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Burroughs Corporation

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B1800/B1700 FORTRAN77 COMPILER

PRODUCT SPECIFICATION

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SBP 1968 8-76

BURROUGHS CORPORATION
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INTRODUCTION

This specification describes the FORTRAN77 language compiler, based on Revision B of the Burroughs FORTRAN77 Corporate Standard, which produces FORTRAN77 S-Language code for execution on B1800/B1700 systems.

RELATED PUBLICATIONS

TITLE	NUMBER
FORTRAN77 Corporate Standard	1283 0048
FORTRAN77 S-Language	2222 2749
B1800/B1700 FORTRAN77 Reference Manual	
Compiler Control Images	1955 2959

GENERAL DESCRIPTION

LANGUAGE

The language acceptable as input to this compiler is based on the Burroughs FORTRAN77 Corporate Standard.

INPUT

SOURCE INPUT FILES

The compiler uses one or more source input files to make a complete, updated FORTRAN77 program. Punched cards, disk, diskpack, or magnetic tape can be specified as source language input media for a single input file or for a master file. If two input files are used, the compiler merges them on a sequence number basis.

Records of input files are 80 bytes in length. Default blocking is used for all input files. The format of each 80 byte record is defined in the FORTRAN77 Corporate Standard.

SOURCE LIBRARY FILES

FORTRAN77 source text which is common to several programs may be included in a program by use of a $INCLUDE (CCI). A library file is included in the logical program to be compiled but not in a new source language file if one is created unless $INCLNEW is also specified.

ICM LIBRARY FILES

FORTRAN77 ICMs (Independently Compiled Modules) previously compiled by the FORTRAN77 compiler and saved in an ICM library file may be included into the logical program by use of the CCI option $USEICM.

INTRINSIC LIBRARY FILES

Intrinsics from the ICM library file FORTRAN77/INTRINSICS are automatically bound into the logical program as needed. A different Intrinsic (ICM) library file may be specified by the CCI option $INTRINSICS.

OUTPUT

NEW SOURCE LANGUAGE FILES

An updated master symbolic output file, acceptable as input to the FORTRAN77 Compiler, may be created by use of the Control Card Image (CCI) option NEW.

NEW ICM LIBRARY FILES

A new ICM library file, acceptable as input to the FORTRAN77 compiler, may be created by use of the CCI option $ICM. All ICMs included through the CCI option $USEICM or correctly compiled by the compiler from input source images, and which have not been deleted by the CCI option $REMOVEICM will be included in the new ICM library file (even if they are not bound into the logical program). Separate ICMs are generated for each program unit and entry point.

OUTPUT LISTINGS

Listings provided by this compiler include:

- Diagnostic messages
- Input source language (may be inhibited)
- Indication of inserted, replaced, or deleted lines
- Summary information
- Cross reference listing (upon request)

GENERATED CODE

The object code generated is written to disk.

LABEL EQUATE INFORMATION

Internal Filename	External Filename	Function
CARD	CARD	Source or update input. Default device is card reader.
SOURCE	SOURCE	Source program input. Default device is disk.
NEWSOURCE	NEWSOURCE	Updated source program output. Default device is disk.
LINE	LINE	Printed output listing. Default device is printer.
CODE	program-name	Object code file.
ERRORS	ERRORS	Printed diagnostic listing. Default device is printer.
ICM	ICM	Independent Code Module Library Output.
INTRINSICS	FORTRAN77/INTRINSICS	Intrinsic Library input.

DEBUGGING AND DIAGNOSTIC FACILITIES

The following compile time facilities are available:

A. Syntax error messages and warnings are printed after the line in error. A "↕" indicates location of the possible error.

B. Various informational messages are printed.

C. No code is generated if syntax errors are present.

All error messages are specific and are sufficient to determine the cause of the error.

COMPILER LIMITS

The following is a list of all currently recognized compiler limits.

1023 Bytes	Data dictionary entries.
7 Bytes	Levels of subscripting.
1023 Bytes	Code segments.
3712 Bytes	Maximum Record size that may be declared in a file statement.

COMPILER CONTROL IMAGES (CCI)

The CCI ($ in column 1) is used to control certain options which are available during the compilation process.

Any number of CCIs may be used. With the few exceptions (noted separately) options may appear anywhere in the source files and become active or inactive at that point.

A Boolean option may be "SET" on, "RESET" off.

A stack is associated with each Boolean option. Whenever a Boolean option is SET or RESET its old value is pushed into a stack and may be retrieved for later use.

"CLEAR" and "POP" are also used to control the value of Booleans.

CCI OPTIONS

The following CCI options have been selected from those specified in the Compiler Control Images Standard.

SET <b option>
Sets <b option> to "ON"

<b option>
Sets <b option> to "ON"

RESET <b option>
Sets <b option> to "OFF"

POP <b option>
Sets <b option> to a previously stacked value

CLEAR
Sets all boolean options to "OFF" except MERGE and, if NEWSOURCE is open, NEW. All previously stacked values are discarded.

<b option> - BOOLEAN OPTIONS

AUTOBIND [<mainline>]
Default = set. Causes ICMs to be bound together into a codefile. <mainline> specifies which <mainline> program unit is to be used (by default, the first one compiled is used).

DELETE
Causes the compiler to ignore source language images and CCIs from the secondary (MERGEed) input (disk) until disabled. Images are ignored for compilation purposes and are not made part of a new output SOURCE file.

DOUBLE
Causes the output listing to be printed in a double-spaced format.

ERRORLIST
Default = set if SW 1=1 else reset. Causes syntax error messages and warning messages to be listed separately to file ERRORS.

ICM [<filename>]
Default = reset. Creates an ICM library file consisting of those ICMs either compiled or inserted via CCI option USEICM. <filename> will be the name of the ICM library created if this CCI option is processed prior to inclusion of any ICM's.

INCLNEW
Default = reset. Causes those input source images included by the CCI option INCLUDE to be output to NEWSOURCE. CCI option NEW must also be set for this option to be effective.

LIST
Default = set. Creates an output listing of the source image input with error and warning messages inserted where required. This option is SET on by default and must be RESET if the listing is not wanted.

LISTDELETED
When LIST option is set, causes LISTing of DELETED images.

LISTDOLLAR
When LIST option is set, causes LISTing of CCIs. This option is set on by default.

LISTINCL
Default = reset. When LISTINCL option is set, causes LISTing of INCLUDEd images.

LISTOMITTED
When LIST option is set, causes LISTing of OMITTED images.

LISTP
Causes the compiler to print a listing of images from the primary (CARD) source file as they are read.

MAP
Default = reset. Causes the compiler to include relative addresses of allocated variables in the program listing.

MERGE
Causes a secondary (usually disk) file to be opened by the compiler and merged with the primary (card) file. Once SET, this option cannot be RESET, POP'ed, or SET again. CLEAR does not affect this option.

NEW
Creates a NEW output source file with changes, if any, entered through use of the MERGE option and DELETE options. Compiler Control Images are not included in the new file unless they are marked with an additional $ sign in column 2. Once SET, this option may not be RESET, POP'ed, or SET again. CLEAR may reset the NEW option but only if no records have yet been written.

NOBOUNDS
Default = reset. Causes compiler to generate code that will not check variable subscripts for validity. This option may not be SET, RESET or POPed between program units.

OMIT
Causes the compiler to ignore source language images and Compiler Control Images from the secondary (MERGE'd) input (disk) until disabled. Images are ignored for compilation purposes but they are included in a new output SOURCE file, if one is being produced.

SEQCHECK
Causes the compiler to check for sequence errors and print a warning message for each sequence error detected.

SEQUENCE
Causes the compiler to assign new sequence numbers to the source language images accepted for compilation or inclusion in a new source file. Sequence numbers begin with the value of the sequence base integer associated with this option. If the sequence base integer is not specifieciated it begins at 00000100. Sequence numbers are incremented by the value of the sequence increment integer associated with this option. If the sequence increment integer is not specified sequence numbers are incrementec by 100.

SUMMARY

Causes the compiler to print a summary of the information about the compilation normally included as part of a LISTing. Needed when LIST is RESET.

XREF
Causes the compiler to print a cross-reference listing for the source language accepted for compilation. Unless ctherwise specified, cross-reference names are associated by line number.

XSEQ
Used in conjunction with the XREF option, causes cross-reference names to be associated by sequence number.

MISCELANEOUS COMPILER CONTROL OPTIONS

integer
Associated with the SEQUENCE option, the integer is assigned to the sequence base.

+integer
Associated with the SEQUENCE option, the integer is assigned to the sequence increment.

DYNAMIC = integer
integer = size of dynamic memory to be allocated to the codefile in 4-byte word units. Default = total required for all data pages to be present concurrently.

ERRORLIMIT = integer
integer specifies number of errors found before compiler ceases to report further errors. Default = no limit.

INTERPRETER = <filename>
<filename> specified which interpreter is to be used with the codefile generated. Default = "FORTRAN77/INTERP2M" on the diskpack where the compiler is located.

INTRINSICS = <filename>
<filename> specifies which ICM library file contains the FORTRAN77 system intrinsics. Default = "FORTRAN77/INTRINSICS" on the diskpack where the compiler is located.

INCLUDE <filename> [<seq-1> [- <seq-2>]]
Include those records from <filename> specified by the sequence range <seq-1> (default=first record) to <seq-2> (default=last record) at this point in the compilation.

OPTIMIZE [= <number>]
Default = 1. If OPT=0, line number s-ops are included in the code compiled, thus any dumpfile generated will reflect the line number being executed when the error occured. If OPT > 0, the line number s-ops are suppressed. No other optimization is currently available.

PAGE
If a LIST is being produced, causes the compiler to skip to the top of the next page. This option is reset automatically as soon as it is used.

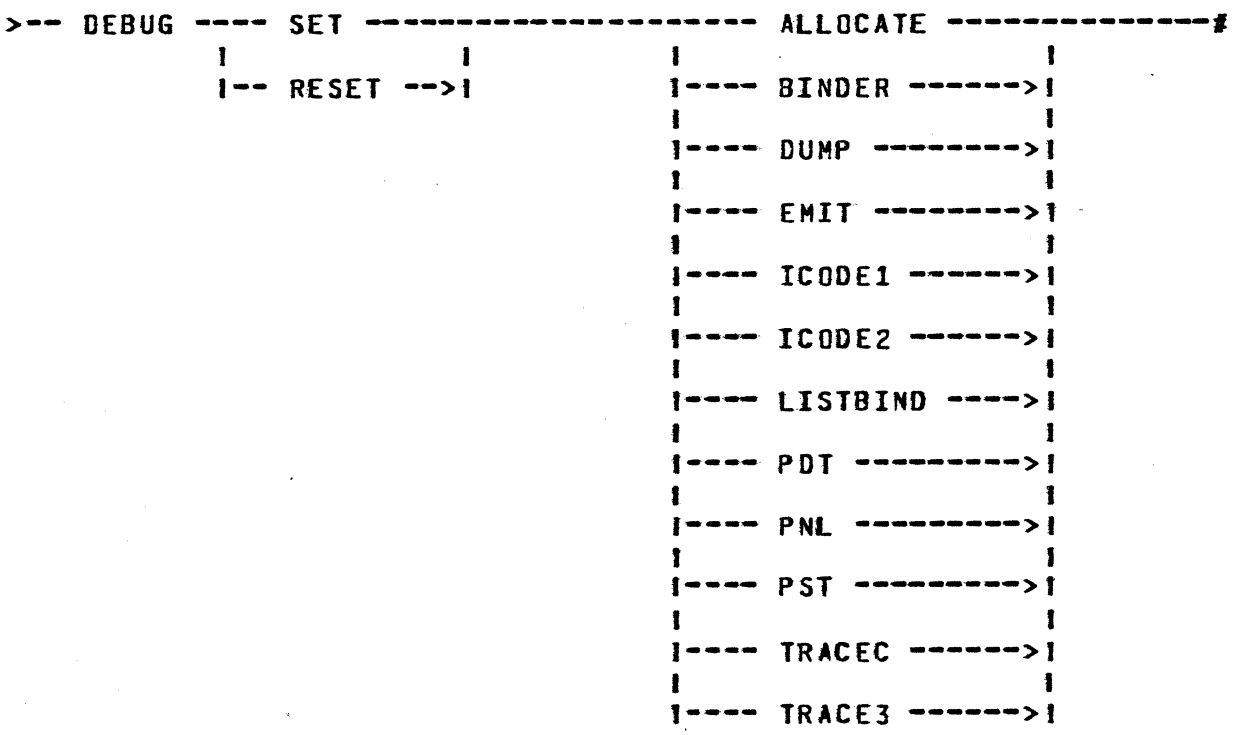
REMOVEICM <icm-list>
<icm-list> is a list of ICMs tc be deleted (from the set of ICMs currently compiled or inserted via USEICM) to avoid multiple ICMs with the same name.

USEICM <filename> <icm-list>
<icm-list> may either be a list of ICMs or "=" meaning all ICMs in the ICM library <filename> to be used in the current compilation or to be included in a new ICM library file being created.

VOID [<seq>]
Allowed only in primary (card) file images, this option causes a secondary file image bearing the same sequence number to be ignored for compilation purposes and excluded from the output new source file, if any. If <seq> is specified subsequent images are also ignored until a secondary (disk) file image is encountered with a sequence number value greater than <seq>.

OPTIONS FOR USE BY COMPILER DEVELOPMENT PERSONNEL

Syntax:



Semantics:

Causes the compiler to activate a monitor function.

ALLOCATE
Suppresses the step of register allocation.

BINDER
Causes the binder to look for ODT input. Different binder tables are displayed for those ICMs specified by the ODT input:

SIT if SW 1 = 2
CODE if SW 2 = 1
DATA if SW 3 = 1
TVI if SW 4 = 1

DUMP
Creates a dumpfile of the compiler.

EMIT
When reset, disables the generation of the ICM.

ICODE1
Causes the LISTing of intermediate code prior to register allocation.

ICODE2
Causes the LISTing of intermediate code after register allocation.

LISTBIND
When reset, suppresses the LISTing generated by the BINDER.

PDT
When set, causes a LISTing of the dimension table following each END statement.

PNL
When set, causes a LISTing of NAMELIST, PIDC and PIDV tables following each END statement.

PST
When set, causes a LISTing of the ID table following each END statement.

TRACEC
Produces a trace listing of the compiler.

TRACE3
Produces a delayed trace of the compiler beginning during the thrid pass.

FILE ATTRIBUTE MODULE DESCRIPTION

The following file attributes are included from the File Handling Standard to augment the FORTRAN77 Corporate Standard.

BLOCKSIZE = <number>
<number> represents the number of bytes per block.

KIND = <device>
Valid devices are DISK, PRINTER, PUNCH, READER, ODT, TAPE and REMOTE.

MYUSE = <dir>
<dir> may by IN, OUT or IO.

FEATURES NOT INCLUDED IN THE 10.0 RELEASE

$ and K format specifiers.

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