

Loading Basic with the 88-2SIO Board

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88-2SIO Bootstrap Loader

This is the standard Altair Basic 3.X and 4.X 88-2SIO Bootstrap Loader, to be toggled in via the front panel. This will load from the 88-2SIO's Port 0. If your paper tape has my modified Checksum Loader, then you can also load from the 88-2SIO's Port 1, as shown below. Note that the byte at address 011 changes with the version of Basic, and the byte at 012 changes for different sizes of Basic. Note also that the sense switches are set differently depending on the version of Basic.

Octal Address	88-2SIO Port 0 Octal Data	88-2SIO Port 1 ¹ Octal Data	Mnemonic	Comment
000	076	076	MVI A,ARESET	ACIA Reset command
001	003	003		
002	323	323	OUT CTRL	reset ACIA
003	020	022		
004	076	076	MVI A,AINIT	Initialize ACIA
005	025	025		(025 for 1 stop bit, 021 for 2 stop bits)
006	323	323	OUT CTRL	
007	020	022		
010	041	041	LXI H,LADDR	Last address of checksum loader
011	302	302 <---(256 for Basic 3.X, 302 for Basic 4.X)		
012	077	077 <---(017 for 4K, 037 for 8K, 077 for Extended Basic)		
013	061	061	LXI SP,STACK	Used for the following return instructions
014	032	032		
015	000	000		
016	333	333	IN ASTAT	Get ACIA status
017	020	022		
020	017	017	RRC	Receive Data Available is bit 0
021	320	320	RNC	Loop back to 013 if no data available
022	333	333	IN ADATA	Read ACIA data
023	021	023		
024	275	275	CMP L	Is it a leader byte?
025	310	310	RZ	Yes: loop back to 013
026	055	055	DCR L	Next address, and set Z flag if done
027	167	167	MOV M,A	Write data to memory
030	300	300	RNZ	Loop back to 013 if not done
031	351	351	PCHL	Go execute the loaded code
032	013	013		Stack for the above returns
033	000	000		

¹ Requires modified Checksum Loader on the Basic tape

Basic 3.X Sense Switch Settings

The Basic 3.X loader uses the same port for loading Basic and for the Console.

Load & Console	A15	A14	A13	A12	A11	A10	A9	A8
SIOA,B,C (not rev 0)	0	0	0	0	0	0	0	0
SIOA,B,C (rev 0)	0	1	0	0	0	0	0	0
88-PIO	0	0	1	0	0	0	0	0
4PIO	0	0	0	1	0	0	0	0
88-2SIO-0 (1 stop bit)	0	0	0	0	1	1	0	0
88-2SIO-0(2 stop bits)	0	0	0	0	1	0	0	0

Basic 4.X Sense Switch Settings

The Basic 4.X loader makes a distinction between the Load Source and the Console Device, allowing you to load from one device, and use another for the Basic console.

Load Source	A11	A10	A9	A8	Console Device	A15	A14	A13	A12
88-2SIO-0 (2 stop bits)	0	0	0	0	88-2SIO-0 (2 stop bits)	0	0	0	0
88-2SIO-0 (1 stop bit)	0	0	0	1	88-2SIO-0 (1 stop bit)	0	0	0	1
SIO	0	0	1	0	SIO	0	0	1	0
ACR	0	0	1	1	(not allowed)	0	0	1	1
4PIO	0	1	0	0	4PIO	0	1	0	0
PIO	0	1	0	1	PIO	0	1	0	1
HSR ¹	0	1	1	0	(not allowed)	0	1	1	0

- (1) Martin Eberhard modification: this setting will load from 88-2SIO port 1 with 1 stop bit, for example to load from a high-speed paper tape reader such as the Ghilmetti FER204A.

4.X Loader Error Messages

Error Code	Meaning
C	Checksum error. Bad tape data.
M	Memory error. Data won't store properly.
O	Overlay error. Attempt to overwrite checksum loader.
I	Invalid Load source. Illegal sense -switch setting.

Basic 4.X Initialization Dialog

4K Basic

MEMORY SIZE? (<RETURN> to use all memory. Basic uses 3.4K.)
 TERMINAL WIDTH? (<RETURN> for 72 columns)
 SIN? (Y saves SIN, SQR and RND. N deletes SIN and brings next question.)
 SQR? (Y saves SQR and RND. N deletes SQR and brings next question.)
 RND? (Y saves RND, N deletes RND.)

8K Basic

MEMORY SIZE? (<RETURN> to use all memory. Basic uses 6.2K.)
 TERMINAL WIDTH? (<RETURN> for 72 columns)
 WANT SIN-COS-TAN-ATN? (Y or N)

Extended Basic

MEMORY SIZE? (<RETURN> to use all memory. Basic uses 14.6K.)
 LINEPRINTER? (O for 80LP, C for C700, Q for Q70)
 WANT SIN-COS-TAN-ATN? (Y or N)