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USER MANUAL

Accessory 82M

MACRO INTERFACE FOR SIGMA-II (YASKAWA)

3Ax-603790-xUxx

January 6, 2006



DELTA TAU
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Delta Tau Data Systems, Inc. Technical Support
Phone: (818) 717-5656
Fax: (818) 998-7807
Email: support@deltatau.com
Website: http://www.deltatau.com

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INTRODUCTION

The MACRO SIGMA-II Application Module (ACC-82M) is an accessory card that connects to the Yaskawa Sigma-II (SGDH) amplifier. The purpose of this accessory card is to provide the MACRO fieldbus interface between Yaskawa Corp. amplifiers and Delta Tau Data Systems MACRO-based motion controllers.

This interface accessory card provides 4 outputs that are Open-collector style. This interface card also has 4 inputs. A 25-pin DSUB connector is used for the user's interface.

This accessory card requires the user to supply an external 12-24Vdc power supply.

It should be noted that the SGDH amplifier is identical to the SGDM amplifier except that the SGDH amplifier has an external port connector that is used for peripheral devices. The SGDM amplifier cannot be fitted for the ACC-82M. Contact Yaskawa for further information on exchanging amplifiers.



ACC-82M w/OPT-A
FIBER OPTIC



ACC-82M w/OPT-B
WIRED MACRO

GETTING STARTED

Setup of Yaskawa Drive

Perform the installation and setup of the SGDH SIGMAII drive per the recommendations of Yaskawa Corp.

This should include the electrical installation of the motor and the drive per the instruction manual supplied with the Yaskawa SIGMAII drive.

You may use the SIGMAWIN setup program (provided by Yaskawa Corp.) to set up the drive's parameters, or enter parameters using the operator interface on the front of the SIGMAII drive.

The ACC-82M operates the SIGMA-II drive in torque mode. Set Pn000 to torque mode by setting digit #1 to the value of 2. Refer to the Appendix B in the SIGMA II User's Manual for the list of parameters.

There are also parameters available to bypass wired functions such as SERVO ENABLE , POSITIVE OVERTRAVEL, and NEGATIVE OVERTRAVEL. Refer to Pn50A and Pn50B for setting these overrides.

WARNING

If the values of overrides are set to bypass the physical interface at the CN1 connector on the drive, dangerous over-travel or undesired motion may occur.

--Caution must be used when operating the drive with any overrides enabled--

ACC-82M Yaskawa Station Setup

The ACC-82M is pre-configured from the factory to operate the Yaskawa SGDH drive without very much user interaction.

There are 4 things that must occur to get the interface to operate correctly with the drive:

1. The drive must be configured to operate using the SIGMAWIN program supplied from Yaskawa, the operator panel on the drive, or the optional digital operator.
2. The PMAC/UMAC controller must be set to communicate with the MACRO ring.
3. Ring order must be established to allow configuration of the ACC-82M through the MACRO ring.
4. The node number must be established in the ACC-82M and configured at parameter I996.

The phase clock at MI992 in the ACC-82M is defaulted to 5895 (10KHz) and the SERVO clock at MI998 is defaulted to 4 (2KHz). This corresponds to the value of I6800 in the UMAC of 5895. If other values of phase clocking are used, the servo clock in the ACC-82M must be set to operate at 2KHz.

ACC-82M Yaskawa Station Quick Setup

After hooking up the Ring to each of your MACRO 1x Stations, try to set up one station.

RING ORDER (At the Ring Controller)

TYPE: " MACSTA255"

If you get Macro I/O ERR08, (Make sure I6840=$4030, I6841 = $0FCxx1), I79=32, SAVE, $$$) and then try “MACSTA255” again.

TYPE: “CLRF” ; clears any faults

TYPE: "MI996=$0F4001" (Binds to Ring Controller 0 & Node 0)

TYPE: “STN=1” ; Set MACRO Ring station number.

TYPE: “^T” ; Control T (Terminates ASCII Ring Order)

TYPE: “I6800=5895” 10 Khz Phase Clock

TYPE: “I70=1” ; Enable Ring Flag transfer

TYPE: “I71=1”

TYPE: “I78=32” ; MacroSlave command timeout

TYPE: “I110 = $100”

TYPE: “I124=$860001” ; High True AMP fault & disable limits

TYPE: “I195 = $F40000”

TYPE: “I8000 = $278420”

; The following are motor tuning parameters which may be different in your application.

TYPE: “I130= 19800” ; Servo Forward Gain

TYPE: “I131 = 2520”

TYPE: “I132 = 2520”

TYPE: “I133= 101390” ; Servo Integrator Gain

TYPE: “I134= 1

TYPE: “I116 = 10000”

TYPE: “I117 = 10”

TYPE: “I119 = 10”

TYPE: “I122 = 3277”

TYPE: “I123 = 786”

TYPE: “#1->131072X”

TYPE the following program

```
OPEN PROG 1 CLEAR
While (1 < 2)
  F10X100
  DWELL1000
```

```
  X0
  DWELL1000
EndWhile
CLOSE
```

Your should be ready to Home and run the above program.

TYPE: “$*” to get the absolute position home value.

INPUTS AND OUTPUTS

The ACC-82M has 4 opto-coupled inputs and 4 opto-coupled outputs. There are also 2 outputs (not opto-coupled) that are connected to DO3 and DO4 that operate at high speed for secondary encoder capture outputs.

Refer to the Delta Tau Data Systems, Inc. manual "MACRO SINGLE AXIS ACCESSORY SOFTWARE REFERENCE MANUAL."

Search for the MACRO1X STATION MACRO 72-bit Node I/O FORMAT located near the front of the manual for the Flag command bits (DO1-DO4 outputs) and the flag status bits (IN_A - IN_C, HOME1).

The table below shows how the bits are organized:

	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
INPUTS X:$3440..X:$347F					IN_C	IN_B	IN_A	HOME																
OUTPUTS Y:$3440..Y:$347F	DO4	DO3	DO2	DO1																				

By assigning M-Variables in the UMAC, these inputs and outputs become available.

MACRO node 0 is located at X/Y $3440, Node 1 is located at X/Y $3441, Node 2 is located at X/Y $3442 etc.

NOTE

When assigning M-variables to these bits, it is important to avoid changing any of the other bits in this word. The other bits in this word are used for real time flag data such as amplifier fault and amplifier enable.

A reference schematic is shown for these inputs and outputs in the connector description of this manual.

SECONDARY ENCODER

The secondary encoder input provides for an AquadB style encoder input that is connected through the CN6 connector. Refer to the connector interface diagrams (later in this manual) for the pin connections to be used.

By using the first 16-bit MACRO register in the configured slave node of the ACC-82M, the register of the secondary encoder may be returned to the controller as a 16-bit value.

Setup of ACC-82M

Set the I109 parameter in the ACC-82M to $C091. This will insert the phase count register of the secondary encoder register into the first 16-bit encoder register of the selected MACRO slave address.

The other registers in the accessory are set to default values to allow a quadrature encoder to operate.

I109, I910-I915, I990, I993 are parameters that are set in the accessory card which will affect the operation of the secondary encoder. Refer to MACRO1x Software Reference for the modifications of these I-variables.

Setup of UMAC (and PMAC-TURBO) for Secondary Encoder

The secondary encoder counter in the UMAC is returned as a 16-bit value in the MACRO register associated with the selected amplifier.

Position data is obtained in the UMAC by configuring the encoder conversion table to fetch the value from the returned MACRO data.

Please refer to the PMAC2-TURBO software reference to obtain the addressing for the data. The information pertaining to the encoder conversion table setup is found at the “CONVERSION TABLE I-VARIABLES” definition using Parallel Feedback Entries. The address map for the returned data from the MACRO ring is located in the “TURBO PMAC MEMORY AND I/O MAP” chapter of the Software Reference. Search for Turbo “PMAC2 MACRO Node Registers” and use the first 16 bit feedback register address for the particular node that is used.

The example below shows the encoder conversion table entry for a secondary encoder that is used for axis #1 position.

EXAMPLE:

```
I8000=$678421   ;Parallel data read at location $78421 (node0 1st 16-bit register)
I8001=$010008   ;Read 16 bits wide starting at bit 8.
I103=$3502      ;Point inputs to second encoder entry line.
I104=$3502
```

DISPLAYS

All displays appear at the front panel of this accessory card.

Alphanumeric Display

The following codes may be displayed:

0: Ring Active with no errors
1: Amp enabled
A: AMP Fault (latched on a fault, cleared by MSCLRF & AMP ENA)
B: Ring-break fault (Amp is disabled)
C: Configuration change fault
D: Ring data-error fault (Amp is disabled)

Flashing Display:

This indicates that the ACC-82M is in the ASCII mode.

Note

If the display is blank, this indicates that ring communications are not active, which means that this value cannot be reported back to the controller.

LINK Display

This bi-color LED turns green when the MACRO signal is present. This LED is red when the MACRO signal is not present.

WATCHDOG LED (Inside Enclosure)

This red LED illuminates when the watchdog circuit triggers. This usually means that there is a failure of the processor in the ACC-82M or that the bootstrap jumper is not correctly installed.

This is D5 located on the PCB inside the enclosure.

POWER GOOD LED (Inside Enclosure)

This green LED illuminates to indicate that the power supply is operating correctly in the ACC-82M.

This is D6 located on the PCB inside the enclosure.

JUMPERS

Jumpers are configured as follows:

		Factory Setting
E1	Watchdog bypass –	No Jumper Installed
E3	Normal/Bootstrap Operation	2 – 3 Normal Operation
	1 – 2 Bootstrap Load	
	2 – 3 Normal Operation	
E4	Servo Clock inversion	1 – 2 Non- inverted clock.
	1 – 2 Non-Inverted	
	2 – 3 Inverted	
E5	Not used	
JP1-JP4	Not used	

CONNECTOR PINOUTS

All interface signals appear at the front panel of this accessory card.

USB Connector – AUX Comms for Accessory card

This is a standard USB interface connector. This is used for direct communications with the accessory card processor.

SC-Style Fiber Interface Connector – MACRO Comms (OPT-A)

This is the fiber optic MACRO interface connector.

RJ-45 In and Out Interface Connector – MACRO Comms (OPT-B)

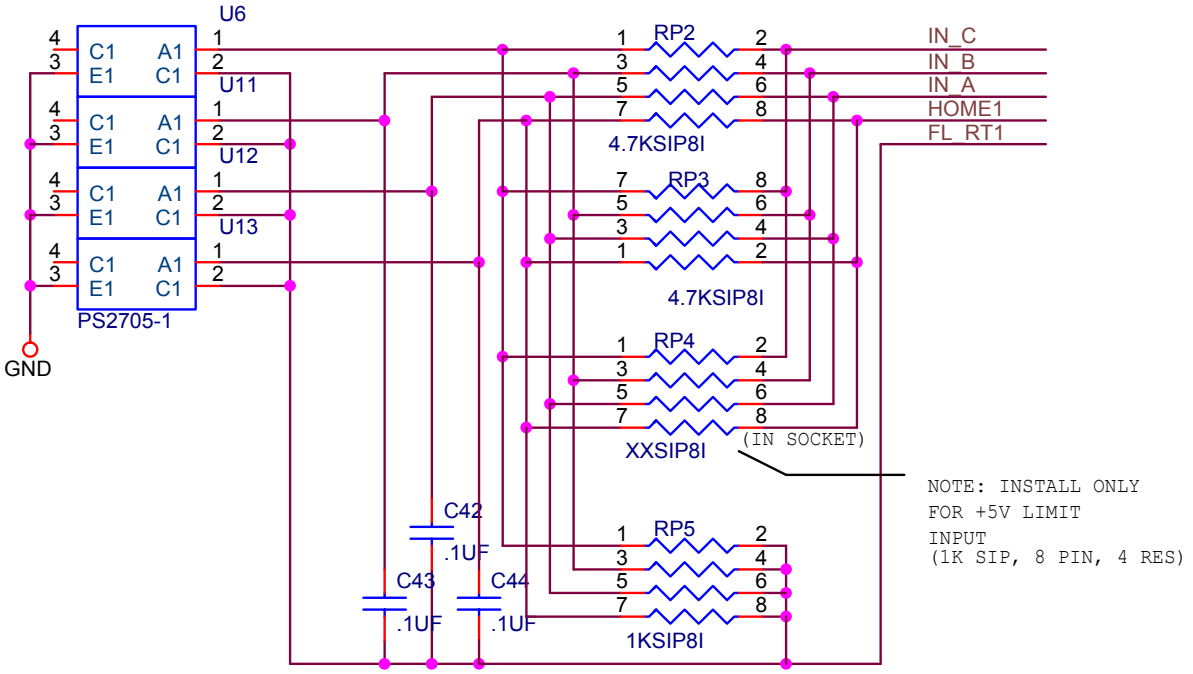
These are the wired MACRO interface connector.

Connector CN6 – Interface Signals for Accessory card

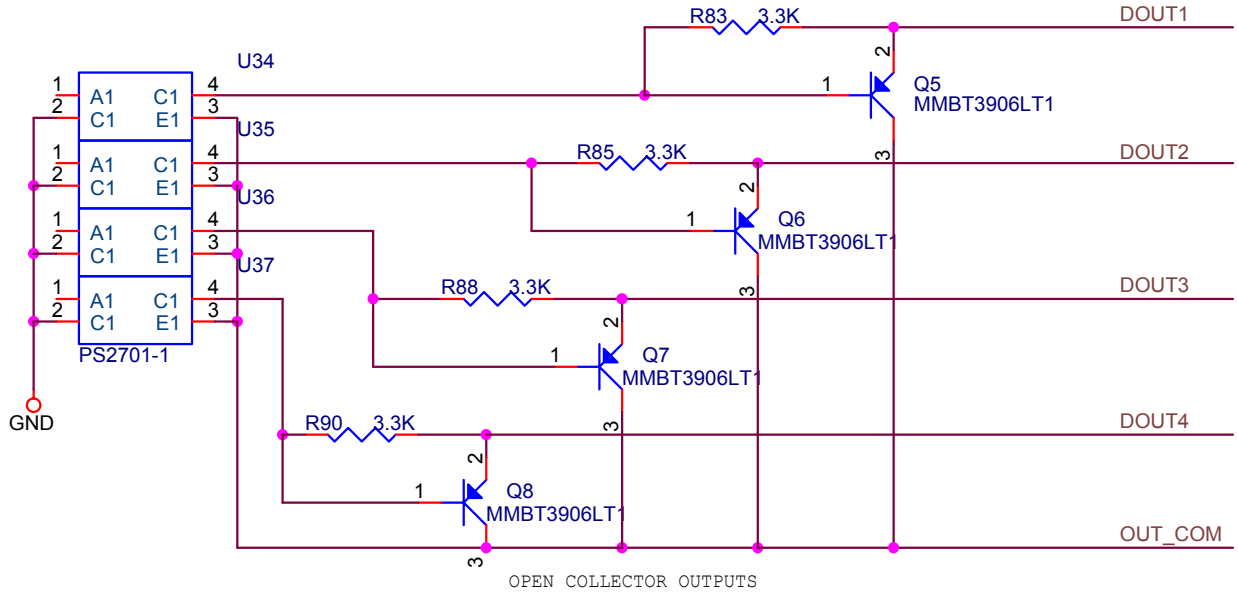
This is a DB25S pin DSUB connector. The user needs a DB25P style connector.

Pin#	Signal Name	Type	Description
1	+5Vdc	OUTPUT	Power supply output for encoder.
2	GND		Digital ground
3	CHA+	INPUT	Secondary encoder input
4	CHB+	INPUT	Secondary encoder input
5	CHC+	INPUT	Secondary encoder input
6	IN_C	INPUT	Flag_D
7	IN_A	INPUT	Flag_B
8	FL_RT	INPUT	RET for flags
9			
10	DO1	Open Collector	User-defined output
11	DO3	Open Collector	User-defined output
12	OUT_COM		COM return for DOx lines
13	GND	POWER	USER SUPPLIED 12-24Vdc Power Supply
14	EQU1/OUT3	TTL	High Speed TTL output
15	EQU2/OUT4	TTL	High Speed TTL output
16	CHA-	INPUT	Secondary encoder input
17	CHB-	INPUT	Secondary encoder input
18	CHC-	INPUT	Secondary encoder input
19	IN_B	INPUT	Flag_C
20	HOME	INPUT	Flag_A
21			
22			
23	DO2	Open Collector	User-defined output
24	DO4	Open Collector	User-defined output
25	+24Vdc	POWER	USER SUPPLIED 12-24Vdc Power Supply

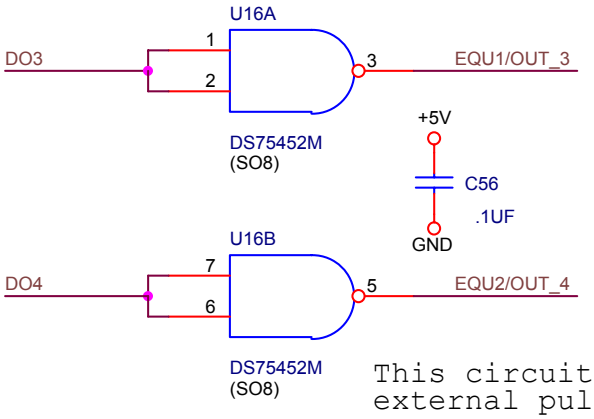
User Inputs Circuit Diagram



User Outputs Circuit Diagram



High Speed TTL Outputs Circuit Diagram



This circuit requires external pullup resistors

YASKAWA DUAL PORT RAM MEMORY

Memory	**Description Macro Station CPU to AMP**
Y:$4000	Not used
X:$4000	Watch Dog Counter
Y:$4001	Command Word (Contains AMP ENA bit 1, Reset AMP Faults bit 4
y:$4002	Clear Following Error = bit 7
X:$4002	Latch Request Flg LT {Home ENA) = bit 7
X:$400E	$0x0B = Ring Break $0x0D =Ring Data Error $0x08 = (Generic Station Fault)
Memory	**Description AMP to Macro Station CPU**
X:$4040	Watch Dog Counter
x:$4041	Status Word (Contains AMP Fault bit 1)
x:$4042	Status Word AMP FAULT bits 4-6, Latch Complete Flag (Home Complete) bit 7
X/Y:$4046	Position Feedback
X/Y:$4047	Position Feedback
X/Y:$4048	Latched Position Feedback
X/Y:$4049	Latched Position Feedback

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