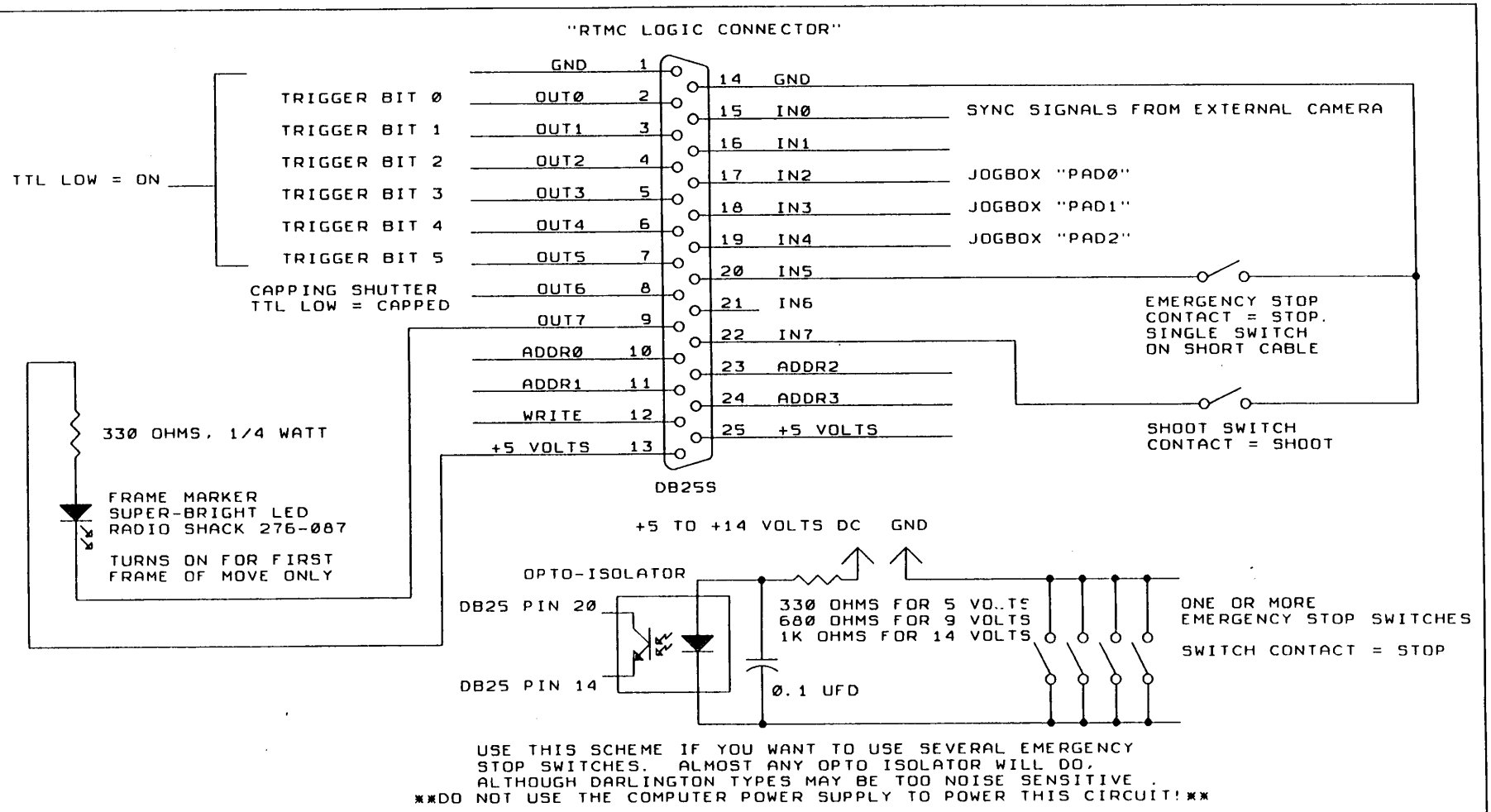

THIS IS THE "RTMC LOGIC CONNECTOR"

THE DB25S CONNECTOR IS CONNECTED RTMC16 CARD "H1"
VIA A 25 WIRE FLAT CABLE. PIN 26 OF H1 IS IGNORED.
PIN 1 OF H1 (THE PIN NEAREST THE "H1" LEGEND ON THE BOARD)
IS CONNECTED TO PIN 1 OF THE DB25S CONNECTOR.

THE CAMERA HOME AND EMERGENCY STOP CIRCUITS ARE NOT REQUIRED

ALL SIGNALS ARE TTL LEVEL. BE CAREFUL NOT TO LET THESE SIGNALS
COME IN CONTACT WITH EXTERNAL VOLTAGES OR METALLIC OBJECTS .

AS SHOWN, THE EMERGENCY SWITCH CIRCUIT IS INTENDED FOR USE
WITH A SINGLE SWITCH ON A SHORT CABLE.

FOR COMPLEX EMERGENCY STOP CIRCUITS, USE AN OPTO-ISOLATOR TO
PROTECT THE COMPUTER FROM DANGEROUS EXTERNAL VOLTAGES AND
ELECTRICAL NOISE.

ALL THE ACCESSORIES SHOWN ARE OPTIONAL,
ALTHOUGH THE SHOOT SWITCH IS ESSENTIAL
FOR ANIMATION.

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SIMPLE ACCESSORY SCHEME

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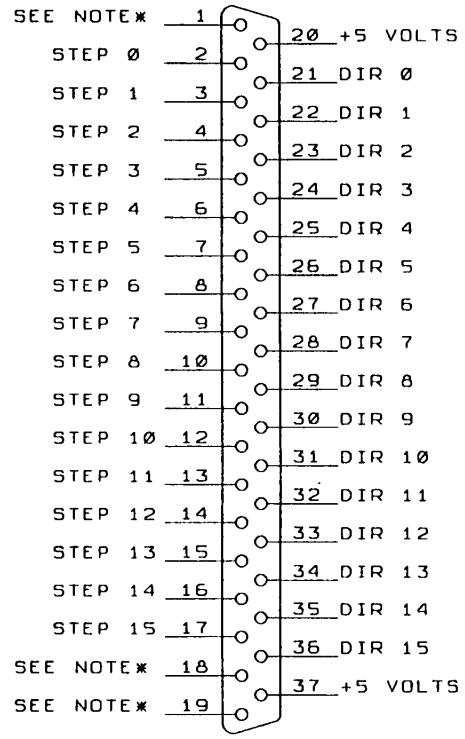
STEP AND DIRECTION CONNECTORS AS SEEN
FROM THE REAR OF THE COMPUTER.

CONNECTORS ARE DB37S



ON THE RTMC48 CARD, 40 PIN HEADERS
BRING OUT THE STEP AND DIRECTION
SIGNALS TO DB37S CONNECTORS IN
I/O SLOTS ON THE BACK OF THE COMPUTER.

HEADER ASSIGNMENTS ON THE RTMC48 CARD:

JP1 = AXES 1 TO 16 (0 TO 15)
JP2 = AXES 17 TO 32 (16 TO 31)
JP3 = AXES 33 TO 48 (32 TO 47)

FOR EACH GROUP OF 16 AXES,
*PINS 1, 18, AND 19 MAY BE SET TO PROVIDE
EITHER +5 VOLTS OR GROUND BY ADJUSTING JUMPERS
JP6, 7, AND 8 ON THE RTMC48 CARD. IN EACH CASE:

GND = CENTER TO YOUR LEFT (PINS 1 AND 2)
+5VOLTS = CENTER TO YOUR RIGHT (PINS 2 AND 3)

JP6 = AXES 1 TO 16 (0 to 15)
JP7 = AXES 17 TO 32 (16 to 31)
JP8 = AXES 33 TO 48 (32 to 47)

ALL SIGNAL OUTPUTS ARE OPEN-COLLECTOR TTL.

THE VOLTAGES AVAILABLE ON PINS 1, 18, 19, 20 AND 37
AND ARE INTENDED TO BE USED TO DRIVE OPTO-ISOLATED
INPUTS TO STEPPING MOTOR DRIVERS. THESE VOLTAGES
ARE THE COMPUTER BUS SUPPLY VOLTAGES. USE GREAT
CARE WHEN MAKING EXTERNAL CONNECTIONS. EXTERNAL
CIRCUITRY OTHER THAN OPTO-ISOLATED DRIVER INPUTS
USING THESE VOLTAGES SHOULD BE LIMITED TO 300 MILLIAMPS.

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RTMC48 PULSE OUTPUT CONNECTORS		
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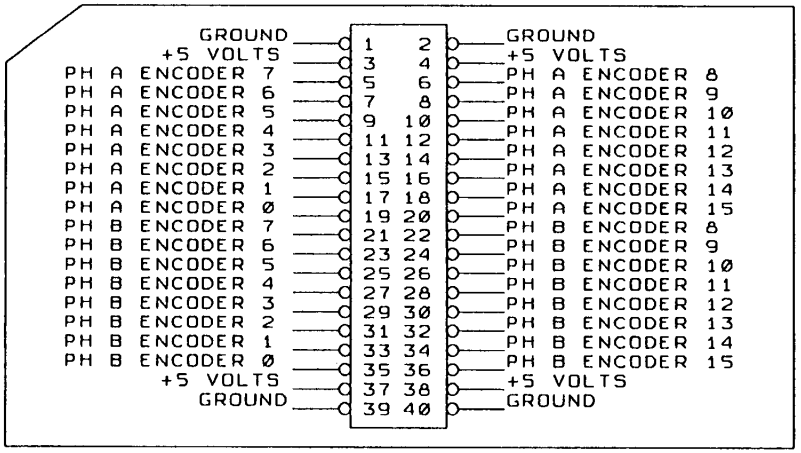
ENCODER CONNECTOR JP4 ON THE RTMC48 CARD

CONNECTOR IS A DUAL IN LINE PIN HEADER ON 0.1" CENTERS



TOP OF BOARD ->>

ALL ENCODER INPUTS ARE TTL LEVEL PULLED HIGH THROUGH 2.2K RESISTORS ON THE BOARD.

+5 VOLT AND GROUND VOLTAGES ARE OBTAINED FROM THE COMPUTER BUS POWER SUPPLY. USE GREAT CARE WHEN CONNECTING THESE VOLTAGES EXTERNALLY. THE MAXIMUM CURRENT WHICH SHOULD BE DRAWN IS 300 MILLIAMPRES, SUFFICIENT TO DRIVE 3 OR 4 NORMAL ENCODERS. IF YOU NEED TO USE MORE ENCODERS, USE AN EXTERNAL 5 VOLT SUPPLY OR KUPER BLACK BOX ENCODER INTERFACE.
WHEN USING AN EXTERNAL SUPPLY, CONNECT ALL FOUR GROUND PINS TO THE POWER SUPPLY GROUND, BUT LEAVE THE +5 PINS OF JP4 UNNCONNECTED.

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RTMC48 ENCODER INTERFACE CONNECTOR

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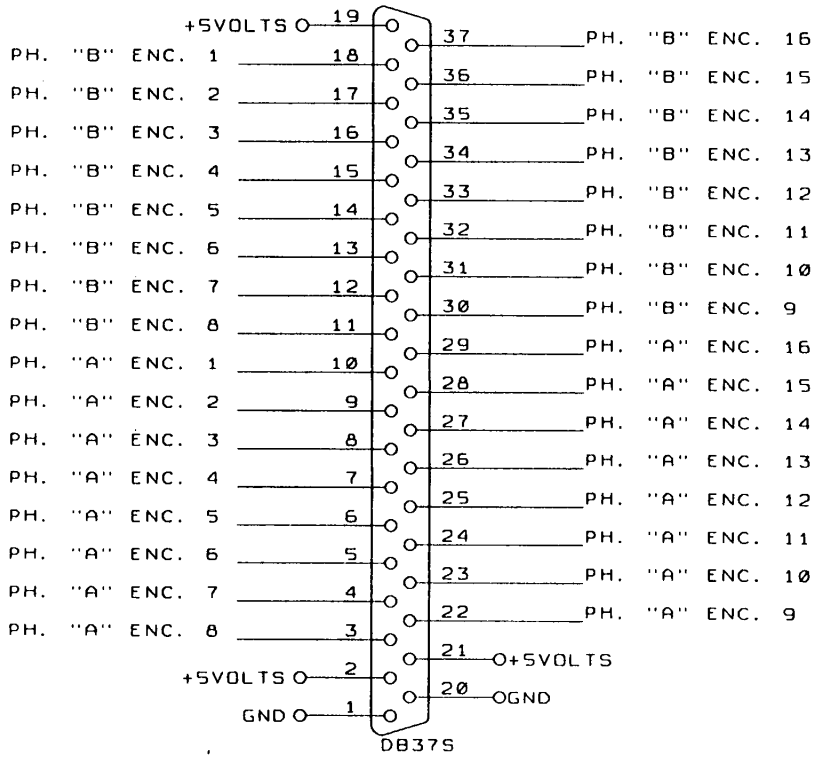
HOOKING UP ENCODERS WITHOUT A BLACK BOX.



WIRE COLOR SCHEME FOR
US DIGIPOT S2-2048 ENCODERS
USING "MC/4" CONNECTORS
SUPPLIED BY U.S. DIGITAL

+5 VOLTS	ORANGE
GROUND	BROWN
PHASE A	YELLOW
PHASE B	BLUE

IT IS POSSIBLE TO HOOK UP ENCODERS WITHOUT THE BLACK BOX. THE ABOVE SCHEMATIC SHOWS THE ENCODER CONNECTIONS WHEN CONNECTOR "JP4" ON THE RTMC48 CARD IS BROUGHT OUT TO A MALE DB37P CONNECTOR AT THE BACK OF THE COMPUTER. IT IS ASSUMED THAT PIN ONE OF JP4 AND PIN ONE OF THE DB37 ARE CONNECTED TOGETHER VIA THE RED WIRE ON THE RIBBON CABLE.

PLEASE NOTE THAT THIS SCHEME DERIVES THE ENCODER POWER DIRECTLY FROM THE COMPUTER POWER SUPPLY. BE VERY CAREFUL TO PREVENT THE POWER LEADS FROM SHORTING AGAINST ANYTHING, AND USE SHIELDED CABLE WITH THE SHIELD CONNECTED ONLY TO THE COMPUTER CASE.

KEEP ALL LEADS AS SHORT AS POSSIBLE.

EACH ENCODER REQUIRES A CONNECTION FOR:

+5VOLTS, GROUND, PHASE A, PHASE B

FOR ENCODER #1:

ENCODER +5VOLTS: DB37 PIN 2
ENCODER GROUND: DB37 PIN 1
ENCODER PHASE A: DB37 PIN 10
ENCODER PHASE B: DB37 PIN 18

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ENCODER TO DB37 PINOUTS WITHOUT BLACK BOX

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