

Computers in Traveller

By Alex Ingram

The level of computerization is directly related to several world variables: its tech level, its population size and its government type are central. Because computer technology is currently available on a world does not necessarily mean that the planet's industrial base (TL) can actually support it. A lower TL may denote that computers are not manufactured on planet, or the number of imported computers are quite limited, or computer parts / software is available in restricted quantities, or there is a shortage of trained computer repair specialist available. Government structure also affects this equation in that a dictatorship may severely limit computer ownership and use in order to restrict information contrary to ideological or political doctrine, or a theocratic regime may censor unholy ideals to the masses. Another factor that could possibly affect computerization is the world's Social Control Rating and Law Level imposed. GNP could also play a part in this equation denoting that only the privileged can own computers. The GM should determine if these issues are valid for a specific world.

Universal Computerization Rating (UCR) (1d10)

UCR denotes the percentage of the planetary population having direct access to computer technology. This does not address networking (See UNR below). Roll 1d10 for the base percentage of planetary computerization. The results will range from: 0 equaling 0-9% (minimal computerization) through 9 equaling 90-99% (maximum computerization). The UCR primarily represent world population centers; rural areas and wilderness settings will have significantly lower computer ownership. Apply the following DMs:

Tech Levels		Population*		Governments	
1-4	= -9	1	= -8	Total Anarchy	= -7
5	= -7	2	= -4	Theocracy	= -9
6	= -3	3	= -2	Repressive Dictatorship	= -3
7	= 0	4	= -1	Subjugated Government	= -3
8	= +1	5	= 0	Feudal Aristocracy	= -1
9	= +2	6	= +1	Monarchy / Oligarchy	= 0
10	= +3	7	= +2	Technocracy / Bureaucracy	= +5
11	= +4	8	= +3	Corporate Government	= +7
12	= +5	9	= +4	Democracy	= +9
13	= +6	10	= +5		
14	= +7				
15	= +9				

* Population ranges from 10¹ (10 people) to 10¹⁰ (10 billion+ people)

Universal Network Rating (UNR) (1d10)

If UCR is 30% or greater roll on the UNR table below. Keep in mind that less populated areas of a world may be outside network connectivity. The following can be modified by the GM depending upon TL, population size, government type, Social Control Rating, Law Level and GNP of a world.

2-3	No Publicly-Accessed Computer Networks are Available
4-5	Publicly-Accessed Centralized Unregulated Wired Local Area Networks (Intranets)
6-9	Publicly-Accessed Centralized Regulated Wired Wide Area Networks (Internets)
10-11	Publicly-Accessed Decentralized Unregulated Wireless Global Network (Cybernet)
12	Government / Military Decentralized Classified Wireless Global Network (Skynet)

The GM should determine which of the following computer technologies are dominate. The only thing that can be accurately predicted is that in the future computers will become cheaper, smaller, faster and more reliable. The system below is non-Earth-centric; it's based upon Imperial standards.

TL-3-4	Mechanical Computers (Babbage-type Engine)
TL-5-6	Electrical Computers (Vacuum Tube Technology)
TL-7-8	Electronic Computers (Integrated Circuit Technology)
TL-9-14	Optical Computers (LightWave Technology)
TL-14-15	Quantum Computers (Positronic Technology)
TL-15	Nanobot Computers (Under development by Imperial military / megacorporations)
TL-16	Biological (DNA) Computers

Computer-Related Skills

Using computers and networks require training in their creation, operation and maintenance. IMTU the following skills apply:

Keyboarding-OSCA (Operating Systems & Common Applications)

Skilled in touch typing at speeds upwards of 75 wpm.. Trained in using either *WindowsX* 2D OS, and/or the newer *Holographx* 3D OS. Each operating system has its own suite of applications (i.e., word processing, spreadsheet and database programs). Developed and licensed by Microsoft Corporation *WindowsX* version 43.77 is 'the' universal standard throughout the galaxy. Developed and licensed by the Linxx Corporation *Holographx* version 24.6 is the most widely used holographic OS. While *WindowsX* uses *CommonX* as its programming language, *Holographx* uses *PolyGloc* as its.

Programming Languages

CommonX (TL 7-14) (standard 2D operating system used in all general business applications)

CG9000 (TL 10-15) (used in the majority of technical, computer, engineering or scientific applications)

Laxx (TL-11-16) (used exclusively by the Imperial military and its defense contractors) (Most Secret)

Ubby (TL 7-14) (used exclusively by the Zhodani military and their defense contractors)

PolyGloc (TL 15) (used only in photonic / holographic systems)

Ludwig (TL 15-16) (used exclusively in heuristic and synthetic intelligence systems)

Networking

Skilled in surfing hundreds to thousands of planetary computer networks while accessing unclassified information or communicating with friends and colleagues. Often referred to as a "Netrunner", many are trained by the military and intelligence services in detecting, avoiding, countering or circumventing computer network intrusion routines. Network administrators and programmers are constantly creating new intrusion routines (traps, viruses, Trojan horses, guard-dog programs, etc.) to prevent illegal access or outright thief of sensitive and classified information. Netrunners use specifically designed "Cyberdecks", which are advanced powerful systems in order to run the networks, while using a neural interface device (often directly implanted into the brain stem) referred to as a "CyberJack". The use and possession of Cyberdecks and CyberJacks are illegal on many worlds referred to as tools of cyber thieves and industrial spies or foreign espionage agents. Cracking unauthorized networks is a serious crime in most jurisdictions, and at the very least has major ethical implications. In order to create cyber traps, viruses, malware, etc. the PC must also have skills in programming, especially CG9000 and Laxx. Cryptography-Cryptanalysis can also be a useful side skill for a netrunner.

Databasing

Skilled in the design, configuration and management of computer information systems collecting vast amounts of private and public information. Databasers use a common database program to search, classify and extract critical data through data-mining techniques. This information analysis can be either legal or extra legal depending upon intent. Progressive and democratic governments often have laws and regulation regarding the release and use of personal and national security data.

Cybertechnure

Skilled in building a computer network from components, and configuration of computer hardware including micro-computers, personal desktop and laptop machines, and at the high end, "cyberdecks". This also includes designing and integrating wired, wireless and optical computer networks.

Cryptography-Cryptanalysis

Skilled in creating and breaking codes and ciphers. Military systems written in Laxx, and specific CommonX business programs utilize high-level cryptographic algorithms for security purposes. Cryptography includes the cryptanalysis of foreign or rival cryptosystems.

Macro-Electronics (TL-12-15)

Skilled in diagnosis and repair of electronic devices at the module or board level.

Micro-Electronics (TL-12-15)

Skilled in diagnosis and repair of electronic systems at the microchip level.

Generation Ratings (GR)

The term "Generation" refers to a new engineering technology, different enough in production methods, materials, and theories distinguishing it from an earlier product line. IMTU, computer technology is designated by its Generation Rating (GR). Modern Earth would be TL 7-8.

TL-5	GR-1	BIPS: 0.0001	MStor: 0.1 Megabyte	Cost: 10,000 ICr
TL-6	GR-2	BIPS: 0.001	MStor: 1.0 Megabyte	Cost: 5,000 ICr
TL-7	GR-3	BIPS: 0.01	MStor: 10 Megabytes	Cost: 2,500 ICr
TL-8	GR-4	BIPS: 1.0	MStor: 100 Megabytes	Cost: 2,250 ICr
TL-9	GR-5	BIPS: 10	MStor: 1 Gigabyte	Cost: 2,000 ICr
TL-10	GR-6	BIPS: 100	MStor: 10 Gigabytes	Cost: 1,750 ICr
TL-11	GR-7	BIPS: 1,000	MStor: 100 Gigabytes	Cost: 1,500 ICr
TL-12	GR-8	BIPS: 10,000	MStor: 1 Terabyte	Cost: 1,250 ICr
TL-13	GR-9	BIPS: 100,000	MStor: 10 Terabytes	Cost: 1,000 ICr
TL-14	GR-10	BIPS: 1,000,000	MStor: 100 Terabytes	Cost: 750 ICr
TL-15	GR-11	BIPS: 10,000,000	MStor: 1 Exobyte	Cost: 500 ICr
TL-16	GR-12	BIPS: 100,000,000	MStor: 10 Exobytes	Cost: 250 ICr

The maximum amount of system RAM, as well as the maximum amount of Mass Storage (MStor) is ten times larger for each successive generation. This translates into the ability of a computer to run more efficient versions of its operating system and web browsers, along with higher complexity applications and databases.

Primary Components of Standard Computer Systems

Central Processing Unit / Microprocessors – May contain one or more chips

- Mechanical Technology (TL-2-4)
- Vacuum Tube Technology (TL-5)
- Large Scale Integrated Circuit (LSIC) Technology (TL-6-7)
- Lightwave (Electro-Optical Laser) Technology (TL-8-9)
- Quantum (Neuronet) Technology (TL-10-15)
- Biomimetic Technology (TL-15)

Motherboards + Random Access Memory (RAM)

Mass Data Storage Devices

- Computer Punch Cards (TL-5)
- Magnetic Drum / Tape (TL-5)
- Floppy Disc (TL-5-6)
- Electro-Optical Media Discs (CDs / DVDs) (TL-6-10)
- Hard Disk Drives (HDD) (i.e., MFM / EDSI / SCSI / SATA) (TL-6-10)
- Flash Memory Storage Devices (Secure Digital / Compact Flash) (TL-6-10)
- Crystal Matrix Memory Modules (TL-13-15)

Graphics Cards – May contain one or more cards connecting to one of the following:

- Cathode Ray Tube (CRT) Displays (TL-5-6)
- Liquid Crystal Displays (TL-7-8)
- Liquid Plasma Displays (TL-7-13)
- Laser Heads-Up Displays (HUD) (TL-7-13)
- Virtual Reality (VR) Holographic Displays (TL-13-15)
- Nano-Tube Displays (Flexible Portable or Multi-Walled) (TL-11-15)
- Neural Interface Devices (Helmet or Surgically Implanted) (TL-10-15)

Input-Output Interface Cards (using SCSI, USB, FireWire, Bluetooth Wireless, etc.)

- Keyboards / Mice / Trackballs / Game Controllers
- Image Scanners
- Digital Video or Still Cameras
- Headphones / Speaker Systems / Microphones
- Telephone Modems
- Printers (Laser / Thermal / Impact / Dye-Sub / Inkjet)

Network Interface Cards (Wired or Wireless) (Determines the latency speed for network connections)

- World-Wide Network Broadband or Dialup Protocols (connecting via Coaxial or Optical Fiber Cable)
- Bluetooth Personal Area Network (Wireless Protocols)
- Cellular Wide Area Network (Wireless Protocols)
- WiFi Local Area Network (Wireless Protocols)

Power Supply / Batteries

Graphical Operating Systems (MS Windows OS, Macintosh OS, CommonX OS, etc.)

Network Browsers

Search Engines / Expert Systems

Applications (Word Processing, Spreadsheet, Database, Presentation, Page Layout,

- Image Manipulation, Organizational Tools, etc.)

Databases (Subsector Star Charts, Planetary Directories, World Statistical Extracts, etc.)

Computer System Size

Handheld (Personal Digital Assistants (PDAs) / Cell Phones / Pocket PCs)

Notebook (Tablet PC / Laptops)

Desktop (Personal PC / PC Workstations / Cyberdecks)

Microframe (Cabinet-sized systems used by small businesses and smaller networks)

Mainframe (Vehicle-sized systems used for corporations and larger networks)

Special Capability Costs

Hardened – Resistant to electro-magnetic pulse (multiply cost by 10)

Modular – Build as compactly as possible to fit within another structure or robotic frame (multiply cost by 5)

Printed – Circuits are imprinted on specialized textile or other flexible material (multiply cost by 5)

Quantum – Extremely fast processors designed specifically for massive computational programs or intelligent programs (multiply cost by 100)

Semi-Sentient (also referred to as Machine Intelligence) (no emotions or social adaptability)

Full Sentient (also referred to as Synthetic Intelligence – Neuronet)

IQ Level – Only applies to sentient programs and equates to human IQ.

Classified (C) or Trade Restricted (TR) – Classified by the military or security services or restricted from export trade for national security reasons