



R6500 Microcomputer System APPLICATION NOTE

A CRT Monitor or TV Interface for AIM 65

PURPOSE

The twenty-column printer and display on the AIM 65 is sufficient for most AIM 65 applications, but there are occasions when a longer line length, more lines per display or a separate video display is desired. The hardware and software described in this note offer a method of directing the display to a standard TV set, a modified TV set or a CRT monitor requiring a composite video input.

REQUIRED EQUIPMENT

The following equipment is required to build and trouble shoot the hardware, and to assemble the software into PROM.

1. Dual trace oscilloscope - DC to 10 MH
2. High impedance input multimeter
3. PROM programmer
4. Assembler
5. Schematic for TV
6. See Parts List

HARDWARE DESCRIPTION

Figure 1 is the block diagram for the interface circuit. All necessary timing and control signals are provided by the 6845 CRTC chip, IC1. The CRT controller chip provides the refresh addresses (MA0-MA13) to retrieve display characters from the refresh RAM and the row address so the character generator (IC2) can define the dot pattern for each row of each character to be displayed. The CRTC also provides the video timing (Hsyn, Vsyn) and display enable. These timings are programmable by writing into various registers of the chip. As designed, the registers are accessed by first writing the register number into memory location \$8000 and then the desired value for that register into \$8001 (see Figure 2).

Under control of the CRTC, the character generator (IC2) converts the ASCII code and row address into a seven-bit pattern which is transferred to an internal shift register. This bit pattern is then clocked out serially to produce the dot pattern shown in Figure 3. Timing and load for the shift register are provided by the gated oscillator (IC8 and related circuitry). This gated oscillator is clocked by the $\phi 2$ signal.

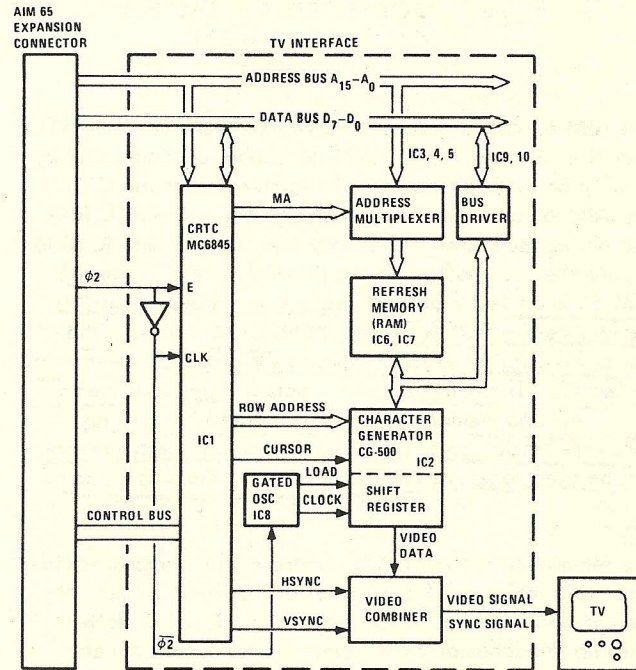


Figure 1. DISPLAY CONTROLLER INTERFACE BLOCK DIAGRAM

REG. #	REG FILE	CALCULATION	PROGRAMMED VALUE	
			DECIMAL	HEX
R0	H. TOTAL	64 X 1-64 USEC	64-1-63	\$3F
R1	H. DISPLAYED	40 X 1-40 USEC	40	\$28
R2	H. SYNC POSITION	50 X 1-50 USEC	50	\$32
R3	H. SYNC WIDTH	02 X 1-02 USEC	02	\$02
R4	V. TOTAL	23 X 704-16.18 MS	23-1-22	\$16
R5	V. TOTAL ADJUST	08 X 64-512 USEC	08	\$08
R6	V. DISPLAYED	16 X 704-11.26 MS	16	\$10
R7	V. SYNC POSITION	19 X 704-13.30 MS	19	\$13
R8	INTERLACE MODE			\$00
R9	MAX SCAN LINE ADDR		11-1-10	\$0A
R10	CURSOR START RASTER			\$4A
R11	CURSOR END RASTER		11	\$0B
R12	START ADDRESS (H)			\$00
R13	START ADDRESS (L)			\$00
R14	CURSOR (H)			\$00
R15	CURSOR (L)			\$00
R16	LIGHT PEN (H)			\$00
R17	LIGHT PEN (L)			\$00

CHARACTER ROW PERIOD = 11 X 64 = 704 USEC
VERTICAL PERIOD = (23 X 704) + (8 X 64) = 16.69 MS
TYPICAL 40 X 16 SCREEN FORMAT INITIALIZATION OF CRTC

Figure 2. CRTC REGISTER SUMMARY TABLE

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