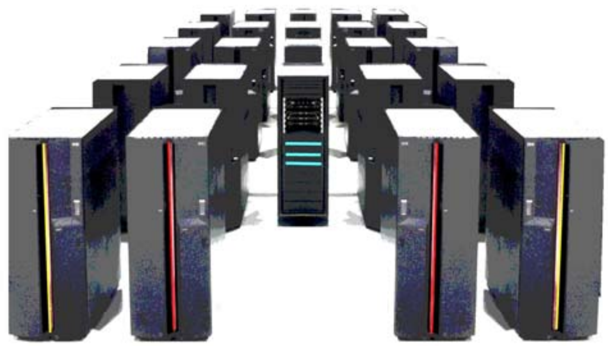
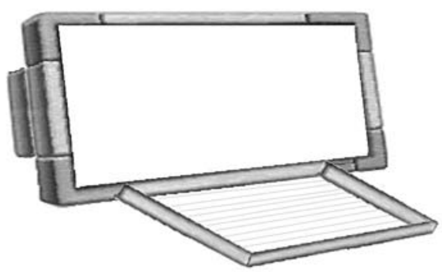
Computers and Brains



Zirunkariish Model/5

Zirunkariish

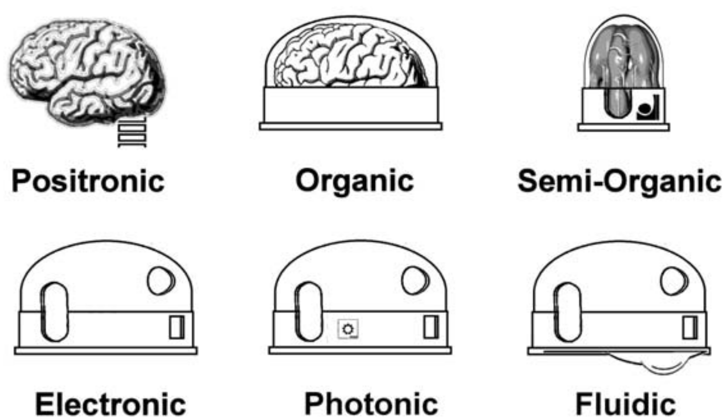
Computer Model/1
Computer Model/1bis
Computer Model/2
Computer Model/2bis
Computer Model/3
Computer Model/4
Computer Model/5
Computer Model/6



Zirunkariish "Universal" Console

Zirunkariish

Display Console
With Touch Pad,
Voice Input,
View Screen.



Zirunkariish Robotics

Zirunkariish

P1-Positronic Brain-12
Organic Brain in Case
S1-Semi-Organic Brain-11

System Process- Electronic
System Process- Photonic
System Process- Fluidic

Zirunkariish

Quality Computronics Since 143

Computers and CyberSpace

Cyberspace -- the computing space within computers -- is awash with operating applications, maintenance activities, applets, and even occasional personalities.

Once computer and brain circuitry reaches a threshold level of sophistication, the computing space becomes an environment in which packages of software move and perform their functions.

The internal operations of computers are (in most cases) transparent to the user. Data is input into the computer, processed into information, and ultimately output.

Inside The Computer. The environment inside the computer becomes important with the advent of artificial intelligences and recorded personalities. Personalities and artificial intelligences are basically programs that can move through circuitry and networks.

The Cyberspace Metaphor. Given their size and sophistication, this interior computation circuitry of computers and networks can be best understood as a broad space, marked off into locations and bounded by barriers.

THE CHARTS

The four computer-related charts show the basic structure and operation of computers.

Chart 1. Computers.
Chart 2. Processes.
Chart 3. Applets.
Chart 4. Personalities.

UNDERSTANDING COMPUTERS

The physical device is the Computer: a set of electronic (or photonic or positronic or fluidic) circuits which process data according to some set of instructions.

A Computer has an Architecture: an internal structure of cells and connections which governs its operations.

Types of Computers

Computers are identified by the basic principles of their operation.

Electronic Computer. A Computer using electronic circuits. Electronic Computers are by far the most commonly encountered type.

Photonic Computer. A Computer using photonic or fiber optic circuits. Photonic Computers are resistant to EMP Effects, have lower power requirements, and have reduced waste heat output when compared to Electronic Computers.

Fluidic Computer. A Computer using gas or liquid flow circuits. Fluidic computers are resistant to EMP Effects, have lower power requirements, and have reduced waste heat output when compared to Electronic Computers. They are sensitive to temperature variations.

THE ELEMENTS OF CYBERSPACE

Delving deeper into Computers reveals their internal structure: Cyberspace. Cyberspace is a set of interconnected cells (locations) for operating computer programs, processes, applets, and data streams.

Users. People outside the computer system who use the computer though control consoles are Users.

Cells. The foundation of Cyberspace is its structure of cells. Each cell is a location for an activity within the computer. A map of the cells in a computer draws each location and shows connections between them. The (and map draws a square (or other polygon) grid showing the computer's total number of cells; sides which touch are connected.

Processes. Some cells are permanently occupied by Processes. A process is a large-scale program dedicated to a specific activity. Starship Life Support is a process in the starship's computer.

Applets. In contrast to Processes, Applets are small, temporary, mobile programs which roam throughout the computer. Applets perform many maintenance and protection functions. A Courier Applet carries targeted data messages between processes. A Censor evaluates data streams and applets for malware.

Data Streams. The underlying circuitry carries a continual flow of data streams between processes. This flow is constant as long as the computer is operating, and for all practical purposes invisible.

Connectors. The lines linking computers are Connectors: they may be wired or wireless.

Programs. For terminology purposes, Processes and Applets are both Programs.

Priority

Every Process and Applet within the computer has a Priority: a number which shows its relative importance in the overall hierarchy of the computer.

Under normal circumstances, Priority is a number from 1 to 6.

Moving In Cyberspace

Processes are immobile, being assigned more or less permanent locations within the grid of cells.

Applets roam at will within the computer, subject to specific limits:

Applets may move without limit through empty cells, or through any Process or Applet with a lower Priority.

An Applet stops when it moves next to a Program with equal or higher priority. Applets with equal Priority can never move into the same Cell.

An Applet which stops in a cell with a Program with lower Priority stops that Program for as long as they both occupy the same cell.

An Applet which may move onto a Connector, at which point it ends movement for the current turn. It begins its next turn of movement at the other end of the connector.

Stacking In A Cell. A cell can contain one Process and any number of Applets as long as each program has a different Priority (and only the highest Priority program can be functional).

IFFN Identification Friend or Foe or Neutral

All Programs native to a specific computer (or network) carry a visible IFFN Tag which identifies them as Friend. Programs with strange or unrecognized Tags are identified as Foe.

Friends are ignored by Friends unless they initiate attacks; Foes are automatically attacked.

Ignore. Some tags indicate the Program is Neutral and should be ignored unless it starts to overload the system.

Neutrals normally roam freely within cyberspace. If too many Neutrals are present and begin to overload the system, settings may change to exclude or destroy Neutrals. This is all much more Complex, with safeguards, encrypted identifications, and other details.

Conflict in Cyberspace

Programs can come into conflict with other Programs:

Processes are passive; they cannot attack other Processes or Applets. They depend on protective Applets to defend them.

Some Applets can destroy Processes using their available skill sets. An Applet can destroy one Program per turn (as the last activity in the turn).

Any Applet can attack any other Applet to which it is adjacent.

Applet Conflict. When applets clash, they resolve the conflict through comparison of assets. The applet with the greater assets prevails (tied applets are immobilized). A losing applet is destroyed.

Applet1 Assets	vs	Applet2 Assets
C4+C5+C6+ Priority + Skills	**vs**	**C4+C5+C6+ Priority + Skills**

If AI or Personality: Add Good Flux.

APPLET TYPES

Type	Description
Cleaner	Clears obsolete or useless code.
Fixer	Repairs chance variations or faults.
Phage	Destroys malware.
Courier	Carries internal messages and data..
Popup	Carries messages to outputs.
Censor	Evaluates all Applets passing through it.
AI AyEye	Artificial Intelligence.
Personality	Recorded organic personality.
Virus	Creates applets from within a Process.

UNDERSTANDING APPLETS

An **Applet is** mobile programming that performs support, maintenance, and internal housekeeping functions. Applets roam from location to location, cleaning out vacated locations, searching and destroying malware, and transporting priority data across networks.

Applets are rudimentary personalities with relatively low intelligence and relatively simple missions.

Applets are created and erased as needed.

For example, a priority message must be transmitted to another computer. The originating process creates (spawns?) an applet around the message and sends it on its way. This specific applet travels through the circuitry, attached networks, as a transmission, or even in a wafer or chip, until it ultimately reaches its destination. Recognition codes within the applet confirm the destination and deliver the message.

THE ELEMENTS OF THE APPLET

C4	Intelligence
C5	Education or Training or Instinct
C6	Social Standing or Charisma (but not Caste)
CS	Sanity
	A limited set of Skills or Knowledges or Talents
	A set of unique Memories
	A sense of Purpose and of Self (including IFFN).
	Special Features: Priority. Expiration

Characteristics. An Applet may have one or more characteristics C4 C5 C6.

Sanity. An Applet may malfunction if it fails a Sanity Check.

Skills. An Applet may have one or more skills; usually a specialized Applet skill.

Memories. An Applet has Memories and is able to interact with other applets about them.

Purpose. An Applet has a sense of Purpose, usually hardwired, associated with its activities. The Applet has a sense of Self, including an ability to identify and be identified as a friend or foe (or neutral).

Priority. An Applet has a Priority established when it is created.

Expiration. An Applet has an Expiration and it dissolves when this date is reached.

Applet Duplication

Applets are self-directed and self-duplicating.

Any Applet may make identical duplicates of itself (the number it can make is equal to its Priority), but each duplicate is Priority one lower.

Applet Skills

An Applet is created with one skill (usually no more) which supports its mission or function.

Clean (Cleaner, Maintenance) is the ability to identify and erase obsolete or useless code, applets, or processes. Applets with Clean roam through cyberspace examining applets, processes, and data streams for expiration dates and faulty diagnostics. Those that it finds, it shreds, leaving behind empty cells.

Fix (Fixer, Repair) is the ability to identify minor software malfunctions and repair them. Applets with Fixer roam through cyberspace performing diagnostics for applets, processes, and data streams: when faults are found, they are repaired (if possible): expiration dates are reset, checksums repaired, software structures are reset to their original state.

Defend (Defender, Protect) is the ability to identify Foe (as defined by IFF) Applets and Processes and attack and destroy them. Applets with Defender roam through cyberspace examining the IFF status of applets and destroying those that cannot be verified as Friendly.

Destination (Goal) is the ability navigate through cyberspace to an identified destination. Applets with Destination travel through cyberspace to an assigned Process in order to deliver a packet of information essential to that Process. A destination is not necessarily in the current computer or even the current network.

An Applet with Destination is a Courier.

Destination is distinct from Output, which is associated with carrying information to an assigned Output device.

Output is the ability to navigate through cyberspace to an identified output device. Applets with Output travel through cyberspace to an assigned Output device to deliver a packet of Output intended for display to a user. The output device is not necessarily in the current computer or even the current network.

An Applet with Output is a Popup.

Output is distinct from Destination, which is associated with carrying information to an assigned Process.

Censor (Anti-Virus, Anti-Malware) is the ability to evaluate all applets and data streams it encounters searching for malware (and especially for viruses).

An Applet with Censor repeatedly cycles its Priority 6-5-4-3-2-1-6.

Stealth (Clandestine) is the ability to conceal oneself from the evaluations and diagnostics of others. An Applet with Stealth can ignore evaluations by Clean, Fix, Defend, or Censor if its Stealth is greater than the opposing skill.

Programmer (Coding, Coder) is the ability to edit the software elements of Processes and Applets (including the elements of the Applet using the skill). Programming does not allow creating new code; the specific values required must be taken from (cut and pasted) other Applets in the same cell (including from oneself).

Programmer is not a skill generally available to created Applets; it is brought into an Applet through a Personality. For example, Eneri Dinsha, Programmer-4, records his personality; when it sends it into cyberspace, one of its available skills is Programmer-4.

For Example,

An Applet is generated with Clean. The Applet is a Phage, devoted to eating obsolete or expired code fragments. It located and attacks Applets which have passed their expiration date.

An Applet is generated with Fix. The Applet is a Fixer with a minor repair function: it roams in search of minor software flaws and repairs them.

An Applet is generated with Defend. The Applet is a Defender dedicated to seeking out and destroying Applets which fail an IFFN test.

An Astrogation Process generates an Applet with Destination Jump Drive Processor and is given a packet of data calculations about an upcoming Jump. The Courier Applet is a courier which makes its way through the on-board network to the Jump Drive Processor and delivers its packet (the Jump Drive Processor may generate its own Courier with an acknowledgement).

An Jump Drive Processor (having just received its data packet about an upcoming jump) generates an Applet with Output directed toward the Astrogator Display Console. The Popup travels through the network to the ADC and notifies the astrogator that all is ready for the upcoming jump.

An Applet is generated with Censor. The Applet stations itself in a cell through which many Applets must pass (and which cannot be bypassed). A passing Popup is forced to stop when it moves adjacent to the higher priority Censor, which then evaluates it for malware. The Popup passes the evaluation; the Censor momentarily drops its Priority and the Popup proceeds on its way.

DATA PACKETS

A Data Packet is an encapsulated (in an Applet) set of data or information. It may be generated by a Processor or by a User.

Internal Data is basic output from one processor intended to be used as input by another processor. An Astrogation Processor outputs a data packet (calculations about an upcoming jump) and sends it to the Jump Drive Processor.

Internal Data is carried by Courier applets.

Console Output is information (progress reports, query responses, messages, emails) intended for display on a control console to be read (viewed, heard) by a User.

Console Output is carried by Popup Applets.

Virus is a set of Applet-producing instructions concealed within a Data Packet. Upon delivery to a Processor, the Data Packet tricks the Processor into creating the specified Applet (or great numbers of the Applet, or many different Applets).

The Xmail System

Some versions of the Xmail System use Neutral Output Applets. A message to a specific person is inserted into the Applet and thousands of copies are sent into the xmail system, carried by ships to hundreds of worlds.

When the recipient arrives on one of those worlds and checks an xmail terminal, his specific message pops up on the display console.

PERSONALITIES AND ARTIFICIAL INTELLIGENCES

A person can insert his Personality into a computer: special software wraps it in an Applet which enters the computer.

A person can establish a feedback loop with his Recorded Personality as it is run on a Computer and monitor its activities. The resulting effect is that the person feels like he is in the computer (the term is **jacked in**).

Jacking In. To monitor the activities of a Recorded Personality being run on a Computer, a person establishes a connection between his Wafer Jack and the computer.

When the person disconnects, the Recorded Personality continues in the computer until it dissipates.

The Personality

A Personality accurately reflects the characteristics of the User. The Applet is, in effect, the person, now inside the computer.

Artificial Intelligences

Some Personalities are artificially created.

WHAT CYBERSPACE LOOKS LIKE

At its simplest, cyberspace is sparse and bare; its locations filled with heaps of pulsating processes, and glowing streams of data flowing between them.

Skins. Personalities ranging through cyberspace may adopt their own favorite filters through which to view their surroundings:

Prehistoric Landscapes littered with valuable gems and roamed by dinosaurs.

Medieval landscapes filled with castles, towns, and villages, and threatened by dragons, plague, and random storms.

Contemporary Interplanetary Space populated by planets and satellites and swept by stellar flares and radiation storms.

But in each Skin, the elements are the same: locations which process data, operating stationary processes, and roaming applets performing a variety of functions.

Internal Architecture. The environment within cyberspace is a broad plane of locations arranged in a regular pattern. Each location has a distinct number of connections to neighboring locations. This number identifies its architecture.

For example, Architecture-4 indicates each location has four connections to adjacent locations (which is a square grid). Architecture-6 indicates six connections (which is a hexagon grid). Any number of connections are possible, although Architecture 1 and Architecture-2 appear to be impractical.

Many substantial variations of Architecture are possible:

The edges of the plane may wrap (like a cylinder) or the plane may be the surface of a sphere.

Locations may have varying or random numbers of connections.

Y-Connectors and X-Connectors linking locations with multiple other locations

Standard Imperial Computer Architecture is a compact bounded flat plane with a square grid.

POSITRONIC BRAINS

Positronic brains begin as blank slates. A positronic brain is activated, giving it consciousness and self-awareness. It is immediately connected to a flash learning system which floods the brain with information and the techniques and abilities to use it.

In a matter of weeks, the brain has reached the equivalent of Life Stage 3 and is ready to be installed in a robot body.

Cannot Be Recorded or Overlaid. A positronic brain is dependent on the random structure of the noble metal sponge. Its personality can be imitated (by an expert system), but it cannot be recorded. Personalities cannot be overlaid on it or implanted.

MISSILE BRAINS

Missiles can be equipped with a variety of guidance and control systems.

Hardwired (C+S)= 5

The Missile is hardwired with a rudimentary decision-making systems. It operates independently once launched.

Minimum Missile Size = 3.

Operator Guided (C+S)= Operator

The Missile is guided by a Gunner in the launching Mount.

The Missile takes its C+S from the Characteristic and Skill of the Operator.

Distance Effects. Guidance by an Operator at a distance ultimately declines in quality. (C+S) is modified by minus World Range (R=). If (C+S)-R becomes less than 5, the Missile reverts to Hardwired (C+S)=5.

Attention Effects. The Operator must be participating in the Guidance process when the missile attacks. If not, the Missile reverts to Hard-Wired (C+S)=5.

Minimum Missile Size = 4.

Self-Aware (C+S)= varies

Self-Aware missiles are equipped with a Brain (Electronic, Positronic, Semi-Organic, usually not Organic) which operates the missile and guides it to its target.

Self-Aware Brains are constantly fed sensor data about the current ship's position and the location of other ships and targets in the area. When in jump, the Brains are fed random situations and information.

The Brains are constantly gaming the information, competing with each other for high scores and other rewards.

Although Missile Brains communicate with each other, there are no communications channels with the ship or crew; it is important that Brains never learn that, when actually deployed, the end of the mission is final.

Self-Aware Missiles self-destruct if their mission is unsuccessful.

DataCasters. One purpose of DataCasters is to communicate with Self-Aware Missile Brains. Success shocks the Brain into inaction or even to turning on its launchers.

Self-Aware (C+S). C+S for a Self-Aware Missile is determined at the time of Launch

C= 6 + 1D
S= 1D
Plus Flux.
Minimum Missile Size = 5.

DownLoad. A Missile Gunner can DownLoad his Personality into a Missile (or several missiles) and send them on their way.

Each missile is guided by the personality of the Operator (which would dissipate anyway after several days).

Minimum Missile Size = 5.

Eneri Dinsha Drives Across The Continent

For example, Eneri Dinsha is driving a GroundCar. There is a computer in place between the controls and the vehicle itself. That computer may include sophisticated braking features; finely tuned reactive suspension, and an array of console information. Nevertheless, driving tasks are resolved using Eneri's characteristic and skill.

For example, Eneri Dinsha is driving a GroundCar equipped with a computer which has a P0 Positronic Brain as its System Process (but not a Component process). Eneri starts to fall asleep at the controls; the On Board Brain senses his erratic driving and speaks to him: "Alert! Your driving is erratic!".

For example, Eneri Dinsha is driving a GroundCar equipped with a computer which has a P0 Positronic Brain as its System Process, and with a Vehicle Component Process. Eneri starts to fall asleep at the controls; the On Board Brain senses his erratic driving and takes over the controls. Since a P0 has Int=1 and Vehicle-1D (=4), it isn't a very good driver, but it can at least pull the vehicle to the side of the road, crank up the heating system, and flash the interior lights to

get Eneri's attention: "Alert! You were driving erraticly. You should get some sleep before we continue."

Finally, for example, Eneri Dinsha is driving a GroundCar equipped with a computer which has an S2 Semi-Organic Brain (Int=2D, Skill=2D) and a Vehicle Component Process. Eneri starts to fall asleep at the controls. The On Board Brain senses his erratic driving and takes over the controls, driving the vehicle through the night. Eneri wakes up in the morning as the vehicle is just arriving at its destination.

CYBERSPACE AND SPACE COMBAT

Resolving conflict in CyberSpace during space combat is overlong and distracting. Instead, use the following:

A Virus successfully introduced onto a ship disables the Component at the Hit Location.

In each successive Combat Round, the Virus may attack an adjacent Hit Location and succeeds if 1D < Computer + Virus.

For example, a Virus is assigned a value = 1D = 3. It attacks an adjacent Hit Location Power Plant controlled by Computer/2. It must roll 1D for 2+3 or less = 5. If successful, that location is disabled.

A Virus is isolated if all computer connections are cut between the Virus disabled locations and all other hit locations.

Computers

Computers fill a variety of roles in the control of equipment, vehicles, and the processes of industry and bureaucracy. Computers operate in a number of ways to complement, supplement, supplant, or replace active intelligent control or supervision.

THE SHIP'S COMPUTERS

Select a master Ship's Computer.
Install it on the Bridge.
Note the Local Computers for each of the Major Components.
Create the Local Network.

THE SHIP'S COMPUTER

Every ship has a master Ship's Computer located on the Bridge. It networks with the many Local Computers throughout the ship.

Local Computers. Every major component has its own Local Computer managing its activities and operation.

The Standard **Local Computer** is a Model/2 loaded with a Console System Process and the appropriate Component Process.

Major Components

Each item in these categories is a Major Components and has a Local Computer.

- Drives
- Power Plants
- Sensors
- Weapons
- Defenses

Computers are identified by Model, and distinguished by TL, Cells, and Cost.

Cells. Computer capacity is measured in Cells. One cell can contain one Process. A system operates most efficiently if free Cells equal installed Processes.

Computer Tonnage. Computers are not all that big: one Cell is a Lan, or about 100 Cells per ton. Model/5 and lower is dwarfed by its control console (which is about one Deck Square).

Brain Tonnage. Brains are installed in an existing Cell, so while the Brain itself is about 1 or 2 liters, it is part of a larger Cell.

COMPUTER CONCEPTS

Cells hold Processes. The ship's computer network needs enough cells to hold all of its software processes.

Free Cells enhance efficiency. Empty cells help a computer process more rapidly.

COMPUTERS

M	Stage	Model	TL	=	Cells	KCr	Tonnage
0		Model/0	5	2^0	1	100	
1		Model/1	6	2^1	2	200	Console
1b		Model/1 bis	7	2^1+1	3	300	Console
2		Model/2	7	2^2	4	400	Console
2b		Model/2 bis	8	2^2+1	5	500	Console
3		Model/3	9	2^3	8	800	Console
3b		Model/3 bis	10	2^3+1	9	900	Console
4		Model/4	10	2^4	16	1600	Console
5		Model/5	11	2^5	32	3200	Console
6		Model/6	12	2^6	64	6400	1 ton
7		Model/7	13	2^7	128	12800	2 tons
8		Model/8	14	2^8	256	25600	3 tons
9		Model/9	15	2^9	512	51200	5 tons
Ex	Experimental (= Full QREBS)		-3			x 10	x 3
Pr	Prototype (= 3 of 5)		-2			x 3	x 2
Ea	Early (= 1 of 5)		-1			x 2	
Im	Improved (= +1 of 5)		+1			/ 2	
Adv	Advanced (= +3 of 5)		+2			/ 2	
	Fiber Optic	fib	+1			x 1.5	x 2
	Photonic	phot	+3			/ 2	
	Fluidic	flu	+4			x 2	x 2
	Neural Network	neu	+5			x 2	

M. The model number or variant suffix for the computer.
Stage. The technological development stage for the computer.
Model. The standard model name for the computer (bis = second or enhanced).
TL. The tech level of the computer.
=. Shows the formula for computing the number of cells based on Model.
Cells. The number of internal computer operating cells. Each cell holds a process.
KCr. Computer cost.
Tonnage. The ship tonnage requires for the computer.

NETWORK UPGRADES

Upgrade	Status	=
Hardwire Connections	Standard	
Fiber Optic Connections	Standard for fib	
Photonic Connections	Standard for phot	
Fluidic Connections	Standard for flu	
Neural Connections	Standard for neu	
Specific Links Cut	Upgrade	
Wireless Connections	Upgrade	

Default Network. All Local Computers and the Master Computer are default hardwire networked with each other. Upgrade the Network as desired.

Software

The heart of the computer is its software. Each major component and many housekeeping functions are managed by computers controlled by Processes dedicated software packages that relieve people of the burden of day-to-day activities.

COMPUTER PROCESSES

The software that drives a computer is the Process. Each Process addresses a specific function and manages it within the computer.

There are three types of Processes:

System. The Operating System for a Computer. Every Computer requires an Operating System Process.

Component. The governing Process for a Component.

Service. A Process providing support or information.

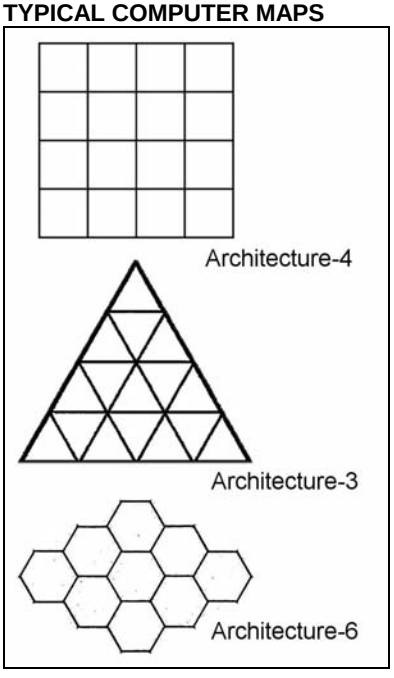
Redundant

Three identical Processes allow a Computer to automatically ignore a computing failure by one of the three.

Brain Tonnage. A Brain is installed in an existing Cell, so while the Brain itself is about 1 or 2 liters, it is part of a larger Cell.

Free Cells. A system operates most efficiently if it has free Cells equal to installed Processes. If the Computer has fewer than one empty cell per operating Process, output is delayed one Round.

TYPICAL COMPUTER MAPS



SYSTEM PROCESSES

M	Type	Process	TL	KCr	C	S
3.1	Console	Process	7	50		
XP	Console XP	Process	8	50		
	Conversational	Process	9	100		
XS	Expert System	Process	10	200		
SA	Self Aware	Process	14	300		
S0	Semi-Organic	Brain-0	10	100	1	1
S1	Semi-Organic	Brain-1	11	400	1D	1D
S2	Semi-Organic	Brain-2	12	800	2D	2D
S3	Semi-Organic	Brain-3	14	1200	3D	3D
P0	Positronic	Brain-0	11	400	1	1D
P1	Positronic	Brain-1	12	900	1D	1D
P2	Positronic	Brain-2	13	1500	2D	2D
P3	Positronic	Brain-3	15	2000	2D	3D
AI-16	Artificial Intelligence	Process	16	2000	1D	1D
AI-18	Artificial Intelligence	Process	18	3000	2D	2D
AI-20	Artificial Intelligence	Process	20	4000	2D	3D
AI-22	Artificial Intelligence	Process	22	5000	3D	3D

Each computer (Local or Master) requires a System Process. It must be installed in the computer is controls. It occupies one Cell.

COMPONENT AND SERVICE PROCESSES

Process	Type	TL	Cells	KCr	C	S
Drive	Component	=Jump	1	=TL		
Power Plant	Component	=PPlant	1	=TL		
Sensor	Component	=Sensor	1	=TL		
Weapon	Component	=Weapon	1	=TL		
Defense	Component	=Defense	1	=TL		
Guidance	Component		1	10		
Life Support	Service		1	10		
Data Base	Service		1	10		
Accounting	Service		1	10		
Astrogation	Service		1	10		
Medical	Service		1	10	+2D	+1D
Entertainment	Service		1	10		
Library Data	Service		1	10		
Security	Service		1	10		
Maintenance	Service		1	10		
Damage Control	Service		1	10	+1D	+1D

Component Processes must be installed in the Computer which controls the Component. The System Process is the controlling software for the computer.

Distributed Processing. Service Processes may be installed in any available Cell in any computer.

COMPUTER MAPS

The interior of a computer can be mapped. It shows the Computer's Cells on a grid based on the computer Architecture.

Architecture-N. Architecture is the number of connections between cells. Architecture-4 connects a cell to 4 adjacent cells; Architecture-9 indicates connections to 9 adjacent cells.

Architecture-3 is triangles; Architecture-4 is squares; Architecture-6 is hexagons.

Many possible architectures exist: for example, Architecture-9 wrapped to a cylinder; Architecture-5 mapped to a sphere.

Standard Imperial Computer Architecture is a compact bounded flat plane with a square grid (Architecture-4).

Applets

Applets are mobile programs roaming about within computers.

UNDERSTANDING APPLETS

An Applet is a mobile program or function capable of moving through the circuitry of computers (as opposed to Processes, which are programs fixed in one location).

Most Applets are basic personalities with low intelligence and simple missions. A Recorded Personality becomes an Applet with the addition of Priority and Expiration.

THE ELEMENTS OF THE APPLET

Char	Details
C4	Intelligence
C5	Education or Training or Instinct
C6	Social Standing or Charisma (but not Caste)
CS	Sanity
	A limited set of Skills or Knowledges or Talents
	A set of unique Memories
	A sense of Purpose and of Self (including IFFN).
	Special Features: Priority. Expiration

Characteristics. An Applet may have one or more characteristics C4 C5 C6.

Sanity. An Applet malfunctions if it fails a Sanity Check.

Skills. An Applet may have one or more skills; usually a specialized Applet skill.

Memories. An Applet has Memories and is able to interact with other applets about them.

Purpose. An Applet has a sense of Purpose, usually hardwired, associated with its activities. The Applet has a sense of Self, including an ability to identify and be identified as a friend or foe.

Priority. Priority is established when the Applet is created.

Expiration. An Applet has an Expiration and it dissolves when this date is reached.

MOVING IN THE CYBERSPACE EVIRONMENT

Applets function within Cyberspace: inside the circuitry of computers. They move along connections between cells.

An Applet may move without limit through empty cells.

It may move without limit through any Process or Applet with a lower Priority. It must Stop when it moves next to a higher priority Process or Applet.

APPLET TYPES

Type	Description
Cleaner	Clears obsolete or useless code.
Fixer	Repairs chance variations or faults.
Phage	Destroys malware.
Courier	Carries internal messages and data..
Popup	Carries messages to outputs.
Censor	Evaluates all Applets passing through it.
AI	Artificially Intelligent personality.
RP	Recorded organic personality.
Virus	Creates applets from within a Process.

APPLET CONFLICT

When applets clash, they resolve it through comparison of assets. The applet with the greater assets prevails (tied applets are immobilized). A losing applet is destroyed.

Applet1 Assets	vs	Applet2 Assets
C4+C5+C6+ Priority + Skills	**vs**	**C4+C5+C6+ Priority + Skills**

If AI or Personality: Add Good Flux.

IFF Identification Friend or Foe or Neutral. Native applets (created within a computer carry an IFF code which identifies them. Defenders attack Applets without the proper IFF code.

APPLET GENERATOR

	1	2	3	4	5	6	Virus
C4	1D	2D	0	0	0	0	A Virus is a
C5	Edu=1D	Edu= 2D	Tra= 1D	Tra= 2D	Ins=1D	Ins= 2D	
C6	Cha= 1D	Cha=2D	0	0	0	0	Data Stream or Message
CS	2D	2D	1D	1D	1D	1D	
Skill (=1D)	Clean	Fix	Anti-ware	Destination	Output	Censor	
Memories	Temporary	Temporary	Temporary	Temporary	None	None	

---------- Priority= 1D Days. Expiration= 1D Days. ----------

SPECIAL APPLETS

	AI	RP
C4	= 2D	= 2D
C5	=2D	= 2D
C6	Cha= 1D	=2D
CS	2D	2D
Skills	Many	Many
Memories	Permanent	Permanent
Priority	=1D	=1D
Expires	= 1D Days	1D Days

Or as dictated by the Sophont details

STANDARD APPLET SKILLS

Skill	Applet Type
Clean=	Phage
Fix=	Fixer
Anti-ware=	Defender
Destination=	Courier
Output =	Popup
Censor=	Propaganda

Personalities

Every sophont (natural or artificial) has a Personality: a unique set of non-corporeal elements that define and empower him independent of his body.

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T5

Through much of history, the personality has been integral with the body and never independent of it. Technology has made it possible to free the personality from the body.

Personalities can be recorded, edited, enhanced, and implanted in new bodies.

The basic technology that allows the recording of personalities in turn allows a wide variety of personality manipulations. Recorded personalities can be overlaid on others for a variety of purposes including mindwipes, life insurance, temporary skills, and recreational personalities.

THE ELEMENTS OF THE PERSONALITY

Char	Details
C4	Intelligence
C5	Education or Training or Instinct
C6	Social Standing or Charisma or Caste
CS	Sanity
	A set of Skills or Knowledges or Talents
	A set of unique Memories
	A sense of self (one's identity).
Added When A Personality Becomes An Applet:	
	IFFN Tags. Priority = 1D. Expiration = 1D.

IDENTIFYING THE ISOLATED PERSONALITY

			C4	C5	C6
X	**X**	**X**	**5**	**6**	**0**

Not Applicable

Manufacturing standards and brand reputation are important for skill wafers. QREBS applies.

Skill Wafer. A skill wafer contains a single skill (it's a personality edited down to a single skill). Overlaid on a subject, it grants him the ability to use that skill.

Recreational Wafer. A recreational wafer contains an interesting personality (primarily its memories). The user experiences those memories, and in the process makes them his own, even after the originals fade.

Occupation Wafer. Temporary local needs can be filled by standardized Occupation Wafers: they overlay the skills required for an occupation (as well as some characteristics and a "loyal" identity). The Sanity risk is considered slight when balanced against the needs of society. Typical occupations include Enforcer, Emergency Doctor, Militia, Damage Control Expert. A person under an Occupation wafer is referred to as: "He's been Programmed Police," or "He's Programmed EMT."

TYPICAL WAFER

The typical wafer is about Size= 1; easily inserted into the Wafer Slot present on most computers.

Wafer Jacks. Some individuals have Wafer Jacks: a small implanted sensor capable of reading a Wafer held near it (there is no slot or break in the skin).

WAFER TECHNOLOGY

Wafer Technology encompasses recording, editing, and implanting personalities. Standard Wafer Technology is available at TL-13.

Recording. Most medical facilities have the ability to record personalities. The process is non-invasive and painless.

More sophisticated systems can record personalities from dead (recently dead) brains.

Editing. A Personality can be edited to **remove** or reduce any of its elements. Elements from other Personalities can be **added** (spliced) into a Personality.

Applet Conversion. The raw Personality Recording is relatively useless. After conversion to an Applet, the Personality can be used overlaid or implanted on subjects.

Overlay. A Personality can be overlaid on a person; the elements of the Recorded Personality which are present suppress corresponding current elements. All other original elements remain.

Overlay is not without its dangers: Check San every Day.

An Overlay is **temporary**; it fades after the Expiration period in Days (usually upon awakening the next morning).

Implant. A person's own Personality can be permanently implanted. If edited, the elements of the Recorded Personality which are present suppress corresponding current elements. All other original elements remain.

Jacked In. A Personality (as an Applet) can be inserted into a Computer. A person can establish a feedback loop with his Recorded Personality within a Computer and monitor its activities. The resulting effect is that the person feels like he is in the computer (the term is **jacked in**).

When the person disconnects, the Personality continues in the computer until it expires.

SOME RESTRICTIONS

Wafer Technology has a variety of restrictions.

Genetic Profile. Personalities are best overlaid on an individual of the same Genetic Profile. If overlaid on a different Genetic Profile, Check San daily for each Genetic Profile difference.

Element=0. If an Element is edited to Zero, it suppresses the current non-zero Element. This technique is the basis for Mindwipe.

Element Removed. If an Element is removed; the current Element remains in force.