Diamond Technologies

**ERxx Software
Command Reference
Guide**

Version 1.02

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Revision History

Version	Date	Description
1.0	08/20/25	Original Version
1.01	09/05/25	Add in additional read and write commands
1.02	09/10/25	Updated product image

Contents

About this manual

This ERxx Software Command Reference Guide is intended for programmers who have the need to programmatically configure the Diamond Technologies ERxx embedded RFID modules. This manual provides an overview on the programming syntax and the codes needed to configure all aspects of the reader/writer operation.

The ERxx embedded RFID reader/writer modules include RS232 and USB interface models. Some programming commands are specific to the ERxx model you may have; as an example, RS232 commands are specific to RS232 and USB commands are specific to USB model readers. The ERxx is an embedded RFID module capable of reading and writing a wide range of both high frequency referred to as "HF"(13.56Mhz) and low frequency referred to as "LF" (125Khz) tags and cards. The ERxx supports a wide range of RFID industry standard protocols including ISO14443A, ISO14443B, ISO15693, and ISO18092. The readers have various configuration parameters and settings which can be modified before and during operation.

Current Diamond models supported by this guide include:

Product	Supported Models
ER02	ER02 Embedded reader/writer all models

Programmatic Interface Protocol

The ERxx RFID modules support programming via a host programmatic configuration through the USB Serial or RS232 communications interface. Configuration programming includes a range of features including changing the operating modes and operating parameters. The programmatic interface requires that the user send commands to the module in the correct format. This format is defined as the following:

 Prefix Command,(Parameter),(Parameter)…(Parameter) Terminator

Prefix   (3) Ascii characters **SYN C CR** (ASCII 22, 67, 13) or

(3) Ascii characters **SYN R CR** (ASCII 22, 82, 13)

*Note SYN C is used for device management type commands while SYN R is used for RFID specific commands such as reading and writing tags.

Command A (4) character case-sensitive field that identifies the desired menu command. For example, RBYT which is the Read Byte command.

Parameter   A numeric value or multiple values depending on the command. For example, RBYT00,05 instructs the RFID module to read 5 bytes starting at byte address 0.

Terminator   A single character that specifies the end of the command in this case it is a (**.**) period

Example Commands:

The following command will set the RS232 Baud rate to 9600 and save the value to permanent memory.

Prefix	Command	Parameter	Parameter	Terminator
SYN C CR	CHBD	00000060		.

The following command will set the RS232 Baud rate to 115,200 and save the value to permanent memory.

Prefix	Command	Parameter	Parameter	Terminator
SYN C CR	CHBD	00000480		.

Module Response

The RFID module will respond to commands by echoing back the command followed by three possible responses to the command. These responses are as follows.

Response	Description
ACK	Indicates a good command which has been accepted and processed.
ENQ	Indicates an invalid command.
NAK	The command was good but the parameter value was out of allowable range, the prefix was invalid, or a command was issued but no RFID tag was found in the readers field from which to read or write data.

Query Commands

There are also query commands which can be used with the RFID module in order to receive information on the modules settings.

Query Command	Definition
?	What is the modules current value for the command setting.

Command Examples

The following are examples of commands sent to the RFID module and responses from the module (note [] are used to show characters but are not used in the module protocol).

Example: Read modules current value for Baud rate.

Host: [SYN]C[CR] CHBD?.

Module: CHBD00000480[ACK].

In this example the command was accepted and processed. The module responds with the current setting and mimics the command sent.

Example: Incorrect prefix sent when checking current Baud rate value.

Host: [SYN]R[CR]CHBD?.

Scanner: CHBD[NAK].

In this example the scanner responded that the command prefix was not correct. The correct prefix for this device management command would be SYN C CR.

Example: Set Module to Auto read mode.

Host: [SYN]R[CR]AUTO1.

Scanner: AUTO1[ACK].

In this example the command was accepted and processed and stored in permanent memory and the module enters Presentation reading mode.

Trigger Commands

When the ERxx RFID module is set to AUTO0 mode the reader will require either a hardware or serial trigger to initiate the reading or writing of a tag.   This is referred to as Trigger operating mode.   The host can also send the deactivate command to stop the trigger cycle, likewise the hardware trigger can be deactivated to stop the trigger cycle. The trigger activate and deactivate commands utilize the following format.

Trigger Activate: **SYN T CR**

Trigger Deactivate: **SYN U CR**

When the RFID module receives the Trigger Activate command its' LED illumination will come on and it will begin looking for Tags.   The module will turn off and deactivate the read/write phase when either the module finds and reads/writes a valid tag, the module receives the trigger deactivate command, or the module's hardware trigger is deactivated.

Interface Selection

Since your embedded RFID module should have shipped with the correct interface (RS232 or USB), the interface type should already be defined. If you need to change the interface type, the codes below can be sent to the module to configure the module to your desired interface type.

Each reader model will support one of the following sets of host interfaces:

RS232 Models
1. RS232-STD Standard interface (default).   RS232 also allows for configuration of specific communication parameters.

USB Models
1. USB COM Serial Simulate RS232 (Default)
2. USB Keyboard

If your installation requires you to programmatically customize your modules interface, use the following commands to do so.

Prefix	Command	Parameter	Terminator	Interface
SYN C CR	CINT	0	.	USB COM*
SYN C CR	CINT	1	.	USB Keyboard

RS232 Interface Parameters

The default RS232 communications parameters are 115,200 baud, 8 Data Bits, 1 Stop bit, No Parity. If the application requires different parameters, the following commands can be used to change the RS232 settings.

Baud Rate

The following commands can be used to set the desired baud rate. The * indicates the default in each category.

Prefix	Command	Parameter	Terminator	Baud Rate
SYN C CR	CHBD	00000060	.	9600
SYN C CR	CHBD	000000C0	.	19200
SYN C CR	CHBD	00000180	.	38400
SYN C CR	CHBD	00000240	.	57600
SYN C CR	CHBD	00000480	.	115200*

Data Bits, Stop bits, and Parity

The following commands can be used to set the desired Stop bits, and Parity. The * indicates the default in each category.

Prefix	Command	Parameter	Terminator	Stop Bits
SYN C CR	CHSB	01	.	1*
SYN C CR	CHSB	02	.	2
Prefix	Command	Parameter	Terminator	Parity
SYN C CR	CHPR	00	.	None*
SYN C CR	CHPR	01	.	Odd
SYN C CR	CHPR	02	.	Even

Operating Modes

The ERxx RFID modules can operate in various modes called operating modes. The two basic operating modes are Manual Trigger mode and Presentation mode. In Presentation Mode the module will automatically read a tag when the tag comes into the modules RFID field. In Trigger mode the RFID Module will sense a tag when it comes into its' RFID field. You will see the RFID module's yellow field sense LED flashing when sensing a tag, but the module will not read or write the tag until it receives a hardware or software trigger.

Presentation mode is typically used in machines and devices when the host system can control when a tag is presented to the module and there is a defined read point in the process. The following commands can be used to set the ERxx into the desired operating mode.

Prefix	Command	Parameter	Terminator	Interface
SYN C CR	AUTO	0	.	Trigger Mode
SYN C CR	AUTO	1	.	Presentation Mode

Reading and Writing Data

The basic function of the ERxx RFID module is to read and or write data to an RFID Tag. The ERxx modules support a wide range of HF and LF frequency tags and support standard protocols such as ISO14443A, ISO14443B, ISO15693, ISO18092. By default, the ERxx modules will read the Tag's UID on sensing the tag in the RFID field or on receiving a trigger from the host system.

The ERxx modules are also capable of reading other areas of a Tag's memory using the Read Byte (RBYT) or Read Block (RBLK) commands. Likewise, the ERxx modules are capable of writing to other areas of a Tag's memory.

The block write and block read commands read a 4 byte segment of memory starting at the memory location specified in the first parameter, while the Byte read and Byte write commands can read and write from a section of memory defined in the parameters. The syntax for these commands as well as some examples are shown below.

WBLK<data>,<addr>

- <data>: 4 HEX characters (4 bytes) to write.

- <addr>: 4-character decimal block address.

    o   Note: ICODE SLIX tag user memory is addressable from blocks 0000-0027

RBLK<addr>

- <addr>: 4- decimal block address to read.

  - Note: ICODE SLIX tag user memory is addressable from blocks 0000-0027

RBYT<start byte >,<length>

- <start_byte>: ASCII-HEX start byte offset within the tag memory.

- <length>: decimal number of bytes to read.

  - Note: ICODE SLIX tags have 112 bytes of user memory, so in ASCII-HEX the range of this parameter is 00-70

WBYT<start_byte>,<length>,<data>

- <start_byte>: ASCII-HEX start byte offset.

- <length>: decimal number of bytes to write.

- <data>: ASCII-HEX string of exactly <length>.

Examples

Prefix	Command	Parameter	Parameter	Parameter	Terminator	Description
SYN R CR	RBYT	00	05		.	Read 5 bytes of data starting at byte 0
SYN R CR	RBLK	01			.	Read Block (4 bytes) of data starting at address 01
SYN R CR	WBYT	01	03	454342	.	Write 3 bytes of data starting at byte 01, data = hex 45, 43, 42
SYN R CR	WBLK	08091011	02		.	Write 4 bytes of data starting at byte 02, data = hex 09, 10,11,12

*NOTE: USB models of the ERxx need to be connected to a USB port before they will send data or respond to commands.

*NOTE: Issuing a RBYT or RBLK command while in presentation mode will result in the module providing both the RBYT or RBLK data response as well as the Tags UID data.

Other Programming Selections

The following table provides programmatic interface commands for the ERxx RFID modules.

Command List

Command Description	Prefix	Command	Parameters	Default	Example	Notes
Trigger	<SYN>T<CR>				<SYN>T<CR>	Will cause the device to act as if the trigger button was pressed and held. If an RFID tag is in the field, it will read the RFID Tag, otherwise it will activate the scanner
Untrigger	<SYN>U<CR>				<SYN>U<CR>	Will cause the device to act as if the trigger button was released

Sleep		S			S	Will put the device into a low-power sleep mode. When in sleep mode, all LEDS will turn off. If 'CTWK=1', the device will wake up when the trigger is pressed- otherwise, it will only wake when receiving the 'Resume' command. The sleep state will be overridden by the port state if CPWK=1, so using the Sleep and Resume host commands is only effective when CPWK=0
Resume		R			R	Will cause the device to exist sleep state and resume normal operation. If the device is not currently in sleep state, it will be ignored
Command	**Prefix (Host)**	**Command**	**Parameters**	**Default**	**Example**	**Notes**
System Firmware Version	<SYN>C<CR>	CVER			CVER. CVER?.	Question mark is optional. Returns the hardware and software version of the Creo-R
Default	<SYN>C<CR>	CDFT			CDFT.	Set Factory Defaults
Vibrator	<SYN>C<CR>	CVIB	0 = Disabled, 1 = Enabled	Enabled	CVIB0.	Turn the vibrator on / off
RFID Mode	<SYN>C<CR>	RMOD	0 = Disabled, 1 = Enabled	Enabled	RMOD1.	Enable / Disable RFID Module
Comm Mode	<SYN>C<CR>	CINT	0 = USB-COM 1 = USB-KBD	USB-COM	CINT0.	Host Communication Interface

Feedback LED	<SYN>C<CR>	CFBL	0 = Disabled 1 = Enabled	ON	CFBL1.	Will turn off good read led
Beeper Volume	<SYN>C<CR>	CBPV	0 = LOW, 1=MED, 2=HI	MED	CBPV2.	Beep Volume
Keyboard Fallback	<SYN>C<CR>	CKBD	0 = Disabled 1 = Enabled	OFF	CKBD1. CKBD?.	When the USB-COM port is not open, but a USB-HID endpoint exists, all data will be automatically sent as USB-KBD data. NOT COMPATIABLE WITH CPWK=1
Wake On Trigger	<SYN>C<CR>	CTWK	0 = Disabled 1 = Enabled	ON	CTWK0. CTWK?.	When Creo-R is in SLEEP mode, a trigger press will wake the device
Sleep/Wake on Port	<SYN>C<CR>	CPWK	0 = Disabled 1 = Enabled	OFF	CPWK1. CPWK?.	When enabled, the device will enter sleep mode any time the COM port is closed. It will automatically wake from sleep mode when the COM port opens
Command	**Prefix (Host)**	**Command**	**Parameters**	**Default**	**Example**	**Notes**
RS232 Settings set Baud Rate	<SYN>C<CR>	CHBD	00000060 = 9600 000000C0 = 19200 00000180 = 38400 00000240 = 57600 00000480 = 115200	115200	CHBD00000060.	Modifies the unit's baud rate

RS232 Settings set stop bits	<SYN>C<CR>	CHSB	01 = 1 02 = 2	1	CHSB02	Modifies the unit's stop bits
RS232 Settings set parity	<SYN>C<CR>	CHPR	00 = None 01 = Odd 02 = Even	None	CHPR01	Modifies the unit's parity
Enable Tag	<SYN>R<CR>	RTEA	*This command requires 2 parameters for SET and 1 Parameter for GET:* *(See Example and Notes Column)* -------------------------------------- *Values:* *Tag Type :* *99: ALL* *10: Low Freq* *20: High Freq* *Enabled State:* *00: Disable* *01: Enable*	All Enabled	**SET (2 Parameters)** -------------------- RTEA99,01. RTEA10,00. -------------------- **GET (1 Parameter)** ----------------------- RTEA?99. RTEA?10.	**SET SYNTAX:** ----------------- XX,YY *WHERE:* *XX = Tag Type to Set* *YY = State to Set* -------------------- **GET SYNTAX:** -------------------- ?XX *WHERE:* *XX = Tag Type to Get*
RFID Tag Byte Order	<SYN>R<CR>	RTBO	0 = Standard, 1 = Reversed	Standard	RTBO1.	

RFID Prefix	<SYN>R<CR>	RPRE	Four ASCII-HEX bytes (eg. 31323334 = '1234'). 00 for 'end of string' if less than 4 characters used	00000000	RPRE41424344. RPRE?.	Must always include 4 bytes (8 characters) in the parameter. When a 00 is encountered, this indicates the end of the string (if using less than 4 characters). To remove the prefix, set 00000000
RFID Suffix	<SYN>R<CR>	RSUF	Four ASCII-HEX bytes (eg. 31323334 = '1234'). 00 for 'end of string' if less than 4 characters used	0D000000 0	RSUF0D0A0000. RSUF?.	Must always include 4 bytes (8 characters) in the parameter. When a 00 is encountered, this indicates the end of the string (if using less than 4 characters). To remove the prefix, set 00000000
RFID Auto-Read	<SYN>R<CR>	AUTO	0 = Disabled 1 = Enabled	Disabled	AUTO1. AUTO?.	When enabled, RFID tags will be automatically read and transmitted as soon as they are detected in the field (No need to press the trigger to read the tag). Disabled tag types will still be ignored.
Read Byte	<SYN>R<CR	RBYT	Two ascii bytes representing <Addr>,<Length>		RBYT00,05	Read 5 bytes starting at tag address 00

Write Byte	<SYN>R<CR>	WBYT	Three ascii bytes representing <Addr>,<Length>,<Data>		WBYT01,05,02030405	Write 5 bytes = 02030405 starting at tag address 01
Read Block	<SYN>R<CR>	RBLK	One ascii byte representing <Addr>		RBLK03	Read a block of 4 bytes starting at tag address 03
Write Block	<SYN>R<CR>	WBLK	A 4 character hex value to write and a 4 character decimal value representing the starting address <Data>,<Addr>		WBLK03040506,0001	Write the 4 byte value 03040506 to tag address starting at 0001

Appendix A

ASCII Chart

ASCII Char.	Hex No.	ASCII Char.	Hex No.	ASCII Char.	Hex No.	ASCII Char.	Hex No.
NUL	00	SP	20	@	40	'	60
SOH	01	!	21	A	41	a	61
STX	02	"	22	B	42	b	62
ETX	03	#	23	C	43	c	63
EOT	04	$	24	D	44	d	64
ENQ	05	%	25	E	45	e	65
ACK	06	&	26	F	46	f	66
BEL	07	'	27	G	47	g	67
BS	08	(	28	H	48	h	68
HT	09	)	29	I	49	i	69
LF	0A	*	2A	J	4A	j	6A
VT	0B	+	2B	K	4B	k	6B
FF	0C	,	2C	L	4C	l	6C
CR	0D	-	2D	M	4D	m	6D
SO	0E	.	2E	N	4E	n	6E
SI	0F	/	2F	O	4F	o	6F
DLE	10	0	30	P	50	p	70
DC1	11	1	31	Q	51	q	71
DC2	12	2	32	R	52	r	72
DC3	13	3	33	S	53	s	73
DC4	14	4	34	T	54	t	74
NAK	15	5	35	U	55	u	75
SYN	16	6	36	V	56	v	76
ETB	17	7	37	W	57	w	77
CAN	18	8	38	X	58	x	78
EM	19	9	39	Y	59	y	79
SUB	1A	:	3A	Z	5A	z	7A
ESC	1B	;	3B	[	5B	{	7B
FS	1C	<	3C	\	5C			7C
GS	1D	=	3D	]	5D	}	7D
RS	1E	>	3E	^	5E	~	7E
US	1F	?	3F	_	5F	DEL	7F