# BCS Utility Subroutines for HP 59310A/B Bus

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## INTRODUCTION

The BCS Bus Utility Library is a special relocatable library for use with the 59310B BUS INPUT/OUTPUT Interface Kit and the Basic Control System (BCS) Relocating Loader.

The library provides utility routines which are useful in using BUS compatible devices when programming in FORTRAN or HP Assembly Language.

The library part number is 59310-60050.

## SUBROUTINE DOCUMENTATION FORMAT

Each subroutine is documented in a standard format. The following items appear for each subroutine:

| | |
|---|---|
| NAME | The name of the subroutine as it appears in the NAM record. |
| ENTRY POINTS | The symbolic label of entry point(s) to the routine. Only included if the entry point is different from the name or if the subroutine has more than one entry point. If the subroutine has more than one entry point, the remaining portion of the documentation format is repeated for each entry point. |
| PURPOSE | The use of the routine. |
| PARAMETERS | A description of each parameter to be passed to the routine or passed back from the routine including what the parameter specifies, its type and range of values. |
| OPERATION | A brief description of how the routine performs its functions. |
| EXTERNAL REFERENCE | A list of the symbolic labels of entry points of other subroutines used by the subroutine. |

## LOADING SEQUENCE

The Bus Utility Library should be loaded before the standard FORTRAN Libraries as the Bus routines may require use of routines contained in the FORTRAN Libraries.

## SUBROUTINE FORMAT SUMMARY

CIOC (*unit ref. #, request code, status buffer, buffer address, buffer length*)

CMD (*unit ref. #, addr string, data string, . . .*)

DEVCL (*unit ref. #*)

LOCL (*unit ref. #*)

READB (*unit ref. #, format, array, # reads, # elements, buffer, record size)*

REMOT (*unit ref. #, mode*)

## CIOC

PURPOSE: To allow direct calls to the BCS input/output control module (IOC) from FORTRAN or ALGOL programs.

CALLING SEQUENCE:

Assembly:

```
        JSB   CIOC
        DEF   RTN       pointer to return point
        DEF   UREF#     addr of unit reference #
        DEF   RCODE     addr of request code
        DEF   SBUF      addr of status buffer
        DEF   BUFA      addr of buffer address
        DEF   BUFL      addr of buffer length
RTN     return point
```

NOTE

It is not necessary to use CIOC when calling in assembly language. Use calls to .IOC. directly.

FORTRAN:

CALL CIOC (*unit ref. #, request code, status buffer, buffer address, buffer length*)

PARAMETERS:

*unit ref. #*
specifies: bits 0-5 of word 2 of the calling sequence to .IOC.

type: integer
range: 1 to 63 as allowed by IOC


*request code*
specifies: bits 6-15 of word 2 of the calling sequence to .IOC.

type: integer
range: 0000 to 7777 octal as allowed by IOC

*status buffer*
specifies: a 3 word array to which the information contained in the A & B registers is stored upon return from the call to .IOC.
type: integer array (dimension 3)
format:
IA(1) = contents of A reg
IA(2) = contents of B reg
IA(3) = 0:normal return
= neg:reject return

*buffer address*
specifies: word 4 of the call to .IOC.
type: integer array (dimension as required)

*buffer length*
specifies: word 5 of the call to .IOC.
type: integer
range: as allowed by IOC

OPERATION:

CIOC converts the FORTRAN calling sequence to the calling sequences required by IOC. Upon return from IOC, CIOC puts the contents of the A & B registers into the status buffer and sets IA(3) to indicate a normal or reject return.

EXTERNAL REFERENCES: .ENTR,.IOC.

## CMD

PURPOSE: To output addresses, universal commands, and ASCII data to a specified bus or device.

CALLING SEQUENCE:

Assembly:

```
    JSB     CMD
    DEF     *+1+N       pointer to return point
P1  DEF     ADDR1       addr of unit reference #
P2  DEF     ADDR2       addr of first addr string
P3  DEF     ADDR3       addr of first data string
P4  DEF     ADDR4       addr of second addr string
P5  DEF     ADDR5       addr of second data string
P6  DEF     ADDR6       addr of third addr string
```

FORTRAN:

CALL CMD (*unit reference #, addr string, data string, addr string, data string, addr string*)

NOTE

A variable number of parameters may be passed:

Two is minimum.
Six is maximum.

PARAMETERS:

*unit reference #*
specifies: The equipment table (EQT) entry of the bus to which the *addr strings* and *data strings* are to be sent.

type: integer
range: 1 to 63 (value determined during PCS generation)

*addr string*
specifies: an array containing a string of bus addresses or universal commands
type: integer array (string constant)
format: word 1 contains a positive integer equal to the number of bytes contained in words 2 thru n.
word 2 thru n contain the string. Two bytes are stored per word. Odd # bytes are in the upper half (bit 15-8) and even # bytes are in the lower half.

*data string*
specifies: an array containing a string of data bytes to be sent to a device on the bus
type: integer array (string constant)
format: same as for *addr string*

OPERATION

CMD outputs to the specified bus one to five strings as specified in the calling sequence. The strings specified by parameters 2, 4, & 6 are outputted as bus addresses or as universal command (ATN is low). The strings specified by parameters 3 & 5 are outputted as device data (ATN is high). Each *data string* must be preceeded by an *addr string* which addresses the appropriate device(s) to talk and listen. Execution of CMD is terminated with the last parameter in the current calling sequence.

CMD requires the use of the BCS driver D.37A or D.37B.

EXTERNAL REFERENCES: .ENTR,.IOC.

## DEVCL

PURPOSE: To clear all devices on a specified bus.

CALLING SEQUENCE:

Assembly:

```
JSB    DEVCL
DEF    *+2          pointer to return point
DEF    ADDR1        addr of unit reference #
return
```

FORTRAN:

CALL DEVCL (*unit reference #*)

PARAMETERS:

*unit reference #*
specifies: The equipment table (EQT) entry of the bus on which the devices are to be cleared.
type: integer
range: 1 to 63 (value determined during PCS generation)

OPERATION:

DEVCL causes the bus universal command "device clear" (DCL)
to be sent to all devices on the specified bus.
DFVCL requires the use of the BCS driver D.37A or D.37B.

NOTE

Some devices may not respond to the DCL command.

EXTERNAL REFERENCES: .ENTR,CMD

## LOCL

PURPOSE: To set the devices on a specified bus to local control.

CALLING SEQUENCE:

Assembly:

```
JSB    LOCL
DEF    *+2        pointer to return point
DEF    ADDR1      addr of unit reference #
return
```

FORTRAN

CALL LOCL (*unit reference #*)

PARAMETERS:

*unit reference #*
specifies: The equipment table (EQT) entry of the bus to be switched to local
type: integer
range: 1 to 63 (value determined during PCS generation)

OPERATION

LOCL causes the bus signal line REN to be set high on the specified bus by making a call to .IOC. with a request code of 0302.
CMD requires the use of the BCS driver D.37A or D.37B.

EXTERNAL REFERENCES: .ENTR,.IOC.

## READB

PURPOSE: To read and convert data to real internal format using double buffering.

CALLING SEQUENCE:

Assembly:

```
JSB    READB
DEF    *+8        pointer to return point
DEF    ADDR1      addr of unit ref. #
DEF    ADDR2      addr of format
DEF    ADDR3      addr of array
DEF    ADDR4      addr of # of reads
DEF    ADDR5      addr of # of elements
DEF    ADDR6      addr of buffer
DEF    ADDR7      addr of record size
return
```

FORTRAN:

CALL READB (*unit ref. #, format, array, #of reads, #of elements, buffer, record size*)

PARAMETERS:

*unit reference #*
specifies: The equipment table (EQT) entry of the device from which the readings are to be taken.

type: integer
range: 1 to 63 (value determined during PCS generation)

*format*
specifies: an array containing a FORTRAN format specification including the parenthesis
type: integer array
format: word 1 contains a positive integer equal to the number of bytes contained in words 2 thru n.
word 2 thru n contain the string. Two bytes are stored per word. Odd # bytes are in the upper half (bit 15-8) and even # bytes are in the lower half.

*array*
specifies: an array into which the converted data is stored
type: real array
dimension: must be equal to or greater than *# of reads* x *# of elements*

*# of reads*
specifies: The number of records to be read from the specified unit.
type: integer
range: positive non zero

*# of elements*
specifies: The number of data elements to be converted in each record.
type: integer
range: positive integer

*buffer*
specifies: A real or integer array into which two input records are buffered.
type: array
dimension: number of words in array must be equal to or greater than *record size* + 1

*record size*
specifies: The number of characters in each record.
type: integer
range: A positive non zero value equal to or greater than the number of characters in each record.

OPERATION:

READB sets up two buffers and initiates reads into each alternately, converting the contents of one buffer while the other is being filled.

EXTERNAL REFERENCES: .ENTR,.IOC.,FRMTR,.DIO.,.IOR.,.IOI.

## REMOT

PURPOSE: To set the devices on a specified bus to remote control.

CALLING SEQUENCE:

Assembly:

```
JSB    REMOT
DEF    *+3        pointer to return point
DEF    ADDR1      addr of unit reference #
DEF    ADDR2      addr of mode
return
```

FORTRAN:

CALL REMOT *(unit reference #, mode)*

PARAMETERS

*unit reference #*
specifies: The equipment table (EQT) entry of the bus to be switched to remote.
type: integer
range: 1 to 63 (value determined during PCS generation)

*mode*
specifies: mode of remote operation
type: integer
range: 0: allow local reset of individual devices
1: disable local reset
default value: 0

OPERATION:

REMOT causes the bus signal line REN to be set low on the specified bus by making a call to .IOC. with a request code of 0303. If the *mode* parameter is 1, the universal command "local lock out" (LLO) is sent to all devices. REMOT requires use of the BCS driver D.37A or D.34B.

NOTE

Some devices may not respond to LLO.

EXTERNAL REFERENCES: .ENTR,.IOC.,CMD

## READER COMMENT SHEET

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**FOR HP 59310A/B BUS**

**59310-90050** **MAR 1976**

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