

# Halewood DB13 and FB155 Overview



 **GETRAG**

Precision. Passion. Partnership.

# Manufacturing Engineering DB13 Standard

## SIEMENS

**MCIS MDA Machine  
GETRAG Corporate Group**



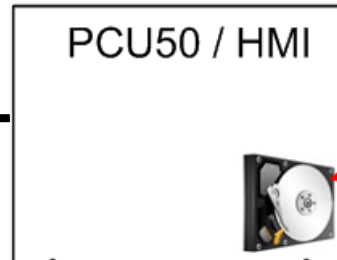
Precision. Passion. Partnership.

Specification

Edition 02/2007

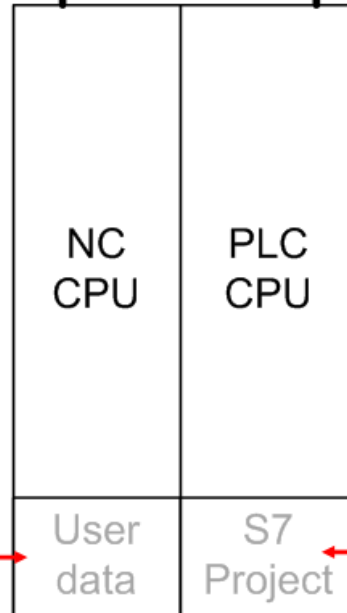
# Basic Machine Concept

Quantum via  
Manufacturing  
Network



PCU50 Hard drive should be imaged **once per year** or after every major software modification.

NCU



Machine NC Archive to be backed up **once a week**.

The machine S7 Project (PLC) should be backed up **once per year** or after every major modification.

# PLC memory locations

**OB** Organisation **B**lock

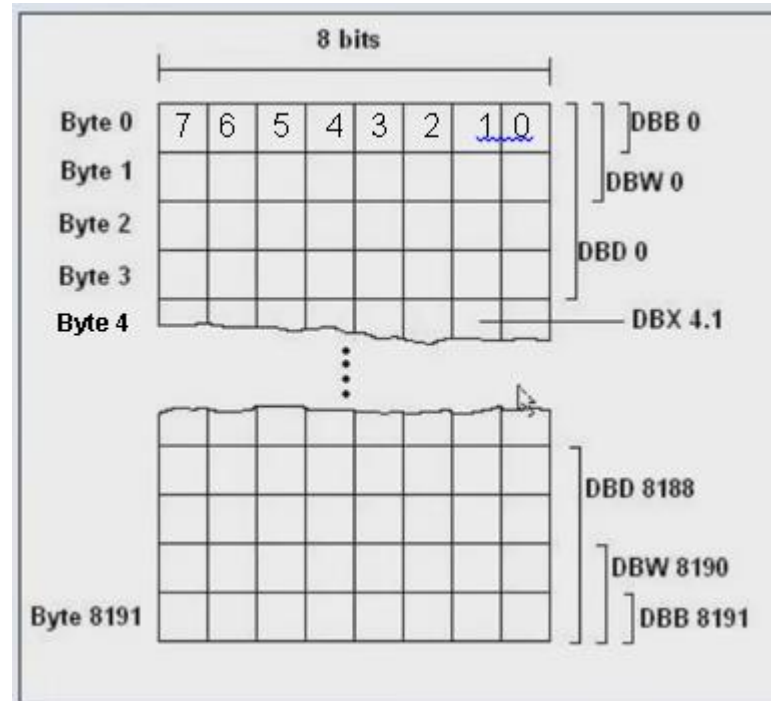
**DB** Data **B**lock

**FC** Function (without memory)

**FB** Function **B**lock (with memory) that you not have mentioned

# PLC Addressing

- DBX = Bit
- DBB = Byte = 8 bits
- DBW = Word = 2 x Bytes
- DBD = Double word 4 x Bytes

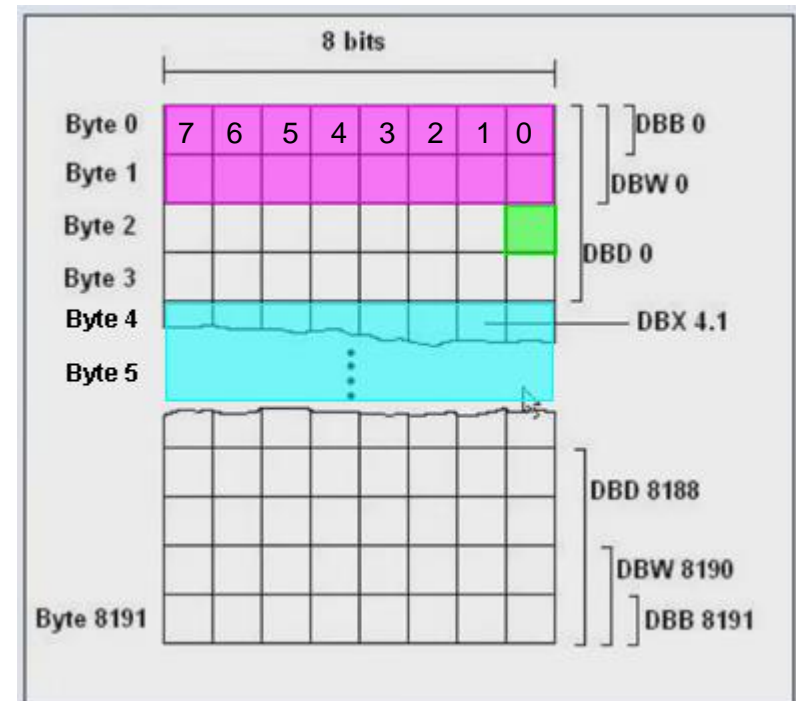
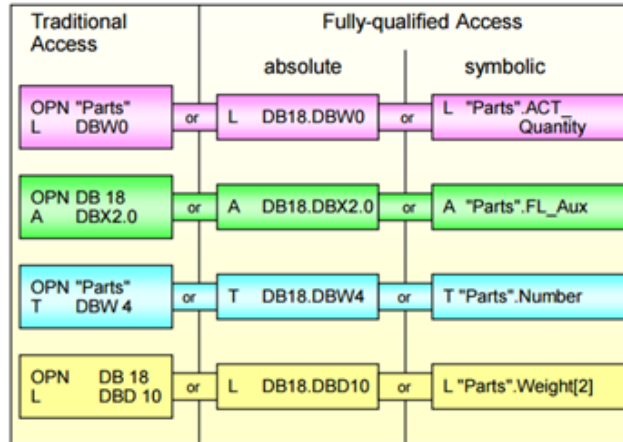


- 1, A data block is an area of memory that can be freely setup for any type of data you like. This can be bits, bytes, words, ints, reals or even your own data types.
- 2, Size of the data block depends on the PLC. Consult the manual for that PLC. Generally, 1024 bytes is safe for all S7 300 and 400. Most are capable of more.
- 3, Function of the data block is to allow you to setup the memory area in a convenient manner for your program. As a secondary function, it allows you to set aside memory for the FB type of function. This type of function retains its memory between calls, therefore needs a place to store the "instance" of the function block.

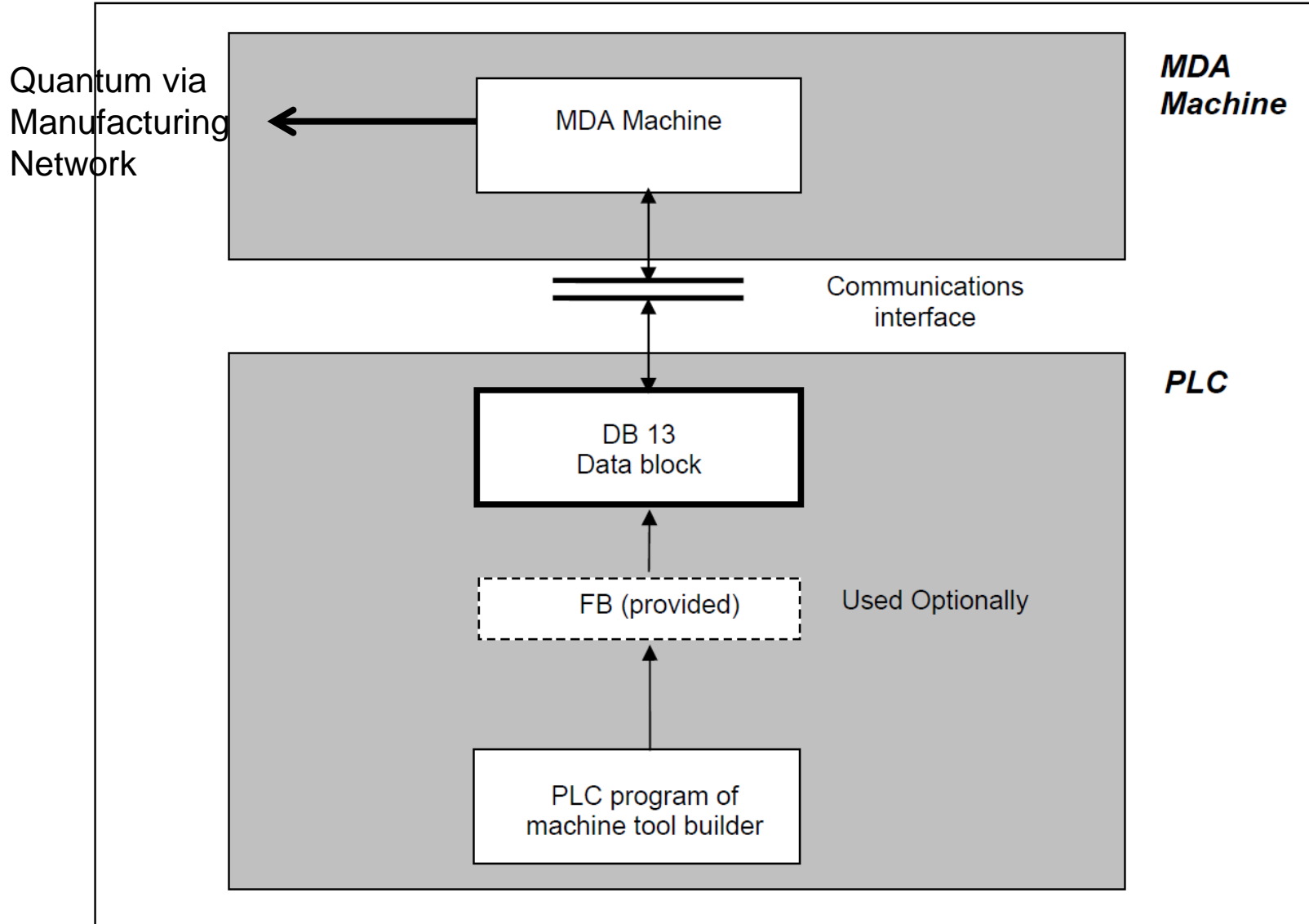
# PLC Addressing

## Accessing Data Elements

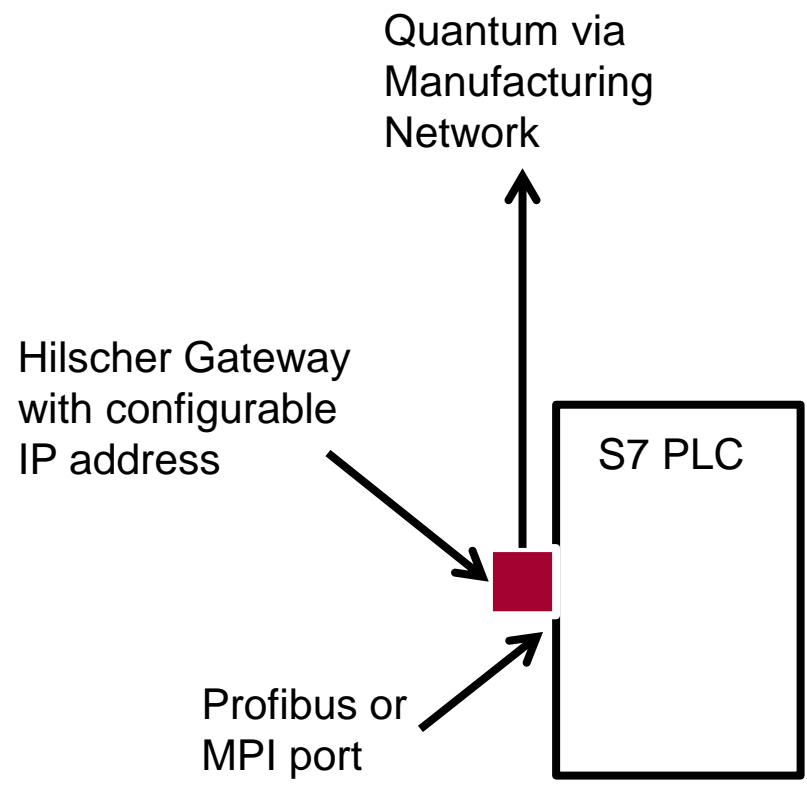
DB 18 "Parts"		
Addr.	Name	Type
0.0	Act_Quantity	INT
2.0	FL_Aux	BOOL
4.0	Number	INT
6.0	Weight[1]	REAL
10.0	Weight[2]	REAL



# Manufacturing Engineering DB13 Standard

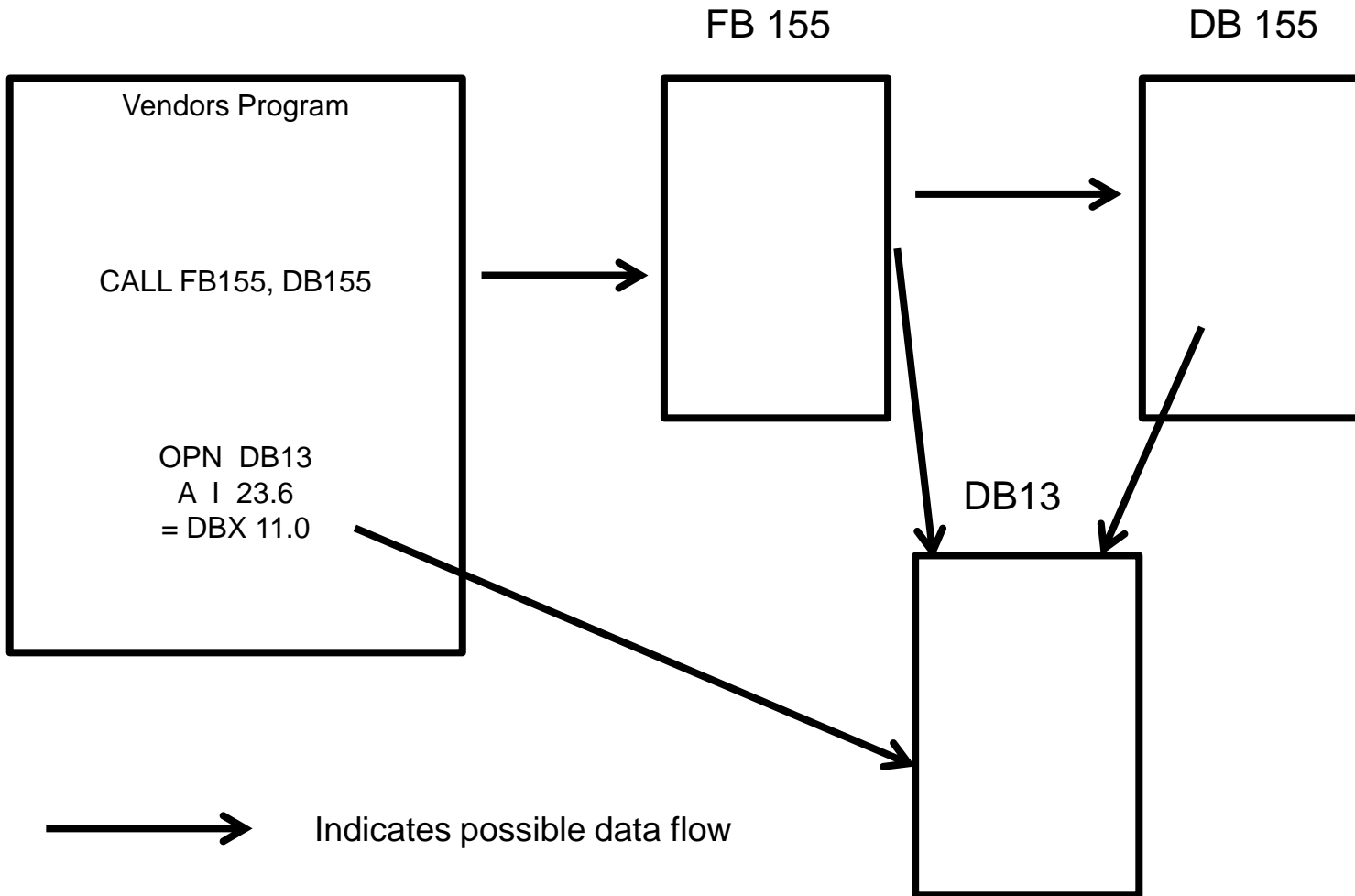


# PLC connection to Manufacturing Network

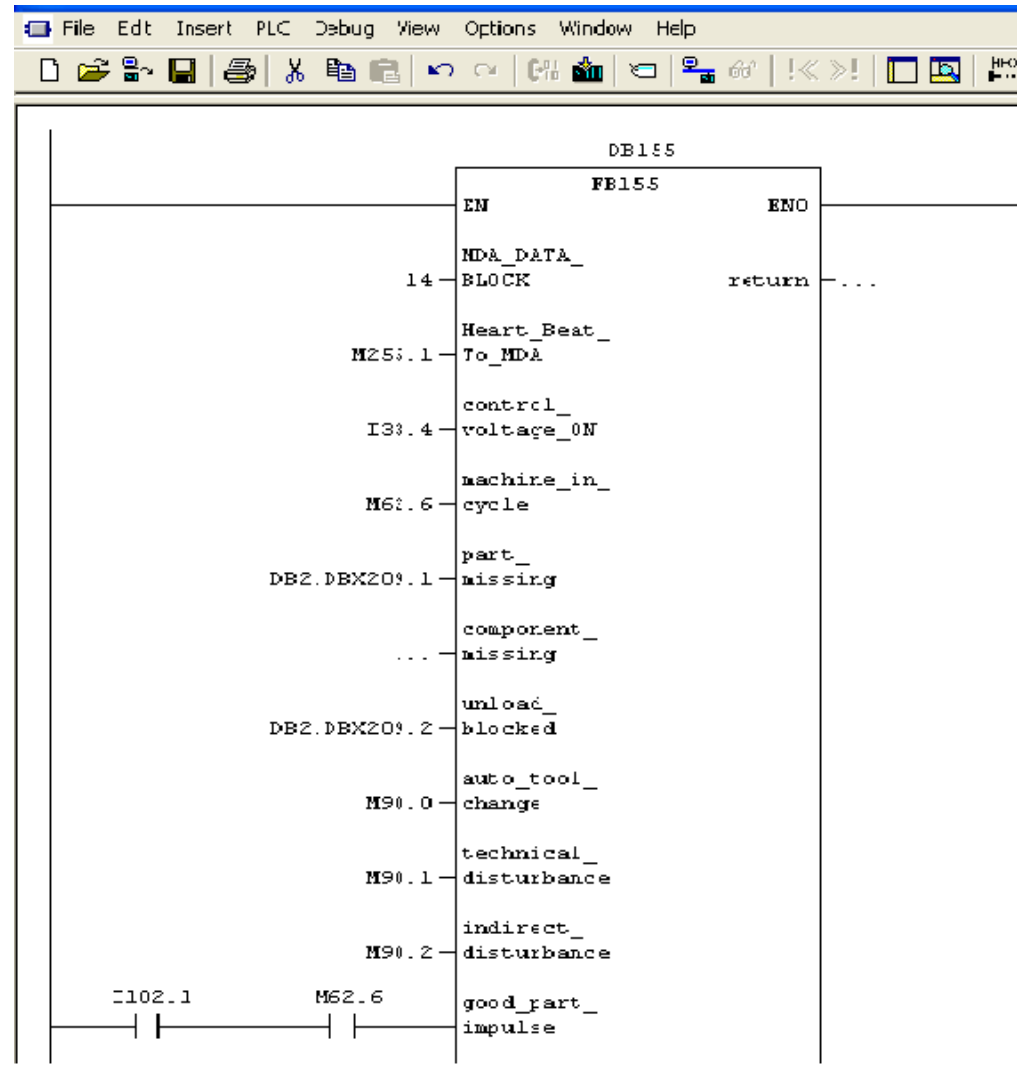




# Data Flow options to MDA Data Block (DB 13)



# FB 155 in Vendor Program



## MDA Step 7 code functionality

DB 13 is a communication Post Box.(can be any unused Data Block)

The PLC program deposits values and states into it and the IT system takes the data away for reporting purposes.

There are two sets of counts, one is absolute (the total number of parts made by the machine) for Good / Scrap / Rework

The second is also for Good / Scrap / Rework but is termed delta. This is the number of parts made since the Data was last accessed by the IT system.

Within the DB is a co-ordination flag, the PLC sets it to 1 when it has new data available.

## MDA Step 7 code functionality cont..

When the IT system takes data, it also resets this flag.

When another part count occurs, the previous value which the system has taken is deleted and the new count made available.

The co-ordination word is also set to 1 to indicate new data available.

The program for this is in the PLC in FB155.

## MDA Step 7 code functionality cont..

If the data is not taken by the system before another part is made, (indicated to the PLC by the co-ordination remaining at 1) the values are stored in DB 155 which is the Instance Data Block for FB 155.

The idea behind this is in case of loss of communication to the PLC.

The part counts are held in DB155 until communication is restored, indicated by the co-ordination being set to 0.

On this occurring the number of parts made during the loss of communication is passed to DB13 to be taken by the system ensuring data integrity.

# Original MDA Data Block (DB 13)

DBB	Name	Description	Data Type	#Byte
0	Spares			
4	Status bit strip of machine/unit	Setup, machining, disturbance, maintenance, ...	128-bit array	16
20	Part counter 1	Part count good (absolute)	DInt	4
24	Part counter 2	Part count scrap (absolute)	DInt	4
28	Part counter 3	Part count rework (absolute)	DInt	4
...	Reserved 2)			
84	Coordination Word	Access coordination	DInt	4
88	Reserved 2)			
92	Order ID	Order/part number/NC program	String	32
...	Reserved 2)			
188	Part counter 1	Part count good (delta)	DInt	4
192	Part counter 2	Part count scrap (delta)	DInt	4
196	Part counter 3	Part count rework (delta)	DInt	4
200	Cycle counter 1	Target machining time 1)	DInt	4
204	Cycle counter 2	Actual machining time 1)	DInt	4
...	Reserved 2)			

# MDA Machine Original Status (DBB 4)

DBX 4.0	BOOL	Bit 8 Indirect Disturbance	e.g. coolant missing, air missing etc
DBX 4.1	BOOL	Bit 7 Technical Disturbance	machine stopped with alarm
DBX 4.2	BOOL	Bit 6 Auto Tool Change	automatic tool change
DBX 4.3	BOOL	Bit 5 Unload Blocked	outflow full
DBX 4.4	BOOL	Bit 4 Components Missing	no material
DBX 4.5	BOOL	Bit 3 Part Missing	machine starved
DBX 4.6	BOOL	Bit 2 Machine in Cycle	running in automatic
DBX 4.7	BOOL	Bit 1 Control Voltage On	control on selected

# MDA Machine Improved Status

DBX 5.0	BOOL	Machine in Tool Change Mode	tool change selected
DBX 5.1	BOOL	Machine in Change Over Mode	change over mode selected
DBX 5.2	BOOL	Grinding Wheel in Dress	Dressing Active
DBX 5.3	BOOL	Maintenance Mode	Machine out of production for maintenance
DBX 5.4	BOOL	Semi Auto Mode	No auto Loader
DBX 5.5	BOOL	Energy Saving Mode	energy saving mode entered
DBX 5.6	BOOL	Auto Mode Selected	auto mode selected
DBX 5.7	BOOL	Manual Mode	manual mode selected
DBX 6.0	BOOL	Heart Beat	heart beat to MDA



# MDA Machine Improved Status

DBD 32	REAL	Part Change Time	Time taken to perform part type changeover (Seconds to 3 decimal places)
DBD 36	REAL	Wheel Dress Time	Time machine in dressing mode (Seconds to 3 decimal places)
DBD 40	REAL	Maintenance PPM Time	Time taken to perform PPM tasks (Seconds to 3 decimal places)
DBD 44	REAL	Actual Cycle Time per part	Actual Cycle Time (Seconds to 3 decimal places)
DBD 88	DINT	Electrical Power	power in kWh from energy meter for machine. Programmed outside FB155
DBW 208	INT	Feed rate	value of position of axis feed rate switch. Programmed outside FB155

# Future Plans for MDA

DBX 11.0	BOOL	Temperature Alarm 1	For possible future use
DBX 11.1	BOOL	Temperature Alarm 2	For possible future use
DBX 11.2	BOOL	Temperature Alarm 3	For possible future use
DBX 11.3	BOOL	Temperature Alarm 4	For possible future use
DBX 11.4	BOOL	Temperature Alarm 5	For possible future use
DBX 11.5	BOOL	Temperature Alarm 6	For possible future use
DBX 11.6	BOOL	Temperature Alarm 7	For possible future use
DBX 11.7	BOOL	Temperature Alarm 8	For possible future use

# Requirements

- Copy of PLC program
- Copy of Electrical Drawings
  - Time
  - Patience
  - Determination

Any questions ?