

# Tulip Electronics Inc.

## INSTALLATION INSTRUCTIONS FOR FANUC 15i / 16i / 18i / 20i & 21i Controls



### **SAVE CNC DATA WITH PCMCIA SRAM CARD BEFORE UPGRADING MEMORY**

All Fanuc “i” model controls have a memory card slot on the front left-hand side of the CRT. This slot is to be used with an SRAM card (these are PCMCIA cards) to back up all of your existing SRAM memory (this SRAM is your on-board part program storage). Using a PCMCIA SRAM card, you will be able to quickly and easily perform a complete backup for safety reasons. Although the procedure can be done manually with the serial port, we strongly recommend you use this SRAM card feature during this memory upgrade.

There are various sizes of SRAM cards that can be purchased – 1, 2 & 4 megabytes.

- When you have a Fanuc 15 or 16 “i” control that can be upgraded to 2.25 megabytes of memory, you will need a 4 megabyte SRAM card to back it up properly.
- The Fanuc 18 “i” control has a maximum memory of 2 megabyte (5120 meters), so a 4 megabyte SRAM card will be needed.
- The Fanuc 20 & 21 “i” controls have a maximum memory of 512 kilobyte (1280 meters) and so a 1 Meg card will be need to back them up.

## 1. DIRECTIONS TO USE SRAM CARD FOR A SYSTEM BACK-UP

Turn the control ON while pressing the two right-hand soft keys until the System Monitor Main Menu Screen comes up.

Select number 5 (SRAM DATA BACK-UP).

Press SELECT softkey.

Choose number 1 (SRAM DATA BACK-UP TO CNC MEMORY CARD).

Press SELECT.

Press YES.

The screen will now show COMPLETE.

Press SELECT. Now exit by paging down to END. Press SELECT. Page down to 10:END. Press SELECT and YES.

You will have a binary file (or files) on your PCMCIA SRAM card with all the data of your control. At this time using a laptop or other PCMCIA Type II slot read the card and save the files.

# of Files Size	1	2	3	4	5
256 KB	SRAM256A.FDB				
0.5 Meg	SRAM0_5A.FDB				
1.0 Meg	SRAM1_0A.FDB	SRAM1_0B.FDB			
1.5 Meg	SRAM1_5A.FDB	SRAM1_5B.FDB	SRAM1_5C.FDB		
2.5 Meg	SRAM2_5A.FDB	SRAM2_5B.FDB	SRAM2_5C.FDB	SRAM2_5D.FDB	SRAM2_5E.FDB

► Note that to reload an SRAM file, you must change the name of the saved file to match the new file name expected. As such, if you had a backup with SRAM0\_5A.FDB, when you upgrade the memory card to 1 Meg the SRAM Restore screen (Holding the right 2 softkey IPL mode) will only see files that look like SRAM1\_0A.FDB and so on.

## 2. BACKUP OF PART PROGRAMS NECESSARY

After booting to the normal Fanuc screen, you must now download to this same SRAM card (or to a PC using the standard Fanuc serial port) the following information:

► **BACKUP ALL YOUR PART PROGRAMS & O8000/O9000 MACRO PROGRAMS as they will be lost when the new option is enabled to expanded the memory after the base SRAM restore.**

Optionally, it is recommended that you also backup all NC PARAMETERS, PMC PARAMETERS, PITCH ERROR COMPENSATION, MACRO VARIABLES, OFFSETS and any other variables to have a readable copy of the system parameters before this upgrade.

How to do this is discussed in your Maintenance Manual under the Inputting and Outputting of data.



PCMCIA Type II SRAM Card Available from Memex

### **3. OPTIONAL FANUC SERIAL BACKUP PROCEDURE**

Turn on the machine tool (the control is already on), home all axes, and clear any alarms.

#### ***3.1 Punching out NC parameters:***

Select the M-Card as the I/O device (or leave the serial settings if you are downloading serially).

To set the M-Card as the I/O Device, select MDI;  
Press OFFSET SETTING key;  
Press SETTING soft key;  
Turn on PWE (by setting PARAMETER WRITE ENABLE to a 1);  
Press INPUT;  
Cursor down to I/O CHANNEL;  
Press 4 and INPUT (to select the M-Card).

#### **► TO UNPROTECT 8000 AND 9000 SERIES MACRO PART PROGRAMS**

With PWE on, now is a good time to unprotect the 8000/9000 Macro Programs. To do this simply go to Parameter 3202 and change bit 4 and bit 0 to a 0 (e.g. P3202="xxx0 xxx0" where x is existing value).

Reset PWE to 0.

Now that you have a known I/O Channel...

Go to EDIT mode.

Press SYSTEM key.

If you are using a PC, make it ready to receive your NC Parameter file (e.g. Fanuc18i.NCP)

Press the following soft keys:  
PARAM, OPRT, "+", PUNCH, NON-0, EXEC

Now you will see OUTPUT flashing.

This procedure generates a file on the M-Card called "CNCPARAM.DAT".

### **3.2 Punching out PMC parameters:**

Select MDI mode.

Press OFFSET SETTING key TWICE.

Make PWE = 1

Press the SYSTEM key.

Now press the following soft keys:  
PMC, then PMCPRM, then KEEP RL

Select K-17.

Set bit one to one. (K17=xxxx xx1x)  
(Note if you have more than 20 Keep Relays, page down & change 900.1 to a 1 instead of K17.1=1. Also make sure you stop the ladder when reloading PMC parameters)

Change to EDIT mode.

Press left arrow key.

Press I/O soft key.

This brings up the Device Screen. Set it as follows:

<b>DEVICE</b>	-	<b>M-CARD</b>
<b>FUNCTION</b>	-	<b>WRITE</b>

Cursor down to the DATA KIND, and press PARAM.

Then press EXEC.

Change to MDI mode.

Press OFFSET SETTING key and set PWE to zero.

Press RESET to clear PWE alarm.

### **3.3 Downloading Programs:**

Go to EDIT mode.

Turn MEMORY PROTECT key OFF and ON.

Press PROG key.

Press "+", CARD, OPTR, PUNCH soft keys.

This will bring up the M-Card Directory.

You must now name the files you want saved as one file.

Call them, for example: "33" - Key in 33 and press the soft key F NAME.

Next type in -9999 [minus 9999], then press O SET, and then EXEC.

Your programs are now stored on the M-Card as FILE: NAMED 33.

### **3.4 To Save Offsets:**

Press OFFSET SETTING key.

Press the following soft keys:

OFFSET, OPRT, "+", PUNCH, EXEC

### **3.5 To Save Macro Variables:**

Press OFFSET SETTING key.

Press the following soft keys:

+", Marco, OPRT, "+", PUNCH, EXEC

Now your backup is complete.



A Fanuc 18i Model A Control From Behind The Monitor

#### **4. PHYSICAL INSTALLATION OF THE MEMORY MODULE**

Have control and main machine power OFF.

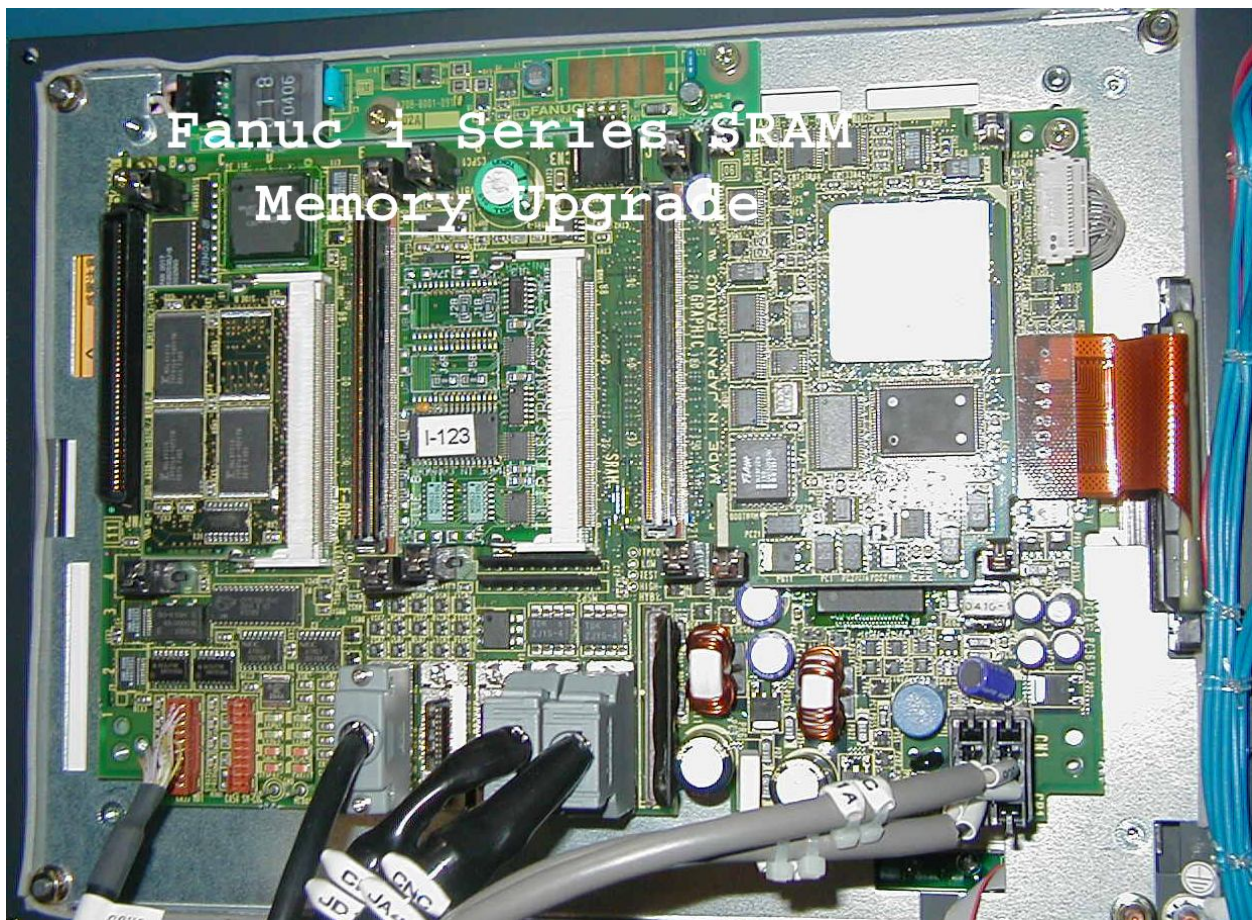
Locate the buried Fanuc Memory Module (DIMM).

(Depending upon which hardware configuration you have, this may involve removing a yellow cage behind the display. If this is the case, disconnect the back light inverter connector at the upper right, the fans and the battery and any other cable in the way. Mark each cable and take care.)

Remove the mounting screws from each corner of the cage.

Pull the cage assembly straight back to disconnect it from the circuit board.  
(Set it aside for later reassembly)

Remove any cards, which may be concealing the memory Fanuc Memory Module.



After removing the yellow case and the left 2 covering cards, you will see the SRAM module (DIMM) in the center.

The memory can be recognized by one of the following numbers printed on the upper side, along the edge farthest from the socket into which it is fitted:

A20B-3900-0052  
A20B-3900-0053  
A20B-3900-0060  
A20B-3900-0061

Remove the Fanuc Memory Module (DIMM) carefully with two hands – watch for static by grounding yourself before touch the boards.

Replace it with the Memex Memory Module, which is mounted with B side UP (label showing).

Replace the card or cards that were removed to gain access to the DIMM.

Be very careful lining them up before pressing them into their connectors, as shown on Page B, attached.



Re-install the card cage, fans, etc, which were removed earlier.

Check that everything is correct.

You are now ready to power ON and complete the installation.

## **5. LOADING DATA INTO YOUR CONTROL FROM THE SRAM CARD**

Enable E-STOP (Emergency Stop)

Press **RESET** and **DELETE** to clear the new memory card, and hold these keys while turning the control ON until the normal screen comes up (with alarms).

With the SRAM Card installed, turn the CNC off and then on holding the right 2 soft keys to get back to the IPL screen.

With the file name changed on the SRAM card to reflect the new memory size, proceed to restore the SRAM backup file. If you do not have enough files, that is OK as long as the first file

is named and loads properly. The rest of the files are usually blank. If you want to get a blank 512k file we have one on our web site at:

[http://www.tulipmemory.com/products/SRAM2\\_5D.FDB](http://www.tulipmemory.com/products/SRAM2_5D.FDB)

After restoring the base file and exiting IPL, your control should load normally. If this is the case, jump ahead to section 5.2, otherwise continue...

### ***5.1 Optional Re-Load Your NC Parameters:***

Press SYSTEM key.

Cursor down parameter 20.

Press 4 and INPUT. (This sets the I/O device to M-Card)

Press right chapter "+" soft key.

Press READ

Press EXECUTE. (This re-loads your NC parameters)

Turn control OFF and ON.

### ***5.2 Set Options to Re-Size Your Memory***

Press OFFSET SETTING key TWICE.

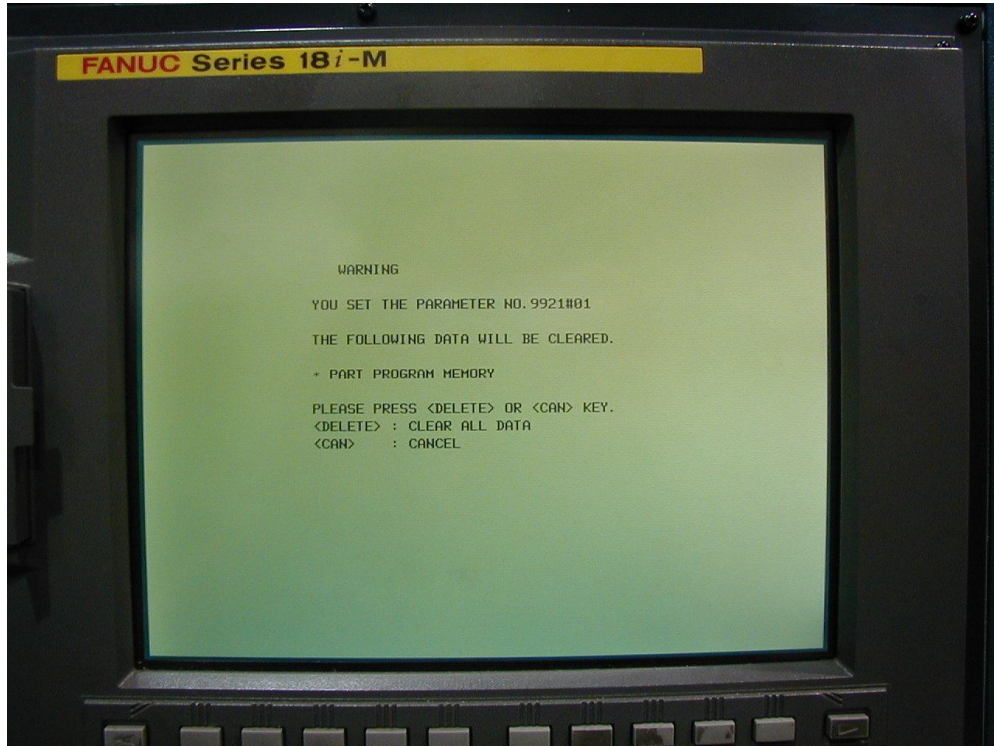
Set PWE to one, turning it on.

Press SYSTEM.

Press 9921 and then NO SRH

Set bit 4, 3, 2, 1, 0 to ZERO. DO NOT CHANGE bits 7, 6, 5 however. (P9921= "xxx0 0000")

If any of these bits were on and you have turned one off, you will now get a warning screen that says you will lose information.



Press DELETE (so it accepts that change).

**NOW SET ONE OF THE FOLLOWING MEMORY PARAMETERS:**

**With PWE on, in MDI mode and Parameters 9921 reset, you then set:**

- (A) Parameter 9943, bit 6 to 1 for 512k (P9943 = "x1xx xxxx"), or set it to "0" & set**
- (B) Parameter 9953, bit 2 to 1 for 1 megabyte (P9953 = "xxxx x10x"), or set**
- (C) Parameter 9953, bit 1 to 1 for 2 megabytes (P9953 = "xxxx x01x").**

Additionally, you can also turn on parameter 9920, bit one, to a one.  
This allows the G10 tool offsets to be inputted.

Reset PWE to 0 after you are done.

You still have a "000 Alarm – Power Must Be Off"

Turn control OFF and then ON.

Your control should come up fine with the new memory size. If so, jump to section 5.4 to reload your 8000 and 9000 macro part programs.

### **5.3 To Re-Load Your PMC Parameters:**

Press SYSTEM key.

Press PMC, PMCPRM, KEEP RL.

Cursor to K17 and set bit one, to ONE by keying in 10 and INPUT.

(Note if you have more than 20 Keep Relays, page down & change 900.1 to a 1 instead of K17.1=1. Also make sure you stop the ladder when reloading PMC parameters)

Press left soft key.

Press I/O

Press M-CARD.

Cursor down to FUNCTION and press READ soft key.

Input the file name you created on the M-Car for the PC parameters, by keying in @ PMC – RB PRM.

Press EXEC.

Turn control OFF and ON.

Take control out of E-STOP.

Press SYSTEM and then enter 3202 and press NO.SRH.

At parameter 3202, turn bit 4 and bit 0 to Zero.

Press OFFSET SETTING key TWICE to bring up PWE and set it to zero (OFF).

Then press RESET to clear your alarm.

### **5.4 To Re-Load Your Part Programs and 8000/9000 Macro Programs:**

Make sure PWE is off and there are no alarms.

Select EDIT mode.

At this point you must confirm that the MEMORY PROTECT key lock switch is OFF.

Press PROG, "+", CARD, OPRT, F READ.

Now enter the **file number** – not the **file name** (e.g. O0009), for the file you named 33, to re-load this batch of files.

Press F SET.

Press EXEC.

If all seems OK with the control, jump to section 5.8 to reset the 8000/9000 protection, otherwise reload the system files from your backup as follows...

### ***5.5 Optionally To Re-Load Macro Variables:***

(By way of explanation, there are two steps to this: You have to input the macro file saved earlier in to the control, and then execute that file.)

Press F READ

Input the MACROVAR.DAT file number from the SRAM card.

Press F SET.

Then give it a file number for the control (such as 20).

Press O SET.

Press EXEC.

### ***5.6 Optionally To Execute the Macros (if not loaded):***

Go to MEM MODE.

Press PROG. This should bring up the macro program, because it was the last thing you entered. If not, select macro from the directory.

Press the OPRT soft key.

Press the O SRH soft key to select the MACRO program number (20, if you used 20).

Press CYCLE START.

This re-loads the macro settings.

### ***5.7 Optionally To Re-Load Offset Data:***

Press OFFSET SETTING key TWICE.

Press OPRT, "+", READ, EXEC.

Like the macro file, this offset needs to be run like a program to automatically set the offsets.

### ***5.8 Re-Protect the 8000/9000 Macro Programs***

The Last thing to do is RE-LOCK parameter 3202, bit 4 and bit 0 (Changing them to ONE)

This protects the 8000 and 9000 programs.

... To do this, select MDI mode.

Press OFFSET SETTING key TWICE.

Bring up PWE and set it to one (turn it on).

Press SYSTEM key.

Find parameter 3202 and turn on bits 4 and 0.

Press OFFSET SETTING key.

Bring up PWE again, and turn it off (set it to ZERO).

Check your control completely...

### **5.9 Absolute Encoder Note:**

Note: If you have absolute encoders and you get a 300 APC Alarm, you may need to reset the absolute encoders. With PWE on in MDI mode, set Parameter 1815 bit 4 on all axes to 0. Reset PWE to 0. Hit reset to clear alarms. Home the control manually and check that P1815 bit 4 is back to a 1 (if it is not set PWE and make it a 1 in all applicable axes). With PWE off, hit RESET to clear all alarms.

**CONGRATULATIONS YOUR FANUC I SERIES MEMORY UPGRADE IS NOW COMPLETE.**

## **Tulip Electronics Inc.**

**627 Main Street East, Unit L07  
Hamilton, Ontario  
Canada L8M 1J5**

**Phone: 289-389-6117**

**Fax: 289-389-6584**

**[www.tulipmemory.com](http://www.tulipmemory.com)**

**Thank you for Choosing Tulip Today**

File: M100734B – Fanuc I Series Installation Manual.doc