

# IBM Host Code Page Issues

*A Technical Document on code page issues with IBM S/390 systems*

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## Overview

This technical document describes a problem faced by many customers regarding the translation of common characters such as the Not Sign, Caret, and Square Brackets when accessing S/390 host systems such as TSO and CMS.

### Historical Problem

Original 3270 terminals (before the existence of code pages) used the following mappings (in EBCDIC):

Not Sign	0x5F	¬
Caret	0xB0	^

APL enabled terminals added the following mappings (in EBCDIC):

Open Square Bracket	0xAD	[
Close Square Bracket	0xBD	]

Therefore, we got to a point where end-users expected a code page with the following mappings:

Not Sign	0x5F
Caret	0xB0
Open Square Bracket	0xAD
Close Square Bracket	0xBD

Unfortunately, there is no code page which contains these mappings. As of today, the two most common code pages are:

#### English-U.S. (037)

Not Sign	0x5F
Caret	0xB0
Open Square Bracket	0xBA
Close Square Bracket	0xBB

#### Open Systems / Latin-1 (1047)

Not Sign	0xB0
Caret	0x5F
Open Square Bracket	0xAD
Close Square Bracket	0xBD

The 037 code page has the Not Sign in the correct location but the Square Brackets in the wrong location. The 1047 code page has the Square Brackets in the correct location but the Not Sign in the wrong location.

In an attempt to resolve the code page discrepancies, the 1989 June Share hosted a session called "ASCII and EBCDIC Character Set and Code Issues in SSA". The result of this session was the creation of a code page informally called "Consensus EBCDIC" or "Share 037/2". In 1997, there was another session (9060) at Share called "Character Set and Code Page Issues in VM" which reviewed the issue. As of today, no emulators support this new "037/2" code page even though it is implemented in the CMS Pipelines package.

## The Fix

HostExplorer Version 9.0 and 10.0 (out of the box) unfortunately shipped with a broken 1047 code page which was really the "037/2" code page. After numerous technical support calls, the 1047 code page was corrected to be accurate as per IBM standards as of HostExplorer patches 9.0.0.11 and 10.0.0.1.

To resolve the issue properly, two new code pages have been added to HostExplorer to provide the mapping as required by customers. These are:

English-US Share (037/2)  
English-US Share Euro Enabled (1140/2)

As one might expect, the first code page, "English-US Share (037/2)" is a code page with the following mappings:

Not Sign	0x5F	¬
Caret	0xB0	^
Open Square Bracket	0xAD	[
Close Square Bracket	0xBD	]

The second code page, "English-US Share Euro Enabled (1140/2)" is a code page with the following mappings:

Not Sign	0x5F	¬
Caret	0xB0	^
Open Square Bracket	0xAD	[
Close Square Bracket	0xBD	]
Euro Symbol	0x9F	€

With the proper patch installed, the new code pages can be selected in HostExplorer's Session profile dialog in the Terminal / Character Set category.

Support for the new code pages will be released in the next patches for HostExplorer Version 9 and Version 10.

For reference purposes, the 037, 1047, 037/2 and 1140/2 code pages are appended to this document.

## English (U.S.) Code Page

Code page number = 037; CECP character set = 697/1; Base character set = 101.

Hex Digits 1 <sup>st</sup> → 2 <sup>nd</sup> ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SP SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	RSP SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	° SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	a SM210000	¡ SP030000	[ SM060000	SHY SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	° SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	( SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	Š SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	 SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	

### Legend:

RSP required space

SHY syllable hyphen

SP space

## Open Systems / Latin-1

Code page number = 1047; CECP character set = 697/1; Base character set = 101.

Hex Digits 1 <sup>st</sup> → 2 <sup>nd</sup> ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SP SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¬ SM660000	{ SM110000	}	\ SM070000	0 ND100000
-1	RSP SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	° SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	a SM210000	¡ SP030000	Ý LY120000	SHY SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	” SD170000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	( SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	đ SD410000	[ SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	 SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	

### Legend:

**RSP** required space

**SHY** syllable hyphen

**SP** space

## English (U.S.) Code Page (Share)

Code page number = 037/2; CECP character set = 697/1; Base character set = 101.

Hex Digits 1 <sup>st</sup> → 2 <sup>nd</sup> ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SP SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	RSP SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	° SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	a SM210000	¡ SP030000	Ý LY120000	SHY SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	° SM200000	¿ SP160000	¨ SD170000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	( SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	[ SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	 SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	

Note: This code page is based on the work done at Share and documented in "ASCII and EBCDIC Character Set and Code Issues in SSA" Share SSD #366, June 1989, Page 61.

### Legend:

RSP required space  
SHY syllable hyphen  
SP space

## English (U.S.) Code Page (Share) Euro Enabled

Code page number = 1140/2; CECP character set = 697/1; Base character set = 101.

Hex Digits 1 <sup>st</sup> → 2 <sup>nd</sup> ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SP SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	RSP SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	° SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	a SM210000	¡ SP030000	Ý LY120000	SHY SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	° SM200000	¿ SP160000	” SD170000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	( SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	đ SD410000	[ SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	þ LT640000	’ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	 SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	

Note: This code page is based on the work done at Share and documented in "ASCII and EBCDIC Character Set and Code Issues in SSA" Share SSD #366, June 1989, Page 61.

### Legend:

**RSP** required space

**SHY** syllable hyphen

**SP** space