September 3, 1958

FILE MEMO: Project 7000

SUBJECT: SIGMA — PHYSICAL DESCRIPTION

The material in this memo is dated and subject to change. It was gathered by interview from many sources and is reported without modification by the author.

Two standards are used in SIGMA — rollegon* and the SMS module. The SMS module is a cube occupying about as much floor space as a 727 tape unit. These cubes may be stacked two high and closely juxtaposed providing access to front and rear is possible. This module is used for the adapters of the reader, printer, punch, tape, console, and inquiry station. The SMS cube has space for 8 gates. (The universal tape adapter, TAU, which is to be used for all 729-III type tape units on Project 7000 systems as well as others, requires 4 of these gates.)

The rollegon is about the size and shape of the 727 tape unit and contains four larger gates paired two to a slide. Each of these gates can hold as many as 3000 transistors. It is used in the main frame, memories, exchanges, and disk control unit.

Non-standard boxes are used for the reader, printer, punch, console, inquiry stations, disk unit, and tape units. These units will use the same packages for SIGMA as they use for other systems such as Type 7070.

The main frame uses nine rollegons, one for each of the following:

Memory buss	VFL
I Unit (modifier)	Floating Point (ADD)
I Unit (controls)	Floating Point (MPR)
Look-ahead	Maintenance
Arithmetic register	

*This term may be changed because of patent problems.

The 2 usec. memory requires one rollegon for each block of 16,384 words of storage. The memory maintenance console is a rollegon. Only one console is required regardless of the number of memory blocks included in a given system.

The .5 usec. memory requires 1 1/2 rollegons for each block of 1024 words of storage. The 1/2 rollegon is a unit modified to 1/2 height and contains the freon tank. (Its top must be kept clear.)

The exchange uses three or four rollegons, one for each of the following:

> Maintenance
> Memory, ECC, and modifier
> Addressing, low speed channel,
>   and channels
> Extra channels

Eight 9-bit channels or 4 wider channels can be installed on a single gate. If more than two gates are used for channels (other than the low speed channel), then the fourth rollegon is required.

The disk system uses four rollegons plus a non-standard box about the size of two rollegons as follows:

> High speed exchange (read-channel)**
> High speed exchange (write-channel)**
> Disk control unit
> Disk (logic)
> Disk (physical) non-standard box.

Each added disk unit requires both a Disk (logical) rollegon and a Disk (physical) box.

The 1000 cpm card reader uses two stacked SMS modules for the adapter plus a non-standard box for the physical reader. The reader and adapter may be juxtaposed.

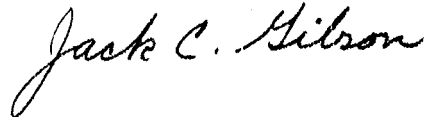**Design improvements may permit one rollegon to replace these two.

The 250 cpm card punch uses two stacked SMS modules for its adapter plus a non-standard box for the physical punch. The punch and adapter may be juxtaposed.

The 600 lpm printer (chain) uses two stacked SMS modules for its adapter plus a non-standard box for the physical printer . The printer and adapter may be juxtaposed.

The console and the inquiry station are housed in non-standard boxes but share a common adapter. This adapter requires one SMS module and will serve either the console or the inquiry station or both but not two consoles nor two inquiry stations.

The tape unit uses two stacked SMS modules for its adapter plus a non-standard box for the tape mechanism.

The enclosed chart attempts to summarize these facts.

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UNIT	COMPONENT	Rollegon	SMS Mod.	Non. Stand.
Main frame	Memory bus	1		
	I Unit (modifier)	1		
	I Unit (controls)	1		
	Look-ahead	1		
	Arithmetic Register	1		
	VFL	1		
	F.P. (ADD)	1		
	F.P. (MPR)	1		
	Maintenance	1		
2 usec. memory	16,384 words	1		
	Maintenance	1		
.5 usec. memory	1,024 words	1		
	Freon tank	1		
Exchange	Maintenance	1		
	Memory, Ecc, and Modifier	1		
	Addressing, low speed channel & channels	1		
	Extra channels	1		
Disk system	High speed exchange (read)	1		
	High speed exchange (write)	1		
	Disk control unit	1		
	Disk (logic)	1		
	Disk (physical)			1
Reader (1000 cpm)	Reader			1
	Adapter		2	
Punch (250 cpm)	Punch			1
	Adapter		2	
Printer (600 lpm)	Printer			1
	Adapter		2	
Tape unit	Tape mechanism			1
	Adapter		2	
Manual system	Console			1
	Inquiry Station			1
	Adapter		1	