

ANSWERS TO QUESTIONS MOST
FREQUENTLY ASKED ABOUT THE
PROMPT 48

THE MOST IMPORTANT RULE OF THUMB is to ensure when you operate the Prompt 48 that these three things are correct:

ACCESS MODE
P2 MAP
LSN of P2

TIMER INTERRUPT DISABLED ON 'SINGLE-STEP' or 'WITH-BREAKPOINT MODE'. To debug timer routines, then, insert JTF (Jump on Timer Flag) command in the program loop.

MONITOR RE-ENTRY USES NEXT AVAILABLE LEVEL OF THE STACK. If user is not aware of this and puts data immediately above his stack, the data will be "zapped".

UPPER 16 BYTES OF 1st 1K BLOCK (3F0-3FF) MUST BE RESERVED FOR RE-ENTRY CODE. This applies whether the user is running out of the 1K writable program memory or out of the 1K on-board prom. Prom programming command [7] (see command structure) automatically programs this re-entry code into those 16 bytes. Prom programming command [3] does not.

ANL BUS,A and ORL BUS,A ARE NOT SUPPORTED EXCEPT IN ACCESS MODE 3 AND THEN ONLY IN 'GO NO BREAK'.

OUTL BUS,A CAN ONLY BE USED IN ACCESS MODE 0 OR 3.

<u>ACCESS CODE</u>	<u>PROGRAM MEMORY</u>	<u>SYSTEM IO and SYSTEM CALLS</u>	<u>EXPANSION MEMORY AND IO</u>	<u>OUTL PORT 0</u>
0	WRITABLE (RAM)	no	no	yes
1	WRITABLE (RAM)	no	yes	no
2	WRITABLE (RAM)	yes	no	no
3	READ ONLY (ON CHIP)	no	no	yes
4	READ ONLY (ON CHIP)	no	yes	no
5	READ ONLY (ON CHIP)	yes	no	no

now
cannot use
B043 - monitor
will be affected
Access codes
double

Table 1 - Access Codes

LIMITED USE OF INS A, BUS. This one takes some explanation. At the chip level, the MCS48 BUS port was designed to work in one of the following configurations but not in combination of these modes.

	<u>CONFIGURATION</u>	<u>IN/OUT</u>	<u>COMMAND</u>
1)	Bi-Directional	both	MOVX
2)	Uni-Directional	out	OUTL
3)	Uni-Directional	in	INS

TABLE 2

In all 3 configurations, command \overline{RD} and \overline{WR} is produced but is not generally used on the INS and OUTL.

PROMPT 48 supports the first and second configurations completely: bi-directional, using access mode 1 or 4 and uni-directional output using access mode 0 or 3. The INS command is basically not supported by the PROMPT 48 but it can be used by doing the following:

- 1) USE ACCESS MODE 1 OR 4
- 2) SET (DRIVE HIGH) PORT 2 LINE 2 OR 3
(explained in #8 below)
- 3) STROBE THE DATA ONTO THE BUS WITH THE \overline{RD} LINE (Figure 1)

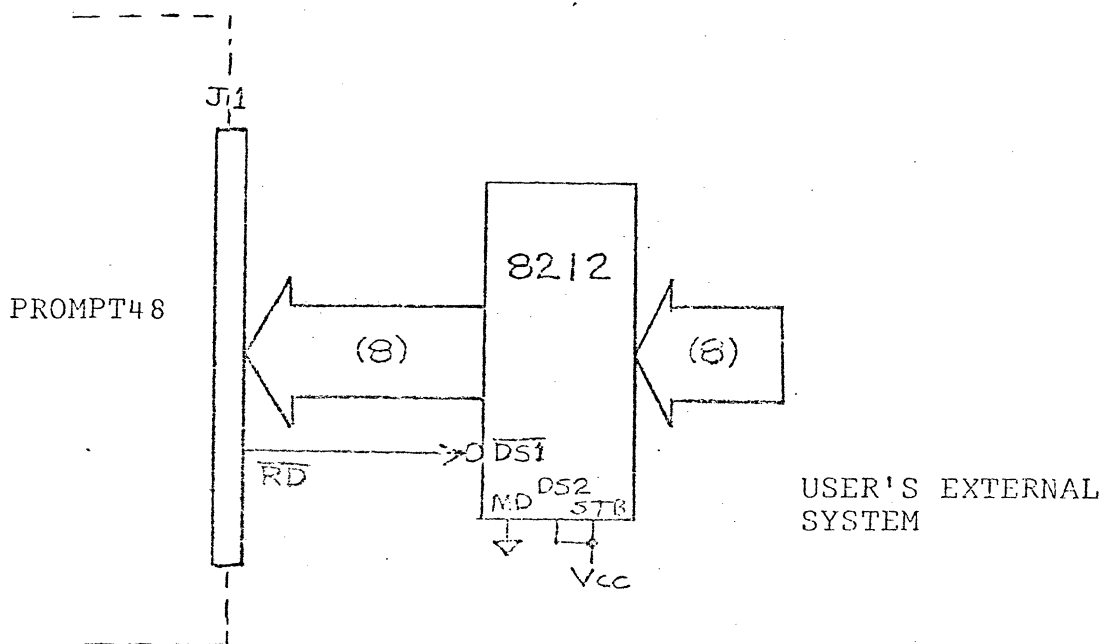


Figure 1 - Strobed Data Input

Figure 2 shows the reason for the above steps. Access mode 1 or 4 enables a bi-directional driver and tri-states a latch that holds the data on an OUTL BUS, A command. Setting P22 or P23 deselected internal PROMPT48 memories. Data must be strobed onto the bus or else the inputs would fight the 8216 drivers which are driving out when RD is inactive.

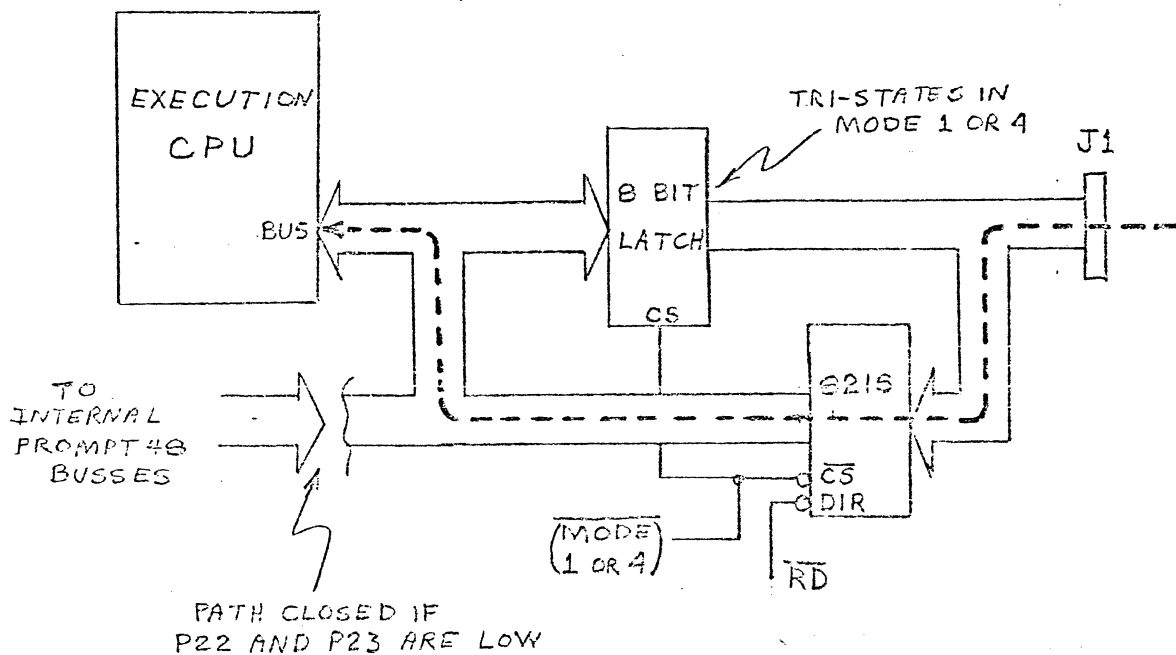


Figure 2 - DATA PATH WITHIN PROMPT48 USING INS A,BUS

P2 MAPPING. The lines of Port 2 must be designated on a pin by pin basis as to their direction. This is done with the P2 map command. The default condition is 'output'. The following items need to be considered:

P23-27 MAY BE MAPPED 'INPUT' OR 'OUTPUT' REGARDLESS OF ACCESS MODE. These pins are wired directly from the execution CPU to J1 interface so the only criterion is what device the user attaches to the pin.

P20-23 MAPPING IS DETERMINED BY ACCESS. This requires explanation on a mode-by-mode basis:

MODES 0,2, OR 5 - MAP P20-23 AS OUTPUT

P20-23 are used by the monitor to select various internal memories of the PROMPT 48 and therefore must not be affected by input devices. Referring to Figure 3, we can see the data path is P2,H,J,K. If P20-23 is mapped input, data Path J1, A, D, G, H could foul things up.

MODE 1 or 4 - MAPPING IS 'DON'T CARE' - *S/B output*

P20-23 are used by the user to select various external memories, IO chips, and/or 8243 Port Expander chips he may have connected to J1. Being select lines, their function will always be output except if using an 8243 Port Expander. In Figure 3 the path is H, G, B, E, J1. The P20-23 mapping mechanism is actually bypassed in these modes and is therefore immaterial. If it is mapped as output, the contents are saved by the monitor during debug. If using an 8243, on a MOVD A,Pn command, the path switches to J1, F, B, G, H.

MODE 3 - MAPPING MAY BE INPUT OR OUTPUT AS THE USER REQUIRES

In this mode we are running a $\leq 1K$ program on-board the CPU. With INPUT mapping the path is J1, A, D, G and H. With OUTPUT mapping the path is P2, H, J, C, A, J1. You might notice that if the monitor takes control (due either to single-step, with-break, or monitor interrupt pressed) the last data on the 4-bit latch is held and the P2-map is temporarily switched to OUTPUT. Again, this is to prevent possible input lines from affecting the internal memory select lines.

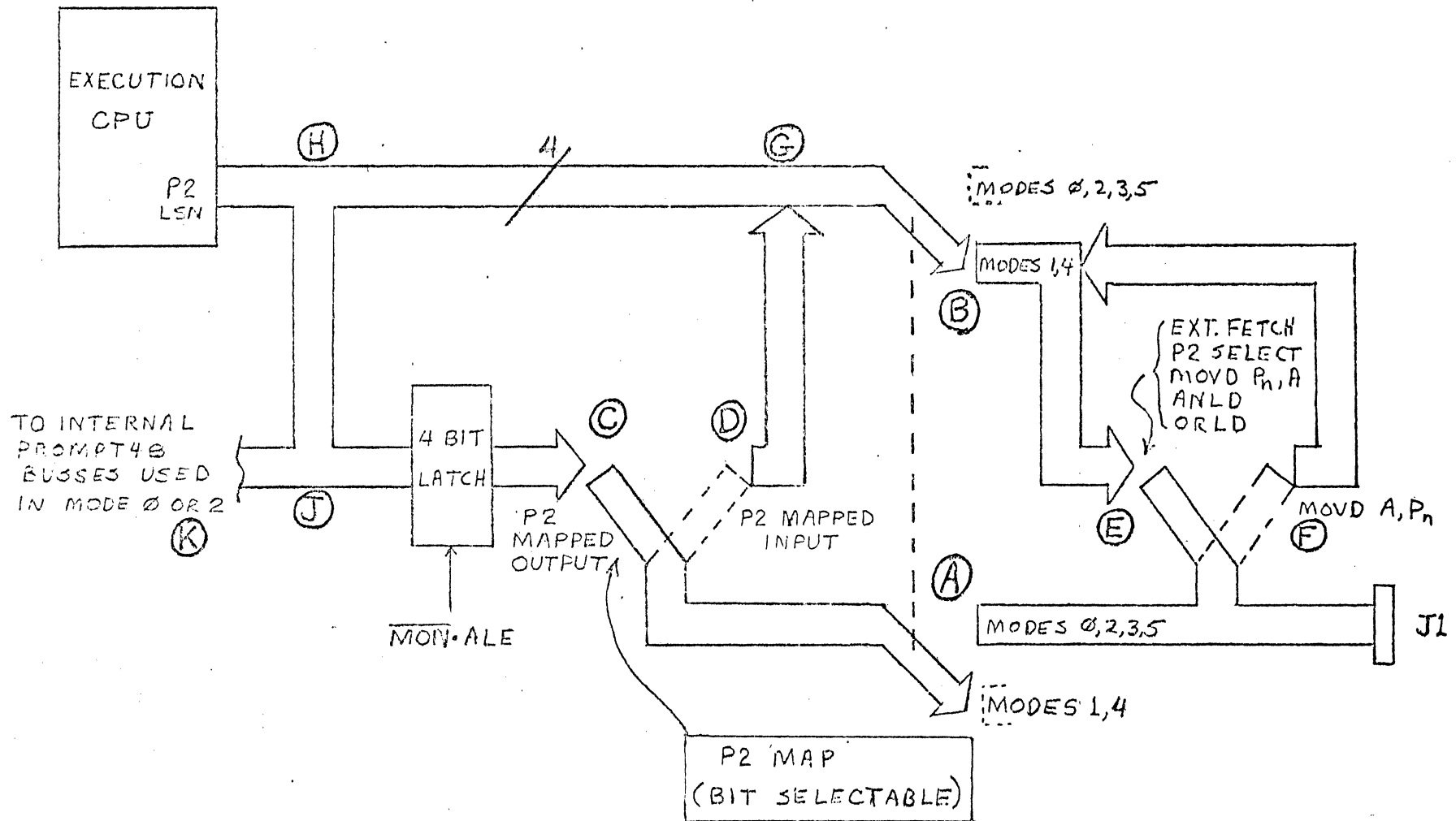


Figure 3 - PROMPT48 PORT 2 BUS STRUCTURE

RAM AND IO SELECTION. On MCS 48 systems, the MOVX command is used for data and IO transfers with R0 or R1 as a pointer. The addressing capability is then limited to 1 page (256). This is expanded to 4K by using P20-23, decoded to 16 page selects. Internally the PROMPT48 requires the first 1K addresses, i.e. P22 and 23 low. There are 2 consequences of this:

- a) To access the 256 byte user ram that's inside the PROMPT48, the user program must output 0's to P22 and 23. (drive low). P20 and P21 are 'don't care'.
- b) To select data and IO that has been bussed to J1, either P22 or P23 has to be driven high (logical 1). This deselects any internal memory.

Summarizing the above:

	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
	P23	P22	P21	P20	(R0) ←————→ (R1)							
Internal Prompt 48 →	0	0	X	X								
External Selection (Mode 1 or 4)	0	1	X	X								
	1	0	X	X								
	1	1	X	X								

EARLY VERSIONS OF PROMPT48:

- a) EXHIBIT GLITCHES ON PORT 2 AND BUS
- b) PERFORM READS ON EXPANSION BUS WHEN MONITOR IS OPERATING.
On some IO chips this can be a problem.
- c) 'HANGS UP' WHEN 'USER INT' KEY HELD WHILE SINGLE-STEPPING THROUGH THE PROGRAM.
- d) DON'T ALLOW USER PROGRAMS TO WRITE TO DATA RAM UNDER ACCESS MODES 0 OR 1. If it works under access mode 2, then you have this problem. First check that LSN of P2 < 3.

All of the above have been fixed by ECO. Contact the factory if you are experiencing problems.

TTY AND CRT PERIPHERALS ARE USED ONLY FOR DUMPING OR READING PAPER TAPE. The keyboard input is not a substitute for the keypad on the PROMPT48.

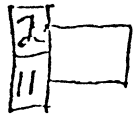
YOU MAY CONNECT A 40-PIN SOCKET TO J1 AND RUN A PROTOTYPE WITH THE PROMPT48. All of the major pins are wired to J1 except \overline{SS} (pin 5), EA (pin 7), Vcc (pin 40), and V_{DD} (pin 26). Caution: This does not make it an ICE module. It has limited breakpoints and no trace or symbolic debug.

GROSS SPEED DEGRADATION OCCURS WHEN 'GO WITH BREAKPOINTS'.

This is due basically because the operation is a replica of single-stepping. This means that after every instruction the monitor re-takes control, saves the processor state, checks the PC against the eight breakpoints, then restores the processor state and goes back to the User mode. - If your program has timing loops in it, you can easily think the processor has 'gone out to lunch'.

WHEN USING PROMPT48 SYSTEM CALLS, DO NOT 'GO WITH SGL. STEP' OR 'GO WITH BREAKPOINT'. The monitor is like a lot of us; it does not handle self-examination very well!

PINS 40 pin socket
 MATE TO ZI socket
 ALLOW FOR HANDLE TO BE OPENED
 AND CLOSED



PROMPT 48 SCRAMBLER SOCKET
 FOR 8700 PROGRAMMING

