HONEYWELL

DPS 8/C CONFIGURATION GUIDE

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GENERAL

CP-6

DPS 8/C CONFIGURATION GUIDE

HONEYWELL CONFIDENTIAL & PROPRIETARY

ORDER NUMBER

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Honeywell

CP-6
DPS 8/C Configuration Guide

PREFACE

This guide attempts to provide nearly complete freestanding information for configuring any portion of a CP-6 DPS 8/C system. Included in this outline are only the DPS 8/C systems announced in March 1981 and updated by subsequent announcements. In addition, this material covers all peripherals which are the most current for DPS 8/C and the Level 66/DPS B and C systems. To configure CP-6 central systems and front end processors for other than DPS 8/C systems use the CP-6 Configuration Guide, Revision 6, February 23, 1981, available from the CP-6 Program Office.

The guide is constructed to be as self-teaching as possible and to provide for configuring both initial system orders and subsequent add-ons.

Material in this outline dealing with DPS 8/C central systems consists mainly of a set of charts and brief summaries which are designed to be largely self-explanatory. By following the appropriate flowcharts and tables you will be able to configure any initial system order or add-on order accurately.

This material is divided into gross functional sections. Be sure to read the Table of Contents in full before using the configuration material. The table will show you the pattern of approach used in configuring.

Section 1 summarizes key general rules and policies which govern configuration of DPS 8/C systems. Before doing any configuring you should always review Section 1.

Section 2 provides master flowcharts which identify the sequence and components to be considered in configuring. Detach the pertinent flowchart(s) and keep it in view while you use it to access other portions of this material in order to configure easily, completely, and accurately. The flowchart has chapter references to other sections for detailed information on configuration of the components at each level of the flowchart.

Section 3 contains overview configurators to give you the perspectives for complete systems.

Section 4 covers the configuring of central systems and memory sizes. Included in this section are all marketing identifiers for all central systems.

Section 5 covers the configuring of the components needed within each IOM. These components relate to physical and logical IOM channels for peripheral subsystems and IOM aggregate load considerations.

Sections 6 through 9 cover the configuring of unit record, magnetic tape, mass store, and console subsystems.

Section 10 introduces you to some generic terms and concepts related to data communications and front end processors (FEPs).

Section 11 covers the configuration of the DN8/C FEP.

Section 12 deals with manually controlled peripheral switches.

Section 13 includes the motor-generator sets and circumstances dealing with their use.

Section 14 covers CP-6 software products.

Site preparation information for DPS 8/C may be found in the Site Preparation Manual for DPS 8/20, 8/44 (Order Number DL64) and in the DPS 8 (Freestanding) Site Preparation Manual for DPS 8/52/62/70 (Order Number DN01). Site preparation information for configurable DPS 6 peripheral equipment may be found in the DPS 6 Systems Site Preparation Manual (Order Number CP77-00).

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TABLES

SECTION 1
Peripheral and Communications Subsystems Per CP-6 System

LOWER SPEED SUBSYSTEMS

	Min	Max
Card reader or card reader/punch	0	As needed (See Note 2)
Card punch	0	As needed (See Note 2)
Printer	0	As needed (See Note 2)
FEP	1	(See Note 1) (See Note 3)
Console (IOM-connected)	1	4 (See Note 4)

Notes:

1. Maximum of 12 local FEP's per system. Maximum of 4 remote FEP's per local FEP. Maximum of 16 FEP's per system (including both local and remote FEPs). See Section 11.

2. Maximum of 2 unit record devices on URP8012/8013. Maximum of 4 unit record devices on URP8011 and on URP in MFP8001 for DPS 8/47C/49C. Maximum of 8 devices on other URPs. Maximum of 6 unit record devices on each Front End Processor.

3. One Front End Processor (FEP) included with CPS81XX. Every FEP requires a minimum of one CIB and one async CI, neither included in base price. One additional CIB and one sync CI (Bell 201C modem or equivalent) per CP-6 system (neither included in base price) is strongly recommended for a sync line to interface to the automated system for software support and distribution of patches.

4. FEP-connected consoles may be added as needed.

HIGHER SPEED PERIPHERALS

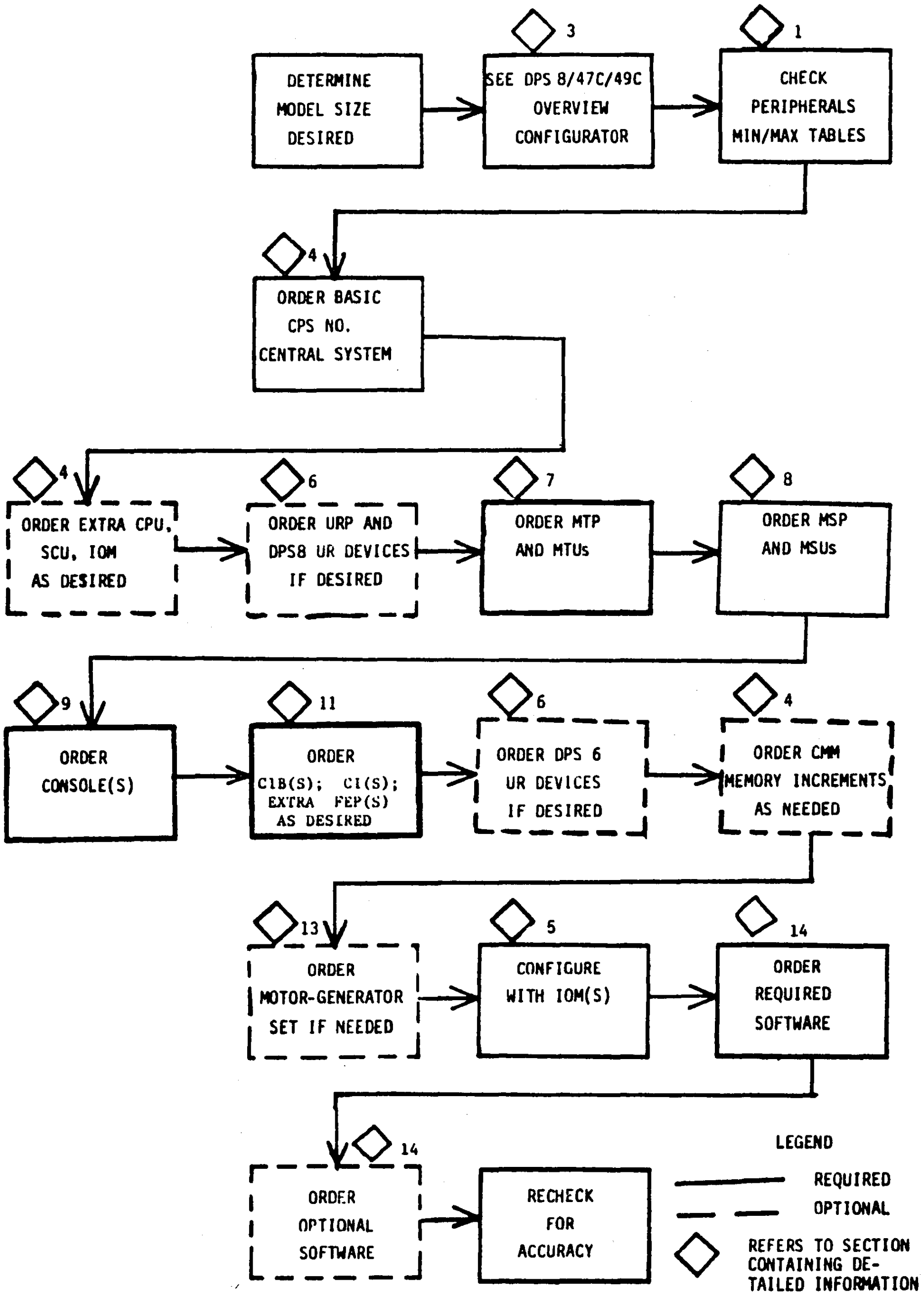
	Min	Max
Magnetic tapes	1 (See Note 1)	As needed (See Note 2)
Disk storage	157 M Bytes (See Note 3)	As needed (See Note 4)

Notes:

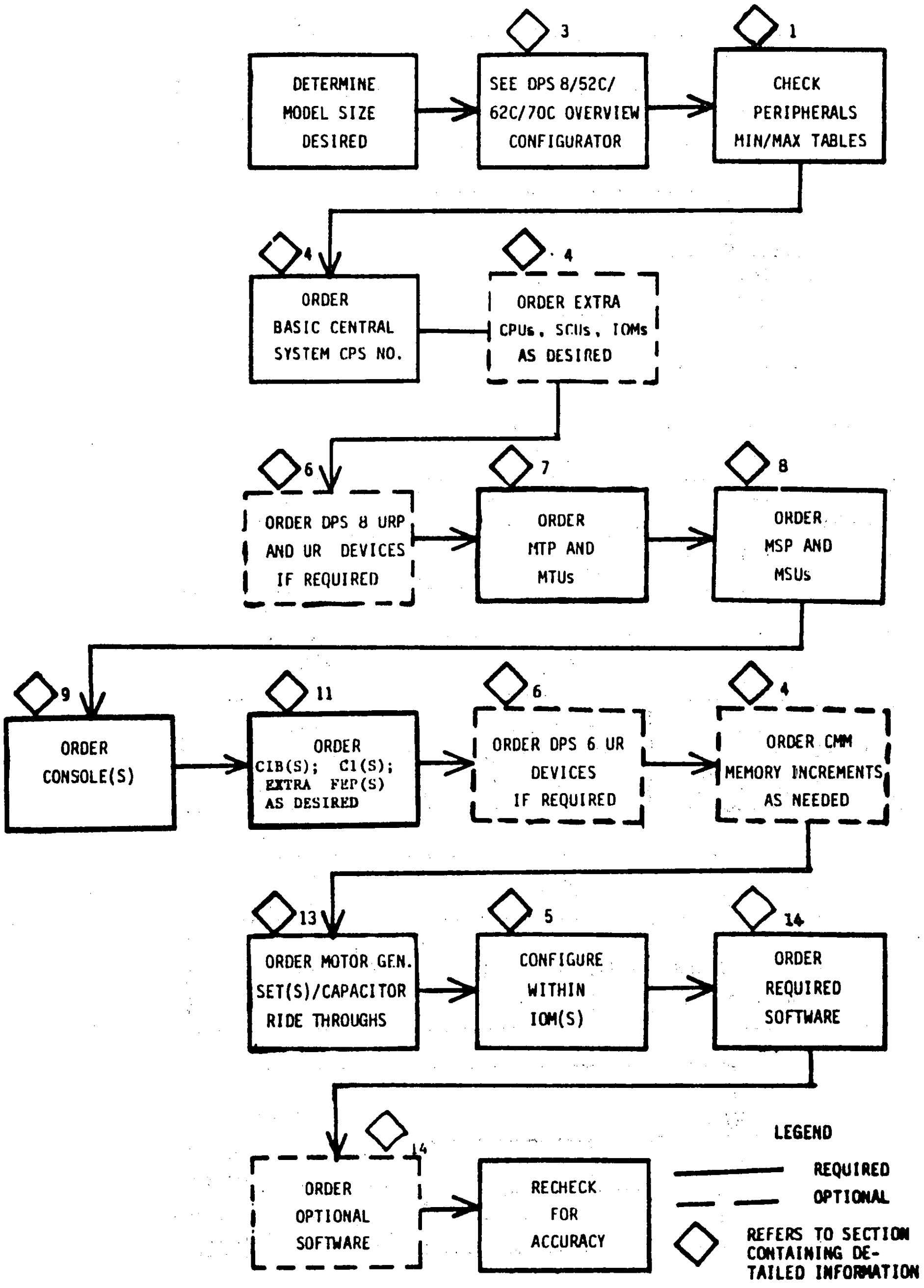
1. One tape unit is normally used for the initial system boot.
2. The maximum is 8 tape units on single-channel MTP, 16 on dual-channel MTP. Maximum of 8 tapes on MFP8001.
3. Needed for CP-6 Operating System, support and temporary files.
4. See permissible maximum combinations per MSP in Section 8.

SECTION 2
Master Flowcharts for DPS 8/C Configuring

DPS 8/47C/49C SYSTEMS

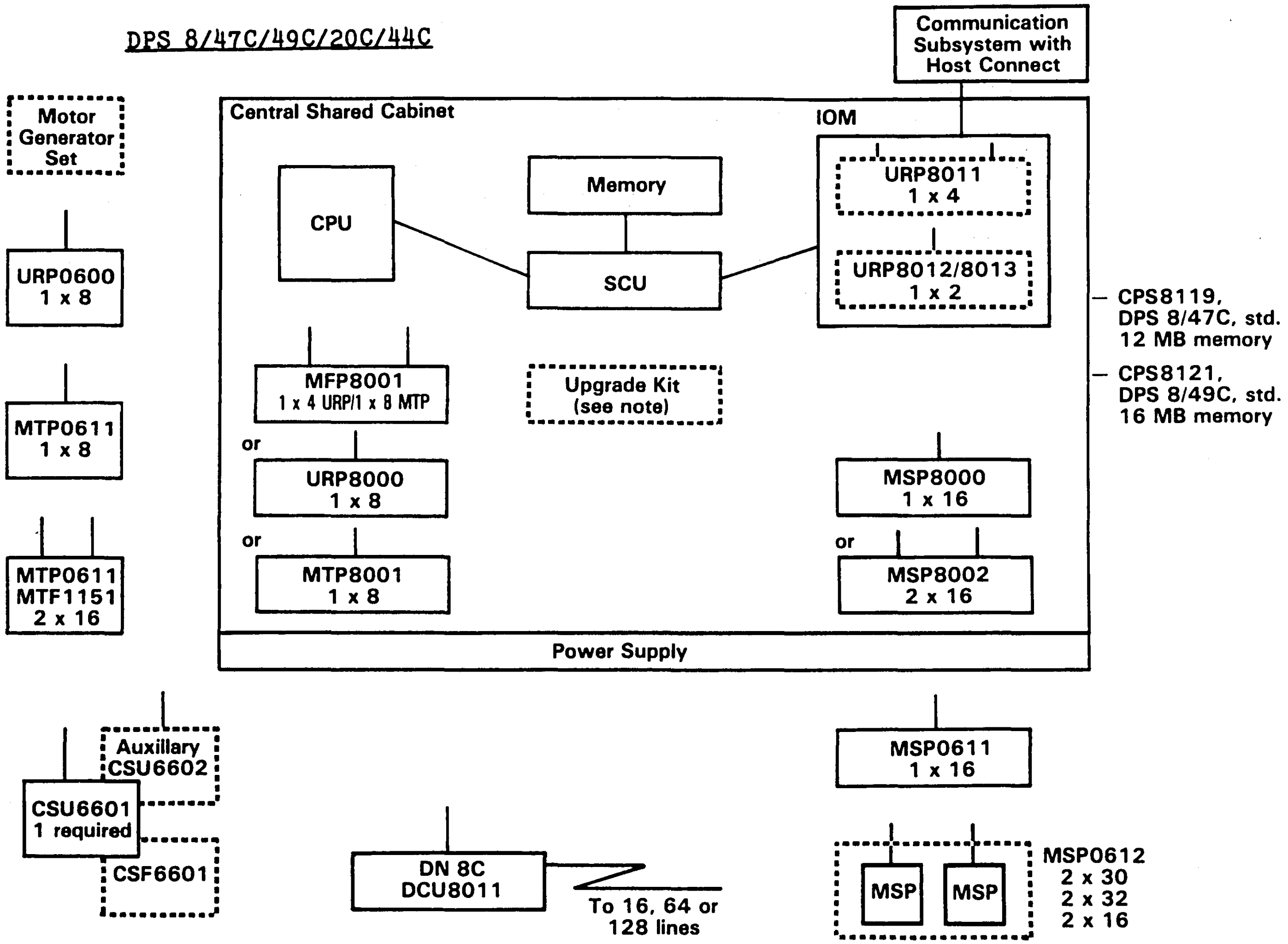


DPS 8/52C/62C/70C SYSTEMS



SECTION 3
Configurator Overview

DPS 8/47C/49C/20C/44C



Required Per System

- 1 MT Subsystem
- 1 MS Subsystem
- 1 CIB & 1 async line
- 1 CSU6601 console
- 1 212A modem & comm. line

DPS 8/20C, 8/44C Options

SCU Upgrade - MXK8007
Extra SCU - MXC8003 } Maximum 1 each
Extra IOM - MXU8003
(3 & 4 CPU configurations available via RPQ after system upgrade with CPK8366)

DPS 8/47C, 8/49C Options

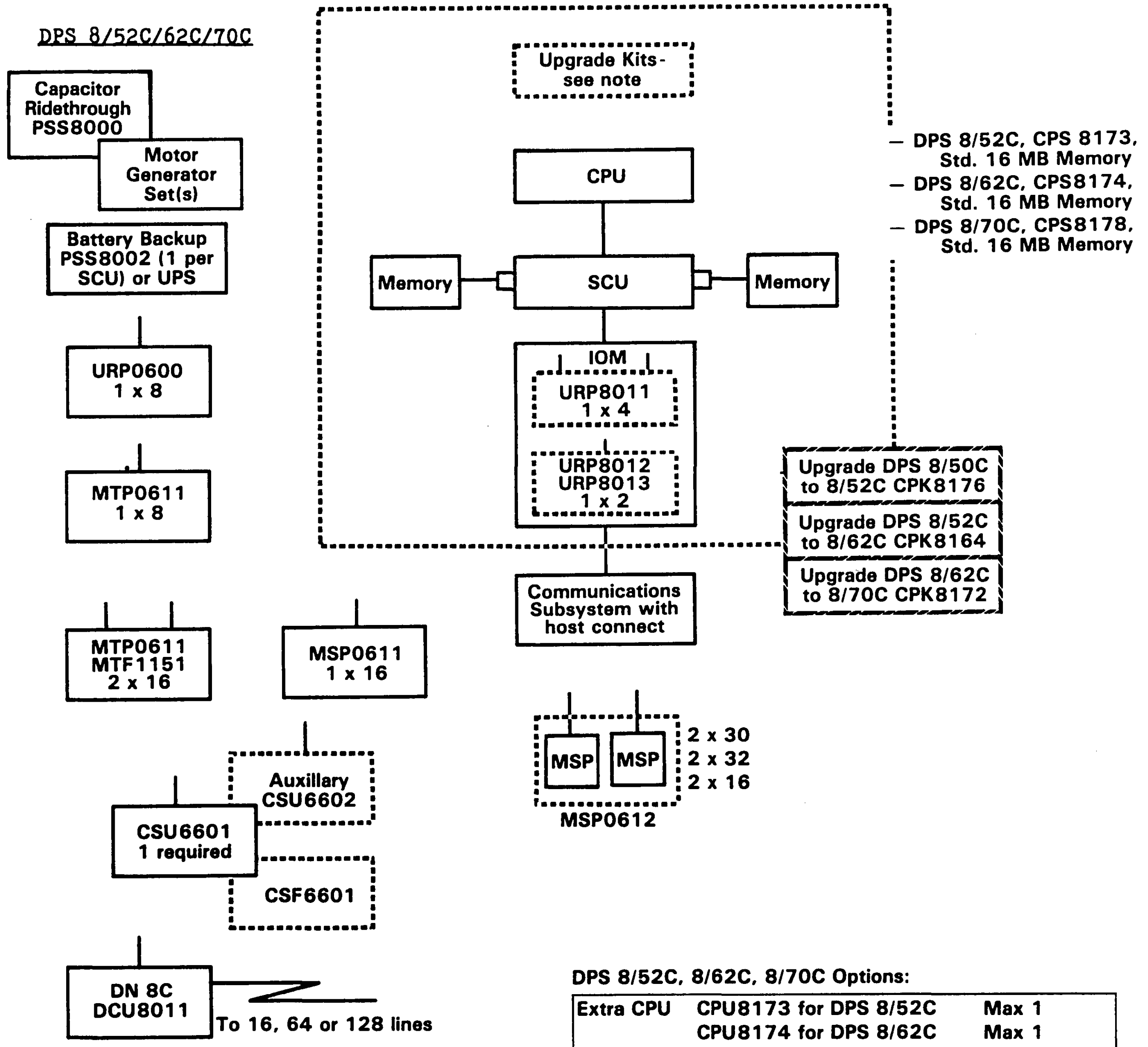
Extra CPU	CPU8119 for DPS 8/47C CPU8121 for DPS 8/49C	Max 1 Max 3
SCU Upgrade	MXK8007 MXK8009	2-5 port expansion 5-8 port expansion
Extra SCU	MXC8003 (5 port)	Max 1
Extra IOM	MXU8003	Max 1
Tandem Systems use	1 RSF8001 - Redundant System Facility 2 CPS81XX - Central Systems 2 MXK8007 - SCU Expansions 2 CSU6601 - Consoles	

(See p. 3-2 for notes)

<u>Notes:</u>

- Performance upgrade Kit DPS 8/20C (CPS8114) to 8/44C (CPS8116) is CPK8113.
- CPU upgrade: CPU8114 to CPU8116 is CPK8119.
- Performance upgrade Kit DPS 8/44C (CPS8116) to 8/49C (CPS8121) is CPK8366.
- Performance upgrade Kit DPS 8/44CD (CPS8117) to 8/49C (CPS8121 and CPU8121) is CPK8367.
- CPU upgrade: CPU8116 to CPU8121 is CPK8368.
- Central System upgrade DPS 8/47C (CPS8119) to 8/49C (CPS8121) is CPK8362.
- CPU upgrade: CPU8119 to CPU8121 is CPK8365.

DPS 8/52C/62C/70C



DPS 8/52C, 8/62C, 8/70C Options:

Extra CPU	CPU8173 for DPS 8/52C CPU8174 for DPS 8/62C CPU8178 for DPS 8/70C	Max 1 Max 1 Max 5*
Extra SCU Extra IOM	MXC8002 MXU8002	Max 3* each cross-barring included
Tandem Systems use 1 RSF8002 and 2 CPS8173/8174/8178		
* Total CPUs and IOMs = 8 or less		

Required per System	
1 MT subsystem	
1 MS subsystem	
1 CSU6601	
1 CIB and 1 async line	
1 212A modem and comm. line	
1 motor generator or PSS8000 for each CPU/IOM	or UPS
1 battery backup on each SCU	

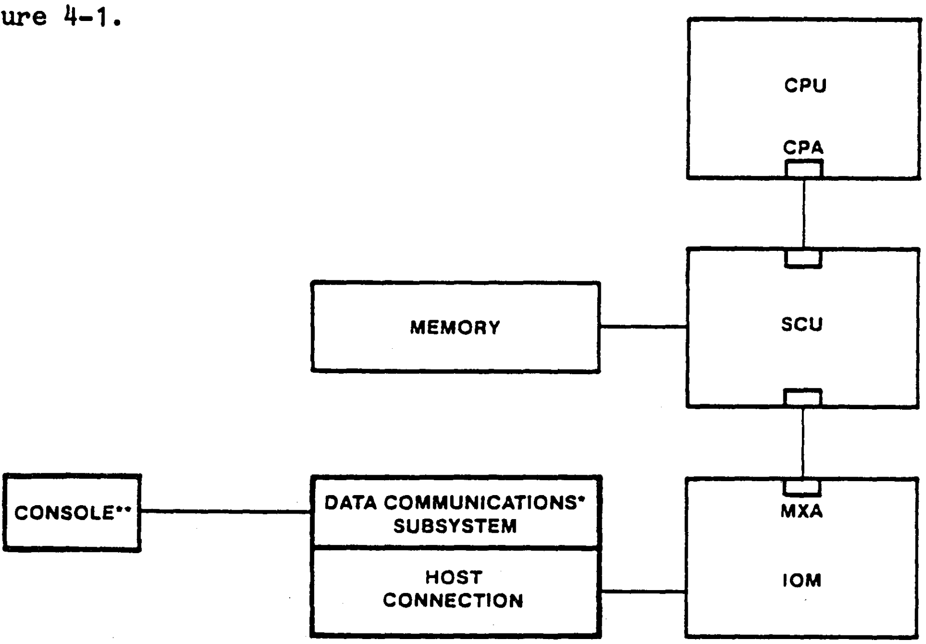
Note: CPU Upgrades: CPU8170 to CPU8173 is CPK8177;
CPU8173 to CPU8174 is CPK8174;
CPU8174 to CPU8178 is CPK8178

SECTION 4
Central System Configuring

ORDERING THE CENTRAL SYSTEM (CPS)

This is the configuration which is the heart of each initial order. It is obtained by use of the CPS marketing identifier for the model you want to order. The base CPS identifier is the first identifier that you write on your initial order. All additions at the time of the initial order or after the system has been installed are made to the base CPS system. The base CPS system is also known as the base system, basic system, or base mainframe.

The components of each DPS 8/C Central System are illustrated in Figure 4-1.



* Includes diskette, for maintenance purposes
** 30 cps terminal, included for maintenance purposes

Figure 4-1. DPS 8/C Central System Components

Each CPS identifier gives you a complete central system as shown:

One CPU and one SCU, a base quantity of memory, one IOM, plus one Central Processor Addressing feature or port (CPA) in the CPU and one IOM Addressing feature or port (MXA) in the IOM, one Data Communications Subsystem, including one Host Connection, one Communications Subsystem connected, 30 cps Console and one diskette (the console and diskette are included for maintenance purposes). Components in the central system do not have individual identifiers.

DPS 8/47C/49C central systems may be connected together via the Redundant Systems Facility (RSF8001), provided both systems have upgraded to a 5 port SCU with the SCU Expansion (MXK8007). DPS 8/52C/62C/70C central systems may be connected together via the Redundant Systems Facility (RSF8002).

DPS 8/47C/49C CPS Identifiers

- CPS8119 for DPS 8/47C
- CPK8362 Upgrade Kit from CPS8119 to CPS8121
- CPS8121 for DPS 8/49C

Each CPS identifier includes:

- Central system cabinet (CSC).
- CPU, SCU, IOM - 1 each, with connecting cables and addressing features. IOM includes 20 logic board slots for physical I/O channels.
- Memory: 12M bytes on the DPS 8/47C (expandable to 32M bytes in 2 or 4M byte increments - requires MXC8003, additional 5 port SCU, beyond 16M bytes). 16M bytes on the DPS 8/49C (expandable to 32M bytes in 2 or 4M byte increments--requires MXC8003, additional 5 port SCU).
- Power supply for all components within the central system cabinet.
- Space for one MSP8000 or one dual channel MSP8002.
- Space for one MFP8001 or one MTP8001 or one URP8000. The peripheral processors themselves are not included in CPS8119/8121 identifiers.
- All items above contained in the central system cabinet.
- One freestanding Data Communications subsystem with one Host Connection, one Communications Subsystem connected, 30 cps Console and one diskette (the console and diskette are included for maintenance purposes).
- Requires one standard dial up line and one 1200 baud asynchronous modem (must be Bell 212A, or Vadic Triple Modem (3451P, 3451S), or Rixon T212A, or equivalent) for use with the diagnostic processing functions. Neither the line nor the modem is included in the CPS.

DPS 8/52C/62C/70C CPS Identifiers

- CPS8173 for DPS 8/52C
- CPK8176 Upgrade Kit from CPS8170 (DPS 8/50C) to CPS8173 (DPS 8/52C)
- CPK8164 Upgrade Kit from CPS8173 to CPS8174
- CPS8174 for DPS 8/62C
- CPK8172 Upgrade Kit from CPS8174 to CPS8178
- CPS8178 for DPS 8/70C

Each CPS identifier includes:

- One CPU and its power supply.
- 16M bytes main memory. All are expandable to 64M bytes. MXC8002 required for each 16M bytes or fraction thereof above initial 16M bytes.
- One IOM with own power supply and inclusion of 36 logical board slots for physical I/O channels. Capacity for 18 more board slots for I/O channels via MXF8005 Channel Expansion option.
- CPU, SCU, IOM and Data Communications Subsystem (which also includes one Host Connection, one Communications Subsystem connected, 30 cps Console and one diskette). Connecting cables and addressing features are included in CPS identifier.
- Requires 1) MG and one PSS8002 Battery Backup on each SCU (neither included in CPS), or 2) one PSS8000 Capacitor Ride-Through for each CPU/IOM and one PSS8002 Battery Backup on each SCU, or 3) UPS.
- Requires one standard dial up line and one 1200 baud asynchronous modem (must be Bell 212A, or Vadic Triple Modem (3451P, 3451S), or Rixon T212A, or equivalent) for use with the diagnostic processing functions. Neither the line nor the modem is included in the CPS.

ORDERING EXTRA CPUs, SCUs, IOMs FOR DPS 8/47C/49C

One additional SCU, IOM and/or CPU can be ordered initially, or later as additions on DPS 8/47C. One additional SCU and IOM and up to three additional CPUs can be ordered initially, or later as additions on DPS 8/49C.

- Maximum of two SCUs, two IOMs and two CPUs per DPS 8/47C System.

- Maximum of two SCUs, two IOMs and four CPUs per DPS 8/49C System.

- Marketing identifiers

- SCU:	MXK8007	SCU Port Expansion (2 - 5 Port)
	MXK8009	SCU Port Expansion (5 - 8 Port)
	MXC8003	Additional (5 Port) SCU
- IOM:	MXU8003	Additional IOM (requires MXK8007)
- CPU:	CPK8113	Performance increase DPS 8/20C (CPS8114) to DPS 8/44C (CPS8116) - requires CPK8119 if system includes CPU8114; requires SFS6130, if installed, be replaced with SFS6135.
	CPK8119	CPU8114 to CPU8116 performance increase (requires CPK8113).
	CPU8119	Additional DPS 8/47C CPU (requires MXK8007).
	CPU8121	Additional DPS 8/49C CPU (requires MXK8007, requires MXK8009 and 2nd CSU6601/6602 for 3rd CPU on a system).
	CPK8362	Central System increase DPS 8/47C (CPS8119) to DPS 8/49C (CPS8121) - requires CPK8365 if system includes CPU8119; requires SFS6135, if installed, be replaced with SFS6145.
	CPK8365	CPU8119 to CPU8121 performance increase (requires CPK8362).
	CPK8366	Performance increase DPS 8/44C (CPS8116) to performance of DPS 8/49C (CPS8121) - requires CPK8368 if system includes CPU8116; requires SFS6135, if installed, be replaced with SFS6145.
	CPK8367	Performance increase DPS 8/44CD (CPS8117) to performance of DPS 8/49C (CPS8121 and CPU8121); requires SFS6135, if installed, be replaced with SFS6145.
	CPK8368	CPU8116 to CPU8121 performance increase (requires CPK8366).
- Tandem System:		
	RSF8001	Redundant System Facility for CPS8119/8121 - requires MXK8007 installed in each SCU.

All necessary connecting cables and addressing features are automatically included. Each CPU and each IOM is cross-barred to each SCU by Customer Services at the site. You must supply cable lengths.

ORDERING EXTRA CPUs, SCUs, IOMs FOR DPS 8/52C/62C/70C

Up to 3 more SCUs and/or IOMs can be ordered initially, or later as additions on DPS 8/52C/62C/70C. One additional CPU may be ordered for DPS 8/52C/62C. Up to 5 more CPUs can be ordered initially, or later as additions on DPS 8/70C, provided that the combined total of CPUs and IOMs are less than or equal to 8.

- Maximum of four SCUs, IOMs per DPS 8/52C/62C/70C system. Maximum of two CPUs on DPS 8/52C/62C. Maximum of six CPUs on DPS 8/70C, so long as the combined total of CPUs plus IOMs are less than or equal to eight.

- Marketing identifiers

SCU:	MXC8002	Additional SCU
IOM:	MXU8002	Additional IOM
	MXF8005	IOM Expansion (36 to 54 slots)
CPU:	CPU8173	Additional DPS 8/52C CPU
	CPU8174	Additional DPS 8/62C CPU
	CPU8178	Additional DPS 8/70C CPU
	CPK8176	Performance increase, DPS 8/50C (CPS8170) to DPS 8/52C (CPS8173) - requires CPK8177 if system includes CPU8170; requires SFS6140, if installed, be replaced with SFS6145.
	CPK8164	Performance increase, DPS 8/52C (CPS8173) to DPS 8/62C (CPS8174) - requires CPK8174 if system includes CPU8173; requires SFS6145, if installed, be replaced with SFS6150.
	CPK8172	Performance increase, DPS 8/62C (CPS8174) to DPS 8/70C (CPS8178) - requires CPK8178 if system includes CPU8174; requires SFS6150, if installed, be replaced with SFS6155.
	CPK8177	CPU8170 to CPU8173 performance increase (requires CPK8176).
	CPK8174	CPU8173 to CPU8174 performance increase (requires CPK8164).
	CPK8178	CPU8174 to CPU8178 performance increase (requires CPK8172).
Tandem System:	RSF8002	Redundant System Facility for CPS8173/8174/8178.

- All necessary connecting cables and addressing features are automatically included. Each CPU and each IOM is cross-barred to each SCU by Customer Services at the site. You must supply cable lengths.

DPS 8/C MEMORY CONFIGURATORS

DPS 8/20C, 8/44C Total Memory Size

<table>
<tr><th></th><th>6 MB</th><th>8 MB</th><th></th><th></th><th>10 MB</th><th>12 MB</th><th>14 MB</th><th>16 MB</th></tr>
<tr><td>CPS8114</td><td rowspan="2">Standard</td><td>CMM8002</td><td>MXK8007</td><td>MXC8003</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td></tr>
<tr><td>CPS8116</td><td></td><td>MXK8007</td><td>MXC8003</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td></tr>
</table>

Figure 4-2 DPS 8/20C, 8/44C Memory Configurator

DPS 8/47C, 8/49C Total Memory Size

<table>
<tr><th></th><th>12 MB</th><th>14MB</th><th>16 MB</th><th></th><th>18 MB</th><th>20 MB</th><th>22 MB</th><th>24 MB</th><th>26 MB</th><th>28 MB</th><th>30 MB</th><th>32 MB</th></tr>
<tr><td rowspan="2">CPS8119</td><td rowspan="4">Standard</td><td>CMM8002</td><td>CMM8002</td><td rowspan="2">MXC8003</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td></tr>
<tr><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td></tr>
<tr><td rowspan="2">CPS8121</td><td colspan="2" rowspan="2"></td><td rowspan="2">MXC8003</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td><td>CMM8002</td></tr>
<tr><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td><td colspan="2">CMM8003</td></tr>
</table>

Figure 4-3 DPS 8/47C, 8/49C Sample Memory Configurator

DPS 8/50C, 8/52C, 8/62C, 8/70C Total Memory Size

		16 MB			18 MB	20 MB	22 MB	24 MB	26 MB	28 MB	30 MB	32 MB
CPS8170/8173/8174/8178 DPS 8/50C, 8/52C, 8/62C, 8/70C	PSS8002*	Standard	PSS8002*	MXC8002	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020

			34 MB	36 MB	38 MB	40 MB	42 MB	44 MB	46 MB	48 MB
CPS8170/8173/8174/8178 DPS 8/50C, 8/52C, 8/62C, 8/70C	PSS8002*	MXC8002	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020

			50 MB	52 MB	54 MB	56 MB	58 MB	60 MB	62 MB	64 MB
CPS8170/8173/8174/8178 DPS 8/50C, 8/52C, 8/62C, 8/70C	PSS8002*	MXC8002	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020	CMM8020

* PSS8002 required for all DPS 8/50C, 8/52C, 8/62C, 8/70C systems without UPS.

Figure 4-4 DPS 8/50C, 8/52C, 8/62C, 8/70C Memory Configurator

Marketing identifiers (MI) for memory are given in the following listing.

System	MI	Description
DPS 8/20C/44C	CMM8002	2M bytes main memory
DPS 8/47C/49C	CMM8002	2M bytes main memory
DPS 8/47C/49C	CMM8003	4M bytes main memory
DPS 8/50C/52C/62C/70C	CMM8020	2M bytes main memory

The Control Unit Battery Backup (PSS8002) provides up to 4 minutes of power to storage units. One is required for each 16M bytes, or fraction thereof, on DPS 8/50C/52C/62C/70C without UPS. Not available on DPS 8/20C/44C/47C/49C.

To upgrade memory size on an installed DPS 8/C system, using identifiers from the listing above, add the appropriate number of increment identifiers for the total size you want, less the identifiers already used for the currently installed memory size. On the DPS 8/50C/52C/62C/70C, add one MXC8002 for each 16M bytes or fraction thereof above the initial 16M bytes. If no UPS, add one PSS8002 for each 16M bytes or fraction thereof on the DPS 8/50C/52C/62C/70C. On the DPS 8/20C/44C, add one MXK8007 and one MXC8003 if a total of more than 8MB is configured on the system. On the DPS 8/47C/49C, add one MXC8003 if a total of more than 16MB is configured on the system.

> Example: To increase an installed DPS 8/50C from its present 16 M-byte to 28 M-byte memory you order 6 CMM8020. 1 PSS8002 and 1 MXC8002.

Memory interleaving is not available on DPS 8/20C/44C/47C/49C. The memory interleaving aspects of the DPS 8/50C/52C/62C/70C are discussed later in this section.

COMPUTING MEMORY REQUIREMENTS FOR DPS 8/C

Memory requirements for DPS 8/C systems are broken down into four parts.

- Operating System
- Compilers
- Programs
- Other activities

The total estimated memory requirement for a DPS 8/C system is equal to the sum of the requirements for each of the four parts plus an allowance for growth and peak loads.

Operating System - The basic minimum operating system memory requirement is approximately 3.240K bytes. To this minimum, add the following, as needed:

Added Item	Size (K bytes)
Additional CPUs (beyond 1 CPU)	40 x (# CPUs - 1)
Additional FEPs (beyond 2 FEPs)	24 x (# FEPs - 2)
Mail system	120
Beam/Move system (SCOTTY)	152
IDS (Data Base Control System)	132
Transaction Processing	48
Fortran/Basic/APL Lib (:SHARED_COMMON)	120
COBOL/Sort Lib (:SHARED_COBOL)	144
COBOL Lib without Sort (:SHARED_COB)	76
RPG Lib (:SHARED_RPG)	80
Pascal Lib (:SHARED_PASCAL)	72

Compilers - Each compiler used requires a quantity of memory. For each compiler this memory consists of two parts, data and shared procedure. The table below shows the memory sizes for each compiler. In using the table, note that:

n = the number of concurrent users of the compiler. For FORTRAN and COBOL n = n_1 (# users with programs <200 lines) + n_2 (# users with programs >200 lines)
m = the minimum of n or 4.

Compiler*	Size (K bytes)	
	Data	Shared Procedure
FORTRAN	(128 x n_1) + (160 x n_2)	+ 172 + (80 x m)
COBOL	(160 x n_1) + (200 x n_2)	+ 82 + (120 x m)
FPL	(80 x n)	+ 192
PASCAL	(140 x n)	+ 88 + (112 x m)
PL6*	(160 x n)	+ 40 + (200 x m)
RPG	(88 x n)	+ 76 + (48 x m)

* Note that users of SPSS have memory requirements similar to those shown here for PL6.

Programs - The numbers given below yield the minimum memory requirements for the program types shown. In all cases, compensation must be made for large programs and data sizes.

The constants represent sharable procedure. The coefficients of n represent data (i.e., n = the number of users for that program).

Program Type	Size (K bytes)		
	Data		Shared Procedure
FORTRAN	(4 x n)	+	4
PL6	(4 x n)	+	4
RPG	(8 x n)	+	4
PASCAL	(4 x n)	+	4
COBOL (using:SHARED_COBOL)	(32 x n)	+	4
COBOL (using:SHARED_COB)	(20 x n)	+	4
Any above under DELTA	Add (40 x n)		
Any above using IDS	Add (52 x n)		
(Note this must also be added to APL or BASIC as required.)			
Any above running in TP	Add (12 x # of TP user slots)		
TP instances	(52 x # of instances) + 64		

Other Activities - The numbers given here are representative of moderate sized programs. As noted, compensation must be made for large programs. Again, n = the number of concurrent users of an activity.

Activity	Size (K bytes)		
	Data		Shared Procedure
Each CP-6 User	(16 x n)		
IBEX	(16 x n)		
Editor	(28 x n)	+	84
APL (depends on program)	(52 x n)	+	352
BASIC (depends on program)	(44 x n)	+	324
IDP	(32 x n)	+	120
LINK (depends on program)	(96 x n)	+	152
SORT (uses as much memory as it is given)	(56 x n)	+	56
MERGE (uses as much memory as it is given)	(52 x n)	+	56
PCL	(36 x n)	+	96
STATS	(32 x n)	+	96
MAIL	(28 x n)	+	48
SEND	(32 x n)	+	28
TEXT	(64 x n)	+	196

Growth and peak load allowance - Use 10-20% of the sum of the memory requirements for compilers, programs and other activities.

Examples 1 and 2 point out the differences in memory requirements between installations exercising tight control of memory and those which do not constrain its use.

Example 1

A single CPU system to run eighty users in a pure time sharing system for students with tight controls on on-line memory use. All compilations will be done in a single batch stream. Other off-hour data processing will be done, but will be less demanding than the peak hour student load. Fortran, Basic, APL, Pascal, and PL6 will be the languages used. COBOL and SORT will be required for the DP activities, but will not be used by students. The expected mix of users is: 20 in IBEX, 25 in EDIT, 2 in PCL, 10 in Basic, 5 in APL, and the remaining 18 running their own programs averaging 20K bytes data and 8K bytes procedure.

Operating System	Size (K bytes)
Item	
Base Operating System	3240
Fortran/Basic/APL Lib	120
Pascal Lib	72
Cobol/Sort Lib	144

Operating System Total = 3576K bytes

Compilers

Note that all compilations will be done in a single batch stream (i.e., one at a time) and that this will handle the peak load. Hence the compiler requirement is equal to the worst case situation which in this example would be a greater than 200 line FORTRAN compilation.

Data	Shared Procedure		Size (K bytes)
(160 x 1)	172 + (80 x 1)	=	412

Programs

The problem states that the memory requirements for programs is:

Data		Shared Procedure		Size (K bytes)
18 x ((20 x 1)	+	8)	=	504

Note that the problem states that each of 18 users are running their own programs, i.e., they are <u>not</u> using shared procedures. Also note that the sizes specified (in the problem) are above the minimum program sizes allowed.

Other Activities

Item	Data		Shared Procedure		Size (K Bytes)
Each CP-6 User	(16 x 80)			=	1280
IBEX	(16 x 20)			=	320
Editor	(28 x 25)	+	84	=	784
APL	(52 x 5)	+	352	=	612
BASIC	(44 x 10)	+	324	=	768
PCL	(36 x 2)	+	96	=	168

Other Activities Total = 3932K Bytes

Growth and peak load allowance.

Use 15% of the sum of the memory requirements for compilers, programs and other activities.

Compilers = 412
Programs = 504
Other Activities = 3932

4848K Bytes x 0.15 = 727K Bytes

Total memory requirement is:

Item	Size (K Bytes)
Operating System	3576
Compilers	412
Programs	504
Other Activities	3932
Allowance	727
System Total	9151K Bytes --> 12MB on DPS 8/47C --> 16MB on DPS 8/49C/52C/62C/70C

Example 2

The same single CPU system to run eighty time sharing users and off hours data processing work requiring COBOL and SORT. A smaller set of languages will be used than in Example 1. However, there is no plan to constrain compilations to batch, and heavy use of a large statistical package (SPSS) is anticipated. The expected mix of users is: 10 in IBEX, 10 in EDIT, 20 in SPSS, 10 in FORTRAN (5 small, 5 large), 10 in PASCAL, 2 in PL6, and 18 running assorted user programs averaging 20k bytes data and 8k bytes procedure.

Operating System	Size (K bytes)
Item	
Base Operating System	3240
Fortran/Basic/APL Lib	120
Pascal Lib	72
Cobol/Sort Lib	144

Operating System Total = 3576K bytes

Compilers

Type	Data		Shared Procedure		Size (K Bytes)
FORTRAN	(128 x 5)+(160 x 5)	+	172 + (80 x 4)	=	1932
PASCAL	(140 x 10)	+	88 + (112 x 4)	=	1936
PL6	(160 x 2)	+	40 + (200 x 2)	=	760
SPSS	(160 x 20)	+	40 + (200 x 4)	=	4040
COBOL	N/A since run off hours, and with a small number of users. Thus, is guaranteed that size is less than sum of other compilers above.				

Compilers Total = 8668K Bytes

Programs

The problem states that the memory requirements for programs is:

Data		Shared Procedure		Size (K bytes)
18 x ((20 x 1)	+	8)	=	504

Note that the problem states that each of 18 users are running their own programs, i.e., they are not using shared procedures. Also note that the sizes specified (in the problem) are above the minimum program sizes allowed.

Other Activities

Item	Data		Shared Procedure		Size (K Bytes)
Each CP-6 User	(16 x 80)			=	1280
IBEX	(16 x 10)			=	160
Editor	(28 x 10)	+	84	=	364
			Other Activities Total	=	1804K Bytes

Growth and peak load allowance.

Use 15% of the sum of the memory for compilers, programs, and other activities.

Compilers = 8668
Programs = 504
Other Activities = 1804

10976K Bytes x 0.15 = 1646K Bytes

Total memory requirement is:

Item	Size (K Bytes)
Operating System	3576
Compilers	8668
Programs	504
Other Activities	1804
Allowance	1646
System Total	16198K Bytes

A 16MB DPS 8/C system would just minimally meet these memory requirements, 18MB might be preferable.

Example 3

A dual CPU system is to be configured with 5 FEPs to run a mixture of timesharing, batch, and TP. Approximately 200 TP terminals are expected to be connected to two TP instances, each of which will have 10 user slots. The TPAPS will be COBOL/IDS programs and approximately 10 distinct ones will be in use at any time. The batch load is expected to be 5 batch streams running an assortment of programs with an average total memory requirement of 200K bytes. 100 time sharing users are expected in two groups. The first group (50 users) run one of two large engineering design programs. The second group is doing program development. Tne users break down as follows:

TP	20 user slots each with 72K bytes data and 10 shared COBOL/IDS programs each with approximately 164K bytes procedure.
Batch	5 users, average 200K bytes.
Timesharing	50 users, each with an average of 84K bytes data, using 2 shared Fortran programs, each with approximately 164K bytes procedure. 10 users IBEX 20 users EDIT 3 users Fortran Compiler 3 users Cobol Compiler 7 users debugging Fortran programs, with an average size of 164K bytes procedure and 84K bytes data. 7 users debugging Cobol programs, with an average size of 164K bytes procedure and 72K bytes data.

Memory requirements are derived as follows:

Operating System	Size (K bytes)
Item	
Base Operating System	3240
Additional CPU	40
Additional FEPs	72
IDS	132
TP	48
Fortran/Basic/APL Lib	120
Cobol/Sort Lib	144
Total Operating System =	3796K bytes

Compilers

Type	Data		Shared Procedure		Size (K Bytes)
FORTRAN	(160 x 3)	+	172 + (80 x 3)	=	892
COBOL	(200 x 3)	+	82 + (120 x 3)	=	1042
			Total Compilers	=	1934K Bytes

Programs

Type	Data		Procedure		Size (K Bytes)
Batch	(200 x 5)			=	1000
Timesharing					
FORTRAN	(42 x 50)	+	164	=	2264
	(42 x 50)	+	164	=	2264
FORTRAN - debug*	(84 x 7)	+	(164 x 7)		
Add DELTA	+(40 x 7)			=	2016
COBOL - debug	(72 x 7)	+	(164 x 7)		
Add DELTA	+(40 x 7)			=	1932
TP					
COBOL	(72 x 20)	+	(164 x 10)		
Add IDS	+(52 x 20)				
Add TP	+(12 x 20)			=	4360
TP Instances	(52 x 2)	+	64	=	168
			Total Programs	=	14,004K bytes

* Note that programs being debugged are not shared.

Other Activities

Item	Data		Shared Procedure		Size (K Bytes)
Each CP-6 User	(16 x 125)			=	2000
IBEX	(16 x 10)			=	160
Editor	(28 x 20)	+	84	=	644
			Total Other Activities	=	2804K Bytes

Growth and peak load allowance

Use 15% of the sum of the memory for compilers, programs and other activities.

Compilers = 1934
Programs = 14004
Other Activities = 2804

18742K Bytes x 0.15 = 2811K Bytes

Total memory requirement is:

Item	Size (K Bytes)
Operating System	3796
Compilers	1934
Programs	14004
Other Activities	2804
Allowance	2811
System Total	25,349K Bytes --> 26MB on DPS 8/47C/49C/ 52C/62C/70C

Memory Interleaving Aspects

The DPS 8/50C, DPS 8/52C, DPS 8/62C and DPS 8/70C support 2-way interleaving on one SCU with configurations of 16M bytes. Requires memory to be evenly divided on each of the two memory ports of SCU. As noted above, memory interleaving is not available on DPS 8/47C/49C.

DPS 8/50C, DPS 8/52C, 8/62C and 8/70C may have more than one SCU, to a total of four in one system.

- If two SCUs exist in one system, 4-way interleaving is possible. Requires same amount of memory on each of the four memory ports involved (two per SCU).
- If three SCUs exist in one system, 4-way interleaving is possible on two of the SCUs, 2-way interleaving on the third SCU.
- If four SCUs exist in one system, two sets of 4-way interleaving are possible.

Interleaving causes physical memory addresses to be distributed sequentially across two memory ports on one SCU (2-way) or across four memory ports (two ports each for two SCUs for 4-way).

- Example of 2-way interleaving:

Addresses	Port 1	Port 2
Addresses	0-1	2-3
	4-5	6-7
	8-9	10-11
	etc.	etc.

- Example of 4-way interleaving addresses

SCU 1		SCU 2	
Port 1	Port 2	Port 1	Port 2
0-1	2-3	4-5	6-7
8-9	10-11	12-13	14-15
16-17	18-19	20-21	22-23
etc.	etc.	etc.	etc.

Interleaving increases the effective speed of memory where memory locations are accessed in sequence. Allows the restore portion of a memory cycle on one memory port to be overlapped by the fetch portion of next memory cycle from next port in succession.

CONFIGURATION EXAMPLES FOR INITIAL ORDERS AND ADDITIONS

1. Examples of initial central system order.

- Customer wants DPS 8/47C system with 14M bytes memory

1 CPS8119	DPS 8/47C central system with 12M bytes
1 CMM8002	2M byte Expansion

- Customer wants DPS 8/49C with 16M bytes memory

1 CPS8121	DPS 8/49C central system with 16M bytes

- Customer wants dual DPS 8/70C with 32M bytes total

1 CPS8178	1 DPS 8/70C central system, 16M bytes
1 CPU8178	1 Additional CPU (Specify Cable Lengths)
1 MXC8002	1 Additional SCU (Specify Cable Lengths)
8 CMM8020	16M bytes Additional Memory
2 PSS8002	2 Control Unit Battery Backups
3 PSS8000	3 Capacitor Ride-Throughs

- Customer wants DPS 8/52C with 16M bytes memory

1 CPS8173	DPS 8/52C central system with 16M bytes
1 PSS8002	1 Control Unit Battery Backup
2 PSS8000	2 Capacitor Ride-Throughs

2. Examples of additions to central system orders.

- Customer has DPS 8/20C installed with 6M bytes. Wants memory upgrade to 8M bytes.

1 CMM8002	6M bytes to 8M bytes

- Customer has a 1-CPU, 1-IOM DPS 8/70C installed with 16M bytes and 2 SCUs (1 optional). Wants to add a second CPU.

1 CPU8178	2nd CPU (specify cable length)
1 PSS8000	Capacitor Ride-Through for 2nd CPU

- Customer has DPS 8/44C installed. Wants a second IOM.

1 MXK8007	SCU Port Expansion
1 MXU8003	2nd IOM

SECTION 5
Configuring Within Any IOM

This section shows how to determine the number of physical and logical I/O channels required for the peripheral subsystems you wish for your system.

You must determine the quantity of logic boards required to contain the electronic logic for the number and type of physical I/O channels you desire. You must also determine whether there are sufficient channel board slots and logical channels available on a standard basis or via option to contain the needed logic boards in the DPS 8/C system you wish to configure.

In addition, you must determine IOM aggregate loads for the quantity of physical I/O channels you wish. (CP-6 does not require the manual assignment of Data Rate expansion (DRE) facilities as does GCOS.)

BASE IOM AND EXTRA IOM'S

The IOM included within CPS8XXX identifier has no type number. All IOMs configured for the DPS 8/47C/49C are integrated and all IOMs for the DPS 8/52C/62C/70C are freestanding, i.e., not integrated. The designation "freestanding" is retained for low profile components which are not physically integrated. These components may, however, be bolted together and may not actually be freestanding from one another.

Integrated IOMs may be obtained in three ways (DPS 8/47C/49C only):

- One is included in the base DPS 8/47C/49C.
- One more (MXU8003) may be ordered optionally on the initial DPS 8/47C/49C. The SCU Port Expansion, MXK8007 is a prerequisite. Maximum quantity of integrated IOMs on the DPS 8/47C/49C is two.
- One more (MXU8003) may be ordered optionally as an add-on to an installed DPS 8/47C/49C. Prerequisites and limits are the same as in the preceding paragraph.

All necessary cables and addressing features are automatically included to crossbar each IOM to each SCU. You must specify cable lengths.

Freestanding IOMs may be obtained in three ways (DPS 8/52C/62C/70C only):

- One is included in base CPS identifier of freestanding systems.
- One (MXU8002) or more may be ordered optionally on your DPS 8/52C/62C/70C initial order along with the CPS components. Maximum quantity of freestanding IOMs on the DPS 8/52C/62C/70C is four.
- One (MXU8002) or more may be ordered optionally as add-on components to a DPS 8/52C/62C/70C after your system has been installed. Limits are the same as in the preceding paragraph.

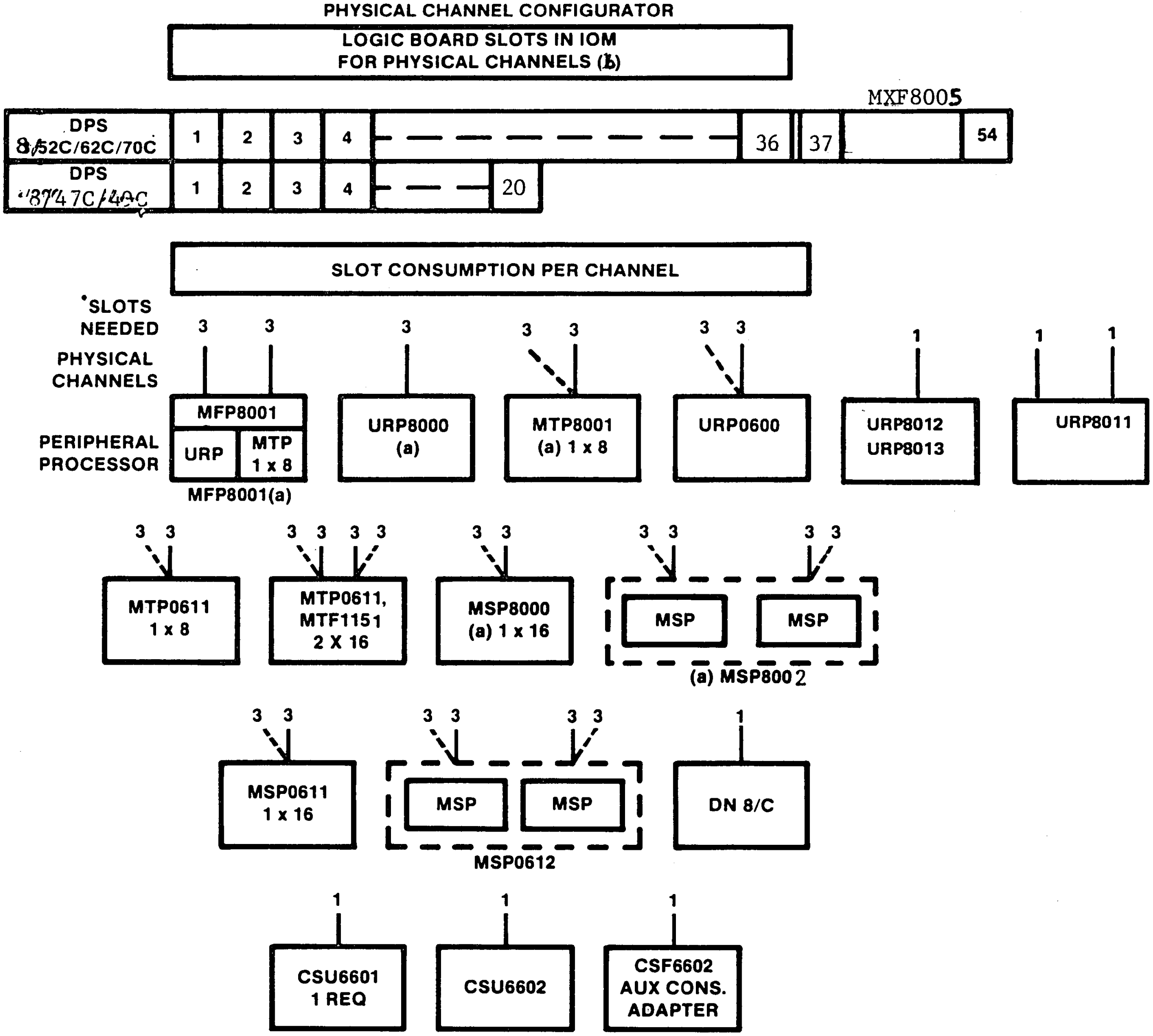
Each freestanding IOM, whether optional or included in CPS identifier, has its own power supply.

For each extra IOM ordered for DPS 8/52C/62C/70C all necessary cables and addressing features are automatically included to cross-bar each IOM to each SCU. You must specify cable lengths.

When two or more IOMs exist in a DPS 8/52C/62C/70C system it is desirable to split the two channels of dual-channel MTPs and MSPs, one channel to each of two IOMs. This allows the entire MT or disk subsystem to be accessible even if one IOM is lost.

PHYSICAL CHANNELS AND LOGIC BOARDS

In order to determine the quantity of physical channels required, and the number of logic boards (board slots) needed and provided, use the Physical Channel Configurator illustrated in Figure 5-1.



(a) For DPS 8/47C/49C only. URP8000, MTP8001, MFP8001 are mutually exclusive within a cabinet.

(b) Each peripheral processor price includes 1 IOM channel except 2 are included for URP8011, MSP0612, MSP8002; also 2 are included for MFP8001, one for URP portion and one for MTP portion.

Figure 5-1. Physical Channel Configurator

The top portion of the Configurator in Figure 5-1 shows how many slots are provided and can be optionally obtained to hold the logic boards for physical I/O channels in IOM.

- DPS 8/47C/49C IOM provides a fixed complement of 20 slots included in CPS identifier price. No additional slots are available.
- DPS 8/52C/62C/70C IOMs provide a fixed complement of 36 slots included in CPS identifier price. One MXF8005 Channel Expansion option is available for each IOM to provide 18 more board slots. Each additional IOM on DPS 8/52C/62C/70C provides the same base complement of 36 slots in its price and provision for one MXF8005 option in each added IOM.

The lower portion of the Configurator in Figure 5-1 shows the quantity of logic boards (thus board slots) in IOM needed to terminate each I/O cable from a peripheral processor.

- Each solid line from a peripheral processor represents the main channel(s) for the processor. MSP8002, MSP0612 peripheral processors include two simultaneous main channels in their price. MTP0611 can be configured with a second simultaneous channel. The second MTP0611 simultaneous channel is required if the MTP0611 is to service 9 to 16 tape units in its subsystem.
- The dotted lines from certain peripheral processors imply the optional switched channel feature applied to a main channel. No switched channel path can have I/O simultaneously with its associated main channel. No dual-channel peripheral processor thus can have more than two data transfers in operation simultaneously, no matter how many switched channel features are used.

  NOTE: Each switched channel feature defines a data transfer path and an IOM channel in its price.
- Total the board slots required for each data path termination required (main channels and swithced channels). Compare this to the total slots available.

If you cannot configure the desired number of peripheral subsystems and their complement of physical channels and switched paths, REGROUP and consider these alternatives:

- In case of a freestanding IOM use the Channel Expansion Option MXF8005.
- Bid a second IOM if the prospect will allow it.
- Use fewer simultaneous channels and/or switched paths.
- Use fewer subsystems of same type.
- Use fewer subsystems.
- Use different mix of subsystems.
- Change from DPS 8/47C/49C to DPS 8/52C/62C/70C, if possible.
- If possible, connect UR devices through DN8/C and use no unit record processor.

Determine next the logical channels or data paths which must be assigned to each physical channel and switched path, and the quantity which may optionally be assigned.

ASSIGNING LOGICAL CHANNELS TO PHYSICAL IOM CHANNELS

Each IOM supports up to 32 logical channels (up to 24 on DPS 8/47C/49C without MXK8007). No options are available. (A logical channel expansion, providing support for up to a total of 56 logical channels, may be requested via RPQ for DPS 8/52C/62C/70C.)

See Table 5-1 for a listing of Logical Channel Assignments.

TABLE 5-1. CONFIGURATION FOR LOGICAL CHANNEL ASSIGNMENTS

PERIPHERAL PROCESSOR	PHYSICAL CHANNELS REQUIRED (b)	LOGICAL CHANNELS REQUIRED (c)	ADDED USEFUL LOGICAL CHANNELS (d)
URP (PLUS 1-4/1-8 DEVICES) (a)	1	1 PER DEVICE	--
MSP SGL - CHANNEL	1	1	1 - 3
MSP DUAL - CHANNEL	2	2	1 - 3 PER PHY. CH.
(a) MTP SGL - CHANNEL	1	1	0 - 1
MTP DUAL - CHANNEL	2	2	0 - 1 PER PHY. CH.
CSU6601	1	1	--
DN 8/C	1	1	--

(a) Including URP and MTP in MFP8001 for DPS 8/47C/49C.

(b) Each peripheral processor includes one physical IOM Channel in its price, except URP8011, MSP8002/0612 which includes two.

(c) Don't forget the freestanding MTP, MSP allow for switched path features to be added to each Physical Channel. Each termination in IOM is a Physical Channel and must be allotted separate logical channels(s), the same quantity for each termination.

(d) Optional but valuable in increasing subsystem throughput.

The following paragraphs detail the rules for the assignment of IOM logical channels to physical channels.

- o Every main and switched physical IOM channel must be assigned one logical channel or data path. URP, MTP, MSP may use more than one logical channel per physical channel, as explained below.
- o Assignment is established onsite by Customer Services according to the mix of required and optional logical channels specified by you.
- o A table showing the assignment of logical to physical channels and of physical channels to peripherals is given to CP-6 at system startup time. Accordingly, CP-6 always knows what logical channels to use (thus physical channels) to reach a given peripheral processor, console, or FEP.
  - In effect CP-6 "sees" the peripherals it wants to reach via the logical channels.
  - The logical channel concept provides a link to slave program buffer areas - their size and locations. Without such a link, the transfer path to/from memory could not be established.

The following paragraphs explain the reasons for assigning more than one IOM logical channel to a physical cnannel.

1. Use of multiple logical channels per physical channel allows multiple places to which CP-6 can send or can queue I/O commands.
   - o As long as a logical channel is available, CP-6 can queue in it the next I/O command for a given subsystem, even though the physical channel is busy with data transfers for a prior operation initiated through another logical channel. Otherwise, with a single logical channel, the physical and logical channel would be tied up during the data transfer and interrupt sequence, preventing the overlapped stacking of the next I/O command by CP-6. CP-6 would have to wait for an opportunity to gain access to the single channel.
   - o The effect here is potentially greater subsystem throughput by using the physical channel more efficiently, stacking commands in front of the subsystem at any time as long as a logical channel is available.
   - o Looking at it another way, the use of more than one logical channel per physical channel (block multiplexing) allows multiple I/O operations to be in some stage of execution concurrently. There can be as many concurrent stages as logical channels assigned to the subsystem involved. In the URP, e.g., there could be as many as eight card reading/card punching/line printing operations simultaneously, using one physical channel.

2. Assigning more than one logical channel to a physical channel can help achieve the following advantages:

   - Greater subsystem throughput

   - Use of fewer physical channels

   - Larger number of I/O operations in some stage of execution concurrently

   - Better use of physical channels

   - Increased subsystem throughput by combining with rotational position sensing (RPS) in disk subsystems.

Figure 5-2 illustrates the concept of multiple logical channels/paths per physical channel.

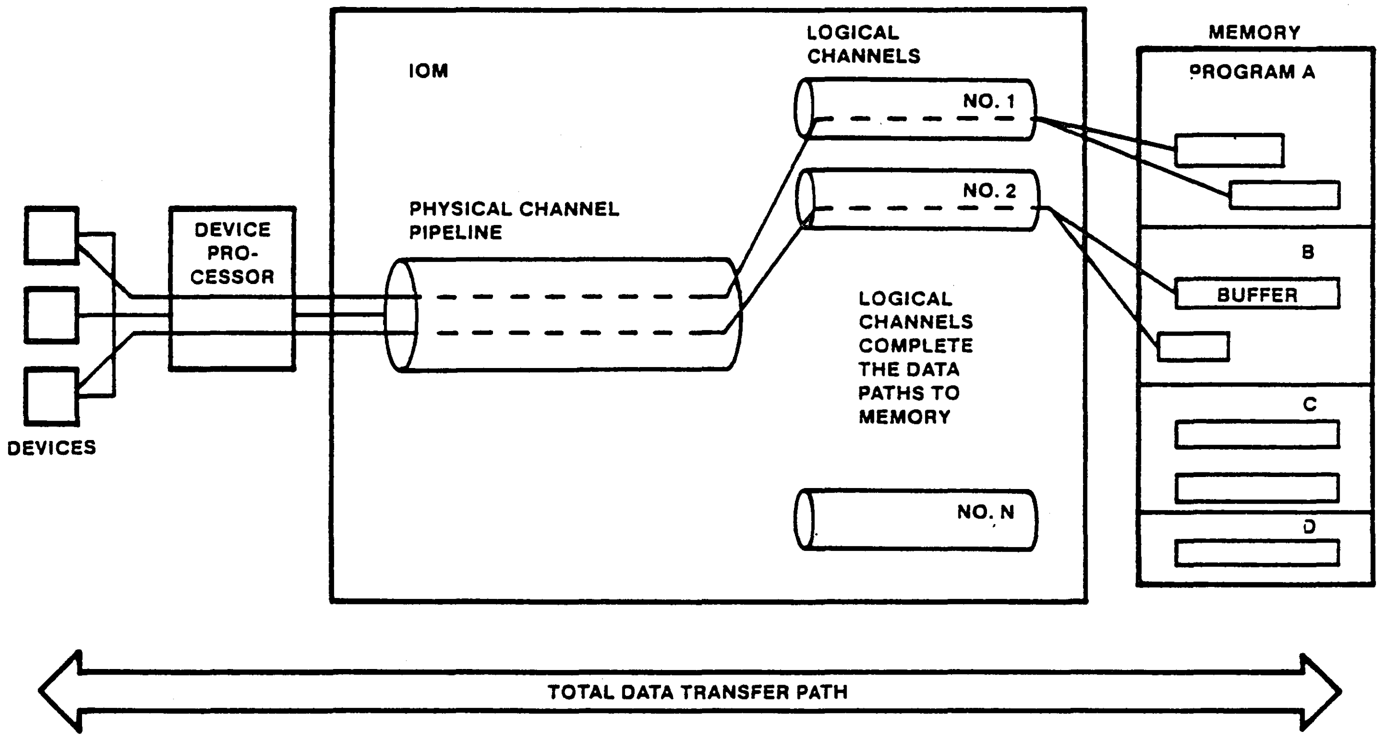


Figure 5-2. Physical Channel and Logical Channel Concepts

Subsystems Allowing Multiple Logical Channels Per Physical Channel

UNIT RECORD PROCESSOR SUBSYSTEMS

In Unit Record Processor (URP) subsystems there must be one and only one logical channel assigned to each unit record device connected to URP. A specific logical channel is assigned to each device.

- URP can handle up to 8 unit record devices (URP0600/8000), or up to 4 unit record devices (URP in MFP8001, URP8011), or up to 2 unit record devices (URP8012/8013).
- URP, in combination with its channel and 1 to 8 logical channels in IOM, performs a block (unit record) multiplexing function, allowing up to 8 devices to run simultaneously. URP buffers a full physical record from/for each device and assigns each record to the IOM physical channel as soon as the last record has transferred. Each URP unit record device must be permanently preassigned to a logical channel to be used by CP-6 in issuing commands for it. The logical channel controls the transfer into memory into/from the proper buffer area for the device concerned.

MAGNETIC TAPE PROCESSOR SUBSYSTEMS

In Magnetic Tape Processor (MTP) subsystems a second (added) logical channel may optionally be assigned to each physical channel.

The value of the second logical channel for each physical channel is that it allows CP-6 to send a new command to an open logical channel, even though the physical channel may be transferring data under command of another logical channel assigned to the subsystem. As soon as the first operation terminates, a second could be initiated immediately from the command standing by in the second logical channel. CP-6 could then send another command to the first logical channel, which is now open again, etc. If only one logical channel is used, CP-6 cannot have any next command standing by when a command is already in operation.

DISK SUBSYSTEMS

A normal useful maximum of logical channels for each IOM physical channel termination related to a mass store subsystem is four.

MSP and disk spindles obtain automatic latency reduction via rotational position sensing and block multiplexing of the physical channel(s) involved. Both features can increase subsystem throughput and should always be used, at least on single-channel subsystems. They depend on multiple logical channels per subsystem.

The number of logical channels assigned for a subsystem shoud not normally exceed the number of spindles in the subsystem. There is no gain with a greater number of logical channels.

In CP-6, using multiple logical channels gives relatively more performance improvement than does using multiple physical channels. It is desirable to have as many logical channels as it is expected to have concurrent seeks in progress.

With dual channel MSPs, subsystems commands are more frequently (than with single channel MSPs) serviced almost as soon as they are delivered to the subsystem. As a result, there is relatively less chance to have command queues build up and thus there is less relative effect from multiple logical channels in a dual-channel subsystem than in a single channel subsystem. Dual-channel subsystems will probably give greater throughput in all cases, especially where the subsystem includes more than four or five disk spindles.

Subsystems Allowing Only A Single Logical Channel Per Physical Channel

FEPs

One and only one logical channel must be assigned per IOM-connected (local) FEP. No optional logical channels are permitted.

CONSOLES

One and only one logical channel must be assigned per IOM-connected console. No optional logical channels are permitted.

IOM AGGREGATE LOAD CONSIDERATIONS

Determine next the IOM aggregate load to ensure adequate IOM capacity.

The IOM's maximum aggregate bandwidth is 4000K bytes. One simple test of IOM load is based purely on bandwidth. By adding up the maximum bandwidth for those devices that will require individual data paths, a certain level of capacity can be perceived. However, due to peripheral processor buffering considerations, the actual bandwidth used may be less. This is especially true for communications equipment. Conversely, certain high speed magnetic tape and disk devices have a finite 'tolerable delay factor' that, combined with the IOM channel priority of the devices, can restrict the IOM to a subset of the permissible bandwidth.

Table 5-2 lists estimated device bandwidths along with a constant 'T' (the tolerable delay factor) that attempts to take these variations into consideration. The devices have been listed in the recommended I/O channel priority order (from highest to lowest). It must be recognized that this method is offered as a general guide in estimating IOM loading and as such is not intended to establish any finite limit on peripheral configurations for a specific application. Unit Record and Communications Processor equipment values are excluded because of their negligible impact.

TABLE 5-2. ESTIMATED DEVICE BANDWIDTHS

Device	Description	Bandwidth K Bytes	'T'	Channel Priority
MTU0610	200 ips 6250 bpi MTU	1250	19	Highest
MSU0402/0451	78.6/157.2 mb disk	803	21	2nd Highest
MTU0630	125 ips 6250 bpi MTU	781	29	3rd Highest
MTU0630	75 ips 6250 bpi MTU	469	31	.
MTU0610	200 ips 1600 bpi MTU	320	34	.
MTU0500/0630	125 ips 1600 bpi MTU	200	40	.
MTU0630	75 ips 1600 bpi MTU	120	51	Etc.
MTU0500	125 ips 800 bpi MTU	100	80	.
MSU0501	1101 mb disk	1200	250	.
Unit Record Peripnerals				.
Communications Processor				Lowest

The IOM load equation is: L = 6 (N+1) - T

where:

T = tolerable delay factor for specific peripheral characteristics. T values are contained in Table 5-2.

N = IOM channel priority 1 to 20 when using an integrated IOM,
1 to 54 when using a freestanding IOM.

N = 1 for the highest priority device attached,
N = 2 for the second highest priority device attached, etc.

If the value of L is negative, the peripheral, for which T was chosen, can be considered a qualified connection to an IOM channel with priority N. A positive value for L indicates that a timing overrun can occur, and the value of L indicates the probable occurrence of an overrun. If the value of L is 6 or less, the frequency of timing overruns, in most applications, will be minimal with no measurable effect on system performance. If the value of L is between 6 and 12, the application should be examined closely. If the vlaue of L is greater than 12, the configuration should be considered invalid.

IOM CONFIGURING - AN EXAMPLE

Assume a CP-6 system includes the following:

- 1 Dual-Channel MSP using MSU0451s
- 1 Single-channel MTP using
  - 3 GCR tape units @ 200 ips, and
  - 1 PE tape unit @ 75 ips
- 1 URP
- 1 1600-lpm printer
- 1 1200-lpm printer
- 2 low-speed card readers
- 1 card punch
- 1 console
- 1 auxiliary console
- 4 FEPs

Table 5-3 lists the IOM-related features necessary for this configuraiton.

TABLE 5-3. SOLUTION TO IOM CONFIGURATION EXAMPLE

Quantity	M.I.	Description	# of Physical Slots	Max. # of Useful Logical Channels	6(N + 1) - T = L
1	MSP0612	Dual Channel MSP	6	8	--
1-16	MSU0451	157.2 mb disk	-	-	6(2 + 1) - 21 = -3 6(3 + 1) - 21 = 3
1	MTP0611	Single Channel MTP	3	2	--
3	MTU0610	GRC tape, 200 ips	-	-	6(1 + 1) - 19 = -7
1	MTU0630	PE tape, 75 ips	-	-	Covered by higher priority MTU0610 on same channel
1	URP0600	Unit Record Processor	3	-	--
1	PRU1600	1600 lpm printer	-	1	--
1	PRU1200	1200 lpm printer	-	1	--
2	CRU0501	500 lpm card reader	-	2	--
1	PCU0121	Card punch	-	1	--
1	CSU6601	Console	1	1	--
1	CSU6602	Auxiliary Console	1	1	--
1	CPS81XX	Central System - includes one FEP	1	1	--
3	DCU8011	FEP	3	3	--
			18	21	

The number of physical slots, 18, is less than the 20 permitted on DPS 8/47C/49C and the 36 permitted on DPS 8/52C/62C/70C (without expansion).

The number of logical channels, 21, is less than the 32 available.

L ranges from -7 to +3, in all cases falling below the +6 value requiring close examination and well below the +12 value which indicates an invalid configuration.

Therefore, all equipment included can be configured on one IOM.

SECTION 6
Unit Record Subsystems

DPS 8 Unit Record equipment may be attached to a CP-6 Central System and DPS 6 Unit Record equipment may be attached to a CP-6 FEP, although none is required. In this section, DPS 8 equipment is reviewed first, followed by the supported DPS 6 equipment.

CONFIGURING THE DPS 8 UNIT RECORD PROCESSOR (URP) SUBSYSTEMS

The following configuration elements must be included per DPS 8 unit record subsystem:

- URP (unit record processor) - MFP8001 for DPS 8/47C/49C includes URP and MTP.
- URA (unit record addressing) - For each unit record unit/device, select the specific URA for that unit/device. Not required with URP8011/8012/8013.
- DPS 8 unit record devices from list in Table 6-1.

Multiple URPs can be used on a DPS 8/C system. The following URPs are available for DPS 8/C systems.

- URP0600 - freestanding, own power supply, usable with any DPS 8/C system. Up to 8 devices.
- URP8000 - contained in central system cabinet (CSC) of DPS 8/47C/49C or in MXU8003 IOM cabinet. Shares power supply in cabinet. Mutually exclusive within a cabinet with MTP8001 and MFP8001. Up to 8 devices.
- MFP8001 - contained in central system cabinet (CSC) of DPS 8/47C/49C or in MXU8003 IOM cabinet. Shares power supply in cabinet. Up to 4 unit record devices supported by URP portion of MFP8001. MTP also included in MFP8001. MFP8001 is mutually exclusive within a cabinet with URP8000 and MTP8001. URP and MTP portions have individual channels and can operate simultaneously.
- URP8011 - contained in the IOM of DPS 8/C. Shares power supply in cabinet. Up to 2 printers and up to 2 card devices.
- URP8012 - contained in the IOM of DPS 8/C. Shares power supply in cabinet. Up to 2 card devices.
- URP8013 - contained in the IOM of DPS 8/C. Shares power supply in cabinet. Up to 2 printers.

TABLE 6-1. DPS 8 UNIT RECORD DEVICES

Device	Model	Max Per URP	Speed
Card readers	CRU1050	1-2	1050 cpm
	CRU0501	1-2	500 cpm
Card punches	PCU0121	1-2	100-400 cpm
Printers	PRU1200	1-6	To 1200 lpm
	PRU1600	1-6	To 1600 lpm
	* PRU0901	1-2	To 900 lpm
	* PRU1201	1-2	To 1200 lpm

* PRU0901/1201 supported only on URP8011/8013. The only printers supported on URP8011/8013 are the PRU0901/1201.

The maximum number of unit record devices is two on URP8012/8013, four on URP8011/MFP8001, eight on other URPs. Maximums may be chosen from these for each type of device:

- 2 CRU1050 or 2 CRU0501 or 1 each
- 2 PCU0121
- 6 PRU1200/1600 printers
- 2 PRU0901/1201 printers

The following rules should be used in configuring a URP subsystem.

Every unit record device in URP subsystem must be configured with a specific unit record adapter or addressing feature (URA) which is related to the device type. (URA features not required for URP8011/8012/8013.)

Options are identified by dotted lines or boxes. In general, options are priced features beyond the standard complement included in basic URP or device price.

You must show on your order any pertinent item with a type number.

Figure 6-1 illustrates a configurator for URP0600/8000

- o Order URAs and unit record devices as needed.
- o URP0600 - freestanding, usable on any DPS 8/C system.
- o URP8000 - in Central System Cabinet of DPS 8/47C/49C or in MXU8003 IOM cabinet. Cannot be used within the same cabinet with MTP8001 or MFP8001.

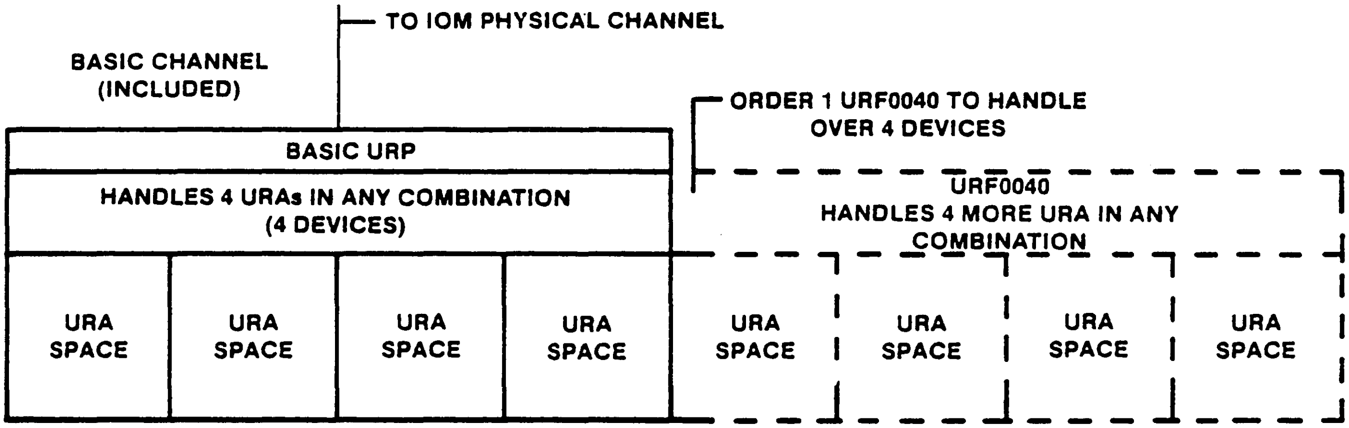


Figure 6-1. Configurator for URP0600/8000

Figure 6-2 illustrates the configurator for URP in MFP8001.

- o Order URAs and unit record devices as needed.
- o MFP8001 - in Central System Cabinet of DPS 8/47C/49C or in MXU8003 IOM cabinet. Cannot be used within the same cabinet with MTP8001 or URP8000.

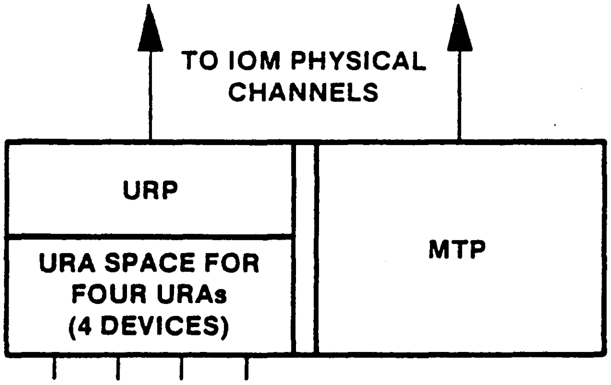


Figure 6-2. Configurator for URP in MFP8001

Configurator for URAs and associated unit record devices are illustrated in Figure 6-3. Each device must have one specific URA associated with it. These URAs relate to all URPs and to URP portion of MFP8001.

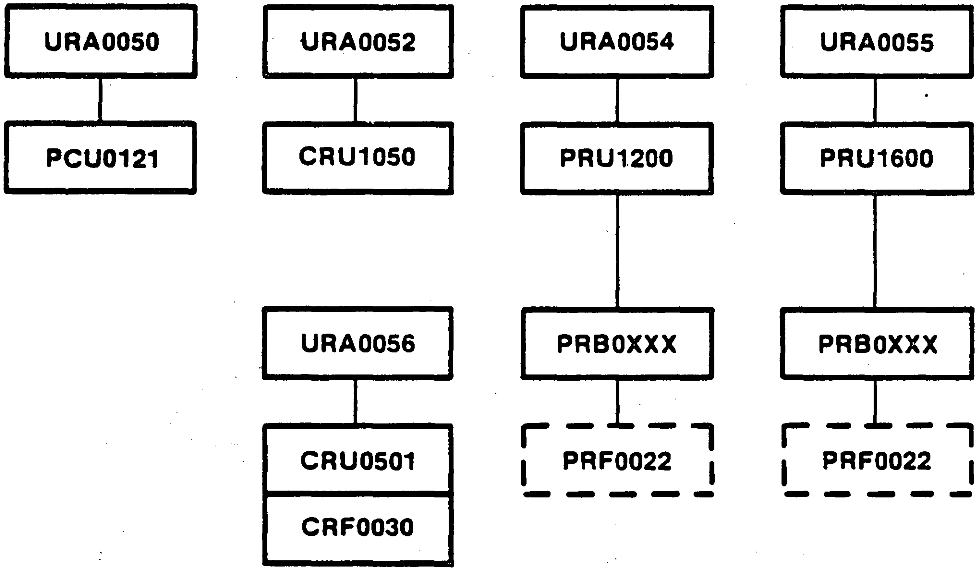


Figure 6-3. Configurator for URAs and Associated Unit Record Devices

Figure 6-4 illustrates the configurators for URP8011/8012/8013.

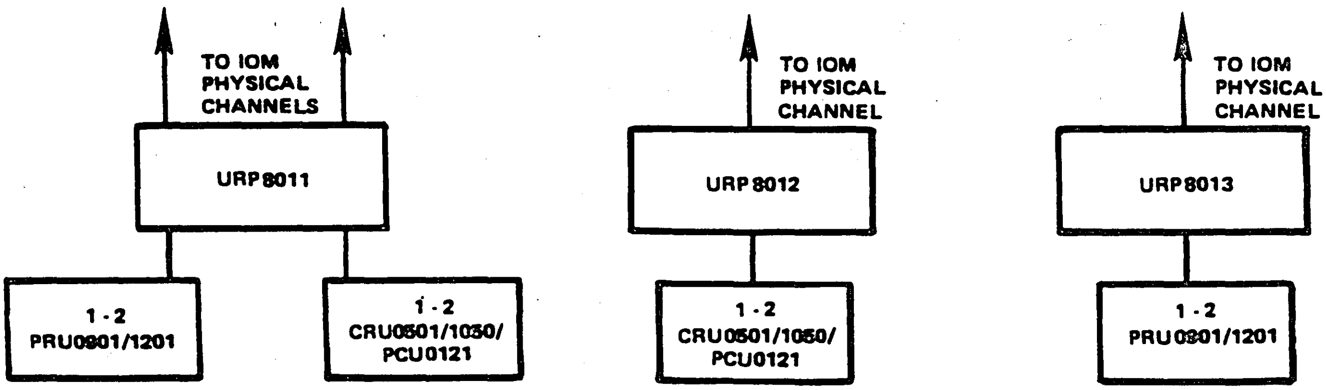
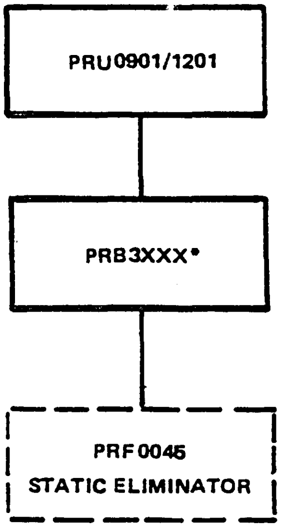


Figure 6-4. Configurators for URP8011/8012/8013

Figure 6-5 illustrates the configurator for PRU0901/1201.



* Two print belts included with PRU0901/1201. A single type must be specified from the supply catalog.

Figure 6-5. Configurator for PRU0901/1201

The following listing summarizes the marketing identifiers (MI) related to URP subsystems.

MI	Description	Remarks
URP0600	Freestanding URP (1x8)	All URPs include 1 IOM Channel. Any DPS 8/C system.
URP8000	URP in Central System Cabinet (1x8) or in MXU8003 cabinet	DPS 8/47C/49C only. Mutually exclusive within a cabinet with MFP8001 and MTP8001.
MFP8001	URP (1x4) and MTP (1x8) in Central System Cabinet or in MXU8003 cabinet	DPS 8/47C/49C. Mutually exclusive within a cabinet with URP8000 and MTP8001.
URP8011	Embedded Unit Record Processor (1x4) Contained in IOM.	Up to 2 PRU0901/1201 and up to 2 card devices.
URP8012	Embedded Unit Record Processor (1x2) Contained in IOM.	Up to 2 card devices.
URP8013	Embedded Unit Record Processor (1x2) Contained in IOM.	Up to 2 PRU0901/1201.

MI	Description	Remarks
URF0040	Unit Record Addressing (URA) Expansion for URP0600/8000	Handles up to 4 more intermixed URAs beyond standard maximum of 4. Required if more than 4 devices are configured.
PCU0121	100 to 400-cpm Card Punch	Optional
URA0050	Unit Record Addressing for PCU0121	1 required per Punch.
CRU1050	1050-cpm Card Reader	
CRU0501	500-cpm Card Reader	
URA0052	Unit Record Addressing for CRU1050	1 required per CRU1050
URA0056	Unit Record Addressing for CRU0501	1 required per CRU0501
CRF0030	Pedestal for CRU0501	Optional
PRU1200	Belt Printer	At least one belt required per PRU1200.
URA0054	Unit Record Addressing for PRU1200	1 required per PRU1200
PRK1216	PRU1200 to PRU1600 Upgrade Kit	
PRU1600	Belt Printer	At least one belt required per PRU1600.
URA0055	Unit Record Addressing for PRU1600	1 required per PRU1600
PRF0022	Expansion of PRU1200/1600 from 136 to 160 Print Columns	
PRB0500	64-character BCD Belt for PRU1200/1600	Nominal speed = 975 lpm for PRU1200 = 1325 lpm for PRU1600
PRB0513	64-character ASCII Belt for PRU1200/1600	Nominal speed = 975 lpm for PRU1200 = 1325 lpm for PRU1600
PRB0524	64-character Belt, with OCR-A/B numeric font for PRU1200/1600	Nominal speed = 975 lpm for PRU1200 = 1325 lpm for PRU1600

MI	Description	Remarks
PRB0600	96-character ASCII Belt for PRU1200/1600	Nominal speed = 700 lpm for PRU1200 = 985 lpm for PRU1600
PRU0901	Belt Printer. Price includes power stacker and two print belts. (Belts must be ordered from the supply catalog.)	Requires URP8011 or URP8013
PRU1201	Belt Printer. Price includes power stacker and two print belts. (Belts must be ordered from the supply catalog.)	Requires URP8011 or URP8013
PRB3600	96-character ASCII Belt for PRU0901/1201	Must be specified from the supply catalog.
PRB3500	64-character BCD Belt for PRU0901/1201	Must be specified from the supply catalog.
PRB3513	64-character ASCII Belt for PRU0901/1201	Must be specified from the supply catalog.
PRB3524	64-character ASCII Belt with OCR-A/B numeric font for PRU0901/1201	Must be specified from the supply catalog.
PRK0901	PRU0901 to PRU1201 Upgrade Kit	
PRF0045	Static Eliminator for PRU0901/1201	Desirable if humidity falls below 30%.
URF8000	Printer Optical Cable Adapter	For PRU0901/1201 only. Requires F80-YYYY.
F80-YYYY	Optical Cable with Connectors	Allows printer placement 100-2000 meters from central system. YYYY is length in meters. Prerequisite is URF8000.
MXF8008	Exchange of URP Attachment Feature (to DPS 8 Systems only) - wire wrap to hard copper, in the IOM.	For URP0600 installed on non DPS-8 systems (equipment removed and replaced by MXF8008 becomes the property of Honeywell upon removal.) One required for each peripheral processor channel.

Example of DPS 8 URP Configuring

Assume you are bidding a DPS 8/47C and that you want a URP subsystem with a card reader, card punch, and two 1600 lpm printers. The 1600 lpm printers are each to have both 64-character (BCD) and 96-character (ASCII) printing capability. The URP and MTP are to be integrated within the Central System Cabinet.

You would order as follows:

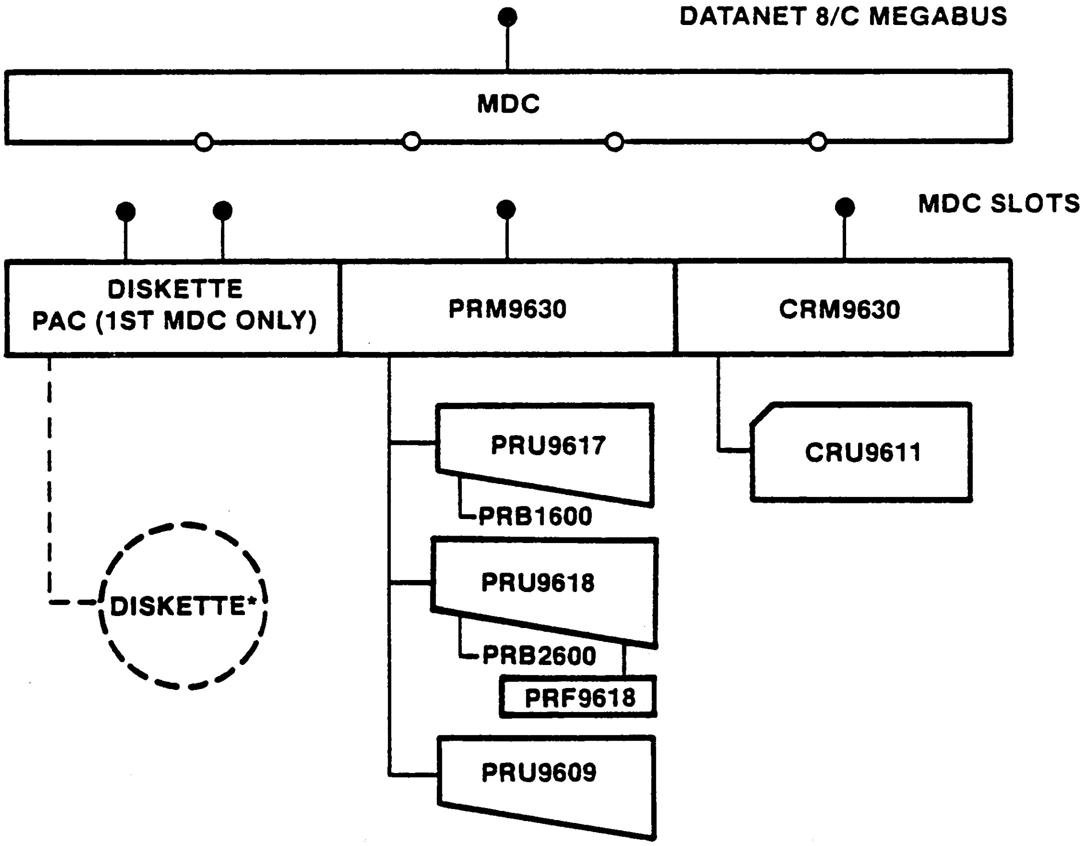
Qty	MI	Description
1	MFP8001	MTP and URP Integrated in Central System Cabinet
1	CRU0501	Card Reader
1	URA0056	Unit Record Addressing for CRU0501
1	PCU0121	Card Punch
1	URA0050	Unit Record Addressing for PCU0121
2	PRU1600	Belt Printer
2	URA0055	Unit Record Addressing for PRU1600
2	PRB0500	64-Character BCD Belt for PRU1600
2	PRB0600	96-Character ASCII Belt for PRU1600
1	CRF0030	Pedestal for CRU0501 (Optional)

CONFIGURING SUPPORTED DPS 6 UNIT RECORD EQUIPMENT

Each DN 8/C FEP included in CP-6 Central Systems and the DCU8011 FEP contains a Multiple Device Controller (MDC). Card reader and/or line printer device pacs may be attached to the MDC. Up to two DPS 6 Unit Record devices may be attached via this MDC. A second MDC (or MDC expander) may be ordered which allows attachment of up to four additional DPS 6 unit record devices. Thus, up to six DPS 6 unit record devices may be added via each FEP.

Model	Description	Prerequisites
MDC9640	MDC Peripheral Port Expander, accommodates up to four additional peripheral Device Pacs.	CPS81XX or DCU8011, DCE8002
CRM9630	Device Pac for Card Reader	CPS81XX or DCU8011
PRM9630	Device Pac for Line Printer	CPS81XX or DCU8011
PRU9617	300-lpm Band Printer with VFU, 64 char. (uppercase only)	PRM9630
PRU9618	600-lpm Band Printer with VFU, 64 char. (uppercase only)	PRM9630
PRB1600	96-Character Band (uppercase & lowercase), Reduces printer to nominal speed = 240 lpm (Must be ordered via a Supply Requisition)	PRU9617
PRB2600	96-Character Band (uppercase & lowercase), Reduces printer to nominal speed = 440 lpm (Must be ordered via a Supply Requisition)	PRU9618
PRF9618	132- to 136-Print Position Extension Factory Installed Only	PRU9618
PRU9609	900-lpm Drum Printer with VFU, 64 char. (uppercase only)	PRM9630
CRU9611	500-cpm Card Reader (binary input not supported)	CRM9630

Figure 6-6 illustrates a configuration diagram for DPS 6 Unit Record Equipment



* A single diskette is included as part of the DN 8/C for maintenance purposes.

Figure 6-6. Configurator for DPS 6 Unit Record Equipment

Example of DPS 6 Unit Record Configuring

Assume you are bidding one DPS 6 440-lpm uppercase/lowercase printer attached to a DPS 8/C system via the FEP.

In addition to the Communications features ordered on the DATANET 8/C, you would order as follows:

Qty	MI	Description
1	PRM9630	Device Pac for printer
1	PRU9618	Band printer
1	PRB2600	96 Character Band

SECTION 7
Magnetic Tape Subsystems

CONFIGURING MAGNETIC TAPE SUBSYSTEMS

The following configuration elements are required:

- MTP0611 (magnetic tape processor), MTP8001, or MFP8001 (contains MTP and URP). Each MTP handles any combination of MTUs described below. MTP0611 is freestanding, with own power supply, and can be used on any DPS 8/C system. MFP8001 and MTP8001 are contained in CSC of DPS 8/47C/49C and shares Central System Cabinet power supply (or can be available in the MXU8003 IOM cabinet, sharing that cabinet's power supply).

- MTU (magnetic tape units)

    - Multiples of any MTU type number can be used in any combination.

    - Must be a minimum of one tape unit per DPS 8/C system. Review Section 1 for minimum and maximum peripherals.

- MTU density feature

    - Every tape unit must be equipped with only one density feature from the MTU features table below. Density features are upgradeable onsite by Customer Services.

    - Each tape unit when equipped with the desired density feature has one 7-track read/write head or one 9-track read/write head, not both.

    - See Table 7-3 for a complete list of density features.

- MTA (magnetic tape addressing) - one per 4 tape units, two for first 8 units in case of dual-channel MTP. See Table 7-2.

- Second IOM physical channel (MTF1151) - required if more than 8 tape units will be configured in a tape subsystem; optional otherwise. Maximum of 16 MTUs per subsystem.

The following restrictions apply to 7-track tapes.

- Support by RPQ only.
- No ANS standard labeled tape support (i.e., no managed file formats).
- 7-track tapes may not be used as CP-6 Boot tapes or as any other system tape.
- CP-6 will not support a 7-track only system.
- From a resource management point of view, 7-track tapes will be supported in a "foreign device" mode and not be included in the general magnetic tape resource pool for general use. 7-track must be explicitly requested, in all cases.

Table 7-1 provides a listing of magnetic tape unit characteristics.

TABLE 7-1. MTU CHARACTERISTICS

	MTU0500 (RPQ Only)	MTU0610	MTU0630
Automatic threading	Y	Y	Y
Forward speed (ips)	125	200	75/125
Cartridge load option	Y	Y	Std.
Rewind speed (ips)	500	640	500
Power windows	Y	Y	Y
Recording format	NRZI/PE	NRZI/PE/GCR	NRZI/PE/GCR
7-track operation	RPQ	N	N
Interrecord gap	.75 in.	NA	NA
556-bpi character rate	52.3K Bytes	NA	NA
800-bpi character rate	75.2K Bytes	NA	NA

	MTU0500 (RPQ only)	MTU0610	MTU0630
9-track operation	NA	Y	Y
Interrecord Gap	NA	.6 in. (1600 bpi)	.6 in. (800/1600 bpi)
		.3 in. (6250 bpi)	.3 in. (6250 bpi)
200-bpi byte/character rate	NA	NA	NA
556-bpi byte/character rate	NA	NA	NA
800-bpi byte/character rate	NA	160K Bytes	75 ips = 60K Bytes 125 ips = 100K Bytes
1600-bpi byte/character rate	NA	320K Bytes	75 ips = 120K Bytes 125 ips = 200K Bytes
6250-bpi byte/character rate	NA	1250K Bytes	75 ips = 469K Bytes 125 ips = 781K Bytes

Figure 7-1 illustrates the configurator for a single-channel MTP (1x8 subsystem).

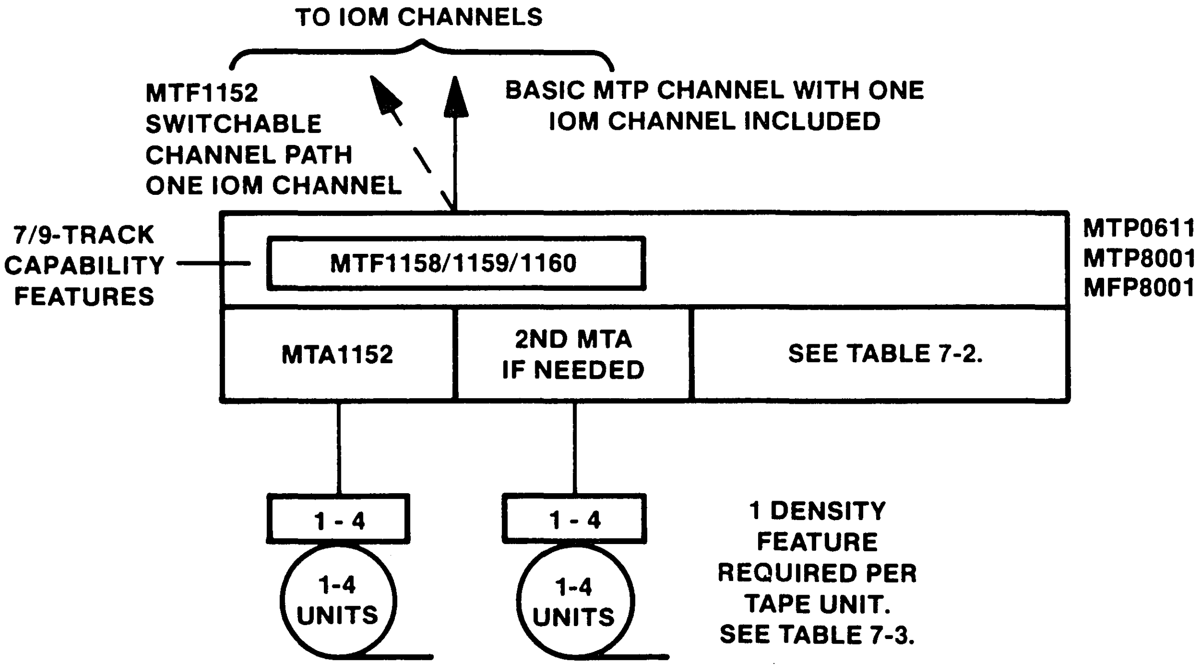


Figure 7-1. Single-Channel MTP Configurator

Figure 7-2 illustrates the configurator for a freestanding dual-channel MTP (2x16 subsystem).

- Second channel (MTF1151) required if more than 8 units are used in a subsystem.
- Each channel is cross-barred to each tape unit.

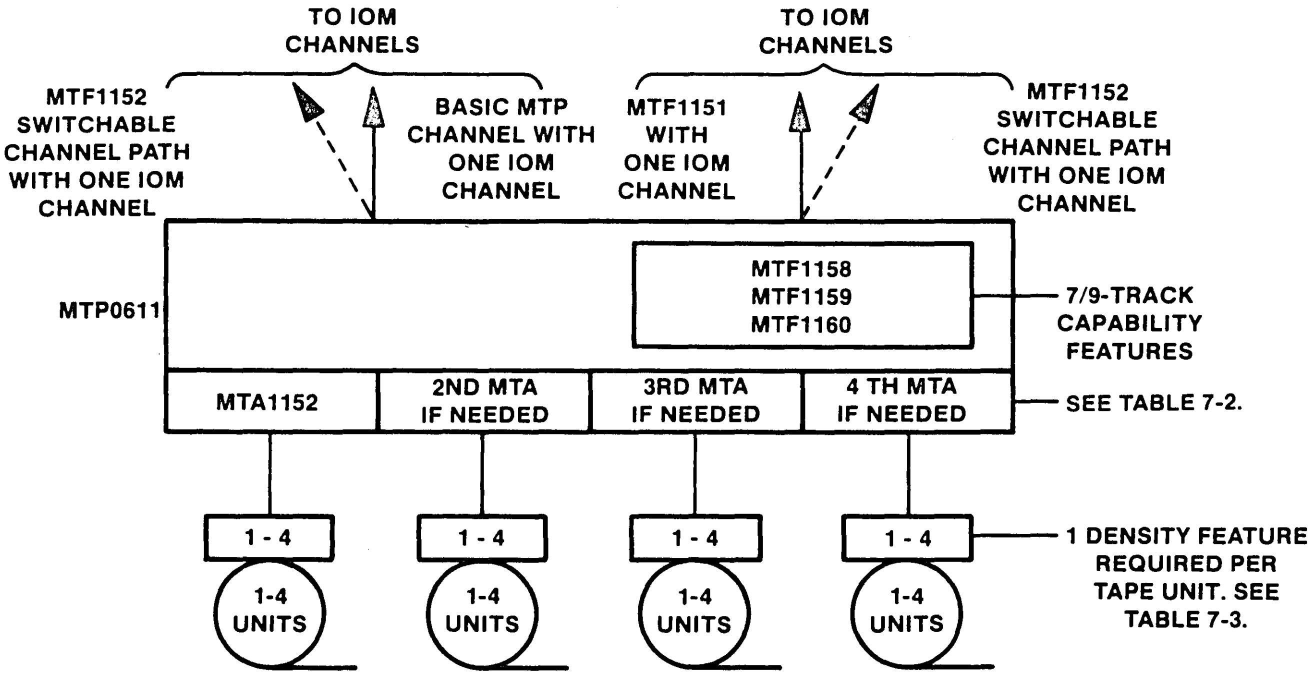


Figure 7-2. Dual-Channel MTP Configurator

The following listing provides the magnetic tape processor (MTP) components with marketing identifiers (MI).

MI	Description	Remarks
MTP0611	Freestanding Magnetic Tape Processor. Handles up to 8 tape units (1x8) or up to 16 with MTF1151 (2x16). Includes IOM physical channel. Requires MTF1159 and/or MTF1160 feature(s).	Required if MFP8001 or MTP8001 are not used.
MFP8001	Contained in DPS 8/47C/49C CSC or in MXU8003 IOM cabinet. Includes 1x8 MTP and MTP IOM physical channel, plus 1x4 URP and its IOM channel. Both URP and MTP operate simultaneously. Cannot be used in the same cabinet with MTP8001 or URP8000. Requires MTF1159 and/or MTF1160 feature(s).	Required if MTP8001 or MTP0611 are not used.
MTP8001	Contained in DPS 8/47C/49C CSC or in MXU8003 IOM cabinet. 1x8 MTP, including MTP IOM physical channel. Cannot be used in the same cabinet with MFP8001 or URP8000. Requires MTF1159 and/or MTF1160 feature(s).	Required if MTP0611 or MFP8001 are not used.
MTF1152	Switchable Non-simultaneous Channel. Makes an MTP channel software-switchable. Includes IOM physical channel for termination of switched channel path. Maximum of one per MTP0611/MTF1151/MFP8001/MTP8001.	Optional
MTF1151	Dual Simultaneous Channel (device procesor channel) for MTP0611. Includes IOM channel.	Required to support more than 8 units. Optional otherwise. Requires redundant options MTF1158/1159/1160 if these were configured in MTP0611.

MI	Description	Remarks
MTA1152	Magnetic Tape Addressing Adapter	1 per 4 MTUs (a)
MTF1158	7-track support, for 556/800 bpi density. MTF1159 required.	Optional (b)
MTF1159	9-track support, for NRZI recording (800 bpi) and PE recording (1600 bpi).	X (b,c)
MTF1160	9-track support, for PE recording (1600 bpi) and GCR recording (6250 bpi).	X (b,c)
PSS8001	Capacitor Ridethrough for MTP0611.	Option
MXF8007	Exchange of Disk or Tape Processor Attachment Feature (to DPS 8 systems only) - IOM wire wrap channel replaced with hard copper.	For installed MTP0601/ 0610, XTP9310. One required per channel. Equipment removed and replaced by MXF8007 becomes the property of Honeywell upon removal.

Notes:

a. Two required for first eight tape units if MTF1151 is configured, i.e., if you are configuring a dual simultaneous channel MTP0611. See Table 7-2.

b. Two required if you are configuring a dual simultaneous channel MTP0611.

c. Either MTF1159 or MTF1160 is required. MTF1158 use requires MTF1159. MTF1158/1159/1160 may all be present in same MTP.

Table 7-2 shows the quantities of required magnetic tape unit addressing adapters (MTA1152). Each MTA1152 interfaces to up to 4 tape units and to a device processor channel. Two MTAs are required for the first 8 tape units in a dual simultaneous channel MTP0611.

TABLE 7-2.
REQUIRED NUMBER OF MTU ADDRESSING ADAPTERS

No. of Tape Units on MTP	MTP0611	
	1x8 MTP No. of MTAs	2x16 MTP No. of MTAs
1-4	1	2
5-8	2	2
9-12	-	3
13-16	-	4

The following listing provides descriptions and marketing identifiers for the magnetic tape unit components. After selecting a tape unit, you must select a tape density feature from Table 7-3. Density feature establishes transfer rate. K Bytes indicate thousands of 8-bit bytes per second instantaneous transfer rate.

MI	Description
MTU0500 (RPQ only)	125 ips, 25K Bytes to 200K Bytes.
MTU0610	200 ips, 160K Bytes to 1250K Bytes.
MTU0630	75/125 ips, 60K Bytes to 781K Bytes.

Table 7-3 lists MTU density and other features and marketing identifiers.

Every tape unit must have only one density feature. Density feature establishes the transfer rate. In addition to a density feature for each MTU, there must also be 7-track and/or 9-track support feature(s) in each MTP. These support features (MTF1158/1159/1160) are identified earlier in this section.

TABLE 7-3. MTU DENSITY FEATURES

MTU0500 (RPQ only) 125 inches per second		MTU0610 200 inches per second		MTU0630 9-track density	
MTF0016:	7-track density, 556/800 bpi	MTF0607:	9-track density, 800/1600 bpi	MTF0634	75 ips, PE/NRZI Feature, 800/1600 bpi
MTF0018:	Cartridge Load, factory installed option	MTF0608:	9-track density, 1600/6250 bpi	MTF0635	75 ips, PE/GCR Feature, 1600/6250 bpi
MTF0019:	Cartridge Load, field installed option	MTF0678:	Kit to upgrade MTF0607 to MTF0608	MTF0636	125 ips, PE/NRZI Feature, 800/1600 bpi
MTF0020:	Optional High Altitude Adapter, for altitudes 4000-7500 ft.			MTF0637	125 ips, PE/GCR Feature, 1600/6250 bpi
MTF0021:	Optional High Altitude Adapter, field installed for altitudes 4000-7500 ft.			MTK0630	Upgrade MTF0634 to MTF0635 Performance
MTF0022:	Optional DC Power-On Meter, factory installed only			MTK0631	Upgrade MTF0636 to MTF0637 Performance
MTF0023:	Optional Tape Movement Meter, factory installed only			MTK0632	Upgrade MTF0634 to MTF0636 Performance
				MTK0633	Upgrade MTF0635 to MTF0637 Performance
				MTK0634	High Altitude Adapter

Magnetic Tape Subsystem Configuring Example

A DPS 8/47C prospect wants a tape subsystem with six 9-track units, 4 of which are 800/1600 bpi units and 2 of which are 1600/6250 bpi units.

You should order as follows:

Qty	MI	Description
1	MFP8001	Magnetic tape processor with one IOM channel, plus URP with one IOM channel.
1	MTF1159	9-track NRZI/PE support (800/1600 bpi).
1	MTF1160	9-track PE/GCR support (1600/6250 bpi).
2	MTA1152	Magnetic tape addressing features or ports on MTP. Each handles 4 tape units.
6	MTU0610	9-track, 200 ips tape units.
4	MTF0607	9-track density, 800/1600 bpi.
2	MTF0608	9-track density, 1600/6250 bpi.

SECTION 8
Mass Storage Subsystem

CONFIGURING MASS STORAGE SUBSYSTEMS

The following are the required mass storage subsystem configuration elements.

- MSPXXXX (mass store processor) - choose one or more MSPs consistent with packaging of DPS 8/C mainframe (CSC-oriented or freestanding), with number of simultaneous channels desired, and with type of disk spindle used. Every DPS 8/C system must include a mass storage subsystem. See Section 1 for minimum and maximum peripherals complement.

- Disk device adapter (MSF10XX) - required with MSU04XX spindles. These features supply the proper "personality" for the MSP to interface to MSU04XX spindles. Device adapters for MSU0501 are standard in each MSP.

- MSAXXXX (device addressing) - choose one for every four MSU04XX (4 spindles) and one for every two MSU0501 (4 spindles).

- MSU0XXX (mass store unit) - with announcement of MSU05XX, an ambiguity was introduced in use of the word "unit". Prior to MSU05XX, a unit was equal to a spindle, but a MSU05XX (unit) provides for 2 spindles. In this section, "spindle" is used as the unambiguous term for the device which contains one disk reading/writing pack or head disk assembly (HDA).

- RPS (rotational position sensing) feature - one MSF000X required per MSU04XX spindle. MSU0501 includes RPS feature for each spindle.

- Dual access feature - one required per disk unit when two channels are cross-barred in the mass store subsystem. This feature provides an access path to each spindle from each channel. No more than two MSP channels can be used to access any given spindle.

- Two-channel cross-bar feature - included in dual-channel MSPs (MSP8002/0612) to allow each channel to access each spindle when dual access feature is installed in MSU.

- Device native mode feature (firmware to enable access of 512 word sectors used in MSU0501) - one required per MSP channel if MSU0501 used.

The following listing provides MSP and disk unit/spindle components and marketing identifiers (MI) or type number (CSC = Central System Cabinet)

MI	Description	Required or Option
	Integrated MSPs	
MSP8000	Single-channel MSP for DPS 8/47C/49C. Contained in CSC or in MXU8003 IOM cabinet. Maximum of two per system. One IOM channel included. Maximum of 16 spindles in specific combinations of MSU04XX and/or MSU0501.	One MSP of some type required per DPS 8/C system.
MSP8002	Dual-channel MSP version of MSP8000 for DPS 8/47C/49C. Maximum of two per system. Consists of two cross-barred MSPs in CSC or in MXU8003 IOM cabinet. Maximum of 16 spindles in specific combinations of MSU04XX and/or MSU0501. Two IOM channels included.	One MSP of some type required per DPS 8/C system.
	Features for MSP8000/8002	
MSF8003	Switched IOM channel. Runs non-simultaneously with main IOM channel on same MSP8000 or same MSP in MSP8002. Maximum of one to three per MSP8000 and one to three per MSP in MSP8002.	Option
	Features for MSP8000	
MSF8000	Device adapter for MSU04XX on MSP8000. Maximum of one per MSP8000.	Required for MSU04XX.
MSA8000	Addressing capability for 4 MSU04XX for MSP8000. Maximum 4 per MSP8000.	One required per 4 MSU04XX (4 spindles).
MSA8001	Addressing capability for 2 MSU0501 (4 spindles) for MSP8000. Maximum of 4 per MSP8000.	One required per 2 MSU0501 (4 spindles).

MI	Description	Required or Option
MSK8002	Upgrade kit, MSP8000 to MSP8002. Includes MSP, second IOM channel, and cross-barring of both to each spindle. Note that all disk units must have the dual access feature. In addition, the MSF8000, if present, must be replaced by separately ordered MSF8101, if MSU04XX will be used on upgraded MSP. MSA8000, if present, must be replaced by separately ordered MSA8102, if MSU04XX will be used on upgraded MSP.	Option
	Features for MSP8002	
MSF8101	Device adapter for MSU04XX on MSP8002. Maximum of one per MSP8002.	Required for MSU04XX.
MSA8102	Addressing capability for 4 MSU04XX for MSP8002. Maximum of 4 per MSP8002.	One required per 4 MSU04XX (4 spindles).
MSA8103	Addressing capability for 2 MSU0501 (4 spindles) for MSP8002. Maximum 4 per MSP8002.	One required per 2 MSU0501 (4 spindles).
	Freestanding MSPs	
MSP0611	Freestanding single-channel MSP for any DPS 8/C system. One IOM channel included. Maximum of 16 spindles - 16 MSU04XX or 8 MSU0501 or combinations totaling 16 spindles.	One MSP of some type required per DPS 8/C system.
MSP0612	Freestanding dual-channel MSP for any DPS 8/C system. Consists of two cross-barred MSPs. Includes two IOM channels. Maximum of 16 MSU04XX or 15 MSU0501 (30 spindles) or 16 MSU04XX and 8 MSU0501. Use of 9 to 15 MSU0501 requires MSF1142 MSU0501 Expansion Feature.	One MSP of some type required per DPS 8/C system.

MI	Description	Required or Option
	Features for MSP0611/0612	
MSF1144	Switched IOM channel. Runs non-simultaneously with main IOM channel. Maximum of three per MSP0611 and three per MSP in MSP0612.	Option
PSS8001	Capacitor Ridethrough Option for MSP0611/0612.	Option
	Features for MSP0611	
MSF1140	Device adapter for MSU04XX on MSP0611. Maximum one per MSP0611.	Required to use MSU04XX.
MSA1140	Addressing capability for 4 MSU04XX on MSP0611. Maximum 4 per MSP0611.	One required per 4 MSU04XX (4 spindles).
MSA1141	Addressing capability for 2 MSU0501 on MSP0611. Maximum 4 per MSP0611.	One required per 2 MSU0501 (4 spindles).
MSK0612	Upgrade kit, MSP0611 to MSP0612. Provides second MSP, second IOM channel and cross-barring of both IOM channels to each spindle. Existing MSF1140, MSA1140, MSA1141 must be replaced by separately ordered MSF1141, MSA1142, MSA1143 according to spindle types used (MSU04XX, MSU0501).	Option
	Features for MSP0612	
MSF1141	Device adapter for MSU04XX on MSP0612. Maximum of one per MSP0612.	Required to use MSU04XX.
MSA1142	Addressing capability for 4 MSU04XX on MSP0612. Maximum of 4 on MSP0612.	One required per 4 MSU04XX (4 spindles).
MSA1143	Addressing capability for 2 MSU0501 on MSP0612. Maximum of 8 on MSP0612.	One required per 2 MSU0501 (4 spindles).
MSF1142	MSU0501 Expansion for MSP0612. Provides support for 9 to 15 MSU0501. Maximum of one per MSP0612.	Required if 9 to 15 MSU0501 used, i.e., 18 to 30 spindles.

MI	Description	Required or Option
	Features for MSP0611/0612/8000/8002	
MSF0015	Device Native Mode Feature. Firmware to enable access of 512 word sectors used in MSU0501.	One required for each MSP channel using MSU0501.
MXF8007	Exchange of Disk or Tape Processor Attachment Feature (to DPS 8 systems only) - IOM wire wrap channel replaced with hard copper.	For installed MSP0603/0607/0609, XSP9310. One required per channel. Equipment removed and replaced by MXF8007 becomes the property of Honeywell upon removal.
	Disk Unit/Spindle Components	
MSU0501	1101MB disk unit with two spindles. Nonremovable disk modules. Includes rotational position sensing (RPS) feature per spindle. May be freely intermixed in same subsystem.	At least one MSU0501 required if nonremovable storage wanted.
MSF0011	Dual access feature for MSU0501.	One required for each MSU0501 disk unit (2 spindles) for dual-channel MSPs (MSP8002, MSP0612). Permits each channel to be cross-barred to each spindle.
MSF0501	Additional (spare) MSU0501 HDA (disk module). Note: Title to this HDA or upgrade passes to and vests in HIS when installed on lease or rental MSU0501. On written request by customer, HIS will pass title to the removed HDA in exchange for receiving title to the previously purchased spare when installed as a permanent substitute.	Option, purchase only.

MI	Description	Required or Option
MSU0402	78.2MB removable-pack disk unit. One spindle. Upgradeable onsite to MSU0451 by MSK4025.	MSU04XX required if removable storage wanted. MSU04XX mixable in same subsystem.
MSU0451	158.4MB removable-pack disk unit. One spindle. Same essential as MSU0402 except with double capacity.	
MSF0007	RPS feature for MSU0402/0451	Required per MSU0402/0451 disk spindle.
MSF0006	Dual-access feature for MSU0402/ 0451	One required per MSU0402/ 0451 (spindle) for dual-channel MSPs (MSP8002, MSP0612). Permits each channel to be cross-barred to each spindle.

Configurator For MSP8000 Subsystem (Single-Channel 1x16) - For DPS 8/47C/49C Only

The block diagram for MSP8000 is illustrated in Figure 8-1.

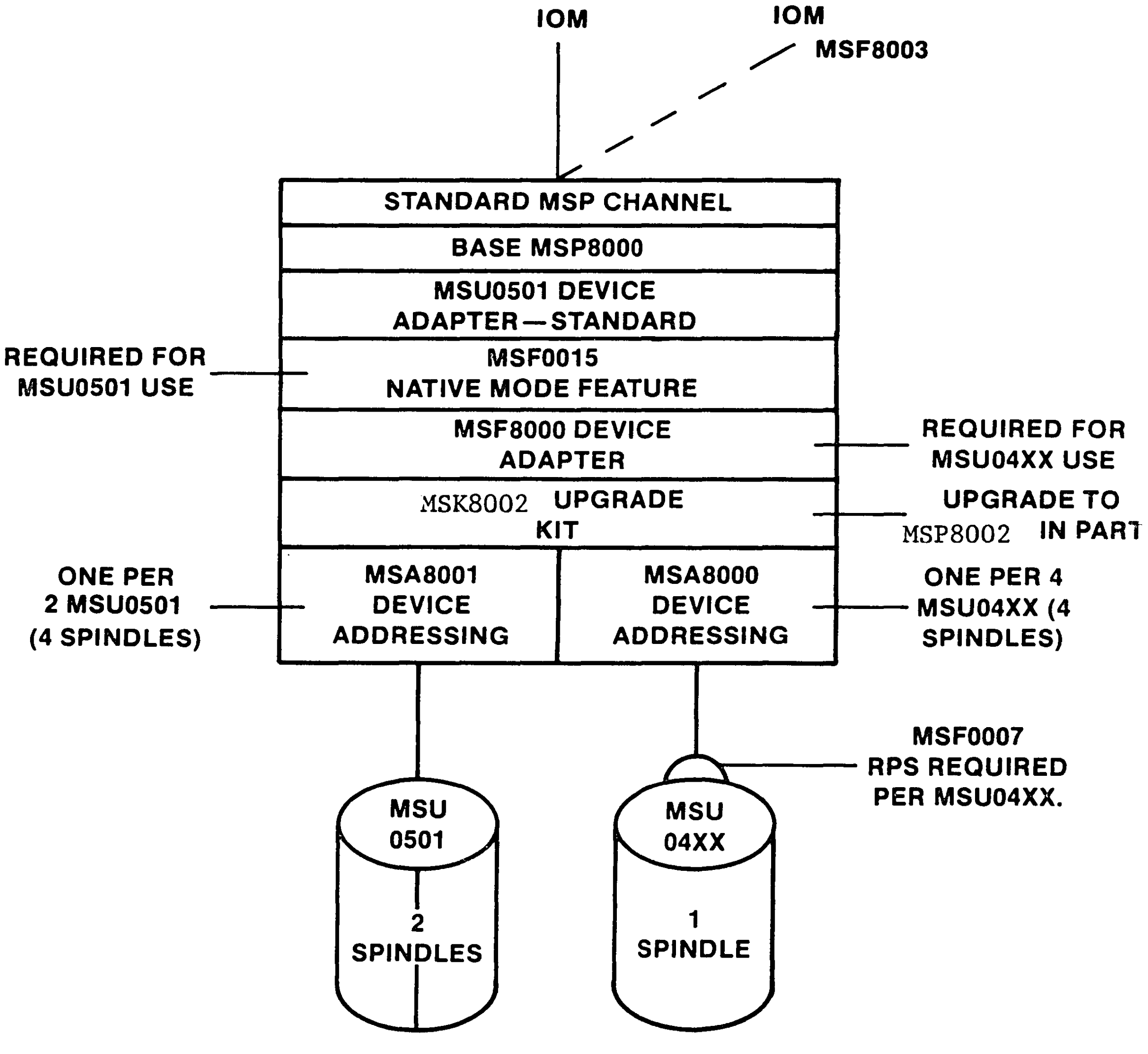


Figure 8-1. MSP8000 Block Diagram

Table 8-1 illustrates the configuration table for MSP8000.

TABLE 8-1. MSP8000 CONFIGURATION

The permissible maximum combinations of 16 spindles for MSP8000 are:

1. 16 MSU04XX
2. 8 MSU0501
3. 12 MSU04XX and 2 MSU0501
4. 8 MSU04XX and 4 MSU0501
5. 4 MSU04XX and 6 MSU0501

		COM-BINA-TION # (FROM ABOVE)	MSU04XX ITEMS				MSU0501 ITEMS			MSK 8002	MSF 8003 (d)
			MSF8000 DEVICE ADAPTER	MSU 04XX	MSA 8000 Addr (a)	MSF 0007 RPS (b)	MSU 0501	MSA 8001 Addr (c)	MSF 0015		
8/47C 8/49C	MSP 8000 1 x 16	1	1	1-16	1-4	1-16	—	—	—	OPTIONAL KIT—PARTIAL UPGRADE TO MSP8002	1-3 OPTIONAL SWITCHED IOM CHANNELS
		2	—	—	—	—	1-8	1-4	1		
		3	1	1-12	1-3	1-12	1-2	1	1		
		4	1	1-8	1-2	1-8	1-4	1-2	1		
		5	1	1-4	1	1-4	1-6	1-3	1		

a) 1 per 4 MSU04XX (4 spindles)
b) 1 per MSU04XX
c) 1 per 2 MSU0501 (4 spindles)
d) Maximum quantity is three

)

Configurator For MSP8002 Subsystem (Dual-Channel 2x16) - For DPS 8/47C/49C Only

Figure 8-2 illustrates the block diagram for MSP8002.

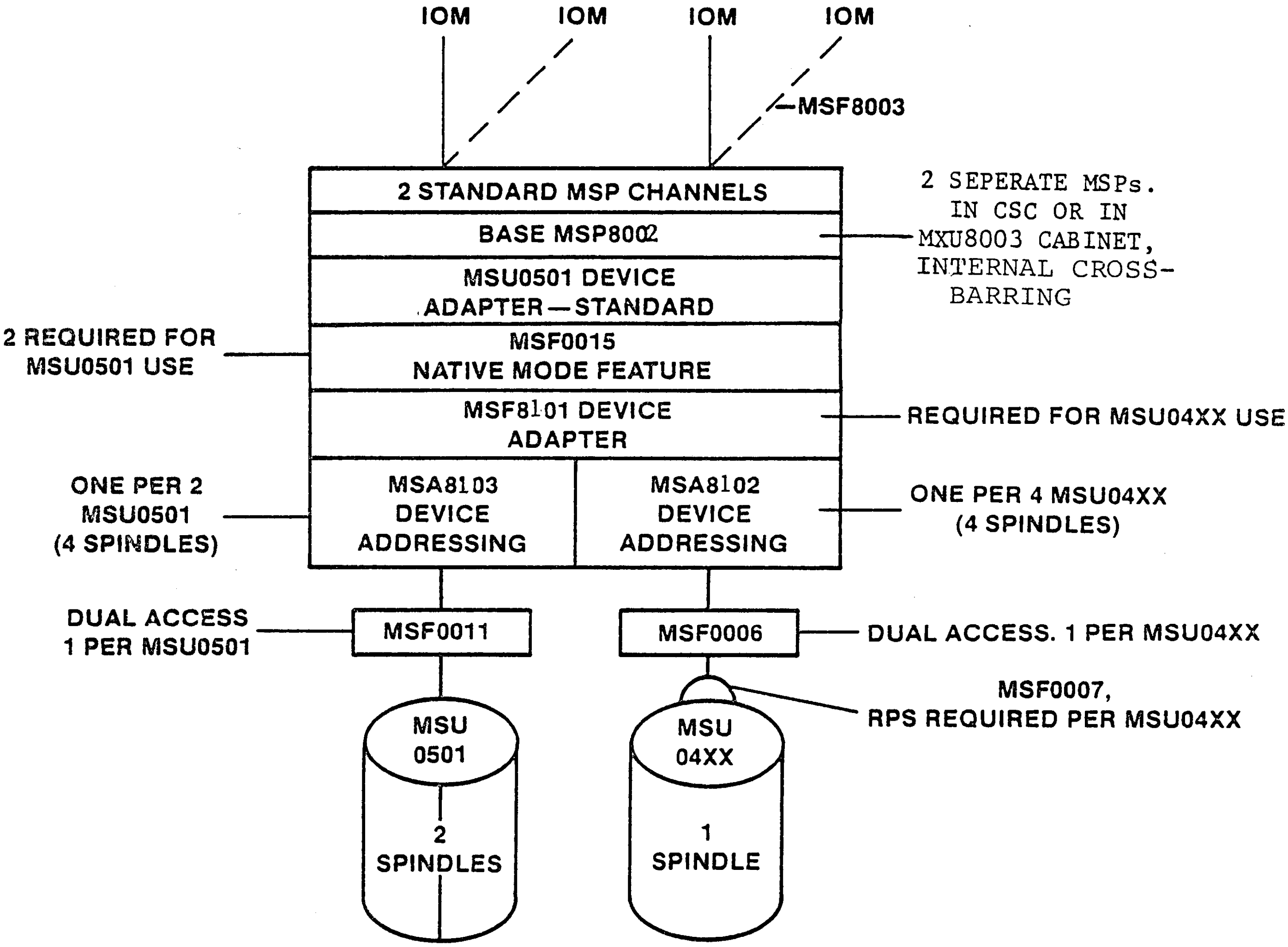


Figure 8-2. MSP8002 Block Diagram

Table 8-2 illustrates the configuration table for MSP8002.

TABLE 8-2. MSP8002 CONFIGURATION

The permissible maximum <u>combinations</u> of 16 spindles per MSP8002 are:

1. 16 MSU04XX
2. 8 MSU0501
3. 12 MSU04XX and 2 MSU0501
4. 8 MSU04XX and 4 MSU0501
5. 4 MSU04XX and 6 MSU0501

		COM-BINA-TION # (FROM ABOVE)	MSU04XX ITEMS					MSU0501 ITEMS				MSF 8003 (d)
			MSF8101 DEVICE ADAPTER	MSU 04XX	MSA 8102 ADDR (a)	MSF 0007 (b)	MSF 0006 (f)	MSU 0501	MSA 8103 ADDR(c)	MSF 0011 (g)	MSF 0015	
8/47C 8/49C	MSP 8002 2 x 16	1	1	1-16	1-4	1-16	1-16	—	—	—	—	1-6 OPTIONAL SWITCHED IOM CHANNELS (e)
		2	—	—	—	—	—	1-8	1-4	1-8	2	
		3	1	1-12	1-3	1-12	1-12	1-2	1	1-2	2	
		4	1	1-8	1-2	1-8	1-8	1-4	1-2	1-4	2	
		5	1	1-4	1	1-4	1-4	1-6	1-3	1-6	2	

a) 1 Per 4 MSU04XX (4 spindles)
b) RPS feature required. 1 per MSU04XX.
c) 1 per 2 MSU0501 (4 spindles)
d) Maximum quantity is six.
e) 1-3 per MSP in MSP8001
f) Dual access feature required. 1 per MSU04XX (spindle)
g) Dual access feature required. 1 per MSU0501 (2 spindles)

)

Configurator For MSP0611 Freestanding Subsystem (Single-Channel 1x16) - For Any DPS 8/C Subsystem

Figure 8-3 illustrates the block diagram for MSP0611.

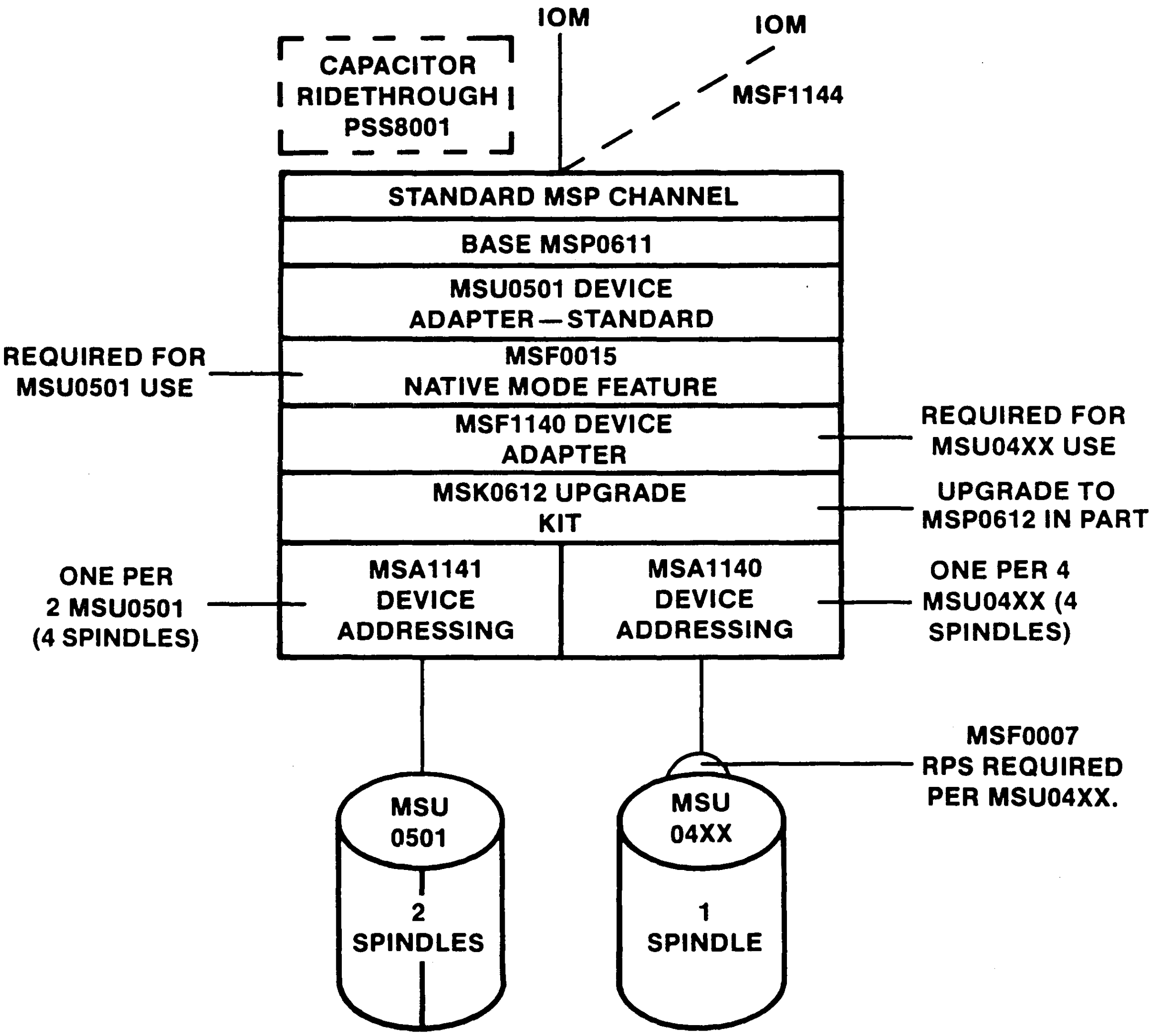


Figure 8-3. MSP0611 Block Diagram

Table 8-3 illustrates the configuration table for MSP0611.

TABLE 8-3. MSP0611 CONFIGURATION

The permissible maximum combinations of 16 spindles for MSP0611 are:

1. 16 MSU04XX
2. 8 MSU0501
3. MSU04XX and MSU0501 totaling 16 spindles

		COMBINATION # (FROM ABOVE)	MSU04XX ITEMS				MSU0501 ITEMS			MSK 0612	MSF 1144 (d)	PSS 8001
			MSF1140 DEVICE ADAPTER	MSU 04XX	MSA 1140 ADDR (a)	MSF 0007 RPS (b)	MSU 0501	MSA 1141 ADDR (c)	MSF 0015			
ANY DPS 8 MODEL	MSP 0611	1	1	1-16	1-4	1-16	—	—	—	OPTIONAL KIT—PARTIAL UPGRADE TO MSP0612	1-3 OPTIONAL SWITCHED IOM CHANNELS	OPTIONAL CAPACITOR RIDETHROUGH
		2	—	—	—	—	1-8	1-4	1			
		3	1	1-14	1-4	1-14	1-7	1-4	1			

a) 1 per 4 MSU04XX (4 spindles)
b) 1 per MSU04XX
c) 1 per 2 MSU0501 (4 spindles)
d) Maximum quantity is three.

Configurator For MSP0612 Freestanding Subsystem (2x16, 2x30, 2x32) - For Any DPS 8/C System

Figure 8-4 illustrates the block diagram for MSP0612.

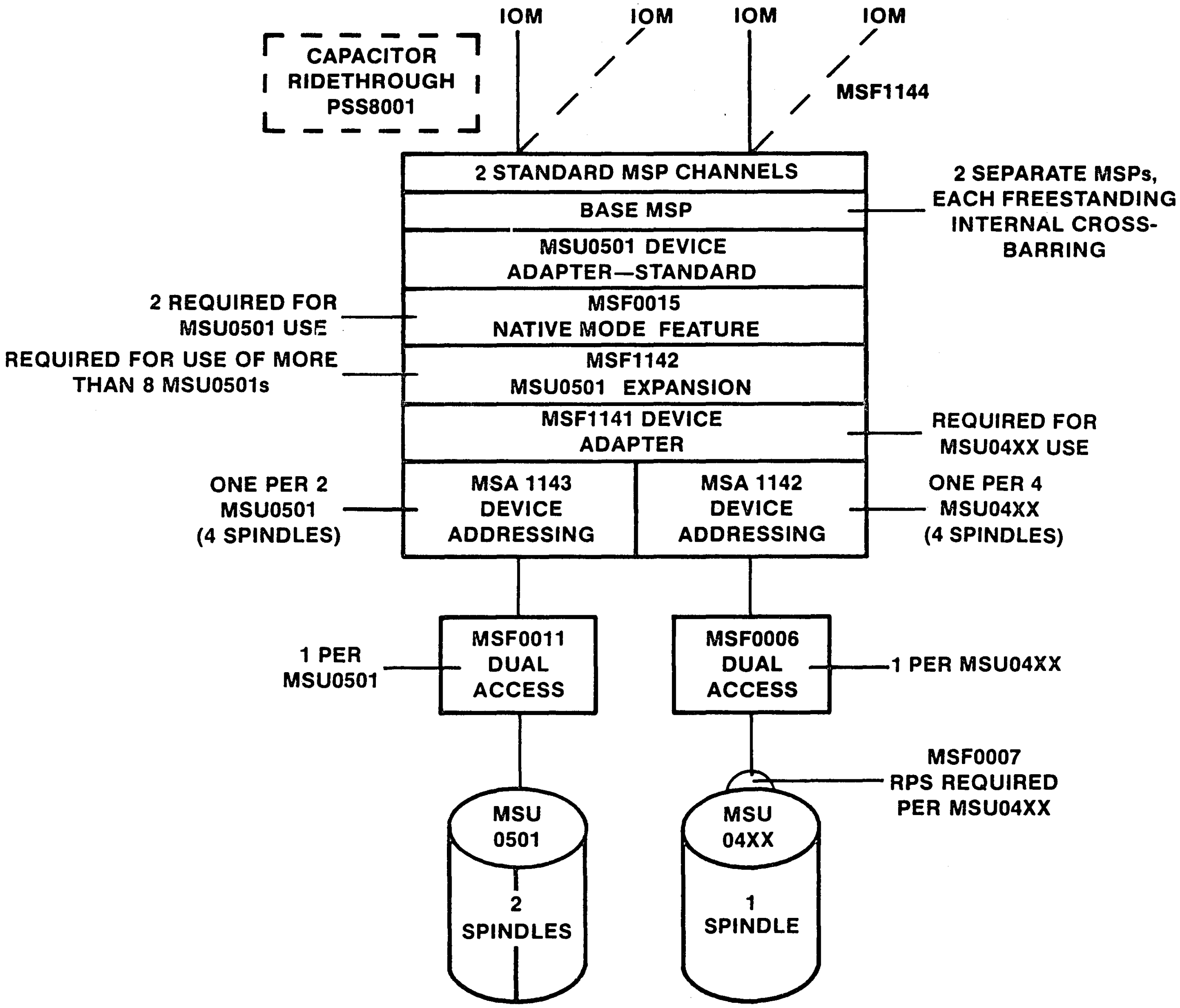


Figure 8-4. MSP0612 Block Diagram

Table 8-4 illustrates the configuration table for MSP0612.

TABLE 8-4. MSP0612 CONFIGURATION

The permissible maximum combinations for MSP0612 are:

1. 2x16 MSU04XX (16 spindles)
2. 2x15 MSU0501 (30 spindles)
3. 2 x 1-16 MSU04XX and 1-8 MSU0501. Total 32 spindles.

		COMBINATION # (FROM ABOVE)	MSU04XX ITEMS					MSU0501 ITEMS					MSF 1144 (d)	PSS 8001
			MSF1141 DEVICE ADAPTER	MSU 04XX	MSA 1142 ADDR (a)	MSF 0007 (b)	MSF 0006 (f)	MSU 0501	MSA 1143 ADDR (c)	MSF 0011 (g)	MSF 0015	MSF1142 (h)		
ANY DPS 8 MODEL	MSP 0612 2 x 16 2 x 30 2 x 32	1	1	1-16	1-4	1-16	1-16	—	—	—	—	—	1-6 OPTIONAL SWITCHED IOM CHANNELS (e)	OPTIONAL CAPACITOR RIDETHROUGH
		2	—	—	—	—	—	1-15	1-8	1-15	2	0-1		
		3	1	1-16	1-4	1-16	1-16	1-8	1-4	1-8	2	—		

a) 1 per 4 MSU04XX (4 spindles)
b) RPS feature required. Per MSU04XX.
c) 1 per 2 MSU0501 (4 spindles)
d) Maximum quantity is six
e) 1-3 per MSP in MSP0612
f) Dual access feature required. 1 per MSU04XX (spindle)
g) Dual access feature required. 1 per MSU0501 (2 spindles).
h) 1 required if 9-15 MSU0501 used (18-30 spindles), maximum of 1 per MSP0612.

Configuring Example For Mass Storage

A DPS 8/47C prospect wants a 2-channel (2 MSPs) subsystem. Prospect will start with four MSU0451 spindles and three MSU0501 units (6 spindles).

1	MSP8002	MSP for lowest price
4	MSU0451	4 Spindles
4	MSF0007	RPS per MSU0451 spindle
4	MSF0006	Dual access feature per MSU0451 spindle
1	MSF8101	Device adapter for MSU0451
1	MSA8102	Device addressing for MSU0451
3	MSF0501	6 spindles, 3 units
3	MSF0011	Dual access feature per MSU0501 unit (2 spindles)
2	MSA8103	Device addressing for MSU0501
2	MSF0015	Native Mode Features for MSU0501.

SECTION 9
Configuring Consoles

CONFIGURATION RULES FOR IOM-CONNECTED CONSOLE SUBSYSTEMS FOR DPS 8/C SYSTEMS

One IOM-connected Console CSU6601 is required for each DPS 8/C system.

Console Subsystem (CSU6601)

At least one CSU6601 is required in each DPS 8/C system. Each base CSU6601 includes an adapter and IOM channel, a 12-inch CRT screen, keyboard, a 120-cps dot matrix printer, a connection to the DPS 8/C system DPU (Diagnostic Processor Unit), and a communication line interface for remote maintenance purposes.

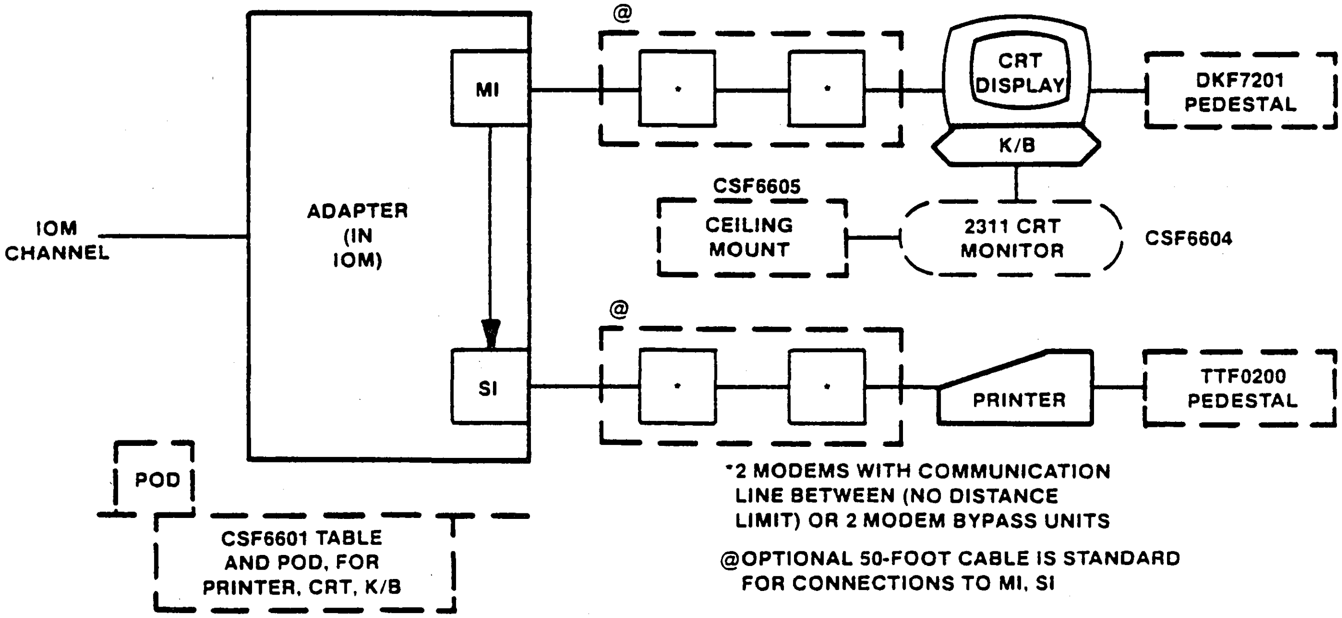
The display screen (12-inch CRT) has space for 1920 characters (80 characters times 24 lines).

The adapter unit provides two terminal-oriented communication line interfaces of EIA RS-232-C type. This allows the use of modem bypass units or modems to position the console printer, CRT, and keyboard remotely to the DPS 8 system, if desired.

- Master interface (MI) - prime connection for keyboard and CRT as part of base CSU6601.

- Slave interface (SI) - a connection slaved off the master interface. Base printer of CSU6601 connects to SI.

Figure 9-1 illustrates the block diagram of base CSU6601 and options.



*2 MODEMS WITH COMMUNICATION LINE BETWEEN (NO DISTANCE LIMIT) OR 2 MODEM BYPASS UNITS

@OPTIONAL 50-FOOT CABLE IS STANDARD FOR CONNECTIONS TO MI, SI

Figure 9-1. CSU6601 Block Diagram

The following listing provides the marketing identifiers (MI) and descriptions for base CSU6601 and options.

MI	Description
CSU6601	Base console with power supply, 12-inch CRT screen, keyboard, 120-cps printer, IOM channel, master interface (MI), slave interface (SI), adapter (in IOM). At least one required per DPS 8/C system.
CSU6602	Auxiliary console with keyboard and 120-cps printer. As additional console used remotely or locally. Includes CSF6602 Auxiliary Console Adapter.
CSF6601	Console table for CRT, printer, and keyboard. Includes indicator pod with emergency power disconnect switch, initialize switch, bootload switch, and processor activity indicator. Adjusts to sitdown or standup heights.

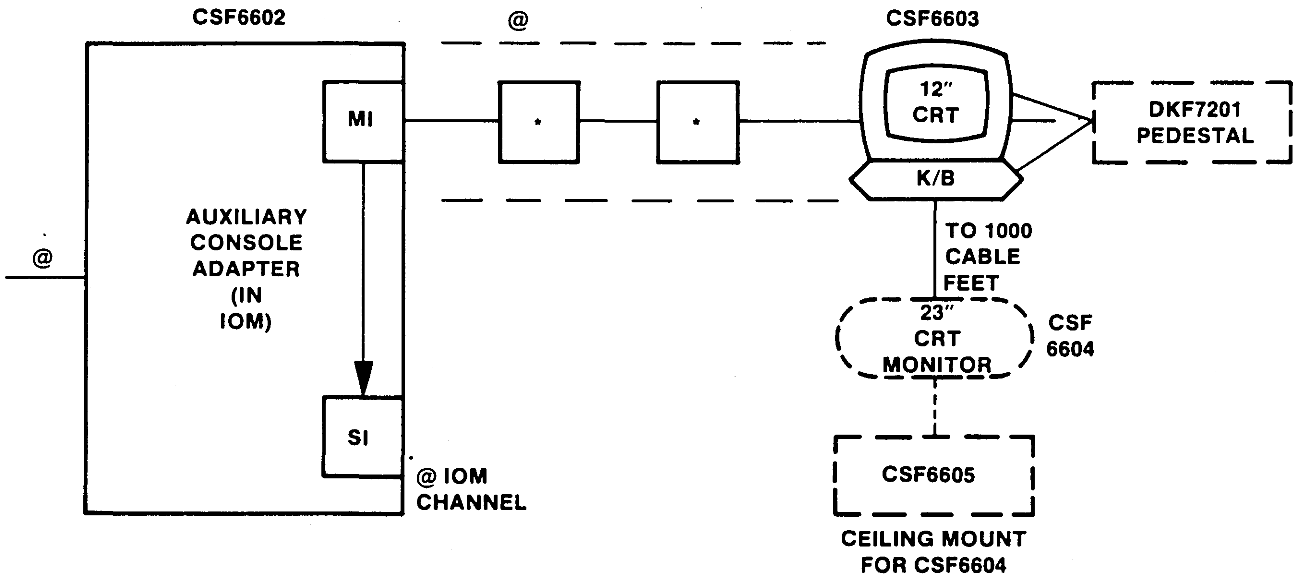
TTF0200	A sitdown-height pedestal option for auxiliary printer and keyboard.
DKF7201	A sitdown-height pedestal for auxiliary 12-inch CRT and keyboard.
CSF6604	A 23-inch, large-screen monitor to be connected to 12-inch CRT and displaying what is shown on it. A 50-foot cable is supplied. Cable length up to 1000 feet can be obtained by ordering the W09-0001C cable assembly in the desired length. Refer to the Terminals Sales Reference Handbook Price Catalog (CG32), Section 4 for configuration and pricing.
CSF6605	Ceiling mount for CSF6604 to eliminate need for table for the 23-inch monitor.

Auxiliary Console Adapter - CSF6602

This adapter is similar to that for the CSU6601, but is not necessarily related to the CSU6601. It has its own IOM channel. Provides a low-cost means for use of a separate CRT and optional 23-inch, large-screen monitor. Use of CSF6602 is independent of CSU6601, except when the Extended System Control Feature (CSF6606) is used to link CSU6601 Base Console and CSF6602 with its attached CRT and keyboard. CSF6606 is discussed later in this section.

Note: The official title of CSF6602 is Auxiliary Keyboard/Display Attachment Feature.

Figure 9-2 illustrates the block diagram of CSF6602 and related features.



@ Optional 50-foot cable is standard for connection to MI.

* 2 modems with communication line between (no distance limit) or 2 modem bypass units with up to 2500 cable-feet between them. If no modems or bypasses are used, the cable length from Adapter to CRT/KB/printer is 50 feet.

Figure 9-2. CSF6602 Block Diagram

The following listing provides the marketing identifiers (MI) and descriptions for CSF6602 Auxiliary Console Adapter (Auxiliary Keyboard Display Attachment Feature).

MI	Description
CSF6602	Auxiliary Console Adapter (in IOM) with power supply, IOM channel, master interface (MI), and slave interface (SI). Required to use CSF6603 and CSF6604. (Ordered separately, or included in price of CSU6602 Auxiliary Console.)
CSF6603	12-inch CRT with keyboard. Requires CSF6602.
DKF7201	Sitdown-height pedestal for auxiliary 12-inch CRT and Keyboard. Optional.
CSF6604	23-inch large-screen monitor, slaved off CSF6603 12-inch CRT. Displays what is shown on CSF6603. A 50-foot cable furnished. Cable up to 1000 feet can be obtained by ordering the W09-0001C cable assembly in the desired length. Refer to the Terminals Sales Reference Handbook Price Catalog, (CG32), Section 4 for configuration and pricing.
CSF6605	Ceiling mount for CSF6604. Eliminates need for table for the 23-inch monitor.

Console Switch Feature - CSF6606 (Official Title is Extended System Control Feature)

This switch feature provides a variety of switching functions for backup purposes.

- Where CSU6601 is used by itself, but with local or remote auxiliary console devices, the switch can be used to select which console device (local or auxiliary) will be the operational console device.
- Where CSU6601 and Auxiliary Console Adapter CSF6602 are used (thus two adapters and two IOM channels) the CSF6606 Console Switch Feature can be used to switch console devices between the two adapters.
- Requires CSF6601 Console Table to contain switch logic.

SECTION 10
Generics of Data Communications Front End Processors (FEPs)

Figure 10-1 illustrates the block diagram of typical components of Front End Processors (FEPs). The numbers shown within the figure correlate to the paragraph numbers in the following discussion.

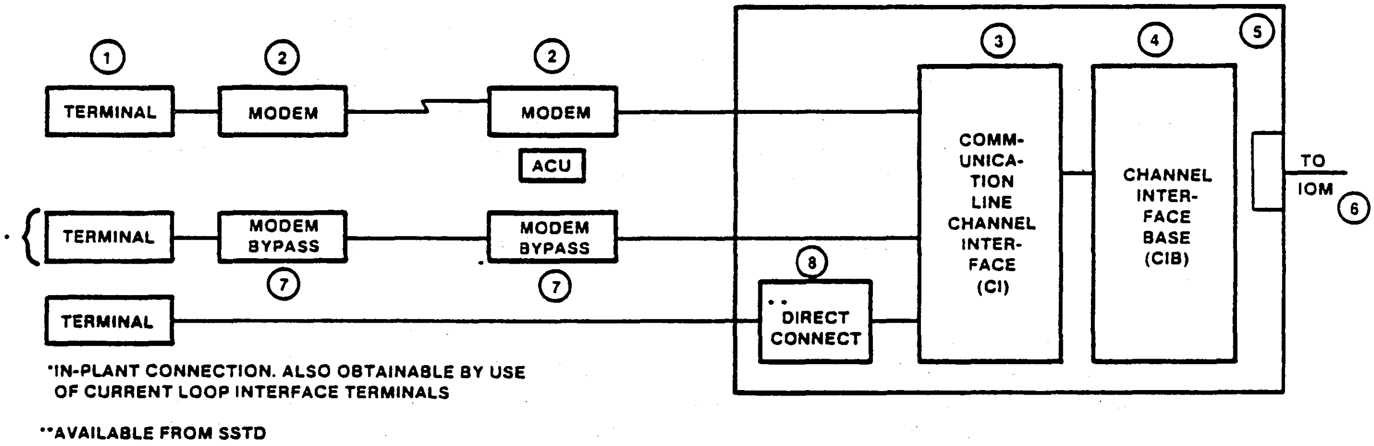


Figure 10-1. Typical Front End Processor Components

1. Terminal selection exerts a major configuring effect. Some terminal considerations:

   - Terminal type: batch, keyboard (CRT, hardcopy, or both). May affect the choice of communication Channel Interface (CI).

   - Terminal operating speed in bits per second, baud rate, or characters per second. Determines minimum line speed and modem speed to be selected.

   - FDX (full-duplex) or HDX (half-duplex) operation of the line and terminal. May affect choice of modem, line type, or CI type. HDX is only supported for synchronous terminals.

   - Synchronous or asynchronous physical transmission technique. Affects modem type and choice of CI.

   - Line discipline or link protocol used by terminal. May affect CI choices in FEP; may determine whether synchronous or asynchronous transmission technique is to be used. BSC (Binary Synchronous Communications) protocol, for example, requires a specific BSC-oriented CI. HDLC and asynchronous protocols also require specific CIs. May affect choice of modem used.

   - Modem selection is directly affected by terminal selection and line speed.

   - In addition, some terminals use a current loop type of interface which sometimes does not use modems. (Current Loop is a transmission technique that recognizes current flow rather than voltage levels. It has traditionally been used in teletypewriter networks incorporating batteries as the transmissin power source.) Current loop is only supported for asynchronous terminals. (Modems are sometimes not used for RS-232, also.)

2. Modem stands for modulator-demodulator, a device for transforming signals between the line and the device at the end of the line. Other generic names -- data set, digital subset, subset, coupler.

   - Most commonly a modem (or equivalent device) will be needed at each end of a line obtained from a public carrier company. Thus modem costs can become significant.

   - Modems are often either for synchronous or asynchronous transmission. In synchronous operation the modem at each end furnishes timing signals to keep each end of the line in synchronization with the other. If the modem used does not provide timing signals in synchronous transmission cases, a timing device must be attached to the terminal.

   - The use of either 2-wire or 4-wire lines may affect modem choice or whether or not a modem is used.

3. Channel Interface (CI) is attached to a Channel Interface Base (CIB) which is in turn contained within an FEP. (Another name sometimes used for CI is Communication Line Adapter - CLA.)

   CI is a termination point or connection point into the FEP for one or two lines. The path for a given line through a CI is often called a channel, or sometimes, a subchannel.

   This section refers to "line" in the sense of (1) links provided directly or indirectly by public service carriers, such as telephone companies (such companies are also known as common carriers), and (2) "In-plant" type links or lines do not involve public service carriers and sometimes do not require modems. Some line considerations affecting configuring are:

   o Whether public lines (also known as dialed, switched or dial-up lines) or private lines (also known as leased or direct lines) are used. Private lines do not involve dialing. There is, in effect, a permanent path established. This may affect modem choice and modem attachments.

   o If private lines are involved, various levels of line conditioning are available from the telephone company to regulate line quality - noise level, error probability, etc. Private lines may or may not use modems depending on the type of interface: current loop without modems, EIA RS-232 or EIA RS-422 without modems (i.e., direct connect), EIA RS-232 with modems. Only one interface type may be used per line.

   o Whether line is to be used on half-duplex (HDX), two-way alternate (TWA) basis, or full-duplex (FDX) basis. FDX lines can be used on either a TWA basis or two-way simultaneous basis (TWS). This may affect modem type.

   o Whether line is used for both data and voice transmission, called DUV (data under voice). Normally the use of sucn transmission does not affect the modem or CI choice.

   There are multiple types of CIs, some very general, some specialized. Some CIs interface one line each, some two lines each.

   CIs are not included in the base FEP price but must be configured. Every line must terminate at a CI, regardless of the type of line, whether by common carrier or in-plant connection.

4. CIB (channel interface base) provides common service logic for a number of CIs, the number of CIs varying with CI type. (Another name sometimes used for CIB is Multi-Line Communications Processor - MLCP.)

   The CIB is completely general in its capabilities. Any line speed, code set, link protocol, or transmission technique supported by our FEP hardware is supported by CIB.CIs on any given CIB must be of the same type; no mixing of ASYNC, SYNC, or HDLC on the same CIB. Mixing of SYNC (2780, 3780, HASP, 3270) on the same CIB is permitted.

   CIBs are not included in the base FEP price but must be configured.

5. Base FEP. (Other names sometimes used for FEP are either Communications Processor, or Front-End Network Processor - FNP). Maximum of 12 local FEPs per system, maximum of 16 FEPs (local and remote) per system.

   Attributes which may affect operation of the FEP include:

   - Echoplex (FDX only) - With echoplex (echo on), the FEP will echo back to the terminal whatever is entered or typed in. Without echoplex (echo off), no echo of the input stream is sent to the originating terminal. Echoplex is typically used with time sharing and other applications terminals. It would not be used when an FEP receives data from another computer.

   - Transparent terminal I/O - Permits a device to transmit data which will not in any way be edited by the FEP. The FEP essentially is transparent to the I/O operation. Typically used for special devices with unique control characters (e.g., graphics devices).

6. Connection to DPS 8/C IOM is provided by a DIA (direct interface adapter). Included in base CPS81XX FEP, not included in DCU8011. The DIA also includes a physical channel in the IOM.

7. Modem Bypass. Used for in-plant connections. No telephone line furnished by a common carrier such as AT&T. Modem bypass units perform same basic function as modems.

   Cable length restrictions exist between two successive modem bypass units but additional units can be inserted into the line to act as repeaters or signal strengtheners. In-plant connection is considerably cheaper (long-term) than use of modems and common carrier lines.

8. Direct Connect. Another way to use in-plant connection. Direct connect features cannot be repeated in series. An in-plant line is established by a cable with no involvement of a common carrier. Advantage: lower costs. Disadvantage: no access to telephone network, no way to dial another destination.

   RS232 asynchronous direct connect is assured to work for distances of up to 50 feet (up to 1000 feet under ideal conditions). The current loop asynchronous approach of in-plant connection is for distances up to 1000 cable feet. RS422 asynchronous direct connect is for distances up to 4000 feet at 19.2K baud.

SECTION 11
Configuring DATANET 8/C Front End Processor (FEP)

REQUIRED CONFIGURATION COMPONENTS

- Base FEP (included in DPS 8/C central system CPS81XX or as DCU8011) (FEPs are also sometimes called either Communications Processors, or Front-end Network Processors - FNPs).

- DPS 8/C Host Connection (included in central system CPS81XX; not included in DCU8011).

- Console (CIB connected. Required and included in central system CPS81XX. Not required or included in DCU8011 but recommended for each site using DCU8011 as a remote FEP.). Requires one async line, not included in central system CPS81XX or in DCU8011.

- One or more communication Channel Interfaces (CIs). (CIs are also sometimes called Communications Line Adapters (CLAs).) One CI per FEP is required for an async line for the console. One CI per CP-6 system is recommended for a sync line needed as a prerequisite for interfacing to the automated system for software support and distribution of patches.

  - Every line (sometimes called a subchannel or channel) must terminate in a CI from any common carrier or any in-plant connection.

  - Every CI represents electronic logic on circuit boards for which space is provided in "slots" in one or more general-purpose Channel Interface Bases (CIBs).

- Sufficient quantity of CIBs to connect the quantity of CIs needed to support the desired number of lines and protocols. Only one type of CI (SYNC, ASYNC, HDLC) per CIB is permitted. DN 8/C does not include any CIBs in base price, but one or more must be configured in order to provide for the CIs needed to connect the lines to the FEP. (CIBs are also sometimes called Multi-Line Communications Processors (MLCPs).)

- One or more in-plant connection features if lines are not furnished by common carrier companies. In-plant connection is by use of modem bypass or direct connect features, or by use of terminals of the current loop interface type. Each must connect to an appropriate CI.

NETWORKING CONSIDERATIONS

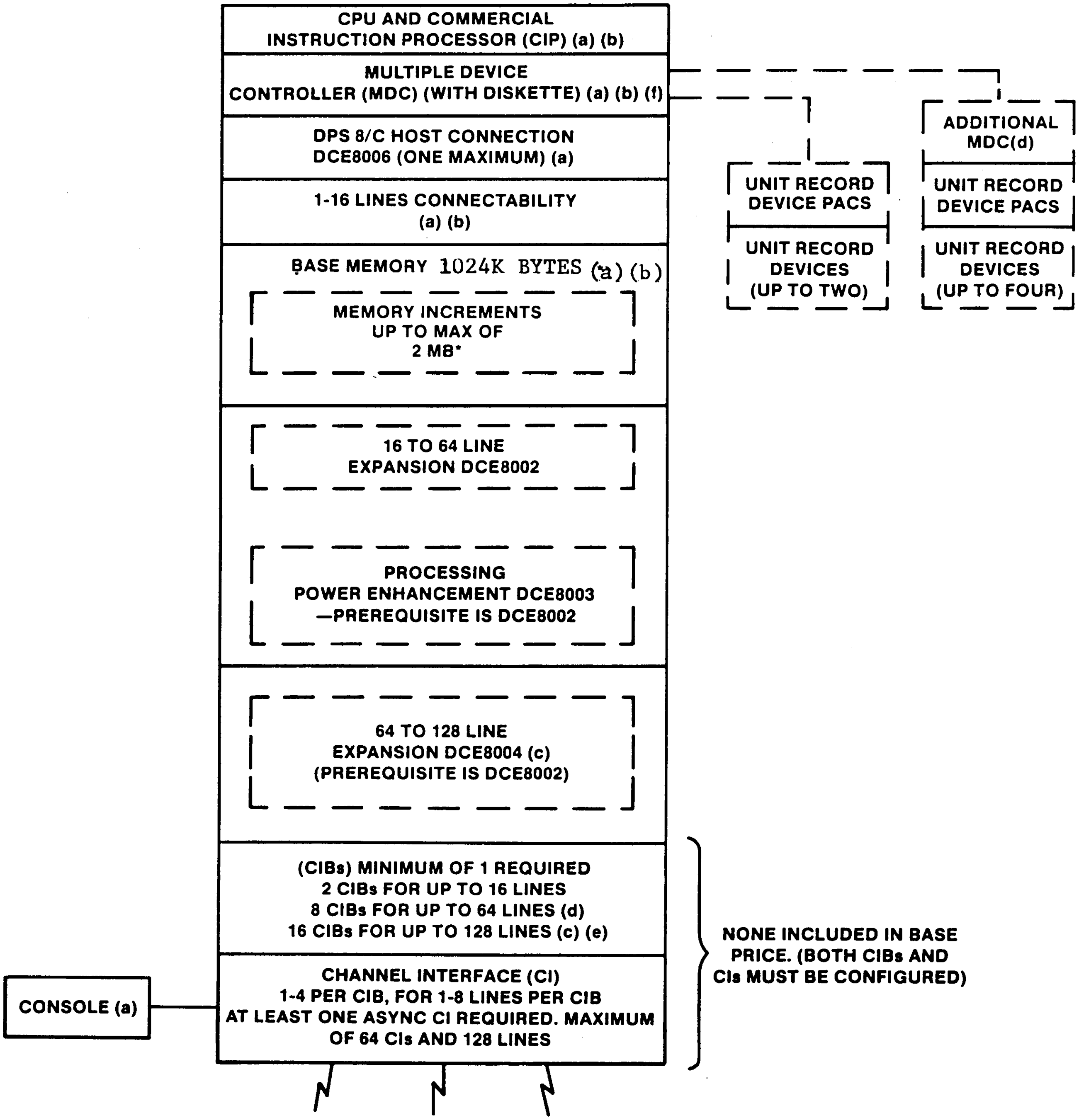
CP-6 supports two kinds of FEPs: local (to the central system) and remote (from the central system). Local FEPs are connected to the central system via the DCE8006 Host Connection option. Remote FEPs are connected to local FEPs via High-Level Data Link Control (HDLC) lines. Other than for this method of connection to the system, local and remote FEPs are identical (i.e., they have the same line connectability and functionality).

DPS 8/C Networking constraints are as follows:

- Minimum of one local FEP required (included with CPS81XX).
- Maximum of 12 local FEPs per system.
- Maximum of 16 FEPs per system.
- Maximum of 4 remote FEPs per local FEP.
- Each local FEP can connect to one and only one host.
- Each remote FEP can connect to one and only one local FEP.
- Only one level of remote FEP is allowed (i.e., no remote FEP to remote FEP connections are possible).

CONFIGURING THE DATANET 8/C

Figure 11-1 illustrates the DATANET 8/C block diagram. CP-6 Basic System (M.I. SFS6120), Access Modes (M.I. SFS6121) and the Communications System (M.I. SFC6120) is the required software. (The Remote Communications Software (M.I. SFC6121) is required per each remote FEP.)



(See p. 11-4 for notes)

Figure 11-1. DATANET 8/C Block Diagram

Notes:

(a) Part of FEP included with central system CPS81XX.

(b) Part of DCU8011.

(c) Expansion to 128 lines requires use of power supply in a second cabinet (included with DCE8004).

(d) Requires DCE8002 (64 line chassis).

(e) Requires DCE8002 (64 line chassis) and DCE8004 (128 line chassis).

(f) Diskette included in DN 8/C for maintenance purposes and for booting remote FEPs. (Blank media [Honeywell Product Number M4101, single sided diskette] for creating remote FEP boot diskette must be ordered via a Supply Requisition.)

* 512K bytes per memory increment, DCM8008, DCM8005. 1M byte per bus slot.

Table 11-1 illustrates the board slot assignments for the DATANET 8/C.

TABLE 11-1. DATANET 8/C BOARD SLOT ASSIGNMENTS

Total Slots	CPS81XX or DCU8011	(CPS81XX or DCU8011) + DCE8002	(CPS81XX or DCU8011) + DCE8002 + DCE8004
1	SCF	SCF	SCF
2	CPU	Cache	Cache
3	CIP	CPU	CPU
4	MDC 1	CIP	CIP
5	Coupler	MDC 1	MDC 1
6	CIB 1	MDC 2	MDC 2
7	CIB 2	Coupler	Coupler
8	MEM 2	CIB 1	CIB 1
9	MEM 1	CIB 2	CIB 2
10	TERMINATOR	CIB 3	CIB 3
11		CIB 4	CIB 4
12		CIB 5	CIB 5
13		CIB 6	CIB 6
14		CIB 7	CIB 7
15		CIB 8	CIB 8
16		Reserved	CIB 9
17		Reserved	CIB 10
18		Reserved	CIB 11
19		MEM 2	CIB 12
20		MEM 1	Jumper
21			CIB 13
22			CIB 14
23			CIB 15
24			CIB 16
25			Reserved
26			Reserved
27			Reserved
28			Reserved
29			MEM 2
30			MEM 1

Note: One CIB and one sync CI strongly recommended for a sync (HASP) line (Bell 201C modem or equivalent) as a prerequisite for interfacing to the automated system for software support and distribution of patches.

DATANET 8/C FEP-RELATED MARKETING IDENTIFIERS AND THEIR FUNCTIONS

The following listing provides all DATANET 8/C FEP-related marketing identifiers (MI) and their functions. The list applies to base FEP included in CPS81XX and to DCU8011.

MI	Description
Base FEP	
DCU8011	A freestanding FEP with 1024K bytes memory, a chassis for up to 16 line connections, and a 256K bytes diskette. No console, no DPS 8/C Host Connection, and no CIBs or CIs are included in the DCU8011. (The FEP included in the CPS81XX includes one DCU8011, one DCE8006, and one Communications Subsystem connected, 30 cps console, DCF8008 [included for maintenance purposes]. No CIBs or CIs are included with this FEP.) Maximum of 16 CIBs may be configured. NOTE - Blank media (Honeywell Product Number M4101, single sided diskette) for creating remote FEP boot diskette must be ordered via a Supply Requisition.
Host Connect Option (Coupler)	
DCE8006	DPS 8/C Host Connection from the DCU8011 FEP to the DPS 8/C IOM. A maximum of one may be configured. CPS81XX includes one DCU8011, one DCE8006, one Communications Subsystem connected, 30 cps console - a DCF8008, (included for maintenance purposes).
Console Options	
DCF8006	120 cps communications console for the Datanet 8/C.
DCF8008	30 cps communications console for the Datanet 8/C. One is included with the CPS81XX. Requires one async line Channel Interface, which is not included in the CPS81XX. One console (terminal) of any type is recommended for each site using DCU8011 as a remote FEP.

Memory Expansion

DCM8008	512K bytes memory increment for the Datanet 8/C, 1024-1536K bytes.
DCM8005	512K bytes memory increment for the Datanet 8/C, 1536-2048K bytes.

Figure 11-2 illustrates the FEP memory configurability.

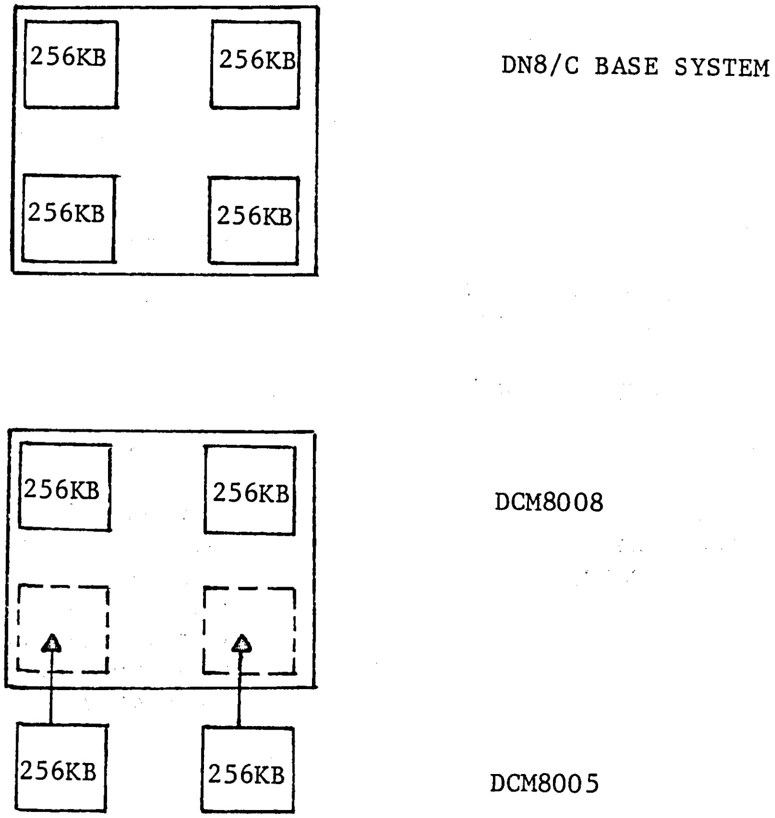


Figure 11-2. DATANET 8/C Memory Configurability

Estimated DATANET memory requirements for DPS 8/C features are given below. (These estimates assume standard, as shipped control and tuning parameters.)

Kernel = 376 K bytes

Host Link = 24 K bytes

ASYNC = 44 K bytes + 2.4 K bytes per terminal

Connection of Remote FEPs (memory required in local FEP) = 40 K bytes + 60 K bytes per remote FEP

Connection to Local - FEP (memory requried in remote FEP) = 60 K bytes

IMP = 400 bytes per instance of IMP (usually one instance of IMP per async terminal)

BSC = 32 K bytes

RBT (2780,3780,HASP; requires BSC) = 18 K bytes + 8 K bytes per terminal

3270 (requires BSC) = 26 K bytes + 5 K bytes per terminal

URP = 28 K bytes + 4 K bytes per device

Forms Interpreter (for Transaction Processing) = 120 K bytes + 6 K bytes per terminal (in addition to async or 3270 per terminal amounts) + program buffer, size determined by site. (Typical size = 112K bytes, enough for six, 18K-byte programs + 4K bytes for overflow.)

Performance Enhancement

DCE8003	Processor power module enhancement (cache) for the DN 8/C FEP. Provides performance increase of approximately 20%. Prerequisite is DCE8002 (64 lines). Requirement for DCE8003 is dependent on throughput considerations. See "FEP Throughput Calculations and CI Board Packaging Tables" later in this section for a discussion of throughput factors.

Line Connection Expansion

DCE8002	Additional chassis for line configurability for the DCU8011, from the 16 base connections to a maximum of 64 lines. Only one can be configured.
DCE8004	Additional chassis and cabinet for DCU8011 line configurability from 64 lines to a maximum of 128 lines. Prerequisite is DCE8002 (64 lines). Maximum of one can be configured.

Channel Interface Base (CIB)

DCF8007	Channel Interface Base (CIB) for the FEP. Maximum of 16 may be configured. Requires DCE8002 (64 line connections) if more than two CIBs are configured. Requires DCE8002 and DCE8004 if more than eight CIBs are configured. One CIB accommodates up to four Channel Interface (CIs) with one transmission type (asynchronous, synchronous or High-Level Data Link Control (HDLC)) per CIB.

Channel Interface (CI) Options (all include 50 ft. cables)

DCF8009	Dual asynchronous channel package, EIA RS-422-A, up to 19,200 bps each. RPQ only.
DCF8011	Terminates two synchronous lines (2780, 3780, HASP or 3270) at up to 19,200 bps each. Each line can run at different speed. EIA RS-232-C interface. EBCDIC code. HDX only. Connects Dataphone 201, 208, 209, 212A, 303 or equivalent modems, DCF8026 modem by-pass, or direct connect.
DCF8012	Terminates two asynchronous lines at up to 19,200 bps each. Each line can run at different speed. EIA RS-232-C interface. FDX only. 8-11 format for 110 and 200 baud. 8-10 format for all other speeds. For Dataphone 103, 113, 212A or equivalent modem, modem bypass, or direct connect.
DCF8020	Terminates one line at up to 19,200 bps. For HDLC link protocol (e.g., remote FEP). Bit-oriented protocol. EIA RS-232-C interface. FDX only. For modems, modem bypass, or direct connect.
DCF8022	Terminates one line in broadband (wideband) range at up to 72,000 bps. HDLC link protocol (e.g., remote FEP). Bit-oriented protocol. FDX only. Bell 301/303 compatible.
DCF8023	Terminates one line at up to 72,000 bps. HDLC link protocol (e.g., remote FEP). For CCITT V.35 interface. Bit-oriented protocol. FDX only.
DCF8036	Two async current loop ports, to 9,600 bps. FDX only.

Modem Bypass Option

DCF8026	Universal Modem Bypass feature for connection to one synchronous or asynchronous line (cable). Minimum of two per line: one at FEP end, other at terminal end. Maximum cable length between two successive bypass units is 2500 feet. Intermediate bypass units can be used as line signal repeaters or strengtheners. Cable used between the DCF8026 is customer-furnished and is specified as two pair of loosely twisted inside telephone cable equivalent to the Alpha Wire Inc. No. 1302. Speed to 19.2K bps for synchronous or 1800 bps for asynchronous.

Direct Connect Option

Connection may also be made without modems, using an adapter connector, cable Product Number W18-0001C (Honeywell Part Number 60128766, Rev C), which connects the CI cable to the terminal's cable or to another CI cable. Synchronous line clocking may be provided by either the CIB or the terminal (if so equipped); however, all CIs on the same CIB using CIB clocking must run at the same speed.

CIBs Packaged with Channel Interface Options

DCF8030	CIB and eight async RS-232-C ports
DCF8032	CIB and eight sync RS-232-C ports
DCF8034	CIB and eight current loop ports
DCF8038	CIB and one broadband sync port, Bell 301/303 compatible, with modem cable
DCF8040	CIB and one broadband HDLC port, V.35 CITT compatible, with modem cable
DCF8042	CIB and one broadband sync. port, V.35 CITT compatible, with modem cable
DCF8044	CIB and one broadband HDLC port, Bell 301/303 compatible, with modem cable

Unit Record Equipment

DPS 6 Unit Record equipment may be attached to the DN 8/C. See Section 6 for configuration information and example.

Attachment Feature

MXF8009	Exchange of FEP Attachment Feature (to DPS 8 systems only) - wire wrap to hard copper, in the IOM. For installed, non DPS 8 FEPs. Equipment removed and replaced by MXF8009 becomes the property of Honeywell upon removal.

SUPPORTED TERMINALS

Most asynchronous, full duplex, ASCII terminals are quickly and easily supportable via CP-6 Profiles; however, a few special features of a few devices may not be able to be utilized. Currently supported profiles include those shown below. (The terminals should support cursor positioning to make full use of CP-6 T.P.) In addition, all terminals compatible with these are also supported.

ASYNC Profiles

Profile Name	Terminal Description
ADDS25	ADDS (Regent) 25
ADDS60	ADDS (Regent) 60
ADDS60TP	ADDS (Regent) 60, without ELO
ADDS200	ADDS (Regent) 200
ADDS580	ADDS (Consul) 580
ADDS980	ADDS (Consul) 980
ADDSVPA1	ADDS Viewpoint Model A1
ADDSVPA2	ADDS Viewpoint Model A2
ANNAMB	Ann Arbor Ambassador
BEEDM20	Beehive DM20
CDI1203	Computer Devices Inc 1203 (Miniterm)
CDI1203S	Computer Devices Inc 1203S (Miniterm)
CDI1205	Computer Devices Inc 1205 (Miniterm) with narrow platen
CDI1205W	Computer Devices Inc 1205 (Miniterm) with wide platen
CDI2200	Computer Devices Inc 2200 (Miniterm) with narrow platen
CDI2200H	Computer Devices Inc 2200 (Miniterm) on high-speed (>1200 baud) line
CDI2200W	Computer Devices Inc 2200 (Miniterm) with wide platen
CDI2200HW	Computer Devices Inc 2200 (Miniterm) high-speed line, wide platen
CTR6300	Centronics 6300
DBL1550	Diablo 1550
DBL1610	Diablo 1610
DBL1620	Diablo 1620
DBL1641	Diable 1641
DECDS120	Digital Equipment LA36 with Datasouth 120
DECLA120	Digital Equipment LA120
DECLA34	Digital Equipment LA34
DECLA36	Digital Equipment LA36
DECLA36SD	Digital Equipment LA36 with SUPERDEC board
DECVT100	Digital Equipment VT100
DECVT100W	Digital Equipment VT100, wide
DECVT131	Digital Equipment VT131
DECVT131W	Digital Equipment VT131, wide
DECVT50	Digital Equipment VT50
DECVT52	Digital Equipment VT52
DECVT52W	Digital Equipment VT-1xx in VT52 mode, wide

Profile Name	Terminal Description
DTM1520	Datamedia Elite 1520A
DY4VGT100	DY-4 Systems VGT-100
GETN300	GE Terminet 300
GT100	General Terminal GT 100
GT 400	General Terminal GT 400
GT400TP	General Terminal GT 400 for TP
HP2645	Hewlett Packard 2645
HP9845	Hewlett Packard 9845
HTH14	Heath H14 Printer
HTH19	Heath H19
HTH19A	Heath H19 (ANS mode)
HTH89	Heath H89
HZL1000	Hazeltine 1000
HZL1500	Hazeltine 1500
HZL1520	Hazeltine 1520
HZL2000	Hazeltine 2000
HZL2000P	Hazeltine 2000 Printer
HZLMOD1	Hazeltine Modular 1
IBM3101-1X	IBM 3101-1X
IBM3101-2X	IBM 3101-2X
IBMPC-H89	IBM Personal Computer in Heath H89 mode
INFI100	Infoton I-100
INFI400	Infoton I-400
INFSTL	Infoton Satellite
INFVST	Infoton Vistar
INTI	Intertec Intertube I
INTII	Intertec Intertube II
INTSII	Intertec Superbrain II
LSIADM31	Lear Siegler Inc ADM 31
LSIADM3A	Lear Siegler Inc ADM 3A
LSIADM5	Lear Siegler Inc ADM 5
MCRACTIV	Microterm ACT-IV
NEC5510	NEC 5510 (Spinwriter)
NEC5515	NEC 5515 (Spinwriter)
NEC5520	NEC 5520 (Spinwriter)
NEC5525	NEC 5525 (Spinwriter)
PE550	Perkins Elmer 550
PRU1002	Honeywell PRU1002
PRU1003	Honeywell PRU1003
PRU1005	Honeywell PRU1005
SDS420	SDS (Scientific Data Systems) 420
SNRKTM380	Synertek KTM 3/80
SOROC120	Soroc 120
TEK4010	Tektronix 4010
TEK4010L	Tektronix 4010, long, narrow
TEK4013	Tektronix 4013
TEK4013L	Tektronix 4013, long, narrow
TEK4023	Tektronix 4023

Profile Name	Terminal Description
TEK4024	Tektronix 4024
TEK4025	Tektronix 4025
TEK4027	Tektronix 4027
TI725	Texas Instruments 725
TI733	Texas Instruments 733
TI743	Texas Instruments 743
TI745	Texas Instruments 745
TI783	Texas Instruments 783
TI785	Texas Instruments 785
TI787	Texas Instruments 787
TI810	Texas Instruments 810
TI820	Texas Instruments 820
TLR1000	Teleray 1000
TLR3300	Teleray 3300
TRS80M1	Radio Shack TRS-80 Model 1
TRS80M2	Radio Shack TRS-80 Model 2
TVI912A	Televideo TVI-912A
TVI912C	Televideo TVI-912C
TVI920	Televideo TVI-920
TVI950	Televideo TVI-950
TTY33	Teletype Model 33
TTY35	Teletype Model 35
TTY37	Teletype Model 37
TTY43	Teletype Model 43
TWU1002	Honeywell TWU1002
TWU1003	Honeywell TWU1003
TWU1005	Honeywell TWU1005
TWU9101	Honeywell TWU9101
TWU9104	Honeywell TWU9104
TWU9106	Honeywell TWU9106
VC303A	Volker Craig VC303A
VC403A	Volker Craig VC403A
VC404	Volker Craig VC404
VC414H	Volker Craig VC414H
VIP7100	Honeywell VIP 7100
VIP7105	Honeywell VIP 7105
VIP7200	Honeywell VIP 7200
VIP7201	Honeywell VIP 7201
VIP7205	Honeywell VIP 7205
VIP7301	Honeywell VIP 7301
VIP7801	Honeywell VIP 7801
VIP 7802	Honeywell VIP 7802
XRX850	Xerox 850
XRX1760	Xerox 1760
XRX7015	Xerox 7015
ZENZ19	Zenith Z19
ZENZ89	Zenith Z89

3270 Profiles

IBM "3270" and all compatible terminals of other manufacturers. Included are 3271, 4, 6, 7, 8, 9 (without color support) controllers and keyboard displays (polled EBCDIC BSC only; point to point and/or multi-drop; clusters and/or single device; for time sharing and T.P.; APL character set not supported). 328X attached printers may be supported by RPQ.

RBT Profiles

HASP multileaving 360/20 mode compatible devices (both master and slave) including other CP-6 systems, CP-V systems, the Level 6 HASP IRBT package and XEROX 530 XSP systems. (EBCDIC BSC; transmits transparent, receives either transparent or non-transparent automatically.)

IBM 2780 and 3780 or compatible terminals (non-transparent EBCDIC BSC). CP-6 does not emulate 2780 or 3780 terminals.

FEP THROUGHPUT CALCULATIONS AND CI BOARD PACKAGING TABLES

The configurability of CIs is affected by three items: CIBs, physical board size, and throughput load factor.

CIBs

CIs on any given CIB must be of the same type; no mixing of async, sync or HDLC on the same CIB. Mixing of sync (e.g., 2780, 3780, HASP, 3270) on the same CIB is permitted.

In addition, a maximum of 1 active broadband line per CIB should be observed. CIB maximum throughputs can be derived from Table 11-2.

TABLE 11-2. CIB THROUGHPUT CAPACITY

Protocol	Maximum Lines per CIB
Async (full duplex)	4 9600 baud, simultaneous input plus output (e.g., microcomputer), or, 8 9600 baud, mostly output (e.g., time-sharing).
Sync (half duplex)	8 9600 baud, or 1 72,000 baud
HDLC (full duplex)	8 9600 baud, or, 1 72,000 baud.

(Preferred placement of CI types within the FEP cabinet, from top to bottom, is as follows: Async, Sync, HDLC, Broadband Sync, Broadband HDLC.)

Physical Board Size

Channel Interfaces are either quarter- or half-board sizes depending on their specific functionality. The physical capacity of each CIB is either four quarter-boards, two half-boards, or two quarter-boards and one half-board Channel Interfaces as illustrated in Figure 11-3.

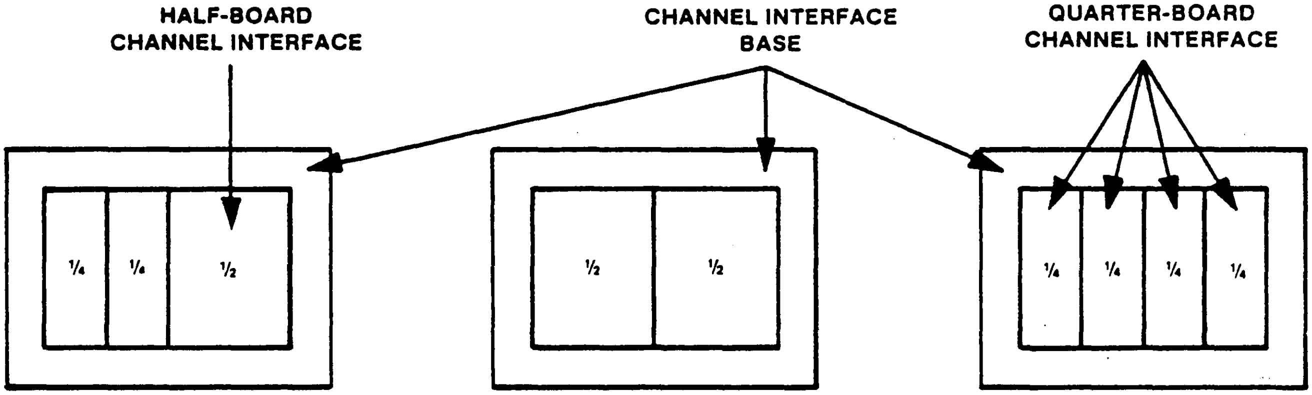


Figure 11-3. CI Physical Board Sizes

To determine the CI fit on the CIBs, use Table 11-3.

TABLE 11-3. DATANET 8/C CHANNEL INTERFACE PHYSICAL BOARD SIZES

Marketing Identifier	Description	Board Size	Lines/Board
DCF8009	Dual Async, EIA RS-422-A	1/4	2
DCF8011	Dual Sync, EIA RS-232-C	1/4	2
DCF8012	Dual Async, EIA RS-232-C	1/4	2
DCF8020	Single HDLC, EIA	1/4	1
DCF8022	Single HDLC Wideband Channel	1/2	1
DCF8023	Single HDLC Wideband	1/2	1
DCF8030	CIB and eight Async RS-232-C Ports	4/4	8
DCF8032	CIB and eight Sync RS-232-C Ports	4/4	8
DCF8034	CIB and eight Current Loop Ports	4/4	8
DCF8036	Two Async Current Loop Ports	1/4	2
DCF8038	CIB and One Broadband Sync Port, 301/303	1/4	1
DCF8040	CIB and One Broadband HDLC Port V.35 CITT	1/2	1
DCF8042	CIB and One Broadband Sync Port V.35 CITT	1/4	1
DCF8044	CIB and One Broadband HDLC Port 301/303	1/2	1

Throughput Load Factor

The FEP has a limit to the total communication load it can handle. In order to calculate whether this limit has been exceeded, throughput factors based on protocol type have been estimated and are discussed below. These estimates should be used as guidelines to aid in configuring FEPs. Figures 11-4 through 11-13 assume standard tuning, SUPER, and FEPCOM parameters, and represent throughput characters (char/min) as measured between the host and the FEP.

Figures 11-4 through 11-13 assume 1024, 1536 or 2048K bytes of FEP memory. Configurations with 768, 1280 or 1792K bytes of FEP memory may experience performance penalties averaging approximately 10%.

In addition to protocol type, the effect of TP forms processing and the effect of DATANET-connected unit record devices and remote FEPs must also be considered in total throughput calculations. These factors are discussed at the end of this section.

In addition to total FEP throughput factors, a maximum of 1 active broadband line per CIB should be observed.

PROTOCOL TYPE.

Communications processors, referred to as FEPs in this discussion, are normally configured to support a customer's required throughput expressed in characters per minute. The throughput available from a particular FEP is independent of the number of lines and the individual line speeds.

The charts describing the FEP consumption for each different protocol are broken down between asynchronous and synchronous communications. Communications load estimates can be plotted on these charts assuming you know the character rate/minute and the typical message length.

Figures 11-4 to 11-6 illustrate FEP consumption for asynchronous operations.

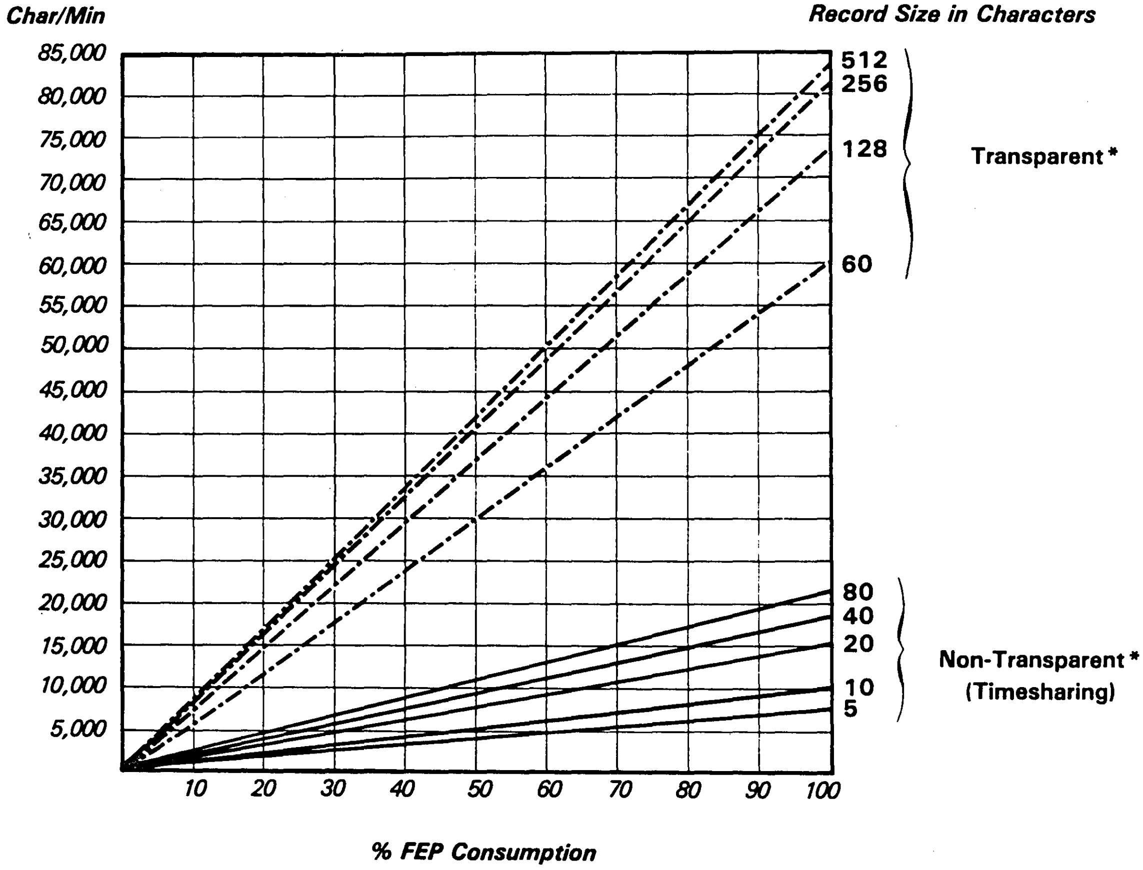


Figure 11-4. ASYNC Input Performance

* Non-transparent ASYNC input is for normal time-sharing. Transparent ASYNC input is for connections such as micro-computers and other devices that require a transparent data stream (i.e., no echo, no character translation, no IMP, and no special character detection).

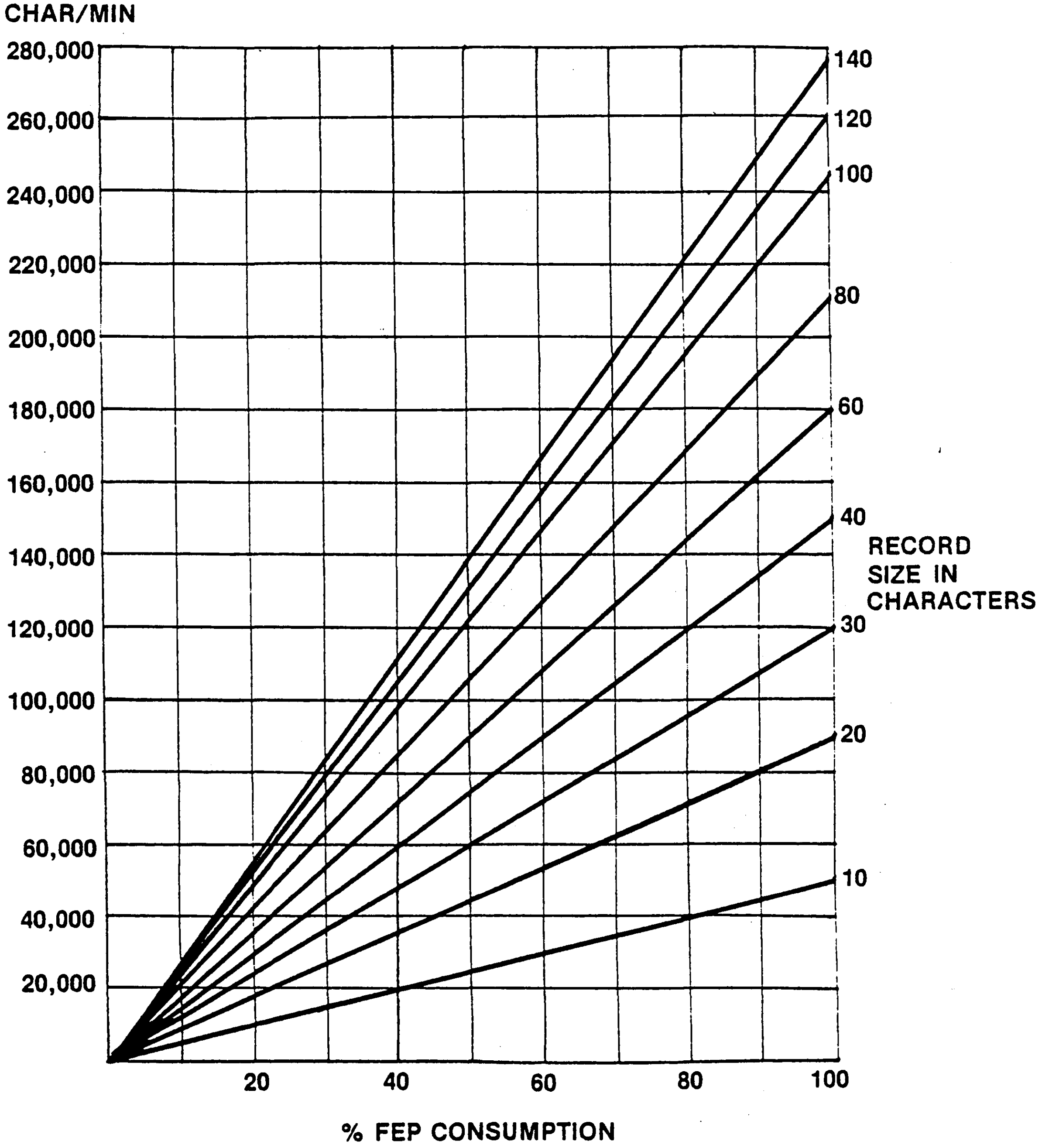


Figure 11-5. ASYNC Output Performance*
Non-Transparent (Time-Sharing)

* Based on VIP7801 profile - medium to high capability terminal with direct cursor control.

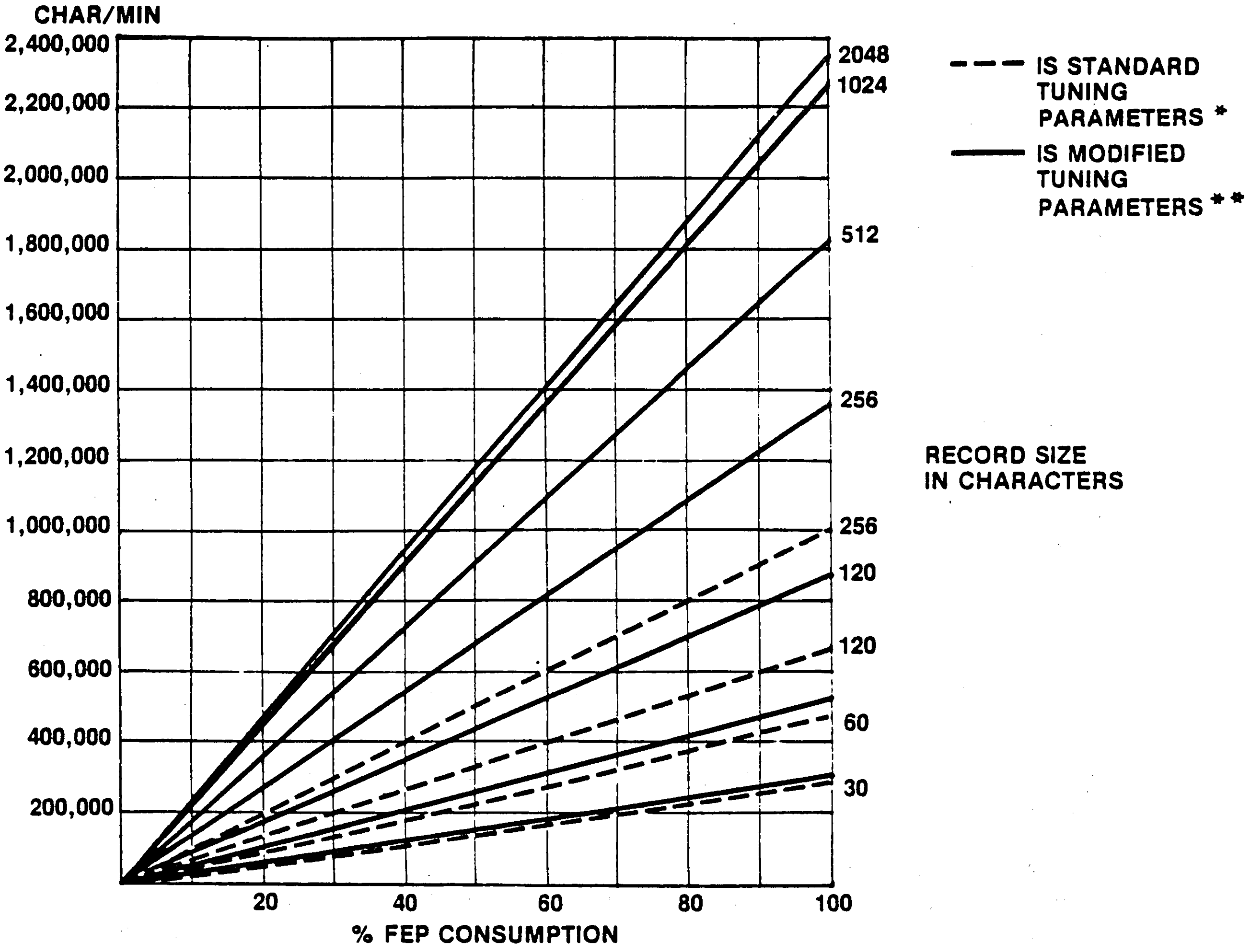


Figure 11-6. ASYNC Output Performance
Transparent

* Dashed lines are for standard tuning parameters, which are optimized for normal time-sharing and do not provide high throughput for large records.

** Solid lines are for modified tuning parameters, given below, which are recommended for record sizes greater than 120.

Async Blocking Value = 10,000 bytes (standard = 2000)
Async Unblocking Value = 2,000 bytes (standard = 500)
Big Output Buffer Byte Size = 1,024 bytes (standard = 256)

Memory requirements <u>triple</u> for those terminals which use these modified tuning parameters.

If the customer wishes to upgrade the line speeds for interactive asynchronous terminals, the following general rule may be used as a guideline.

> Quadrupling the line speed (four times faster) causes a 50% increase in the output character rate. The input rate remains constant.

If the customer wishes to attach intelligent devices on a communications line (minicomputer w/instruments, peripherls, etc.), the required character rate and typical record length is determined by an analysis of the application. Record length may be defined, for example, as the average number of characters per read or per write.

In some cases asynchronous applications do not require echo operations on input. If so, use the top half of Figure 11-4 to determine FEP utilization.

To summarize, the following information must be obtained:

- Total asynchronous input rate from all terminals in characters per minute and/or desired input rate from minicomputers, etc. Also determine if echoplex (non-transparent mode) is required.
- Average asynchronous input message/line length (divide character rate by number of interactions).
- Total asynchronous output rate to all terminals and/or desired output rate to minicomputers, etc.
- Average asynchronous output message/line length (divide character rate by number of terminal writes).

Figures 11-7 to 11-9 illustrate FEP consumption for synchronous communications.

The HASP, 2780 and 3780 protocols require the same amount of FEP capacity for input and output. The FEP has a somewhat higher capacity for 3270 output than for 3270 input. The required character rate and message length is determined by an analysis of the application. Synchronous comunications activities occur at a lower priority than asynchronous activities. A temporary overload of the FEP capacity will result in slower synchronous I/O but no loss of data.

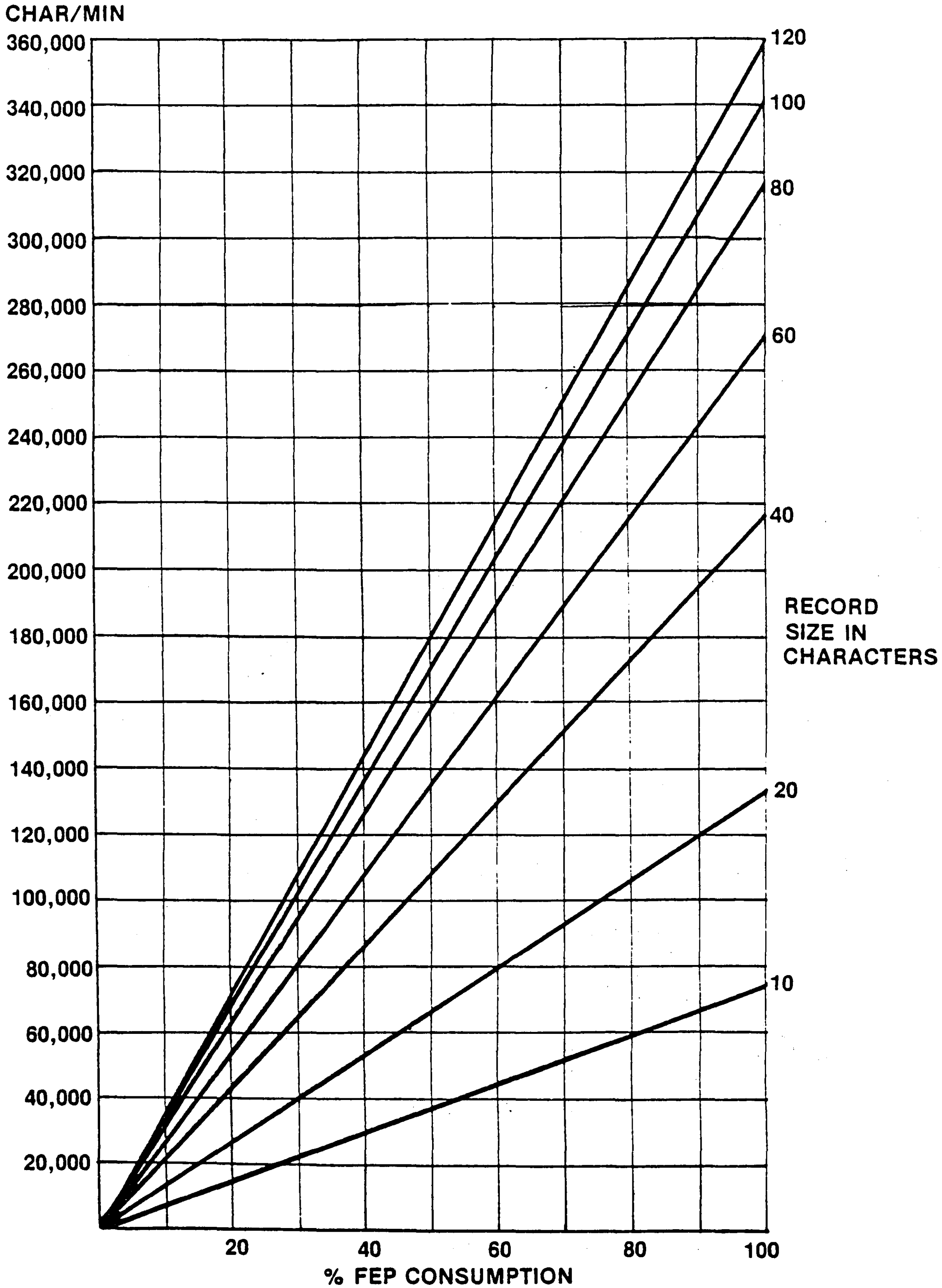


Figure 11-7. HASP, 2780, 3780 Input & Output Performance

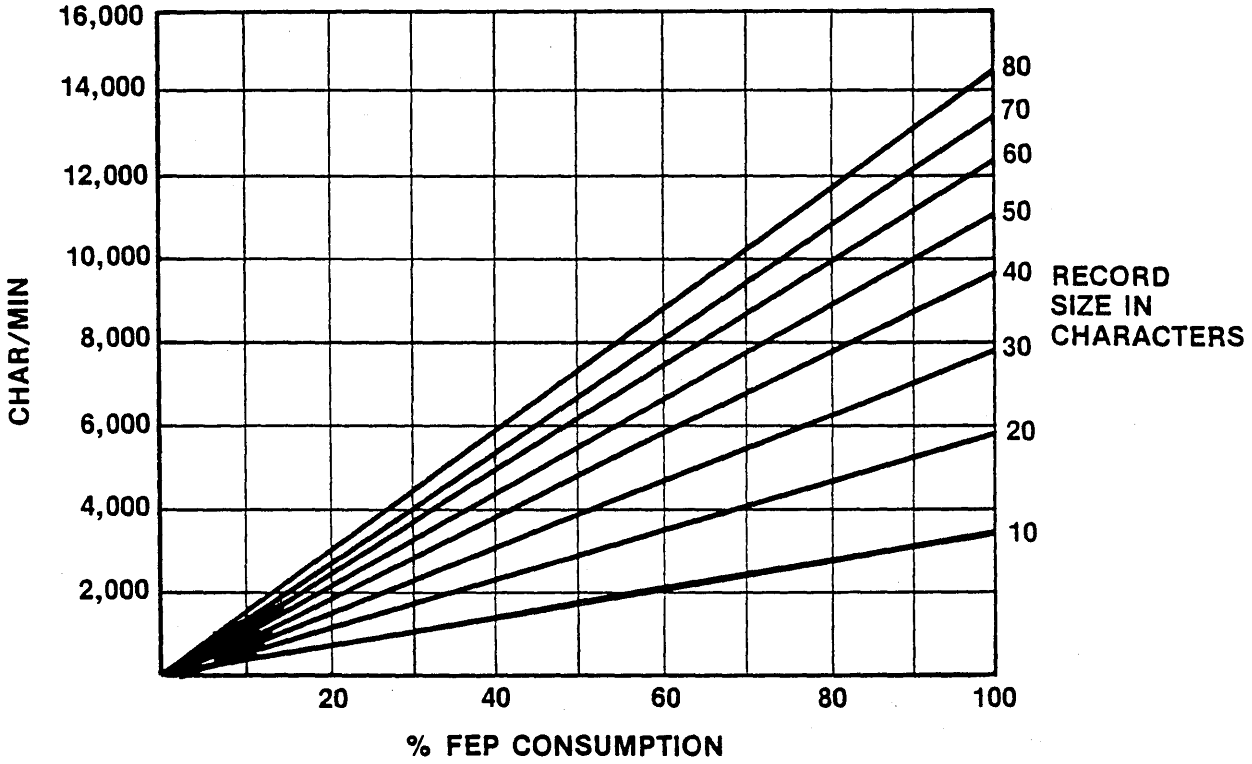


Figure 11-8. 3270 Input Performance

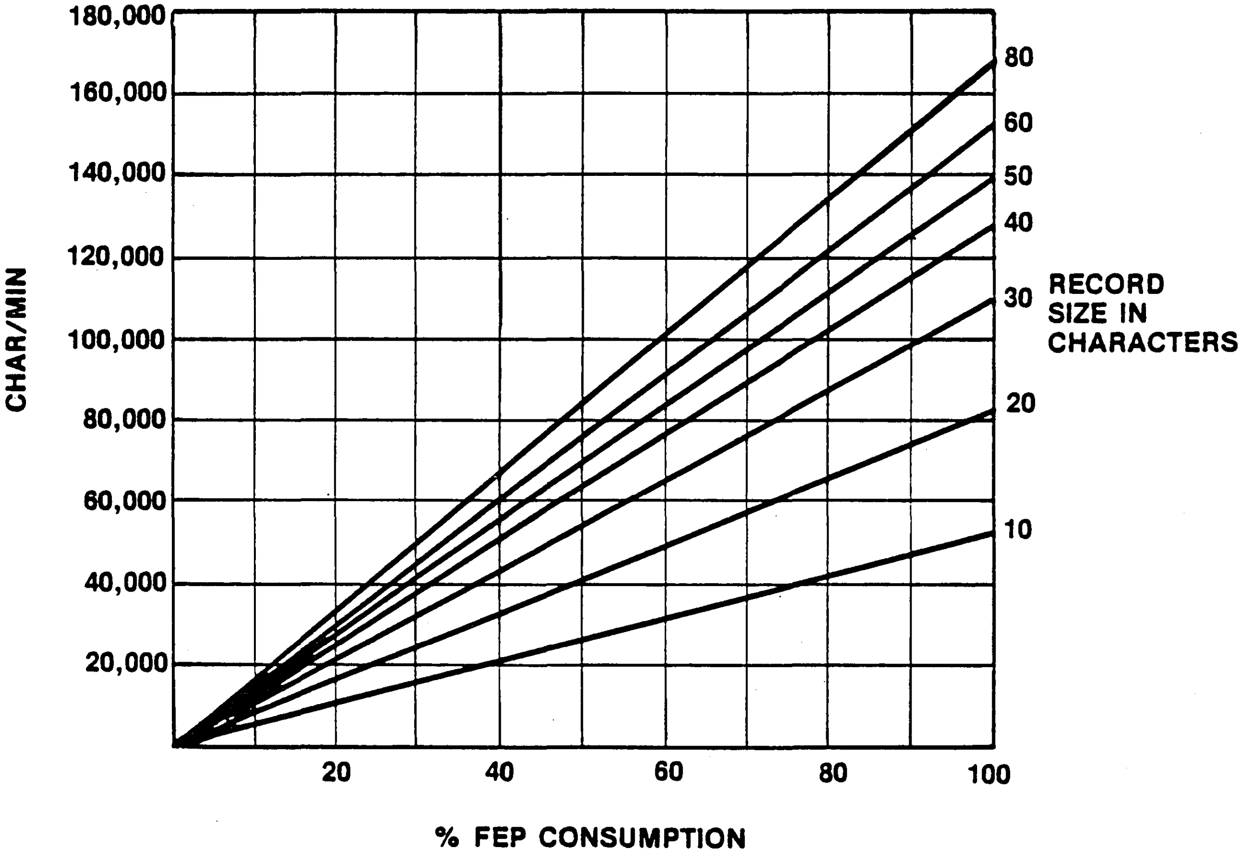


Figure 11-9. 3270 Output Performance

Another term that is used to help determine the FEP load for synchronous applications is called the device duty cycle. This is determined by evaluation of the percentage of available time that a particular device (e.g., card reader, line printer, etc.) must run at its rated speed. If a 300 lpm printer is only required to run 25% of the time, then its duty cycle is 25%. This means that the applications load will permit printing to be slowed down to as much as 25% of 300 lpm or 75 lpm depending on the FEP consumption of other concurrent operations.

To calculate application dependent character rates per minute, use these three elements in the following way: Device rated speed (in units per minute) x average unit character length x duty cycle percentage = total characters/minute. For example, assume 60 characters per line (unit) for a 300 lpm printer with a 25% duty cycle. The formula would calculate as follows: 300 lpm x 60 char/line x 25% duty cycle = 4500 char/min synchronous output.

Communications Load Example

The following example may help clarify the load calculation process.

Assume that a customer desires the following communications equipment on his system:

Synchronous Operations:

HASP Workstation with 200-cpm reader, 600-lpm printer
Average characters per card: 20; Duty cycle = 75%
Average characters per line: 60; Duty cycle = 75%

HASP Workstation with 1200-lpm printer
Average characters per line: 60; Duty cycle = 25%

Asynchronous Operations:

Time Sharing Terminals (111)
Input rate (echo on): 60 char/min/terminal; 10 char/message
Output rate: 500 char/min/terminal; 40 char/message

Graphic Scope (1)
Input rate (echo on): 60 char/min; 10 char/message
Output rate: 1500 char/min; 40 char/message

Minicomputer (1)
Input rate (echo off): 14,400 char/min; 60 char/message

Communications Load Example (Continued)

		Character Rates					
		Message Length		Duty	Total	%	From
	Qty	Input	Output	Cycle	Char/Min	FEP	Figure
1st Workstation:	1	200 cpm	600 lpm	75%	Input 3,000	3	11-7
		20	60		Output 27,000	10	11-7
2nd Workstation:	1		1200 lpm	25%			
			60		Output 18,000	7	11-7
Async Terminals:	112 In	60 cpm	500 cpm		Input 6,720	65	11-4[a]
	111 Out	10	40		Output 55,500	37	11-5
Graphic Scope:	1 In*		1500 cpm				
	1 Out		40		Output 1,500	1	11-5
Minicomputer:	1	14,400 cpm			Input 14,400	24	11-4[b]
		60					
Total FEP Load						147	

* Included with Async. Terminals - In

[a] Use the "Non-Transparent" scale

[b] Use the "Transparent" scale

Thus 2 FEPs would be required to ensure desired throughput.

TP FORMS PROCESSING

Figures 11-10. and 11-11. are used to estimate the FEP performance consumption used in handling a specified Forms Processing load.

In this document we refer to only two types of forms processing, "system input" and "system output" transactions. System input transactions are characterized as involving a read of some amount of information from a terminal and writing that information to the Host system for processing. System output transactions are characterized as involving a read from the Host for information that is subsequently displayed on a terminal.

SYSTEM INPUT = TERMINAL READ + HOST WRITE
SYSTEM OUTPUT = HOST READ + TERMINAL WRITE

For each transaction, find the correct slope on the appropriate chart for the average field size. Locate where this slope intersects with the appropriate number of fields. Read down to the horizontal axis for the % FEP consumption x 1000 for each transaction.

The % FEP consumption x 1000 for each transaction is multiplied by the actual transaction rate per hour/1000 (as the chart is based upon 1000 transactions per hour).

Do this for each forms application and sum to get the total transaction processing % FEP consumption.

Note that the number of physical terminals connected to the FEP does not dictate the performance of the machine. Only when the terminals are doing something as part of transactions do they affect the performance of the FEP. This aspect is implicit in Figures 11-10 and 11-11. Also, Figures 11-10 and 11-11 assume an average amount of user forms processing.

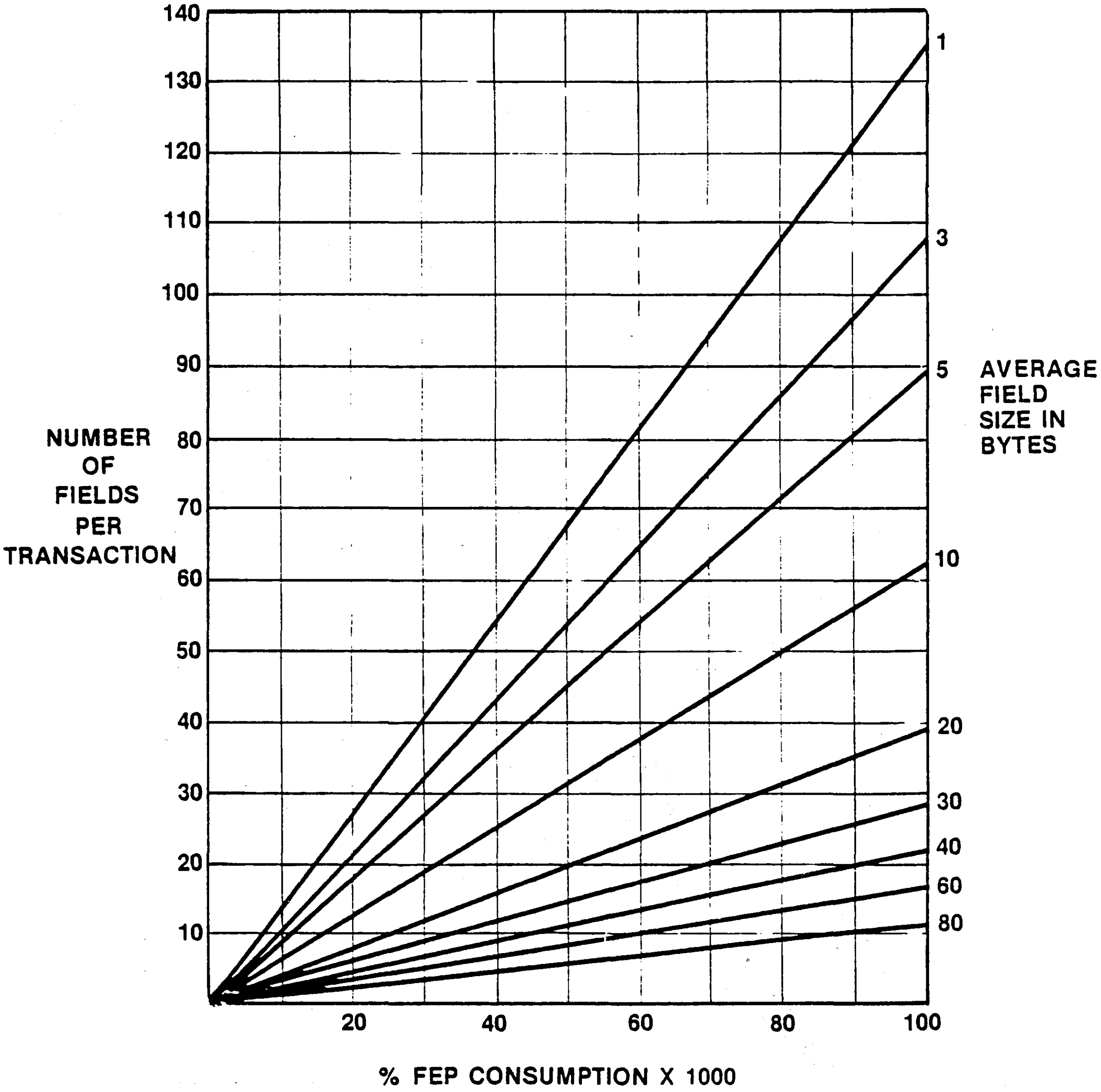


Figure 11-10. FEP TP Forms Performance, Systems Input
(1000 Transactions Per Hour)

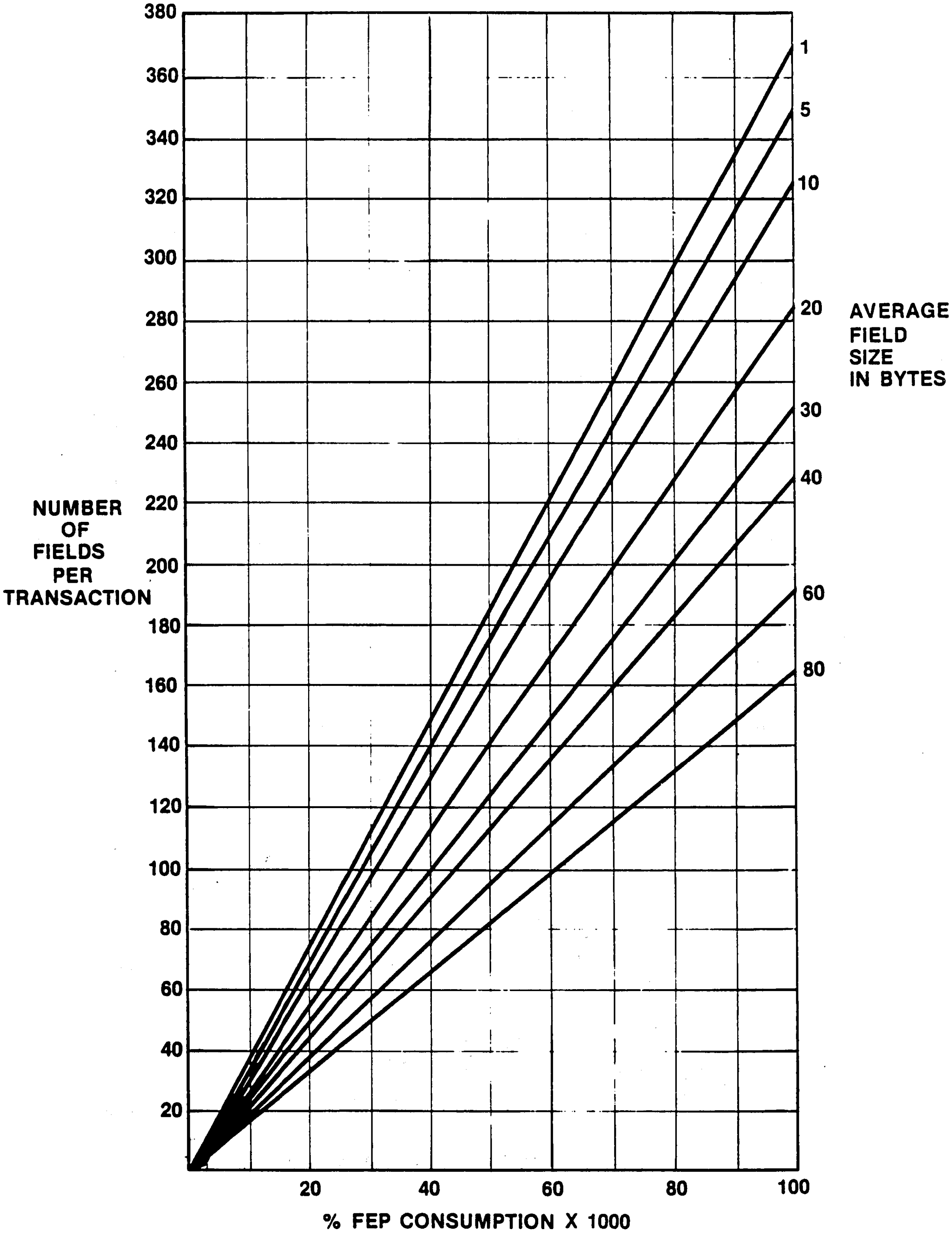


Figure 11-11. FEP TP Forms Performance, Systems Output (1000 Transactions Per Hour)

The following example will help clarify the load calculation process for TP Forms Processing.

Suppose that we determine that a customer has four applications which we will call A, B, C, and D. Applications A and B are data collection applications (another way of saying they process system input transactions). Application C performs Inquiry and Response operations (another way of saying that C does both system input and system output operations). Finally, application D generates reports (another way of saying that it processes system output transactions).

Application A, which processes system input transactions, reads 2 fields from the terminal which total 20 characters. This application is expected to process 1800 system input transactions per hour.

Application B, which also processes system input transactions, reads 40 fields comprising 300 bytes of information. It is expected to handle 120 system input transactions per hour.

Application C, which processes system input and system output transactions, reads 3 fields totaling 12 bytes from the terminal which it sends to the Host for processing. It receives 550 bytes in response and displays those bytes in 40 fields. Application C is expected to process 1200 transactions per hour.

Application D, which processes system output transactions, receives 1000 bytes from the Host and writes them to the terminal as 100 fields. It is expected to produce 20 reports per hour.

This set of programs and their % FEP consumption can be described as follows:

Note that the numbers in the column labeled "Fields" are either Input Fields (if the transaction type is system input) or Output Fields (if the transaction type is system output). Note also that there are two entries (lines) for Application C which processes both system input and system output transactions.

Application	Transaction Type	Fields	Total Bytes	Bytes/ Field	Rate/ Hour	Trans %FEP/1000	Figure	% FEP
A	System Input	2	20	10	1800	5	11-10	9
B	System Input	40	300	7.5	120	55	11-10	7
C	System Input	3	12	4	1200	5	11-10	6
	System Output	40	550	13.75	1200	15	11-11	18
D	System Output	100	1000	10	20	33	11-11	
							Total	41%

Thus, the applications in this example would require approximately 41% of a DN8/C FEP to complete their tasks.

A more precise estimate of the % FEP consumption may be made by using the following equations:

systems input: $tms = 64 + (17 \times f) + (2.5 \times b)$
systems output: $tms = 56.4 + (7 \times f) + (.112 \times b)$

where tms = the time in milliseconds required to process a transaction
f = the number of fields in the transaction
b = the total number of bytes in the transaction.

To get the % FEP consumption, compute tms for each transaction, multiply tms by the transaction rate per hour, sum the results for all transaction types and divide the total by 2.67 million.

Using this method in the above example yields the following:

Application	Transaction Type	Fields	Bytes	tms	Rate/Hr	ms. used
A	System Input	2	20	148	1800	266,400
B	System Input	40	300	1494	120	179,280
C	System Input	3	12	145	1200	174,000
	System Output	40	550	398	1200	477,600
D	System Output	100	1000	868	20	17,368
					Total	1,114,648

$$\frac{1114648}{2670000} = 42\% \text{ of an FEP}$$

UNIT RECORD DEVICES

Figure 11-12 illustrates the FEP consumption for unit record devices. In Figure 11-12 use the "40 character record" line for all card reader record lengths. Use the other lines as appropriate for line printer calculations.

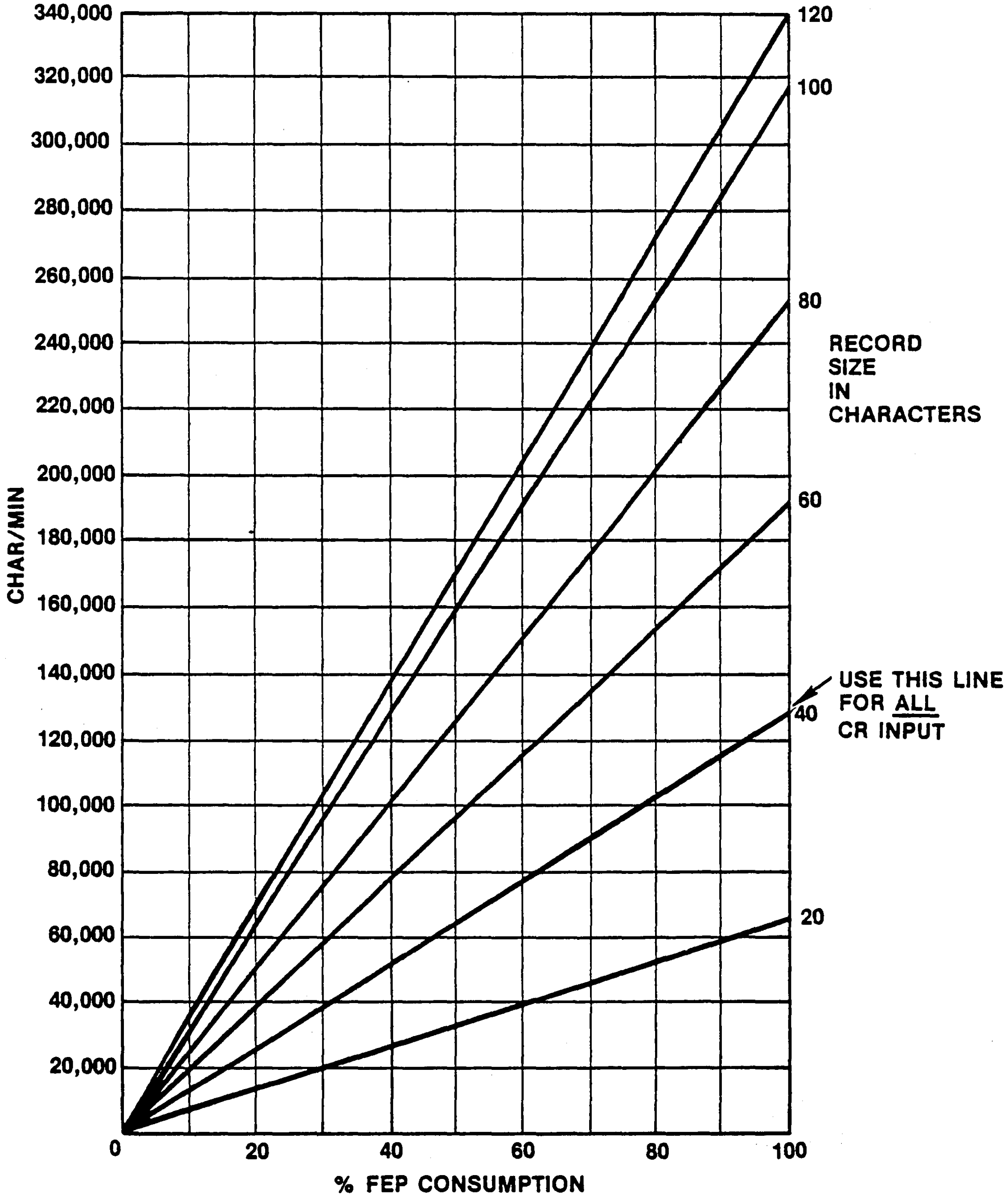


Figure 11-12. URP Performance

REMOTE FEPS

Figure 11-13 is used to compute the load a remote FEP places on a <u>local</u> FEP. It should be used in calculating local FEP consumption, both input and output.

Figure 11-13 should be used for all work on the remote FEP, except Transaction Processing. If Transaction Processing is done on the remote FEP, add 5% to the number computed by using Figure 11-13, to get the total load % the remote FEP places on its local FEP.

Use Figures 11-4 through 11-12 for calculating the remote FEP consumption from the devices attached to it.

Figure 11-13 assumes frame size of 1024 bytes, which is the CP-6 default for Non-Public Data Network (PDN) connections. PDN connections require a frame size of 146 bytes which doubles FEP consumption.

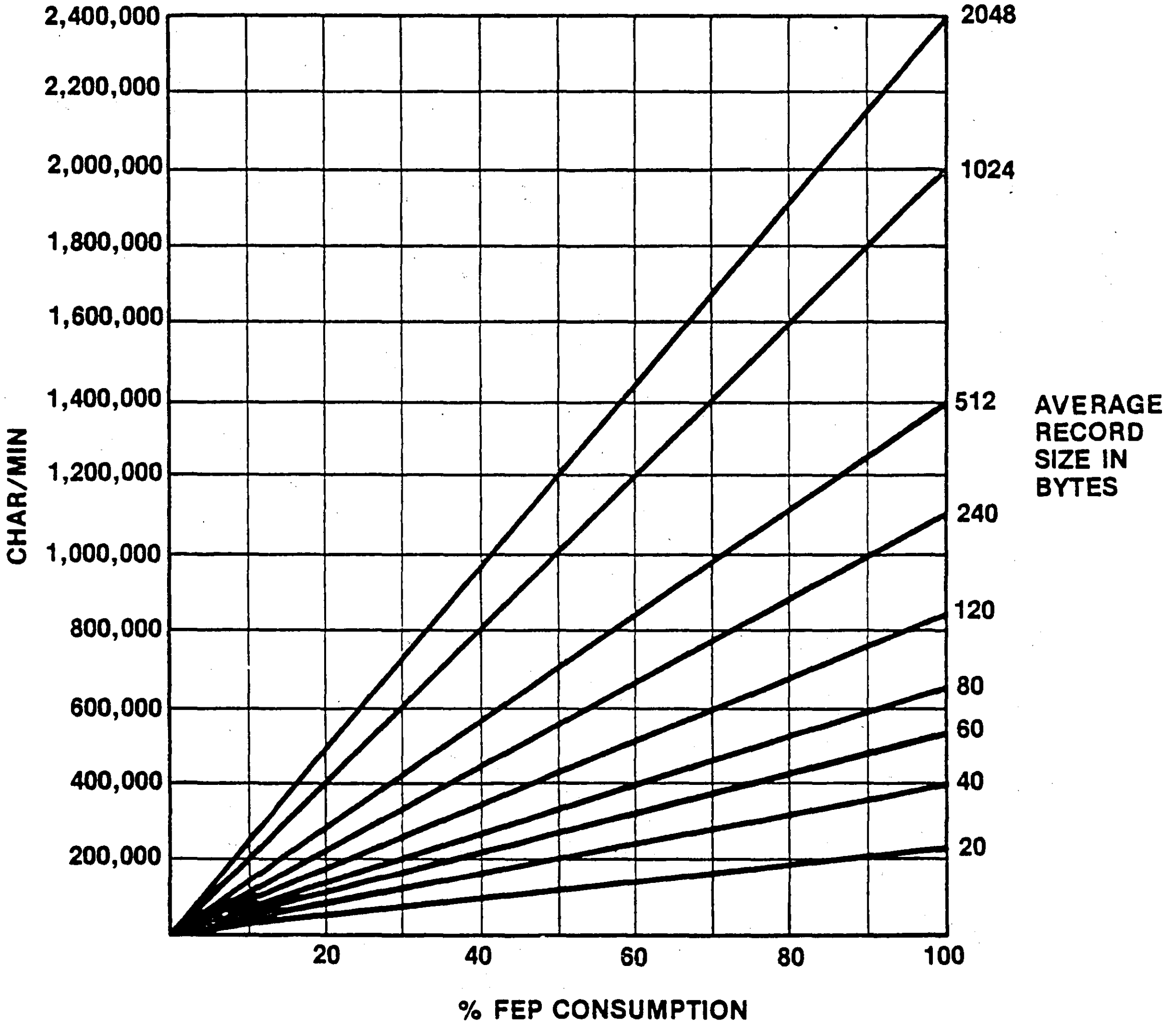


Figure 11-13. Remote FEP Performance - Input and Output, No Transaction Processing

Determination of Remote FEP Link Speed

One-half of the HDLC (X.25) link bandwidth in each direction between a local and a remote FEP is available for user data (i.e., terminals and devices on the remote FEP). If this is exceeded, non-symbiont output (e.g., timesharing terminals) has priority over symbiont output (e.g., URP, HASP, 2780, 3780), although symbiont output will never be completely locked out.

Example: The following devices are on a remote FEP:

- 20, 30 cps asynchronous time-sharing terminals, 15 of which may be outputting currently.
- 1, 440 lpm URP printer with an average record length of 50 columns and a duty cycle of 40%.

The 15 outputting asynchronous time-sharing terminals will consume 450 bytes per second of bandwidth (30 cps x 15 terminals = 450 bytes per second). The 440 lpm printer will consume 146 bytes per second of bandwidth (440 lpm x 50 columns divided by 60 seconds per minute x .40 duty cycle = 146 bytes per second). Therefore, a 9600 baud link is needed between the local and the remote FEP (450 + 146 = 596 bytes per second; 596 x 8 bits per byte x 2 = 9536 baud). Input is insignificant in this example.

DATANET 8/C CONFIGURATION EXAMPLES

Example #1

Customer requires

50 Time sharing (T/S) async lines

Assume

30 300 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 425 char/min.

and 20 1200 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 650 char/min.

1 9600 baud async line for input from a minicomputer - echo off;
Avg. 60 char message; duty cycle 80%

Spare CIBs and async lines for backup.

Solution

Throughput calculations.

Item	Terminal Speed	(1) # Lines	(2) Avg. Msg. Length	(3) Terminal Rate Char/Min Per Terminal	(1) x (3) Total Char/Min.	% FEP	Figure
T/S	300 baud Input	30	10	30	900	8%	11-4 Non-Transparent
	300 baud Output	30	40	425	12,750	7%	11-5
	1200 baud Input	20	10	30	600	4%	11-4 Non-Transparent
	1200 baud Output	20	40	650	13,000	8%	11-5
					Total T.S. =	27%	
Minicomputer	9600 baud Async Line				46,080*	78%	11-4 Transparent
					Total FEP =	105%	--> Cache Required

*Assume 8-10 format. Therefore
9600 baud = 960 char/sec.
960 char/sec x 60 sec/min x 80% duty cycle = 46,080 char/min.

Memory calculations

Configuration 50 T/S Async Terminals
+ 1 Minicomputer (terminal)
51 Terminals

Kernel = 376K bytes

Host Link = 24K bytes

Async = 44K bytes + (51 terminals x 2.4K Bytes/terminal) = 166.4K bytes

Total FEP = 566.4K bytes
--> 1024K bytes

Required Configuration Components

Quantity	MI	Description
1	CPS81XX	Central system - includes DATANET 8/C, console, coupler, diskette, 1024K bytes of FEP memory.
1	DCE8002	Additional chassis for 16 to 64 line configurability.
1	DCE8003	Processor Power Module - Cache
8	DCE8030	Channel Interface Base + 4 Async Channel Interfaces (8 Async Ports)
50	VIP7801	T/S Terminals

Example #2

Customer requires

75 Async Transaction Processing (T.P.) lines for 7 applications having the following attributes.

Application	Transaction Type	Fields	Total Bytes	Rate/Hour
A	System Input	3	15	250
	System Output	10	100	250
B	System Input	1	10	600
	System Output	4	120	600
C	System Input	5	40	100
D	System Input	2	20	400
E	System Input	5	50	1500
F	System Input	10	30	1000
G	System Output	50	2000	30

These applications require 14 Forms Programs, each averaging 18K bytes, although only 10 of these programs are required to be active at one time.

1 FEP-connected printer 600-lpm; Avg. Print Line 60 char;
Duty cycle 50%.

Spare CIBs and lines for backup

Solution

Throughput calculations

Mode	Application	Transaction Type	Fields	Total Bytes	Bytes/ Field	Rate/ Hour	Trans % FEP/1000	Figure	% FEP
T.P.	A	System Input	3	15	5	250	6	11-10	1.5
		System Output	10	100	10	250	6	11-11	1.5
	B	System Input	1	10	10	600	4	11-10	2.4
		System Output	4	120	30	600	5	11-11	3.0
	C	System Input	5	40	8	100	8	11-10	0.8
	D	System Input	2	20	10	400	5	11-10	2.0
	E	System Input	5	50	10	1500	10	11-10	15.0
	F	System Input	10	30	3	1000	12	11-10	12.0
	G	System Output	50	2000	40	30	24	11-11	0.7

Total T.P. = 39%

FEP Peripherals	Device Speed-LPM	Duty Cycle	Total Lines/Min	Char/ Line	Char Min.	Figure	% FEP
Printer	600	50%	300	60	18000	11-12	6%

Total FEP = 44%

Memory calculations

Configuration
75 T.P. Async Terminals
10 Forms Programs
1 FEP Connected Line Printer

Kernel = 376K bytes

Host Line = 24K bytes

Async = 44K bytes + (75 terminals x 2.4K bytes/terminal)
= 180K bytes

Forms Int = 120K bytes + (75 terminals x 6K bytes/terminal)
+ (Program Buffer = 10 Programs x
18K bytes/Program + 8K bytes, arbitrary
overflow assignment) = 758K bytes

URP = 28K Bytes + (1 device x 4K Bytes/device) = 32K bytes

Total FEP =1370K bytes
--> 1536K bytes

Required Configuration Components

Quantity	MI	Description
1	CPS81XX	Central system - includes DATANET 8/C, console, coupler, diskette, 1024K bytes of FEP memory.
1	DCE8002	Additional Chassis for 16 to 64 line configurability.
1	DCE8004	Additional chassis for 64-128 line configurability.
11	DCF8030	Channel Interface Base + 4 Async Channel Interfaces (8 Async Ports)
1	PRM9630	Line Printer Device Pac
1	PRU9618	600 lpm Printer
1	DCM8008	Memory Increment 1024-1536K bytes
75	VIP7801	T.P. Terminals

Example #3

Customer requires

50 Async Transaction Processing (T.P.) lines for 7 applications having the following attributes.

Application	Transaction Type	Fields	Total Bytes	Rate/Hour
A	System Input	3	15	170
	System Output	10	100	170
B	System Input	1	10	400
	System Output	4	120	400
C	System Input	5	40	70
D	System Input	2	20	225
E	System Input	5	50	1000
F	System Input	10	30	700
G	System Output	50	2000	20

These applications require 14 Forms Programs, each averaging 18K bytes, although only 10 of these programs are required to be active at one time.

A minicomputer as a workstation, connected over a 2400 baud 3780 line. The workstation will include:

1 Printer	600-lpm; Avg. print line 60 char; Duty cycle 30%
1 Reader	500-cpm; Avg. card length 20 char; Duty cycle 10%

1 Operator's Console - may be connected either through CP-6 IOM or via any spare FEP line.

Spare CIBs and Async lines for backup.

Solution

Throughput calculations

Mode	Application	Transaction Type	Fields	Total Bytes	Bytes/ Field	Rate/ Hour	Trans % FEP/1000	Figure	% FEP
T.P.	A	System Input	3	15	5	170	6	11-10	1
		System Output	10	100	10	170	6	11-11	1
	B	System Input	1	10	10	400	3	11-10	1
		System Output	4	120	30	400	4	11-11	2
	C	System Input	5	40	8	70	9	11-10	1
	D	System Input	2	20	10	225	4	11-10	1
	E	System Input	5	50	10	1000	10	11-10	10
	F	System Input	10	30	3	700	12	11-10	8
	G	System Output	50	2000	40	20	24	11-11	-
							Total T.P.	=	25%

Work Stat.	RBT Device	# Lines	Avg. Msg. Length (Char/Line)	Printer/Reader Speed LPM/CPM	Duty Cycle	Total Char/Min.	Figure	% FEP
3780	Printer	1	60	600	30%	10,800	11-7	4%
	Reader	1	20	500	10%	1,000	11-7	1%
					Total Workstation		=	5%
					Total FEP		=	30%

Memory Calculations

Configuration 50 T.P. Async Terminals
10 Forms Programs
1 3780 RBT Workstation (Terminal)

Kernel = 376K bytes
Host Line = 24K bytes
Async = 44K bytes + (50 terminals x 2.4K bytes/terminal = 164K bytes

Forms Int = 120K bytes + (50 terminals x 6K bytes/terminal) + (Program Buffer = 10 Programs x 18K bytes/ Program + 8K bytes, arbitrary overflow assignment). = 608K bytes

BSC = 32K bytes

RBT = 18K Bytes + (1 terminal x 8K Bytes/terminal) = 26K bytes

Total FEP =1230K bytes
--> 1536K bytes

Required Configuration Components

Quantity	MI	Description
1	CPS81XX	Central system - includes DATANET 8/C, console, coupler, diskette, 1024K bytes of FEP memory.
1	DCE8002	Additional Chassis for 16 to 64 lines configurability.
7	DCF8030	Channel Interface Base + 4 Async Channel Interfaces (8 Async Ports).
1	DCF8007	Channel Interface Base
1	DCF8011	Channel Interface - 2 sync lines
1	DCM8008	Memory Increment 1024-1536K bytes
50	VIP7801	T.P. Terminals

Example #4

Customer requires

Remote FEP(s) with 20 async T.P. lines and a 300 lpm printer for 3 applications having the following attributes;

Application A is quite capable and performs several different kinds of things -- which involve several different combinations of system input and system output transactions. Applications B and C are "report" applications. These applications only process system output transactions.

Program	Transaction	Fields	Total Bytes	Rate/Hr
A	System Input	5	40	125
	System Output	50	750	50
	System Input	3	20	150
	System Input	60	900	50
	System Output	3	10	400
	System Output	150	1800	75
B	System Output	300	1700	75
C	System Output	5	80	500

These applications require 8 Forms Programs each averaging 25K bytes, although only 4 of these programs are required to be active at one time.

The remote FEP(s) will also have:

100 T/S Async Lines

60 300 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 425 char/min.

40 1200 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 650 char/min.

Customer Requires (Con't)

In addition to the remote FEP requirements, the customer requires.

100 local T/S Async Lines

60 300 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 425 char/min.

40 1200 baud - Avg. input message size = 10 char/line
Avg. output message size = 40 char/line
Avg. input typing rate = 30 char/min.
Avg. terminal output rate = 650 char/min.

125 local Async T.P. Lines, for 7 applications having the following attributes:

Application	Transaction Type	Fields	Total Bytes	Rate/Hour
A	System Input	3	15	420
	System Output	10	100	420
B	System Input	1	10	1000
	System Output	4	120	1000
C	System Input	5	40	170
D	System Input	2	20	625
E	System Input	5	50	2500
F	System Input	10	30	1700
G	System Output	50	2000	50

These applications require 14 Forms Programs, each averaging 18K bytes, although only 10 of these programs are required to be active at one time.

1 9600 baud Async line for input from a minicomputer - echo off;
Avg. 60 char. message; duty cycle 80%

Customer Requires (Cont'd)

3 Sync lines for remote batch

CP-6 as a workstation to a foreign host

4800 baud HASP line

FEP Printer - 600-lpm; Avg. Print Line 60 char; Duty cycle 40%

Host Connected Reader - 500-cpm; Avg. Card Length 40 char; Duty cycle 20%

Operator's Console

A minicomputer as a workstation

2400 baud 3780 line

Printer	600-lpm; Avg. print line 60 char; Duty cycle 30%
Reader	500-cpm; Avg. card length 20 char; Duty cycle 10%

Operator's Console

2400 baud line to a CP-6 support computer (used to expedite transmittal of software patches to the customer and transmittal of customer problems to Honeywell).

FEP Printer 600-lpm; Avg. Print line 60 char; Duty cycle 50%

Spare CIBs and lines for backup.

Solution

Throughput calculations, remote FEP

Mode	Application	Transaction Type	Fields	Total Bytes	Bytes/ Field	Rate/ Hour	Trans % FEP/1000	Figure	% FEP
T.P.	A	System Input	5	40	8	125	9	11-10	1
		System Output	50	750	15	50	18	11-11	1
		System Input	3	20	7	150	7	11-10	1
		System Input	60	900	15	50	125	11-10	6
		System Output	3	10	3	400	4	11-11	2
		System Output	150	1800	12	75	48	11-11	4
	B	System Output	300	1700	6	75	87	11-11	7
	C	System Output	5	80	16	500	6	11-11	3

Total T.P. = 25%

	Terminal Speed	(1) # Lines	(2) Avg. Msg. Length	(3) Terminal Rate Char/Min Per Terminal	(1) x (3) Total Char/Min.	Figure	% FEP
T/S	300 baud Input	60	10	30	1,800	11-4 Non-Transparent	16%
	300 baud Output	60	40	425	25,500	11-5	14%
	1200 baud Input	40	10	30	1,200	11-4 Non-Transparent	8%
	1200 baud Output	40	40	650	26,000	11-5	16%
					54,500		

Total T/S = 54%

Remote FEP Total = 79%

∴ 1 remote FEP is adequate.

Solution (Cont.)

Throughput calculations, local FEP.

Mode	Bytes/Record	Char/Min	Figure	% FEP
Remote FEP				
T.P.				5%
T/S	25	54,500	11-13	22%

Total Remote FEP = 27%

	Terminal Speed	(1) # Lines	(2) Avg. Msg. Length	(3) Terminal Rate Char/Min Per Terminal	(1) x (3) Total Char/Min.	Figure	% FEP
T/S	300 baud Input	60	10	30	1,800	11-4 Non-Transparent	16%
	300 baud Output	60	40	425	25,500	11-5	14%
	1200 baud Input	40	10	30	1,200	11-4 Non-Transparent	8%
	1200 baud Output	40	40	650	26,000	11-5	16%

Total T/S = 54%

	Application	Transaction Type	Fields	Total Bytes	Bytes/ Field	Rate/ Hour	Trans % FEP/1000	Figure	% FEP
T.P.	A	System Input	3	15	5	420	6	11-10	3
		System Output	10	100	10	420	6	11-11	3
	B	System Input	1	10	10	1000	3	11-10	3
		System Output	4	120	30	1000	4	11-11	4
	C	System Input	5	40	8	170	9	11-10	2
	D	System Input	2	20	10	625	4	11-10	3
	E	System Input	5	50	10	2500	10	11-10	25
	F	System Input	10	30	3	1700	12	11-10	20
	G	System Output	50	2000	40	50	24	11-11	1

Total T.P. = 64%

Throughput calculations, local FEP (Cont.)

Work Stat.	RBT Device	# Lines	Avg. Msg. Length (Char/Line)	Printer/Reader Speed LPM/CPM	Duty Cycle	Total Char/Min.	% FEP	Figure
HASP	Printer	1	60	600	40%	14,400	5%	11-7
	Reader	1	40	500	20%	4,000	2%	11-7
3780	Printer	1	60	600	30%	10,800	4%	11-7
	Reader	1	20	500	10%	1,000	1%	11-7
	CP-6 Support	1	-	-	-	-	0*	
					Total RBT	=	12%	

Total Char/Min = Avg. Msg. Length * Device Speed * Duty Cycle

Minicomputer	9600 baud Async Line Avg. Message Length = 60 Char/Line	46,080**	78%	11-4 Transparent

* Infrequent, low levels of use. FEP consumption assumed negligible.

** Assume 8-10 format. Therefore 9600 baud = 960 char/sec.
960 char/sec x 60 sec/min x 80% duty cycle = 46,080 char/min.

Throughput calculations, local FEP (Cont.)

FEP Peripherals	Device Speed-LPM	Duty Cycle	Total Lines/Min	Char/ Line	Char/ Min.	% FEP	Figure
Printer	600	50%	300	60	18000	6%	11-12
				Total U/R	=	6%	
				Total FEP	=	241%	

∴ 3 FEP's required

To configure these you assume the following.

FEP #1

50 T/S + Minicomputer
27% + 78% = 105% (Processor power module enhancement (cache) required to handle volume on one FEP.)

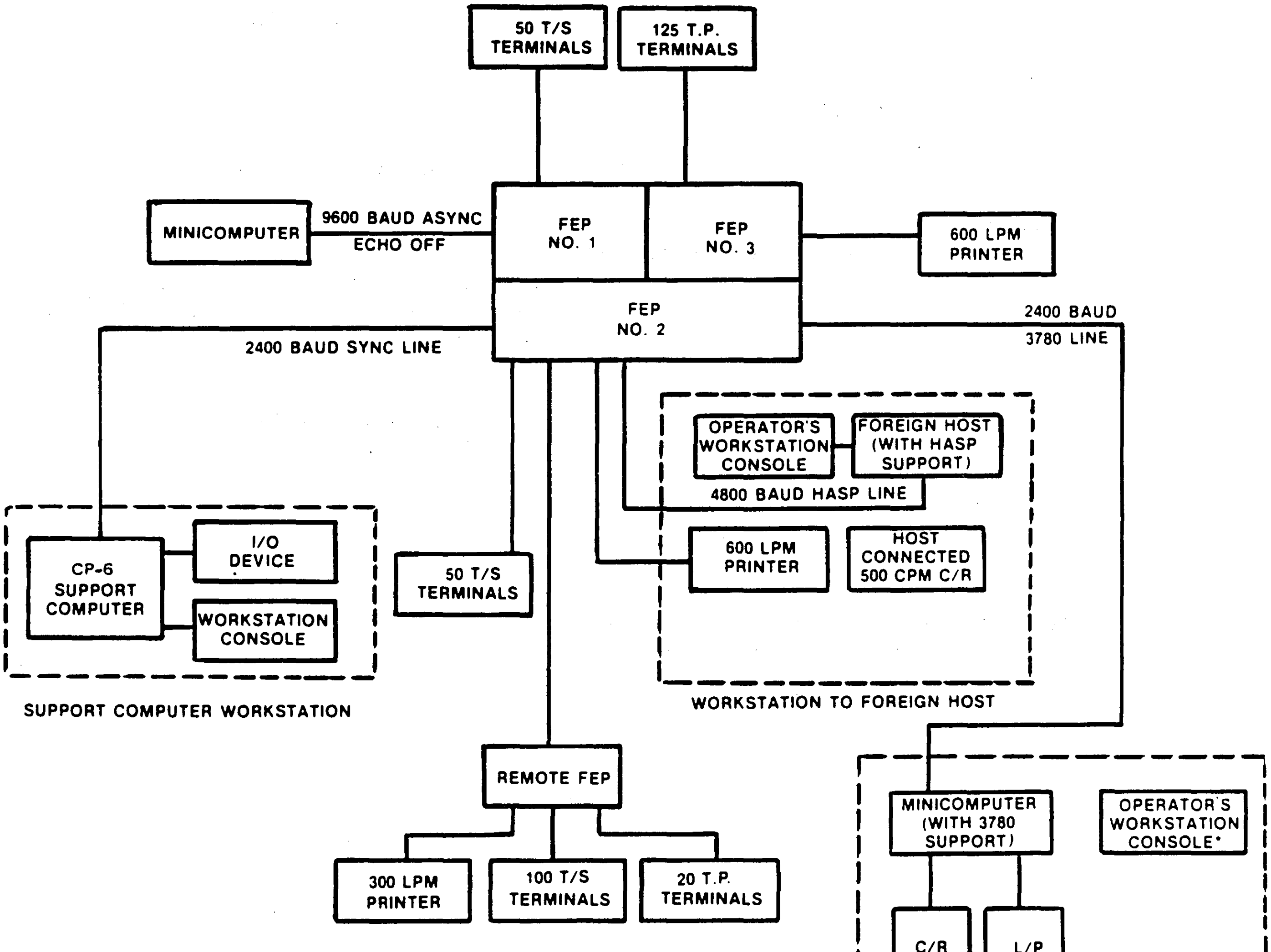
FEP #2

50 T/S + HASP + CP-6 Support + RFEP + 3780
27% + 7% + 0% + 27% + 5% = 66%

FEP #3

125 T.P. + FEP Printer
64% + 6% = 70%

Note: Cache recommended above 90% FEP utilization to ensure adequate capacity for peak loads.



* May be connected either through CP-6 IOM or via any spare FEP line.

Figure 11-14. DATANET 8/C Configuration
Example #4

Remote FEP link speed determination.

The remote FEP has both Transaction Processing and timesharing activities on it.

For Transaction Processing, the user data requirements are:

Program	Transaction	Total Bytes	Rate/Hr	Bytes/Hr	Bytes/Sec
A	System Input	40	125	5,000	1
	System Output	750	50	37,500	10
	System Input	20	150	3,000	1
	System Input	900	50	45,000	13
	System Output	10	400	4,000	1
	System Output	1800	75	135,000	38
B	System Output	1700	75	127,500	35
C	System Output	80	500	40.000	11
				Total T.P. =	110

For timesharing, the user data requirements are (from throughput calculations, remote FEP)

$$54{,}500 \frac{\text{char}}{\text{min}} / 60 \frac{\text{min}}{\text{sec}} = 908 \frac{\text{char(bytes)}}{\text{sec.}}$$

The total FEP user data requirement is 110 + 908 = 1018 $\frac{\text{Bytes}}{\text{sec.}}$

The baud link required is thus:

$$1018 \frac{\text{bytes}}{\text{sec}} \times \frac{8\text{ bits}}{\text{byte}} \times 2 = 16{,}288 \text{ bps} \dashrightarrow 19{,}200 \text{ bps}$$

Therefore, the DCF8020, 19,200 bps HDLC link can be used.

FEP memory calculations are as shown below:

FEP #1

Configuration

50 T/S Async Terminals
+ 1 Minicomputer (terminal)
51 Terminals

Kernel = 376K bytes

Host Link = 24K bytes

Async = 44K bytes + (51 terminals x 2.4K bytes/terminal) = 166.4K bytes

Total FEP 1 = 566.4K bytes
--> 1024K bytes

FEP #2

Configuration

50 T/S Async Terminals
1 2400 Baud Sync line to CP-6 Support (RBT terminal)
1 4800 Baud HASP line to foreign host (RBT terminal) with
1 FEP Connected Line Printer
1 3780 RBT Workstation (terminal)
1 Remote FEP

Kernel = 376K bytes

Host Link = 24K bytes

Async = 44K bytes + (50 terminals x 2.4K bytes/terminal) = 164K bytes

BSC = 32K bytes

RBT = 18K bytes + (3 terminals x 8K bytes/terminal) = 42K bytes

URP = 28K Bytes + (1 device x 4K Bytes/device) = 32K bytes

Connection of Remote FEP = 100K bytes

Total FEP 2 = 770K bytes
--> 1024K bytes

FEP #3

Configuration
125 T.P. Async Terminals
10 Forms Programs
1 FEP Connected Line Printer

Kernel = 376K bytes

Host Link = 24K bytes

Async = 44K bytes + (125 terminals x 2.4K bytes/terminal) = 344K bytes

Forms Int = 120K bytes + (125 terminals x 6K bytes/terminal) + (Program Buffer = 10 Programs x 18K bytes/Program + 8K bytes, arbitrary overflow assignment) ≐ 1058K bytes

URP = 28K Bytes + (1 device x 4K Bytes/device) = 32K bytes

Total FEP 3 =1834K bytes
--> 2048K bytes

Remote FEP

Configuration
100 T/S Async Terminals
20 T.P. Async Terminals
10 Forms Programs
1 FEP Connected Line Printer

Kernel = 376K bytes

Async = 44K bytes + (120 terminals x 2.4K bytes/terminal) = 332K bytes

Connection to local FEP = 60K bytes

URP = 28K bytes + (1 device x 4K bytes/device) = 32K bytes

Forms Int = 120K bytes + (20 terminals x 6K bytes/terminal) + (Program Buffer = 4 Programs x 25K bytes/Program + 4K bytes, arbitrary overflow assignment) = 344K bytes

Total Remote FEP = 1144K bytes
--> 1536K bytes

Required Configuration Components

FEP1	FEP2	FEP3	Remote FEP	M.I.	Description
1				CPS81XX	Central System - includes DATANET 8/C, console, coupler, diskette, 1024K bytes of FEP memory.
	1	1	1	DCU8011	Additional Freestanding FEP
			1	DCF8008	30 cps Communications Console
1	1	1	1	DCE8002	Additional Chassis for 16 to 64 line configurability.
	1	1	1	DCE8004	Additional Chassis for 64-128 line connectability.
1				DCE8003	Processor Power Module-Cache
	1	1		DCE8006	Host Connection - Coupler
8	7	16	15	DCF8030	Cnannel Interface Base + 4 Async Cnannel Interface (8 Async Ports)
	2		1	DCF8007	Channel Interface Base
	2			DCF8011	Channel Interface - 2 Sync Lines
	1		1	DCF8020	Channel Interface - 19,200 bps HDLC Link
	1	1	1	PRM9630	Line Printer Device Pac
			1	PRU9617	300 LPM Printer
	1	1		PRU9618	600 LPM Printer
		1	1	DCM8008	Memory Increment 1024-1536K bytes
		1		DCM8005	Memory Increment 1536-2048K bytes
50	50	125	120	VIP7801	T/S and T.P. Terminals

SECTION 12
Peripheral Switches

CONFIGURING MANUAL PERIPHERAL SWITCH SUBSYSTEMS

The following is a listing of manual peripheral switch subsystem marketing identifiers (MI) and their functions.

MI	Description	Remarks
PSU0200	Switch console and power supply. Includes one physical PSI channel (URP/MTP/MSP) in IOM and one PSF0511.	Every manual switch subsystem must include only one switch console, either PSU0200 or PSU0201. Each console handles up to 16 switch units.
PSU0201	Switch console and power supply. Same as PSU0200 except that no IOM channel is included. Includes one PSF0511.	
PSF0511	Manual switch unit to switch a device to one of two device processors or to select one of two devices to switch to a device processor. Does not include a channel in IOM. Usable with URP and MTP devices only. Could also be used to switch a PSI channel in IOM between two device processors - URP, MTP, or MSP.	Each console includes one. May be mixed with PSF0512 to maximum of 16 switch units per console.
PSF0512	Manual switch unit to switch a device processor to one of two IOM PSI type physical channels. Includes one IOM PSI channel. Usable with URP, MTP, and MSP only.	May be mixed with PSF0511 to maximum of 16 switch units per console.

Figure 12-1 illustrates the configurator for PSU0200 manual peripheral switch subsystem.

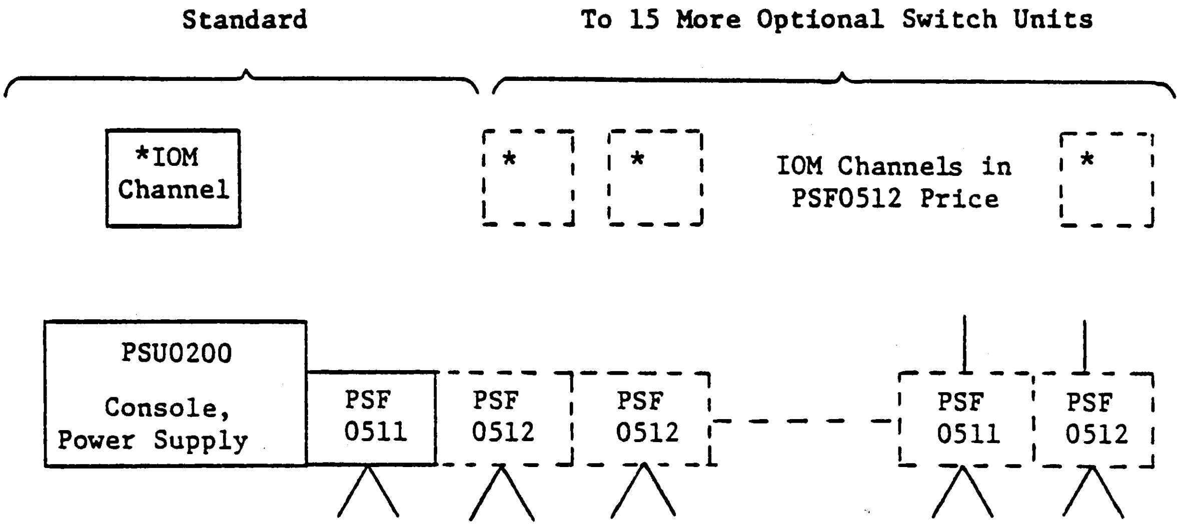
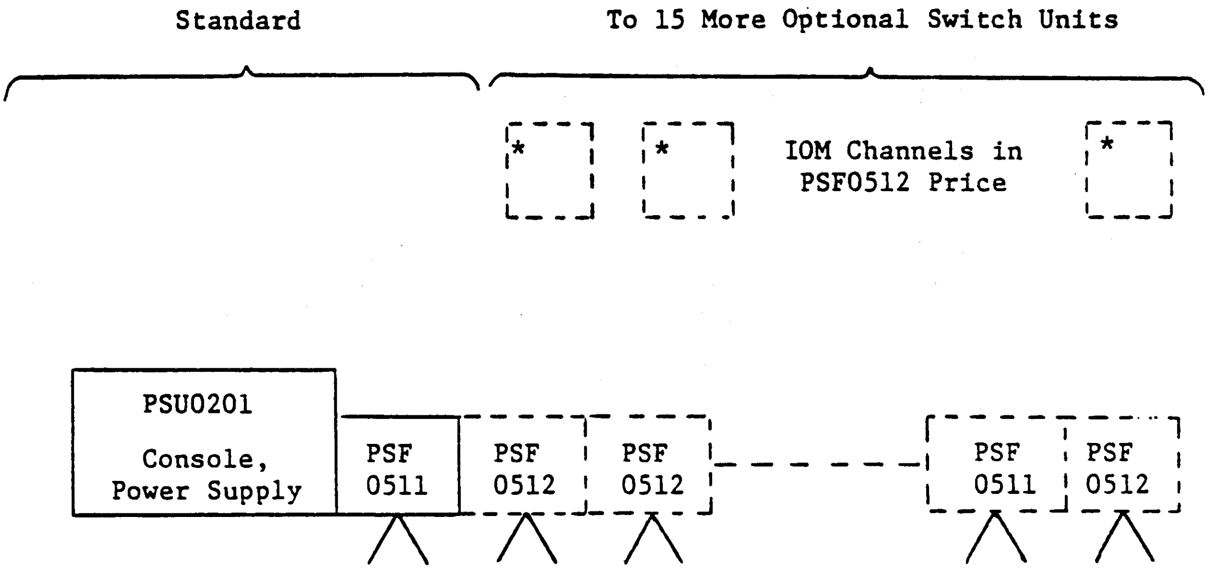


Figure 12-1. PSU0200 Configurator

Figure 12-2 illustrates the configurator for PSU0201 manual peripheral switch subsystem.



*3 channel spaces (board slots) required in the IOM.

Figure 12-2. PSU0201 Configurator

EXAMPLES OF USE OF MANUAL PERIPHERAL SWITCHES

Example 1

Figure 12-3 illustrates the switching of a peripheral device between two device processors. For example, to switch a tape unit between two MTPs or a card reader between two URPs.

> Note: The reverse approach could also be used, i.e., to select one of two devices to connect a device processor.

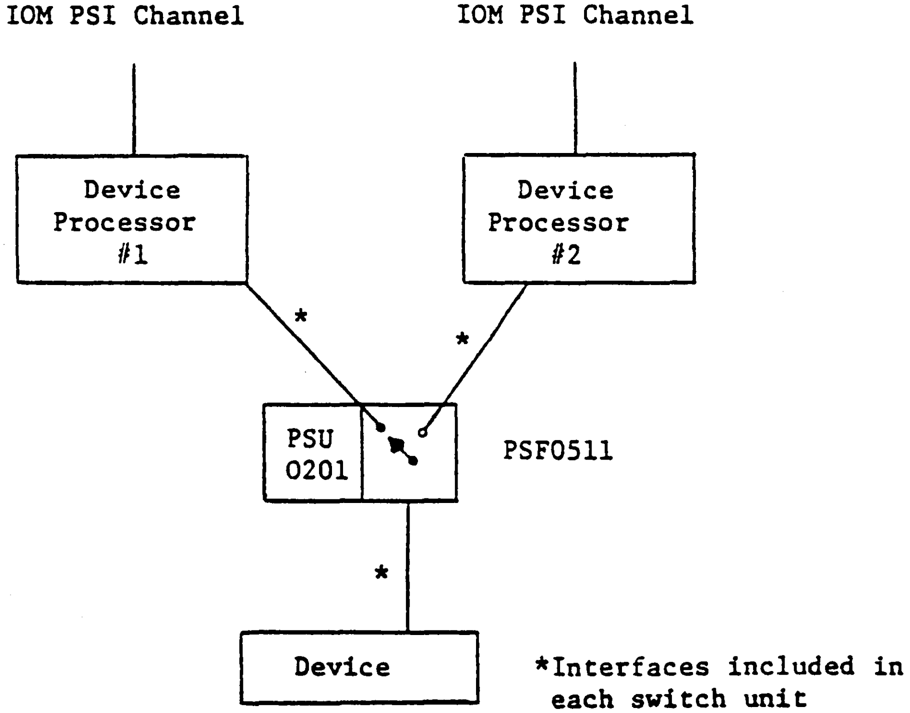
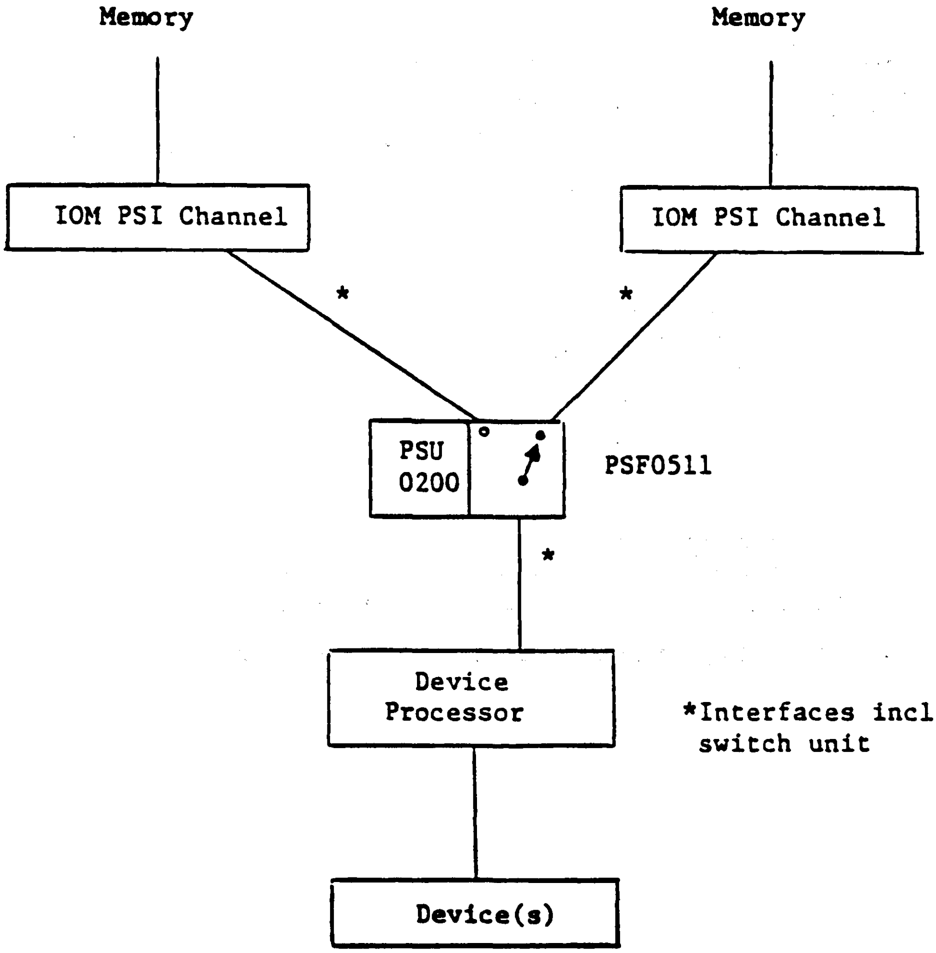


Figure 12-3. Switching Between Two Device Processors

Example 2

Figure 12-4 illustrates the switching of a device processor between two physical IOM PSI channels. For example, to switch an MTP between two physical IOM PSI channels.

> Note: The reverse approach could also be used, i.e., to select one of two device processors to connect to an IOM PSI channel. Since only one IOM channel is required, and one each would have been included in the prices of the device processors, PSU0201 would be the lower priced approach. PSU0201 price does not include an IOM channel, which would be superfluous in this case.



May be on same IOM, different IOM in same system or in different systems. One IOM channel comes with the device processor, one with PSF0511 which is included in PSU0200 price

*Interfaces included in each switch unit

Figure 12-4. Switching Between Two Physical IOM PSI Channels

Example 3

Figure 12-5 illustrates the switching of a device between two device processors and switching a device processor between two IOM physical channels.

In this example you would order one PSF0511 switch unit in addition to the PSU0200 console, which includes one PSF0511. Note that this example could be handled by configuring a PSU0201 console and one PFS0512 switch unit at a slightly higher cost.

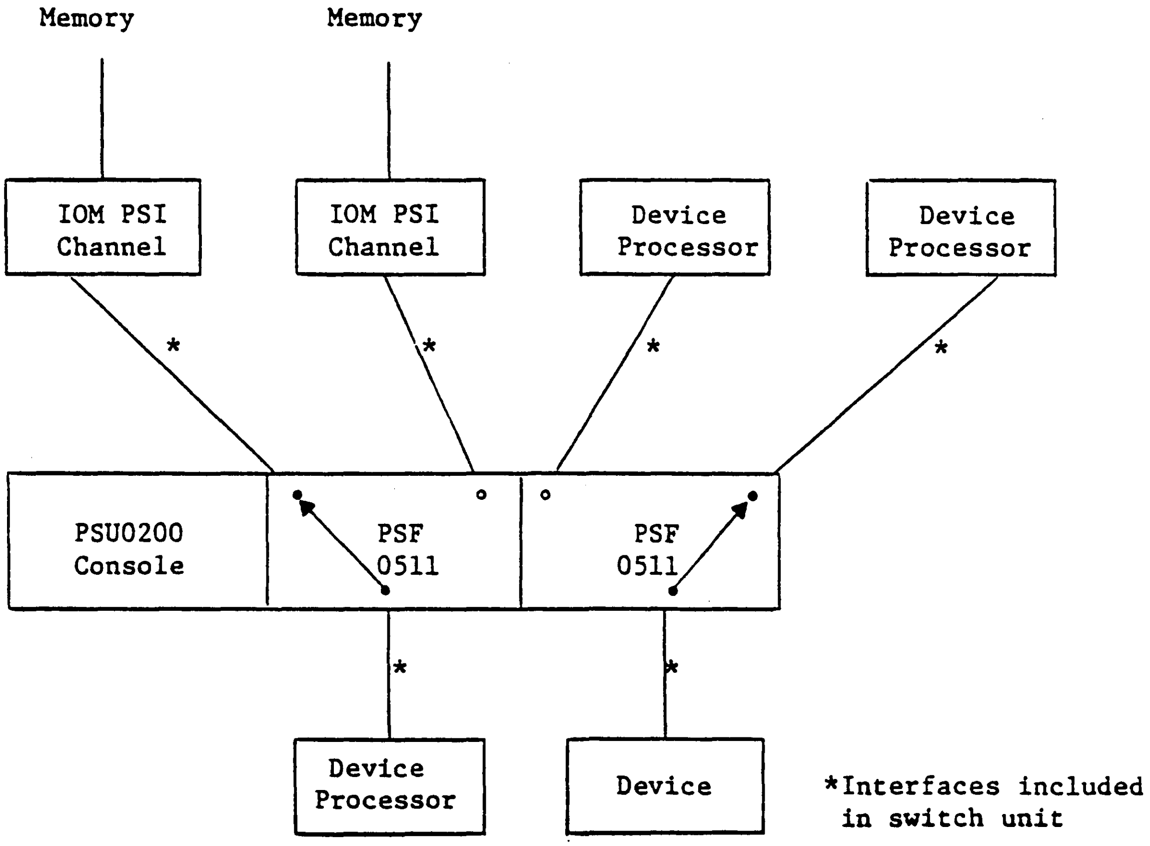


Figure 12-5. Switching Between Two Device Processors and Between Two IOM Physical Channels

SECTION 13
Configuring Motor-Generator and Control Sets

The following are the marketing identifiers for the motor-generator control units and motor-generators.

MI	Description
MGS6001	Motor-Generator Control Unit & Motor Generator 31.1 kVA, 60 Hz, 208/440 Vac Input
MGS6002	Motor-Generator Control Unit & Motor Generator 62.6 kVA, 60 Hz, 440/480 Vac Input
MGS6003	Motor-Generator Control Unit & Motor Generator 62.6 kVA, 50 Hz, 380 Vac Input
MGS6004	Motor-Generator Control Unit & Motor Generator 62.6 kVA, 60 Hz, 208 Vac Input

At least one set must be ordered for each DPS 8/52C/62C/70C system if the PSS8000 Capacitor Ride-Through options or UPS are not used. In some cases two may be desirable, depending on the size of the system. The DPS 8/47C/49C include a built-in power ride-through of 100ms, i.e., the ability to continue operation through a power interruption of up to 100ms. For components contained in the DPS 8/47C/49C Central System Cabinet, it may not be necessary to use a motor-generator set (MGS). An MGS may be desirable on these systems if they contain freestanding controllers in their configuration. The need or desirability of an MGS should always be carefully evaluated by the customer, in conjunction with an HIS Customer Services representative.

To be more competitive in bidding new systems, you may choose not to include the price of the motor-generator and control set as part of the system proposal. The motor-generator ride-through (duration of one second) and electrical noise reduction capabilities would be beneficial to most computer systems; therefore, it should be considered a site preparation item and included in the site prep section of your proposals, but denoted as "to be provided separately" or "not included in proposal pricing" so as to help avoid any confusion or claim.

Motor generator and control sets are used in applying power in an orderly fashion and in regulating the electrical quality fed to the hardware. They level out voltage variations and compensate for power interruptions for one second. The length of period is affected by the load imposed by the configuration. Check with Customer Services for specific figures.

Determine which model to order in the following way:

1. Decide on your complete system configuration - central system, peripherals, FEPs, and consoles.

2. Refer your configuration to your pertinent Customer Services branch. They will use data on the kVA load applied by each component in your configuration. Adding the individual kVA loads gives a total figure which determines which MGS type number to order. Do not skimp on the MGS used. Discuss with Customer Services the need or desirability of using two units in the specific customer case. The price of these units is often significant in the typical total system price, but they serve a very important function in helping maintain the DPS 8/C system in an available condition.

3. The sets are heavy, bulky, noisy, and unattractive. They do not require the same air conditioning levels as the DPS 8/C systems themselves. Frequently, they are installed away from people in order to avoid noise and appearance problems. For this reason it may be undesirable to bid a minimal MGS. Your customer will grow. Where practicable discuss the alternatives and costs with your customer and suggest some growth leeway before an MGS swap would be involved.

While electric utility power systems are reliable, they serve many loads of varying characteristics. The loads are switched off and on continuously. Frequently, voltage transients upset computer systems. By using a flywheel-type, motor-generator set to supply power to critical devices, the effects of voltage transients and short duration voltage dips can be reduced.

It is recommended that battery backup units (PSS8002), when used, be connected directly to the main power system rather than through the motor generator unit. This is due to the fact that the motor generator will likely not be in the same room as the battery backup and thus in the event of a power interruption, the system operator may not be able to physically access and activate the MGS unit before the battery backup system loses power.

SECTION 14
Software

A tiered packaging structure for CP-6 software is currently in effect. The CP-6 software packages are linked to the performance level of the host CP-6 hardware. Marketing Identifiers for CP-6 software packages are given below.

Marketing Identifier	Description
SFS6135	8/47C Software package
SFS6145	8/49C/52C Software package
SFS6150	8/62C Software package
SFS6155	8/70C Software package

For each of the Marketing Identifiers above, the package contains:

Control Program-6 (SFS6120)
Access Modes (SFS6121)
Local Communications (SFC6120)
FORTRAN (SFL6120)
APL (SFL6121)
BASIC (SFL6122)
RPG-II (SFL6123)
COBOL 74 (SFL6124)
PL-6 (SFL6125)
Assembler (SFP6120)
Math Library (SFR6001)
TEXT (SFP6121)
SORT/MERGE (SFU6120)
SYSTEM AIDS (SFU6011)
Transaction Processing (SFS6122)
TP Forms Processor (SFU6121)

In the event of any Central Processor upgrade, the license for this CP-6 Software Package will terminate. Honeywell will license an equivalent CP-6 Software Package in accordance with license fees and terms as applicable to the upgraded Central Processor. (The new CP-6 Software Package Marketing Identifier must be ordered and the new Software Package must be installed.)

If the package is not chosen, the items may be ordered individually as follows:

Marketing Identifier	Description
SFS6120	Control Program-6
SFS6121	Access Modes
SFC6120	Local Communications
SFL6120	FORTRAN
SFL6121	APL
SFL6122	BASIC
SFL6123	RPG-II
SFL6124	COBOL 74
SFL6125	PL-6
SFP6120	Assembler
SFR6001	Math Library
SFP6121	TEXT
SFU6120	SORT/MERGE
SFU6011	SYSTEM AIDS
SFS6122	Transaction Processing
SFU6121	TP Forms Processor

In addition, separate, non-packaged items are:

Marketing Identifier	Description
SFD6121	IDS II
SFD6120	IDP
SFC6121	Remote Communications (one required per remote FEP)
SFH6200	Personal Computing Facility
SFD6110	ARES
SFH6201	Electronic Mail

Example

An 8/52C customer desiring the software package, IDS II and IDP would order the software package on DPS 8/52C (SFS6145), IDS II (SFD6121) and IDP (SFD6120). Should the customer upgrade to 8/62C performance, the new software would be the software package on DPS 8/62C (SFS6150), IDS II (SFD6121) and IDP (SFD6120). (SFS6150 must be ordered and installed.)

APPENDIX A

CHECKLIST CONFIGURATOR

This appendix is also published as a freestanding document, Order No. DP54

PREFACE

This checklist configurator provides helpful information for ordering DPS 8/C system components and options. This document should be used in conjunction with the DPS 8/C Configuration Guide, Order No. DP37.

CONTENTS Page

This checklist configurator provides a convenient way to determine that 1) all required components of a CP-6 DPS 8/C system are included in an order, and 2) that all required prerequisites are in fact ordered for desired options. This checklist will assist in generating correct, connectable systems; it will not ensure that system or component performance, load balancing, redundancy, etc. requirements will be met. These parameters are discussed in the appropriate chapters of the CP-6 DPS 8/C Configuration Guide.

To use the checklist configurator, first determine which DPS 8/C model is desired. Locate that model on either Figure A-1 or Figure A-2 and check the indicated marketing identifier (M.I.). For each DPS 8/C model, required components are indicated by solid lines. (All items indicated as Basic are automatically included with the system M.I. and do not have to be ordered individually.) Optional components are indicated by dotted lines. Components having prerequisites are indented below their prerequired components. Additional relevant configuration rules are given in the indicated footnotes. By checking off the M.I.s for all required components, desired options, and necessary prerequisites, complete and accurate configurations may be established.

- Central Systems DPS 8/47C, 8/49C
  - Basic
    - (DPS 8/47C) ►○ (1) CPS8119
      - Upgrade to DPS 8/49C ►○ (5) CPK8362
      - Additional DPS 8/47C CPU ►○ (3) CPU8119
        - Add CPU upgrade to CPU8121 ►○ (4) CPK8365
    - or
    - (DPS 8/49C) ►○ (1) CPS8121
      - Additional DPS 8/49C CPU(max. of 3) ►○ (3, 6) CPU8121
  - SCU (Basic)
    - SCU expansion (2 to 5 ports) ► ○ (7) MXK8007
      - SCU expansion (5 to 8 ports) ► ○ (8) MXK8009
    - Additional SCU (5 ports) ► ○ MXC8003
      - SCU expansion (5 to 8 ports) ► ○ (8) MXK8009
  - IOM (Basic) - 20 slots
    - Additional IOM ► ○ (3) MXU8003
  - Memory (12 MB on DPS 8/47C Basic; 16 MB on DPS 8/49C Basic)
    - Additional 2 MB increments ► ○ (2) CMM8002
    - Additional 4 MB increments ► ○ (2) CMM8003
  - IOM-connected console (see Figure A - 3)
  - Communication subsystem (see Figure A - 4)
  - Magnetic tape subsystem (see Figure A - 5)
  - Mass storage subsystem (see Figure A - 6)
  - Unit record subsystem (see Figure A - 7)
  - Peripheral switches (see Figure A - 9)
  - Motor generators (see Figure A - 10)
  - Tandem systems ► ○ (9) RSF8001

Notes:

(1) Includes 1 processor, 1 SCU, 1 IOM, a base quantity of memory, 1 communications subsystem with host connect, and 1 communications subsystem connected console.

(2) Up to a maximum of 32 MB on DPS 8/47C, 8/49C; requires MXC8003, additonal SCU beyond 16 M bytes.

(3) Requires MXK8007, SCU port expansion

(4) Requires CPK8362

(5) Requires CPK8365 if system includes CPU8119.

(6) Requires MXK8009 and second CSU6601/6602 for third CPU on a system.

(7) Required for additional CPU, additional IOM. Required for each CPS of a tandem system.

(8) Required on each SCU for third CPU of a DPS 8/49C system.

(9) Two CPS 8119/8121, two CSU 6601/6602, two MKX8007, one RSF8001 required to comprise a tandem system.

DPS 8/47C, 8/49C Central Systems and Major Subsystems

Figure A - 1

Central Systems
DPS 8/52C,
8/62C, 8/70C

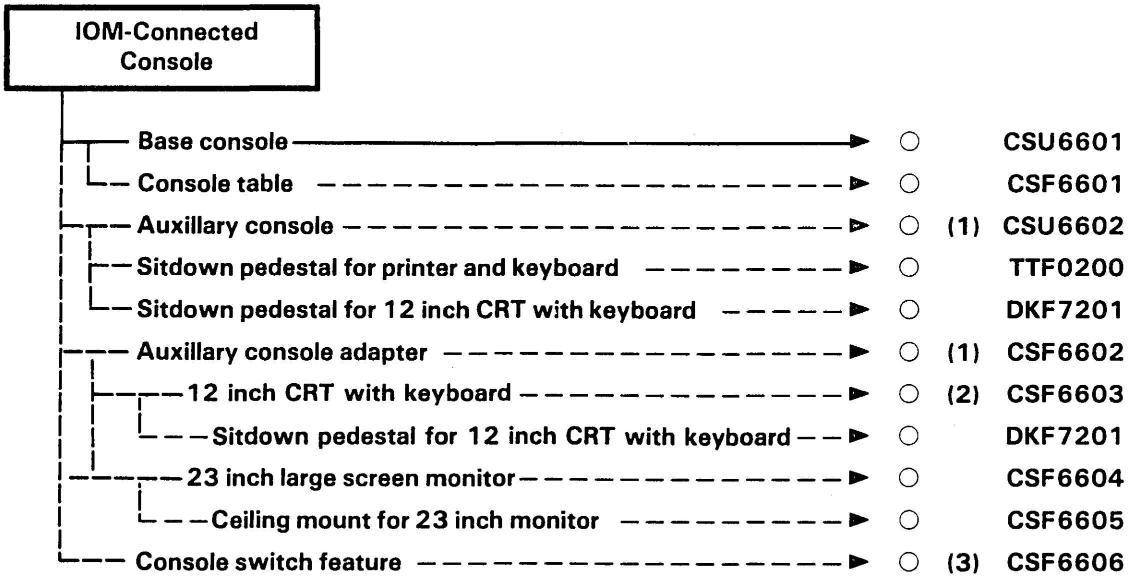
(DPS 8/52C)	○	(1)	CPS8173
Upgrade to DPS 8/62C	○	(10)	CPK8164
Additional DPS 8/52C CPU	○		CPU8173
Add CPU upgrade to CPU8174	○	(7)	CPK8174
or—(DPS 8/62C)	○	(1)	CPS8174
Upgrade toDPS 8/70C	○	(11)	CPK8172
Additional DPS 8/62C CPU	○		CPU8174
Add CPU upgrade to CPU8178	○	(8)	CPK8178
or—(DPS 8/70C)	○	(1)	CPS8178
Additional CPUs (max. of 5)	○	(5)	CPU8178
IOM (Basic) - 36 slots			
Additional IOMs - 36 slots (max. of 3)	○	(5)	MXU8002
Channel expansion - to 54 slots	○		MXF8005
SCU (Basic)			
Additional SCUs (max. of 3)	○	(2)	MXC8002
Memory (16 MB Basic)			
Additional 2 MB increments	○	(2, 3, 4)	CMM8020
Battery back-up	○	(3)	PSS8002
IOM-connected console (see Figure A - 3)			
Communication subsystem (see Figure A - 4)			
Magnetic tape subsystem (see Figure A - 5)			
Mass storage subsystem (see Figure A - 6)			
Motor generators/capacitor ridethroughs (see Figure A - 10)			
Unit record subsystem (see Figure A - 7)			
Peripheral switches (see Figure A - 9)			
Tandem Systems	○	(6)	RSF8002

Notes:

(1) Includes 1 CPU, SCU and IOM, 16 MB main memory, 1 communications subsystem with host connect, and 1 communications subsystem connected console.
(2) 1 SCU required per 16 MB of memory or fraction thereof.
(3) 1 PSS8002 required per 16 MB of memory or fraction thereof for all CP6 systems without UPS.
(4) Up to a max. of 64 MB.
(5) Total number of CPUs and IOMs must be 8 or less.
(6) Requires two CPS8173/8174/8178, oneRSF8002 to comprise a tandem system.
(7) Requires CPK8164.
(8) Requires CPK8172.
(10) Requires CPK8174 if system includes CPU8173.
(11) Requires CPK8178 if system includes CPU8174.

DPS 8/52C, 8/62C, 8/70C Central Systems and Major Subsystems

Figure A - 2



Notes:

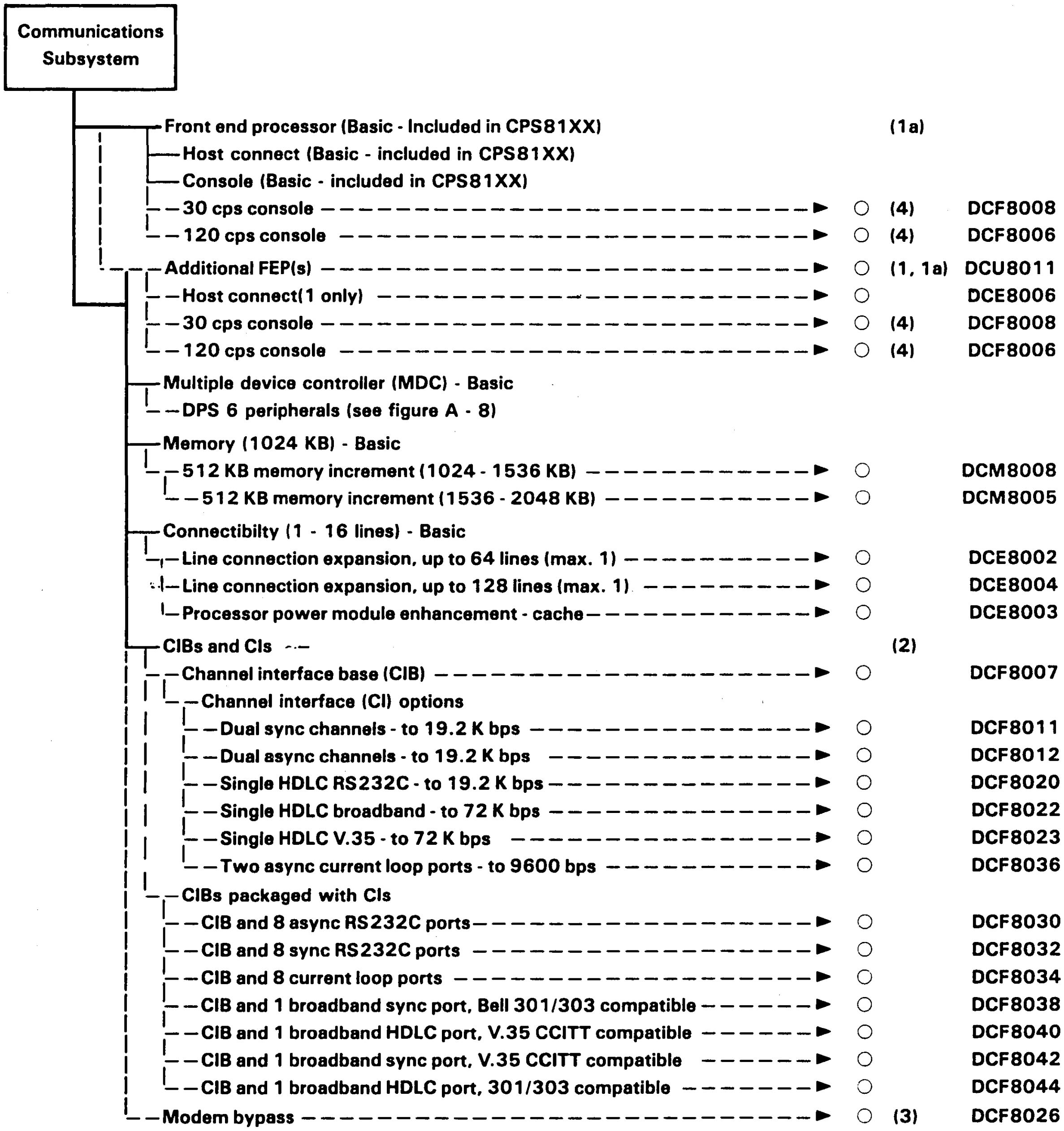
(1) Auxillary console adapter CSF6602 included in price of CSU6602 auxillary console.

(2) Perequisite is auxillary console adapter CSF6602.

(3) Requires at least 2 console devices.

IOM-Connected Console

Figure A - 3



Communications Subsystem			
Front end processor (Basic - Included in CPS81XX)		(1a)	
— Host connect (Basic - included in CPS81XX)			
— Console (Basic - included in CPS81XX)			
— 30 cps console	○	(4)	DCF8008
— 120 cps console	○	(4)	DCF8006
Additional FEP(s)	○	(1, 1a)	DCU8011
— Host connect(1 only)	○		DCE8006
— 30 cps console	○	(4)	DCF8008
— 120 cps console	○	(4)	DCF8006
Multiple device controller (MDC) - Basic			
— DPS 6 peripherals (see figure A - 8)			
Memory (1024 KB) - Basic			
— 512 KB memory increment (1024 - 1536 KB)	○		DCM8008
— — 512 KB memory increment (1536 - 2048 KB)	○		DCM8005
Connectibilty (1 - 16 lines) - Basic			
— Line connection expansion, up to 64 lines (max. 1)	○		DCE8002
— Line connection expansion, up to 128 lines (max. 1)	○		DCE8004
— Processor power module enhancement - cache	○		DCE8003
CIBs and CIs		(2)	
— Channel interface base (CIB)	○		DCF8007
— — Channel interface (CI) options			
— — — Dual sync channels - to 19.2 K bps	○		DCF8011
— — — Dual async channels - to 19.2 K bps	○		DCF8012
— — — Single HDLC RS232C - to 19.2 K bps	○		DCF8020
— — — Single HDLC broadband - to 72 K bps	○		DCF8022
— — — Single HDLC V.35 - to 72 K bps	○		DCF8023
— — — Two async current loop ports - to 9600 bps	○		DCF8036
— CIBs packaged with CIs			
— — CIB and 8 async RS232C ports	○		DCF8030
— — CIB and 8 sync RS232C ports	○		DCF8032
— — CIB and 8 current loop ports	○		DCF8034
— — CIB and 1 broadband sync port, Bell 301/303 compatible	○		DCF8038
— — CIB and 1 broadband HDLC port, V.35 CCITT compatible	○		DCF8040
— — CIB and 1 broadband sync port, V.35 CCITT compatible	○		DCF8042
— — CIB and 1 broadband HDLC port, 301/303 compatible	○		DCF8044
— Modem bypass	○	(3)	DCF8026

Notes:

(1) Max. of 15 (up to 11 may be local).

(1a) Each FEP includes 1 MDC with a maintenance diskette, 1 - 16 lines connectibility, and 1024 KB memory as basic. All else not shown as basic must be configured.

(2) At least 1 CIB & 1 async CI required per FEP; none included in base price 1 - 4 CIs per CIB, for 1 - 8 lines per CIB, max. of 64 CIs and 128 lines per FEP. Max. of 16 CIBs per FEP. Up to 2 CIBs for up to 16 lines in base FEP. With DCE8002 up to 8 CIBs for up to 64 lines. With DCE8004 up to 16 CIBs for up to 128 lines.

(3) Minimum of 2 per affected line. 1 at FEP end, other at terminal end.

(4) Requires 1 async line. 1 console (terminal) of any type recommended for each site using DCU8011 as a remote FEP.

Communications Subsystem

Figure A - 4

Magnetic Tape Subsystem

Magnetic Tape Processors			
MTP (1 x 8) and URP (1 x 4) in central system cabinet	○	(1, 2)	MFP8001
or			
MTP (1 x 8) in central system cabinet	○	(1, 2)	MTP8001
or			
Freestanding MTP (1 x 8)	○		MTP0611
Dual simultaneous channel (up to 2 x 16)	○	(3)	MTF1151
Capacitor ridethrough	○		PSS8001
Required features and options			
Magnetic tape addressing	○	(4)	MTA1152
9-track NRZI/PE (800/1600 bpi) support	○		MTF1159
and/or			
9-track PE/GCR (1600/6250 bpi) support	○		MTF1160
7-track (556/800 bpi) support	○	(5)	MTF1158
Switchable non-simultaneous channel	○		MTF1152
Magnetic Tape Units			
125 ips tape unit	○	(7)	MTU0500
7-track density (556/800 bpi)	○	(6)	MTF0016
Cartridge load, factory installed	○		MTF0018
Cartridge load, field installed	○		MTF0019
High altitude adapter	○		MTF0020
High altitude adapter, field installed	○		MTF0021
DC power-on meter, factory installed	○		MTF0022
Tape movement meter, factory installed	○		MTF0023
and/or			
200 ips tape unit	○		MTU0610
9-track density (800/1600) bpi	○	(6)	MTF0607
Upgrade 800/1600 to 1600/6250 bpi	○		MTF0678
or			
9-track density (1600/6250 bpi)	○	(6)	MTF0608
and/or			
75/125 ips 9-track tape unit	○		MTU0630
75 ips - 800/1600 bpi	○	(6)	MTF0634
Upgrade from 75 to 125 ips at 800/1600 bpi	○		MTK0632
Upgrade from 800/1600 to 1600/6250 at 125 ips	○		MTK0631
Upgrade from 800/1600 to 1600/6250 at 75 ips	○		MTK0630
Upgrade from 75 to 125 ips at 1600/6250 bpi	○		MTK0633
or			
75 ips - 1600/6250 bpi	○	(6)	MTF0635
Upgrade from 75 to 125 ips	○		MTK0633
or			
125 ips -800/1600 bpi	○	(6)	MTF0636
Upgrade from 800/1600 to 1600/6250 bpi	○		MTK0631
or			
125 ips -1600/6250 bpi	○	(6)	MTF0637
High altitude adapter	○		MTK0634

Notes:

(1) MFP8001, URP8000, MTP8001 are mutually exclusive within a cabinet.
(2) Available on DPS 8/47C, 8/49C only.
(3) Required to support more than 8 units. Optional otherwise. Requires redundant features MTF1158/59/60 if these are configured in MTP0611.
(4) 1 required per each 1 - 4 MTUs. 2 required for first 1 - 8 units if MTF1151 configured.
(5) MTF1159 required.
(6) 1 unique density feature required per MTU.
(7) RPQ only.

Magnetic Tape Subsystem

Figure A - 5

Mass Storage Subsystem

Mass Storage Processors			
Single channel MSP in central system cabinet	○	(1, 2)	MSP8000
Addressing for MSU0501	○	(3)	MSA8001
Device adapter for MSU04XX	○		MSF8000
Addressing for MSU04XX	○	(5)	MSA8000
Upgrade kit, MSP8000 to MSP8002	○	(6)	MSK8002
Switched IOM channel	○	(7)	MSF8003
or			
Dual channel MSP (1 channel in central system)	○	(1, 2)	MSP8002
Addressing for MSU0501	○	(3)	MSA8103
Device adapter for MSU04XX	○		MSF8101
Addressing for MSU04XX	○	(5)	MSA8102
Switched IOM channel	○	(7)	MSF8003
and/or			
Freestanding single channel MSP	○	(8)	MSP0611
Addressing for MSU0501	○	(3)	MSA1141
Device adapter for MSU04XX	○		MSF1140
Addressing for MSU04XX	○	(5)	MSA1140
Upgrade kit, MSP0611 to MSP0612	○	(9)	MSK0612
Switched IOM channel	○	(7)	MSF1144
Capacitor ridethrough	○		PSS8001
and/or			
Freestanding dual channel MSP	○	(10)	MSP0612
Addressing for MSU0501	○	(12)	MSA1143
Device adapter for MSU04XX	○		MSF1141
Addressing for MSU04XX	○	(5)	MSA1142
Switched IOM channel	○	(7)	MSF1144
Capacitor ridethrough	○		PSS8001
MSU0501 expansion feature - support for 9-15 MSU0501	○	(11)	MSF1142
Disk unit/spindle components			
Device native mode for MSU0501	○	(13)	MSF0015
1101 MB non-removable disk (2 spindles)	○		MSU0501
Dual access for MSU0501	○	(14)	MSF0011
Spare MSU0501	○		MSF0501
and/or			
78.2 MB removable disk (1 spindle)	○		MSU0402
RPS feature for MSU0451/0402	○	(15)	MSF0007
Upgrade from MSU0402 to MSU0451	○		MSK4025
Dual access feature for MSU0451/0402	○	(16)	MSF0006
and/or			
158.4 MB removable disk (1 spindle)	○		MSU0451
RPS feature for MSU0451/0402	○	(15)	MSF0007
Dual access feature for MSU0451/0402	○	(16)	MSF0006

Notes:

(1) DPS 8/47C, 8/49C only. Maximum of 1 per IOM.

(2) Maximum of 16 spindles in specific combinations of MSU04XX and/or MSU0501.

(3) 1 required per 2 MSU0501 (4 spindles). Maximum of 4 per MSPXXXX.

(5) 1 required per 4 MSU04XX. Maximum of 4 per MSPXXXX.

(6) MSK8002 requires that all disk units must have dual access feature. If MSU04XX is to be used on upgraded MSP, then MSF8000 if present must be replaced by MSF8101, and MSA8000 if present must be replaced by MSA8102.

(7) Maximum of 3 per single channel MSP and 3 per channel in dual channel MSP.

(8) Maximum of 16 spindles - 16 MSU04XX or 8 MSU0501 or combinations totaling 16.

(9) Existing MSF1140, MSA1140/41 must be replaced by MSF1141, MSA 1142/43 according to spindle types used (MSU04XX, MSU0501).

(10) Maximum of 16 MSU04XX or 15 MSU0501 (30 spindles) or 16 MSU04XX and 8 MSU0501. Use of 9 - 15 MSU0501 requires MSF1142, MSU0501 expansion feature.

(11) Maximum of 1 per MSP0612.

(12) 1 required per 2 MSU0501 (4 spindles). Maximum of 8 per MSP0612.

(13) 1 required per MSP channel using MSU0501s.

(14) 1 required for each MSU0501 disk unit (2 spindles) for dual channel MSPs (MSP8002, MSP0612).

(15) 1 required per MSU0402/0451 disk spindle.

(16) 1 required per MSU0402/0451 (spindle) for dual channel MSPs (MSP8002, MSP0612).

Mass Storage Subsystem

Figure A - 6

Unit Record Subsystem

Unit Record Processors *			
URP (1 x 4) & MTP (1 x 8) in central system cabinet	○	(1, 2)	MFP8001
or			
URP (1 x 8) in central system cabinet	○	(1, 2)	URP8000
UR Addressing expansion	○	(3)	URF0040
and/or			
Freestanding URP (1 x 8)	○		URP0600
UR addressing expansion	○	(3)	URF0040
Card punch addressing	○	(4)	URA0050
100 to 400 cpm card punch (2 max. per MFP/URP)	○	(5)	PCU0121
Card reader (500 cpm) addressing	○	(4)	URA0056
500 cpm card reader	○	(5, 6)	CRU0501
Pedestal for 500 cpm card reader	○		CRF0030
Card reader (1050 cpm) addressing	○	(4)	URA0052
1050 cpm card reader	○	(5, 6)	CRU1050
Belt printer (1200 lpm) addressing	○	(4)	URA0054
1200 lpm belt printer (136 columns)	○	(5, 7)	PRU1200
64 character BCD belt	○		PRB0500
and/or			
64 character ASCII belt	○		PRB0513
and/or			
64 character belt with OCR-A/B numeric font	○		PRB0524
and/or			
96 character ASCII belt	○		PRB0600
Expansion to 160 print columns	○		PRF0022
Upgrade to 1600 lpm	○		PRK1216
Belt printer (1600 lpm) addressing	○	(4)	URA0055
1600 lpm belt printer	○	(5, 7)	PRU1600
64 character BCD belt	○		PRB0500
and/or			
64 character ASCII belt	○		PRB0513
and/or			
64 character belt with OCR-A/B numeric font	○		PRB0524
and/or			
96 character ASCII belt	○		PRB0600
Expansion to 160 print columns	○		PRF0022

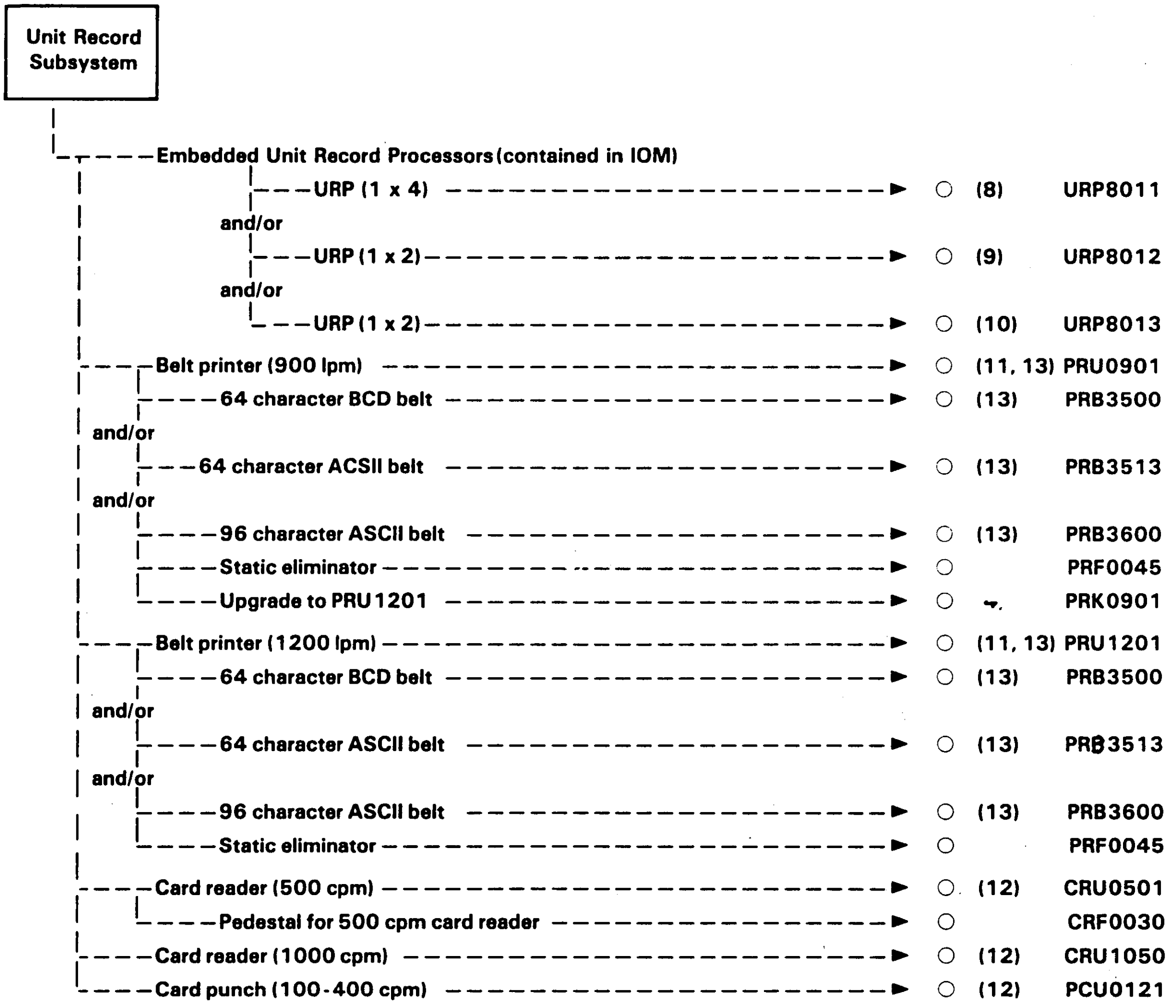
Notes:

(1) MFP8001, URP8000, MTP8001 are mutually exclusive within a cabinet.
(2) Available on DPS 8/47C, 8/49C only.
(3) URP0600/8000 only. Required if more than 4 devices are configured per URP.
(4) 1 addressing feature required per UR device. 1 URP required per 8 addressing features or 1 MFP required per 4 addressing features.
(5) Each UR device requires 1 addressing feature.
(6) Maximum 2 CRU0501 or 2 CRU1050 per MFP/URP, or one of each.
(7) At least 1 belt required per PRU1200/1600.

* Embedded URP's , their devices and features are shown on Part 2 of Figure A-7.

Unit Record Subsystem

Figure A - 7 Part 1



Unit Record Subsystem			
Embedded Unit Record Processors (contained in IOM)			
URP (1 x 4)	○	(8)	URP8011
and/or			
URP (1 x 2)	○	(9)	URP8012
and/or			
URP (1 x 2)	○	(10)	URP8013
Belt printer (900 lpm)	○	(11, 13)	PRU0901
64 character BCD belt	○	(13)	PRB3500
and/or			
64 character ACSII belt	○	(13)	PRB3513
and/or			
96 character ASCII belt	○	(13)	PRB3600
Static eliminator	○		PRF0045
Upgrade to PRU1201	○		PRK0901
Belt printer (1200 lpm)	○	(11, 13)	PRU1201
64 character BCD belt	○	(13)	PRB3500
and/or			
64 character ASCII belt	○	(13)	PRB3513
and/or			
96 character ASCII belt	○	(13)	PRB3600
Static eliminator	○		PRF0045
Card reader (500 cpm)	○	(12)	CRU0501
Pedestal for 500 cpm card reader	○		CRF0030
Card reader (1000 cpm)	○	(12)	CRU1050
Card punch (100-400 cpm)	○	(12)	PCU0121

Notes:

(8) Up to 2 PRU0901/1201 and 2 card devices.
(9) Up to 2 card devices only. No printers.
(10) Up to 2 PRU0901/1201 only. No card devices.
(11) URP8011/8013 only. Price includes 2 print belts of same type.
(12) Not available on URP8013.
(13) Print belts must be ordered from the supply catalog.

Unit Record Subsystem

Figure A - 7 Part 2

DPS 6 Peripherals

Part of FEP - Communication Subsystem (see figure A - 4)

Multiple device controller (MDC) - Basic		(1)	
Device pac for card reader	○		CRM9630
Card reader (500 cpm)	○		CRU9611
and/or			
Device pac for printer	○		PRM9630
Drum printer, 900 lpm, 64 character	○		PRU9609
and/or			
Device pac for printer	○		PRM9630
Band printer, 300 lpm, 64 character	○		PRU9617
96 character band	○		PRB1600
and/or			
Device pac for printer	○		PRM9630
Band printer, 600 lpm, 64 character	○		PRU9618
96 character band	○		PRB2600
132 to 136 print position extension	○		PRF9618
MDC expander (second MDC)	○	(2)	MDC9640
Device pac for card reader	○		CRM9630
Card reader (500 cpm)	○		CRU9611
and/or			
Device pac for printer	○		PRM9630
Drum printer, 900 lpm, 64 character	○		PRU9609
and/or			
Device pac for printer	○		PRM9630
Band printer, 300 lpm, 64 character	○		PRU9617
96 character band	○		PRB1600
and/or			
Device pac for printer	○		PRM9630
Band printer, 600 lpm, 64 character	○		PRU9618
96 character band	○		PRB2600
132 to 136 print position extension	○		PRF9618

Notes:

(1) Maximum of 2 devices per basic MDC. Basic MDC included in all DATANET 8Cs.

(2) Requires DCE8002. Maximum of 4 devices per second MDC.

DPS 6 Peripherals

Figure A - 8

Peripheral Switches

Switch console (includes 1 IOM PSI channel)	○	(1)	PSU0200
Switch (no IOM channel included)	○	(2)	PSF0511
Switch (1 IOM PSI channel included)	○	(2)	PSF0512

or

Switch console(no IOM channel included)	○	(1)	PSU0201
Switch (no IOM channel included)	○	(2)	PSF0511
Switch (1 IOM PSI channel included)	○	(2)	PSF0512

Notes:

(1) Every manual switch subsystem must include only 1 switch console, PSU0200 or PSU0201. PSU0200 and PSU0201 each handles up to 16 switch units. 1 PSF0511 included in each.

(2) PSF0511 and PSF0512 may be mixed to a maximum of 16 switch units per console.

Peripheral Switches

Figure A - 9

Motor Generators/ Capacitor Ridethroughs

Motor-generator control unit and motor generator 31.1 KVA, 60 Hz, 208/440 Vac input → ○ (1) MGS6001

or

Motor-generator control unit and motor generator 62.6 KVA, 60 Hz, 440/480 Vac input → ○ (1) MGS6002

or

Motor-generator control unit and motor generator 62.6 KVA, 50 Hz, 380 Vac input → ○ (1) MGS6003

or

Motor-generator control unit and motor generator 62.6 KVA, 60 Hz, 208 Vac input → ○ (1) MGS6004

or

Capacitor ridethrough(1 per each IOM/CPU) → ○ (1) PSS8000

Notes:

(1) At least 1 MGS or capacitor ridethroughs required for DPS 8/52C, 8/62C, 8/70C if UPS is not used.

Motor Generators/Capacitor Ridethroughs

Figure A - 10

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