CHART

FOR NATURAL

Version 3.1F Reference Manual



Pty Ltd, 1994-2001

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Version 3.1F

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1 Introducing CHART

1.1 What CHART does

Tired of searching through NATURAL objects and XREF to find what calls what ? Tired of moving from library to library to analyse your application system ? Tired of drawing program structure charts by hand or on PC packages ? And re-drawing them after any logic changes ?

CHART draws a program chart for you, on-line, in seconds, across all your libraries. CHART can completely document your system, with no mistakes. CHART documents application systems written in any version of NATURAL.

CHART for NATURAL draws calling structures, using the source code of the applications. All objects detected are drawn in an easy-to-read format - a CHART. You can exclude any object types from the CHART depending on your purpose. You can suppress objects or groups of objects from being exploded in the CHART. CHART is a powerful and accurate tool for analysis and documentation.



Type in an object name, choose any object types to be excluded, and *CHART* will draw the calling structure chart for you. Just like this ...

etchRet LocalDA LocalDA GallMat Fetc RF10000 PRFUHDRL PRFUBCKL PRFIEXTS PRF0	ch Call ADOP PROFINIT	<2> InputHap Inp PRF600L1 PR
RESOORT PREVIOUS PROFINIT	InputMap PRF 000L 1	Hel
	Fetc PRF52	h FetchRet 200P PRF6100P
allNat FetchRet FetchRet FetchRet RFNTAC PRF7400P PRF1300P PRF7600P	FetchRet Fetch PRF1500P PRF77	Ret FetchRet Fet OOP PRF1400P PRF
User: TBF1 C	FG	elen eller eller

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1.2 When to use CHART

It is often said that "... a picture tells a thousand words ...". Program calling structure *CHARTs* are very revealing pictures and tell us a great deal about our application systems. We draw structure charts during analysis, specification, development, and maintenance already -- on paper, in PC packages, and in our minds.

CHART is particularly useful in the **on-line** environment during development and maintenance of applications. Analysts and programmers need to **see** the calling structure of the systems they work on - before, during, and after any changes are made. SCAN (within EDIT and LIST) and XREF are commonly used to build up calling structures. This often takes **hours** of tedious (and error-prone) work.

CHART achieves the same results in seconds, with no mistakes.

CHART reads NATURAL source code across <u>all</u> your step libraries, starting with the **seed** object. Objects called by the **seed** are identified, and then they too are searched for calls to other objects. And so on, until a complete program chart has been built.

And you can browse the source code of any object while viewing a CHART ...

2001-02-18 16:	:25 ~ C ~ ~ ~ D	~ ~ ~ <i>E</i> ~ ~ HMC100I1 ~	G ~ ~ Page: 1L of 2
b <3>	<5>	i	
InputMap Fetch	Ret CallNat InputM	Map Call CallNat	CallNat CallNa
HMC100M3 DMC100	012 DMCNSTAT HMC10	0M2 RCCCAM64 DMC100N9	DMCNSSAK TFNCHE
C		<2>	
	HelpRo	out InputMap CallNat	Call# Call
	HEL	Browse Obje	ect
		<i>Top</i> HMC10011	Lib DEVLIB S 1442
d		0005 *************	* * * * * * * * * * * * * * * * * * * *
InputMap Cal		0010 * Program Name:	HMC100I1
DMC100M1 SPG	Browse Object	0015 * System:	Receivable Paymen
	-	0020 * Subsystem:	Keying Payments
е	Row Col	0025 *	
	d F	0030 * Description:	Kev details about
	bН	0035 *	then for each for
	bС	0040 *	- Kev pavments ma
f	b B	0045 *	- Kev amendments
CallNat	αG	0050 *	- Decide if lette
DMC100N2	5.0		
Enter-PF1PF2-	PF3PF4PF5·	PF6PF7PF8PF9-	PF10PF11PF12
+P HELP	QUIT SCAN +P,,	SC NOKEY -P +P SHAP	PE LEFT RIGHT SHIFT

CHART can easily be used in the **batch** environment, allowing charts to be **printed** on line printers or laser printers for review or documentation.

CHART can also be used in **batch** to completely **document** and **audit** your system:

- pass all the seeds of your application to *CHART* (in CMWKF01);
 a table of contents (including page numbers) will be created (in CMPRT01);
 program charts will be generated for each seed (in CMPRT02);
 an index of objects will be created (showing object length, date last saved, library, and every page / row / column at which the object appears) (in CMPRT03);
 an audit list of objects 'not referenced' can be created (in CMPRT04)
- an **audit** list of objects 'not referenced' can be created (in CMPRT04).

CHART

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1.3 Invoking CHART On-line

Invoke CHART, from the Command or NEXT prompts, by typing "ch" or "chart".

For example, at the NEXT prompt ...

NEXT **chart**

LIB=ANYLIB

or at the Command prompt ...

Enter	Code:	Туре:	Name:
Command: ch			

The initial CHART "seed" menu will then be displayed ...

	B L G	Debugging Facility List Objects, X-Ref Global Environment
	Seed Don't Expl/Show	Draw New Chart with New Criteria Trace 5000_ ^M*
Command -	Command ==	==>
Enter-PF1- Help	PF2PF3 About Quit	-PF4PF5PF6PF7PF8PF9PF10PF11PF12 Main Order StpLb Batch Excln Shape Doco Parms

Alternatively, the *CHART* parameters (seed name, exclusions, trace interval, etc.) can be entered directly after the *CHART* command, and the "seed" menu will not be displayed ...

	Enter Code:	Type:	Name:
Command:	CH PROG1 DSC		

(The fields and parameters for the initial *CHART* menu are explained in the following section.)

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1.4 CHART, the Year 2000, and NATURAL Versions

CHART is fully Year 2000 compliant and fully compatible with all versions of NATURAL up to and including Version 3.1.2.

The only date manipulation in *CHART* is to display the current date and time and to display the last saved date of a NATURAL object, when requested. While the century has always been available for display in previous versions of *CHART*, with *Version 3.1F* the century is now included in date displays. The format of dates within *CHART* can be changed at any time. The order of day, month, and year can be chosen as well as the character which separates them. The default format is 'YMD' separated by '-', eg. 2001-02-18.

CHART Version 3.1F has been developed in NATURAL 2.2.8 but also operates correctly in previous versions of NATURAL as well as NATURAL Version 2.3 and Version 3.1. Some SAG supplied 'USR' subprograms need to be available to *CHART*. See '**12.5 Copy Required SAG subprograms from SYSEXT**' on Page 86 of this manual for details.

While *CHART Version 3.1F* operates correctly under NATURAL Version 2.2.8, official support of *CHART* for NATURAL Version 2.2.8 (and all versions prior to Version 2.2.8) will be discontinued after December 31, 2001.

1.5 CHART in German, French, Spanish, and Italian

CHART is now available in German, French, Spanish, and Italian (as well as English). All screens, messages, and help can be viewed in these languages. To access this feature, use the L=n terminal command, as follows:

%L=1	will give you	English
%L=2	will give you	German
%L=3	will give you	French
%L=4	will give you	Spanish
%L=5	will give you	Italian

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2 Release Notes for CHART Version 3.1F

- *CHART Version 3.1F* is faster and more efficient. Online *CHART*s are now drawn up to 35% faster than in *CHART Version 2.3E*. In batch, *CHART Version 3.1F* uses up to 34% less CPU time and up to 22% less elapsed time than *CHART Version 2.3E*;
- *CHART Version 3.1F* supports large screen displays. While the normal 24x80 mainframe screen is commonly used, many terminal emulators now support the larger screen sizes: 32x80, 43x80, and 27x132. *CHART* now automatically detects the use of the larger screen displays and adjusts its own display to show you as much as possible;

>	1				1		?		?	?		1	?	
LocalDA	LocalDA	LocalDA	LocalDA	LocalDA	CallNat	i	CallNat	Fetch	CallNat	CallNat	Call	Call	StackCom	Fet
PRFVCTRL	PRFVCUPL	PRFVHDRL	PRFVUSRL	PRFVUGLL	PRFTEXT1	i i	USR0050N	PRFUE99P	USR2004N	USR0011N	PROFINIT	PROFCLOS	SETUP	PRFO
						i		1						i i
c .						i		i i	<14>	1	1	1	*	1
						1		FetchRet	Fetch	LocalDA	CallNat	WrteForm	Fetch	- I
						1		PRFSAVE	PRF2100B	PRFVHDRL	PRFTEXT1	PRF000B1	PRFUE99P	- I
						I								- I
d			1		<38>			1					<20>	- I
			StackCom		StackCom			LocalDA					StackCom	- I
			PRF6000P		PRF0000P			PRFVUGLL					PRF5200P	- I
			1											
ē	1	1	1	1	<5>	1	<1>	<16>	<8>	<9>		<9>	<6>	<6
CallNat	LocalDA	LocalDA	1	Call	Fetch	Fetch	Fetch	Fetch	Fetch	Fetch		Fetch	Fetch	Fet
PRFTEXT1	PRFVHDRL	PRFVBCKL		PROFINIT	PRF3500B	PRF2300B	PRF7340B	PRF3100B	PRF7550B	PRF3200B		PRF2200B	PRF7100B	PRF7
~														
E .				1	1	1	0-118-5	* 						
				LOCALDA	LOCAIDA	LOCAIDA	Calinat	Fetch						
				PREVDUKL	PREVCIRL	PREVHDRL	PRFIEXTI	PRFUE99P						
~	+			+	1	< 0 >	< 0 >		<2>	+		+	+	
J I	DDEOOOOD	DDE60011		DDEUEGOD	DDECOOT 1	<9>	< 92 DDE6200D	DDOFTNE	<3>	DDEUEGOD	DDE4000D		DDEOOOOD	DDEG
FREGUURI	FREGOUGE	FREGUUII		FREUESSE	FREGOULI	FREGHOUF	FREGSOUP	FROFINII	FREIOUOF	FREUESSE	FRE4000F	FRESZOUF	FREGOUGE	FREO

- *CHART Version 3.1F* allows a wildcard to be used in the seed name in batch. For example, if a seed of 'UXD*' is used, then *CHART*s will be drawn for every program, subprogram, subroutine, and helproutine starting with 'UXD';
- *CHART Version 3.1F* allows the seed name to be changed directly on the *CHART* display screen. Change the seed name and a new *CHART* will be drawn immediately (using the same "exclusions" and "don't explodes" as the previous seed);



• *CHART Version 3.1F* detects inline SQL and draws the database file/table referenced. When inline SQL statements such as SELECT ... FROM, DELETE ... FROM, INSERT ... INTO, and PROCESS SQL are embedded within NATURAL (and if you have chosen to include database files in your *CHART*), then these SQL statements will be detected and the referenced database file/table will be drawn;

For example, 'SELECT PD_UNLOAD_DATE FROM PAYEE-DECLARATION' would cause the database file reference to be drawn at row e, column D:



• *CHART Version 3.1F* allows you to browse any object (within your current step libraries) from the *CHART* display screen. While browsing an object (use PF2 to do this), type 'BR' or 'BROWSE' and an object name and you will immediately begin browsing the nominated object;

		I				DEVLIB Lib.
b +	+	+	*		I	
Fetch	LocalDA	Fetch	Perf Ext	CallNat	InputMap	
XXXFER	ZJOBL	ZJOB	QR1000	DATERNGE	QR1000M1	
					Ι	
		Prove	o Object			
> brow	rse nx4000	BLOWS	e object P	 rogram	OR1000	Lib DEVLIB
Brws	+1	.++.	+	4	+5	. Mode Struct
3110	END-DECIDE /*	(2990)				
3110 3120	END-DECIDE /*	(2990)				
3110 3120 3130	END-DECIDE /* * DECIDE ON FIR:	(2990) st value of #	FUNCTION			
3110 3120 3130 3140	END-DECIDE /* * DECIDE ON FIR: VALUE 'S'	(2990) st value of #	FUNCTION			
3110 3120 3130 3140 3150	END-DECIDE /* * DECIDE ON FIR: VALUE 'S' MOVE TRUE	(2990) ST VALUE OF #	FUNCTION	IO #STATS	-REPORT-R	EQD
3110 3120 3130 3140 3150 3160	END-DECIDE /* DECIDE ON FIRS VALUE 'S' MOVE TRUE MOVE '?	(2990) ST VALUE OF # ? L'	FUNCTION	IO #STATS IO #ZJOB-	-REPORT-R SYSOUT-LI	EQD ST
3110 3120 3130 3140 3150 3160 3170	END-DECIDE /* DECIDE ON FIRS VALUE 'S' MOVE TRUE MOVE ' 2' MOVE ' 1:	(2990) ST VALUE OF # ? L' 1'	FUNCTION	IO #STATS IO #ZJOB- IO #ZJOB-	-REPORT-R SYSOUT-LI COPIES-LI	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180	END-DECIDE /*	(2990) ST VALUE OF # ? L' 1' F'	FUNCTION	IO #STATS IO #ZJOB- IO #ZJOB- IO #ZJOB-	-REPORT-R SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180 3190	END-DECIDE /*	(2990) ST VALUE OF # ? L' 1' F'	FUNCTION	IO #STATS IO #ZJOB- IO #ZJOB- IO #ZJOB-	-REPORT-R SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180 3190 3200	<pre>END-DECIDE /* * DECIDE ON FIRS VALUE 'S' MOVE TRUE MOVE ' 2' MOVE ' 1: MOVE ' 1: MOVE ' POR' VALUE 'D' MOVE TRUE</pre>	(2990) ST VALUE OF # ? L' 1' F'	FUNCTION	TO #STATS TO #ZJOB- TO #ZJOB- TO #ZJOB- TO #DETAI	-REPORT-R SYSOUT-LI COPIES-LI USER-ID LED-REPT-	EQD ST ST REQD



- *CHART Version 3.1F* has a new default installation option called 'AUTOSTEP' for initialising step libraries. 'AUTOSTEP' detects that NATURAL SECURITY is in use and will initialise your step libraries to be the same as those defined there. Otherwise, the existing installation option NONATSEC will be used;
- *CHART Version 3.1F* allows you to see the full database file or internal subroutine name. The shortened name will still be shown on the *CHART* display screen, but the 'Find' object list (PF5) will show the full name;



• *CHART Version 3.1F* has extra help screens to fully explain the use of PF keys;

		Chart General Help
PF1	Help	Displays these help screens.
PF2	About	Displays CHART license information.
PF3	Quit	Exits from the CHART 'Entry screen'.
PF4	Main	Exits from the CHART 'Entry screen'.
PF5	Order	Allows the order of searching to be changed
		if more than one source code respository is
		used, e.g. two FUSER files.
PF6	StpLb	Allows the step libraries to be changed.
		CHART will look for NATURAL objects in the
		current library first, and will then look in
		each of the step libraries.
PF7	Batch	Allows 'batch invokers' to be defined.
		These are the program(s) in your environment
		that are called online to submit a batch job.
PF8	Excln	Allows you to choose which object types are
		to be excluded from the CHART.
PF9	Shape	Changes the shape of the CHART entry screen.
PF11	Doco	Displays CHART Documentation on-line.
PF12	Parms	Allows various CHART parameters to be changed.



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• CHART Version 3.1F has extra help screens to fully explain the use of PF keys;

Trace of Chart being built ... Press <Enter> to continue building. Press <PF3> to stop building the CHART Press <PF5> to see what the incomplete CHART looks like, so far 'source lines processed' is a count of number of Natural source code lines that have been processed by CHART, so far. 'objects placed in Chart' is a count of the number of Natural objects that have been placed on the 'page', so far. The counts in brackets (eg. 7M, 5N) show a breakup of this object count by object type. That is, 7M indicates that seven of the objects placed are maps. 'objects still to be checked' is the number of called Natural objects that have not yet been checked/processed by CHART, so far. Any newly called objects that are found are added to this count.

• *CHART Version 3.1F* now produces a work file that can be read into Microsoft Visio2000. Information about every object drawn by *CHART* is automatically written to CMWKF04 in batch and can be read directly into Visio2000 as organisation charts;

Microsoft Visio		
Ele Edit Yew Insert Format Iook	Shape Window Help	
Gren	Choose Drawing Type Steve Drawing Coll+N Browse Sample Drawings	★ デ・A・ロ・ノ・G ■□□□□□□▲ Δ・2・2
En port crist Sere pro Rends Construction Port Series	Block Diagram Database Plowchart Forms and Charts Datemet Diagram Map	
Seng To	Office Leyout Office Leyout Organization Chart Project Schedule	Creanzation Chart Weard
1,31,1,Take-on Surcharge, vod 2,31,1,Take-on LMR, vod 2,31,1,Take-on RBL, vod ±,31,1,Take-on, vod	Software Visio Extras Blank Drawing	
Egt		

- *CHART* is now available in German, French, Spanish, and Italian. All screens, messages, and help can be viewed in these languages. To access this feature, use the %L=n terminal command, where 1 = English, 2 = German, 3 = French, 4 = Spanish, and 5 = Italian;
- While *CHART Version 3.1F* operates correctly under NATURAL Version 2.2.8, official support of *CHART* for NATURAL Version 2.2.8 (and all versions prior to Version 2.2.8) will be discontinued after December 31, 2001.



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3 Defining what you want to CHART

CHART needs (at least) the name of the **seed** or "initial" object from which it will draw a **program chart**. Other parameters and criteria can also be provided on the "seed" menu. Certain object types can be **excluded** from the generated chart. For example, you may want to **exclude** all maps and data-areas from the chart, depending on your objective. Also, you can specify which objects are NOT to be **exploded** in the chart.

Enter command 'ch' or 'chart' and the window-size "seed" menu will be displayed ...

	B L G	Debugging Facility List Objects, X-Ref Global Environment
	Seed Don't Expl/Show Command ==	Draw New Chart with New Criteria Exclude DSCO Trace 5000_ ^M*^DB*
Command = Enter-PF1- <i>Help</i>	PF2PF3 About Quit	-PF4PF5PF6PF7PF8PF9PF10PF11PF12 Main Order StpLb Batch Excln Shape Doco Parms

Press **PF9** to change the 'shape' of this menu to **full-screen** ...

17:44:48 ****	CHART	V3.1F for	r Natural	****		2001-02-18
User HMC01	Code	Functior	1		Lil	brary DEVLIB
	G L ?	Generate License Chart He Terminat	e Chart Details elp ce Chart	- -		
Code	G	Seed	MYPROG			
Exclude B R D O Tra	GO Batch Routir Data <i>P</i> Other <i>ce</i> 5000	Calls X hes (S Areas (G Types (F)_ source	Map Xtrnl Cal Subroutir Global Ar D'base Fi lines (or	W lls K ne N cea L lle I Page	Work Files Set Key Subprogram Local Area Inline Subr E Limit in 'D	C Copycode P Program H Helproutine) A Param Area)) Batch')
Don't Expl/Sh	ow X*		Z*			
Command ===>		· · · · · · · · · · · · · · · · · · ·				
Enter-PF1PF2PF3- Help About Quit	PF4 Main	-PF5PF Order St	56PF7 tpLb Batch	-PF8- D Excl	PF9PF1	0PF11PF12 Doco Parms

Apart from the field called "Code", all other parameters and PF keys are identical between the **window-size** and **full-screen** "seed" menus.

Code: Type "G" for "Generate Chart".





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3.1 Choosing a Seed

Type in the name of your **seed** or "initial" object. *CHART* reads NATURAL source code across all your libraries, starting with the **seed** object you specify. Objects called by the **seed** are identified, and then they too are searched for calls to other objects. And so on, until a complete chart has been built.

3.2 Excluding Objects

Any combination of object **types** can be **excluded** from the chart. For example, exclude Maps and DataAreas and only programs and subprograms will be drawn:

2001-02-18 12	11 ~ <i>C</i> ~ ~ ~ <i>D</i> ~ ~ HISPROG1 ~ <i>F</i> ~ ~ ~ <i>G</i> ~ ~ Page: 1 of 1
User: YOURII	Library: DEVL
b	CallNat Fetch
	HERSUBP1 HISPROG2
С	Fetch
	HERPROGA

Exclude only **D**ataAreas and programs, subprograms, and maps will be drawn:

2001-02-18 User: Y0	3 12:13 ~ C ~ ~ DURID	~ D ~ ~	~ E ~ ~	HISPROG1	~ G ~ ~	Page: 1 Library:	of 1 DEVL	
b		CallNat	Fetch	InputMap	InputMap			
		HERSUBP1	HISPROG2	HISMAP1	HISMAP2			
			1		I.			
		I.	1	*	1			
С		WrteForm	Fetch	HelpRout	HelpRout			
		HERFORM1	HERPROGA	HISHELP	HISHELP			
			1					
			1					
d			InptMap#		InputMap			
			HERMAPA		HISMAP3			

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Exclude Objects:	Pre obj war	ss PF9 on the <i>CHART</i> "seed" menu to sect types currently excluded will be shown texcluded:	see the 'Exclusions' window. The wn. Mark the object types that you
User HMC01	_	Development Facilities	Exclusions _ M Map
	Code	Function	D Data Areas X G Global Area L Local Area
	с	Create Object	A Param Area
	Е	Edit Object	P Program
	R	Rename Object	_ K Set Key
	D	Delete Object	_ R Routines
	х	Execute Program	_ Subroutine
	т	DB Command Log Facility	_ N Subprogram
	в	Debugging Facility	_ H Helproutine
	L	List Objects, X-Ref	_ C Copycode
	G	Global Environment	_ X Xtrnl Calls
		Draw Chart with Criteria	- B Batch Calls
See	ea	MYPROG Exclude	Work Files
Don		×*	X O Other Types
Expl,	Snow		- Inline Subr
Com	nand -		- r D'base File
Command =	uana =	/	
Enter-PF1PF2I	>₽3	PF4PF5PF6PF7PF	_ DPKSNXB Prog Calls
Holp About (J Diii +	Main Order Stalh Batch Ev	



3.3 Trace of CHART being built

On the *CHART* "seed" menu, there is an option called 'Trace..' with a default value of 5000. This means that a **trace** screen will be displayed for every 5000 lines of source code processed. This **trace** screen shows the total number of source lines processed and the number of objects placed (so far) summarised by object type (eg. 7P means seven programs have been placed, 5N means five subprograms, and so on).

```
Trace of Chart being built ...
5000 source lines processed
23 objects placed in Chart
(7P 5N 9M 2L)
6 objects still to be checked
--Enter-Continue--PF5-ShowChart--PF3-Exit--
```

You may continue with the generation of the chart by pressing **Enter**, or to go back to the "seed" menu by pressing **PF3**. To see the (incomplete) *CHART* at this point, press **PF5** (ShowChart). You can change the default of 5000 lines on the "seed" menu. To STOP the **trace** screen being displayed, use a value of zero (0).

Press **PF1** (Help) on this screen and the following help screen will be displayed:

Trace of Chart being built ... Press <Enter> to continue building. Press <PF3> to stop building the CHART Press <PF5> to see what the incomplete CHART looks like, so far 'source lines processed' is a count of number of Natural source code lines that have been processed by CHART, so far. 'objects placed in Chart' is a count of the number of Natural objects that have been placed on the 'page', so far. The counts in brackets (eg. 7M, 5N) show a breakup of this object count by object type. That is, 7M indicates that seven of the objects placed are maps. 'objects still to be checked' is the number of called Natural objects that have not yet been checked/processed by CHART, so far. Any newly called objects that are found are added to this count.



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3.5 Options for drawing 'Inline Subroutines' and 'Database Files'

You have NOT excluded 'Inline S	Subroutines' or 'Database Files'.			
You have a choice about how the	ese object types are drawn			
· EITHER as 'parents' ·	OR only as 'children' of another			
of other objects	Natural object, never 'parents'			
•	5 . 1			
CAPTURE1 .	CAPTURE1			
I				
.				
f:READ- i:CHECK- i:AMEND	i:CHECK- f:READ- i:AMEND- InputMap			
DATA DATA DATA .	DATA DATA DATA AMENDM1			
.				
i:CHECK- InputMap .	To get this format, enter 'don't			
DATA AMENDM1 .	explodes' of 'INLINESUBRTN'			
•	and/or 'DATABASEFILE'			
Don't Explode 'INLINESUBRTN'?	Don't Explode 'DATABASEFILE'?			

You can decide how **Inline Subroutines** and **Database Files** are drawn in a *CHART*. They can be drawn either as "child" or "parent" objects. If you haven't excluded them, **Inline Subroutines** and **Database Files** will be drawn as "parent" objects by default. If you use the special **Don't Explode** values of INLINESUBRTN and/or DATABASEFILE then they will be drawn only as "child" objects.

3.6 CMWKF01, CMWKF02, or CMWKF04 as "Don't Explodes"

For "high volume" *CHART*-ing in batch, you can specify that every other object in CMWKF01, CMWKF02, or CMWKF04 is to be treated as a **Don't Explode** (or **Don't Show**) object, automatically. For example, if an object is about to be "exploded" in a *CHART* but that object is also in CMWKF01, then the object's children will NOT be exploded. Special **Don't Explode/Show** values of CMWKF01, CMWKF02, CMWKF04, ^CMWKF01, or ^CMWKF02 are used to invoke this feature.

See section 10.6 Less redundancy with special *Don't explode* values for more information.



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3.7 Order of Searching

Press PF5 on the *CHART* "seed" menu to view (and alter) the 'order of searching'. This order is important for clients with more than one location for source code, eg. multiple FUSER files, source code in archiving products like NMCF, or source code on several platforms (MVS and UNIX).

user HMCUl	- 1	Development Facilities - Library DEVI.TB
		Define Order of Searching
	Code	Order of Searching repositories F
	 c	Subprograms 'HMCINFOx', 'HMCLINEx', and 'HMCSUBRx'
	E	are used to access Natural application source code
	R D	F: ADABAS 'FUSER' File (Mainframe)
	X T	G: General access via 'USR1057N' (M/F or UNIX) N: NMCF (Natural Migration Control Facility)
	B	U: UNIX Directory ('C' Programs)
	G	w. windows bilectory (C Frograms)
	Seed	The source code of these subprograms are provided and may be amended and copied to suit your needs.
	Don't Expl/Show	For example, if you have two 'FUSER' files to hold
		your source code, copy the 'HMCF' subprograms
Command =	Command ==	to 'HMCP' and amend the DDMs to point to the other 'FUSER' file. Then 'P' could be included
		in the 'Order of Searching' specified above.

3.8 Step Libraries

Press PF6 on the *CHART* menu to see this window. The step libraries are initialised by *CHART*. The way they are initialised is chosen when *CHART* is installed. The most common method is to use those step libraries defined in NATURAL SECURITY. Amend the libraries as you require:

Step	Libraries .	DEVL TEST PROD
< to in (be searched order after CURRLIB >	



3.9 Batch Invokers

Press PF7 on the *CHART* "seed" menu to view (and alter) the current **batch invoker** definitions. Batch invocations of NATURAL using the standard Software AG program NATRJE are automatically detected and drawn. Some existing clients (who use "homegrown" pre-cursors to NATRJE) have had these "batch invokers" incorporated directly into the *CHART* software. For ease of use, up to four simple "batch invokers" can be defined in the initial *CHART* program and/or by using PF7 on the "seed" menu.



3.10 PF Keys on the CHART "Seed" Menu

The following is a summary of the PF keys available on the "seed" menu:

		Chart General Help
PF1	Help	Displays these help screens.
PF2	About	Displays CHART license information.
PF3	Quit	Exits from the CHART 'Entry screen'.
PF4	Main	Exits from the CHART 'Entry screen'.
PF5	Order	Allows the order of searching to be changed
		if more than one source code respository is used, e.g. two FUSER files.
PF6	StpLb	Allows the step libraries to be changed. CHART will look for NATURAL objects in the current library first, and will then look in each of the step libraries.
PF7	Batch	Allows 'batch invokers' to be defined. These are the program(s) in your environment that are called online to submit a batch job.
PF8	Excln	Allows you to choose which object types are to be excluded from the CHART.
PF9	Shape	Changes the shape of the CHART entry screen.
PF11	Doco	Displays CHART Documentation on-line.
PF12	Parms	Allows various CHART parameters to be changed.

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3.11 NATURAL Statements that CHART looks for

CHART looks for the following NATURAL statements in your source code (depending on which object types you may have excluded), identifies the object called/invoked by the statement, and draws that object along with a descriptive "calling method":

Called Using	Calling	Dynamic	Relates To
NATURAL Statement	Method	<u>Call</u>	Object Type
CALL	Call		External
CALL	Call#	Yes	External
CALLNAT	CallNat		Subprogram
CALLNAT	CallNat#	Yes	Subprogram
DELETE FROM	DbseFile,	f:	<several></several>
FETCH	Fetch		Program
FETCH	Fetch#	Yes	Program
FETCH RETURN	FetchRet		Program
FETCH RETURN	FtchRet#	Yes	Program
FIND	DbseFile,	f:	<several></several>
GET	DbseFile,	f:	<several></several>
GLOBAL USING	GlobalDA		Global Data Area
HISTOGRAM	DbseFile,	f:	<several></several>
INCLUDE	Include		Copycode
INPUT USING MAP	InputMap		Map
INPUT USING MAP	InptMap#	Yes	Мар
INSERT INTO	DbseFile,	f:	<several></several>
LOCAL USING	LocalDA		Local Data Area
PARAMETER USING	ParamDA		Parameter Data Area
PERFORM	Perf Ext		External Subroutine
PERFORM	Perf Int,	i:	Inline Subroutine
PROCESS SQL	DbseFile,	f:	<several></several>
READ	DbseFile,	f:	<several></several>
READ WORK FILE	ReadWork		<several></several>
RUN	Run		Program
RUN	Run#	Yes	Program
SELECT FROM	DbseFile,	f:	<several></several>
SET KEY	SetKey		Program
SET KEY	SetKey#	Yes	Program
STACK COMMAND	StackCom		Program / Command
STACK COMMAND	StckCom#	Yes	Program / Command
USING HELP	HelpRout		HelpRoutine
USING HELP	HlpRout#	Yes	HelpRoutine
WRITE USING FORM	WrteForm		Form
WRITE USING FORM	WrteFrm#	Yes	Form
WRITE WORK FILE	WrteWork		<several></several>

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3.12 External Subroutines should be CATALOGed

CHART reads the source code of Natural objects and finds which other objects are called. When *CHART* finds a call to an external subroutine, some extra non-source code information is needed. This is because the actual name of the external subroutine can be different from the name of the object that it is stored in. For example, the following subroutine is called JANE but defines a subroutine called FRED. The subroutine is invoked with "PERFORM FRED":

Object	JANE :			
DEFINE *	SUBRO	DUTI	INE	FRED
WRITE *	'HERE	IS	FRE	ED'
END				

The link between the name of the object JANE and the subroutine name FRED is recorded in the FUSER file when the object is STOWed or CATALOGed. When *CHART* sees the source code "PERFORM FRED" (and "FRED" is not an inline subroutine), the link information (ie. FRED is defined in object JANE) is retrieved from the FUSER file and *CHART* then reads the source code of JANE. This is the only time that *CHART* uses FUSER information other than source code.

For the above reasons, it is recommended that external subroutines be CATALOGed before CHART is used.



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3.13 CHART Manual On-line

Press PF11 on the *CHART* "seed" menu to view this manual on-line. Select the chapter(s) and section(s) that you want to view.

Press PF7 to page up within a section and PF8 to page down.

Press PF3 to leave a section or chapter.



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4 Formats, Symbols, and Abbreviations

4.1 Large Screens (27x132, 32x80, 43x80)

CHART Version 3.1F supports large screen displays. While the normal 24x80 mainframe screen (also known as IBM 3279 Model 2) is commonly used in NATURAL applications, many terminal emulators now support the larger screen sizes: 32x80 (IBM 3279 Model 3), 43x80 (IBM 3279 Model 4), and 27x132 (IBM 3279 Model 5). *CHART* now automatically detects the use of the larger screen displays and adjusts its own display to show you as much as possible. The following is an example of the 27x132 (IBM 3279 Model 5) screen:

>					1		?		?	?			?	
LocalDA	LocalDA	LocalDA	LocalDA	LocalDA	CallNat	ì	CallNat	Fetch	CallNat	CallNat	Call	Call	StackCom	Fet
PRFVCTRL	PRFVCUPL	PRFVHDRL	PRFVUSRL	PRFVUGLL	PRFTEXT1	ì	USR0050N	PRFUE99P	USR2004N	USR0011N	PROFINIT	PROFCLOS	SETUP	PRF0
						ì		1						1
2						ì		İ	<14>				*	i
						I.		FetchRet	Fetch	LocalDA	CallNat	WrteForm	Fetch	1
						1		PRFSAVE	PRF2100B	PRFVHDRL	PRFTEXT1	PRF000B1	PRFUE99P	1
						1		1						1
d					<38>			- I					<20>	1
			StackCom		StackCom			LocalDA					StackCom	1
			PRF6000P		PRF0000P			PRFVUGLL					PRF5200P	1
			1											1
e	- I		I	I	<5>	1	<1>	<16>	<8>	<9>		<9>	<6>	< 6
CallNat	LocalDA	LocalDA	1	Call	Fetch	Fetch	Fetch	Fetch	Fetch	Fetch		Fetch	Fetch	Fet
PRFTEXT1	PRFVHDRL	PRFVBCKL	1	PROFINIT	PRF3500B	PRF2300B	PRF7340B	PRF3100B	PRF7550B	PRF3200B		PRF2200B	PRF7100B	PRF7
			1			I								
£			1	1		1	1	*						
			1	LocalDA	LocalDA	LocalDA	CallNat	Fetch						
			1	PRFVDCKL	PRFVCTRL	PRFVHDRL	PRFTEXT1	PRFUE99P						
			I											
g l	*	1	1	*	1	<9>	<9>	1	<3>	*	1	*	*	1
PRF600R1	PRF0000P	PRF60011		PRFUE99P	PRF600L1	PRF6400P	PRF6300P	PROFINIT	PRF1000P	PRFUE99P	PRF4000P	PRF5200P	PRF0000P	PRF6



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4.2 Changing connectors, colours, and date formats

Because of varying hardware and software at different sites, the default *CHART* display settings may not be suitable to you. The 'Amend Chart Display Settings' screen allows you to amend the *CHART* display settings to suit your environment.

Press PF12 on the CHART "seed" menu to view the current display settings ...

Amend Chart Display	Settings					
AD= CD=	= Connector	Automati	.cally Sav	ve Paramet	ers? Y	
Seed V R	E Down	Your last	: CHART pa	arams. wil	l be <i>save</i>	ed for you
Connector D Y	E Cross					
Outline D N	E Inverse					
Warning B YH	E Value ^					
Date Order YMD Se	eparate? Y with	n Separato	or - ==>	01-02-18	and 2001-	-02-18
	-	;- A	- _B	- _C	- _D	${E} - :$
Call.Mtho	d Obj.Name	2001-02-	-18 12:38	SEED	Page:	1 of 1 :
AD= CD=	= AD= CD=	:		1		:
Map I PI	I V PI	b				b b
Global Area I NE	E V NE	CallNat	GlobalDA	InputMap	LocalDA	Fetch
Local Area I NE	E V NE	NNNNNNN	GGGGGGGG	MMMMMMM	LLLLLLLL	PPPPPPPP
Param Area I N	E V NE	:				:
Program I GH	R V GR	c		?		C
Subroutine I BI	L V BL	Batch	ParamDA	HelpRout	StackCom	Include
Subprogram I BI	L V BL	PPPPPPPP	аааааааа	ннннннн	PPPPPPPP	CCCCCCCC
Helproutine I BI	L V BL	:			1	:
Copycode D T	U V TU	d				d
Inline Subr I BI	L V BL	ReadWork	WrteWork	Call	Perf Int	DbseFile
Work Files I PI	I V PI	wwwwwww	wwwwwww	PPPPPPPP	IIIIIII	FFFFFFFF
D'base File I NE	E V NE	:_ A	_ ^B	_ C	_ D	\underline{E} \underline{E} :
Enter-PF1PF2PF	F3PF4PF5-	PF6F	PF7PF8-	PF9F	PF10PF11	lPF12
Help OI	uit	Updte		Let		

You can amend the "down connector" and "cross connector" characters and view the effect immediately on the sample *CHART*. Also, the colour settings for each object type and for all other information displayed in *CHART* can be amended. The changes will be immediately reflected in the sample *CHART*.

The format of date display in *CHART* can be amended on this screen. The order of day, month, and year can be chosen as well as the separator character. The default order is 'YMD' with a separator of '-'. Any order of 'Y', 'M', and 'D' can be used and any character can be used as a separator. If you answer 'N' to the 'Separate? Field, no separator character will be used.

Press PF9 on this screen to reverse all your changes and return to the previous display settings. If you are happy with your changes, press PF6 to make the new settings take effect.

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4.3 Changing the "Inverse" (^) Character

Press PF12 on the CHART "seed" menu to view the current display settings ...

Amend Chart Displ	lay Se	ettings		
AD=	= CD=	Connecto.	r Automatically Save Parameters? Y	
Seed V	RE	Down	Your last CHART params. will be saved f	or you
Connector I	YE	Cross		
Outline D) NE	Inverse		
Warning E	3 YE	Value ^		
Date Order YME) Sep	barate? Y	with Separator - ==> 01-02-18 and 2001-02-	18
			: A B C D	$_E$ – :
Call.	Mthd	Obj.Name	2001-02-18 12:38 SEED Page: 1 c	f 1 :
AD=	- CD=	AD= CD=	:	:
Map 1	I PI	V PI	b	l b
Global Area I	I NE	V NE	CallNat GlobalDA InputMap LocalDA Fe	tch
Local Area I	I NE	V NE	NNNNNNN GGGGGGGG MMMMMMM LLLLLLL PPP	PPPPP
Param Area I	I NE	V NE	:	:
Program I	GR GR	V GR	c ?	C
Subroutine 1	BL	V BL	Batch ParamDA HelpRout StackCom Inc	lude
Subprogram I	BL	V BL	РРРРРРРР АААААААА ННННННН РРРРРРР ССС	CCCCC
Helproutine I	BL	V BL	:	:
Copycode I) TU	V TU	d	d
Inline Subr I	BL	V BL	ReadWork WrteWork Call Perf Int Dbs	eFile
Work Files I	I PI	V PI	WWWWWWWW WWWWWWW PPPPPPPP IIIIIII FFF	FFFFF
D'base File I	NE NE	V NE	:_ A B C D	E _ :
Enter-PF1PF2-	PF3	3PF4	-PF5PF6PF7PF8PF9PF10PF11P	F12
Help	Qu	it	Updte Let	

To specify a "Don't Show" object (rather than a "Don't Explode" object), you must use an "inverse" character before the object name, eg. HM* . By default, the inverse character is the carat symbol (O). However, some sites do not use this character on keyboards and/or video displays. *CHART* allows you to change the inverse character to one suitable to your environment. Enter the character that you require in the "Inverse Value" field, and press **PF6** to update your change. This character can be changed at any time.

4.4 Changing the language CHART is displayed in

CHART is now available in German, French, Spanish, and Italian (as well as English). All screens, messages, and help can be viewed in these languages. To access this feature, use the L=n terminal command, as follows:

%L=1	will give you	English
%L=2	will give you	German
%L=3	will give you	French
%L=4	will give you	Spanish
%L=5	will give you	Italian

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4.5 Automatically saving CHART parameters

Press PF12 on the CHART "seed" menu to view the current display settings ...

mend Chart Displa	ay Se	ettings	
AD=	CD=	Connector	r Automatically Save Parameters? Y
Seed V	RE	Down	Your last CHART params. will be saved for you
Connector D	YE	Cross _	
Outline D	NE	Inverse	
Warning B	YE	Value ^	
Date Order YMD	Sep	parate? Y	with Separator - ==> 01-02-18 and 2001-02-18
			: A B C D E - :
Call.1	Mthd	Obj.Name	2001-02-18 12:38 SEED Page: 1 of 1 :
AD=	CD=	AD= CD=	: :
Map I	PI	V PI	b b
Global Area I	NE	V NE	CallNat GlobalDA InputMap LocalDA Fetch
Local Area I	NE	V NE	NNNNNNN GGGGGGGG MMMMMMMM LLLLLLL PPPPPPP
Param Area I	NE	V NE	: :
Program I	GR	V GR	c ? c
Subroutine I	BL	V BL	Batch ParamDA HelpRout StackCom Include
Subprogram I	BL	V BL	РРРРРРР АААААААА ННННННН РРРРРРР СССССССС
Helproutine I	BL	V BL	: :
Copycode D	TU	V TU	d d
Inline Subr I	BL	V BL	ReadWork WrteWork Call Perf Int DbseFile
Work Files I	PI	V PI	WWWWWWWW WWWWWWW PPPPPPPP IIIIIII FFFFFFF
D'base File I	NE	V NE	: A B C D E :
Enter-PF1PF2	PF3	8PF4	-PF5PF6PF7PF8PF9PF10PF11PF12
Help	Qui	it	Updte Let

With *CHART*, each user's most recent *CHART* parameters can be 'remembered'. That is, whichever seed name, object exclusions, don't explodes, etc. were last used (on-line), the next time that user invokes *CHART* (on-line), those parameters will be re-displayed as the default settings.

The field 'Automatically Save Parameters?' controls how this feature works. By default, this field is set to 'Y' which means each user's parameters will be saved each time they use *CHART*.

If a particular user does NOT want their parameters saved in this way, the user should change 'Automatically Save Parameters?' to 'N', and then press PF6 (Updte). This process can be reversed at any time.

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4.6 Date, Time, Seed, Page, User, and Library in CHART Headings

b		 Fot ch			
D	HERSUBP1	HISPROG2	HISMAP1	HISMAP2	
			 *		
С	WrteForm	Fetch	HelpRout	HelpRout	
	HERFORM1	HERPROGA	HISHELP	HISHELP	
d		InptMap#		InputMap	
		HERMAPA		HISMAP3	

Date/Time: The current date and time are shown in the top left corner of the screen.

Seed: The seed of the chart is shown in the middle of the top line of Page 1.

Page: The current page of the chart (and the highest page of the chart) are shown in the top right of the screen. If the generated chart is wider than one screen, the current page number is appended with a lateral indicator of L for Left or R for Right. Some very wide charts may also have a lateral indicator of **M** for Middle. For example,

Page: 1L of 2

indicates that the left side of the first page being displayed:

1L	1R
2L	2R

User: The current user-id is shown in the top left corner of the screen.

Library: The current NATURAL Library is shown in the top right of the screen.



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4.7 Calling Method



Each object displayed in the chart has its **calling method** shown immediately above it, such as: InputMap, CallNat, FetchRet.

Calling	Called Using	Dynamic	Rela	ites To		On-Line
Method	NATURAL Statement	Call	<u>Obj</u>	ect Type		<u>Colour</u>
Batch	<call batch="" natural<="" td="" to=""><td>program></td><td><sev< td=""><td>/eral></td><td></td><td>turquoise</td></sev<></td></call>	program>	<sev< td=""><td>/eral></td><td></td><td>turquoise</td></sev<>	/eral>		turquoise
Call	CALL		Exte	ernal		turquoise
Call#	CALL	Yes	Exte	ernal		turquoise
CallNat	CALLNAT		Sub	program		blue
CallNat#	CALLNAT	Yes	Sub	program		blue
DbseFile	READ, FIND, GET, HIST	FOGRAM,	<sev< td=""><td>/eral></td><td></td><td>white</td></sev<>	/eral>		white
	SELECT FROM, DELET	TE FROM,	INSERT	INTO,	PROCESS	SQL
f:	READ, FIND, GET, HIST	FOGRAM,	<sev< td=""><td>/eral></td><td></td><td>white</td></sev<>	/eral>		white
	SELECT FROM, DELET	TE FROM,	INSERT	INTO,	PROCESS	SQL
Fetch	FETCH		Prog	gram		green
Fetch#	FETCH	Yes	Prog	gram		green
FetchRet	FETCH RETURN		Prog	gram		green
FtchRet#	FETCH RETURN	Yes	Prog	gram		green
GlobalDA	GLOBAL USING		Glo	bal Data	Area	white
HelpRout	USING HELP		Help	Routine		blue
HlpRout#	USING HELP	Yes	Help	Routine	:	blue
i:	PERFORM		Inlir	ne Subro	utine	blue
Include	INCLUDE		Сор	ycode		turquoise
InputMap	INPUT USING MAP		Map)		pink
InptMap#	INPUT USING MAP	Yes	Map)		pink
LocalDA	LOCAL USING		Loc	al Data A	Area	white
ParamDA	PARAMETER USIN	1G	Para	meter D	ata Area	white
ReadWork	READ WORK FILE		<sev< td=""><td>veral></td><td></td><td>pink</td></sev<>	veral>		pink
Run	RUN		Prog	gram		green
Run#	RUN	Yes	Prog	gram		green
Perf Ext	PERFORM		Exte	ernal Sub	oroutine	blue
Perf Int	PERFORM		Inlir	ne Subro	utine	blue
SetKey	SET KEY		Prog	gram		green
SetKey#	SET KEY	Yes	Prog	gram		green
StackCom	STACK COMMAND		Prog	gram / Co	ommand	green
StckCom#	STACK COMMAND	Yes	Prog	gram / Co	ommand	green
WrteForm	WRITE USING FORM		For	n		pink
WrteFrm#	WRITE USING FORM	Yes	For	n		pink
WrteWork	WRITE WORK FILE		<sev< td=""><td>/eral></td><td></td><td>pink</td></sev<>	/eral>		pink



4.8 Objects called dynamically

If there is a "**#**" in the calling method, such as Fetch#, this indicates the object is called **dynamically**. For example, this **dynamic** call of a map would be drawn with a **calling method** of InptMap#:



4.9 Objects called more than once

***** (Descendants Suppressed)

Within one chart the same object may be called several times. Second and subsequent calls to an object are highlighted with a "*", and any descendants are suppressed.



4.10 Don't Explode Objects

+ (Don't Explode)

If you have specified some **don't explode** objects on the *CHART* "seed" menu, these objects will be drawn in the chart with a "+" (but will never have descendants). Up to twenty **don't explode** objects can be specified.

```
MYPROG2
|
+
Include
ERRORHDL
```



4.11 Object with no source code

? (Source Code Not Found)

Sometimes the source code for an object is **not in** the **current** library (or any of the Step Libraries, if specified). This is indicated with a "?" when the object is drawn in the chart. Its descendants can not be drawn.



4.12 Objects whose descendants could not be placed

<n> (Descendants could not be placed)

For large complex *CHART*s, some descendant objects cannot be placed, normally because others "branches" of the *CHART* are "in the way". (See '7 Unplaced Objects within a *CHART*' on Page 48.) When this happens, the number of descendant objects are shown within angle brackets (eg. "<3>") is shown above the object whose descendants could not be placed. Objects with descendants that could not be placed (if any) can be viewed by pressing PF12 on-line. In batch, extra *CHART*'s will be drawn automatically for each "parent" object which had descendants that could not be placed.



4.13 "Long" Names for Inline Subroutines and Database Files

Most objects drawn by *CHART* have names that are a maximum of eight characters long. Inline Subroutines and Database Files can have names up to 32 characters long. Names longer than 14 characters long are shortened by removing embedded vowels (ie. 'a', 'e', 'i', 'o', 'u') starting from the end of the name (until 14 characters long). The first 14 characters of the name are always drawn in the *CHART*. If there is room below this, the remainder of the name is drawn.

The full name of the Inline Subroutine or Database File can be viewed using the PF5 (Find) key. This will display a list of all objects in the *CHART* in alphabetical order.



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5 PF Keys when viewing a CHART

5.1 Help with a CHART (PF1)

Context sensitive help is available throughout the *CHART* software. **Help (PF1)** on a *CHART* will display the following screen:

```
Chart 'Display' Screen Help
        Command
                  Effect
 Key
        _____
                  ____
 _ _ _
 PF2 *
        Browse
                  Browse Object Source
 PF3
                Back to Entry Screen
        Quit
 PF4
        Zoom
                 Zoom in/out on Chart
 PF5 *
        Find
                 Find Object in Chart
 PF6 *
        Chart
                 Draw a new Chart
 PF7
                  Back one Page
        Ūp
 PF8
                  Forward one Page
        Down
 PF9
        Lines/Lngth/SvUsr/SvDte/Libry..
    ... change display above object name
                  Show Left of Chart
 PF10
        Left
 PF11
        Right
                  Show Right of Chart
        Overflow Show Unplaced Objects
 PF12
   ( * means key is cursor sensitive,
       ie. move cursor to object you
           require and press PF key )
Column ids for the Chart (eg. A, B, C)
are shown above or below each column.
Row ids for the Chart (eg. a, b, c) are
shown to the left or right of each row.
```

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5.2 Browsing source code (PF2)

Brwse (PF2) allows you to Browse the source code of any object:



By pressing **PF2**, a specific object can be "**browsed**" - a small window will be shown at the bottom of the screen. All objects in the *CHART* are shown in **alphabetical order** on this window and **full "paging**" facilities are provided. You can page through the list of objects, or **type** the **name** of the object you want to browse in the field provided. Press **Enter** or **PF2** again and the source code of the object will be displayed.

Alternatively, you can **select** the object you want to browse directly from the *CHART*: move your **cursor** to the required object on the existing *CHART* and press **PF2**.

After browsing an object, you will be returned to the original CHART.

See the section '6 Browsing Source code from within a *CHART*' on Page 41 for detailed information about the browse functions available.

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5.3 Zooming in and out on the CHART (PF4)

Zoom (PF4) allows you to Zoom in (and out) while viewing a *CHART*. By default, the *CHART* display screen can show at most **9 columns by 6 rows** of objects at any one time. Scroll up/down and left/right PF Keys allow viewing of the whole *CHART*:



PF4 allows you to "zoom" into a **15 columns by 11 rows** format so that you can see the overall *CHART* in one screen. At least four characters of the object name can be shown in this format. More characters are shown for narrower *CHART*s. PF10 and PF11 allow you to 'scroll' to the left and right of the object name.



Press **PF4** again to return to the **9 columns by 6 rows** *CHART* display format.


5.4 Finding objects in a CHART (PF5)

Find (PF5) allows you to Find all occurrences (if any) of an object within a *CHART*. By pressing **PF5**, a small window will be shown at the bottom of the screen. All objects in the *CHART* are shown in **alphabetical order** on this window and **full "paging"** facilities are provided.



You can page through the list of objects, or **type** the **name** of the object you want to find in the field provided. Press **enter** or **PF5** again and all the row/column references at which the object appears (if any) will be reported in the message line.

HMC0028: Objec	st PYR-DTLS fou	nd at row/column:	dD dN gJ		
2001-02-18 16	5:23 - _C			rest - H	
d				I	
i:EDT-TF i:EI)T-EN CallNat	DbseFile i:VRFY-F	DbseFile	CallNat	i:EDT-
Y-IF-INV BRTH	I-DTE			intentinde	NTCT
e _					
Cal		Find Object	•	CallNat	CallNa
HA2	Find Object.	. PYR-DTLS		ACXCHNGE	HAZNST
		Page 8	of 13		I
f	Row Col	Objects in Alph	abetical Orden	<u>.</u>	I
	1 5				
	a D	FAIER-DEIAILS			
	d D d F	PAYER-NAME			
	d D d F h I	PAYER-NAME RCBPAM72			
g	d D d F h I d M	PAYER-NAME RCBPAM72 RCCCAM62			
g	a D d F h I d M h J	PAYER-NAME RCBPAM72 RCCCAM62 RCCCAM63		 DbseFile	 Call



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5.5 Drawing a new CHART (PF6)

Chart (PF6) allows you to draw a new *CHART* with new criteria. By pressing **PF6** while viewing a *CHART*, a **new** *CHART* **can be drawn** with new criteria. A window appears at the bottom of the screen allowing you to enter a new seed object, trace interval, exclusions, and "don't explodes". By default, the previously entered values for these fields will be shown.

PF6 is cursor sensitive. Before pressing PF6, you can **select** the object you want as the **new seed** by moving your **cursor** to that object on the existing *CHART*.



Press enter to begin drawing the new CHART. Press PF3 to return to the original CHART.

Another way to draw a new *CHART* is to modify the seed name while viewing a *CHART*. The seed name is a modifiable field: simply type the new seed name and press **Enter**. A new CHART will be drawn for the new seed using the previously used step library and "don't explode" criteria.

2001-02-	-18 16:23	- _C	- _D	_ _E	<i>F</i>	spgmhelp	- _H	- _I -
			<3>		<12>			d
1	(2385)	(2540)	(2455)	(2590)	(2755)	(2740)	(3055)	(2105)
I.	HMCNINDC	HMC100W1	HMC100M3	HAZ100W4	HJ2ERROR	RCCCAM62	HAZ100N8	HAZ100N9
I.								
						<2>		* e
4795)	(5760)	(4110)	(5970)		(3680)	(0660)	(0650)	(0790)
C100W3	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCODE



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5.6 Paging around the CHART (PF7, PF8, PF10, and PF11)

On-line, use PF7 (Up) and PF8 (Down) to scroll up and down a chart longer than six rows. Use PF10 (Left), and PF11 (Right) to scroll left and right on a chart wider than nine columns:

--PF5---PF6---**PF7---PF8---**PF9---**PF10--PF11--**Find Chart **Up Down** Lines **Left Right**

5.7 Calling Method and Line, Object Length, and Save Details (PF9)

PF9 can be used to display (in turn) Calling Method, Calling Line, Object Length, Last Saving User, Last Saved Date, and Library, as follows:

Method ==> *Line* ==> *Length* ==> *User* ==> *Date* ==> *Library* ==> *Method* ==> *etc.*

By default, calling methods are displayed in the CHART, and PF9 is called "Lines":

1								
			<3>		<12>			d
	CallNat	InputMap	InputMap	InputMap	Fetch	Call	CallNat	CallNat
	HMCNINDC	HMC100W1	HMC100M3	HAZ100W4	HJ2ERROR	RCCCAM62	HAZ100N8	HAZ100N9
		I	I			<2>		* е
putMap	CallNat	CallNat	CallNat		InputMap	InputMap	Call	CallNat
C100W3	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCODE
Enter-P <i>H</i>	F1PF2 elp Brwse	PF3PI e Quit Zo	74PF5 com Find	PF6PI Chart U <u>j</u>	F7PF8 p Down	PF9Pl Lines Le	F10PF11 eft Righ	PF12 t Ovrfl

If **PF9** is pressed, the **calling line number** (ie. the line number from which objects were <u>first</u> called) will be displayed instead of **calling methods**, and **PF9** will then be called "Lngth":

MC0059:	Lines Di	isplay: so	ource line	e number :	from which	n object v	was called	1.
_								
			<3>		<12>			d
I	(2385)	(2540)	(2455)	(2590)	(2755)	(2740)	(3055)	(2105)
1	HMCNINDC	HMC100W1	HMC100M3	HAZ100W4	HJ2ERROR	RCCCAM62	HAZ100N8	HAZ100N9
								1
						<2>		* e
4795)	(5760)	(4110)	(5970)		(3680)	(0660)	(0650)	(0790)
C100W3	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCODE
Enter-PF	1PF2	PF3PI		PF6P	F7PF8	PF9 P	F10PF11.	PF12
$H \in$	elp Brwse	e Ouit Zo	oom Find	Chart U	n Down	Lnath L	eft Righ	t Ovrfl
	1.	~			<u> </u>	2 -	2	



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Press **PF9** again, and **object length** will be displayed instead of **calling line number**, and **PF9** will become "SvUsr". Object lengths are rounded to the nearest 10 lines:

нмс0060:	Lngth D	isplay: le	ength of a	called ob	ject (rou	nded to ne	earest 10)	•
_!								
1			<3>		<12>			d
1	1220 lns	240 lns	180 lns	200 lns	140 lns	Call	850 lns	970 lns
1	HMCNINDC	HMC100W1	HMC100M3	HAZ100W4	HJ2ERROR	RCCCAM62	HAZ100N8	HAZ100N9
l l								
						<2>		* e
90 lns	330 lns	190 lns	110 lns		180 lns	30 lns	Call	70 lns
C100W3	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCODE
Enter-PF	'1PF2-	PF3PH		PF6PI	7PF8	PF9 PI	F10PF11-	PF12
He	elp Brws	e Ouit. Zo	oom Find	Chart U	o Down	SvUsr L	eft. Right	- Ovrfl
110	10 2100	o guito Di		01141 0 01		51052 24	010 111911	

Press **PF9** again, and **last saving user** will be displayed instead of **object length**, and **PF9** will become "SvDte":

HMC0061: SvUsr Display: user who saved source code of called object. <3> <12> d us:HMC01 us:HMC02 us:SAGPC us:HMC01 us:HMC01 Call us:HMC02 us:HMC04 HMCNINDC HMC100W1 HMC100M3 HAZ100W4 HJ2ERROR RCCCAM62 HAZ100N8 HAZ100N9 < 2.>e us:HMC04 us:SAGPC s:MC02 us:HMC01 us:HMC02 us:HMC01 Call us:HMC01 C100W3 ACXCHNGE HAZNSTAT SPGMPOST HMC100M4 HAZ100W2 HJCPMNAT SPGMCODE Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---**PF9**---PF10--PF11--PF12---Help Brwse Quit Zoom Find Chart Up Down SvDte Left Right Ovrfl

Press **PF9** again, and **last saved date** will be displayed instead of **last saving user**, and **PF9** will become "Libry". Because there is limited room on this screen, the **last saved dates** are shown without the century:

HMC0062: SvDte Display: date source code was saved. PF21 to see century. <3> <12> d Call 97-05-02 96-01-09 96-01-09 97-03-23 94-07-31 97-12-01 97-12-01 HMCNINDC HMC100W1 HMC100M3 HAZ100W4 HJ2ERROR RCCCAM62 HAZ100N8 HAZ100N9 <2> е -11-23 93-08-22 93-08-22 95-02-11 93-08-22 93-10-02 Call 93-09-14 C100W3 ACXCHNGE HAZNSTAT SPGMPOST HMC100M4 HAZ100W2 HJCPMNAT SPGMCODE Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---**PF9**---PF10--PF11--PF12---Help Brwse Quit Zoom Find Chart Up Down Libry Left Right Ovrfl

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Press **PF21** to see the dates with the century (the separator between day, month, and year is temporarily removed):

HMC0065	SvDte D	isplay: da	ate source	e code was	s saved (including	century)	•
1								
_'			<3>		<12>			d
	19970502	19960109	19960109	19970323	19940731	Call	19971201	19971201
	HMCNINDC	HMC100W1	HMC100M3	HAZ100W4	HJ2ERROR	RCCCAM62	HAZ100N8	HAZ100N9
								I
_						<2>		* e
991123	19930822	19930822	19950211		19930822	19931002	Call	19930914
C100W3	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCODE
Enter-PH	71PF2-	PF3PH	74PF5	PF6PI	F7PF8	PF9 PI	F10PF11-	PF12
He	elp Brws	e Quit Zo	oom Find	Chart U	p Down	Libry Le	eft Right	t Ovrfl

Press **PF9** again, and **library** where the source code was found will be displayed instead of **last saved date**, and **PF9** will become "Mthds" (ie **calling methods**):

MC0063	: Libry D	isplay: 1	ibrary whe	ere source	e of calle	ed object	was found	1.
_			<3>		<12>		I	 d
i	1:PRDLIB	1:DEVLIB HMC100W1	1:PRDLIB HMC100M3	1:DEVLIB HAZ100W4	1:TSTLIB HJ2ERROR	Call RCCCAM62	1:PRDLIB HAZ100N8	l:DEVLIB HAZ100N9
-¦						<2.>		 * e
RDLIB . 100W3 2	1:DEVLIB	1:TSTLIB	l:DEVLIB		1:DEVLIB	1:TSTLIB	Call HJCPMNAT	1:PRDLIB
100W3 2	ACXCHNGE	HAZNSTAT	SPGMPOST		HMC100M4	HAZ100W2	HJCPMNAT	SPGMCOD
nter-P.	eln Brws	e Ouit Z	oom Find	Chart U	n Down	Mthds Le	eft. Right	PF1Z - Ovrfl

Please Note: In **batch**, *CHART*s will have **calling line number** shown immediately **above** the **calling method** and **object length** shown immediately **below** the object name (if there is room on the page).



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6 Browsing Source code from within a CHART

While viewing a *CHART* on-line, press **PF2** to "browse" the source code of any object. A small window will be shown at the bottom of the screen.:





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All objects in the *CHART* are shown in **alphabetical order** on this window and **full "paging"** facilities are provided. You may either page through the list of objects, or **type** the **name** of the object you want to browse in the field provided and press **enter** or **PF2** again. The source code of the object will appear in a window on the bottom right hand quarter of the *CHART* display screen:



Before pressing **PF2** on the *CHART* display screen, you can **select** the object you want to browse by moving your **cursor** to that object on the existing *CHART*. After browsing an object, press **PF3** and you will return to the original *CHART*.

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6.1 Commands and PF Keys available while Browsing

There are many commands available while "browsing" source code. The "browse" commands are similar in style to those used in the normal mainframe NATURAL object editor. Commands can be entered in a field at the top left of the "browse" window. Most commands can also be invoked using a PF Key.

HELP	(PF1):	Display a Help window describing all the commands.
QUIT	(PF3):	Stop browsing source code and return to the CHART.
SC, SCAN	(PF4):	Scan for text. See section '6.2 Scanning for text while Browsing' on Page 44.
+P,SC=	(PF5):	Go down one Page and Scan again.
KEYS/NOKEY	(PF6):	Show or Don't Show the current PF Key settings at the bottom of the screen.
-P	(PF7):	Go up one Page.
+P	(Enter, PF8):	Go down one Page.
SHAPE	(PF9):	Changes the Shape of the browse window. By default, the Shape is a full screen. Other options are "wide", "tall", and "quarter".
LEFT	(PF10):	Show the Left hand side of the source code lines.
RIGHT	(PF11):	Show the Right hand side of the source code lines.
SHIFT	(PF12):	Shifts the browse window to a different position over the <i>CHART</i> . For example, from the bottom half to the top half.
TOP,SC=	(PF17):	Go to the Top of the object and Scan again.
-H	(PF19):	Go up Half a page.
+H	(PF20):	Go down Half a page.
ТОР	(PF22):	Go to the Top of the object.
ВОТ	(PF23):	Go to the Bottom of the object.
-nnnn:		Go up "nnnn" lines.
+nnnn:		Go down "nnnn" lines.
nnnn:		Go to line "nnnn".



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6.2 Scanning for text while Browsing

The 'scan for text' feature within Browse can be invoked by pressing PF4 or by entering 'SCAN' (or 'SC' for short) in the command field at the top of the Browse window:

2001 02	-10 12.41 C	QRI000	<u>E</u>	E'		DEVLIB Lib.
o +	+	+	*		I	
Fetch	LocalDA	Fetch	Perf Ext	CallNat	InputMap	
XXXFER	ZJOBL	ZJOB	QR1000	DATERNGE	QR1000M1	
					۱	
		Brows	e Object			
> scan			P	rogram	QR1000	Lib DEVLIB
D		<u> </u>	2 1	4	1 5	Mode Ctmuct
Brws	+	2 + .	+		+ J	. Mode Struct
Brws 3110	END-DECIDE /*(2)	+. 990)	+	••••4••••	TJ	. Mode Struct
Brws 3110 3120	*	2+. 990)	+	••••4••••	TJ	. Mode Struct
Brws 3110 3120 3130	END-DECIDE /* (2) * DECIDE ON FIRST	2+. 990) VALUE OF #	FUNCTION	4	TJ	. Mode Struct
Brws 3110 3120 3130 3140	<pre>END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S'</pre>	+. 990) VALUE OF #	FUNCTION	4	τ	. Mode Struct
Brws 3110 3120 3130 3140 3150	<pre>END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE</pre>	2+. 990) VALUE OF #	FUNCTION	TO #STATS	-REPORT-R	EQD
Brws 3110 3120 3130 3140 3150 3160	<pre>END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ??</pre>	2+. 990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB-	-REPORT-RI	EQD ST
Brws 3110 3120 3130 3140 3150 3160 3170	<pre>END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11'</pre>	2+. 990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB- TO #ZJOB-	-REPORT-RI SYSOUT-LI COPIES-LI	EQD ST
Brws 3110 3120 3130 3140 3150 3160 3170 3180	<pre>END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT'</pre>	2+. 990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB- TO #ZJOB- TO #ZJOB- TO #ZJOB-	-REPORT-RI SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
Brws 3110 3120 3130 3140 3150 3160 3170 3180 3190	<pre>* END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT' VALUE 'D'</pre>	2+. 990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB- TO #ZJOB- TO #ZJOB-	-REPORT-R SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
Brws 3110 3120 3130 3140 3150 3160 3170 3180 3190 3200	<pre>* END-DECIDE /* (2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT' VALUE 'D' MOVE TRUE</pre>	2+. 990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB- TO #ZJOB- TO #ZJOB- TO #DETAI	-REPORT-R SYSOUT-LI COPIES-LI USER-ID LED-REPT-:	EQD ST ST REQD



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The text to be scanned for can be entered directly after the SCAN command, eg. SC END-DEFINE. If just 'SCAN' (or 'SC') is entered, a window will appear allowing the text to be entered or a previously scanned-text to be selected.

2 +	+	ا +	*			110.
Fetch XXXFER	LocalDA ZJOBL	Fet ZJ	ch Perf Ext OB QR1000	CallNat DATERNGE	InputMap QR1000M1 	
> scan				Scan for '	Text	
Brws	+1+	2	Select			
3110	END-DECIDE /*(299	90)	Previous -	-		
3120	*		Scan -	END-DEFI	ЛЕ	
3130	DECIDE ON FIRST N	/ALU	Values	- #FUNCTION	1	
3140	VALUE 'S'		-	VIEW OF		
3150	MOVE TRUE		-	Descript	ion	
3160	MOVE ' ??	L	OR -	FETCH		
3170	MOVE ' 11'		_	INPUT US:	ING	
3180	MOVE 'PORT'		-	-		
3190	VALUE 'D'		New Value	DECIDE		
3200	MOVE TRUE		Absolute	x		- 11



Up to ten previously scanned text strings are remembered by CHART. You can select any of these previously scanned text strings. The string can be amended, if required.

You can also choose whether the scan is 'absolute' or not. That is, an 'absolute' scan will find the required text even if is embedded within other words. A 'non-absolute' scan will only find the text where it exists as whole or distinct words.

The 'scan for text' feature is case sensitive. SCAN will search for matching text in exactly the case entered, whether it is lower case, upper case or any combination thereof. The scan begins from the current line number of the object being browsed, ie. the first displayed line of the object, as shown below:

- _C - -QR1000 $-_{E} - - -_{F} - -$ 2001-02-18 12:41 ______G - Page: 1L of 1 DEVLIB Lib. + h + + LocalDA Fetch Perf Ext CallNat InputMap Fetch XXXFER ZJOBL ZJOB OR1000 DATERNGE OR1000M1 Browse Object ... QR1000 > Program Lib DEVLIB+...1...+...2...+...3...+...4...+...5.... Mode Struct Scan S 3110 END-DECIDE /*(2990) 3120 * 3130 DECIDE ON FIRST VALUE OF #FUNCTION S VALUE 'S' 3140 3150 MOVE TRUE TO #STATS-REPORT-REOD L' MOVE ' ?? 3160 TO #ZJOB-SYSOUT-LIST MOVE ' 11' 3170 TO #ZJOB-COPIES-LIST MOVE 'PORT' 3180 TO #ZJOB-USER-ID 3190 VALUE 'D' 3200 MOVE TRUE TO #DETAILED-REPT-REOD+.. PF1=? PF3=Q PF5=+19,SC= PF7=-P PF8=+P ...5... S 344 Browse **L** 311

After entering the required text, press enter to start the scan. The next occurrence(s) of the required text will be displayed, marked with an 'S' to the left of the line number. The line(s) where the text occurs will also be displayed in a different colour. Press PF5 to move to the next page and repeat the same scan.



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6.3 Browse any object (without leaving Browse)

CHART allows you to browse any object (within your current step libraries) from within the "browse" feature of the *CHART* display screen. While browsing an object, type 'BR' or 'BROWSE' and an object name in the command line and you will immediately begin browsing the nominated object:

> +	+	+	*			
Fetch	LocalDA	Fetch	Perf Ext	CallNat	InputMap	
XXXFER	ZJOBL	ZJOB	OR1000	DATERNGE	OR1000M1	
			~	_	~	
					· · · · · · · · · · · · · · · · · · ·	
		Brows	e Object			
> brow	se nx4000		P	rogram	QR1000	Lib DEVLIB
Brws	+1+	+.	+	4	+5	. Mode Struct
3110	END-DECIDE /*(29	990)				
3110 3120	END-DECIDE /*(29	990)				
3110 3120 3130	END-DECIDE /*(29 * DECIDE ON FIRST	990) VALUE OF #	FUNCTION			
3110 3120 3130 3140	END-DECIDE /*(29 * DECIDE ON FIRST VALUE 'S'	990) VALUE OF #	FUNCTION			
3110 3120 3130 3140 3150	END-DECIDE /*(2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE	990) VALUE OF #	FUNCTION	IO #STATS	-REPORT-R	EQD
3110 3120 3130 3140 3150 3160	END-DECIDE /*(2) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ??	990) Value of # L'	FUNCTION	IO #STATS IO #ZJOB-:	-REPORT-RI	EQD ST
3110 3120 3130 3140 3150 3160 3170	END-DECIDE /*(29) * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11'	990) VALUE OF # L'	FUNCTION	IO #STATS IO #ZJOB-: IO #ZJOB-:	-REPORT-R SYSOUT-LI COPIES-LI	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180	END-DECIDE /* (29 * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT'	990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB-: TO #ZJOB-: TO #ZJOB-:	-REPORT-R SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180 3190	END-DECIDE /*(29 * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT' VALUE 'D'	990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB-: TO #ZJOB-: TO #ZJOB-:	-REPORT-R SYSOUT-LI COPIES-LI USER-ID	EQD ST ST
3110 3120 3130 3140 3150 3160 3170 3180 3190 3200	END-DECIDE /* (29 * DECIDE ON FIRST VALUE 'S' MOVE TRUE MOVE ' ?? MOVE ' 11' MOVE 'PORT' VALUE 'D' MOVE TRUE	990) VALUE OF # L'	FUNCTION	TO #STATS TO #ZJOB-: TO #ZJOB-: TO #ZJOB-: TO #ZJOB-:	-REPORT-R SYSOUT-LI COPIES-LI USER-ID LED-REPT-:	EQD ST ST REOD

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7 Unplaced Objects within a CHART

Sometimes, objects can NOT be placed in the *CHART*. This is usually because the *CHART* has become too crowded. If there is no room left beneath a "parent" object, then its "child" objects can not be placed.

Unplaced objects indicate that the 'chart' you are trying to draw is too big to be shown on one page (ie. 15 rows x 15 columns of objects). You should consider reducing the level of detail in the 'chart' or maybe split the 'chart' into two or more smaller 'charts'. In batch, extra 'charts' are drawn automatically for each parent object whose 'children' will not fit in a 'chart'.

7.1 How unplaced objects are indicated

If there are any objects that could not be placed in the *CHART*, then the "parent" object will be recorded, and **PF12** (called *Ovrfl*) will be activated. Pressing **PF12** will display a small window so that you can view these "parent" objects. Five "parent" objects can be shown at a time in this window - objects are shown in **alphabetical order** and "paging" facilities are provided. The number of children and the row/column references for the "parent" object are also shown on the window.

	i:S YE-1	 TRE-P DCLRT	 i:ASK-IF -SME-PYR	+ Fetch M000RETN	 f:BTCH-D TLS	<9> FetchRet DMC10012	<1> InputMap RPS100M2	 Call DBCPMNAT	+ b Fetch M000JUME	
				+	+	 x			 * C	
	Inpu DMC:	ıtMap 100M1	Call DBCPMNAT	Fetch M000JUMP	Fetch M000RETN	Objects Unplaced	f:BTCH-D TLS	f:RPS-PY E-DCLRTN	CallNat SPGMCODF	
				<3>		<12>			d	
	Cal			Unp.	laced Pare	ents			allNat	
	RPS	Fir	nd Object	···					MC100N9	
			Dave Cal	Family	Pá	age 1 of	3 ad Childe			
	£.M		KOW COL	נט Size נו	DJECTS WIN	in Unpiace	ea Chilare	en	i e	
	TM		ац bt	ים פ	MC100T2					
			b A	9 1	MC100N0					
			c F	25 D!	MC100N1				' * f	
Мар	Cal		c D	5 Di	MC100N3				allNat	

There is no limit on the number of these "parent" objects that can be recorded. Also, the **number** of children that could not be placed **will be shown** (enclosed in angle brackets, eg. <5>) immediately above the "parent" object in the *CHART*.

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7.2 What to do when there are unplaced objects

The 15 row x 15 column limit allows one 'chart' to be completely printed on a standard mainframe page (ie. 132 print characters x 60 print rows). A 15 x 15 chart can be shown on-line with minimal scrolling.

The 15 x 15 limit also means that a maximum of 211 objects can be shown on one 'page' (15 x 15 = 225, less 14 because only the 'seed' is shown on the first row). It is extremely unlikely that 211 objects or calls will fit into the 15 x 15 matrix because many of the available 211 'slots' will get blocked off by various branches of the 'chart'.

If you were drawing the 'chart' by hand, unplaced objects mean roughly the same as 'I don't have any more room on my piece of paper'. You would probably decide to:

- split the 'chart' into two or more logical pieces, with 'connector' symbols pointing to the various pieces; or
- reduce the level of detail in your hand drawn 'chart' -- make room on your page by erasing less important parts of the 'chart'.

With *CHART* you can do the same by use of "don't explodes" and object type "exclusions". For example, say we draw a 'chart' with a seed called 'PROGA':

		PROGA			
 CallNat SUBPGMD	<3> FetchRet PROGB	InputMap	 Call XTRNLPRG	<9> Fetch PROGC	
* Fetch PROGA	 FetchRet PROGB	 InputMap MAP100A	 CallNat SUBPGMZ	 Fetch PROGZ	 Perform SUBRTNZ



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The 'chart' is too crowded and two objects ('PROGB' and 'PROGC') have three (<3>) and five (<5>) child objects respectively which cannot be drawn. Either split the 'chart' in two or reduce the level of detail, as follows.

• Make 'SUBPGMD' a "don't explode" for the original 'chart' and then draw a new 'chart' for 'SUBPGMD' (with 'PROGA' as a "don't explode"):





Or ...

• add maps (M) to your object type "exclusions" and re-draw the 'chart':



In general:

- consider "excluding" object types which are not important to your current purpose (HelpRoutines, WorkFiles, InlineSubroutines, and DatabaseFiles are good candidates).
- consider using more "don't explodes" and "don't shows" (standard 'error handlers', 'menu handlers', GDAs, LDAs are good candidates).

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- if you are using the 'seed list' (CMWKF01) in batch, consider using the special "don't explode" values: 'CMWKF01', 'CMWKF02' or 'CMWKF04'.

7.3 Unplaced objects in batch CHART-ing

In batch, extra *CHART*s are automatically drawn for each object that has "unplaced" child objects. That is, if the first *CHART* drawn has any "unplaced" objects, an extra *CHART* will be drawn automatically for each different "unplaced" parent within the first *CHART*.

A "table of contents" and "index of objects" covering all the resulting *CHARTs* will also be created automatically. If you don't want extra *CHARTs* to be drawn automatically, specify a "page limit" of one (1) immediately after the seed and immediately before any object type exclusions.

If you are using the 'seed list' (CMWKF01) in batch, the number of unplaced objects can be reduced by using the special "don't explode" values: 'CMWKF01', 'CMWKF02', or 'CMWKF04'.

For example, if you use 'CMWKF01' as one of your "don't explodes" then all seeds in the 'seed list' (ie. in file CMWKF01) will be treated as "don't explodes" within every 'chart':

eg. CH CMWKF01, DSCO, 200, ^ERR*, CMWKF01, MENU*

If you use 'CMWKF02' as one of your "don't explodes" then all the seeds in the 'original seeds plus extra seeds' (ie. in file CMWKF02) will be treated as "don't explodes" within every 'chart'.

eg. CHART CMWKF01,GO,0,CMWKF02,MENU*

If you use 'CMWKF04' as one of your "don't explodes" then all the objects in the 'details of all objects chart-ed in CSV format' (ie. in file CMWKF04) will be treated as "don't explodes" within every (subsequent) 'chart'. This option stops redundant *CHART*-ing because each object with children will only be "exploded" once. In subsequent pages such an object will still be drawn, but with a '+' to indicate it has NOT been exploded. The page/row/col where the object was originally exploded will also be shown above the object name.

eg. CHART CMWKF01,GO,0,CMWKF04,MENU*

See the section '9Drawing CHARTs in Batch' on Page 54 for more details.

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8 How to tell *CHART* to draw Batch Invocation

NATURAL applications often allow for batch or background jobs to be **submitted** from an on-line NATURAL object. The **batch job** would then execute one or many nominated NATURAL programs. It is important to include calls to the **batch** environment in the *CHART*s you will generate for your applications. Otherwise, a significant part of your system will not be documented.

A standard **batch submission** program called 'NATRJE' (ie. **NATURAL Remote Job Entry**) was provided by Software AG with NATURAL Version 2.2 onwards. *CHART* detects and draws calls to **batch** NATURAL made with 'NATRJE'. For example ...

MOVE '//CMSYNIN DD *' TO #JCL-CARD(13) MOVE 'LOGON DEVL' TO #JCL-CARD(14) MOVE 'HERPROGA' TO #JCL-CARD(15) ... CALL 'NATRJE' #JCL-CARDS(01) ...

2001-02-18 12:42 ~ C ~ ~ ~ D ~ ~ ~ E ~ ~ HISPROG7 ~ G ~ ~ Page: 1 of 1 User: YOURID Library: DEVL 1 1 - 1 b CallNat Batch InputMap InputMap HERSUBP1 NATRJE HISMAP1 HISMAP2 Т Batch HelpRout С HERPROGA HISHELP WrteForm InputMap d HERFORMA HISMAP3

Before the advent of 'NATRJE', **batch submission** was commonly achieved by calling an **external** (ie. non-NATURAL) program. While very similar in purpose and content, these **batch submission** programs are usually unique to a site, each with a slightly different set of parameters. Because the **batch submission** calls are non-standard, it is not possible to cater for every variation of them in advance. However, some existing clients have had their own "batch invokers" incorporated directly into the *CHART* software.

Also, up to four simple "batch invokers" can now be defined in the initial 'CHART' program. For example, a site may invoke batch with ...

MOVE 'B' TO #JOB-CLASS MOVE 'X' TO #MSG-CLASS MOVE 'PAY100B' TO #BATCH-NATURAL ... CALLNAT 'NATSUB' #JOB-CLASS #MSG-CLASS #BATCH-NATURAL ...



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This is a <u>simple</u> "batch invocation" and can be defined to *CHART* (in the initial 'CHART' program) with the following ...

MOVE 'NATSUB' TO #BATCH-INVOKER-1 MOVE 03 TO #BATCH-PARM-1

CHART will detect the CALLNAT to 'NATSUB', will look at the <u>third</u> parameter of the CALLNAT, will determine what value(s) it has been set to, and will draw ...

User: YOURID					Library:	DEVL
		1	1	1		
)	CallNat	Batch	InputMap	InputMap		
	PAY100N	NATSUB	PAY100M1	PAY100M2		
		1		I		
		1		I		
2		Batch		HelpRout		
		PAY100B		PAY100H2		
		1		1		
				1		
1		WrteForm		InputMap		
		PAY100F1		PAY100M3		

When using *CHART* on-line, the settings of the four simple "batch invokers" can be viewed (and altered) by pressing PF7 on the "seed" menu ...

	X T	Execute Program			
	В	Debugging Facility	Batch Par	rameters	
	G L	List Objects, X-Ref Global Environment	Object which	Natural program	
	Seed Don't	Draw New Chart with N Exclude ^M* ^DB*	invokes batch Natural	to be run in batch is in Parameter	
	Expl/Show Command ==		1. NATSUB 2	3_ 	
Command =			3. 4.	_	
Enter-PF1 Help	PF2PF3 About Quit	PF4PF5PF6PF7 Main Order StpLb Batch			1



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9 Drawing CHARTs in Batch

CHART can be used in the **batch** environment, allowing charts to be **printed** on lineprinters or laserprinters for review or documentation. Some sample JCL for running *CHART* in batch follows:

```
//<userid>C JOB 'CHART V2',CLASS=A,MSGCLASS=X,NOTIFY=<userid>
//*
//NATBATCH EXEC PGM=...
//STEPLIB DD DSN=...
          DD DSN=...
//
//DDCARD DD DSN=...
//*
//CMPRINT DD SYSOUT=*
//CMPRT01 DD SYSOUT=*
//CMPRT02 DD SYSOUT=*
//CMPRT03 DD SYSOUT=*
//CMPRT04 DD SYSOUT=*
//*
//CMWKF01 DD DSN=<seeds identified for extra charts>, DISP=OLD
//CMWKF02 DD DSN=<seeds plus any extra parents>, DISP=OLD
//CMWKF03 DD DSN=<data file for index of objects>, DISP=OLD
//CMWKF04 DD DSN=<details on each object charted>, DISP=OLD
//*
//CMSYNIN DD *
LOGON <library>
GLOBALS IM=D
CHART <seed-1>,<exclude-types>,<page-limit>,<don't-explode>,...
CHART <seed-2>,<exclude-types>,<page-limit>,<don't-explode>,...
. . .
FIN
/*
11
```

The 'chart' commands within the CMSYNIN ddname tell CHART what to do. For example, the command:

```
CHART IMP34011,GO,20,XM*
```

will tell *CHART* to draw a chart with a seed of IMP340I1 using object type exclusions of 'GO' (Global Data Areas, Inline Subroutines, and Database Files) with a page limit of 20 and a "don't explode" of 'XM*' (don't explode any objects starting with 'XM').

Any number of charts can be drawn in this way. If more charts are required, simply repeat the line:

CHART <seed-n>,<exclude-types>,<page-limit>,<don't-explode>,...

and enter the extra seed along with the object exclusions, page limit, and "don't explodes" you require. An example chart drawn in batch is shown of the next page.

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2001-02-3 User:	18 10:29: HMC01	46			**** CHAR Seed: MS1	T V3.1F f 100 Exc	or Natura lusions:	l **** GDA iSrt 1	DbFl				Lib: D	EVLIB
Don't /	Only Exp	1. / Show	7 ^XX*	^Z*		MS1101	MS12*	M	S S13*	tep-Libra UZA*	ry(s)-TES: UZI	FLIB-PROD P*	LIB-CHA	RT-SYSTE
A	В	С	D	Е	F	G	Н	I	J	K	L	М	Ν	0
d						MS1100 950 lns								
ь I			+		+	¦					*			
(5710)		(2540)	(6710)	(3890)	(7100)	(2190)	(7970)	(8230)	(9340)		(9470)			(6690
CallNat		CallNat	Fetch	CallNat	CallNat	InputMap	InputMap	InputMap	Call		Perf Ext			Feto
UZHCONFL		UZDATE	MS1101	UZCIRC	UZPARTY	MS1100M1	MS1100M3	MS1100M4	SORT1D		MS1100			MS11015
800 lns		100 lns	3	230 lns		130 lns	60 lns	210 lns						420 lr
I				1		I								
c		I		*		I	1		I					
		(0990)	(1620)	(2320)		(0071)	(0038)	(0100)	(0089)					
1		InputMap	InputMap	Peri Ext		HelpRout	HelpRout	HelpRout	HelpRout					I
1		70 lpg	50 lps	UZCIRC		UHROOM	MSIIUUHI 90 lpc	00 lpc	40 lpc					1
1		70 1115	5 50 1115			40 1115	00 1115	90 1115 I	40 1115					1
d I						i		1	I				+	 *
-						(0320)		(0520)	(0310)	(1860)		(1730)	(3420) (4230
Ì						CallNat		InputMap	CallNat	Fetch		InputMap	CallNa	t Perf E
						UZHELPNO		UZHELPM	UZHELP	MS1003		MS1101S1	UZPART	Y MS1101
						110 lns		80 lns	100 lns	440 lns		150 lns		
e (3790)	(3240)	(3950)	(6990)	(7070)	(7960)	(0660)			(0660)					
(3790) InputMap	(3240) Call	(3950) InputMap	(0000) ThoutMap	(7070) InputMap	Perf Ext	(0000) InputMap			(0000) InputMap	i i				
JHDISPBK	SORT1D	UHDISPRM	1 UHUPMLST	UHUPMLOC	UZHCONFL	UZHELPM			UZHELPM	i				
60 lns		70 lns	s 80 lns	70 lns		80 lns			80 lns	Í.				
f										I				
										I				
										I				
										-				
ſ	+			+		+	*	*	+	' +			+	*
9	(1410)	(2030)	(2970)	(3340)	(3420)	(3790)	(3580)	(3590)	(3810)	(4230)	(4370)	(3300)	(4270) (4420
	CallNat	Call	HelpRout	CallNat	Call	Fetch	StackCom	Fetch	Fetch	CallNat	CallNat	Fetch	CallNa	t Perf E
	UZPARTY	SORT1D	MS1001H1	UZPRTER	UPCASE	MS1300	MS1003	MS1100	MS1200	UZALLOC	UZFREE	MS1001	UZPRSA	LE MS100
			70 lns								70 lns	430 lns		
A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0

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For *CHART*s drawn in batch the current date, time, user, and library are shown at the top of each page. The heading of the *CHART* also shows the seed name, any object type exclusions, any step libraries, and any "don't explodes" in effect when the *CHART* was drawn.

In batch, object type exclusions are abbreviated in the following way:

Сору	Copycode	GDA	Global Data Area	Spgm	Subprogram
Pgm	Program	LDA	Local Data Area	Help	Helproutine
Xtnl	External Program	PDA	Param Data Area	Isrt	Internal
XSrt	External Subroutine	Btch	Batch Call		Subroutine
Skey	Set Key	Work	Work Files	DbFl	Database File

Row identifiers (a, b, c, ...) and column identifiers (A, B, C, ...) are shown on the boundaries of the *CHART*. If there is room on the page, the calling line number (eg. (5710)) is shown above the calling method (eg. CallNat) and the object's length (200 lns) is shown below the object name (eg. UZHCONFL).

In **batch**, the generated *CHART*s are written to Natural report file two (CMPRT02). This report file can be directed to any normal system output class or device. The report file can also be directed to a dataset. This dataset should have a record format of **FBA** (Fixed length records, **B**locked, **A**NSI Carriage Control Characters) and a record length of **133**.

Error messages are written to Natural report file zero (CMPRINT) so this report file should also be included in your JCL (as in above example). Report files one (CMPRT01), three (CMPRT03) and four (CMPRT04) should also be included to allow for **table of contents**, **index of objects**, and **not referenced list** respectively.

Not referenced list will <u>only</u> be generated if you specify a "page limit" of zero (0).

Table of contents will <u>not</u> be generated if you specify a "page limit" of one (1).

Work files 1 to 4 should also be defined when running *CHART* in batch. The datasets referred to by these work files should have the following attributes:

DD Name	Record Format	Record Length	Disposition
CMWKF01	FB	80 bytes/characters	Read/Write, OLD/NEW
CMWKF02	FB	80 bytes/characters	Read/Write, OLD/NEW
CMWKF03	FB	20 bytes/characters	Read/Write, OLD/NEW
CMWKF04	FB	160 bytes/characters	Read/Write, OLD/NEW

Blocksize for these datasets can be any multiple of the record length and should conform to your site's record blocking conventions. Do NOT use a dataset DISPosition of MOD (for MODify) for these work files in your JCL as this will lead to unpredictable results during the generation of the "Index of Objects" and "Table of Contents". If CMWKF04 is used as special "don't explode" value, then you must also define CMWKF05 in your JCL, with the same record format and record length as CMWKF04.

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10 High Volume *CHART*-ing in Batch

CHART can be used in **batch** to generate a large number of charts in one background job. If all the seeds of your application can be identified, *CHART* can be used in **batch** to completely **document** and **audit** that application, in the following way:

•	pass all the seeds of your application to CHART	(in CMWKF01);
•	a table of contents (including page numbers) will be created	(in CMPRT01);
•	charts will be generated for each seed	(in CMPRT02);
•	extra charts will be generated for each new unplaced object	(in CMPRT02);
•	an index of objects will be created (showing date last saved, librate every page number / row / column at which the object appears)	ry, and (in CMPRT03);
•	an audit list of objects 'not referenced' can be created	(in CMPRT04).

10.1 The seed list, CMWKF01, and the 'table of contents'

CHART can read the names of the **seed** objects from a dataset (Natural work file - CMWKF01) and generate a chart for each **seed**. This dataset can also hold a 70 character title for the **seed** object. The seed name and its 70 character **title** will be printed at the head of its chart. The last 2 characters of each 80 character record are reserved for use by the *CHART* software.

An example of records which could be in CMWKF01:

IMP340I1 Interim Movement Processing, Part 1

CHART will read 'IMP34011' as the **seed** for a chart, and 'Interim Movement Processing, Part 1' will be used as the **title** of the chart. The seed name and the title will appear in the **table of contents**.

If this 'high-volume/dataset' feature is used, *CHART* will automatically create a **table of contents** for the seeds, showing the seed object name, its title, and the page number its chart appears on. The **table of contents** is produced in seed name order, in title order, and also in page number order. The **table of contents** is written to Natural report file one (CMPRT01).

If objects cannot be drawn because the chart is too crowded, an extra chart is drawn (automatically) to completely drawn those objects. This is achieved by temporarily adding the 'parent' of the affected objects to the list of seeds in CMWKF01 (and its copy in CMWKF02). The extra charts are included in the **table of contents** with the same title as the original seed, but with "(Cont.)" appended. The extra 'parent' objects are removed from CMWKF01 when the **table of contents** is generated.





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10.2 Wildcard in the seed name

CHART allows a wildcard to be used in the seed name in batch. For example, if a seed of 'UXD*' is used, then every program, subprogram, subroutine, and helproutine starting with 'UXD' in the current library will be added to the seed list in CMWKF01 and *CHART* swill be drawn for each one.

10.3 CMWKF03, CMWKF04, and the 'index of objects'

CHART will also automatically create an **index** of all objects appearing in the charts. The **index** is generated from information recorded in CMWKF03 and CMWKF04 and is written to Natural report file three (CMPRT03) and shows:

- the object name,
- the object length (rounded to the nearest 10 lines),
- the (first) library where the object was found,
- all the pages which the object appears on,
- the row and column which the object appears at (for each page),
- the date the object was last saved.

In this way, *CHART* can be used to completely **document** your application. If all the **seeds** relevant to your application can be identified and entered into a dataset, *CHART* can automatically generate program charts for each seed, along with a **table of contents** and an **index** of all objects. As your application changes over time, seeds can be added to or removed from the seed 'dataset'. *CHART* can then be used at any time to completely re-document your application.

10.4 Page limit and the 'not referenced' list

If a "page limit" of zero is specified, a **not referenced** listing will be written to Natural report file four (CMPRT04). To generate this listing, all the objects identified in all the *CHART*s are checked against the current library and all the step libraries. If any <u>other</u> objects are found on these libraries, they are added to the **not referenced** listing. That is, they are objects **NOT** referenced in any program chart. These objects may no longer be required, or may highlight that a seed was not included in the seed 'dataset'.

At the end of processing, 'extra' seeds (ie. unplaced objects) are removed from CMWKF01 but are left in CMWKF02 for information. Information about every object in every *CHART* is written to CMWKF04 in a CSV (Comma Separated Value) format.

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10.5 Sample JCL for high-volume CHART-ing

Sample JCL to run the 'high-volume/dataset' feature of CHART in batch follows:

```
//<userid>C JOB 'CHART V2',CLASS=A,MSGCLASS=X,NOTIFY=<userid>
//*
//NATBATCH EXEC PGM=...
//STEPLIB DD DSN=...
11
          DD DSN=...
//DDCARD DD DSN=...
//*
//CMPRINT DD SYSOUT=*
//CMPRT01 DD DSN=<userid>.TABLE.OF.CONTENTS,
         DISP=(NEW,CATLG,DELETE),SPACE=(TRK,(1,1),RLSE),
11
11
              UNIT=SYSDA, DCB= (RECFM=FBA, LRECL=133, BLKSIZE=13300)
//CMPRT02 DD DSN=<userid>. PROGRAM.CHARTS,
11
              DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (10, 10), RLSE),
11
              UNIT=SYSDA, DCB= (RECFM=FBA, LRECL=133, BLKSIZE=13300)
//CMPRT03 DD DSN=<userid>.INDEX.OF.OBJECTS,
11
            DISP=(NEW,CATLG,DELETE),SPACE=(TRK,(2,2),RLSE),
11
             UNIT=SYSDA, DCB= (RECFM=FBA, LRECL=133, BLKSIZE=13300)
//CMPRT04 DD DSN=<userid>.SURPLUS.OBJECTS,
11
             DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (2,2), RLSE),
              UNIT=SYSDA, DCB=(RECFM=FBA, LRECL=133, BLKSIZE=13300)
11
//*
//CMWKF01 DD DSN=<userid>.ORIGINAL.SEEDS, DISP=OLD
//CMWKF02 DD DSN=<userid>.ORIGINAL.SEEDS.AND.EXTRA.SEEDS,
11
              DISP=(NEW,CATLG,DELETE),SPACE=(TRK,(1,1),RLSE),
11
              UNIT=SYSDA, DCB= (RECFM=FB, LRECL=80, BLKSIZE=16000)
//CMWKF03 DD DSN=<userid>.DATA.FOR.INDEX.OF.OBJECTS,
              DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (5, 5), RLSE),
11
11
              UNIT=SYSDA, DCB=(RECFM=FB, LRECL=20, BLKSIZE=16000)
//CMWKF04 DD DSN=<userid>.CHARTED.OBJECTS.CSV.FORMAT,
              DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (10, 10), RLSE),
11
              UNIT=SYSDA, DCB= (RECFM=FB, LRECL=160, BLKSIZE=16800)
11
//*
//CMSYNIN DD *
LOGON <library>
GLOBALS IM=D
CHART CMWKF01,<exclude-types>,<page-limit>,<don't-explode>,...
FIN
/*
11
```

To invoke the 'high-volume/dataset' feature of *CHART*, specify 'CMWKF01' as the seed (as in the above example). The seed 'dataset' (in the above example, <userid>.ORIGINAL.SEEDS) should already exist, with a record format of FB and a record length of 80. The first 8 characters of each record should hold a

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seed object name, the next 70 characters can hold that seed's description or title, and the last 2 characters are reserved for use by the *CHART* software.

Blocksize for these datasets can be any multiple of the record length and should conform to your site's record blocking conventions. Do NOT use a dataset DISPosition of MOD (for MODify) for work files 1 to 4 in your JCL as this will lead to unpredictable results during the generation of the "Index of Objects" and "Table of Contents". If CMWKF04 is used as special "don't explode" value, then you must also define CMWKF05 in your JCL, with the same record format and record length as CMWKF04.

Examples follow of parts of a high-volume batch *CHART* execution. The first page of the **table of contents** (page order) is shown, followed by the last three **charts** (pages 53 to 55), the first and last pages of the **index of objects** (pages 56 and 63), and finally the **not referenced list** (page 64).

2001-02-18 13:0 User: HMC01	06:02	(No Page Limit) Table of Contents	Natural **** - Page Order	Page i Lib: DEVLIB
Seed Page	Title		Seed Page Title	
User: HMCU1 Seed Page AC1000 1 AC1002 2 AC1001 2 AC1001 4 AC1205M4 5 AC1205M4 5 AC1205M4 5 AC1205M4 5 AC1200M1 9 AC1209M1 9 AC1209M1 9 AC1209M1 12 AC1202 16 AC1215 17 AH1003 18 AH1200 19 XNRALC 20 XNFRCASE 21 XNFRCASE 21 XNFRCASE 22 XNFCCL2 2 XNFCCL2 2 AH1200M1 24 XNFRCASE 21 XNFRCASE 22 XNFCCL2 2 XNFCCL2 2 AH1200M1 24 XNFRCASE 21 XNFRCASE 21 XNFRCASE 22 XNFCCL2 2 XNFCCL2 2 AH1200M1 24 XNFRCASE 21 XNFCCL2 2 AH1200M1 24 XNFRCASE 20 XNFCCL2 2 AH1200M1 24 XNFRCASE 20 XNFCCL2 2 AH1200M1 24 XNFRCASE 20 XNFCCL2 2 AH1200M1 24 XNFCCL2 2 AH120M1 24 AH120M1 24	Title Maintain	(No Page Limit) Table of Contents Cases (Cont.) Cases (Cont.) Cases (Cont.)	- Page Order Seed Page Title EP1200 51 View Cases (Cont.) EP1204 52 View Cases (Cont.) EP1000 53 View Hearings EP1000 54 View Parties EP1000 55 View Members 	Lib: DEVLIB
Acl205M3 29 AH1000 30 AP1000 31 AM1000 32 TM1000 33 ACL203 34 FR2000 36 SE1000 37 CR1000 38 XNHELP 39 WR1000 40 EC1000 41 EC1000 41 EC10001 42 EC1001 42 EC1001 45 EC1212 46 EC1212 47 EC1226 48 EC12216 49 EC1227 50	Maintain Maintain Maintain Update T Maintain File Loc Update F Decision Decision Urev Cas View Cas	Cases (Cont.) Hearings Parties Members ables File Locations Ubmit Report ation Report ation Report tinal Decisions Details Correction Details Correction Reasons Audit Report es (Cont.) es (Cont.) es (Cont.)		





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	HMC01			:	Seed: EH1	000 Exc	or Natura lusions:	I **** GDA iSrt I	ObFl				Lib: DEV	VLIB
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(1190)				(0410)	(0620)		(0800)	+						(0950)
Fetch EH1002				InputMap EH1000M1	CallNat XNCASE	CallNat XNYEAR	CallNat XNDATE	StackCom EH1000						Fetch EH1001
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				(0059) HelpBout										
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(2740) Fetch	(1200) Call	(2280) CallNat	(2500) HelpRout	(2640) Fetch	(2730) StackCom	(2820) Perf Ext				(1770) InputMap	(2340) CallNat	(3260) Perf Ext	(3120) InputMap	p
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User:	HMC01					Ind	lex of Obj	ects						Lib:	DEVLIB
Object	Lngth	Library	Page RC	Last Saved	Object	Lngth	Library	Page	RC	Last Saved	Object	Lngth	Library	Page RC	Last Saved
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AC1001	290	DEVLIB	1 bB	1998-12-20	1		DEVLIB	10	jΑ		AC1207M2	110	DEVLIB	28 bG	1998-10-27
		DEVLIB	3 aG				DEVLIB	10	mK		AC1209	190	DEVLIB	1 cA	1998-11-17
		DEVLIB	3 bG				DEVLIB	38	hM				DEVLIB	1 iE	
		DEVLIB	3 bH				DEVLIB	38	ήN				DEVLIB	2 eE	
AC1001H1			3 cF	<nosource></nosource>	AC1205M1	80	DEVLIB	1	jc	1998-10-27	1		DEVLIB	2 kE	
AC1001M1	110	DEVLIB	3 bF	1998-10-27			DEVLIB	2	kC				DEVLIB	4 dD	
AC1002	290	DEVLIB	1 bA	1998-11-17			DEVLIB	4	dH		1		DEVLIB	4 eG	
		DEVLIB	2 aG				DEVLIB	6	aG		1		DEVLIB	10 aG	
		DEVLIB	2 bH				DEVLIB	10	mC				DEVLIB	10 bI	
		DEVLIB	2 bI				DEVLIB	38	j0				DEVLIB	10 aI	
		DEVLIB	3 bE		AC1205M2	150	DEVLIB	1	jJ	1999-02-08			DEVLIB	10 mE	
AC1002H1			2 cG	<nosource></nosource>			DEVLIB	2	kН				DEVLIB	38 iG	
AC1002M1	150	DEVLIB	2 bG	1998-10-27			DEVLIB	4	dI		AC1209M1	100	DEVLIB	10 bE	1998-10-27
AC1201	430	DEVLIB	1 eN	1999-02-08	1		DEVLIB	10	mH		AC1209ST	200	DEVLIB	1 cC	1998-12-18
		DEVLIB	1 iL		1		DEVLIB	38	jЈ				DEVLIB	1 jD	
		DEVLIB	2 gH		AC1205M3	190	DEVLIB	1	jG	1998-10-27	1		DEVLIB	2 eB	
		DEVLIB	2 ij				DEVLIB	2	kΙ		1		DEVLIB	2 kD	
		DEVLIB	4 gF		1		DEVLIB	4	dJ		1		DEVLIB	4 dC	
		DEVLIB	4 hC		1		DEVLIB	10	mJ		1		DEVLIB	4 eE	
		DEVLIB	10 iJ		1		DEVLIB	29	aG		1		DEVLIB	10 qH	
		DEVLIB	10 jI		1		DEVLIB	38	jL		1		DEVLIB	10 mD	
AC1202	730	DEVLIB	1 eH	1998-11-20	AC1205M4	180	DEVLIB	1	jΙ	1998-11-18	1		DEVLIB	12 aG	
		DEVLIB	2 gI		1		DEVLIB	2	kA		1		DEVLIB	12 bH	
		DEVLIB	4 gH		1		DEVLIB	4	dG		1		DEVLIB	38 jF	
		DEVLIB	10 iG		1		DEVLIB	5	aG		AC1209S1	90	DEVLIB	12 bF	1998-11-05
		DEVLIB	16 aG		1		DEVLIB	10	mΙ		AC1210	1370	DEVLIB	10 b0	1999-02-10
		DEVLIB	16 bI		I		DEVLIB	38	jК	1	I		DEVLIB	10 d0	
AC1202M1	150	DEVLIB	16 bE	1998-10-27	AC1205M5	90	DEVLIB	1	jF	1998-10-27	AC1210B	590	DEVLIB	10 dG	1998-11-17
AC1203	850	DEVLIB	1 eM	1999-02-08	1		DEVLIB	2	kF		1		DEVLIB	10 eG	
		DEVLIB	2 gJ		1		DEVLIB	4	dE		AC1212	100	DEVLIB	1 g0	
		DEVLIB	4 gI		1		DEVLIB	10	mF		1		DEVLIB	2 gL	
		DEVLIB	10 iH		1		DEVLIB	38	jН		1		DEVLIB	4 gK	
		DEVLIB	34 aG		AC1206	240	DEVLIB	1	iМ	1998-12-23	1		DEVLIB	10 iK	
		DEVLIB	34 bJ		1		DEVLIB	2	iΙ		1		DEVLIB	27 aG	
		DEVLIB	34 bK		1		DEVLIB	2	jΙ		AC1212M1	130	DEVLIB	27 bG	1998-10-27
AC1203M1	240	DEVLIB	34 bH	1998-11-06	1		DEVLIB	4	hΕ		AC1213	890	DEVLIB	38 cA	1998-12-24
AC1203M2	60	DEVLIB	34 bC	1998-10-27	I		DEVLIB	4	jF	1	1		DEVLIB	38 fI	

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er:	HMC01					Ind	ex of Obj	ects				Lib: DEV	/LIB
Object	Lngth	Library	Page RC	Last Saved	Object	Lngth	Library	Page RC Last S	aved Obje	ct Lngth L	ibrary	Page RC Las	st Saved
NPARTYJ	140	DEVLIB	44 cL	1998-11-27	XNTAXYR	40	DEVLIB	2 eJ 1998-1	1-30				
XNPARTYT	200	DEVLIB	10 bH		I		DEVLIB	4 bF	1				
		DEVLIB	10 cH		1		DEVLIB	4 eL	1				
		DEVLIB	12 bE		I		DEVLIB	10 gM	1				
		DEVLIB	12 cE		XNTITLE	50	DEVLIB	10 dL	1				
(NPARTY2	120	DEVLIB	18 1A		1		DEVLIB	10 eE	1				
		DEVLIB	19 fC		1		DEVLIB	18 1E	1				
INPRCASE	1540	DEVLIB	1 eG	1999-01-27			DEVLIB	19 fG					
		DEVLIB	1 gJ		XNYEAR	50	DEVLIB	1 bG 1998-1	1-25				
		DEVLIB	2 eD				DEVLIB	1 CB					
		DEVLIB	2 hG				DEVLIB	2 eH					
		DEVLIB	4 gN				DEVLIB	4 bC					
		DEVLIB	4 i0				DEVLIB	4 eH					
		DEVLIB	10 1N				DEVLIB	10 gK					
		DEVLIB	10 kO				DEVLIB	30 DE					
		DEVLIB	18 bL				DEVLIB	3/ DE					
		DEVLIB	18 dN				DEVLIB	38 DH					
		DEVLIB	21 aG				DEVLIB	40 bG					
		DEVLIB	21 61				DEVLIB	41 DH					
		DEVLIB	41 eK				DEATIR	53 DG					
		DEVLIB	41 g1										
		DEVLIB	44 GL										
		DEVLIB	44 NI										
NDDMDD	7.0	DEVLIB	53 00	1000 11 20									
NPRIER	70	DEVLIB	1 ek	1998-11-30									
		DEVLIB	2 g0										
		DEVLID	10 10										
		DEVLIB	10 10										
		DEVLIB	18 DE										
		DEVLID	10 UG										
		DEVLIB	33 dN										
		DEVITE	33 fC										
		DEVIJE	41 65										
		DEVIJE	41 gE										
		DEVLTB	44 eH										
		DEVLIB	44 hF										
		DEVLTB	53 d.T										
INSTATUS	230	DEVLIB	1 CH	1999-02-08									
		DEVLIB	1 gF										
		DEVLIB	2 cK										
		DEVLIB	2 hC										
		DEVLIB	4 cN										
		DEVLIB	4 iK										
		DEVLIB	21 bD										
		DEVLIB	41 cF		1				i i				
		DEVLIB	44 cK		1				i i				
	4.0	DEVIJE	1 eE	1998-11-30					i i				

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2001-02-1 User:	L8 13:11:50 HMC01			****	CHART V3.1 Object	F for Natu s NOT Refe	ral **** renced				Page 64 Lib: DEVLIB
Object	Object	Object	Object	Object	Object	Object	Object	Object	Object	Object	
AA1000	AS1001	FC1000M1	HEXLDTRN	LC1100H2	NH1000	TA1300	VB2000				
AA1000B	AS1001B	FR1000B	HEXLICEN	LC1100M1	NH1000B	TA1300M1	VB2000M1				
AA1000M1	CC1000M1	FR2000B	HEXTRNLD	LC1100M2	NH1000M1	TC1000	WR1000B				
AC1205AA	CF1000	GLOBAREA	HP1000	LC1100M3	NL1000	TC1000B	XF1000				
AC1205MA	CF1000M1	HD1000	HP1000M1	LC2000	NL1000M1	TC1000M1	XHAGCY				
AC1205OR	CF1001B	HD1000M1	HP1100	LC2000H1	NL2000B	TD1004	XHAGCY1				
AC1210ST	CH	HD1001B	HP1100M1	LC2000M1	NS	TD1005	XHBOOK				
ACZZUUAA	CHART	HDIUU2B	HPIZUU	LCZIUU	PLICOU	TIM	XHCGRPS				
AHLISTST	CMI000	HD1003B	HPI200HI	LCZIUUMI	PLICOMI	TIM-AUTH	XHCTYPS				
AH1100H2	CMICOUMI	HD2000	HF1200M1	LC3000	PLZUUU	TIM-CASE	XHDIIFS				
AP1400	CMIDDIB	HD2000MI	HRI000	LC3000MI	PRNTCASE DD1000	TIM-DEL	XHGGRP				
AP1400B	CM2000	HD2001B	UP1001B	LC3100B	RB10000	TIM-LCID	VHLOCN				
AP2000	CM2000M1	HE1000B	HS1004	LC4000M1	RB2000	TIM-LOOK	XHPARTY				
AP2000M1	CM2001B	HE1000M1	HS1004B	LC4000M2	BB2000M1	TIM-RSB2	XHREPT				
AP2002B	CM2002B	HE1001	HS1004M1	LOAD	RB2000M2	TIM-RSUB	XHSOLCS				
AP3000	CNTCASEB	HE1001B	HU1000	LOADAG	RB2000N	TIMBATCH	XHSTUS				
AP3000M1	CNTCASES	HE1001M1	HU1000B	LOADCIRC	RD1000	TIMONLIN	XHTABL				
AP3002B	CS1000	HE1002	HU1000C	LOADCS	RD1000B	TR1000	XHTRIB				
AP4000	CS1000M1	HE1002B	HU1000M1	LOADCS2	RD1000M1	TR1000B	XNCALC				
AP4000B	CS1001B	HE1002M1	ID1000	LOADHR	REMAAT	TR1000M1	XNCALC2				
AP4000M1	CS1002B	HE1003	ID1000B	LOADLC	REMAAT2	TR2000	XNCALC3				
ARXLAS2	DC1000	HE1003B	ID1000M1	LOADMBCM	SC1000	TR2000B	XNCONF				
AR6101	DC1000B	HE1003M1	IR1000	LOADMEMB	SC1000B	TR2000M1	XNCONFM1				
AR6101C	DC1000M1	HEX#DATE	IR1000B	LOADM1	SC1000M1	TV1000	XNGHELP				
AR6101M1	DC2000	HEX#DISP	IR1000C	LOADPTS	SD1000	TV1000M1	XNHEAR				
AR6103Y	DC2000M1	HEX#DONT	IR1000D	LOAD1	SD1000B	TV1001	XNHEARM1				
ARGIUSIM	DC2001	HEX#DRAW	TRICOLE	LOADIHI	SDIUUUC	TVIDUIMI	XNHELPMS				
AR610311	DE1000	HEX#EXC	TRIOUOF	LOADIMI	SD1000M1	TV1001M2	XNHLPI				
AR010312	DE1000B	UEV#EVDD	TR1000G	LOAD2M1	SR100VM2	TV1002	VNINCR				
AR6107C1	DE1000C	HEX#INIT	TR1000T	MB1000	SR100V2	TV1002M2	XNINCR4				
AR6107MC	DE1000M1	HEX#LANG	IR1000,7	MB1000M1	SR101V2	USR-FLD	XNINCR5				
AR6109	DE2000B	HEX#LCFM	IR1000K	MB1001	SR101V2M	USR-MSG	XNLINK				
AR6109C	DE2000C	HEX#LCMM	IR1000MS	MB2000	SR1100B	USR0070P	XNLINKM1				
AR6109M1	DE2000D	HEX#LINE	IR1000M1	MB2000M1	SR1100H	USR0070T	XNLIST				
AR6111Y	DOWNLDDE	HEX#LNGI	IR1000SA	MB2001	SR1200B	USR0330P	XNPARTYN				
AR6111YM	DOWNLM1	HEX#LNGO	IR1000SB	MB2001M1	SR2000	USR0330T	XNPARTYV				
AR6111Y1	DOWNLOAD	HEX#LNUM	IR1000SC	MB3000	SR2000M1	USR1025P	XNPRCAST				
AR6111Y2	EC1204	HEX#MSG1	IR1000SD	MB3001	SR2100B	USR1025T	XNTEST				
AR6200	EC1204M1	HEX#MTHD	IR1000SE	MB3001M1	SR3000M1	USR1029P	XNYEAR				
AK6200M1	ECI207AA	HEX#OBJT	IRIUOOSF	MB4000	SISINFO	USR1029T	XXGLOBS				
AR02UIC	EC1213M1	DEX#UKD	TRIUUUSG	MB4000M1	SISINFUD	USKIUSZP	12KCONV V2KCONV				
AR0301M1	EC1213M1	HEY#ORDI	TRIOOOSH	MC1000	SYSTNFOP	USR10321	Y2KCONVL				
AR7200M1	EP1100	HEX#STPM	TR100081	MC1000B	TA1000	USR1035T	Y2KCONV2				
AR7210	EP1100M1	HEX#SUBR	IR1000ST	MC1000M1	TA1100	USR1057P	Y2KPHOL				
AR7220	EP1200AA	HEX#WFD1	LC1000	MI1000	TA1100M1	USR1057T	ZJOBL				
AS1000	FC1000	HEX#WFD2	LC1000M1	MI1000B	TA1200	VB1000	ZMAINGDA				
AS1000M1	FC1000B	HEX#WFPG	LC1100	MI1000M1	TA1200M1	VB1000M1					

10.6 Less redundancy with special Don't explode values

CMKWF01, CMWKF02, and CMWKF04 are three special **Don't explode** values that can lessen redundant *CHART*-ing and improve clarity.

For example, if you use 'CMWKF01' as one of your "don't explodes" then all seeds in the 'seed list' (ie. in file CMWKF01) will be treated as "don't explodes" within every 'chart':

```
LOGON DEVLIB
CHART CMWKF01,GO,0,<u>CMWKF01</u>,MENU*
FIN
```



An object that is also a 'seed' in CMWKF01 will still be drawn, but with a '+' to indicate it has NOT been exploded. The page where the object/seed is fully exploded will also be shown below the object name. For example, "{p2}" means that the seed is fully drawn on page 2 of the current high-volume *CHART*-ing job:

		210 lns		
		l		
		+	+	I
(1830)	(1500)	(1610)	(1930)	(1620)
Fetch	Call	StackCom	Fetch	Fetch
AP1300	UPCASE	AP1000	AP1200	AP1100
90 lns			{p2}	150 lns

If you use 'CMWKF02' as one of your "don't explodes" then all the seeds in the 'original seeds plus extra seeds' (ie. in file CMWKF02) will be treated as "don't explodes" within every 'chart':



An object that is also a 'seed' in CMWKF01 will still be drawn, but with a '+' to indicate it has NOT been exploded. The page where the object/seed is fully exploded will also be shown below the object name.

If you use 'CMWKF04' as one of your "don't explodes" then all the objects in the 'details of all objects chart-ed in CSV format' (ie. in file CMWKF04) will be treated as "don't explodes" within every (subsequent) 'chart'. This option stops redundant *CHART*-ing because each object with children will only be "exploded" once:

```
LOGON DEVLIB
CHART CMWKF01,GO,0,<u>CMWKF04</u>,MENU*
FIN
```

Such an object will still be drawn, but with a '+' to indicate it has NOT been exploded. The page, row, and column where the object was originally exploded will also be shown below the object name. For example, "{p7bD}" means that the object was originally drawn at row 'b', column 'D' on page 7 of the current high-volume *CHART*-ing job:

				TV1000 150 lns 		
			+			+
(0360)	(1040)	(0940)	(1320)	(1430)	(1410)	(1460)
LocalDA	Call	InputMap	FetchRet	FetchRet	CallNat	Perf Ext
LPRINTER	UPCASE	TV1000M1	TV1001	TM1003	XNPRTER	TV1000
10 lns		70 lns	{p7bD}	150 lns	70 lns	

Note: If CMWKF04 is used as special "don't explode" value, then you must also define CMWKF05 in your JCL, with the same record format and record length as CMWKF04.

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10.7 Example CHARTs using special Don't explode values

Simple examples are shown on the following pages to illustrate the effect these special "don't explode" values have. The examples all use a 'seed list' (ie. CMWKF01) containing two seeds (AP1000 and AP1200) as follows:





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The first example was generated using the CHART command:

LOGON CHART FIN	DEVLIB CMWKF01,GO,99

without any special "don't explode" values. Two pages resulted:

1 C C C C C C C C C C C C C C C C C C C	8 12:17:50 HMC01	J	Seed	**** CHAR'. • AP1000	F V3.1F fo Exclusio	or Natura ons: GDA	l **** iSrt DbFl		Page Lib•	DEVIJE
						-Step-Lib	rary(s)-TH	ESTLIB-PR	ODLIB-CHAF	T-SYSTEM
Don't /	Only Exp	l. / Show	Title	: Mainta:	in Orders					
A	в	С	D	Е	F	G	Н	I	J	К
						AP1000 210 lns				a
 (1930) Fetch AP1200 910 lns 				 (1830) Fetch AP1300 90 lns 		* (1610) StackCom AP1000	 (1500) Call UPCASE		 (1620) Fetch AP1100 150 lns 	d
				 (0670) InputMap AP1300M1 90 lns					(0870) InputMap AP1100M1 90 lns	c (1270) Call UPCASE
(3360) nputMap P1200M1 200 lns	 (2110) InputMap AP1200M2 90 lns	 (2290) Call UPCASE	 (5190) CallNat XNPARTY 120 lns	 (5280) CallNat XNDECDSP 70 lns	 (7390) CallNat XNDATE 100 lns	* (9140) Perf Ext AP1200	 (3380) InputMap AP1200M3 190 lns 			d
(0161) elpRout XHSOLC 70 lns	 (0177) HelpRout XHDISABL 40 lns						* (0159) HelpRout XHSOLC	* (0171) HelpRout XHDISABL		e
Δ	P	C	D	E	F	G	н	I	J	К
11	В	C	-	-		÷				
01-02-1 ser:	в 8 12:17:55 НМС01	5	Seed	**** CHAR : AP1200	F V3.1F fo Exclusio	or Natura ons: GDA : -Step-Lib:	l **** iSrt DbFl rary(s)-TH	ESTLIB-PR	Page Lib: ODLIB-CHAF	e 2 DEVLIB RT-SYSTEM
01-02-1 ser: 	B 12:17:55 HMC01 Only Exp	5 	Seed Title	**** CHAR : AP1200 : : View O:	F V3.1F fo Exclusio rders	or Natura ons: GDA : Step-Lib:	l **** iSrt DbFl rary(s)-TH	ESTLIB-PR	Page Lib: ODLIB-CHAF	e 2 DEVLIB RT-SYSTEM
D1-02-1 ser: Don't /	B 8 12:17:59 HMC01 Only Exp B	5 1. / Show C	Seed Title D	**** CHAR AP1200 View O: E	F V3.1F fo Exclusio rders F	or Natura ons: GDA : -Step-Lib: G	l **** iSrt DbFl rary(s)-TH H	ESTLIB-PR I	Page Lib: ODLIB-CHAF J	e 2 DEVLIB RT-SYSTEM K
D1-02-1 ser: Don't / A	B 8 12:17:5 HMC01 Only Exp. B	5 1. / Show C	Seed Title D	**** CHAR AP1200 View O: E	F V3.1F fr Exclusio rders F	G AP1200 Jns: GDA : Step-Lib: G AP1200 J10 lns	l **** iSrt DbFl rary(s)-TH H	ESTLIB-PR I	Page Lib: DDLIB-CHAF J	e 2 DEVLIB T-SYSTEM K a
	в 12:17:55 HMC01 Only Exp В	5 1. / Show C (3360) InputMap AP1200M1 200 lns	Seed Title D (2110) InputMap AP1200M2 90 lns	**** CHAR: : AP1200 : View O: E (2290) Call UPCASE	r V3.1F fr Exclusion rders F (5190) CallNat XNPARTY 120 lns	G AP1200 910 lns (5280) CallNat XNDECDSP 70 lns	I **** iSrt DbFl rary(s)-TH H (7390) CallNat XNDATE 100 lns	I (9140) Perf Ext AP1200	Page Lib: DDLIB-CHAF J (3380) InputMap AP1200M3 190 lns	e 2 DEVLIB KT-SYSTEM K a b
 01-02-1 ser: Don't / A	B 8 12:17:5: HMC01 Only Exp: B (0161) HelpRout XHSOLC 70 lns	C 1. / Show C (3360) InputMap AP1200M1 200 lns (0177) HelpRout XHDISABL 40 lns	Seed Title D (2110) InputMap AP1200M2 90 lns	**** CHAR: : AP1200 : View O: E (2290) Call UPCASE	r V3.1F f Exclusion rders F (5190) CallNat XNPARTY 120 lns	G AP1200 910 lns 	I **** iSrt DbFl rary(s)-TH H (7390) CallNat XNDATE 100 lns	I (9140) Perf Ext AP1200	Page Lib: DDLIB-CHAF J (3380) InputMap AP1200M3 190 lns (0159) HelpRout XHSOLC	<pre>k 2 DEVLIB T-SYSTEM k a b b c (0171) HelpRout XHDISABL</pre>

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Because AP1000 'fetches' AP1200 (at row 'b', column 'A' on page 1) there is redundant *CHART*-ing. All the child objects of AP1200 are drawn on both pages 1 and 2. Using the special "don't explode" value of 'CMWKF01', this redundancy can be removed.

The second example was generated using the CHART command:

LOGON DEVLIB CHART CMWKF01,GO,99,<u>CMWKF01</u> FIN

with the special "don't explode" value of 'CMWKF01' added. Two pages resulted:





AP1000 is now shown to 'fetch' AP1200 at row 'b', column 'I' on page 1. The ' $\{p2\}$ ' shown beneath AP1200 means that it is also a 'seed' and it is drawn on page 2. The child objects of AP1200 are therefore only drawn once and this redundant *CHART*-ing has been removed.

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The third example was generated using the *CHART* command:

LOGON DEVLIB CHART CMWKF01,GO,99,<u>CMWKF04</u> FIN

with a special "don't explode" value of 'CMWKF04' used. Two pages resulted:

2001-02-18 User:	3 12:59:33 HMC01		Seed	**** CHAR : AP1000	F V3.1F f Exclusi	or Natura ons: GDA	l **** iSrt DbFl		Page Lib:	DEVLIB
Don't /	Only Expl	. / Show	Title CMWKF04	: Mainta:	in Orders	-Step-Lib	rary(s)-T	ESTLIB-PR	ODLIB-CHAF	T-SYSTEM
A	в	С	D	E	F	G	Н	I	J	К
d						AP1000 210 lns				d
b (1930) Fetch AP1200 910 lns				 (1830) Fetch AP1300 90 lns		(1610) StackCom AP1000	 (1500) Call UPCASE		(1620) Fetch AP1100 150 lns	b
c 				(0670) InputMap AP1300M1 90 lns					(0870) InputMap AP1100M1 90 lns	c (1270) Call UPCASE
d (3360) InputMap AP1200M1 200 lns	 (2110) InputMap AP1200M2 90 lns	 (2290) Call UPCASE	(5190) CallNat XNPARTY 120 lns	(5280) CallNat XNDECDSP 70 lns	 (7390) CallNat XNDATE 100 lns	* (9140) Perf Ext AP1200	(3380) InputMap AP1200M3 190 lns			d
e (0161) HelpRout XHSOLC 70 lns	(0177) HelpRout XHDISABL 40 lns						(0159) HelpRout XHSOLC	(0171) HelpRout XHDISABL		e
А	в	С	D	E	F	G	Н	т	л	к

Harvest] Compu 7 Ltd abn 23	Moon ting 3 054 256	914	CHART Version 3.1F						2605 Nicholson Road, Suite 230 Sewickley, PA 15143 Phone: 724.759.7070 Fax: 724.759.7067 www.treehouse.com			
2001-02-: User:	18 12:59: HMC01	41	* Seed: Title:	*** CHAF AP1200 View C	T V3.1F f Exclusi orders	or Natura ons: GDA -Step-Lib	l **** iSrt DbFl rary(s)-T	ESTLIB-PR	Page Lib: ODLIB-CHAR	2 DEVLIB T-SYSTEM		
Don't . A a	/ Only Ex B	cpl. / Show C	CMWKF04	Е	F	G AP1200 910 lns	Н	I	J	K a		
d		+ (3360) InputMap AP1200M1 {p1dA}	 (2110) InputMap AP1200M2 90 lns	 (2290) Call UPCASE	(5190) CallNat XNPARTY 120 lns	(5280) CallNat XNDECDSP 70 lns	(7390) CallNat XNDATE 100 lns	* (9140) Perf Ext AP1200	+ (3380) InputMap AP1200M3 {p1dH }	d		
A	в	С	D	Е	F	G	Н	I	J	К		

AP1200M1 and AP1200M3 are drawn (and exploded) on page 1 at 'dA' and 'dH' respectively. At this time, they are also added to CMWKF04 (the work file holding details of all objects *CHART*-ed). When AP1200 (and its child objects) are drawn on page 2, AP1200M1 and AP1200M3 are NOT 'exploded' again because they were found in CMWKF04. The special "don't explode" value of 'CMWKF04' has removed some redundancy from the *CHART*s.

CHART

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10.8 Changing excluded object types and Don't explode objects

Object types to be **excluded** and **Don't explode** objects can be changed during high-volume *CHART*-ing (or even before the first 'seed' is drawn). This is achieved with a special command embedded in the seed 'dataset'. The charts generated for your application can be tailored in this way for maximum impact and coverage.

For example, it may be useful to **exclude** more object types from a particular chart to improve its clarity. Also, a chart too large for one page (and therefore with many **unplaced** objects) could be split into two charts:

- specify a significant 'parent' object from the chart as a **Don't Explode** object,
- this significant 'parent' object would have its 'child' objects suppressed,
- this object could then be included in the seed 'dataset' and charted separately.

To change the **excluded** / **Don't explode** criteria during high-volume *CHART*-ing:

- locate the seed in the seed 'dataset' to which the new criteria are to apply,
- insert a new line in the seed 'dataset' immediately before that seed,
- enter '+++++++' in the first eight characters of this line, followed by a space (this indicates that new exclusion and Don't explode criteria are being defined),
- then enter your new excluded object types in the next ten characters, followed by a space,
- then enter your new **Don't explode** objects, separated by spaces or commas.

If all the **Don't explode** objects won't fit into this line, repeat the '+++++++' line and enter the remaining **Don't explode** objects. The '+++++++' and **excluded** object types should be left as in the original line. <u>Note:</u> The new **exclude** / **Don't explode** criteria will remain in effect for all subsequent seeds, or until new criteria are defined.

Example of new criteria defined during high-volume *CHART*-ing - the new criteria (exclude Map, DataArea, and Copycode, Don't explode ERRORHDL, MENUHDL, CHKRSTRT, COM100N1) apply to seed IMP200P1 and subsequent seeds:

. IMP100P1 Staff Impact Report Submission ++++++ MDC ERRORHDL MENUHDL CHKRSTRT COM100N1 IMP200P1 Staff History Report .
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10.9 Changing the Natural Library and Step Libraries

The current **Natural Library** and **Step Libraries** can be changed during high-volume *CHART*-ing (or even before the first 'seed' is drawn). This is achieved with a special command embedded in the seed 'dataset'. In this way, charts for your whole application can be generated no matter which **Natural Library** the seeds are held on.

To change the **Natural Library** during high-volume *CHART*-ing:

- locate the seed in the seed 'dataset' to which the new Natural Library is to apply,
- insert a new line in the seed 'dataset' immediately before that seed,
- enter '>>>>>>' in the first eight characters of this line, followed by a space (this indicates that a new **Natural Library** is being defined),
- then enter the new Natural Library in the next eight characters,
- then enter any specific **Step Libraries**, separated by spaces / commas. Otherwise, the **Step Libraries** will default to those defined in the initial 'CHART' program.

Please note that the new Natural Library and Step Libraries will remain in effect for all subsequent seeds, or until new Libraries are defined.

Example of a new **Natural Library** and three new **Step Libraries** defined during high-volume *CHART*ing - the new **Natural Library** will apply to seed IMP200P1 and subsequent seeds:

. IMP100P1 Staff Impact Report Submission >>>>> HISTLIB PROD TEST DEV IMP200P1 Staff History Report . Harvest Moon Computing Pty Ltd abn 23 054 256 914 **CHART**

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10.10 Potential NAT1205 (No more sort work space) Error

This error <u>may</u> occur when the **index of objects** is being generated. That is, all the *CHART*s have been generated, the **table of contents** has been generated, and the **index of objects** is <u>about</u> to be generated.

To generate the **index of objects**, CMWKF03 needs to be sorted into 'object name' x 'library' order. CMWKF03 holds one record for <u>every</u> object drawn in <u>every</u> *CHART* for the current batch job. If you are generating a large number of *CHART*s in one batch job, CMWKF03 can become very large. When the *CHART* software comes to sort this file before generating the **index of objects**, it is <u>possible</u> a NAT1205 (No more sort space) error will occur. That is, there is a limit to how much you can sort 'in core' with Natural.

If you do receive a NAT1205, the **index of objects** (and the **not referenced** list, if required) can be generated as a <u>separate</u> job after the *CHART*s and **table of contents** have been generated.

To do this, you must <u>first</u> sort the dataset referred to in CMWKF04. This dataset should be sorted into ascending order using (at least) columns 1 to 67.

If you are using JCL to sort the dataset, the SORT command would be:

SORT FIELDS=(1,66,CH,A)

If you are using ISPF-Edit to sort the dataset, the command would be:

SORT 1 66 A

<u>After</u> the dataset is sorted, you can generate the **index of objects** and **not referenced list** in a separate batch job. An example of the JCL to run this job is shown on the next page. (Note: If the SORT and 'generate' are in the same job, the SORT step must be run before the 'generate'.)

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A sample of the JCL required to generate the **index of objects** (and **not referenced list**, if required) follows:

//<userid>C JOB 'CHART V2', CLASS=A, MSGCLASS=X, NOTIFY=<userid> //* //NATBATCH EXEC PGM=... //STEPLIB DD DSN=... 11 DD DSN=... //DDCARD DD DSN=... //* //CMPRINT DD SYSOUT=* //CMPRT01 DD SYSOUT=* //CMPRT02 DD SYSOUT=* //CMPRT03 DD DSN=<userid>.INDEX.OF.OBJECTS, 11 DISP=(NEW, CATLG, DELETE), STACE (1997), UNIT=SYSDA, DCB=(RECFM=FBA, LRECL=133, BLKSIZE=13300) DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (2,2), RLSE), 11 //CMPRT04 DD DSN=<userid>.SURPLUS.OBJECTS, 11 DISP=(NEW, CATLG, DELETE), SPACE=(TRK, (2,2), RLSE), 11 UNIT=SYSDA, DCB=(RECFM=FBA, LRECL=133, BLKSIZE=13300) //* //CMWKF03 DD DSN=<userid>.DATA.FOR.INDEX.OF.OBJECTS, DISP=(NEW,CATLG,DELETE),SPACE=(TRK,(5,5),RLSE), 11 UNIT=SYSDA, DCB=(RECFM=FB, LRECL=20, BLKSIZE=16000) 11 //CMWKF04 DD DSN=<userid>.CHARTED.OBJECTS.CSV.FORMAT, DISP=(NEW,CATLG,DELETE),SPACE=(TRK,(10,10),RLSE), 11 11 UNIT=SYSDA, DCB=(RECFM=FB, LRECL=160, BLKSIZE=16800) //* //CMSYNIN DD * LOGON <library> GLOBALS IM=D CHART CMWKF04, INDEX | NOTREF | BOTH [, <last-page-num>] FIN /* 11

CHART CMWKF04, INDEX | NOTREF | BOTH [, <last-page-num>]

If the option 'INDEX' is used, only the **index of objects** will be generated. If the option 'NOTREF' is used, only the **not referenced list** will be generated. If the option 'BOTH' is used, the **index of objects** and the **not referenced list** will be generated.

The parameter <last-page-num> is optional. If supplied, the page numbering for the generated report(s) will begin after this number. For example, if the 'INDEX' option is used with a <last-page-num> of 37, then the generated **index of objects** would have a page number of 38 on its first page.

Blocksize for these datasets can be any multiple of the record length and should conform to your site's record blocking conventions. Do NOT use a dataset DISPosition of MOD (for MODify) for work files in your JCL as this will lead to unpredictable results during the generation of the "Index of Objects" and "Table of Contents".

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10.11 Details of CHART-ed objects held in CSV Format on CMWKF04

Every object drawn in any *CHART* (in batch) has information about it recorded in CMWKF04. This information is recorded in CSV (ie. Comma Separated Value) format suitable for loading as a spreadsheet or as data for an analysis package. The fields (and their lengths) recorded for each object are:

Object-name	30
Library	8
Database	8
Date-saved	10
Page-number/Row/Column	6
Object-length	5
Number-of-children	3
Children-placed-flag	1
Calling-method	8
Calling-source-code-line-number	6
Parent-object-name	29
Parent-Page/Row/Column	6
Current-user-id	8
Current-date	10
Current-time	8



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The following is an example of the information written to CMWKF04:

Called Obi Lib Dba	se Saved p/i	c Length Child Child Placed? Object Type Called from Line Parent Obj Parent p/rc Drawn	by Date Drawn Time Drawn
HMC#WFD1.CHART		1999-03-25.0001aG.0060.001.Y.Seed Obj. (0000).	.2001-04-02.08.36.4
File1 CHART	,	(NOSOURCE) 0001bG 99992 000 V ReadWork (0240) HMC#WFD1 0001aG HMC01	2001-04-02 08:36:4
UMC#NED2 CUART	,	1992-03-25 00023C 0060 001 V Social Obj (0000) 0000 HMC01	2001-04-02 08:36:5
Eilol CUADE	,	(NoSource) 0002bc 0002 000 Verdenzk (0200) UNCHUED2 0002c UNCOL	2001 04 02,00.30.3
INCHMED2 CUADE	,	1000 02 25 000226, 5555; 000, 1, Readwork, (0500), MC#WFD2, 000286, MMC01	2001 04 02 08.26.5
HMC#WFDS, CHARI	,	(1355-05-25,000326,0000,001,1,5eed 005),(0000), 00000, 0000, 0000, 00000	2001 04 02 08:30:5
FILES , CHARI	,	2001 02 00 000 d c 0000 0 1 k c d o b (0000)	,2001-04-02,08:30:5
HMC#WFH4, CHART	,	,2001-05-29,00044G,0020,001,1,5eed Obj,(0000), ,0000, ,HMC01	,2001-04-02,08:36:5
File4 , CHART	,	, <nosoutce>, 0004bG, 99992, 000, Y, WTEWORK, (0140), HMC#WFH4, 0004aG, HMC01 100002, 02000, 0004bG, 99992, 000, Y, WTEWORK, (0140), HMC#WFH4, 0004aG, HMC01</nosoutce>	,2001-04-02,08:36:5
HMC#WFPG, CHART	,	,1999-03-25,0005aG,0040,004,Y,Seed Obj,(0000), ,0000,HMC01	,2001-04-02,08:36:5
Filel , CHART	,	<pre>,<nosource>,0005bE,99992,000,Y,ReadWork,(0150),HMC#WFPG,0005aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
Filez , CHART	,	<pre>, <nosource>, 0005bF, 99999?, 000, Y, Wrtework, (0310), HMC#WFPG, 0005aG, HMC01</nosource></pre>	,2001-04-02,08:36:5
Filez , CHART	,	<pre>,<nosource>,0005bG,99992,000,Y,ReadWork,(0340),HMC#WFPG,0005aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WF01, CHART	,	,1999-03-25,0005bH,0010 ,001,Y,FetchRet,(0350),HMC#WFPG,0005aG,HMC01	,2001-04-02,08:36:5
File1 ,CHART	,	<pre>,<nosource>,0005cH,9999?,000,Y,WrteWork,(0120),HMC#WF01,0005bH,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WFUP, CHART	,	,1999-03-25,0006aG,0120 ,004,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:36:5
File1 ,CHART	,	<pre>,<nosource>,0006bE,9999?,000,Y,ReadWork,(0440),HMC#WFUP,0006aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
File2 ,CHART	,	, <nosource>,0006bF,9999?,000,Y,WrteWork,(0500),HMC#WFUP,0006aG,HMC01</nosource>	,2001-04-02,08:36:5
File2 ,CHART	,	<pre>,<nosource>,0006bG,9999?,000,Y,ReadWork,(0560),HMC#WFUP,0006aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WF01, CHART	,	,1999-03-25,0006bH,0010 ,001,Y,FetchRet,(0760),HMC#WFUP,0006aG,HMC01	,2001-04-02,08:36:5
File1 ,CHART	,	<pre>,<nosource>,0006cH,9999?,000,Y,WrteWork,(0120),HMC#WF01,0006bH,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WF01, CHART	,	,1999-03-25,0007aG,0010 ,001,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:36:5
File1 ,CHART	,	<pre>,<nosource>,0007bG,99999?,000,Y,WrteWork,(0120),HMC#WF01,0007aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WF02,CHART	,	,1999-03-25,0008aG,0010 ,001,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:36:5
File2 ,CHART	,	<pre>,<nosource>,0008bG,9999?,000,Y,WrteWork,(0120),HMC#WF02,0008aG,HMC01</nosource></pre>	,2001-04-02,08:36:5
HMC#WF03, CHART	,	,1999-03-25,0009aG,0010 ,001,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:0
File3 ,CHART	,	<pre>,<nosource>,0009bG,9999?,000,Y,WrteWork,(0110),HMC#WF03,0009aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WF04, CHART	,	,2001-03-29,0010aG,0060 ,001,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:0
File4 ,CHART	,	<pre>,<nosource>,0010bG,9999?,000,Y,WrteWork,(0450),HMC#WF04,0010aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WF12, CHART	,	,1999-03-25,0011aG,0020 ,002,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:0
File1 ,CHART	,	<pre>,<nosource>,0011bF,9999?,000,Y,ReadWork,(0110),HMC#WF12,0011aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
File2 ,CHART	,	<pre>,<nosource>,0011bG,9999?,000,Y,WrteWork,(0180),HMC#WF12,0011aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WF43, CHART	,	,1999-03-25,0012aG,0070 ,002,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:0
File4 ,CHART	,	<pre>,<nosource>,0012bF,9999?,000,Y,ReadWork,(0500),HMC#WF43,0012aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WF03, CHART	,	,1999-03-25,0012bG,0010 ,001,Y,FetchRet,(0660),HMC#WF43,0012aG,HMC01	,2001-04-02,08:37:0
File3 ,CHART	,	<pre>,<nosource>,0012cG,9999?,000,Y,WrteWork,(0110),HMC#WF03,0012bG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WF45, CHART	,	,1999-03-25,0013aG,0020 ,002,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:0
File4 ,CHART	,	<pre>,<nosource>,0013bF,9999?,000,Y,ReadWork,(0130),HMC#WF45,0013aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
File5 ,CHART	,	, <nosource>,0013bG,9999?,000,Y,WrteWork,(0150),HMC#WF45,0013aG,HMC01</nosource>	,2001-04-02,08:37:0
File5 ,CHART	,	<pre><nosource>,0014bF,9999?,000,Y,ReadWork,(0130),HMC#WF54,0014aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
File4 ,CHART	,	<pre><nosource>,0014bG,9999?,000,Y,WrteWork,(0150),HMC#WF54,0014aG,HMC01</nosource></pre>	,2001-04-02,08:37:0
HMC#WILD, CHART		,2001-03-28,0015aG,0140,006,Y,Seed Obj,(0000), ,0000 ,HMC01	,2001-04-02,08:37:1
HMC#DATE, CHART		,1999-03-25,0015bD,0070 ,000,Y,CallNat ,(0670),HMC#WILD.0015aG.HMC01	,2001-04-02,08:37:1
HMCINFOF, CHART		,1999-01-27,0015bE,0080 ,000,Y,CallNat ,(0850),HMC#WILD.0015aG.HMC01	,2001-04-02,08:37:1
HMCINFON, CHART		,1999-03-25,0015bF,0090 ,000,Y,CallNat ,(0870),HMC#WTLD.0015aG.HMC01	,2001-04-02,08:37:1
HMC#MSG1, CHART		,2001-03-26,0015bG,0430 ,000,Y,CallNat ,(1360),HMC#WTLD.0015aG.HMC01	,2001-04-02,08:37:1
HMCINFO , CHART		<nosource>,0015bH,9999?,000,Y,CallNat#,(0890),HMC#WILD,0015aG,HMC01</nosource>	,2001-04-02,08:37:1
HMC#WF01, CHART		,1999-03-25,0015bI,0010 ,001,Y,FetchRet,(1190),HMC#WILD.0015aG.HMC01	,2001-04-02,08:37:1
File1 ,CHART	,	<pre><nosource>,0015cI,9999?,000,Y,WrteWork,(0120),HMC#WF01,0015bI,HMC01</nosource></pre>	,2001-04-02,08:37:1



10.12 Importing CHART-ed objects into Visio2000

Every object drawn in any *CHART* (in batch) has information about it recorded in CMWKF04. This information can be imported directly into Microsoft Visio2000 as "organisation charts". Download the dataset written to by NATURAL file CMWKF04 to the platform on which you use Visio2000. Follow these steps to import the resulting file into Visio2000. Note that on the fifth screen, the "Name" field **must** be "p/rc" (i.e. page row/column) and the "<u>Reports to</u>" field **must** be "Parent p/rc":



The "First line" field must be "Object Type" and the "Second line" field must be "Called Obj":



 Organization Chart Wizerd
 Image: Choose the columns (held) from your data file that you want to add to organization chart shapes as custom property fields.

 Data file columns:
 Data file columns:

 Data file columns:
 Data file columns:

 Page
 Badd)

 Ross/Col
 Badd)

 Classifier Columns:
 Data file columns:

 Mark file columns:
 Data file columns:

 Page
 Badd)

 Classifier Columns:
 Data file columns:

 Mark file columns:
 Data file columns:

 Data file columns:
 Data file columns:

 Page
 Badd)

 Classifier Columns:
 Classifier Columns:

 More Info
 Cancel
 Classifier Columns:

"Add" as many columns as you like to the list of "Custom Property fields":

Choose the "I want to specify how much of my organization to display on each page" option and on the next screen leave the defined pages option as shown below:



Click the "Finish" button and Visio will import the data from your CMWKF04 data file as a set of "Organization Chart"s.

age Number	Employee at Top of Page	Additional Levels Pa	Add Page.
1	<top executives<="" td=""><td>All Subordinates</td><td>Modily Page</td></top>	All Subordinates	Modily Page
			Delete Pag
			Çlear All Pag

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11 Messages used in CHART

HMC0001: No "SEED" Object Name supplied for Chart. HMC0002: Object <object name> NOT found in Library or Step Libs. HMC0003: Chart Exclusion: <exclusion> NOT valid. HMC0004: Type "R" includes Types "S", "N", and "H". HMC0005: Type "D" includes Types "G", "L", and "A". HMC0006: Type "O" includes Types "I" and "F". HMC0010: Choose a Valid PF Key or PF3 to Quit. HMC0012: Trace Interval must be zero or greater. HMC0013: Use only one "*" to indicate group of objects: <value> HMC0014: "*" cannot be in this position all objects will be suppressed: <value> HMC0015: "*" must be the last significant character: <value> HMC0016: At least one significant character must be used with "!". HMC0017: Invalid object type found after the ")": <value> HMC0018: No object types were found after the ")": <value> HMC0019: Your specified limit of Charts has been reached. Chart-ing terminated. HMC0020: Limit of objects reached -- Chart for <seed name> may be incomplete. HMC0021: Don't Show indicator can only be in first character of object: <value> HMC0022: More than 20 "Don't Explodes". Ignoring <value> HMC0023: "Don't Explode" over 12 characters. Ignoring <value> HMC0024: More than 10 "Step Libraries". Ignoring <value> HMC0025: "Step Library" over 8 characters. Ignoring <value> HMC0026: Enter Object Name. HMC0027: Object <object name> was NOT found in Chart. HMC0028: Object <object name> found at row/column: <row/column> HMC0029: Press PF12 to view Objects with Descendants NOT Drawn. HMC0030: "Not Referenced" List is NOT Available yet for UNIX. HMC0031: All Objects in this Library were Referenced. HMC0033: Line Numbers not available. Chart is too large. HMC0034: Connector can NOT be blank. HMC0035: Must be: BLue, GReen, NEutral, PInk, REd, TUrquoise, or YEllow HMC0036: Must be: "B"linking, "D"efault, "I"ntense, or Reverse "V"ideo. HMC0037: At least one Repository must be selected. HMC0038: Source Code Access subprograms for Repository(s) not found. HMC0039: Children of Inline Subroutines NOT drawn at: <row/column> (and can"t be drawn on later CHARTs). HMC0040: Object name is longer than eight characters. HMC0042: Date Order must be one of "DMY", "DYM", "MDY", "MYD", "YDM", or "YMD". HMC0043: Answer "N" for NO separators in date, or "Y" and choose a separator. HMC0044: Too many objects for "Index of Objects". Use CHART CMWKF04 in batch. HMC0045: Total of NATURAL <count> objects drawn (excl. don't explodes) with a total of approx. <count> lines of source code. HMC0046: library name> will not fit into step-lib array. library-name> will be used instead. HMC0047: <option> is NOT valid. Use INDEX, NOTREF, or BOTH after seed of CMWKF04. HMC0048: <object name> is less than <object name> - CMWKF04 must be SORTed by object name (chars 1-30) at least. HMC0049: Natural Security is installed. Use USR1025N option instead of NONATSEC.



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HMC0050: <PF key> has no effect while the Chart is Zoom-ed. HMC0051: Already at top of Chart. < PF key> ignored. HMC0052: Already at bottom of Chart. < PF key> ignored. HMC0053: Already at far left of Chart. < PF key> ignored. HMC0054: Already at far right of Chart. < PF key> ignored. HMC0055: Already showing left of object names. < PF key> ignored. Try PF11 (Right). HMC0056: Already showing right of object names. < PF key> ignored. Try PF10 (Left). HMC0057: Complete Chart already shown. No need to Zoom. < PF key> ignored. HMC0058: Left side of Object Names shown. Use PF11 to see rest of names. HMC0059: Display: source line number from which object was called. HMC0060: Display: length of called object (rounded to nearest 10). HMC0061: Display: user who saved source code of called object. HMC0062: Display: date source code was saved. PF21 to see century. HMC0063: Display: library where source of called object was found. HMC0064: Display: method in which object was called. HMC0065: Display: date source code was saved (including century). HMC0066: "Y" if you want your last settings remembered, "N" if not. HMC0067: <count> pages of Charts successfully generated in CMPRT02. HMC0068: Index of Objects and/or Not Ref. List to be built from CMWKF04. Option: <option> HMC0069: Table of Contents successfully generated in CMPRT01. HMC0070: Index of Objects successfully generated in CMPRT03. HMC0071: Not Referenced List successfully generated in CMPRT04. HMC0072: Chart for seed <seed name> successfully generated in CMPRT02. HMC0073: Chart Version <version > has completed successfully at <time> on <date>. HMC0074: <PF key> is NOT a Valid PF Key. <PF key> ignored. HMC0075: Answer "Y" for "Don't Explode" or "N" for "Explode". HMC0081: No objects generated by wildcard types <types>. Processing terminated. HMC1001: "CHART for Natural" License will EXPIRE on <date>. HMC1002: "CHART for Natural" License EXPIRED on <date>. HMC1003: "CHART for Natural" License is INDEFINITE from <date>. HMC1004: "CHART for Natural" License is >> INVALID <<. HMC2001: No Object Name supplied for Browse. HMC2002: Use PF9 (Shape) to change window shape before using "Shift".

HMC2003: Line increment is not numeric.

HMC2004: Command < command> not Recognised.

HMC2005: Selected text value is blank. Choose another.

HMC2006: Only one previously scanned text value may be selected at a time.

HMC2007: Enter a value, choose a previous value, or PF3 to exit.





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12 Installing CHART

CHART software is normally supplied on 3.5 inch diskette or on CD. The files required can be copied from the diskette or CD onto your machine using a standard **file copy** or **file transfer** routine. The software is held in two "binary" files on the diskette or CD, one file for Natural Object code and one file for Natural Source code.

12.1 Create target dataset

You must first create (allocate) the two target datasets on your mainframe. The target dataset must have a record format of FB (ie. Fixed length, Blocked records), one with a record length of 250 and one with a record length of 90.

If you use ISPF option 3.2 to create the datasets, select option 'A' (for Allocate new data set) or 'M' (for Enhanced data set allocation), provide the dataset name you require, and press enter. The following screen will allow you to enter space requirements, record format, and record length:

```
Data Set Name . . . . : <user>.chart.v31f.frompc.fb250 (or ..fb90)
Management class. . . .
                                    (Blank for default management class)
Storage class . . . .
                                    (Blank for default storage class)
 Volume serial . . . .
                                    (Blank for authorized default volume)
Data class . . . . .
                                    (Blank for default data class)
 Space units . . . . . trks
                                   (BLKS, TRKS, CYLS, KB, MB or BYTES)
  Primary quantity. . . 15
                                    (In above units)
 Secondary quantity. . 5
                                    (In above units)
 Directory blocks. . . 0
                                    (Zero for sequential data set) *
 Record format . . . . fb
  Record length . . . . 250
                             (or 90)
  Block size . . . .
  Data Set Name type. .
                                     (LIBRARY, HFS, PDS, or blank)
```

12.2 Copy "binary" software file to target datasets

Copy each "binary" software file from the diskette or CD into the dataset you have just created. If you are using a standard "send" command, they should be:

1. send x:\chart31f.bin '<user>.chart.v31f.frompc.fb250'

2. send x:\chart31f.src '<user>.chart.v31f.frompc.fb90'

where "x" is the disk drive you are using.

If you are using a "windows" style file transfer package:

- choose the **send to host** option under the **transfer** menu;
- in the **from** area, select the file **x:\chart31f.bin** (where "x" is the disk drive you are using);
- in the to area, type the target dataset name '<user>.chart.v31f.frompc.fb250';
- for transfer type, choose the binary option (not the text option). If there is a 'Convert from ASCII to EBCDIC' option, ensure it is NOT selected. Ensure any 'Add Carriage Return/Line Feed (CR/LF)' option is also NOT selected;
- click on the **send** button;
- Repeat to send file x:\chart31f.src to dataset '<user>.chart.v31f.frompc.fb90'.



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12.3 Set up some "Natload" JCL

Where possible, "borrow" some JCL from an existing JCL deck that has been used previously to NATLOAD Natural objects (to the required database and FUSER file in your system). The format of these existing JOB, EXEC, STEPLIB, DDCARD, and CMPRINT cards should be copied to the new JCL deck for the "natload" step.

For IBM OS390 operating system, the required JCL should look something like this:

//* "NATLOAD" is a Natural Step to "load" the NATUNLD records from CMWKF01 //******* ***** //* PGM=... PARM=(... STEPLIB... and DDCARD... will be specific to your //* environment. Copy them in from an existing "Batch Natural" JCL ... //********* //NATLOAD EXEC PGM=<mpm>,REGION=0K,PARM=('SYS=<batch>') //* //STEPLIB DD DSN=<mpm>.NATURAL.LOAD,DISP=SHR // DD DSN=SYS4.ADABAS.LOAD,DISP=SHR // DD DSN=SYS3.ADABAS.LOAD,DISP=SHR //DDCARD DD DSN=<mpm>.ADABAS.DDCARD(????),DISP=SHR //CMPRINT DD SYSOUT=* //* CMWKF01 should have record format "FB" and record length 250 or 90. //CMWKF01 DD DSN=<User>.CHART.V31F.FROMPC.FB250,DISP=OLD //* CMSYNIN holds the NATLOAD command for "loading" from CMWKF01 ... //CMSYNIN DD * LOGON CHART NATLOAD LOAD ALL * FM CHART REPLACE /* //* 11



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For IBM VSE operating system, the required JCL should look something like this:

* Natural Step to "load" the NATUNLD records from CMWKF01 * <load libraries>, <dev-xxx>, <dev-yyy>, <User>, <mpm>, <fnat>, * <fuser>, <fdic>, and <fsec> will be specific to your environment. * Copy them in from an existing "Batch Natural" JCL \ldots ***** // LIBDEF *,SEARCH=(SAG,<load libraries>...),TEMP // ASSGN SYSLST, <dev-xxx> // ASSGN SYSxxx, SYSLST // ASSGN SYSRDR,<dev-yyy> // ASSGN SYSyyy, SYSRDR \star CMWKF01 should have record format "FB" and record length 250 or 90. // TLBL CMWKF01, '<User>.CHART.V31F.FROMPC.FB250' // EXEC NATURAL, SIZE=(AUTO, 64K), PARM='SYSRDR' OBJIN=R FNR=<fnat>, DBID=<mpm> FNAT=(<mpm>, <fnat>) FUSER=(<mpm>, <fuser>) FDIC=(<mpm>, <fdic>) FSEC=(<mpm>, <fsec>) IM=D MT=0 MADIO=0 MAXCL=0 AUTO=OFF STACK=OFF /* ADARUN DBID=<mpm>, DEVICE=3390, MODE=MULTI /* LOGON CHART NATLOAD LOAD ALL * FM CHART REPLACE FIN /* /& * \$\$ EOJ /*



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12.4 Run the "Natload" Job

Two JCLs have to be run: one for dataset <User>.CHART.V31F.FROMPC.FB250 and one for dataset <User>.CHART.V31F.FROMPC.FB90. Apart from the dataset name used for CMWKF01, the JCLs can be identical. The JCLs can be run as two steps in one job or as two separate jobs.

Submit the JCL(s) and check the messages when the resulting job(s) have completed. The NATURAL objects (held in the TSO dataset which you created earlier) will be "loaded" by this JCL job. 193 "cataloged" objects and 4 "source" objects should be loaded. Apart from the initial programs (called "CH" and "CHART"), all the other objects for the *CHART* software begin with "HMC".

Below is an example summ	ary from a succ	essful NATLOAD	of the 'FB250'	dataset:
--------------------------	-----------------	----------------	----------------	----------

Statistical Report of Objects Processed			
Sa	ved (Cataloged	
Global Data Area	0	0	
Local/Param Data Area	0	1	
Maps	0	301	
Helproutines	0	9	
Subroutines	0	0	
Subprograms	0	34	
Programs	0	27	
Copycode	0		
Text	0		
Processor		0	
Miscellaneous Objects	0	0	
Total programming obj	0	372	
Total Views Unloaded	0		
Total objects Read	0	372	
Total Object Unloaded		372	
*** NATUNLD has been terminat	ed success	sfully ***	

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Below is an example summary from a successful NATLOAD of the 'FB90' dataset:

Statistical Report	of Objects Processed	d b
	Saved Catalo	oged
Global Data Area	0	0
Local/Param Data Area	0	0
Maps	0	0
Helproutines	0	0
Subroutines	0	0
Subprograms	3	0
Programs	1	0
Copycode	0	
Text	0	
Processor		0
Miscellaneous Objects	0	0
Total programming obj	4	0
Total Views Unloaded	0	
Total objects Read	4	0
Total Object Unloaded		4
*** NATUNLD has been ter:	minated successfully	y ***

12.5 Copy Required SAG subprograms from SYSEXT

The *CHART* software uses some Software AG "user" subprograms. These subprograms need to be copied from library SYSEXT in the FNAT file to library CHART or library SYSTEM in the FUSER file.

Subprogram 'USR0010N' is always required by *CHART*, and one or more of 'USR1025N', 'NSCLI' and 'USR0050N' is required, depending which step library initialisation method is chosen.

The method requiring only subprogram 'USR1025N' is the default. This subprogram should therefore be copied from library SYSEXT on the FNAT file to library CHART or library SYSTEM on the FUSER file. (See section '13.7Current Library and Step Libraries' on Page 90 for more details).

12.6 Make CHART a steplib for relevant users/applications

The *CHART* software is loaded into a library called CHART. In a NATURAL SECURITY environment, users who want to use *CHART* must have access to this library. Therefore, the library CHART must be defined as a steplib for all users and/or applications who will be using *CHART*.

In a non-NATURAL SECURITY environment, the 'NONATSEC' option for initialising CHART step libraries should be used. See '**13.7.3** Initialising Step Libraries using option 'NONATSEC' on Page 91 for details.



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12.7 Enter your License Information

One of the "source" objects supplied is the initial *CHART* program called "CHART". To use the *CHART* software, the correct value for variable #LICENSE-CLIENT-ID must be set in this program and the program STOW-ed. The correct license setting will be supplied to your organisation along with the *CHART* software diskette or CD. If you need to extend a trial license or convert to a permanent license, please contact your local *CHART* software vendor and they will supply the required information.

12.8 Access to the default FUSER

It is <u>no longer necessary</u> to have a DDM available which points to your default FUSER. Previous versions of *CHART* needed some subprograms to be catalog-ed against such a DDM. *CHART Version 3.1F* finds the default FUSER in your environment and is able to read your NATURAL source code from that FUSER. If you have other FUSER files which *CHART* needs to access, please see section '13.2 Access to source code in other FUSER files' on Page 89 for details.



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13 Customising CHART

CHART software is supplied with some source code that may be customised to suit your site. The initial program for *CHART* is called 'CHART' and is provided as source code. It defines the default values for the various *CHART* parameters (eg. seed, exclusions, trace interval, don't explodes, step libraries) and also holds license information (eg. license duration, name and address of the licensed organisation, contact name and phone).

The default values for *CHART* parameters may be altered during installation (or at any later time) by amending and STOW-ing the program called 'CHART'. This program may also be copied and amended to provide differing default parameters for different users or sections in your organisation. The various parameters which can be amended are outlined later in this section.

13.1 Remembering previous CHART parameters

With *CHART Version 3.1F* each user's most recent *CHART* parameters can be 'remembered'. That is, whichever seed name, object exclusions, don't explodes, etc. were last used (on-line), the next time that user invokes *CHART* (on-line), those parameters will be re-displayed as the default settings.

The variable #SAVE-PARAMS in program 'CHART' controls how this feature works. By default, this variable is set to 'Y' which means each user's parameters will be saved each time they use *CHART*.

If a particular user does NOT want their parameters saved in this way, that user can change their own setting for #SAVE-PARAMS. To do this, the user should press PF12 (Parms) on the *CHART* menu and change 'Automatically Save Parameters?' to 'N', and then press PF6 (Updte). This process can be reversed at any time.

The #SAVE-PARAMS variable in program 'CHART' can also be set to 'N' which means that parameters will NOT be saved. While this is the default setting, any user can override the setting for themselves alone by following the process described in the previous paragraph.

Finally, the #SAVE-PARAMS variable in program 'CHART' can be set to 'D' which means that parameters will NOT be saved and users are NOT allowed to override this using PF12 on the *CHART* menu.

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13.2 Access to source code in other FUSER files

The default FUSER file in any environment is automatically available to *CHART*. If your site has other FUSER files holding NATURAL source code, then *CHART* can be set up to access these files.

Three *CHART* subprograms are provided as source code and can be copied for each extra FUSER file that needs to be accessed. The subprograms are 'HMCINFOX', 'HMCLINEX', and 'HMCSUBRX'. A DDM for the required FUSER file needs to be available before these subprograms can be STOW-ed. The name of the relevant DDM must be entered into these subprograms:

1 FUSER VIEW OF <fuser-ddm-name>
2 SRCID
2 C*SRCTX
2 SRCTX(60)

The last character in the name of these subprograms (ie. 'X' in this case) should be added into the #ORDER-OF-SEARCHING variable in program 'CHART'. Alternately, the 'X' can be added to the 'Order of Searching' online by pressing PF5 on the *CHART* menu.

If more than one FUSER file needs to be accessed, copies of 'HMCINFOX', 'HMCLINEX', and 'HMCSUBRX' can be made for each extra FUSER file, altering the 'X' to any other character except 'F', 'G', 'U' or 'W'.

13.3 Order of searching FUSER files (and other repositories)

The order in which these FUSER files will be searched is defined in program 'CHART' by variable #ORDER-OF-SEARCHING. Amend the default value of this variable to say 'FHI' to search FUSER files accessed by first 'HMC....F', then 'HMC....H', and finally 'HMC....I'.

While using *CHART* on-line, PF5 on the *CHART* menu also allows this "order of searching" to be altered.

13.4 Default "Object Types" to be Excluded

The variable #EXCLUSIONS defines the 'object types' which will be excluded by default. Apart from the 'seed' name, this is the most commonly specified parameter when using *CHART* on-line or in batch. However, if it is advisable or preferable for certain object types to be almost always excluded at your site, then INIT-ialise this variable (in the program called 'CHART') to an appropriate value.





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13.5 Default "Trace Interval"

The variable #TRACE-INTERVAL defines the default number of source code lines that will be searched on-line before a 'status' or 'trace' window is displayed. This variable is normally INIT-ialised to 5000 and can always be amended when drawing a *CHART*. However, you can set the 'default' to be any appropriate value (in the program called 'CHART').

13.6 Default "Don't Explode" / "Don't Show" / "Only Explode" Settings

Elements of the array #DONT-EXPLODE can be INIT-ialised (in the program called 'CHART') to values appropriate to your environment. It is normal for some almost universally referenced 'utility' objects to be defined as default values for #DONT-EXPLODE so you don't have to enter them every time you draw a *CHART*.

13.7 Current Library and Step Libraries

The current library (defined in variable #LIBRARY) and the step libraries (defined in array #STEPLIB) are searched in order when a *CHART* is being built. Variable #LIBRARY will always default to the library from which you invoke *CHART* (ie. the same as system variable *LIBRARY).

You can choose how the step libraries are INIT-ialised (in the program called 'CHART') with the variable #INIT-OPTION. This variable can be set to 'USR1025N', 'NSCLI', 'NONATSEC', or 'AUTOSTEP', or left blank. These step libraries can always be overridden when drawing a *CHART* on-line or in batch.

13.7.1 Initialising Step Libraries using option 'USR1025N'

If #INIT-OPTION is set to 'USR1025N', the default step libraries will be INIT-ialised using standard Software AG NATURAL subprogram 'USR1025N'. Where NATURAL SECURITY is installed, this subprogram initialises the *CHART* step libraries to be the same as those defined (if any) for the user in NATURAL SECURITY. In a NATURAL SECURITY environment, 'USR1025N' can only read the steplibs. *CHART* cannot update the NATURAL steplibs, but only maintains its own copy. Only NATURAL SECURITY is allowed to set the steplibs. However, in a non-NATURAL SECURITY environment, 'USR1025N' is allowed to read and update the steplibs for the life of the session. If NATURAL SECURITY is not installed, use option 'NONATSEC'. Subprogram 'USR1025N' will need to be copied from library SYSEXT on the FNAT file to library CHART or library SYSTEM on the FUSER file.





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13.7.2 Initialising Step Libraries using option 'NSCLI'

If #INIT-OPTION is set to 'NSCLI' and if NATURAL SECURITY is installed, the default *CHART* step libraries will be INIT-ialised using standard NATURAL SECURITY subprogram 'NSCLI'. This subprogram initialises the *CHART* step libraries to be the same as those defined (if any) for the user in NATURAL SECURITY. Subprogram 'NSCLI' will need to be copied from library SYSEXT on the FSEC or FNAT file to library CHART or library SYSTEM on the FUSER file.

13.7.3 Initialising Step Libraries using option 'NONATSEC'

If #INIT-OPTION is set to 'NONATSEC' and if NATURAL SECURITY is NOT installed, the default *CHART* step libraries will be the step libraries (if any) defined when your environment was started/initialised.

Subprogram 'USR1025N' can be used in a non-NATURAL SECURITY environment to maintain step libraries. If the 'NONATSEC' option is used, *CHART* uses subprogram 'USR1025N' to read the current step library settings. If necessary, library CHART is added to these settings (so that *CHART* can be invoked from any library).

Subprograms 'USR0050N' and 'USR1025N' will need to be copied from library SYSEXT on the FNAT file to library SYSTEM on the FUSER file. Programs 'CH' and 'CHART' and subprograms 'HMC#INIT' and 'HMCFUSER' will also need to be copied from library CHART to library SYSTEM.

13.7.4 Initialising Step Libraries using option 'AUTOSTEP'

If #INIT-OPTION is set to 'AUTOSTEP', *CHART* will check whether NATURAL SECURITY is installed or not. If NATURAL SECURITY is installed, then *CHART* will initialise step libraries as if #INIT-OPTION was set to 'USR1025N' (as described in section 13.7.1 Initialising Step Libraries using option 'USR1025N'). Otherwise, if NATURAL SECURITY is NOT installed, *CHART* will initialise step libraries as if #INIT-OPTION was set to 'NONATSEC' (as described in section 13.7.3 Initialising Step Libraries using option 'NONATSEC').

If NATURAL SECURITY is installed, then subprogram 'USR1025N' will need to be copied from library SYSEXT on the FNAT file to library CHART or library SYSTEM on the FUSER file.

If NATURAL SECURITY is NOT installed, then subprograms 'USR0050N' and 'USR1025N' will need to be copied from library SYSEXT on the FNAT file to library SYSTEM on the FUSER file, and programs 'CH' and 'CHART' and subprograms 'HMC#INIT' and 'HMCFUSER' will also need to be copied from library CHART to library SYSTEM.

13.7.5 Initialising Step Libraries directly in 'CHART'

If #INIT-OPTION is left blank, you can 'hard-code' the values of #STEPLIB (in the program called 'CHART') and they will be left untouched.



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13.8 Default "Batch Invocation" Parameters

Batch NATURAL invocations using the standard Software AG program NATRJE are automatically detected and drawn by CHART. Some existing clients (who use "homegrown" pre-cursors to NATRJE) have had these "batch invokers" incorporated directly into the CHART software.

#BATCH-INVOKER-n The variables and **#BATCH-PARAM-n** define any site-specific "batch invocation" details to be used by CHART. These details allow "on-line => batch" links to be detected and drawn by CHART. When using CHART on-line, the current "batch invoker" settings can be viewed (and amended) by using PF7 on the initial CHART menu.

13.9 Default Settings for CHART characters and colours

On the CHART "seed" menu, PF12 allows the "down connector" and "cross connector" characters to be changed. Also, the colour settings for each object type and for all other information displayed in CHART can be altered. Any changes you make will only affect your current session. To permanently change any of these settings, you must EDIT and STOW the program called 'CHART'.

Any of these characters and colours can be amended, but the variables which you are more likely to amend to suit your environment are:

- **#DOWN-CONNECTOR** •
- ('|'), ('_'), **#CROSS-CONNECTOR**
- **#SEED-CV**
- #CONNECT-CV
- ('Yellow'). **#OUTLINE-CV** ('Neutral'),
- **#SCREEN-SHAPE**
- ('Browse window starts as a Quarter size'),

('Red'),

(`^').

#INVERSE-VALUE

13.10 CHART and NATURAL Versions

The CHART software draws structure charts for applications written in any version of NATURAL (up to and including NATURAL Version 3.1.2). That is, CHART will draw structure charts for a NATURAL application consisting of any mix of NATURAL Version 1, 2 or 3 source code, whether in reporting mode or structured mode. If new calling constructions are introduced in future versions of NATURAL, CHART will be enhanced to detect and draw those object-to-object constructions.

The CHART software has been developed and compiled using NATURAL Version 2.2.8, but uses few special features of NATURAL Version 2.2. The software should execute successfully in most NATURAL Version 2.1 environments. However, for early NATURAL Version 2.1 environments, the variable #LICENSE-VERSION (in initial program 'CHART') may need to be amended from '3.1F' to '2.1F'. This will force the CHART software to display on-line charts without 'reverse video' and without colour coding by object type (ie. using NATURAL Version 2.1 maps).

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A		L	
ASCII	75	left 27, 31, 33, 36 license	5, 40, 42, 44, 54, 65, 82, 83 79, 80
В		lines	12, 15, 37, 40, 54, 58, 82
batch ., 5, 17, 19, 28, 30, 38, 44, 46, 4	47, 48, 49,	local	
50, 52, 53, 55, 56, 67, 69, 71, 76,	81, 82, 84	М	
batch invoker19,	48, 49, 84	map	29
binary		лт хт	
browse	32, 39, 40	N	
C		NAT1205	
call	28, 29	NATLOAD	
calling method	36, 38, 52	NATRIE	
CMPRT01	53, 55, 68	NATURAL 2.2	
CMPRT02	53, 55, 68	NATURAL 2.2	
CMPRT035, 50, 52, 53,	54, 55, 68	NATURAL 2.3	
CMPRT045, 50, 52, 53,	54, 55, 68		
CMWKF01 5, 17, 46, 47, 50, 52, 1	53, 54, 55,	not referenced	5 52 52 54 56 67 69
59, 60, 61, 62, 63, 64, 76, 77		NSCLI	3, 32, 33, 34, 30, 07, 08
CMWKF02 17, 46, 47, 50, 52, 53, 1	54, 55, 57,	NGCLI	
59, 60		0	
CMWKF0350, 52, 54,	55, 67, 68	object type 1 12 13	14 15 17 24 45 46 47
CMWKF04 17, 46, 47, 50, 52, 54, 564, 67, 68, 69, 70, 71	55, 59, 60,	50, 52, 65, 81, 84	12 12 14 17 46 65 91
colour	24, 42, 84	on line $4, 5, 26, 30$	20 45 48 40 20 21 22
connector	24, 45, 84	84	, 59, 45, 46, 49, 60, 61, 62,
copycode	16	order of searching	18 81
CSV 47, 54, 55,	60, 68, 69	order of searching	
D		Р	
data 5 7 24 27 27 28	50 52 54	page limit	
uale	70. 91	parameters	
digkatta	79, 81	program 4, 5, 12, 16,	, 19, 28, 48, 49, 54, 66, 79,
dynamic	73, 79	80, 81, 82, 83, 84	
dynamic		R	
E		right	27 21 22 26 20
EBCDIC	75	Ingint	
exclude	12, 13, 65		
explode 16, 17, 29, 46, 47, 50, 59, 64, 65	61, 62, 63,		
external			
F			
fetch			
FUSER 18, 76, 79,	81, 82, 83		
Ι			
index of objects 5, 47, 50, 52, 53, 568, 85	54, 56, 67,		
INPL	76		
ISPF	75		
J			
	ac aa ao		
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CHART Version 3.1F

Reference Manual

Harvest Moon Computing CH	ART	2605 Nicholson Road, Suite 230 Sewickley, PA 15143 Phone: 724.759.7070 Fax: 724.759.7067
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