

C H A P T E R ④

Extended X Command Summary and Application Design

Chapter Objectives

The information in this chapter will enable you to:

- Program the SX, ZX, or Model 500 to control the RP240
- Customize the system to meet your requirements

PROGRAMMING NOTE

This chapter provides Extended X programming information that is required to communicate with the RP240. If you are using a 6000 Series product (6200 or 6250), skip ahead to *Chapter ⑤ 6000 Series Command Summary and Application Design*.

Extended X Language Command Summary

Command	Description
DCLR	Clear the display
DCNT	Enable/Disable PAUSE and CONTINUE Keys
DLLED	Turn RP240 LEDs On/Off
DPC	Position Cursor
DSTP	Enable/Disable STOP Key
DTXT	Display Text Data on RP240 LCD
DVO	Display Variable Data on RP240 LCD
VARn=FUN	Enable and Read Function Keys
VARn=NUM	Enable and Read Numeric Keypad

Description of Extended X Language Command Format

The following is a definition of the format fields for the Extended X Language products.

① **DCLR** Clear Display

③ Type	Programming
④ Syntax	<DCLRn
⑤ Units	line number
⑥ Range	Ø, 1, 2
⑦ Default	None
⑨ Response	None
⑩ See Also	DPC, DTXT, DVO

② Version
SX Rev C2
ZX Rev D
500 Rev C
⑧ Attributes
[x] Buffered
[] Device specific
[] Saved independently
[] Saved in sequences

- | | |
|-------------------------------|---|
| ① Mnemonic Code and Full Name | This box contains the command's mnemonic code. |
| ② Valid Revision Level | This field contains the revision history of the command. It includes the revision of software when the command was added or modified. If the revision level of software you are using is equal to or greater than the revision level listed in this field, you are using the proper version of the software. |
| ③ Type | This portion of the box contains the command type. All X Language RP240 commands are programming commands. All of these commands affect program flow. |
| ④ Syntax | The proper syntax for the command is shown here. The specific parameters associated with the command are also shown. Definitions of the parameters are described below: <ul style="list-style-type: none">a This indicates that a device address must accompany the command. Only the device specified by this parameter receives and executes the command. If this parameter, or any other parameter appears within brackets <a>, it is optional.n This represents an integer value.b This represents a binary value. The binary value must be either 0 or 1. |
| ⑤ Units | This field describes what unit of measurement or value the parameter in the command syntax represents. |
| ⑥ Range | This is the range of valid values that you can specify for an argument (or any other parameter specified). |
| ⑦ Default | The default setting for the command is shown in this box. A command will perform its function with the default setting if you do not provide a value. |
| ⑧ Attributes | This field indicates that these commands are buffered. Buffered commands are executed in the order that the system receives them with other buffered commands. Buffered commands can be stored in a sequence. |
| ⑨ Response | There are no system responses associated with these X Language commands. |
| ⑩ See Also | Commands that are related or similar to the command described are listed here. |

Extended X Language Command Listing

DCLR Clear Display

Version

SX Rev C2

ZX Rev D

500 Rev C

Attributes

[X] Buffered

[] Device specific

[] Saved independently

[] Saved in sequences

Type Programming
Syntax <DCLRn
Units line number
Range 0, 1, 2
Default None
Response None
See Also DPC, DTXT, DVO

The Clear Display (**DCLR**) command clears a specified line of the RP240 display, and repositions the cursor to the beginning of the line.

n = 0 Clear all lines of the RP240 display

n = 1 Clear line 1 of the RP240 display

n = 2 Clear line 2 of the RP240 display

Command	Description
> DCLR1	Clear line one (1) of the RP240 display

DCNT Enable/Disable Pause and Continue

Version

SX Rev C2

ZX Rev D

500 Rev C

Attributes

[X] Buffered

[] Device specific

[] Saved independently

[] Saved in sequences

Type Programming
Syntax <a>DCNTb
Units None
Range 0, 1
Default 0
Response None
See Also SSH, SSL

This command enables or disables the **PAUSE** and **CONTINUE** keys on the RP240.

DCNT0 Disable **PAUSE** and **CONTINUE** keys

DCNT1 Enable **PAUSE** and **CONTINUE** keys

When the **PAUSE** and **CONTINUE** keys are enabled (**DCNT1**), pressing the **PAUSE** key will cause the RP240 to send a Stop (**S**) command to the Model 500, **SX**, or **ZX**. Pressing the **CONTINUE** key will cause a Continue (**C**) command to be sent. To have the Model 500, **SX**, or **ZX** pause motion, the Save Command Buffer on Stop (**SSH1**) and the Resume Execution Enable (**SSL1**) must be enabled.

Once you have activated the **PAUSE** and **CONTINUE** keys, they will remain active at all times, except when numeric or function key information has been requested (**VARn=NUM** or **VARn=FUN**).

Command	Description
>XE100	Erase sequence #100
>XD100	Begin definition of sequence #100
SSH1	Enable save command buffer on stop
SSL1	Enable resume execution
DCNT1	Enable PAUSE and CONTINUE keys
DSTP1	Enable STOP key
XT	End definition of sequence #100
>	

DLED Turn RP240 LEDs On/Off

Version
SX Rev C2
ZX Rev D
500 Rev C

Type Programming
Syntax <a>DLEDn
Units None
Range 0, 1, X
Default 0
Response None
See Also O

Attributes
 Buffered
 Device specific
 Saved independently
 Saved in sequences

The DLEDcommand controls the state of the 8 LEDs on the RP240. A one will turn an LED on, a zero will turn an LED off, and an X will leave the LED unchanged from its last state.

The command example below reads from left to right and corresponds to the LEDs from top to bottom.

<u>Command</u>	<u>Description</u>
> DLED1100XX11	Turn LEDs 1,2,7, and 8 on, LEDs 3 and 4 off, and leave LEDs 5 and 6 unchanged

DPC Position Cursor

Version
SX Rev C2
ZX Rev D
500 Rev C

Type Programming
Syntax <a>DPCnxx
Units line number
Range 1, 2
Default None
Response None
See Also DCLR, DTXT, DVO

Attributes
 Buffered
 Device specific
 Saved independently
 Saved in sequences

The Position Cursor (DPC) command places the cursor at line **n**, column **xx**. The lines are numbered from top to bottom, 1 to 2. The columns are numbered from left to right, 00 to 39.

You must use 00, 01, 02,...,09 instead of 0, 1, 2,..., 9 for the column number (i.e., DPC208, not DPC28).

	Column
Line 1	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Line 2	

Once the cursor has been placed, all succeeding text (DTXT) or variable data (DVO) will be displayed beginning at the current cursor location. All numeric data entered using the VARn=NUM command will also be displayed at the current cursor location.

<u>Command</u>	<u>Description</u>
>DPC205	Position the cursor on line 2, column 5
>DTXTCOMPUMOTOR_DEMO_PR OGRAM	Place message COMPUMOTOR DEMO PROGRAM at current cursor position

DSTP Enable/Disable Stop

Version

SX Rev C2

ZX Rev D

500 Rev C

Attributes

[x] Buffered

[] Device specific

[] Saved independently

[] Saved in sequences

Type Programming
Syntax <DSTPb
Units None
Range 0, 1
Default 0
Response None
See Also SSH, SSL

The DSTP command enables or disables the STOP key on the RP240.

- DSTP0 Disable STOP key
- DSTP1 Enable STOP key

When the STOP key is enabled (DSTP1), pressing the STOP key will cause the RP240 to send a Kill (κ) command to the Model 500, SX, or ZX.

CAUTION

Using the STOP key (K command) causes motion in progress to be stopped with the maximum deceleration rate.

Once you have activated the STOP key, it will be active at all times.

<u>Command</u>	<u>Description</u>
>XE100	Erase sequence 100
>XD100	Begin definition of sequence 100
SSH1	Enable save command buffer on stop
SSL1	Enable resume execution
DCNT1	Enable PAUSE and CONTINUE keys
DSTP1	Enable STOP key
XT	End definition of sequence 100
>	

DTXT Display Text Data on RP240 LCD

Version

SX Rev C2

ZX Rev D

500 Rev C

Attributes

[x] Buffered

[] Device specific

[] Saved independently

[] Saved in sequences

Type
Syntax <a>DTXTtext_data
Units None
Range None
Default None
Response None
See Also DCLR, DPC, DVO

This command places the text string, `text_data`, beginning at the current cursor location. The text string can be any alpha character from **A** to **Z**, any numeric character from **0** to **9**, or the following characters:

~, !, @, #, \$, %, ^, &, (,), -, +, =, {, }, [,], |, :, ", ', <, >, ?, ., ., /

An underscore (`_`) is used to separate words. The underscore will be displayed as a space on the RP240 display. The asterisk (`*`), semicolon (`;`), backslash (`\`), and tilde (`~`) are illegal characters to use with the DTXT command. If the text string is too long, the text string will wrap around to the next line.

<u>Command</u>	<u>Description</u>
>DPC205	Position the cursor on line 2, column 5
>DTXTCOMPUMOTOR_DEMO_PROGR AM_1	Place message COMPUMOTOR DEMO PROGRAM 1 at current cursor position

DVO Display Variable Data on RP240 LCD

Version
SX Rev C2
ZX Rev D
500 Rev C

Type Programming
Syntax <DVO n,n,n,b
Units None
Range See Below
Default None
Response None
See Also DPC, DTXT, DCLR

Attributes
[X] Buffered
[] Device specific
[] Saved independently
[] Saved in sequences

The DVO command is used to display a variable at the current cursor location. Any of the fifty variables available in the extended X products can be displayed.

1st n = Variable Number (Range = 1 to 50)
2nd n = Number of whole digits displayed, digits to left of decimal point (Range = 0 to 15)
3rd n = Number of fractional digits displayed, digits to the right of the decimal point (Range = 0 to 5)
b = Sign bit, 0 = no sign displayed, 1 = display plus or minus sign

Command	Description
>DPC205	Position the cursor on line 2, column 5
>DVO2,2,1,1	Place variable 2 at current cursor position. If variable 2 contained the number 53.23, then +53.2 is displayed on the RP240 LCD starting at column 5, line 2

VARN=FUN Enable and Read Function Keys

Version
SX Rev C2
ZX Rev D
500 Rev C

Type Programming
Syntax <a>VARn=FUN
Units variable number
Range 1 to 50
Default None
Response None
See Also VAR

Attributes
[X] Buffered
[] Device specific
[] Saved independently
[] Saved in sequences

The VARN=FUN command is used to enable the function keys on the RP240 and retrieve the function key pressed. Once this command is encountered, command processing stops until the RP240 returns a number corresponding to the function key pressed. Function key 1 (F1) returns a 1, function key 2 (F2) returns a 2, etc. MENU RECALL returns a zero. The number that is returned is placed in the variable n.

The RP240 is actually sending an exclamation point (!) before the number returned, allowing the Model 500, SX, or ZX to interpret the value returned.

Note: If you are using a kill sequence (XFK), place the command "*" at the beginning of the kill sequence.

Command	Description
>XE1	Erase sequence 1
>XD1	Begin definition of sequence 1
DPC205	Position the cursor on line 2, column 5
DTXTPRESS_F1	Place message PRESS F1 at current cursor location
VAR1=FUN	Retrieve function key pressed value and place in variable 1
L	Begin endless loop
IF(VAR1=1)	If variable 1 equals 1, do the commands between IF and NIF
XG2	Branch to sequence 2
NIF	End IF statement
N	End endless loop
XT	End definition of sequence 1
>	

VAR=NUM Enable and Read Numeric Keypad

Version

SX Rev C2

ZX Rev D

500 Rev C

Attributes

[X] Buffered

[] Device specific

[] Saved independently

[] Saved in sequences

Type	Programming
Syntax	<a>VAR=NUM
Units	None
Range	1 to 50
Default	None
Response	None
See Also	VAR

This VAR=NUM command is used to enable the numeric keypad on the RP240 and retrieve the numeric information entered. Once this command is encountered, command processing stops until the RP240 returns a value entered on the numeric keypad. The +/- key changes the sign of the number entered. The +/- key must be pressed before the number is entered, or it will have no effect. The C/E key will clear the number you have entered and allow you to restart. The ENTER key sends the number entered to the 500, SX, or ZX. If no value was entered before the ENTER key was pressed, the ENTER key will have no effect.

The number that is returned by the RP240 is placed in the variable **n** of the 500, SX, or ZX. If either the +/- key or the . key is entered by itself, the variable will be set to zero.

The RP240 is actually sending an exclamation point (!) before the number returned, thus allowing the 500, SX, or ZX to interpret the value returned.

Note: If you are using a kill sequence (XFK), place the command **__** at the beginning of the kill sequence.

Command	Description
>XE1	Erase sequence 1
>XD1	Begin definition of sequence 1
DCLR0	Clear Display
DPC105	Position the cursor on line 1, column 5
DTXTENTER_BAG_COUNT	Place message ENTER BAG COUNT at current cursor location
DCLR2	Clear Display
DPC121	Position the cursor on line 1, column 21
VAR1=0	Initialize variable 1
WHILE (VAR1<1_OR_VAR1>10)	Do statements between WHILE and NWHILE until 0<VAR1<11
DCLR2	Clear line 2 of RP240 display
DPC121	Position cursor on line 1, column 21
VAR1=NUM	Retrieve numeric value and place in variable 1
IF (VAR1<1)	If variable 1 < 1 do the commands between IF and NIF
DPC205	Position the cursor on line 2, column 5
DTXTBAG_COUNT_TOO_LOW	Place message BAG COUNT TOO LOW at current cursor location
T2	Time delay 2 seconds
NIF	End IF statement
IF (VAR1>10)	If variable 1 > 10 do the commands between IF and NIF
DPC205	Position the cursor on line 2, column 5
DTXTBAG_COUNT_TOO_HIGH	Place message BAG COUNT TOO HIGH at current cursor location
T2	Time delay 2 seconds
NIF	End IF statement
NWHILE	End WHILE statement
MN	Set to Normal mode
LD3	Disable limits (if not connected)
A10	Set acceleration to 10 rps ²
V2	Set velocity to 10 rps
D25000	Set distance to 25000 steps
L (VAR1)	Loop as many times as specified by variable 1
G	Initiate motion
N	End loop
XT	End definition of sequence 1
>	