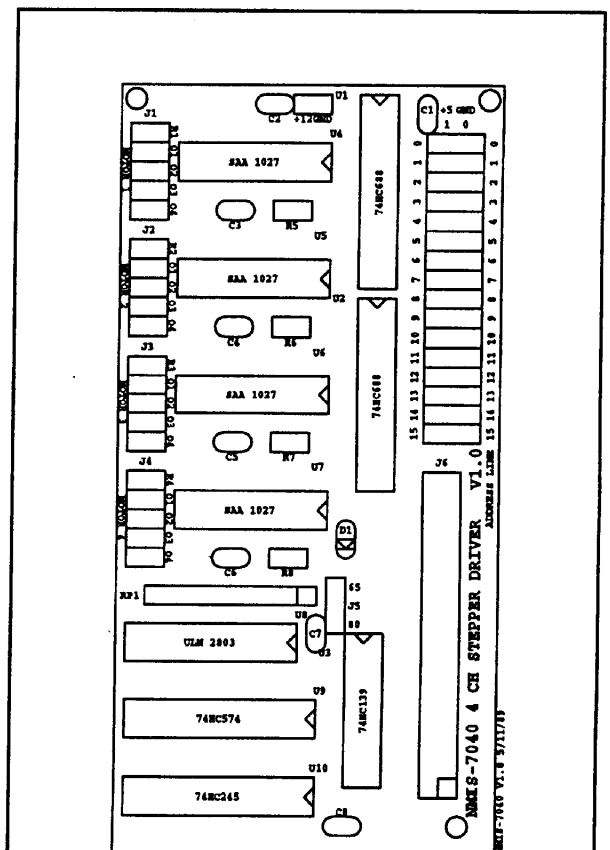
NMIS-7040 STEPPER DRIVER CARD

The NMIS-7040 Low Current Stepper Motor Driver Card, in 2x4"s™ format, provides a JEDSTACK™ computer system with four channels of low power stepper motor drive. Each of four Signetics SAA1027 Low Current Stepper Motor Driver chips provides circuits (bipolar transistor technology) for driving a four-phase, two-stator stepper motor in unipolar mode.



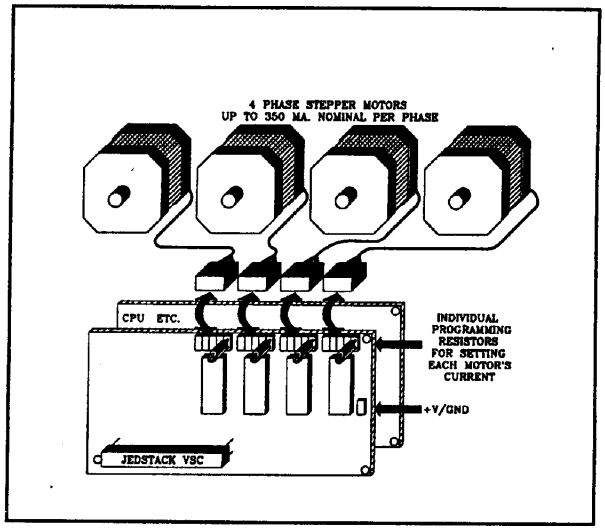
FEATURES

- Four independent stepper motor drive channels
- Currents up to 350 mA. nominal per winding
- Drive voltages up to 18V
- Easy computer interface with 2 control bits per motor: direction and step

The chips consist of a bidirectional, four-state counter and a code converter to drive the four outputs in the required sequence. The step and direction control lines are placed in the memory mapped by the interfacing logic on the card. A register with individual bits representing these lines allows processor control of the stepping occurrences and direction of rotation.

The four stepper motor driver chips, Signetics SAA1027's, are the key parts on the board. Each is located next to its motor connector. The motor connectors are 10-pin, dual .1" center, male pins. On the outer row, the five pins are connected to +V. On the inner row, four pins are connected to the four phase outputs and one pin is the return for the current programming resistor. A resistor pack and ULN2803 are used to interface the HC/TTL signals from the latch circuit to the SAA1027's at the levels required. The 74HC574 and 74HC245 comprise this computer readable-writeable latch.

A Vertical Stacking Connector in the lower right hand corner provides connections to the processor's address and data bus, control signals, 5V power and ground. Address decoding in memory is accomplished by two octal comparators and 16 two-position jumpers. Each jumper setting corresponds to the state of a particular address line. The NMIS-7040 occupies one address. Any single byte location in the 64K address space of the JEDSTACK™ processor's bus can be selected by correct jumper placement.



Application

DESCRIPTION

The NMIS-7040 Stepper Motor Driver card is designed to stack on the 2x4"s™ NMIS Series, the "100 Squared"™ NMIX and the "Generic Target Computer"™ NMIT Series (with the Vertical Stacking Connector added to the latter) of single board computers. The JEDSTACK™ provides the interface signals to the board including address lines, data lines, control lines and 5V power and ground. The fast HC latches allow 90nS access times.

Below the stepper driver chips is a resistor pack and ULN2803 used to interface the HC signals from the latch circuit to the levels required by the SAA1027's. The addressing of the 74HC574 (U9) and 74HC245 (U10) register pair on the NMIS-7040 is sensed by two 74HC688 octal comparators that decode the 16 address lines and one control line. Address decoding in memory is accomplished by the two octal comparators and the 16 two-position jumpers. Each jumper setting corresponds to the state of a particular address line. The NMIS-7040 occupies one address. Any single byte location in the 64K address space of the JEDSTACK™ processor's bus can be selected by correct jumper placement. The 74HC139 further qualifies the address selection with the timing and direction signals from the bus to generate the strobes to the latching chips.

ADDRESS	MOTOR 4		MOTOR 3		MOTOR 2		MOTOR 1	
XXXX	DIR.	STEP	DIR.	STEP	DIR.	STEP	DIR.	STEP

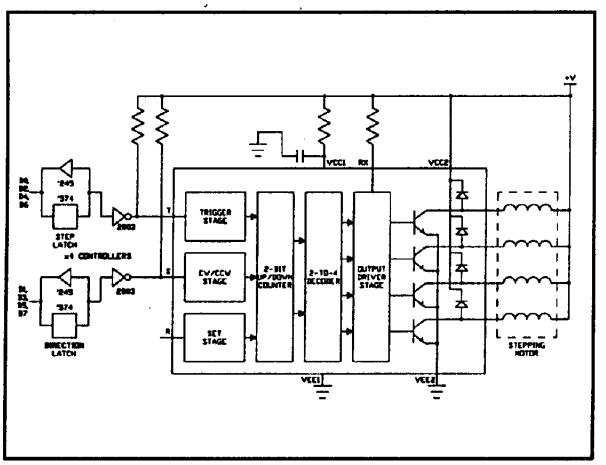
Register Summary

AIRPAX MOTOR CATALOG NO.	STEP ANGLE	MAX. TORQUE (mNm)	MAX. PULL-IN RATE (STEPS/S)
9904 112 04002	7° 30'	12	240
9904 112 05001	7° 30	65	140
9904 112 06001	7° 30	45	120
9904 112 07005	7° 30	5	350
9904 112 08001	15	43	120

Listing of Some Compatible Airpax Motors

AIRPAX MOTOR	R_B	VALUE	I_{SYSTEM} (mA)
9904 112 04002	470	0.33W	300
9904 112 05001	220	0.67W	620
9904 112 06001	220	0.67W	620
9904 112 07005	620	0.33W	200
9904 112 08001	220	0.67W	620

Current Programming Resistor Selection



Block Diagram of SAA1027

NMIS-7040

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