Chapter 9 — Keyboard M68KBD1
Solid State Keyboard

9.0. KEYBOARDS USED WITH PDS

The PDS is offered with two different models of keyboards:

9.1. Model M68KBD1 (CDC)
9.2. Model M68KBD1 (Keytronic)

9.1. MODEL CDC KEYBOARD

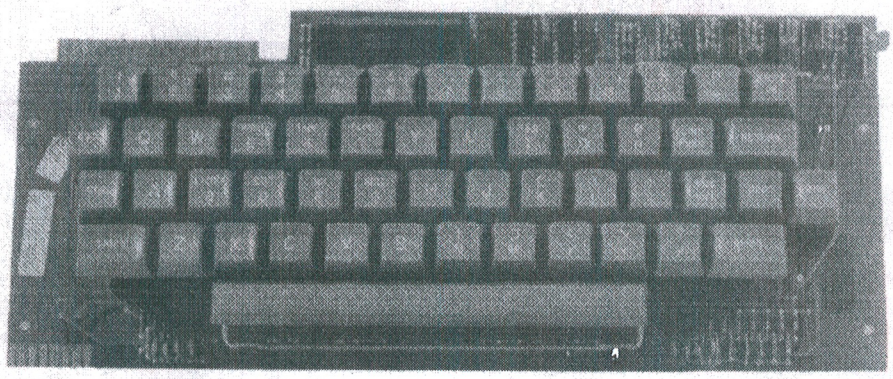

FIGURE 9.0. — MODEL M68KBD1 ASCII KEYBOARD

9.1.1. General Information

The model M68KBD1 provides a reliable and modern, low cost electronic keyboard. A simple combination of printed circuit board fabrication, key design, and scanning electronics yields a fully encoded, solid state keyboard which exhibits long operational life at a cost near that of mechanical switch units. Called C-Scan, the M68KBD1 utilizes a variable capacitance technique to produce the low-cost non-contact keyboards.

Keyboard format is standard ASR-33 with four mode ASCII encoding. Choice of odd or even parity at the connector. "N" key rollover is standard. "N" key rollover allows maximum operator throuput rates by sequentially producing each coded key output in the same order as key depression. Any number of keys can be depressed and held without inhibiting the data entry from subsequent key depressions. "N" key rollover reduces operator error rates by allowing high speed burst rate keying without the restriction of multi-key lockout.

9.1.2. Electrical and mechanical characteristics

9.1.2.1. Electrical parameters

Power input: +5 Vdc ±10% at 350 mA max. and −12 Vdc ±10% at 40 mA max.
Output: 10 TTL equivalent loads.
Positive logic: "0" = 0.4 Vdc max.; "1" = 2.4 Vdc min.
Interlock: sequential, full "N" key rollover.
Repeat: 10 Hz on all coded keys.
Parity: Odd or even at the connector.
Strobe: Negative or positive at the connector; 30 microsecond pulse nominal.
Life: 100 million cycles plus.

9.1.2.2. Mechanical parameters and construction

Positions: 53 keys; 47 codes, 2 functions, 4 controls.
Keyspacing: ¾" centers; 3/8—3/16—3/8 offset.
P.C. Board: G-10 glass epoxy, 0.062" thick.
Termination: Card edge connector, use CINCH 50-36-A-30 or equivalent.
Keytops: 2 shot molded ABS dark gray with white fill is standard.
Switching: Contactless capacitive scanning.
Operating force: 2-1/2 oz. nominal.
Total travel: 1.82" nominal.
Pretravel: 0.090" nominal.
Release point: 0.040" min. from free position.
Fig. 9.1 indicates the dimensions of the M68KBD1 keyboard.

9.1.3. Generated ASCII Code

The table 9.0 indicates the generated ASCII code. The

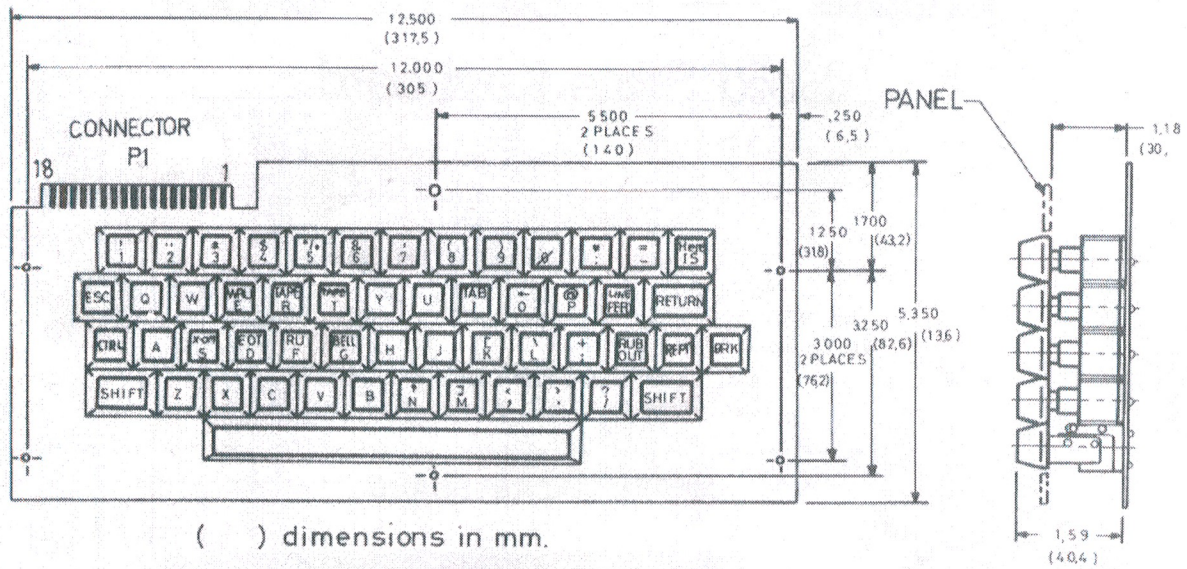

FIGURE 9.1. – M68KBD1 KEYBOARD DIMENSIONS (TOP VIEW)*

* Mechanical dimensions are subject to change without notice.

shift key and the control key subdivise the total code into four groups (4 modes).

9.1.4. Keyboard Adapter and Interconnections

On the keyboard adapter are located the restart switch, the baud rate switch V1/V2 and the optional buzzer. The sequence of connections coming from the data input connectors P5 of the M68SAC1 to the output connector P1 of the keyboard itself are rearranged. The keyboard adapter is directly plugged onto the keyboard connector P1 and is connected to the M68SAC1 board through the 20 wire flat cable (type ICC2P5B). The physical location of each connector is shown on the Fig. 9.2.

On Fig. 9.3 is visualized the interconnection diagram of the keyboard adapter, the M68SAC1 board and the keyboard itself as well as the pin definitions.

9.1.5. Circuit Schematic

On Fig. 9.4 is represented the circuit diagram of the capacitive encoded keyboard.

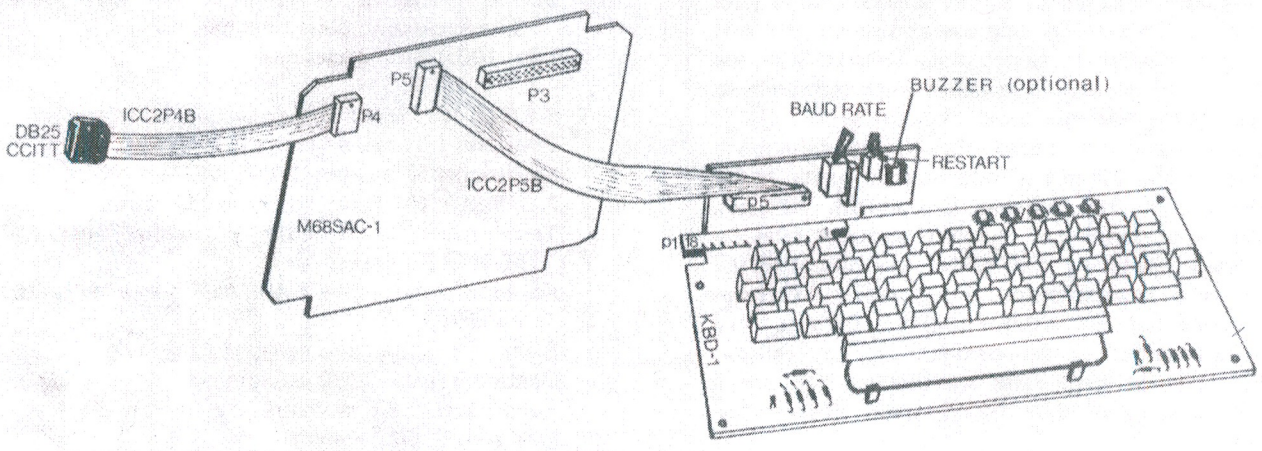

FIGURE 9.2. – M68SAC1 AND THE KEYBOARD INTERCONNECTIONS

TABLE 9.0. – STANDARD ASCII CODE

UNSHIFTED				SHIFTED				CONTROL				CONTROL/SHIFT			
MODE 1				MODE 2				MODE 3				MODE 4			
CHAR	P	765	4321	CHAR	P	765	4321	CHAR	P	765	4321	CHAR	P	765	4321
1	0	011	0001	!	1	010	0001	1	0	011	0001	!	1	010	0001
2	0	011	0010	"	1	010	0010	2	0	011	0010	"	1	010	0010
3	1	011	0011	#	0	010	0011	3	1	011	0011	#	0	010	0011
4	0	011	0100	$	1	010	0100	4	0	011	0100	$	1	010	0100
5	1	011	0101	%/o	0	010	0101	5	1	011	0101	%/o	0	010	0101
6	1	011	0110	&	0	010	0110	6	1	011	0110	&	0	010	0110
7	0	011	0111	'	1	010	0111	7	0	011	0111	'	1	010	0111
8	0	011	1000	(	1	010	1000	8	0	011	1000	(	1	010	1000
9	1	011	1001	)	0	010	1001	9	1	011	1001	)	0	010	1001
0	1	011	0000	0	1	011	0000	0	1	011	0000	0	1	011	0000
:	1	011	1010	*	0	010	1010	:	1	011	1010	*	0	010	1010
–	1	010	1101	=	0	011	1101	–	1	010	1101	=	0	011	1101
HERE IS	FUNCTION OUTPUT														
ESC	1	001	1011	ESC	1	001	1011	ESC	1	001	1011	ESC	1	001	1011
Q	0	101	0001	Q	0	101	0001	DC1	1	001	0001	DC1	1	001	0001
W	0	101	0111	W	0	101	0111	ETB	1	001	0111	ETB	1	001	0111
E	0	100	0101	E	0	100	0101	ENQ	1	000	0101	ENQ	1	000	0101
R	0	101	0010	R	0	101	0010	DC2	1	001	0010	DC2	1	001	0010
T	0	101	0100	T	0	101	0100	DC4	1	001	0100	DC4	1	001	0100
Y	1	101	1001	Y	1	101	1001	EM	0	001	1001	EM	0	001	1001
U	1	101	0101	U	1	101	0101	NAK	0	001	0101	NAK	0	001	0101
I	0	100	1001	I	0	100	1001	HT	1	000	1001	HT	1	000	1001
O	0	100	1111	←	1	101	1111	SI	1	000	1111	US	0	001	1111
P	1	101	0000	@	0	100	0000	DLE	0	001	0000	NUL	1	000	0000
LF	1	000	1010	LF	1	000	1010	LF	1	000	1010	LF	1	000	1010
RETURN	0	000	1101	RETURN	0	000	1101	RETURN	0	000	1101	RETURN	0	000	1101
CTRL	INTERNAL FUNCTION														
A	1	100	0001	A	1	100	0001	SOH	0	000	0001	SOH	0	000	0001
S	1	101	0011	S	1	101	0011	DC3	0	001	0011	DC3	0	001	0011
D	1	100	0100	D	1	100	0100	EOT	0	000	0100	EOT	0	000	0100
F	0	100	0110	F	0	100	0110	SCK	1	000	0110	ACK	1	000	0110
G	1	100	0111	G	1	100	0111	BEL	0	000	0111	BEL	0	000	0111
H	1	100	1000	H	1	100	1000	BS	0	000	1000	BS	0	000	1000
J	0	100	1010	J	0	100	1010	LF	1	000	1010	LF	1	000	1010
K	1	100	1011	[	0	101	1011	VT	0	000	1011	ESC	1	001	1011
L	0	100	1100	\	1	101	1100	FF	1	000	1100	FS	0	001	1100
;	0	011	1011	+	1	010	1011	;	0	011	1011	+	1	010	1011
RO	0	111	1111	RO	0	111	1111	RO	0	111	1111	RO	0	111	1111
REPT	INTERNAL FUNCTION														
BRK	FUNCTION OUTPUT														
SHIFT	INTERNAL FUNCTION														
Z	1	101	1010	Z	1	101	1010	SUB	0	001	1010	SUB	0	001	1010
X	0	101	1000	X	0	101	1000	CAN	1	001	1000	CAN	1	001	1000
C	0	100	0011	C	0	100	0011	ETX	1	000	0011	ETX	1	000	0011
V	1	101	0110	V	1	101	0110	SYN	0	001	0110	SYN	0	001	0110
B	1	100	0010	B	1	100	0010	STX	0	000	0010	STX	0	000	0010
N	1	100	1110	^	0	101	1110	SO	0	000	1110	RS	1	001	1110
M	1	100	1101	]	0	101	1101	CR	0	000	1101	GS	1	001	1101
,	0	010	1100	<	1	011	1100	,	0	010	1100	<	1	011	1100
.	1	010	1110	>	0	011	1110	.	1	010	1110	>	0	011	1110
/	0	010	1111	?	1	011	1111	/	0	010	1111	?	1	011	1111
SHIFT	INTERNAL FUNCTION														
SPACE	0	010	0000	SPACE	0	010	0000	SPACE	0	010	0000	SPACE	0	010	0000

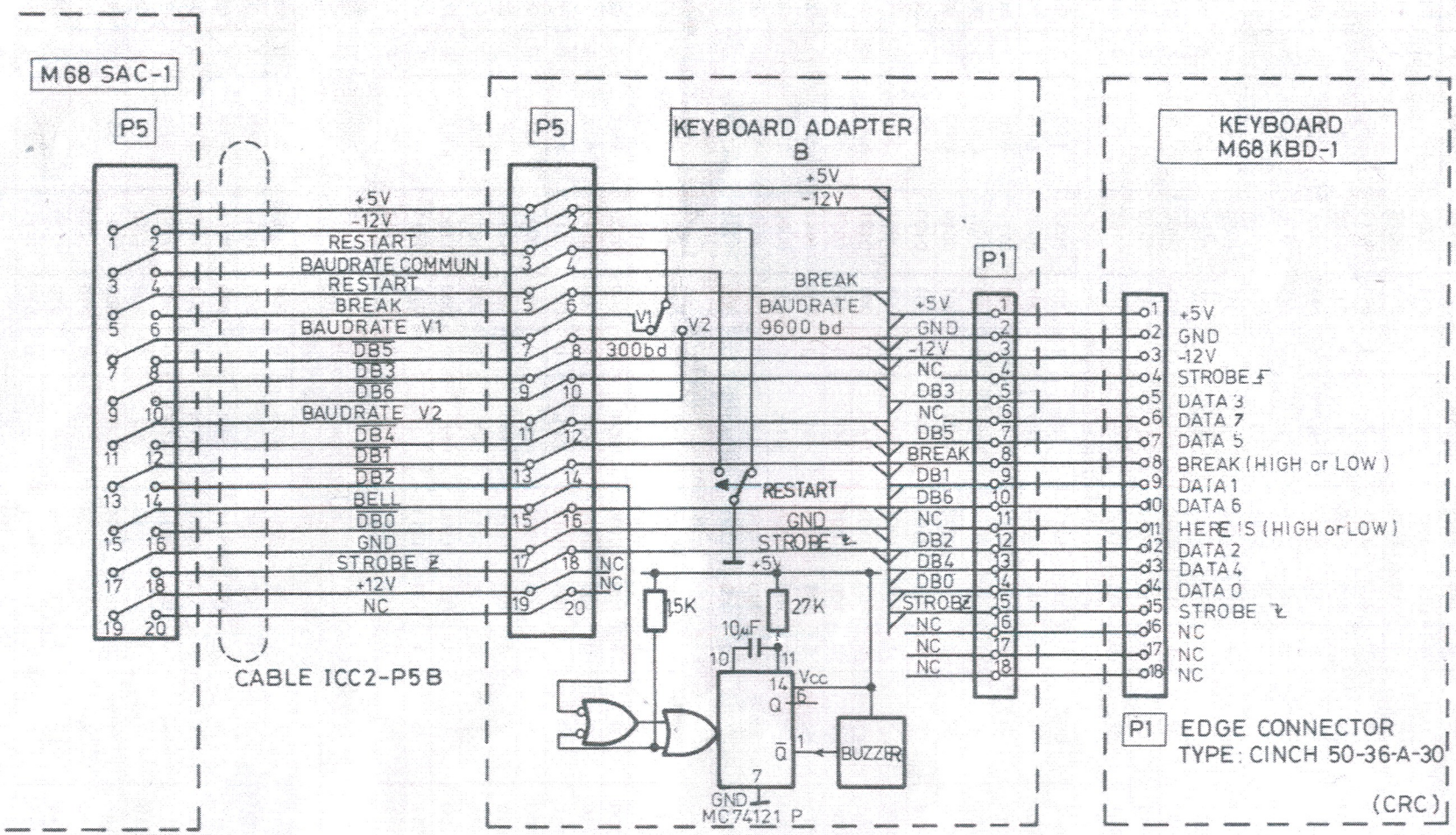

FIGURE 9.3. – KEYBOARD ADAPTER (CDC) AND KEYBOARD INTERCONNECTION CIRCUIT DIAGRAM

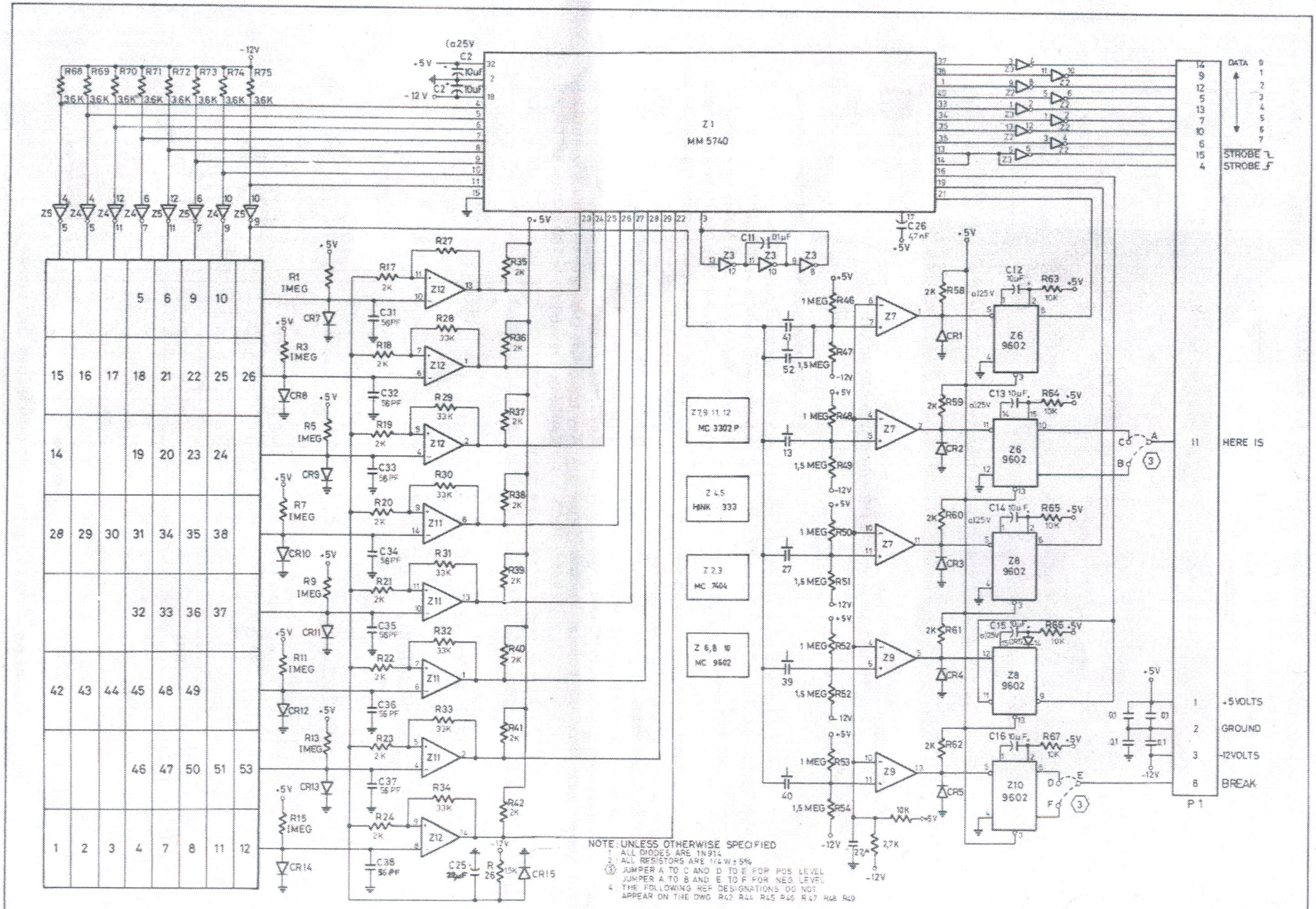

FIGURE 9.4. — M68KBD-1 ASCII KEYBOARD CIRCUIT DIAGRAM.

9.2. MODEL KEYTRONIC KEYBOARD

FIGURE 9.5. – MODEL M68KBD1 ASCII KEYBOARD

9.2.1. General Information

The 53-key model C1466 from Keytronic provides the popular Teletype ASR-33 format (see table 9.1—Code chart).

This quality keyboard features solid-state capacitance keyswitches with unique tactile feel, TTL scan logic for parallel 7-bit ASCII encoding, manual repeat, two shot molded keytops for wear resistant legends and two keys rollover for error free data entry. The keyswitches offers the standard travel and force of popular electric typewriters.

9.2.2. Electrical and Mechanical characteristics

9.2.2.1. Electrical parameters

Input power: +5 Vdc at 300 mA.
Rollover: 0.2 key roll with N-Key lock out.
Data output: Parallel 7-bit ASCII, positive logic.
Strobe: pulsed positive or negative logic. Pulse duration: 10 ±3 microseconds.

9.2.2.2. Mechanical parameters

Total key travel: 4.34 mm.
Key force: 71 grams.
Key top color: Dark grey with black control keys.
Key switch reliability: > 100 million MCBF.

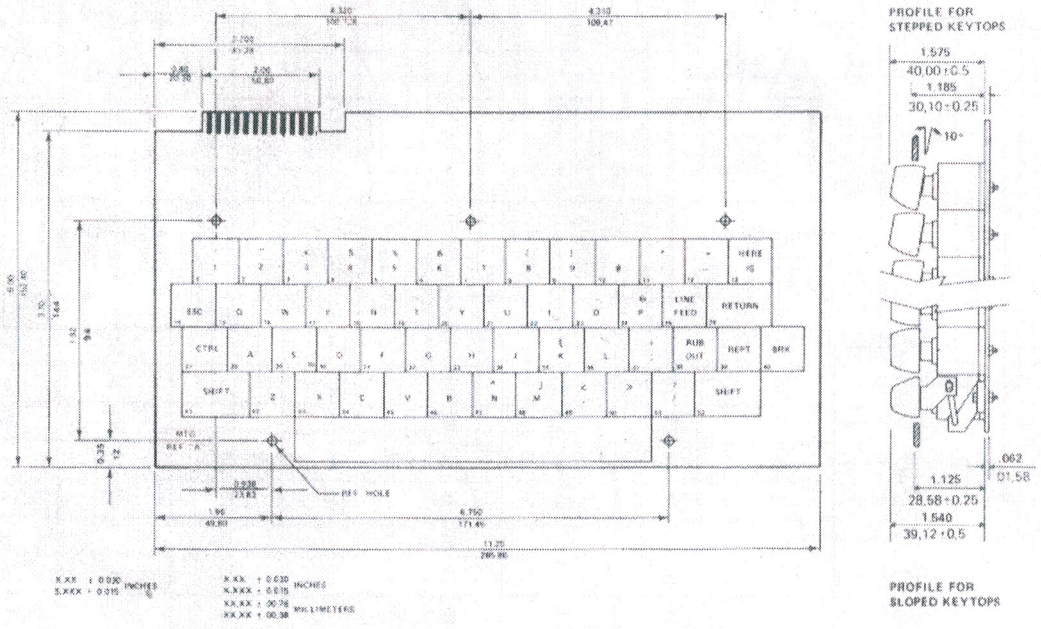

FIGURE 9.6. – M68KBD1 KEYBOARD DIMENSIONS (TOP VIEW)

9.2.3. Keyboard Connector P1

Pin	Function	Pin	Function
1	Bit 6	A	$\overline{\text{Here is}}$
2	Bit 7	B	$\overline{\text{Breack}}$
3	$\overline{\text{Strobe}}$	C	$\overline{\text{Repeat}}$
4	Bit 5	D	Strobe
5	Bit 2	E	Control
6	Bit 4	F	+5 Vdc
7	Bit 1	H	Ground
8	Bit 3		

9.2.4. Keyboard Adapter and Interconnections

On the keyboard adapter are located the restart switch the baud rate switch V1/V2 and the buzzer. The sequence of connections coming from the data input connector P5 of the M68SAC1 to the output connector P1 of the keyboard itself are rearranged. The keyboard adapter is directly plugged onto the keyboard connector P1 and is connected to the M68SAC1 board through the 20 wire flat cable (type ICC2P5B). The physical location of each connector is shown on Fig. 9.7. On Fig 9.8 is visualized the interconnection diagram of the keyboard adapter, the M68SAC1 board and the keyboard itself as well as the pin assignment.

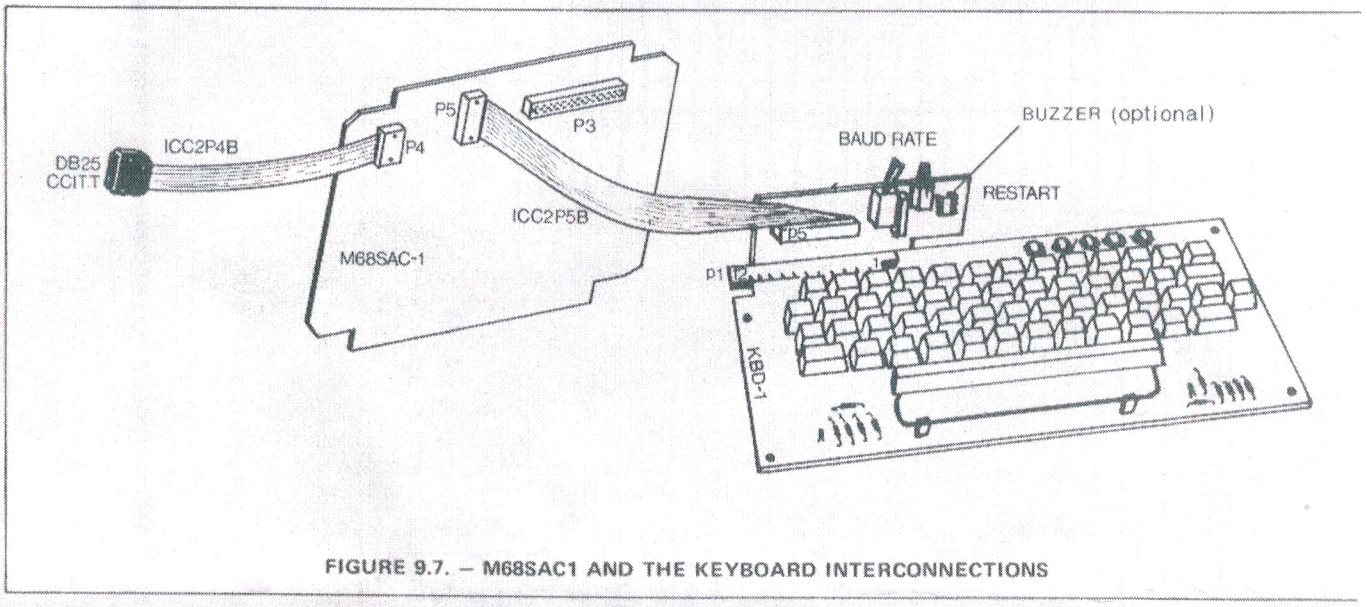

FIGURE 9.7. – M68SAC1 AND THE KEYBOARD INTERCONNECTIONS

TABLE 9.1. – CODE CHART

Key	Unshift	Shifted	Control	Control & Shift	Key	Unshift	Shifted	Control	Control & Shift
1	1	!	1	!	27	FUNCTION (CTRL)			
2	2	"	2	"	28	A	A	SOH	SOH
3	3	#	3	#	29	S	S	DC3	DC3
4	4	$	4	$	30	D	D	EOT	EOT
5	5	%	5	%	31	F	F	ACK	ACK
6	6	&	6	&	32	G	G	BEL	BEL
7	7	'	7	'	33	H	H	BS	BS
8	8	(	8	(	34	J	J	LF	LF
9	9	)	9	)	35	K	[	VT	ESC
10	@	@	@	@	36	L	/	FF	FS
11	:	*	:	*	37	;	+	;	+
12	–	=	–	=	38	DEL	DEL	?	?
13	FUNCTION – NEG. TRUE				39	FUNCTION (REPEAT)			
14	ESC	ESC	ESC	ESC	40	FUNCTION – NEG TRUE			
15	Q	Q	DC1	DC1	41	FUNCTION (SHIFT)			
16	W	W	ETB	ETB	42	Z	Z	SUB	SUB
17	E	E	ENQ	ENQ	43	X	X	CAN	CAN
18	R	R	DC2	DC2	44	C	C	ETX	ETX
19	T	T	DC4	DC4	45	V	V	SYN	SYN
20	Y	Y	EM	EM	46	B	B	STX	STX
21	U	U	NAK	NAK	47	N	^	SO	RS
22	I	I	HT	HT	48	M	]	CR	GS
23	O	–	SI	US	49	,	<	,	<
24	P	@	DLE	NUL	50	.	>	.	>
25	LF	LF	LF	LF	51	/	?	/	?
26	CR	CR	CR	CR	52	FUNCTION (SHIFT)			
					53	SP	SP	SP	SP

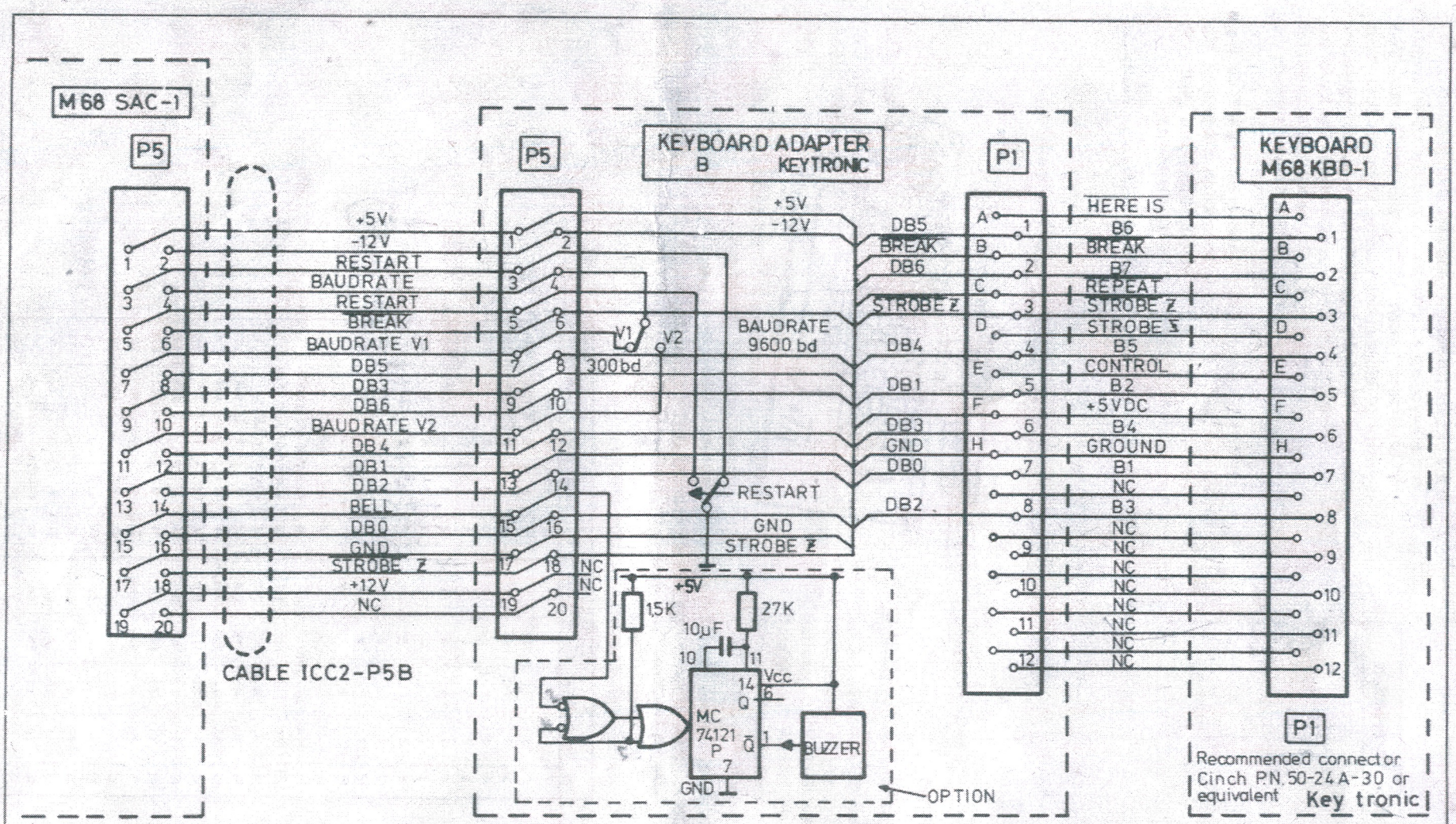

FIGURE 9.8. – KEYBOARD ADAPTER (KEYTRONIC) AND KEYBOARD INTERCONNECTION CIRCUIT DIAGRAM