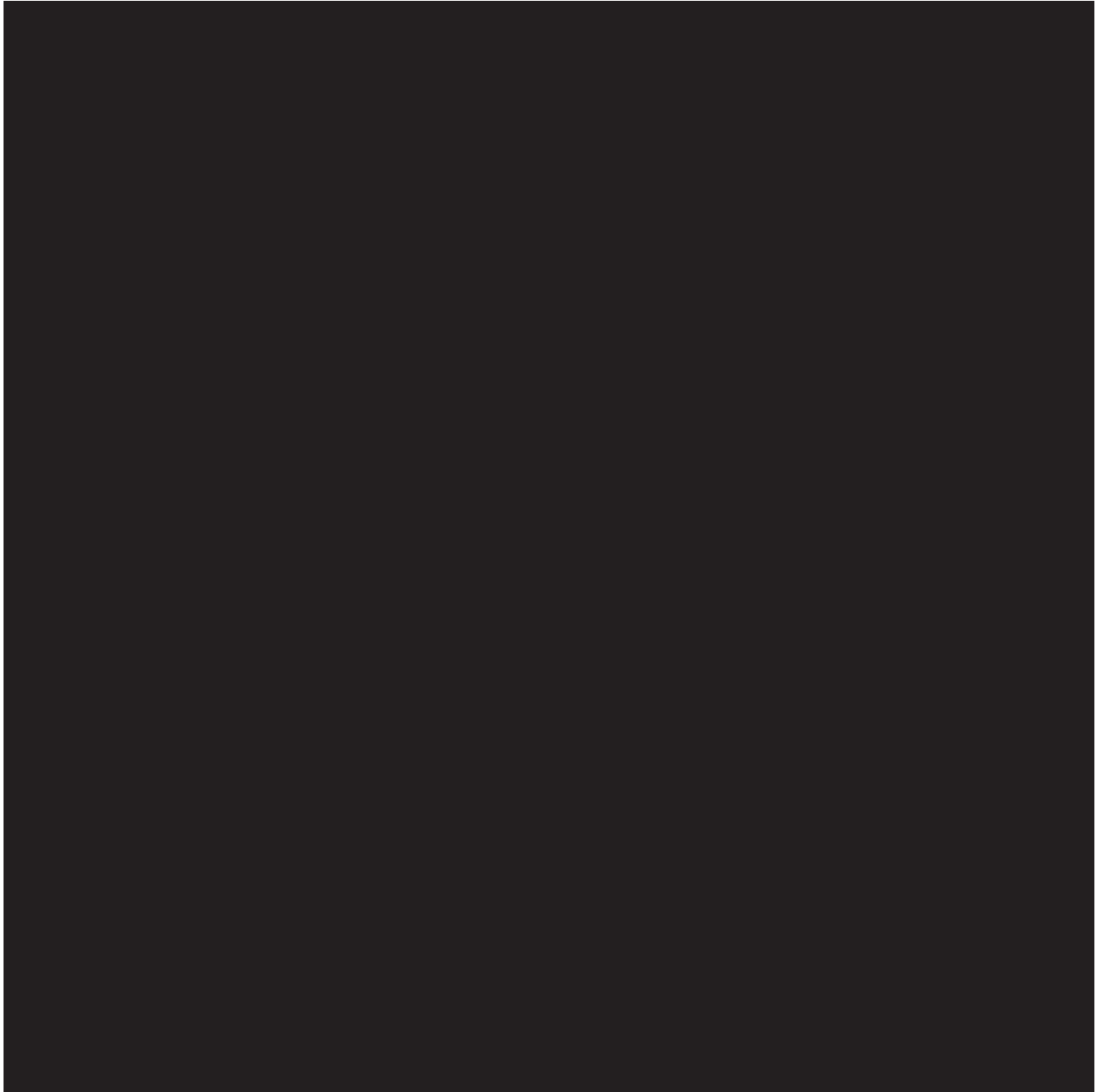


BR736/D

M68HC11EVBU Universal Evaluation Board



GENERAL DESCRIPTION

The MC68HC11 MCU device is an advanced single-chip MCU with on-chip memory and peripheral functions. Refer to the MC68HC11 MCU data sheet for additional device information. To demonstrate the capabilities of this MCU, the EVBU was designed along with a monitor/debugging program called BUFFALO (Bit User Fast Friendly Aid to Logical Operations). This monitor program is contained in MCU ROM.

The EVBU provides a low cost tool for debugging/evaluation of MC68HC11A8, E9, 711E9, 811A8, and 811E2 MCUs. The EVBU is not intended to be a replacement for a much more powerful and flexible tool, such as the Motorola M68HC11EVM Evaluation Module.

The debugging/evaluation operation allows the user to debug user code under control of the BUFFALO monitor program. User code can be assembled in one of two methods. The first method is to assemble code using the line assembler in the BUFFALO monitor program.

The second method is to assemble code on a host computer and then download the code to the EVBU user RAM via Motorola S-records. The monitor program is then used to debug the assembled user code.

Overall debugging/evaluation control of the EVBU is provided by the monitor program via terminal interaction. RS-232C terminal I/O port interface circuitry provides communication and data transfer operations between the EVBU and external terminal/host computer devices.

The EVBU resident M68HC11E9 MCU device (shown in Figure 1) is factory configured for the single-chip mode of operation. The EVBU can be reconfigured for either the expanded-multiplexed, special-bootstrap, or special-test modes of operation. For expanded-multiplexed and special-test modes of operation, additional circuitry must be implemented on the EVBU wire-wrap area to support the two modes. The EVBU can be reconfigured for the special-bootstrap mode of operation without additional circuitry.

An HCMOS real-time clock/calendar, 32 x 8 static RAM, and a synchronous serial interface for MCU communications is accomplished via a user supplied MC68HC68T1 device. The EVBU uses a +5 volt RS-232C driver/receiver device to communicate to a terminal via the EVBU terminal I/O port. The terminal I/O port baud rate defaults to 9600 baud via the MCU SCI. This baud rate can be changed by software by reprogramming the MCU BAUD register.

A wire-wrap area is provided on the EVBU for MCU custom interfacing. With the wire-wrap hole pattern provided, dual-in-line package (DIP) device wire-wrap sockets, strip sockets, headers, and connectors can be installed. Wire-wrap components can be installed on the top side of the EVBU, and wire wrapping can be performed on the bottom side of the EVBU. MCU interfacing is accomplished via the MCU I/O port connector to the wire-wrap area.

The EVBU requires a user-supplied +5 Vdc power supply and an RS-232C compatible terminal for operation. An RS-232C compatible host computer is used with the EVBU terminal I/O port to download Motorola S-records via the BUFFALO monitor commands.

Table 1 lists the available monitor BUFFALO program commands, along with a brief description of each command.

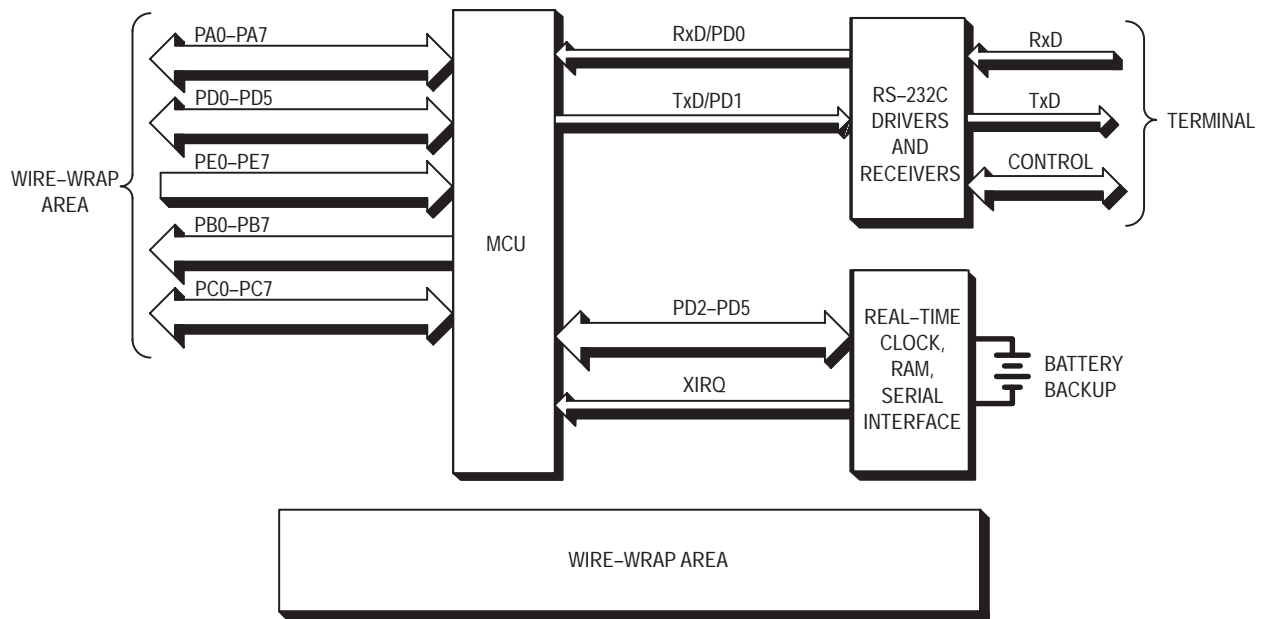



Figure 1. EVBU Block Diagram

FEATURES

- ★ Economical Means of Debugging User Assembled Code and Evaluating MC68HC11A8, E9, 711E9, 811A8, and 811E2 Microcontroller Unit (MCU) Devices
- ★ One-Line Assembler/Disassembler
- ★ Host Computer Downloading Capability
- ★ MC68HC11 MCU Based Debugging/Evaluating Circuitry
- ★ MC68HC68T1 Real-Time Clock + RAM with Serial Interface Peripheral Circuitry
- ★ RS-232C Compatible Terminal I/O Port
- ★ Wire-Wrap Area for Custom Interfacing
- ★ Single (+5 Vdc) Input Power Source Requirements

Table 1. Monitor (BUFFALO) Commands

Command	Description
ASM [<address>]	Assembler/Disassembler
<i>ASSEM</i>	<i>(Same as ASM)</i>
BF <addr1> <addr2> <data>	Block Fill Memory with Data
BR [-][<address>]...	Breakpoint Set
<i>BREAK</i>	<i>(Same as BR)</i>
BULK	Bulk Erase EEPROM
<i>BULKA</i>	<i>(Same as BULKALL)</i>
BULKALL	Bulk Erase EEPROM + CONFIG Register
CALL [<address>]	Executive Subroutine
<i>COPY</i>	<i>(Same as MOVE)</i>
<i>DUMP</i>	<i>(Same as MD)</i>
<i>ERASE</i>	<i>(Same as BULK)</i>
<i>FILL</i>	<i>(Same as BF)</i>
G [<address>]	Execute Program
<i>GO</i>	<i>(Same as G)</i>
HELP	Display Monitor Commands
<i>HOST</i>	<i>(Same as TM)</i>
LOAD <T>	Download (S-Records) via Terminal Port
<i>MEMORY</i>	<i>(Same as MM)</i>
MD [<addr1> [<addr2>]]	Dump Memory to Terminal
MM [<address>]	Memory Modify
MOVE <addr1> <addr2> [<dest>]	Move Memory to New Location
P	Proceed/Continue from Breakpoint
<i>PROCEED</i>	<i>(Same as P)</i>
<i>RD</i>	<i>(Same as RM)</i>
<i>READ</i>	<i>(Same as MOVE)</i>
<i>REGISTER</i>	<i>(Same as RM)</i>
RM [p,x,y,a,b,c,s]	Register Modify/Display User Registers
STOPAT <address>	Stop at Address
T [<n>]	Trace \$1-\$FF Instructions
TM	Enter Transparent Mode
<i>TRACE</i>	<i>(Same as T)</i>
VERIFY <T>	Compare Memory to Download Data via Terminal Port
XBOOT [<address1> [<address2>]]	Send Program to Another M68HC11 via Bootstrap Mode
?	<i>(Same as HELP)</i>
<i>[<address>]/</i>	<i>(Same as MM [<address>])</i>

Motorola reserves the right to make changes without further notice to any products herein to improve reliability, function or design. Motorola does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others. Motorola products are not authorized for use as components in life support devices or systems intended for surgical implant into the body or intended to support or sustain life. Buyer agrees to notify Motorola of any such intended end use whereupon Motorola shall determine availability and suitability of its product or products for the use intended. Motorola and  are registered trademarks of Motorola Inc. Motorola Inc. is an Equal Opportunity/Affirmative Action Employer.

Literature Distribution Centers:

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Center; 88 Tanners Drive, Blakelands Milton Keynes, MK145BP, England.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; P.O. Box 80300; Cheung Sha Wan Post Office; Kowloon Hong Kong.

JAPAN: Nippon Motorola Ltd.; 3-20-1 Minamiazabu, Minato-ku, Tokyo 106 Japan.



MOTOROLA

M68HC11EVBU
BR736/D