4H116U

INSTRUCTION DATA

052576A

RFL Industries, Inc., Boonton, New Jersey 07005

Model 66 SLTC
16-PT SELECT CODER CARD
and
Model 66 SLTCX
16-PT SELECT CODER EXPANDER CARD

DESCRIPTION

Models 66 SLTC and 66 SLTCX are two of the RFL 66 TDMS Series of plug in modules. The purpose of a 66 SLTC is to generate a 6-bit binary code depending upon which one of the sixteen input lines has been activated. 66 SLTC cards may be expanded using 66 SLTCX cards to handle up to 62 different points. The all-zeros output has been reserved for the null or unselected code, and an all-ones output code has been reserved to indicate two or more inputs have been simultaneously activated. An optional memory is available for storage of the 6-bit code. These modules also feature positive- or negative-true logic and pull-up or pull-down resistors.

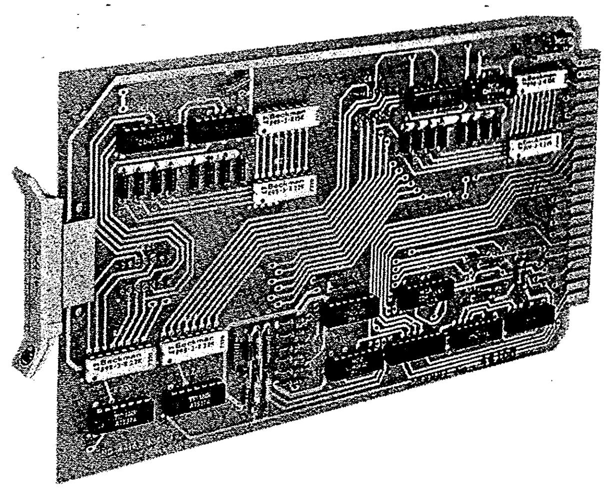


Figure 1. Model 66 SLTCX.

SPECIFICATIONS

Ambient Temperature: -30 to +70°C.

Power: 66 SLTC: 11 to 13 Vdc @ 8.5 mA form A
@ 20.0 mA form B
66 SLTCX: 11 to 13 Vdc @ 2.5 mA form A
@ 14.9 mA form B

Form A or form B above refers to the type of switches connected to each input.

Size: Each module occupies one standard one-half-inch module space in a RFL 68 Chassis.

CONNECTIONS AND PROGRAMMING

These modules contain CMOS logic circuits and special handling precautions should be observed. Refer to "CMOS Handling Precautions", RFL Document 12175.

All inputs will have 15kΩ pull-up resistors if the A1 Jumpers are installed; otherwise, with the A0 Jumpers installed, all of the inputs will have 15kΩ pull-down resistors. Inputs will be activated by logic 1 signals if the B1 Jumpers are installed, or they will be activated by logic 0's if the B0 Jumpers are used.

Determination of the actual 6-bit code available at the outputs is a function of the Programmed Diode Matrix units installed in the CRZ1 and CRZ3 positions on the board. Figure 4 describes the available programs. If more than one input terminal anywhere on the 66 SLTC or the associated expander cards, 66 SLTCX, is activated, the 6-bit code will be forced to all ones, i. e., 111111, and if no inputs are activated, the output will be all zeros.

The 6-bit output code is available on the 66 SLTC card at the terminals shown on the right hand side of the schematic, Figure 5. Terminal N is the most significant bit, and Terminal H is the least significant bit. If the memory option is installed on the board, then the stored outputs are available at Terminals Z through U as shown in the upper right hand corner of Figure 5. A high going pulse into Terminal 20 will load the memory during the 0 to 1 transition of the pulse. The memory will be cleared to all zeros as long as Terminal 19 is held at a logic 1. If the memory option is installed on the card, but not used, Terminals 19 and 20 should be tied to common.

When the D Jumper on the 66 SLTC is in the D1 position, Terminal 19 will be forced to a logic zero if more than one input to the card or its associated expanders is activated. When this feature is not used, the D Jumper should be in the D0 position. Care should be taken not to use the D1 position if Terminal 19 is driven from another logic source.

Terminals 17 and 18 of the 66 SLTC card may be used to activate other system modules. Terminal 17 will go high when any of the inputs on either a 66 SLTC or a 66 SLTCX which are labeled with the letter–A suffix is activated; likewise, Terminal 18 will go high if any of the suffix–B inputs are activated. These two terminals may be wire–ORed together to create a signal which is high if any input is activated.

If a 66 SLTC must be expanded, the A JUNCTION, B JUNCTION and CODING EXPANSION TERMINALS must be bussed to the respective terminals of all the 66 SLTCX cards. If expansion is not required, these terminals should be left open circuited.

Chassis wiring can be simplified if the 66 SLTCX cards are mounted to the left of the 66 SLTC card when viewed from the handle end of the boards.

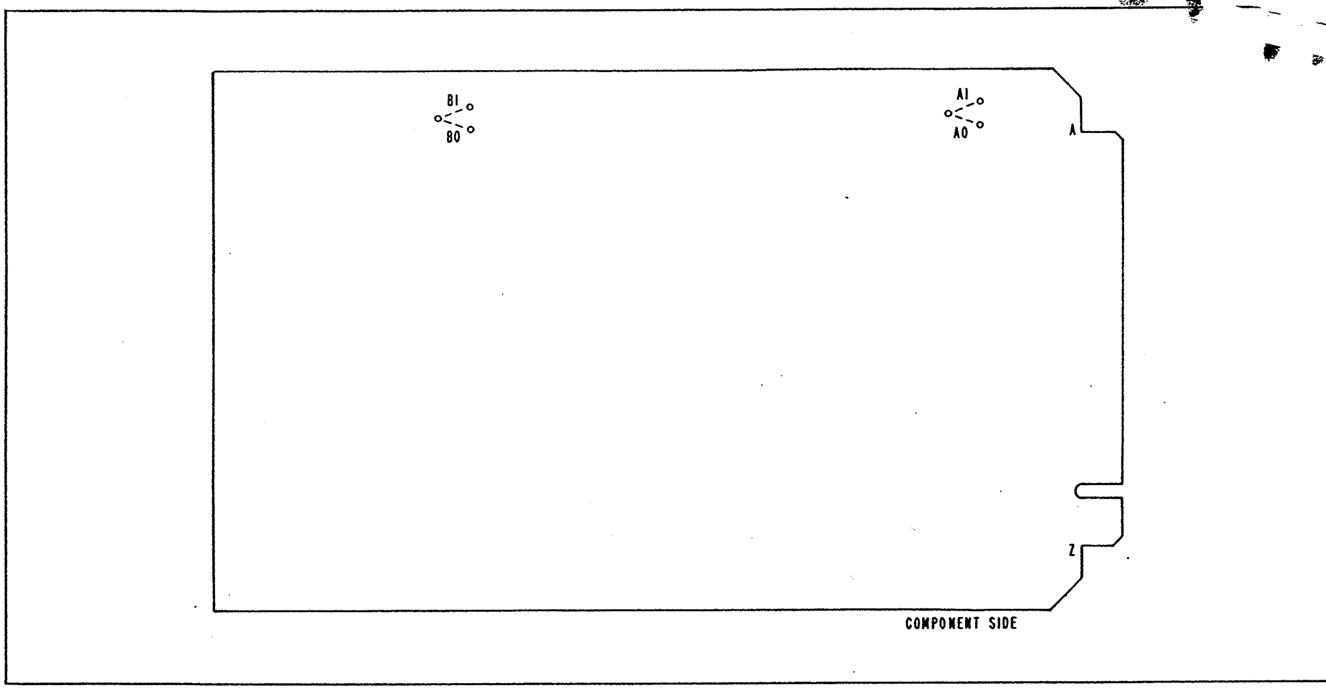


Figure 2. Location of jumpers for programming, Model 66 SLTC.

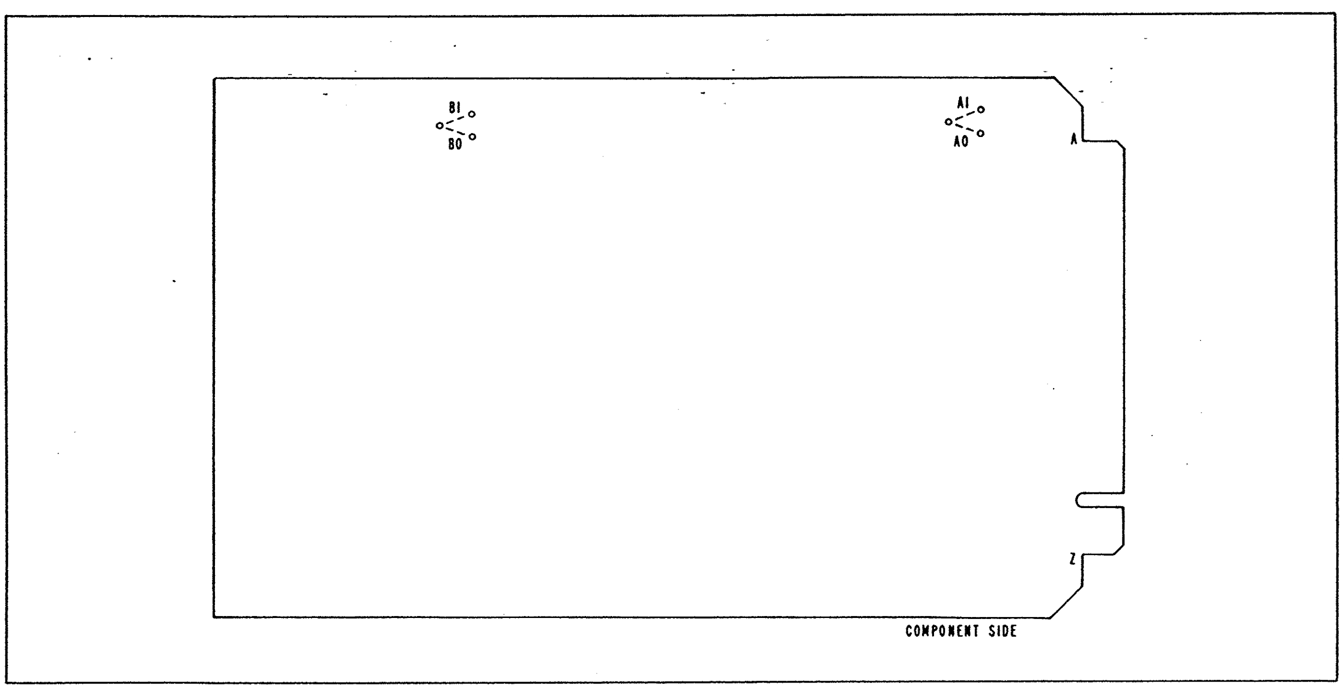


Figure 3. Location of jumpers for programming, Model 66 SLTCX.

Module Designation	HB-44161 Basic Assy.	HB-44168 Option Memory	HB-44169-1 Matrix/CRZ1	HB-44169-1 Matrix/CRZ3	HB-44169-2 Matrix/CRZ3	HB-44167 Option Diode	HB-44171 Basic Assy.	HB-44169-2 Matrix/CRZ1	HB-44169-3 Matrix/CRZ1	HB-44169-4 Matrix/CRZ1	HB-44169-5 Matrix/CRZ1	HB-44169-6 Matrix/CRZ1	HB-44169-7 Matrix/CRZ1	HB-44169-8 Matrix/CRZ1	HB-44169-2 Matrix/CRZ3	HB-44169-3 Matrix/CRZ3	HB-44169-4 Matrix/CRZ3	HB-44169-5 Matrix/CRZ3	HB-44169-6 Matrix/CRZ3	HB-44169-7 Matrix/CRZ3	HB-44169-8 Matrix/CRZ3
66 SLTC-1	●		●	●																	
66 SLTC-2	●	●	●	●																	
66 SLTC-3	●		●		●																
66 SLTC-4	●	●	●		●																
66 SLTCX-1							●	●							●						
66 SLTCX-2							●		●							●					
66 SLTCX-3							●			●							●				
66 SLTCX-4							●				●							●			
66 SLTCX-5							●					●							●		
66 SLTCX-6							●						●							●	
66 SLTCX-7							●							●							●
66 SLTCX-8							●		●								●				
66 SLTCX-9							●				●								●		
66 SLTCX-10							●						●								●

Other combinations available upon request.

THEORY OF OPERATION

Only the 66 SLTC card will be described since the 66 SLTCX is so similar.

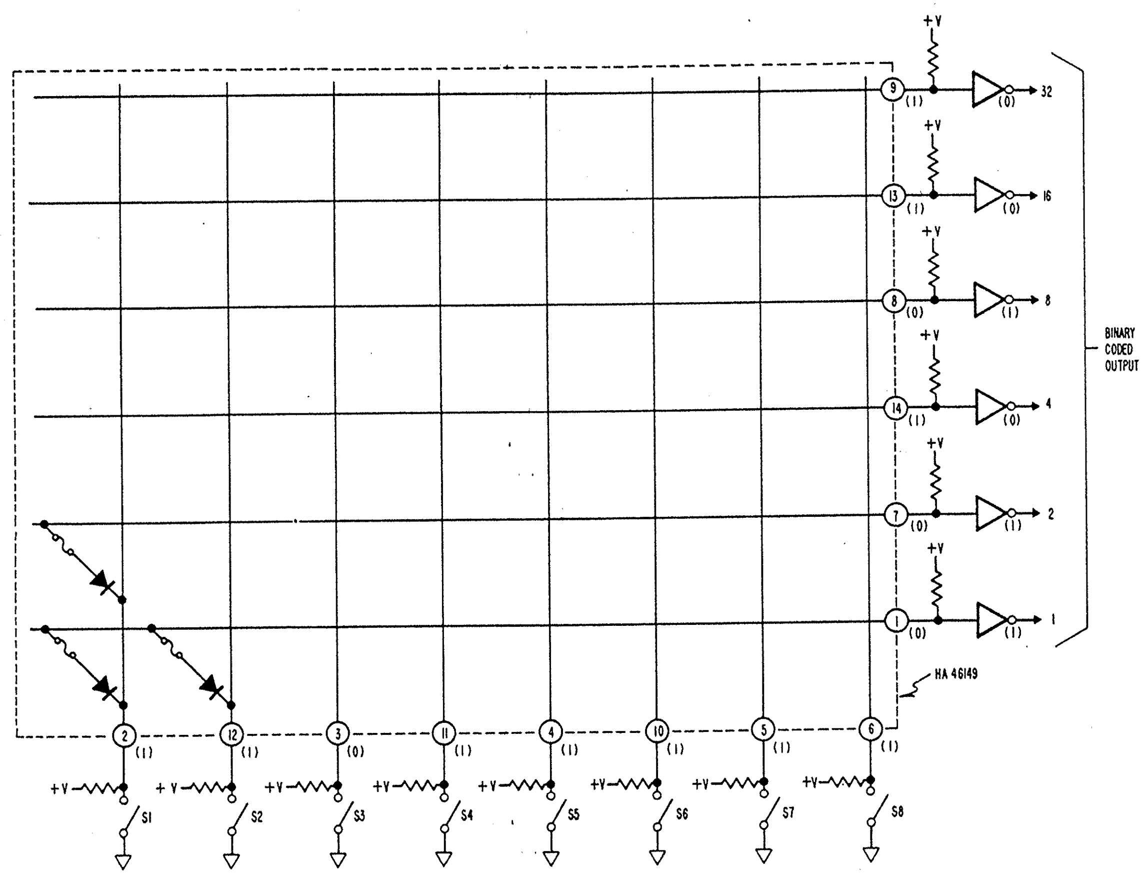
IC1A-3 (found at Zone A4, Figure 5) will be low if the B1 Jumper (G4) is installed, and Terminal 16 (B4) is high. IC1A-3 can also be low if the B0 Jumper is installed, and Terminal 16 is low. For all other combinations of the B Jumper and input logic levels, IC1A-3 will be high.

When IC1A-3 is low, Pin 2 of CRZ1 (D3) will be driven low. Any of the outputs of CRZ1 at Pins 9, 13, 8, 14, 7 and 1 which have diodes to Pin 2 (because of the programming) will be pulled to logic zeros. These zeros appear at the IC5A, IC5B and the four IC7 NAND gate inputs (all H3 and 4) and cause their respective outputs to go high. Thus an activated 1A input causes a corresponding 6-bit code. The other 15 inputs function in a similar manner.

Also when IC1A-3 is low, RZ3-13 (B2) will be low. The input to IC10A (D1) at Pin 7 will now be an analog voltage of approximately 7.4 volts as determined by the resistive divider made of R2 (B1) and the $22k\Omega$ resistor in RZ3. IC10A-6 is biased at approximately 8.8 volts. Therefore, when one or more of the suffix-A inputs is activated, the IC10A comparator output will be a logic 0 which will force IC5C-10 and Terminal 17 (E1) high. IC10B, IC5D and Terminal 18 operate similarly for activated B inputs.

If two or more of the suffix-A inputs are activated, the voltage at IC10C-8 (F1) will drop to less than approximately 5.5 volts.

IC10C-9 is biased at about 6.4 volts, and so, the output of the IC10C comparator will switch low. IC10D functions similarly for the suffix-B inputs. Whenever any input to IC9C (G2) is low, either from the comparators IC10C and IC10D or because IC9A detected that at least one suffix A and at least one suffix B input were activated, then IC9C-10 will be a logic one. IC9B is wired as an inverter and will force to zero an input in each of the six NAND gates IC5A, IC5B and the four IC7 gates (H3). Thus for two or more inputs activated, the CODE OUTPUT will be 111111.



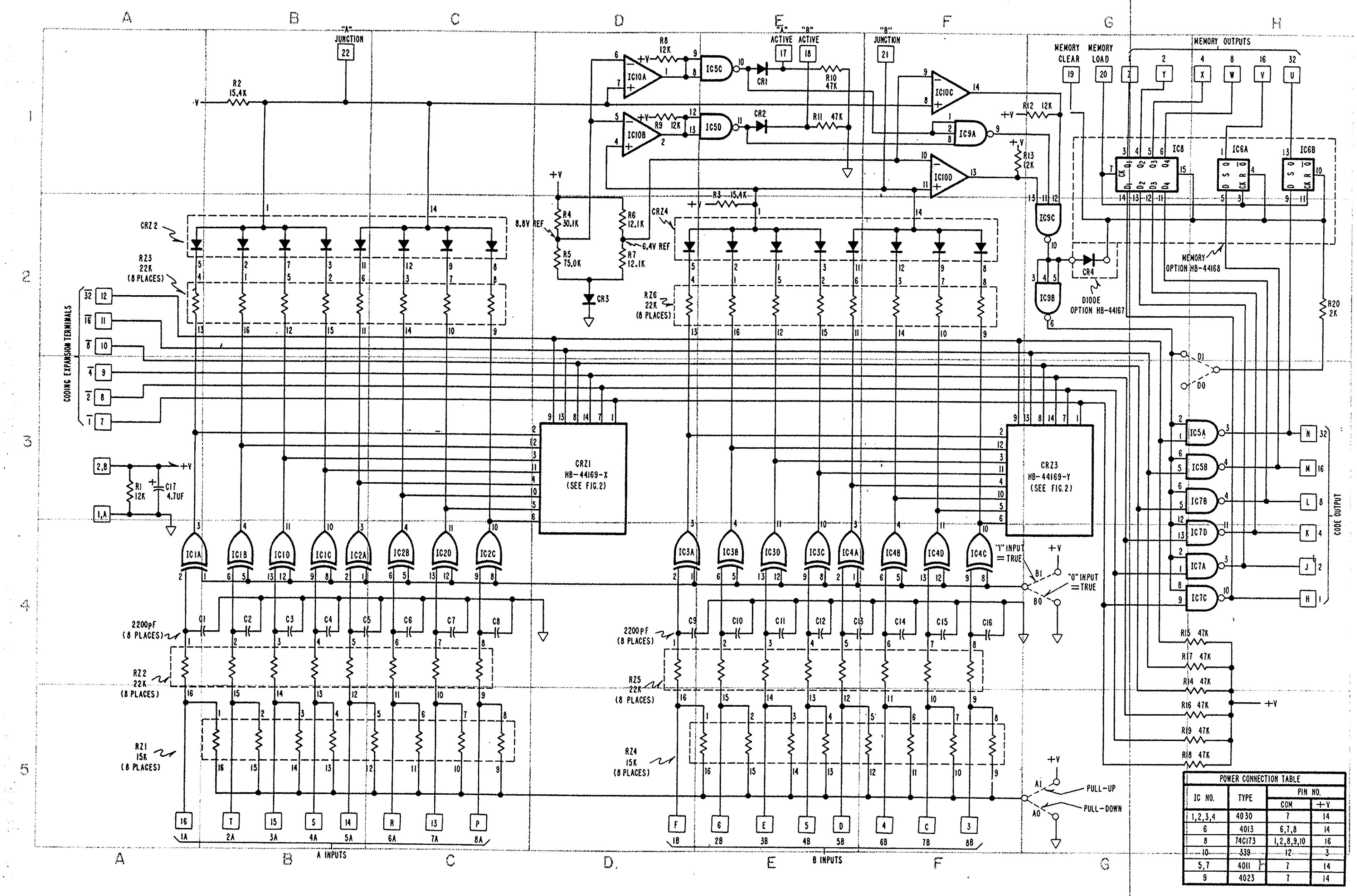
-8	57	58	59	60	61	62	0	0
-7	49	50	51	52	53	54	55	56
-6	41	42	43	44	45	46	47	48
-5	33	34	35	36	37	38	39	40
-4	25	26	27	28	29	30	31	32
-3	17	18	19	20	21	22	23	24
-2	9	10	11	12	13	14	15	16
-1	1	2	3	4	5	6	7	8
DASH NO.	S1	S2	S3	S4	S5	S6	S7	S8
	CLOSED SWITCH							

NOTES:
1. CIRCUITRY INSIDE DASHED LINE SHOWS 3 OF THE 48 FUSIBLE DIODE LINKS.
2. CIRCUITRY OUTSIDE DASHED LINE IS FOR REF TO SHOW PROGRAM AND TEST.
3. NUMBERS IN CHART REPRESENT THE SUM OF THE BINARY CODED OUTPUTS FOR EACH CLOSED SWITCH ASSUMING ALL OTHER SWITCHES OPENED. BINARY NUMBERS SHOWN IN PARENTHESIS SHOW EXAMPLE OF LOGIC LEVELS FOR S3 CLOSED IN -002 UNIT.
4. MADE FROM HA46149.
5. TO PROGRAM BY OPENING FUSIBLE LINKS, DRAW 1 AMP THROUGH LINK.
6. STAMP DASH NO. ON TOP SURFACE OF UNIT.
7. DO NOT CHANGE THIS PRINT WITHOUT FIRST REVIEWING HB44160 AND HB44170 BECAUSE THEIR DASH NO.S REFER TO THESE DASH NO.S.

Figure 4. Schematic of Programmed Diode Matrix, HD-4416[illegible]

Table of Replaceable Parts

DIAGRAM SYMBOL	NAME OF PART AND DESCRIPTION	RFL PART NO.
	Model 66 SLTC 16-PT Select Coder (Assembly HB-44160)	
	and	
	Model 66 SLTCX Select Coder Expander (Assembly HB-44170)	
C1-16	Capacitor, ceramic 0.0022μF, 10%, 100V, Union Carbide CK12BX222K,or eq.	H-1007-1368
C17	Capacitor, tantalum, 4.7μF, 20%, 20V, Kemet T324B475M020AS, or eq.	H-1007-711
CR1, 2, 3	Diode, Type 1N914B	HA-26482
CRZ1, 3	Programmed diode matrix, programmed from RFL P/N HB-46149, 14-pin ceramic, dual in-line package of 48 diodes with fuseable links in an 8 x 6 matrix. Texas Instrument DM286J, or eq.	HD-44169-X
CRZ2, 4	Dual, 4-diode array with common anode, Texas Instrument DI44N, or eq.	HA-46319
IC1, 2, 3, 4	Quad Exclusive-OR gate, RCA CD4030AE, or eq.	H-0615-22
IC5, 7	Quad, 2-input NAND gate, RCA CD4011AE, or eq.	H-0615-5
IC9	Triple, 3-input NAND gate, RCA CD4023AE, or eq.	H-0615-8
IC10	Quad comparator, National LM339N, or eq.	H-0620-119
R1, 8, 9, 12, 13	Resistor, fixed, composition, 12K, 5%, 1/4W, Allen Bradley CB, or eq.	H-1009-805
R2, 3	Resistor, metal-film, 15.4K, 1%, 1/8W all, Type RN55D, RFL Spec HA-38301	H-1510-1298
R4	Same as R2, 30.1K	H-1510-569
R5	Same as R2, 75.0K	H-1510-1569
R6, 7	Same as R2, 12.1K	H-1510-1387
R10, 11, 14-19	Same as R1, 47K	H-1009-792
R20	Same as R1, 2K	H-1009-760
RZ1, 4	8-resistor network, 15K, 2%, 1.5W/pkg., Beckman 898-3-R15.0K, or eq.	HA-46704
RZ2, 3, 5, 6	8-resistor network, 22K, 2%, 1.5W/pkg., Beckman 898-3-R22.0K, or eq.	HA-46706
	Memory, Option HB-44168	
IC3	Tri-state quad flip-flop, Motorola 74C173N, or eq.	H-0615-43
IC6	Dual, D-type flip-flop, RCA CD4013AE, or eq.	H-0615-1
	Diode, Option HB-44167	
CR4	Diode, Type 1N914B	HA-26482
–	Shorting bar	HA-42904
–	Schematic, Model 66 SLTC	HE-44164
–	Schematic, Model 66 SLTC(X)	HE-44174



POWER CONNECTION TABLE

IC NO.	TYPE	PIN NO. COM	PIN NO. +V
1,2,3,4	4030	7	14
6	4013	6,7,8	14
8	74C173	1,2,8,9,10	16
10	339	12	3
5,7	4011	7	14
9	4023	7	14

Figure 5. Schematic of Circuit, Model 66 SLTC.

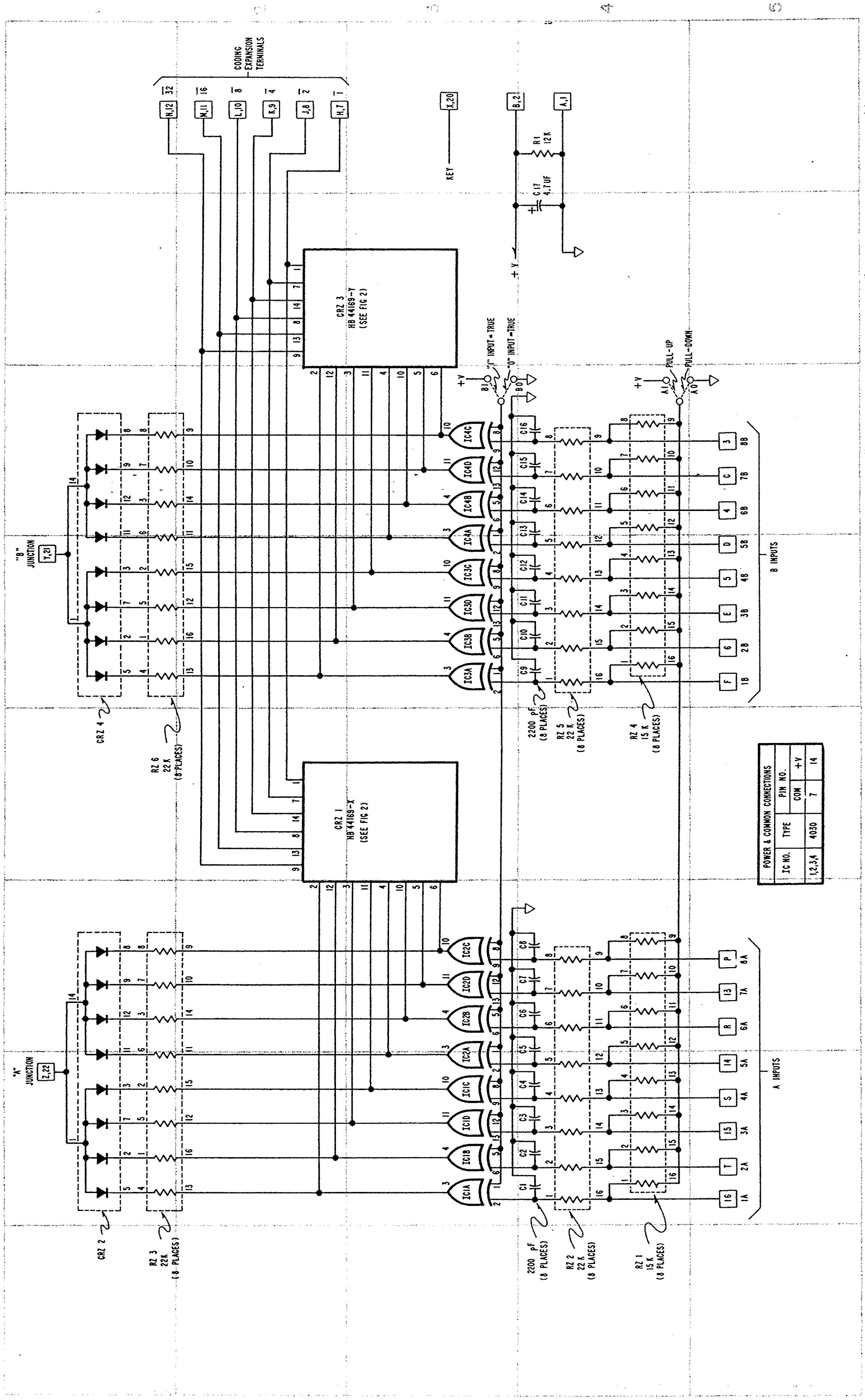


Figure 6. Schematic of Circuit, Model 66 SLTCX.