IBJ Format Working-Notes 2v0

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Note: This document is not intended to be a complete formal description of IBJ format

Contents

1. Philosophy

The IBJ format is a textual representation used to provide an interface between the code generator stage and the Object file generator stage of a compiler.
It is an Instruction Set Architecture neutral format, aimed at describing how to generate the Object file contents. The same IBJ file can be used to generate ELF or COFF object files.

2. File Layout

Each line of an IBJ file represents an IBJ record encoded using ASCII characters.

An IBJ record contains a array sequence of ASCII characters [1..N] starting with an ASCII character in the range: (‘A’ .. ‘W’) used to indicate the IBJ record type.
So IBJ record type is indicated by character[1].

Characters[2..N] are encoded hexadecimal numbers stored as ASCII (‘0’..’9’,’A’..’F’ or ’a’..’f’) in pairs. Each pair of characters represents a byte value.

Characters [2..3] form a byte count of the number of following Hex characters, where:
Character[2] is the high nibble value (as a Hex value).
Character[3] is the low nibble value (as a Hex value).
This limits the number of subsequent bytes to a maximum of 255 after the count byte.

Thus, the first Hex character containing specific data about the IBJ record info is character[4] where the format of the following bytes depends on the IBJ record type.

Record Character	**IBJ Type**	**IBJ Purpose**
A	IF OBJ	plain object code
B	IF DATA	data seg offset code word
C	IF CONST	const seg offset code word
D	IF DISPLAY	display seg offset code word
E	IF JUMP	unconditional jump to label
F	IF JCOND	cond jump to label JE, JNE, JLE, JL, JGE, JG
G	IF CALL	call a label
H	IF LABEL	define a label
I	IF FIXUP	define location for stack fixup instruction
J	IF SETFIX	stack fixup <location> <amount>
K	IF REQEXT	external name spec
L	IF REFLABEL	relative address of label
M	IF REFEXT	external name relative offset code word (call external)
N	IF BSS	BSS segment offset code word
O	IF COTWORD	Constant table word
P	IF DATWORD	Data segment word
Q	IF SWTWORD	switch table entry - actually a label ID
R	IF SOURCE	name of the source file
S	IF DEFEXTCODE	define a code label that is external
T	IF DEFEXTDATA	define a data label that is external
U	IF SWT	switch table offset code word
V	IF LINE	line number info for debugger
W	IF ABSEXT	external name absolute offset code word (data external)

3. Data Types

Data-type	Size		Format		
	Hex	**Bytes**	**H**	**Hex Char**	**'0'..'9','A'..'F' or 'a'..'f' as ASCII char**
			B	**Byte Value**	**0..255**
			W	**16 bit Word value**	**0..65536**
			A	**8-bit ASCII Character**	
Byte	2	1	HH = B H[1] = High value nibble H[2] = Low value nibble		
Condition	2	1	HH = B B = ?		
LabelNo	4	2	HHHH = BB = W H[1]H[2] = High value byte H[3]H[4] = Low value byte		
ShortInt	4	2	HHHH = BB = W H[1]H[2] = High value byte H[3]H[4] = Low value byte		
HexString	N	N/2	HH..HH = B..B This forms a sequence of byte values where each byte is in the range 0..255.		
NameString	N	N/2	HH..HH = A..A This forms a sequence of ASCII characters or a string A[1] the first ASCII character A[N/2] the last ASCII character		

4. IBJ RECORDS

3.1. OBJ

Instruction:	'A'	Data	HexString
Effect:			
Notes:	plain object code (in binary format)		
Error:			
Example:	A020FBFC0	As assembler text MOVSX %EAX,%AX	

3.2. DATA

Instruction:	'B'	Data	ShortInt
Effect:			
Notes:	data seg offset code word		
Error:			
Example:			

3.3. CONST

Instruction:	'C'	Data	ShortInt
Effect:			
Notes:	const seg offset code word		
Error:			
Example:			

3.4. DISPLAY

Instruction:	'D'	Data	ShortInt
Effect:			
Notes:	display seg offset code word		
Error:			
Example:			

3.5. JUMP

Instruction:	'E'	TargetLabel	LabelNo
Effect:			
Notes:	unconditional jump to label		
Error:			
Example:			

3.6. JCOND

Instruction:	'F'	JumpCondition	Condition
		TargetLabel	LabelNo
Effect:			
Notes:	cond jump to label JE, JNE, JLE, JL, JGE, JG		
Error:			
Example:			

3.7. CALL

Instruction:	'G'	TargetLabel	LabelNo
Effect:			
Notes:	call a label		
Error:			
Example:			

3.8. LABEL

Instruction:	'H'	LabelDef	LabelNo
Effect:			
Notes:	define a label		
Error:			
Example:			

3.9. FIXUP

Instruction:	'I'	FixupId	ShortInt
		StringSize	Byte
		NameString	NameString
Effect:			
Notes:	define location for stack fixup instruction		
Error:			
Example:			

3.10. SETFIX

Instruction:	'J'	FixupId	ShortInt
		Offset	ShortInt
		Events	ShortInt
		Trap	ShortInt
		From	ShortInt
Effect:			
Notes:	stack fixup <location> <amount>		
Error:			
Example:			

3.11. REQEXT

Instruction:	'K'	ExternalName	NameString
Effect:			
Notes:	external name spec		
Error:			
Example:			

3.12. REFLABEL

Instruction:	'L'	LabelRefNo	ShortInt
		Offset	ShortInt
Effect:			
Notes:	relative address of label		
Error:			
Example:			

3.13. REFEXT

Instruction:	'M'	ExtNameRef	ShortInt
		Offset	ShortInt
Effect:			
Notes:	external name relative offset code word (call external)		
Error:			
Example:			

3.14. BSS

Instruction:	'N'	Offset	ShortInt
Effect:			
Notes:	BSS segment offset code word		
Error:			
Example:			

3.15. COTWORD

Instruction:	'O'	Data	ShortInt
Effect:			
Notes:	Constant table word		
Error:			
Example:			

3.16. DATWORD

Instruction:	'P'	Data	ShortInt
Effect:			
Notes:	Data segment word		
Error:			
Example:			

3.17. SWTWORD

Instruction:	'Q'	SwitchLabelNo	ShortInt
Effect:			
Notes:	switch table entry - actually a label ID		
Error:			
Example:			

3.18. SOURCE

Instruction:	'R'	FileName	NameString
Effect:			

Notes:	name of the source file	
Error:		
Example:		

3.19. DEFEXTCODE

Instruction:	'S'	ExtCodeName	NameString
Effect:			
Notes:	define a code label that is external		
Error:			
Example:			

3.20. DEFEXTDATA

Instruction:	'T'	ExtDataName	NameString
Effect:			
Notes:	define a data label that is external		
Error:			
Example:			

3.21. SWT

Instruction:	'U'	TableOffset	ShortInt
Effect:			
Notes:	switch table offset code word		
Error:			
Example:			

3.22. LINE

Instruction:	'V'	LineNo	ShortInt
Effect:			
Notes:	line number info for debugger		
Error:			
Example:			

3.23. ABSEXT

Instruction:	'W'	ExtNameRefNo	ShortInt
		Offset	ShortInt
Effect:			
Notes:	external name absolute offset code word (data external)		
Error:			
Example:			

Appendix 1. Example IBJ file

This file has had excess IBJ records removed but is still a legal IBJ file.

```
R0962696C626F2E696D70
V020500
H02E803
S05787A65726F
I0C0000015A45524F434F554E54
V020600
A02C705
B0400000000
A0400000000
V020700
A02C9C3
J0A00000000000000000000
V020900
H02E903
S0478696E63
I0C100001494E4352454D454E54
V020A00
A02FF05
B0400000000
V020B00
A02C9C3
J0A10000000000000000000
V020D00
H02EA03
S0478646563
I0C1C000144454352454D454E54
V020E00
A02FF05
B0400000000
V020F00
A02C9C3
J0A1C000000000000000000
V021100
H02EB03
S067876616C7565
I0828000156414C5545
V021200
A01A1
B0400000000
A02C9C3
V021300
J0A28000000000000000000
V021500
P020000
P020000
```