CHAPTER 7

OPERATION IN MDI/MDI STORE MODE

7.1 OVERVIEW

MDI and MDI STORE enable the operator to create new blocks of part program data through a menu format embedded in the BOSS 8 I firmware. These modes may on some occasions create entire part programs, but will also add to or complete a program already loaded in the machine. MDI created blocks are executed without storage of the text; MDI STORE will execute and store each block at the end of the existing program text.

Absolute or Incremental data may be entered in rectangular or polar coordinates using the inch or metric dimension systems. Refer to Section 4.4, for TLO information.

7.2 MDI MODE

Part program blocks are built up by supplying the information required from the "menu" format. This format is derived from a limited array of G codes which demand certain objective data to complete. An opportunity to review what has been entered or to change an entry is offered through the operator/computer interchange. When the block is complete, the information in it can be executed by the milling machine. A complete list of the G codes available in this "menu" format is shown in Table 7-1.

When MDI is entered, the initial screen display is:

```
-----------------------------------------
|0 0   R P D          G                  |
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|      E N T E R   C Y C L E             |
-----------------------------------------
```

The first two numbers on the top line of the LCD show the current sequence number, automatically updated after completion of each line entry. The next space on the top line identifies the current G code (default G code is G0, rapid traverse). The last part of the top line is the input parameter prompt and data input area. The lower line gives an abbreviated summary (mnemonic) of the meaning of the data entered on the top line.

Pressing ENTER will load the contents of the data entered (via the keypad) into the text buffer and advances the prompt character to the next input parameter. If no entry is made and ENTER is pressed, no entry will be made for that parameter (null entry).

When the end of the parameter list for that G code block has been reached, pressing ENTER will cause a Review mode to begin. In this, the operator can review and change through CE key any data entered. The CE key will delete the incorrect value and the new value can be entered. The system must be in the REVIEW mode before execution can occur. REVIEW mode is entered automatically after all cycle parameters have been entered. It is suggested that all MDI, MDI STORE, and INSERT data be reviewed for keystroke error before execution.

EXECUTE will load the input lines from the text buffer into the system and execute the block.

NOTE

EXECUTE can not be activated until all parameters have been entered.

The following is a typical display for MDI.

```
-----------------------------------------
|0 3   O F R A M E   X 1 . 5             |
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|      E N T E R     C N T R   P T       |
-----------------------------------------
```

The screen shows the part program pointer on line number 3, using a G170 (OUTSIDE FRAME) and entering an X center point value.

7.2.1 CANNED CYCLE OPERATING NOTES

The following notes have been extracted from the Programming Manual (11040532). They are repeated here for your convenience. These notes must be used in conjunction with G codes for canned milling cycles:

1. The following mill cycles are cutter diameter compensated using the cutter diameter for the tool currently being used.

2. The mill cycles include an approach and departure tangential to the part work surface, a Z-axis step capability for deep cuts and roughing and finishing cuts.

3. Length, width, fillet radius, step depth, step over, clearance, finish allowance are all unsigned values.

4. Not applicable in MDI.

5. Not applicable in MDI.

6. All parameters except step depth, finish feed and plunge feed must be entered even if they are zero (0). If finish feed is omitted, it will default to the mill feedrate. If plunge feed is omitted, it will default to 50% of the mill feedrate.

7. The Z start point must be at a clearance point above the work surface. Z cannot be at machine zero (0). It must be a minimum of .050" below Z home position.

8. The dimension to the X, Y center point and the Z clearance plane may be incremental or absolute. All other dimensions are incremental as noted.

9. Not applicable in MDI.

10. Milling cycles end execution at the center of the shape (Y+Y center point defined in cycle) with the Z-axis at the Z clearance plane.

11. A G179 cycle will put the system in absolute programming mode after execution. If the Incremental Programming mode (G91) was programmed prior to a G179, pressing the INCR button is necessary to remain in the incremental mode.

NOTE

MDI entries are limited to the following list of G codes.

The first two numbers on the top line of the LCD show the current sequence number, automatically updated after completion of each line entry. The next space on the top line identifies the current G code (default G code is G0, rapid traverse). The last part of the top line is the input parameter prompt and data input area. The lower line gives an abbreviated summary (mnemonic) of the meaning of the data entered on the top line.

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-----------------------------------------
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The screen shows the part program pointer on line number 3, using a G170 (OUTSIDE FRAME) and entering an X center point value.

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NOTE

MDI entries are limited to the following list of G codes.

Table 7-1: MDI & MDI Store Mode

G CODE DATA REQUIREMENTS

G CODE	AXIS DATA REQUIRED	MNEMONIC ON SCREEN	END FUNCTION
G0		RAPID	Rapid traverse positioning move
	X	END PT	End point
	Y	END PT	End Point
	Z	END PT	End point
	Polar		
	A	END ANGL	End angle
	Z	END PT	End point
G1		LIN	Linear interpolation, feed
	X	END PT	End point
	Y	END PT	End point
	Z	END PT	End point
	F	FEED	Feedrate
	Polar		
	A	END ANGL	End angle
	Z	END PT	End point
	F	FEED	Feedrate
G2		CW	Clockwise
G3		CCW	Counterclockwise
	X	END PT	End point
	Y	END PT	End point
	I	CNTR PT	Center point
	J	CNTR PT	Center point
	F	FEED	Feedrate
	Polar		
	A	END ANGL	End angle
	F	FEED	Feedrate

G170		OFRAME	Outside frame mill
G171		IFRAME	Inside frame mill
	X	CNTR PT	Center point
	Y	CNTR PT	Center point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	R	FILLET	Fillet radius
	Z	DIM	Dimension
	Z	STEP	Step
	P	CLR DIM	Clearance Dimension
	F	FEED1	Feedrate 1
	P	FIN DIM	Finish Dimension
	F	FEED2	Feedrate 2
G172		POCKET	Pocket mill
	X	CNTR PT	Center point
	Y	CNTR PT	Center point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	R	FILLET	Fillet radius
	Z	DIM	Dimension
	Z	STEP	Step
	P	STEPOVER	Stepover
	P	CLR DIM	Clearance Dimension
	F	FEED1	Feedrate 1
	P	FIN DIM	Finish Dimension
	F	FEED2	Feedrate 2
G173		OFACE	Outside face mill
G174		IFACE	Inside face mill
	X	CNTR PT	Center point
	Y	CNTR PT	Center point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	Z	DIM	Dimension
	Z	STEP	Step
	P	OVERLAP	Overlap
	P	CLR DIM	Clearance Dimension
	F	FEED	Feedrate

NOTE

The sum of the Clearance Dimension and the Final Dimension must be less than half of the X or Y dimension whichever is the smaller.

G175		OCIRC	Outside circle
G176		ICIRC	Inside circle
	X	CNTR PT	Center point
	Y	CNTR PT	Center point
	Z	START PT	Start point
	R	CIRC RAD	Circle radius
	Z	DIM	Dimension
	Z	STEP	Step
	P	CLR DIM	CLearance Dimension
	F	FEED1	Feedrate 1
	P	FIN DIM	Finish Dimension
	F	FEED2	Feedrate 2
G179		SLOT	Slot mill
	X	CNTR PT	Center point
	Y	CNTR PT	Center point
	Z	START PT	Start point
	P	LG	Length
	P	DIA	Diameter
	P	ROT FR XAX	Rotation from X axis
	Z	DIM	Dimension
	Z	STEP	Step
	F	FEED	Feedrate
G81		DRILL	Drilling cycle
G82		SPOT	Spotfacing cycle
G84		TAP	Tapping cycle
G85		BORE1	Boring cycle
G89		BORE2	Boring cycle
	X	END PT	End point
	Y	END PT	End point
	Z	DIM	Dimension
	Polar		
	A	END ANGL	End angle
	Z	DIM	Dimension

NOTE

The sum of the Clearance Dimension and the Final Dimension must be less than the circle radius.

G83		PECK	Deep hole drilling cycle
G87		CHIPBK	Chip breaking cycle
	X	END PT	End point
	Y	END PT	End point
	Z	DIM	Dimension
	Z	1ST PECK	First peck
	Z	PECK	Peck
	Polar		
	A	END ANGL	End angle
	Z	DIM	Dimension
	Z	1ST PECK	First peck
	Z	PECK	Peck
G181		DRIL	Drilling cycle
G182		SPOT	Spotfacing cycle
G184		TAP	Tapping cycle
G185		BORE1	Boring cycle
G189		BORE2	Boring cycle
	X	START PT	Start point
	Y	START PT	Start point
	Z START PT	Start point	
	X	DIM	Dimension
	Y	DIM	Dimension
	Z	DIM	Dimension
	P	# HOLES	Number of holes
	F	FEED	Feedrate
	Polar		
	A	START ANGL	Start angle
	Z	START PT	Start point
	A	DIM	Dimension
	Z	DIM	Dimension
	P	# HOLES	Number of holes
	F	FEED	Feedrate

G183		PECK	Deep hole drilling cycle
G187		CHIPBK	Chip breaking cycle
	X	START PT	Start point
	Y	START PT	Start point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	Z	DIM	Dimension
	Z	1ST PECK	First peck
	Z	PECK	Peck
	P	# HOLES	Number of holes
	F	FEED	Feedrate
	Polar		
	A	START ANGL	Start angle
	Z	START PT	Start point
	A	DIM	Dimension
	Z	DIM	Dimension
	Z	1ST PECK	First peck
	Z	PECK	Peck
	P	# HOLES	Number of holes
	F	FEED	Feedrate
G191		DRILL	Drilling cycle
G192		SPOT	Spotfacing cycle
G194		TAP	Tapping cycle
G195		BORE1	Boring cycle
G199		BORE2	Boring cycle
	X	START PT	Start point
	Y	START PT	Start point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	Z	DIM	Dimension
	P	# HOLES X	Number of holes on X axis
	P	# HOLES Y	Number of holes on Y axis
	F	FEED	Feedrate

G193		PECK	Deep hold drilling cycle
G197		CHIPBK	Chip breaking cycle
	X	START PT	Start point
	Y	START PT	Start point
	Z	START PT	Start point
	X	DIM	Dimension
	Y	DIM	Dimension
	Z	DIM	Dimension
	Z	1ST PECK	First peck
	Z	PECK	Peck
	P	# HOLES X	Number of holes on X axis
	P	# HOLES Y	Number of holes on Y axis
	F	FEED	Feedrate

7.3 MDI STORE

In MDI STORE, the program blocks are entered with the same "menu" format and executed as with MDI. The completed blocks are stored at the end of the text buffer.

When MDI STORE is pressed the screen will show:

```
------------------------------------------
|0 0   D E F          :                   |
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|E X E C              P R G M    #        |
------------------------------------------
```

After the part program number is entered, the operator may enter tool parameters for the program. The following screen is displayed:

```
------------------------------------------
|0 0   D E F          T                   |
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|E N T                T O O L             |
------------------------------------------
```

When the tool number has been entered, the operator will be prompted for the TLO, DIA, and the spindle speed. EXECUTE will cause the tool data to be stored in the part program buffer after the part program.