KB670/KB670A
KB675/KB675A

ASCII Keyboards
Parallel & Serial Output

INSTRUCTION & REPAIR MANUAL

Features:

- Serial & Parallel In One Unit
- Self Test Feature
- Eight Baud Rates
- N-Key Rollover
- Auto Repeat
- Customizable For Volume Orders
- KB670A/KB675A CMOS Version

Matric
LIMITED

Key/Output Character Table

Keyboard	0	0	0	1 Control	Keyboard	0	0	1 /	Control
Key	0	1	X	X Shift	Key	0	1	X	Shift
	•	X	#	X U&L Case		X	X	X	U&L Case
A	a	A	A	SOH	0	0	0	NUL	
B	b	B	B	STX	1	1	!	NUL	
C	c	C	C	ETX	2	2	"	NUL	
D	d	D	D	EOT	3	3	#	NUL	
E	e	E	E	ENQ	4	4	$	NUL	
F	f	F	F	ACK	5	5	%	NUL	
G	g	G	G	BEL	6	6	&	NUL	
H	h	H	H	BS	7	7	'	NUL	
I	i	I	I	HT	8	8	(	NUL	
J	j	J	J	LF	9	9	)	NUL	
K	k	K	K	VT				NUL	
L	l	L	L	FF	:	:	*	NUL	
M	m	M	M	CR	;	;	+	NUL	
N	n	N	N	SO	,	,	<	FS	
O	o	O	O	SI	-	-	=	GS	
P	p	P	P	DLE	.	.	>	RS	
Q	q	Q	Q	DC1	/	/	?	US	
R	r	R	R	DC2					
S	s	S	S	DC3	[	[	{	ESC	
T	t	T	T	DC4	\	\	¦	NUL	
U	u	U	U	NAK	]	]	}	NUL	
V	v	V	V	SYN	∧	∧	~	NUL	
W	w	W	W	ETB	DEL	DEL	_	DEL	
X	x	X	X	CAN	@	@	'	NUL	
Y	y	Y	Y	EM					
Z	z	Z	Z	SUB	SP	SP	.SP	SP	
					CR	CR	CR	CR	
					LF	LF	LF	LF	
					+	+	+	+	
					*	*	*	*	
					=	=	=	=	
					ESC	ESC	ESC	ESC	
					BS	BS	BS	BS	

1 – Key Pressed
0 – Key Not Pressed
X – Don't Care
• – Pin 12 Connected to Ground, Serial Port
– Pin 12 Open, Serial Port
* – Pin 4 Connected to Ground, Parallel Port
– Pin 4 Open, Parallel Port

Character/ASCII Code Table: ASCII (Without Parity)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	SP	!	"	#	$	%	&	/	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[		]	V	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	y	w	x	y	z	{	¦	}	~	DEL

Examples: A is Code 41. Carriage Return (CR) is Code 0D


Caution: To prevent fire & shock hazard, provide power only from an isolated, UL Approved, Class 2 power supply rated 5 VDC, 250 mA minimum (and ± 15 volts at 40 mA minimum if RS232C is implemented). Do not exceed voltage and current ratings of the USER1/USER2 keys.

Not for use in explosive atmosphere.

Contains static sensitive devices.

Parallel Output

Timing Diagram
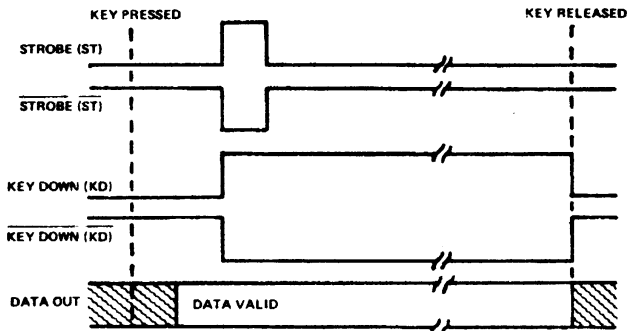
NOTE: STROBE AND STROBE PULSE APPROX. 3.2 μS.
KEY DOWN AND KEY DOWN DELAYED FROM STROBE AND
STROBE LEADING EDGE BY APPROX. 1.6 μS.
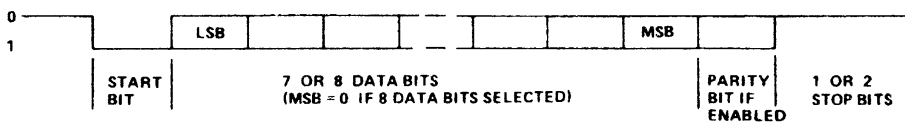
Connector – Rear View (P5)
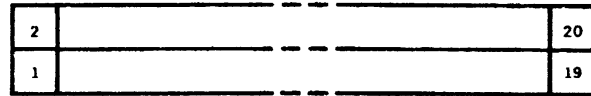
MATING CONNECTOR: 3M PART
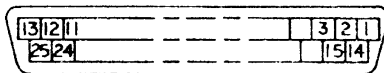No. 3421-6020 OR EQUIVALENT

CAUTION: Inserting cable connector with power applied may
cause permanent damage.

Serial Output

Data Format

| START BIT | 7 OR 8 DATA BITS (MSB = 0 IF 8 DATA BITS SELECTED) | PARITY BIT IF ENABLED | 1 OR 2 STOP BITS |

Connector – Rear View (P4)

MATING CONNECTOR:
25-PIN MALE "D" CABLE CONNECTOR

CAUTION: Inserting cable connector with power applied may
cause permanent damage.

Serial Output Configuration Switches
Configuration Control Switches

Baud Rate	SWITCH NUMBER							SWITCH NUMBER				
	1	2	3	4	5	6		7	8	9	10	
110	1	0	0	0	0	0		1	X	X	X	Even Parity
300	0	1	0	0	0	0		0	X	X	X	Odd Parity
600	1	1	0	0	0	0		X	1	X	X	8 Bit Word*
1200	0	0	1	0	0	0		X	0	X	X	7 Bit Word**
2400	1	0	1	0	0	0		X	X	1	X	2 Stop Bits
4800	0	0	0	1	0	0		X	X	0	X	1 Stop Bit
9600	0	0	0	0	1	0		X	X	X	1	Inhibit Parity
19.2K	0	0	0	0	0	1		X	X	X	0	Enable Parity

* Note: 8th Bit is zero if 8 Bit word length is selected.

** Note: A switch setting of 7 data bits, no parity and one stop bit
is an invalid setting and will generate a ten bit word with two
stop bits.

1 – Switch Closed (Down)
0 – Switch Open (Up)
X – May be up or down dependant on desired configuration

3

Disassembly Procedure

Should disassembly be required, the following procedure should be followed:

1. Be sure power on all connecting cables has been turned off.

2. Disconnect interconnecting cables.

3. Remove three screws from each end cap, six screws total.

4. Remove end caps by pulling away from keyboard end.

5. Slide the bottom panel toward the left or right end of the keyboard.

6. With the keypad face down on a flat surface, remove the screws at the front edge of the printed circuit board. Having removed the screws, the front keyboard metal lip will drop away from the assembly. If it does not, gently pull this front metal piece from the assembly.

7. Lift the front edge of the printed circuit board up slightly and very carefully remove the keypad tails from the connectors located at the front of the printed circuit board.

8. Pull the printed circuit board forward far enough that the rear connector clears the rear panel.

Disassembly is now complete.

CAUTION: Do not attempt to remove the keypad from the metal surface - the keypad will be destroyed!

TO ASSEMBLE: Reverse this procedure.

Circuit Operation Description

The KB670/KB670A and KB675/KB675A keyboards are designed around a high speed, multiport microcontroller, U4(8051 family). This device is supported by a precision crystal oscillator Y1, baud rate switches SW1 thru SW6, parity and word length switches SW7 thru SW10 and a power-on reset circuit, U7.

The controller scans the baud rate and parity switches to determine the user's requirements before each scan of the keyboard. Baud rate switches are read via the multiplexer, U6. Setting of an invalid baud rate will result in a short repetitive tone indicating the need for correction. Keys pressed are stored by the controller in a queue and compared to the keys pressed on a subsequent scan. Occurrence of the same key on two successive scans validates the key for transmission.

Keypresses are transmitted both serially and as parallel bytes with parity. Serial data is buffered via U5 before driving the TTL data output, the current loop circuit or the RS232 driver. The current loop circuit is composed of Q3, R16, R17, R18, R21, R22, R23, D3, D4, and U2. This circuit is passive and bipolar, the user does not need to be concerned about the current source polarity. The RS232 driver is U3. Parallel data is latched into U1 and captured externally via the strobe or strobe-not signals available to the user. All keypresses are further indicated externally via the keydown and keydown-not signals which are active for the duration of the keypress. These latter four signals are also buffered by U5.

An audible tone is generated during keypresses via the speaker driver circuitry composed of R10 thru R13, R19, R20, C9, Q1, and D1.

The prompt LED, D2, driven by Q2, is normally on indicating the power is on. The user may turn the LED off via the prompt input.

This product contains a self test feature invoked by pulling pin 25 of the RS232 connector low. A check sum of the ASCII Character Code Table is performed and all ASCII characters from 2OH to 7EH are output on both the serial and parallel ports at the baud rate selected. Any error detected in the check sum will beep the speaker at a 1 second rate and no ASCII codes will be output.

Replacement Guide
KB670 Replaces RCA Keyboards VP601 and VP606
KB675 Replaces RCA Keyboards VP611 and VP616

No Implied License

The sale or lease of any product, or any part thereof, or the furnishing of any information in the form of data, service or application assistance, by ML to Customer hereunder does not convey any license or guarantee, by implication, estoppel, or otherwise under any proprietary or patent rights of ML or any other party relating either to combinations of said product or part with any other products, parts, apparatus or equipment or to its use in practicing any process.

Acceptance Of Goods

Notwithstanding any items or conditions which may appear on the customer's order, this article is offered for sale specifically on the above condition, and may not be accepted and retained by the purchaser except upon that condition.

Notice: Radio Frequency Interference Statement

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instruction, it may cause interference to radio and television reception.

This equipment has been tested and complies with the limits for a Class B digital device in accordance with the specifications in Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

* Reorient the receiving antenna   * Relocate the computer with respect to the receiver   * Move the computer away from the receiver
* Plug the computer into a different outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio and TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

WARNING

This equipment has been certified to comply with the limits for a Class B digital device under Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. Any changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.
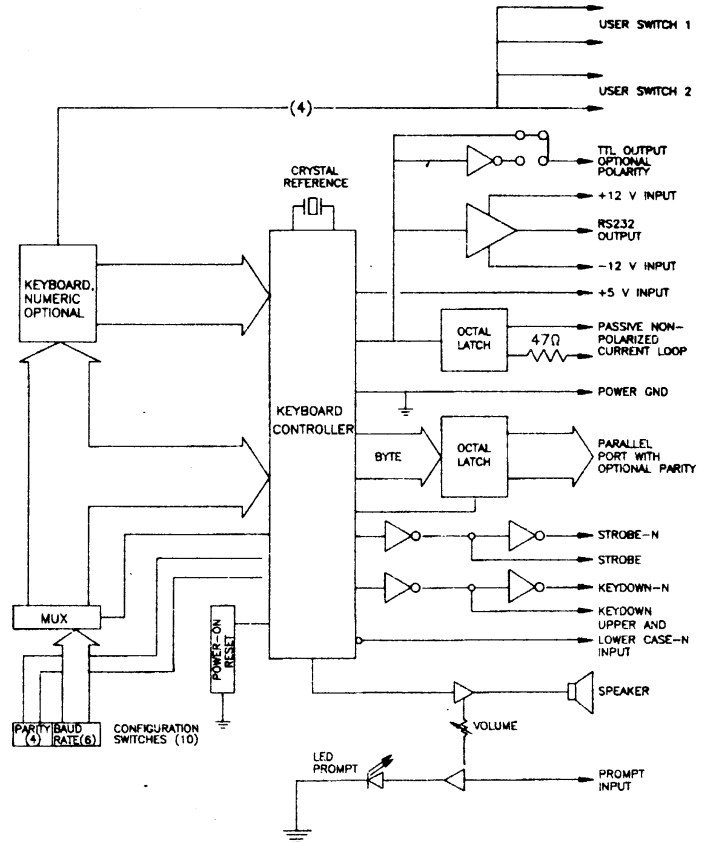
REMARKS

To meet FCC requirements, shielded interface cables are required to connect the device to a personal computer, peripheral, or other Class B certified device.

Design Specifications

Character Set:
128 character ASCII (102 character alphabetical upper-case-only selectable by application of logic level to a connector pin).

Keyboard:
KB670/KB670A - 58-key typewriter format. Includes two user definable keyboard switch closures.

KB675/KB675A - Same as KB670 plus a 16-key, calculator format numeric keypad.

Rollover:
N-key rollover.

Auto Repeat:
An alpha-numeric key held for approx. 1 sec. will auto repeat at the rate of 10 characters a second.

User Keys:
USER 1, USER 2 - SPST switch closures.
Rating - 30 V. 0.1 A, 1 W max.

Audio:
1 kHz tone during keypress. Short duration chirp tone to verify SHIFT or CONTROL keypress. Adjustable volume.

Power Required: (the +5 VDC tolerance is ± 5% at keyboard)
KB670/KB675 - +5 VDC @ 180 mA for parallel, TTL serial and 20 mA current loop. Additional ± 9 VDC to ± 15 VDC @ 5 mA for RS232C compatible output.

KB670A/KB675A - +5 VDC @ 105 mA for parallel, TTL serial and 20 mA current loop. Additional ± 9 VDC to ± 15 VDC @ 5 mA for RS232C compatible output.

NOTE:
+5 VDC current requirement can be reduced up to 50 mA for KB670, KB675, KB670A and KB675A by adjusting the speaker volume to minimum output level.

Outputs:
Parallel - 7 bit ASCII; even, odd or no parity. Strobe and keydown handshaking. Will drive 10 TTL loads.
Serial - Selectable 7 or 8 bits; even, odd or no parity; 1 or 2 stop bits; 110, 300, 600, 1200, 2400, 4800, 9600 or 19.2K baud data rates; TTL(ten load drive),20 mA current loop(110, 300 and 1200 baud) and RS232C compatible serial outputs.

LED Indicator:
Green, Power on or can be used as a host controlled prompt.

Connectors:
Parallel - 20 pin right angle, PC board header connector. Mates with 3M 3421-6020 ribbon cable connector or equivalent.
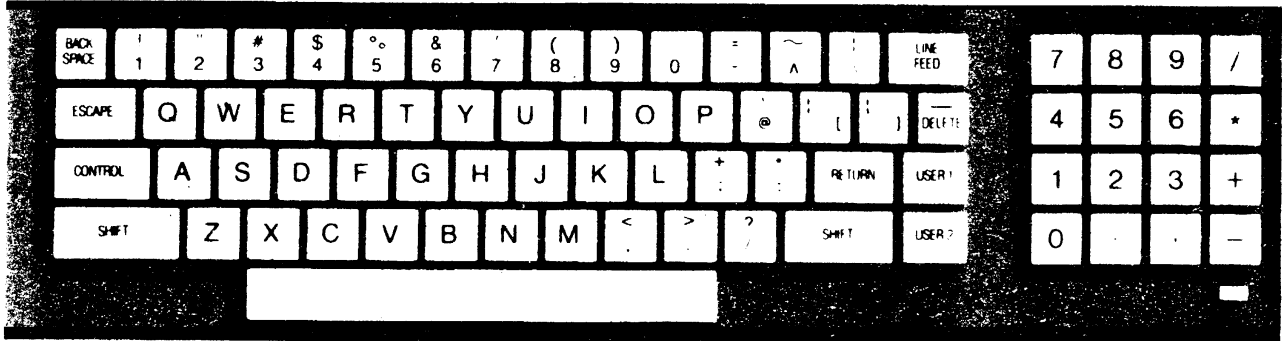Serial - 25 pin subminiature D connector.

Size and Shipping Weight (Approx.):
KB670/KB670A - 13.1x7x2 inches (333x178x51 mm). 3 lbs (1.4 kg)
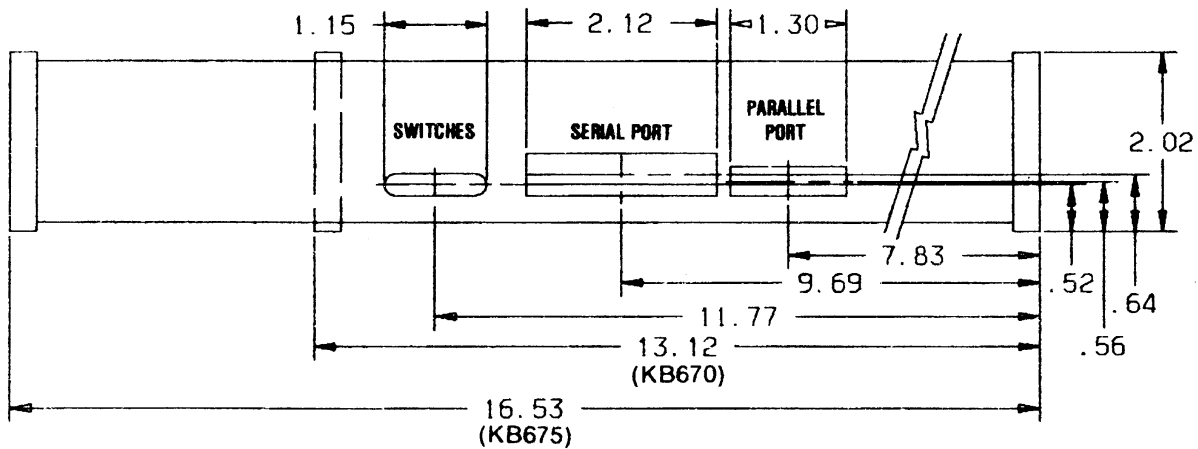KB675/KB675A - 16.5x7x2 inches (419x178x51 mm). 3.5 lbs (1.6 kg)

Environmental:
Temperature - 0° to +50° C, operating.
- 40° to +85° C, storage.

Keyboard Layout

Rear View

Dimensions in inches.