR	**Network Reset**. Reset network layer parameters on one or more modules within a PAN. Responds immediately with an “OK” then causes a network restart. All network configuration and routing information is consequently lost. *If NR = 0*: Resets network layer parameters on the node issuing the command. *If NR = 1*: Sends broadcast transmission to reset network layer parameters on all nodes in the PAN.	CRE	0 - 1	--
SI	**Sleep Immediately**. Cause a cyclic sleep module to sleep immediately rather than wait for the ST timer to expire.	E	-	-
CB	**Commissioning Pushbutton**. This command can be used to simulate commissioning button presses in software. The parameter value should be set to the number of button presses to be simulated. For example, sending the ATCB1 command will execute the action associated with 1 commissioning button press.	CRE		

Execution Commands

AT Command	Name and Description	Node Type[1]	Parameter Range	Default
ND	**Node Discover.** Discovers and reports all RF modules found. The following information is reported for each module discovered. MY<CR> SH<CR> SL<CR> NI<CR> (Variable length) PARENT_NETWORK ADDRESS (2 Bytes)<CR> DEVICE_TYPE<CR> (1 Byte: 0=Coord, 1=Router, 2=End Device) STATUS<CR> (1 Byte: Reserved) PROFILE_ID<CR> (2 Bytes) MANUFACTURER_ID<CR> (2 Bytes) <CR> After (NT * 100) milliseconds, the command ends by returning a <CR>. ND also accepts a Node Identifier (NI) as a parameter (optional). In this case, only a module that matches the supplied identifier will respond. If ND is sent through the API, each response is returned as a separate AT_CMD_Response packet. The data consists of the above listed bytes without the carriage return delimiters. The NI string will end in a "0x00" null character. The radius of the ND command is set by the BH command.	CRE	optional 20-Byte NI or MY value	--
DN	**Destination Node.** Resolves an NI (Node Identifier) string to a physical address (case-sensitive). The following events occur after the destination node is discovered: <AT Firmware> 1. DL & DH are set to the extended (64-bit) address of the module with the matching NI (Node Identifier) string. 2. OK (or ERROR)\r is returned. 3. Command Mode is exited to allow immediate communication <API Firmware> 1. The 16-bit network and 64-bit extended addresses are returned in an API Command Response frame. If there is no response from a module within (NT * 100) milliseconds or a parameter is not specified (left blank), the command is terminated and an “ERROR” message is returned. In the case of an ERROR, Command Mode is not exited. The radius of the DN command is set by the BH command.	CRE	up to 20-Byte printable ASCII string	--
IS	**Force Sample** Forces a read of all enabled digital and analog input lines.	CRE	--	--
1S	**XBee Sensor Sample**. Forces a sample to be taken on an XBee Sensor device. This command can only be issued to an XBee sensor device using an API remote command.	RE	-	-

Node types that support the command: C = Coordinator, R = Router, E = End Device