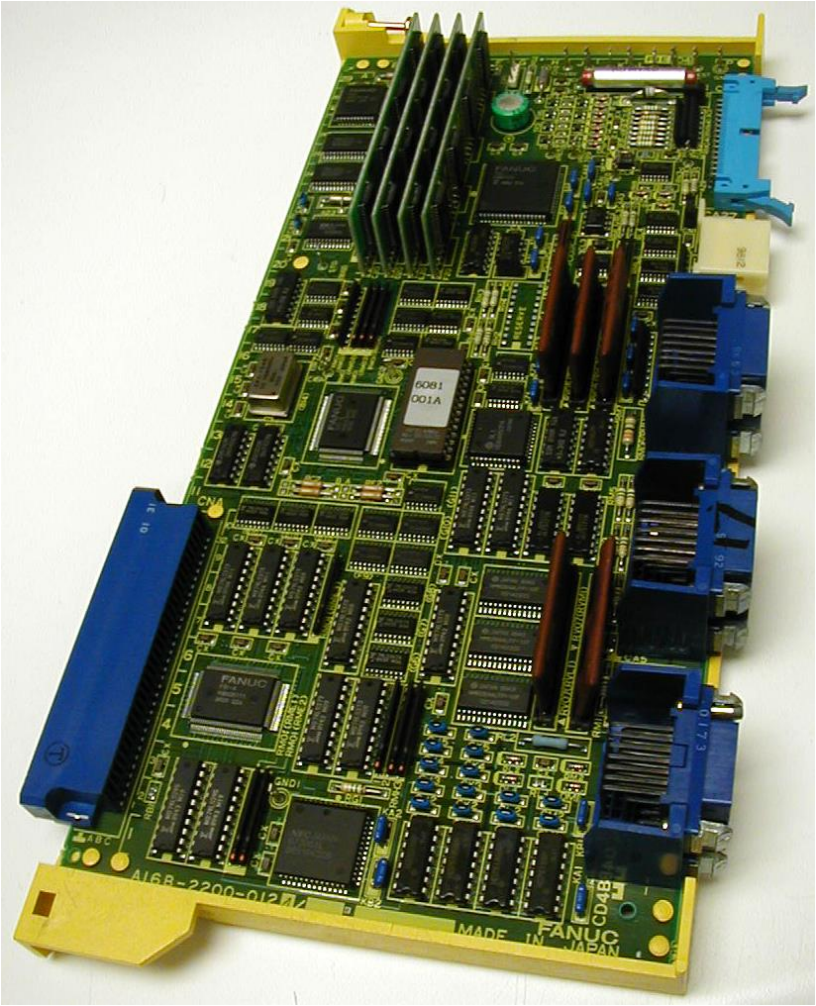
Memory Upgrade
For Fanuc 15A CNC

Installation Instructions



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Introduction

Thank you for purchasing the Memex Memory Upgrade Kit for the Fanuc 15A control. At Memex we invest a great deal of effort in the design, manufacture and testing of each unit we build, and back it with a three-year limited warranty. We are confident you will find this upgrade significantly improves to your machining operations.

General Information

The installation procedure is straightforward and relatively easy to complete – backup the parameters and programs, swap the BASE0 board, and restore the parameters and programs. All that's needed are some basic skills and hand tools.

Estimated installation time required: 1.5 hours.

The part program memory in the Fanuc 15A is located in the BASE0 board, which is the board plugged into the Masterboard at just left of centre in slot 01PE labelled "CNA". The BASE0 board also contains the serial communications ports (M5 & M74) and the video display electronics.

The CMOS memory upgrade modules on the BASE0 board must be installed by Memex, and thus a trade-in of your original BASE0 is needed. To avoid downtime, Memex ships a fully upgraded BASE0 board for immediate installation and requires the existing board in exchange.

Installation Considerations

The memory upgrade should be conducted with care. Never install or remove a board with the control power on (the main power can be on, but not the control). Take care when handling circuit boards, as they are static sensitive. Keep the boards in the anti-static bag provided. Do not place the BASE0 board in any other slot on the Fanuc CPU board. Do not force, drop or otherwise mishandle the boards during the installation procedure.

About this Manual

This manual explains how to install the Memex Memory Upgrade Kit for the Fanuc 15 Model A control, and consists of the following sections:

Installing the Fanuc 15A Memory Upgrade explains how to install the Memex Memory Upgrade into the Fanuc 15A CNC. It consists of sections regarding backing up the control's memory contents to a computer, removing the existing BASE0 board and installing the new one, changing some settings to use the new memory size, and restoring and verifying the control.

Fanuc 15A Technical Summary provides brief summaries of the procedures to punch and read data, critical parameters and their settings, serial port and cable configuration information and memory board model number applicability information.

Technical Support provides contact information for technical support and customer service.

Appendix A: Parameter Records provides tables for manually recording critical parameters before performing the memory upgrade. These parameters must be re-entered manually before restoring the parameter backups after the memory upgrade. *It is critical that they be copied down accurately.*

Installing the Memex Memory Upgrade

Backup All Parameters

Before starting the installation, power on the control and verify that the machine tool is in good working order. If the control has a system error or memory failure that prevents a parameter backup, then it will be necessary to replace the BASE0 board and restore from existing backups. If a good parameter backup is not available then the necessary parameters will have to be entered manually – copied from the printed copy of the original parameters, or determined using the Fanuc Parameter Manual (the assistance of service personnel familiar with Fanuc 15A parameters may be required).

Record Settings & Options

1. Home the machine before performing the memory upgrade.

Settings

2. Using the form on page 17, record SETTING screen data. To display the parameters, Press the SETTING softkey. Enter the number of the parameter to be displayed and press INP–NO . The screen can also be changed using the cursor or page key.

3. Press the SERVICE softkey. Write down the serial port settings in parameters 0, 8, 9, 20-23 and 5000 series in the chart on page 13.

Options

4. Using the form on page 18, record all parameters in the 9100 and 9200 series. These parameters will be backed up to, and restored from, computer in the following steps. However, should any situation arise that prevents their restoration, they will have to be re-entered manually, and they are difficult to read in their backed-up format. It is strongly recommended that they be copied down now. If they do need to be restored manually, they will have to be converted from Binary to Hexadecimal using the chart on page 17.

5. If you have any special options (FAPT, CAP, Loader, etc) back up any settings by hand.

Backup to Computer

1. If not already connected, connect the CNC to a PC with a serial data cable *(see* "Standard Fanuc Serial Cable", *page 14)*. You will need a communications program (such as a DNC system or at least a terminal program) to download and upload the parameters. Make sure the software's communications settings match the CNC's.

NC Parameters

2. Get the computer ready to receive the NC data.
   - Select EDIT mode and switch Memory Protect key off.
   - Press the softkeys SERVICE CHAPTER PARAMETER > PUNCH ALL .

PMC Data

3. Get the computer ready to receive the PMC data.
   - Press the Emergency Stop button.
   -
   - Press the NC/PC key to display the PMC screen.
   - Press PCPRM , KEEPRL and set #K17.7 to 1 ("1xxx xxxx")
   - Press < , SYSPRM and set PG CHANNEL to port 1 or 2.
   - Press softkeys < I/O FDCAS OUTPUT PARAM ADD

Offsets

4. Get the computer ready to receive the Tool Offset data.
   - Confirm that EDIT mode is selected.
   - Press < OFFSET > PUNCH ALL EXEC .

Macro Variables

5. Get the computer ready to receive the MACRO variables.
   - Confirm that EDIT mode is selected.
   - Press < MACRO > PUNCH EXEC .

Part Programs

6. Set parameter #0011.0* and #2201.0 to 0 to *unprotect* part programs in the 8000 series and 9000 series. Get the computer ready to receive part programs.
   - Confirm that EDIT mode is selected.
   - Press < PROGRAM CHAPTER > > PUNCH ALL EXEC

Note: Backup any parameters like FAPT or CAP if they exist.

Upgrade Memory Size Option Parameters

Specific option parameters contain bits that must match the size of memory installed. The bits turned on for the previous memory size must be turned off, and the correct ones for the new size turned on.

An optional convenient way to do so is to use the software included with the upgrade kit. The UPGD15.EXE file can be run from a DOS prompt by typing A:\UPGD15 (assuming Drive A:) or from the Windows Start Button by selecting "Run...", typing in A:\UPGD15 and clicking OK. Select "Open File" and click the NC Parameter file you downloaded. Select "Upgrade" and the software will upgrade the NC parameters.

The software will change the NC parameters according to the following table. The NC parameters can also be changed manually by opening the backup file with an editor and changing the correct two bits. In either case, record the new values in the "Updated" boxes in the form on page 18, in both Binary and Hexadecimal format.

Parameter	New Value
9110.4	0
9110.0	0
9120.2	0
9120.3	0
9120.5	0
9134.0	1

***NOTE:**

Parameters referred to as a four-digit number with a decimal place denote the parameter number and bit number. For example, 9110.4 means bit 4 of parameter #9110. Bits are ordered 76543210. Therefore #9110.4 is the underlined one in "xxx**x**xxxx".

BASE0 board

On example of a Fanuc 15TTA Masterboard

Install the New BASE0 Board

Make sure that there is a current backup of NC Parameters, Pitch Error Compensation, Offsets, PMC Parameters and Part Programs as explained in “Backup All Parameters”, starting on page 2. ***The following steps will delete all data from your control.***

Replace BASE0 Board

1. With the Fanuc control powered off and the Emergency Stop button depressed, access the control’s Masterboard. Find Slot 01PE (connector CAN) just left of centre. Label all cables and their connection locations to ensure correct reconnection.

2. Using a long Philips screwdriver on the retaining screw, carefully remove the BASE0 board and place it in the anti-static bag provided. Install the new BASE0 board in the same slot and fasten the retaining screw.

3. Reconnect all cables to the new board exactly as they were connected to the old board.

Clear Memory

With the 7 & 9 keys depressed, power on the control, and keep the 7 & 9 keys depressed until you see the message “CLEAR FILE: RAM TEST”. This will clear the entire memory. If the control will not power on at this point, check that main power is restored and the cabinet door interlock is bypassed. The control may take a few seconds to clear the entire memory. When it finishes, Press 6 and INPUT to exit IPL mode. Ignore the alarms and turn the control power off and back on.

The new memory has now been initialized and all parameters must now be restored.

Restore The Control

Restore From Computer

1. The communications settings must be manually restored from the chart on page 17.
   - Set Parameter Write Enable, #8000, to “1100 0111”.
   - Select the SETTINGS screen and enter the settings from page 17.

Restore NC Parameters

2. Get the computer ready to send the NC data. Make sure its serial communications settings match the CNC’s corresponding settings.
   - Select EDIT mode, and press the Emergency Stop button.
   - Press softkeys < SERVICE CHAPTER PARAMETER > READ PARAMETER
   - Send the data from the computer.
   - When it finishes, power the control OFF and back ON.

Restore PMC Data

3. Get the computer ready to send the PMC data. Make sure the CNC is ready to receive the PMC data.
   - Press the Emergency Stop button. Set #8000 to “1111 1111”.
   - Press the CNC/PMC key to display the PMC screen.
   - Press PCPRM , KEEPRL and set #K17.7 to 1 (“1xxx xxxx”)
   - Press < , SYSPRM and set PG CHANNEL to port 1 or 2.
   - Press softkeys < EDIT PASWRD ENAON < < I/O FDCAS INPUT EXEC
   - Send the PMC backup from the computer.
   - When it finishes, power the control OFF and back ON.

Restore Offsets

4. Get the computer ready to send the Offsets data.
   - Confirm EDIT mode is selected.
   - Press < PROGRAM CHAPTER > > READ O1 EXEC
   - Send the Offsets backup file from the computer.
   - Switch to PROGRAM screen and select "O0001" on screen
   - Switch to MEMORY mode. Press the CYCLE START button.
   - Once the program is finished executing, delete it.

Restore Macro Variables

5. Get the computer ready to send the Macro Variable data.
   - Confirm EDIT mode is selected.
   - Press < PROGRAM CHAPTER > > READ O1 EXEC
   - Send the Macro backup file from the computer.
   - Switch to PROGRAM screen and make sure O1 is selected
   - Switch to MEMORY mode. Press the CYCLE START button.
   - Once the program is finished executing, delete it.

Restore Part Programs

6. Set parameter 0011.0 and 2201.0 to 0 to *unprotect* part programs in the 8000 and 9000 series.
   - Confirm EDIT mode is selected.
   - Press < PROGRAM CHAPTER > > READ ALL EXEC
   - Send the part programs from the computer.
   - Set parameter 0011.0 and 2201.0 to 1 to *protect* part programs in the 8000 and 9000 series from editing.

Check that the any FAPT or CAP parameters (if they exist) are also complete – if not, reload.

Verify The Control

Once the upgrade is completed, including the reloading of all parameters, test the machine via the following procedure.

IMPORTANT: *Do not move the machine until you are sure all parameters have been restored.*

- Change to either MDI mode or Program mode.
- Home all axes, tool changers and pallets.
- Check spindle functionality through all speeds and gear ranges.
- Check Clockwise and Counter-clockwise spindle rotation with M3 and M4 commands.
- Check the tool changer. Be sure that the tool received was the tool requested and that the carousel rotates in the proper direction.
- Check the pallet changer (if applicable). If the machine requires special custom macros for a pallet changer or tool changer, be sure that they are present.

Note:

If you have absolute encoders, they will need to be reset or else you will Overtravel alarms when you first move the axes.

Power on holding “P” and “Cancel” and then manually home the machine to reset these. Also the IPL screen may have an Overtravel reset.

Look also at parameter 1815.

Installation Checklist

- Check machine - Power ON and check for problems before starting.
- Backup settings, parameters and programs.
- Power OFF.
- Depress E-STOP.
- Change BASE0 boards.
- Power On the Control with 7 & 9 to clear all.
- Set PWE to enable.
- Restore settings.
- Restore parameters & part programs.
- Check the parameters and machine operation thoroughly.

You Are Complete...

Fanuc 15A Technical Summary

Punching

NC Parameters EDIT mode; softkeys SERVICE
CHAPTER PARAMETER > PUNCH ALL

PC Parameters EDIT mode; DGNOS screen;
OUTPUT/START

All Programs EDIT mode; < PROGRAM CHAPTER
> > PUNCH ALL EXEC

Offsets EDIT mode; softkeys < OFFSET
CHAPTER PUNCH ALL EXEC

Reading

NC Parameters EDIT mode; softkeys SERVICE
CHAPTER PARAMETER > READ ALL

PC Parameters EDIT mode; DGNOS screen; INPUT

All Programs EDIT mode; < PROGRAM CHAPTER
> > READ ALL EXEC

Offsets EDIT mode; < PROGRAM CHAPTER
> > READ ALL EXEC
MEMORY mode; CYCLE START

Initializing

Erase *Entire* Memory Power On holding 7 & 9
with Write Protect Key off

Typical Serial Communications Parameter Settings

Parameter		Description Setting
0	Various communications settings	See manual
8.0-3	Baud rate of Device No. 1	1010=9600, 1001=4800
8.4	Stop Bits of Device 1	0 = 1 bit (1 = 2 bits)
8.5	DC Codes used for Device 1	0 = Used
8.7	Feed characters for Device 1	1 = Not output
9	Same as 8 but for Device 2	
20 & 22	Fore-& Background Input channel	0 or 1 = Connector JD5A
21 & 23	Fore-& Background Output channel	1 = Connector JD5A
5001	Device Number of Channel 1	1 = use settings in 5110-5112
5002	Device Number of Channel 2	2 = use settings in 5120-5122
5110	Device type of Device No. 1	3 = Xon/Xoff, no feed char.
5111	No. of Stop Bits of Device No. 1	1 or 2 = No. of Stop Bits
5112	Baud rate of Device No. 1	9 =2400,10 =4800, 11 =9600

5120 – 5122 = same as 5110 – 5112 but for Device No. 2

Applicable BASE0 Boards

BASE0 Board No.	Fanuc Model Applicable to
A16B-2200-0120	15-MA, 15-TA, 15-TTA
A16B-2200-0121	15-MF, 15-TF, 15-TTF
A16B-2200-0124	15-M, 15-TF
A16B-2200-0127	15-MF
A16B-2200-0129	15-TF, 15-TTF

Standard Fanuc Serial Port: (db25 Female)

1 = Frame Ground	6 = Data Set Ready
2 = Transmit Data	7 = Signal Ground
3 = Receive Data	8 = Carrier Detect
4 = Ready To Send	20 = Data Terminal Ready
5 = Clear To Send	25 = +24 Volts DC

Standard Fanuc Serial Cable

Computer		*Fanuc*
25-pin Female to		25-pin Male
Tx – 2	-	3 – Rx
Rx – 3	-	2 – Tx
RTS – 4	-	5 – CTS
CTS – 5	-	4 – RTS
SG – 7	-	7 – SG
		6-8-20 jumpered
FG – 1	-	No Connection
9-pin Female to		25-pin Male
Tx – 3	-	3 – Rx
Rx – 2	-	2 – Tx
RTS – 7	-	5 – CTS
CTS – 8	-	4 – RTS
SG – 5	-	7 – SG
		6-8-20 jumpered
FG – (D-shell)	-	No Connection

Fanuc Protocol: E,7,x

The standard serial communications protocol for Fanuc controls is always Even Parity and 7 Data Bits. Stop Bits are either 1 or 2, as set via parameter 5111 or 5120 (see “Typical Serial Communications Parameter Settings” on page 13).

Memex Technical Support & Service

In case of technical difficulty with the memory upgrade procedure, please contact your Memex dealer, or call Memex Automation Technical Support at **1-905-635-3041**. Page 16 of this manual may be used to record technical information, service advice, etc. as needed.

If you have any other questions or concerns, need answers to technical questions, or need information about Memex products and/or services, please contact your local Memex dealer, or contact us at:

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200 – 3425 Harvester Rd.,
Burlington, Ontario Canada L7N 3N1
Phone: 1-905-635-1540 Fax: 1-905-631-9640
www.memex.ca

Email: support@memex.ca

Notes

Appendix A: Parameter Records

Fanuc System 15A Machine Parameter Worksheet

Company:_____ Machine No.:_____ Date:_____

Fanuc Software Version: _____ Main CPU Board No.:_____

Setting (Handy) Screen

TV Check		Input Device (BackGround)	
Punch Code		Output Device (BackGround)	
Input Unit		Mirror Image X	
Input Device		Mirror Image Y	
Output Device		Mirror Image Z	

Serial Communications Parameters **Note:** Grey boxes are for Remote Buffer Unit (RBU board, labelled "OP1").

Par.#	Value		Par.#	Value	Par.#	Value	Par.#	Value	Par.#	Value	Par.#	Value
0			5001		5071		5081		5110		5120	
20		22	5002		A		5082		5111		5121	
21		23	5070		5073		5083		5112		5122	
5000					5074		5084		11.0		2201.0	

Binary to Hexadecimal Conversion

Binary	Hex	Binary	Hex	Binary	Hex	Binary	Hex
0 0 0 0	0	0 1 0 0	4	1 0 0 0	8	1 1 0 0	C
0 0 0 1	1	0 1 0 1	5	1 0 0 1	9	1 1 0 1	D
0 0 1 0	2	0 1 1 0	6	1 0 1 0	A	1 1 1 0	E
0 0 1 1	3	0 1 1 1	7	1 0 1 1	B	1 1 1 1	F

Example: 11010101	
1 1 0 1 =	D
0 1 0 1 =	5
1101 0101 =	D5

Option Parameters

Par.#	Binary	Hex	OP#		Par.#	Binary	Hex	OP#		Par.#	Binary	Hex	OP#
9100			OP1		9120			OP21	- Original	9140			OP41
9101			OP2		9120			OP21	- Updated	9141			OP42
9102			OP3		9121			OP22		9142			OP43
9103			OP4		9122			OP23		9143			OP44
9104			OP5		9123			OP24		9144			OP45
9105			OP6		9124			OP25		9145			OP46
9106			OP7		9125			OP26		9146			OP47
9107			OP8		9126			OP27		9147			OP48
9108			OP9		9127			OP28		9148			OP49
9109			OP10		9128			OP29		9200			OP50
9110			OP11	- Original	9129			OP30		9201			OP51
9110			OP11	- Updated	9130			OP31		9202			OP52
9111			OP12		9131			OP32		9203			OP53
9112			OP13		9132			OP33		9204			OP54
9113			OP14		9133			OP34		9205			OP55
9114			OP15		9134			OP35	- Original	9206			OP56
9115			OP16		9134			OP35	- Updated	9207			OP57
9116			OP17		9135			OP36		9208			OP58
9117			OP18		9136			OP37		9209			OP59
9118			OP19		9137			OP38		9210			OP60
9119			OP20		9138			OP39					
					9139			OP40					

NOTE: A newer machine may have more 9100 series parameters - it is imperative to record them all.

PC Parameters

Timers				Spare		Counters			Keep Relays	
No.	Data	No.	Data	No.	Data	No.	Preset	Current	No.	Data
1		21		1		1			1	
2		22		2		2			2	
3		23		3		3			3	
4		24		4		4			4	
5		25		5		5			5	
6		26		6		6			6	
7		27		7		7			7	
8		28		8		8			8	
9		29		9		9			9	
10		30		10		10			10	
11		31		11		11			11	
12		32		12		12			12	
13		33		13		13			13	
14		34		14		14			14	
15		35		15		15			15	
16		36		16		16			16	
17		37		17		17			17	
18		38		18		18			18	
19		39		19		19				
20		40		20		20				

"No. of Data" row 0 indicates how many data tables there are. The remaining rows in that column indicate how many entries are in each table. Page down through each table and record all the data in each, using the form on the next two pages - photocopy the form before starting, if more are needed.

Data Tables

No.	Parameter	No. of Data	Offset	Special	Table No. 0
0	- - - - - - - - - -		- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

No.	Data	No.	Data	No.	Data	No.	Data
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	

5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	

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