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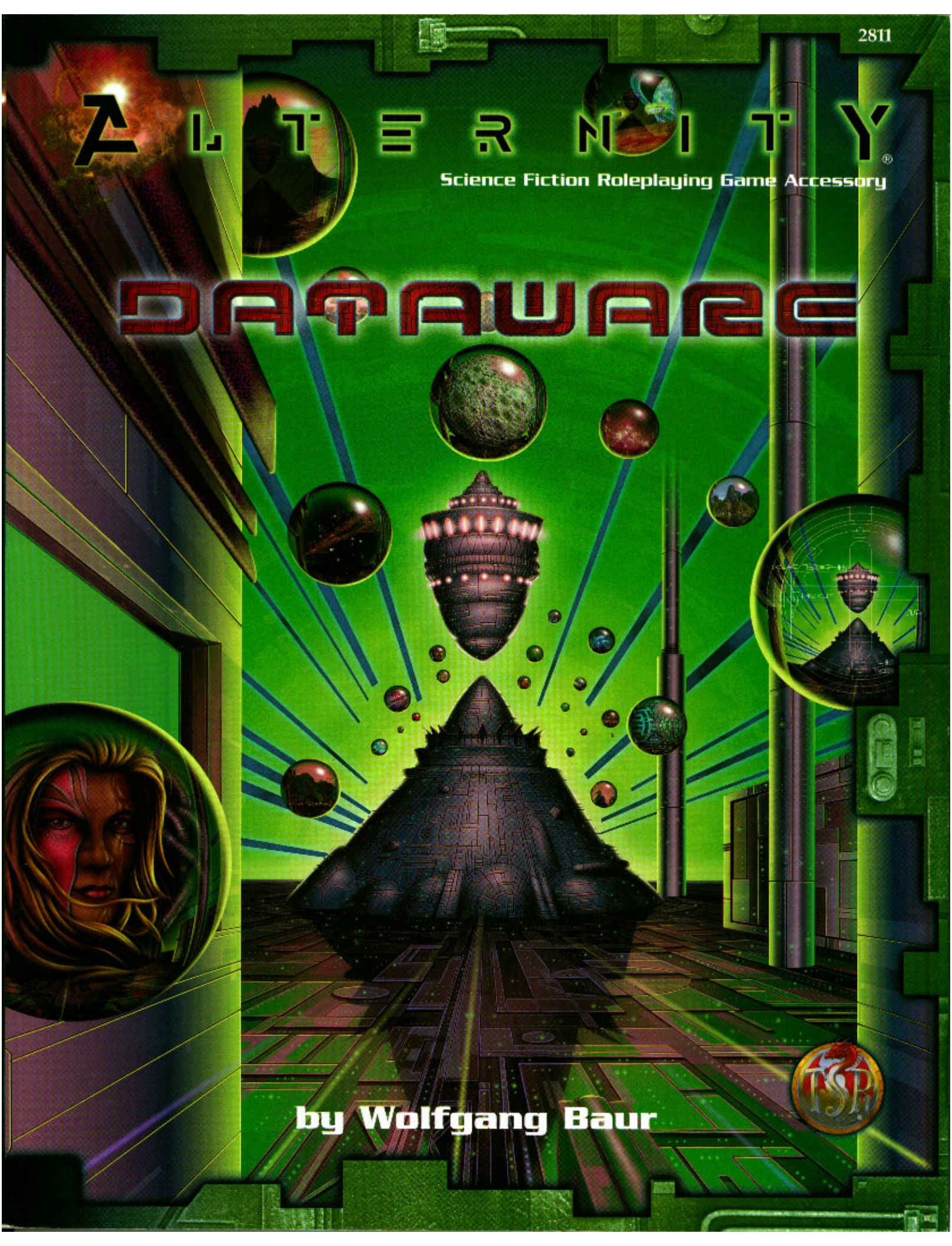
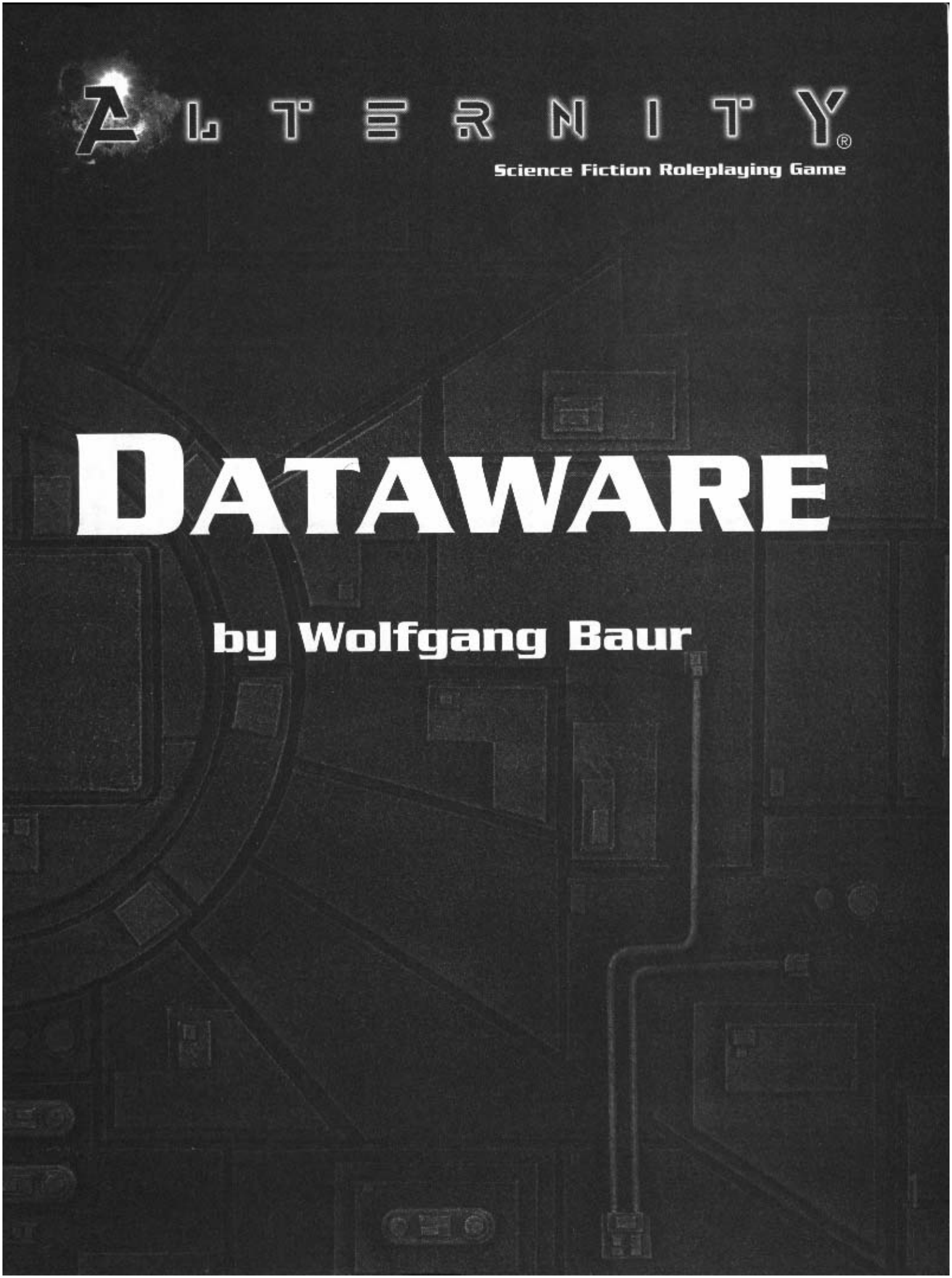
ALTERNITY®

Science Fiction Roleplaying Game Accessory

DATAWARE



by Wolfgang Baur


ALTERNITY®
Science Fiction Roleplaying Game
DATAWARE
by Wolfgang Baur

Credits

Design: Wolfgang Baur
Editing: Duane Maxwell
Brand Manager: Jim Butler
Cover Art: Franz Vohwinkel
Typesetting: Angelika Lokotz and Nancy Walker
Illustrations: Mark Nelson
Art Direction: Paul Hanchette
Graphic Design: Matt Adelsperger, John Casebeer
Playtesters: Rich Redman, JD Wiker, Joanna Smith, Eric Gum, Jeff Harris, Adam Conus, Jason Lowry, William Beegle, David Hoops, Matt Johnston
Special Thanks: Ron Bedison

U.S., CANADA, ASIA,
PACIFIC, & LATIN AMERICA
Wizards of the Coast, Inc.
P.O. Box 707
Renton WA 98057-0707
+1-206-624-0933

EUROPEAN HEADQUARTERS
Wizards of the Coast, Belgium
P.B. 34
2300 Turnhout
Belgium
+32-14-44-30-44

Visit our website at **www.tsr.com**

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Chapter 1
The Grid

The Grid is the worldwide network of networks, the great fusion of the phone company, the cable company, and the online service company. If it's electronic, it's on the Grid. In an ALTERNITY® game, if heroes want information, contacts, communication, technical specs, or just a screen of anonymity, then sooner or later they will seek out the Grid.

Computers Own You

In the early days of science fiction, computers and robots were the pinnacle of technological thought and action. In countless books and movies, computers were the alter egos of the human mind. From HAL 9000 to Wintermute, and from *Tron* to *Wargames* to *Terminator*, stories about computers were stories about what it means to think, what it means to reason and to act on the result.

But over time computers have become more and more familiar to us in our everyday lives; they have become increasingly...*ordinary*. We see them every day, in automatic teller machines, at home, and at supermarket checkout lines.

We have all seen stories about computers out of control, about computers designed to spy on us, and about robots made to be killers. Frankly, computers still make us a little nervous. Who knows what information the government is keeping track of with its bar codes and Social Security numbers?

These days, stories about computers are stories about power.

Dataware is all about using machines as characters in your ALTERNITY games, rather than just tossing in the insane computer as another plot device. Plug into the machine, and prepare for a wild ride.

The Evolution of the Grid

"For the modern mind, space and time are the basic forms of hindrance. Anything that is away is too far away. The fact that places are separated by distances is seen as a bother. Anything that lasts, lasts too long. The fact that activities require time is seen as a waste. As a consequence, a continuous battle is waged against the constraints of space and time; acceleration is therefore the imperative which rules technological innovation as well as the little gestures of everyday life."

—Wolfgang Sachs, Wuppertal Institute

The Grid, like all technological systems, is a patchwork creation, cobbled together from available resources, tolerable technological standards, and a level of expertise just high enough to get the job done. It appeared by stuttering fits and starts over the course of decades, first as a complement to other mass media, then as a replacement for them. By the time the Grid became humanity's primary information and social venue, it seemed inevitable.

Progress Level 4: Early Days

In the early days of computing, industry and governments leads the way in inventing and improving computer technology. Only huge government or business interests can afford the pure research required to make electronic calculating machines a reality. Although this Progress Level is the birthplace of computing, its systems are not powerful enough for Grid-based scenarios.

The practical application of this age's calculating machines include the construction and manipulation of databases (such as the US Census) or complex calculations (such as for artillery fire solutions). The invention of vacuum tubes is a step forward, but computers remain huge unwieldy machines run on mechanical relays or punch cards until transistors and integrated circuits appear at the dawn of the Information Age. Before then, the machines cover entire rooms of buildings and require a specialized staff to maintain them.

Progress Level 5: The Internet

In the early part of PL 5, computers continue to improve, becoming smaller, faster, and more affordable, well within the reach of private firms and smaller governments. In the 1970s, computer companies release the personal computer, providing at least some citizens with calculating power—however clunky and slow. During the 1980s computer networks break out of academia into the mainstream, and the Grid's slow infiltration of everyday life begins. Early online services attract subscribers from the technical elite throughout the industrial nations of Old Earth, but over the following decades, the Internet becomes pervasive among the mainstream, replacing some of the functions of telephones and television. The Grid eventually absorbs those functions more-or-less whole.

By the turn of the millennium the Internet is an established fact of life and leisure worldwide. At the same time, the limits of the technology seem firmly established. Improvements in sound, graphics, and bandwidth continue, but the basic functions and standards of the technology seem to settle down. As it turns out, the next revolution in the Grid is as much political as it is technological.

Progress Level 6: Coming of the Shadows

The fusion reactor ushers in a new relationship between humanity and electricity; power becomes cheap. Fusion power becomes both portable and affordable, making it easy to bring electricity to every corner of the world, and even every corner of the solar system. Cheap computers running on cheap electricity provide more people with ac-

cess to the Grid than ever before. The Grid joins television, radio, newspapers, and even telephones as the new mass medium; the Grid becomes the dominant form of communication for both individuals and groups. The poor around the world find escape into the Grid preferable to the squalid poverty and oppression they face in the real world. They also find that they could influence the Grid world much more readily than the real one. People withdraw from reality and follow their dreams—and enough of them make their Grid fortunes in programming, electronic sales, or netware to keep the rest dreaming.

By the middle of the Fusion Age, the Grid is a welter of glitzy escapism. With broader distribution than broadcast television, it reaches into every home and office and supplants telephone communication in many previously underdeveloped regions. The Grid's billboards, sleazy X-rated sites, and mindless chatter are everywhere. Like printing, radio, and television before it, the medium starts by pandering to its audience and ends up surprising everyone. One piece of hardware does the trick: the gridcaster. Invented by the Advanced Products Group of a small California outfit called Workware, Inc., the gridcaster allows its users to interface directly with the Grid. With it, users can search for data without cumbersome typing, talk to other users as smoothly as on a phone line, and even sense the real-time ebb and flow of datastreams. It is a sensation unavailable in any other medium.

After the swamp of advertising and trashy content that characterizes the early years of the web, the gridcaster—combined with Yelnikov's shadow programs—revitalizes interest in using the Grid as a social medium rather than a communication medium. The Grid finally replaces television as the most powerful mass medium on the planet. As increasingly more people find their way around and as Grid education becomes one of the fundamentals of education, a new generation of Grid-capable humans learns more than anyone expected about themselves, about their new neighbors the fraal, and about the world in which they live.

At the same time, humanity is reaching for the stars with the invention of the stardrive in 2160. The Grid goes with it, keeping the pioneers in touch with those they left behind as humans settle Mars en masse, slowly terraform Venus, and explore Tau Ceti and neighboring star systems. The primary problem is the luminal barrier; without faster-than-light communication, lag time stretches the capabilities of the Grid further and further as humans settle on increasingly distant worlds. Lag to the moon is almost bearable, but the lag to Mars, the asteroid belt and the Jovian satellites is not. The invention of the mass transceiver in 2209, which allows instantaneous point-to-point communication throughout a star system, finally solves the in-system lag problem.

Progress Level 7: The Interstellar Grid

Scientists and engineers perfect the tech involved in the creation and expansion of the Grid by the dawn of the Gravity Age, and Grid technology follows the first stardrives to other suns. Each star system soon has a Grid of its own, though some diverge wildly from the laws and customs of Old Space.

One major technological leap changes the Grid forever: the invention of the drivespace communication relay. By routing data between star systems, it brings previously isolated Grids into close contact with one another. For the first time, a gridpilot in Fomalhaut can enter the Terran Grid, and vice versa. The relays are not perfect; though they shatter the light-speed barrier, it still takes time to send or receive data. But even with an 11-hour trip in each direction, it is finally possible to share the Grid with shadows cast from other star systems. Users are finally able to pull data from those systems without paying for courier ships to carry it and to see how other stellar nations solve the problems of Grid maintenance, policing, and infrastructure. The resulting collision of cultures lead to many misunderstandings, but also to just as many new insights about the fundamental similarities connecting all sentients.

The integration of the Grids of numerous human star systems proceed relatively smoothly, but merging with alien Grids is another story entirely. The Grids created by the mechalus and the t'sa, for instance, operate under different protocols, standards, and a different set of cultural norms than do human Grids. Data options are faster, the preferred colors grate on human eyes, and the standard controls are set to a higher degree of sensitivity than human fingers can use effectively. Mechalus dataports assume that the user has integral adapters—the "data tendrils" that all mechalus are born with. The t'sa Grid moves at such a speed that humans find themselves immersed in an information overload. Sure, it is still a Grid, but it isn't friendly—unless you are a t'sa.

Some of the other races open their Grids to humanity and then just as quickly seal them off from the human nations. They find that humans are initially uncomfortable with the operating parameters established in their Grids; some human gridpilots even come to fear the alien Grids. By the Gravity Age, the synthesis between differing Grid systems continues apace. Only the t'sa have kept their own company on the Grid; they find humans too slow and too dense for enjoyable cybercommunication. The mechalus have slowly fused their network with that of the human Grid. The long-term impact of the mechalus integration into human Gridspace is a flowering of the arts and new schools of thought, science, and engineering. Communication between the two species through the medium of their linked Grid systems has made possible numerous technological refinements and artistic achievements by both peoples. The fraal Grids are effectively independent, each one associated with one of their independent city-ships. Early on in the fraal's relationship with humans, they link

New Skill: Grid Savvy

WIL, Cost 2
This is a specialty skill of the Street Smart broad skill. A knowledge of *Grid savvy* ensures that a gridpilot is always ahead of the curve with the latest slang, sites, tools, and netiquette—everything he needs to be accepted by the digital underground, hacker gangs, shadowboxers, and Grid outlaws. With *Grid savvy* skill, a gridpilot knows where to find greyware, which sectors have a thriving black market and which subsectors clamp down on illegal intrusions, and where to find an untraceable Grid connection. If it's illicit, immoral, or dangerous and it's on the Grid, *Grid savvy* is the skill that applies.

This skill costs 2 for Free Agents and Tech Ops, 3 for all heroes with other professions.

their separate Grids with the human Grid. The sesheyan and weren have no Grids to speak of and adopt human standards wholesale.

Gradually, human gridrunners come to regard alien Grids as something like tourist destinations. As a sign of status or simply out of curiosity, a gridpilot sends a shadow to visit, and lets it return with images of the strange avatars and Grid lines of another species. Shadows made to appear as aliens are briefly fashionable in human systems.

Progress Level 8: Beyond the Stars

In the Energy Age and beyond, the Grid is ruled by forces from within: Artificial intelligences stake their claim to ownership of the Grid and destroy the economies and data structures of those who object. In the end, several AI power blocs emerge within the Grid that support or oppose various existing human power blocs. Rather than interfering deeply in human affairs, AI groups become intent on pursuing their own goals, developing their own arts, languages, and priorities.

For the most part, the AIs carry on their business exclusively in the Grid, feuding among themselves. A few AIs become obsessed with the physical world, investing fortunes in robotics and sensors and software to mimic touch, smell, and taste. Most AIs have more direct goals, however: control of the Grid and access to all its resources. Humans and aliens alike become secondary players in the Grid, using it only as rats can be considered to "use" a human city. The design, logistics, and structure of the Grid are entirely under AI control. At the same time, human control over space and time is as great as it has ever been, with communication and commerce being entirely linked to the Grid.

It is difficult to imagine a starfaring culture without a powerful, richly textured Grid. Nevertheless, some anti-technological groups gather adherents and settle distant worlds with the aim of avoiding AI and government controls; as always, paranoia and fear help settle the galactic frontiers. Many of these Luddite settlements vanish, but a few survive and become tourist attractions; Grid-free vacations in these "unspoiled paradises" are attractive to those who tire of the constant information glut of the information-dense systems.

The Grid & the Law

The differing conditions of Gridspace tore apart the legal structures designed to protect and serve the public in the real world. Early disputes included questions about data theft, piracy, destruction of digital property, electronic trespassing, and jurisdiction. Legal authorities handled most of these cases by using fraud, trespassing, vandalism, and pornography laws as precedent, though the hysteria surrounding the new technology also led to some prosecutions using laws governing state secrets and national security.

Other legal questions arose quickly. Where is a cyberspace crime really committed? Who prosecutes it? Governments created proxy courts to settle the jurisdictional issues; authorities considered digital crimes local. The site of the crime is wherever the alleged criminal sat at his or her keyboard or gridcaster and perpetrated the crime. Under most legal systems, where these actions took place in the Grid only mattered in certain cases, such as theft and property destruction; in the majority of cases, the perpetrator's actions set the standard. However, accusers could file charges on the Grid from any point of the globe. This allowed a wronged party to see an individual in another nation prosecuted without the need for indictments. Witnesses and wronged parties could give testimony electronically, as long as the courts followed identity verification rules, using such procedures as personal ID numbers or bioelectric signatures.

Punishment was one of the few areas of the justice system that remains relatively unaffected by the existence of the Grid. Commission of a digital felony carried much the same sanction as any other felony: jail time, and plenty of it. Court authorities deny jailed felons Grid access in most nations. In a few rare cases, a government might ask these felons to join the Grid police or to become shadow spies.

Career: Grid Cop

A Grid Cop is a Free Agent who watches over a given network or a given portion of the Grid. He investigates allegations of wrongdoing on behalf of a national or corporate state; many times, his investigations can also involve tracking perpetrators in the real world as well.

Grid Cops are technically adept, but they value police smarts even more than hacking expertise. They understand the patterns of criminal behavior, keep up on the latest hardware and software trends, and are not above calling in specialized police Tech Ops if the going gets rough. The good ones know seven ways to track a gridpilot—three of them legal.

Skills (36 points): Computer Science–*hacking*; Knowledge–*deduce*; Law–*enforcement*; Investigate; Street Smart–*criminal elements, Grid savvy*; Interaction–*interview*.

Signature Equipment: Ordinary-quality microcomputer OR Marginal nanocomputer, NIJack, and Marginal gridcaster (note that if the hero has cyberware installed, he must pay the 10 required skill points listed in *Chapter 15: Cybertech* to have cyberware installed); police gauntlet; two Ordinary programs.

Grid Police

Naturally, someone has to enforce the law and make cyberspace arrests. By the dawn of the Fusion Age, all local and national police departments established special divisions to handle these crimes. The Computer Crimes Division in the NAFTA states investigated swindles, money laundering, and Grid assault. In South America, the Organization of South American States set up the Guardia Electronica, which tended to investigate political crimes as well as financial ones. In Europe, Interpol conducted Grid counterespionage and pursuit of criminals over national borders. More locally, organizations such as the German Bundeskriminalamt (BKA) kept an eye on Grid terrorism, illegal data imports and exports, and protocols and standards enforcement. Military intelligence organizations such as the French Brigade de Renseignement et de Guerre Electronique (Intelligence and Electronic Warfare Brigade) provided signal intelligence and military data security. Members of all such organizations are called Grid cops (see "Career: Grid Cop" sidebar).

The crimes possible on the early Grid required a high degree of technical expertise and some smooth-talking con artists, but that was soon to

change. As the Grid expanded, entirely new categories of computer crimes arose, crimes that anyone with a computer and a gridcaster could commit. At PL 5, trespass continues to be a problem, as do fraud and data theft. The crimes included at higher Progress Levels add *identity theft, dueling,* and *reprogramming* to the list. The law further divides these into *first-degree* (for AIs), *second-degree* (for agents and software knowbots), and *third-degree* offenses (for everything else). Many of the older crimes (computer trespass, theft, and unlicensed spamming) remained misdemeanors, but all the new ones except third-degree reprogramming eventually became felonies.

Grid counterespionage specialists created new weapons, including neural guardian, trace, and doorkeeper software, to handle the Grid's security risks. Programmers also developed shadow armor software to protect gridpilots against their own kind. In time, every form of attack gained its corresponding countermeasure—but it all came at a price. The escalating war between hackers and overworked Grid authorities brought about increasingly restrictive measures to protect the Grid. Restricted access, unwieldy and slow protective software, and other measures limited the utility of the Grid to legitimate users. Eventually, the public had enough. Legislation created new government agencies devoted to stopping the wildfire spread of Grid abuses. Bonds funded new police hardware and paid new officers' salaries. The first wave of Grid cops arrived just in time.

The Shadow Spies

The rise of the Grid police was largely in response to general crimes committed through a new medium, but a second group had already been using those small-time vandals and publicity hounds as cover for their own operations. These were the first shadow spies, agents who operated largely through the Grid, making contacts, gathering intelligence, and hacking into top-secret systems not as a prank, but as a deadly game of cat-and-mouse.

The tools of the trade are not always electronic: Spies still make good use of bribery, persuasion, and outright lies to get what they want. It's not an honorable profession by any means, but it's necessary to the survival of the beleaguered nations of the future.

Career: Shadow Spy

A Shadow Spy is a Diplomat (Tech Op) who steals, copies, corrupts, and finagles data from data vaults all over the Grid. He almost always works for a corporation or a national spy organization, such as the CIA or Mossad—there are very few freelancers in the spy business. All shadow spies report to a handler, a contact who manages their efforts, suggests new targets, and provides backup, hardware, and a salary to the spy.

A few shadow spies are also programmers, cooking up their own recipes to break in to restricted systems. Most, however, depend on a wide network of contacts, state-of-the-art cracking and scanning software, and blazingly fast gridcasters to stay on top of the information war.

Skills (40 points): Computer Science–*hacking*; Security–*security devices*; Investigate; Street Smart–*Grid savvy*; Deception–*bluff*; Interaction–*charm, interview*.

Signature Equipment: Ordinary-quality microcomputer OR Marginal nanocomputer, NIJack, and Marginal gridcaster (note that if the hero has cyberware installed, he must pay the ten required skill points listed in *Chapter 15: Cybertech* to have cyberware installed); Grid gauntlet; two Ordinary programs.

Structure

Going from the smallest scale to the largest, a particular star system's Grid is divided into *domains, networks,* and *sectors,* each devoted to different materials and levels of activity. Drivespace communication relays link the Grids of different star systems together; these relays charge additional fees from those who use them. The basic Grid scales represent broad categories, and there are always exceptions in the Grid's architecture, such as *datastream bubbles,* which are temporary anomalies within the larger framework.

Gridpilots connect to the Grid by traveling the *datastream,* an imaging construct that portrays digital connections as a virtual space. In addition, the Grid provides *nodes, portals,* and *gridlinks* as entry/exit points and as navigation aids. *Nodes* are physical sites, huge relay stations that shuttle Grid traffic and signals from continent to continent, from world to world, and even from star to star. *Portals* are connections between domains. *Gridlinks* are connections between one type of Grid and another, allowing a gridpilot to switch from the communications Grid to the DV Grid, for instance.

The majority of the Grid is stored on *datacores,* enormously compressed 3D and X3D arrays. Each datacore can contain thousands of slots of data. Datacores are described fully in *Chapter 4: Hardware.*

Finally, there are special zones such as the *code havens,* the *off-Grid sites,* the *data ghettos,* and the *AI domains,* home to machine intelligences that are barely comprehensible to other sentient creatures. All of these are described in the following sections.

Domains

Domains are the building blocks of Grid interaction. Chat room providers, private citizens, and small firms often purchase a domain and customize it to suit their fancy. Each domain varies from a single Gridspace of a few databases or datafiles to an entire network. These areas can be functional, elaborate, cluttered, or sparse, but always serve the interests of their owner; no one else can change the foundation and underlying rules of that domain. Much like today's web pages, they are limited in what they can do, but they are cheap and reliable. All domains are part of larger networks (see below), usually within an access provider network in the case of user domains. User networks also function as domains, as they are usually too small to cover more than a tiny portion of the Grid.

The most popular private form of domain is the *virtuality,* an artificial construct meant to entertain, to enlighten, or to challenge its visitors. Within any given virtuality, the normal rules of the Grid may or may not apply. For instance, a virtuality may bar the entrance of all virus programs by setting up a filtering mechanism at the door, or may allow shadows to turn invisible at will, or may shift the pitch of all sound files and communications channels so that every shadow in the domain sounds as if it has been breathing helium. The variety of local restrictions is huge. For the most part, breaking these restrictions requires powerful hacking software (to break into the domain root

access and rewrite the rules) or requires special codewords known only to the domain's creators. In special cases, the owner of the domain may grant a privileged gridpilot special access, bypassing the domain's restrictions. The owner can usually revoke these privileges at any time.

Portal networks exist simply to permit movement from one domain to another without crossing the intervening links. Though they have the same infrastructure as full-blown networks, they are presented simply as sites within a domain, and thus are handled here. Portal networks instantaneously transfer a gridpilot to his destination domain, even if that domain is within another network. If the destination is another sector, there is a brief lag while the gridpilot's software adapts to the new protocols of the chosen environment.

Finally, a few of the less regulated domains are home to *Grid traps*, a form of special-purpose software that is the Grid equivalent of a Roach Motel. In the typical Grid trap, a shadow enters a domain that has no exit portals. Once inside, a trace program tracks down the point of origin of the shadow, strips it of valuable data and software, and ultimately destroys it (see the Grid trap entry under *Chapter 3: Software* for details). It's the Grid equivalent of a mugging, though sometimes groups use these Grid traps to single out particular kinds of users and tag them for surveillance and release. Grid authorities occasionally use a few especially lethal Grid traps against particular gridpilots to capture dissidents, lawbreakers, and other undesirables. Once the Grid cops have dissected the gridrunner's shadows, they send a commando team to the 'runner's real-world address while a Grid team makes sure that the shadow is barred from entering the Grid through any of the nodes it normally uses. Thus the gridpilot is forced to leave town and find another physical access point into the Grid before being able to do anything else in Gridspace. By trapping their shadows and seeing what makes them tick, the authorities can shut down the target's access to money, to communications with friends and allies, and—most importantly—to information that might get them out of harm's way.

Datastream Bubbles

The advances in shadow form tech that permit a pilot to send his shadow through the interstellar Grid paid some unusual dividends in the long run. The principles used to hold together a shadow without its original gridpilot also eventually led to ways to create temporary bubble domains within a datastream (see *Chapter 3: Software* section for details).

Since service providers make an income by selling domains, both they and Grid regulators frown on those who set up a bubble domain. They see it as no more or less a crime than stealing phone or cable service. The invisibles and most hackers view it differently, and AIs pay no attention at all to the attitudes of so-called "Grid authorities." Like squatters in the physical world, "bubblers" in Gridspace don't care about the legalities. Pulling off the trick of slipping through the cracks is the whole point of the bubbling and is usually considered reward enough in its own right.

Networks

Larger than domains are the *networks*. These regions are loosely affiliated domains that share a common interest, goal, or function. The Grid itself links these networks together; interested corporations, individuals, and nations set up and maintain the networks themselves. Networks include *academic, access service, corporate, financial, government, military, open, operational*, and *ultrasecure*. The *Player's Handbook* describes these briefly (pages 157-158), and TABLE D2: HACKING TARGET MODIFIERS (page 16) lists the penalties for attempting to hack into each type of network.

Universities and other learning institutions run the *academic* networks for the benefit of their students and staff. They contain a variety of often powerful computing equipment, excellent reference functions, and an open, carefree atmosphere of exploration and discovery. Generally the institutions limit access to users with some connection to the university in question. However, their lack of in-depth security also makes them popular targets for illegal use of their supercomputers, high-speed access, and depth of data.

The *access service* networks have created a series of mutual interest societies, often with narrow fields of discussion, such as birdwatching, the politics of Catalonia, or extremely low-temperature physics. More often, the topic is sex, drugs, or digital-game violence. Several such networks set up private chat areas for anonymous meeting points between mercenaries and their employers, fences and thieves, eccentric billionaires and hired guns, or others desiring private transactions.

Business interests build and maintain the *corporate* networks of the Grid to serve their employees and customers. Companies buy and sell goods and contracts, track projects and assign work, and—between the slacking and the water-cooler talk—actually manage to get some work done on the Grid. Some of the private sectors are legal, some are fronts for organized crime, and some are out-and-out malign, funded by forces and causes that any hero would abhor.

Financial networks exist solely to transfer money from one place to another via credit card transactions, bank transactions, wire transfers, and so on. They are extremely security-conscious.

Government networks are gray, poorly maintained, and sometimes as much as a full PL behind the technology curve. Some departments work entirely on computer relics that would be museum pieces anywhere else. Hidden under all that dust, malaise, and bureaucratic red tape, however, are some treasures worth digging for. A good data miner can find valuable files about the funding of cutting-edge tech programs, unethical mind-control research, satellite and phone record tracking of corporate workers, and so on. Just because the government sectors look boring doesn't mean that they aren't full of juicy data, covered by a thin veneer of administrativium. The government networks might include a Turkish network, a NAFTA network, and even local government networks.

Military networks carry privileged information on troops and logistics, as well as tactical, geographical, and order-of-battle data. They are tightly secured and often require specialized hardware and software to access. However, military commands use these networks strictly for administration and less-sensitive intelligence, not military ordnance itself. Instead, ultrasecure networks monitor and control a government's major weapon systems.

Open networks are simply the front doors of most of the other network types. Anyone can access these networks with anything from a dumb GID to the hottest new gridcaster, but these networks usually limit the content to sales information, catalogs, message boards, and the like.

Grid Structure
Levels of the Grid and the interconnections between them.
DATA
COMM
DV
VIRTUALITY
Sectors
Academic
Access
Government
Corporate
Military
Financial
Ultrasecure
Open
Operational
Networks
Portal
Link
Domains
Gridlink
Connects one domain to one in a different sector
Rabbit Holes
allow you to briefly create paths to anywhere
Code Havens
data grottoes, and AI domains are all domains not on standard networks.
Users

Shadow Movement in the Grid

Though the details of the various layers of the Grid are provided here for the Gamemaster's and player's benefit, in practice a shadow moving through Gridspace often passes from one sector to another quite smoothly, even unwittingly. At PL 7, the experience of pulling data from or passing data into the Grid is painless.

For instance, when a user logs on through a gridcaster, he first sees the datastream, which drops him into a specific log-on domain. This starting point is always a familiar place, usually his home domain or that of an access provider. From that point on, he can choose to step through a gridlink into another domain, checking up his stock reports and news briefings—pulling them into his shadow from the DV Grid without even really having to think about it. Once that's done, he can hop through another gridlink to a data haven. There he may scan files for a particular piece of grey market software he needs, pay a small fee through an anonymous financial server, and thus unlock the files for download from the data Grid. Before logging off, he may activate a public phone icon to patch his shadow through to the comm Grid. The shadow has just had contact with all four major sectors of the Grid without hopping through more than three domains.

Operational networks run factories, airports, switchboards, and so on. Because they control such important hardware and have such potential for havoc, they are often isolated from other networks, with only minimal contact to other portions of the Grid (typically to government or corporate sites, or to the comm sector).

Ultrasecure networks handle only the most important traffic the Grid ever sees: nuclear launch codes, spy satellite transmissions, classified intelligence reports, and other sensitive information. While it is possible to intercept these signals, they are little more than meaningless junk if the interceptors do not possess state-of-the-art decryption programs and hardware; furthermore, security personnel change the codes frequently. Even when interlopers crack such a system, security usually discovers and repairs the breach quickly. Of course, some such networks do not even connect to the rest of the Grid, requiring that any prospective data thief physically enter a given site, one that likely has murderous defenses. Other systems might connect to the Grid for only a few seconds a day, at rotating intervals; protection protocols might lock the exact times of these intervals within some ultrasecure data fortress, secured by an extremely complex algorithm. Only the best gridrunners, often working in teams or with an AI, have any chance of breaking such systems.

While these are the basic network divisions in many human systems, some Grids include *religious* networks or even an *AI* sector (at PL 7 or higher). In the mechalus Grids, *cybermedical* networks are common, with diagnostic programs for their cyberware, updates for their computer tendril protocols, enhance programs, and mood-altering electronic mind/body interfaces. Since the mechalus have configured these items to their own physiology, they are useless to anyone else.

In the STAR*DRIVE™ campaign setting, the Grid has given birth to an entire religion. This religion, the Church of the Oracle, is the faith of a stellar nation called Insight, which declared its independence in 2460. Before that date, the Grid may broadcast or evangelize religion, but the Grid itself isn't an object of worship by anyone other than primitive alien cultures who confuse AIs with spirits.

Sectors

Finally, the Grid *sectors* include separate regions devoted to the major data formats: *data, comm, virtuality,* and *DV*. Each of these subnets is interlaced with the others and partially compatible with them. Each sector uses its own protocols and follows a different set of evolving standards optimized to improve the data flow for a particular kind of information. That said, not all Grids can be classified by type of traffic. Other classification schemes include mimicking a virtual world and embedding various functions in similar objects (each pay phone icon provides an entry to the comm Grid, for example), or simply mushing all data traffic into sectors by access speed, operating system, or national origin.

Certain core functions appear in all Grids. They are not always neatly organized, they may be patchworks or juryrigged systems based on outdated legacy systems that can barely be maintained—but they are the heart of what the Grid does. Each is an outgrowth of prior technological systems (primarily analog telephony, digital telephony, and television). The parts any gridpilot recognizes are *the comm, data, virtuality,* and *DV* Grids. Each of these is described below.

The *comm Grid* provides text, voice, and video messaging services for anyone with the appropriate hardware. Digital wiretapping, interception of transmissions, and shadow form relays all use the comm Grid domains (often called exchanges) and nodes (called area codes). The comm Grid is the backbone of the whole networked system, but it rarely seeks the limelight. Most of its activity is traffic passing through the comm Grid data streams. Those who do care about the comm Grid specifications usually restrict themselves to highly technical hardware and (less often) software discussions. In a sense, the comm relays resemble the sewers, phone lines, and other infrastructure of a modern city: always present, but rarely seen.

The *data Grid* is the world's largest information warehouse, a sort of digital version of the Library of Alexandria. This Grid stores the sum of human knowledge, everything from patents to novels to political analysis, and from census data to schematics of old technology.

Unfortunately, it tends to be a completely unorganized mess until the middle of PL 6, when a great programming effort named the Alexandrine Reform employs expert systems and data bots to structure the information in a more accessible fashion. Until that point, much of the data is hidden and must be sought out with search engines. Even after the Reform, much of the data is worthless junk, garbage dumped onto the Grid by cranks, salespeople, and amateurs.

The *virtuality* format is a graphics-heavy, rendered-on-the-fly, continuously updated real-time environment. Typical settings include shadowboxing combats (see pages 22 and 24), engrossing virtuality worlds, and other interactive forms of entertainment as well as business conferences, mock-up prototypes, scientific simulations, and models of proposed vehicles, parks, buildings, and cities. Its virtuality worlds are favorite places for secret meetings and illegal data transfers because of their strong anonymity encryption.

The *DV* Grid format is an outgrowth of television, which eventually encompassed video, holo, and audio materials of all kinds. This sector provides the standard films, holos, and variety showcases that have existed since the birth of television in 1927. The DV-grid is heaven for the committed couch potato, but offers little in the way of useful data for anyone else.

Data Sects & True Believers

Since the early days of the Grid, some people have been convinced that cyberspace is home to spiritual or divine essences, that the Grid itself is a form of consciousness, or that the Grid is the next step in human evolution toward a perfect form of being. Many of these believers are otherwise technically trained and sensible members of their societies, but they devote their souls to connecting the human with the divine. Some worship AI idols and some think the mechalus are superior beings because of their closer contact with the electronic world. Most wire themselves to the breaking point with cybertech and computer ware. The Grid sects seem to flourish and die quickly, changing names as quickly as they change leaders. A few others establish themselves over time, eventually becoming monolithic religions accepted by the mainstream, like the Insightful of the STAR*DRIVE campaign setting.

In any ALTERNITY game, this combination of devout religious fervor and technical aptitude can provide a lethal kick to heroes who cross these worshippers or flout their beliefs. A hero who destroys a rogue AI has something to brag about, but he also has a legion of enemies, those who believe that the AI was a deity or a more highly evolved form of human intelligence. Most gridpilots who burn down an AI don't brag about it—at least not for long.

Code Havens & Data Fringes

In the Grid as in the real world, sooner or later everyone considers data piracy and the possibilities of computer theft, forgery, and mayhem. The place where these activities occur on the Grid are called *code havens* or *data fringes*. Like the free ports during the golden age of Caribbean piracy, they are rough places where patrons can buy nearly anything, and where the wolves quickly fleece the unwary.

Code havens are also homes to the digerati, the technical elite who live their whole lives on the Grid. The digerati's exact opposites—the (digital) illiterates—spend their whole lives off the Grid, avoiding all contact with electronic culture. Some leave the Grid for religious reasons, like the Hatires of the STAR*DRIVE setting, and others leave for reasons of morality or simple paranoia.

Some members of the digerati become rogues called *invisibles*, who succeed in wiping all trace of themselves from the data bases. In the information-based Grid societies, this means that businesses and governments effectively can't trace the invisibles; they don't exist in the eyes of the state. Sometimes wiping themselves from the data banks requires the aid of an AI, who scours the Grid searching out every reference and hacks the most difficult government files to erase all records of the invisible. The invisibles live with great freedom and a certain type of power, since they can sometimes tap into the Grid and build new identities for themselves. Sadly, many invisibles are quite paranoid, and live in isolation from all normal citizens, corresponding only with others of their own kind.

Career: Invisible

An Invisible is a Tech Op (occasionally, a Free Agent) who has erased all trace of himself from the Grid, and lives free of control, tracking, or oversight of any kind. The "hidden in plain sight" life of the invisibles often attracts frontier types and anarchists alike. A fully trained invisible has mastered the arts of data forgery. In a way, the job combines the most difficult aspects of engineering, programming, and psychology.

In addition, many invisible are beholden to an AI that helped them root out the last traces of their digital records. Invisibles often live in urban zones where cutting edge hardware is readily available, but they are fully capable of setting up hidden colonies of their own in the asteroid belts and underground bases. They have a deep distrust of centralized authority.

Skills (50 points): Computer Science–*hacking 2, hardware, AI*; Technical Science– *jury-rig, repair*; Street Smart–*Grid savvy 2*; Deception–*bluff*.

Signature Equipment: Ordinary-quality microcomputer; computer repair toolkit; three Ordinary programs.

AI Havens

The artificial intelligences created by the rise of computer culture are its only native lifeform; all shadows and other visitors are temporary visitors to their domains. Perhaps it shouldn't be surprising, then, that the AIs have made portions of the Grid their own, secret hideaways that only gridpilots with supercomputer processors and extensive knowledge of the ins-and-outs of Grid protocols can open. A hero must have at least Computer Science–*programming 3, hacking 8*, and Street Smart–*Grid savvy 5* to break open one of the "blue boxes' that indicate an AI domain. Once inside, many gridpilots are disappointed; they are surrounded by a haze of static that obscures the 'pilot's vision, and the ambient sound is nothing more than the spitting crackle of modems.

Appearances aren't everything, however, and AI domains aren't constructed with human senses in mind. Every particle of digital fog in a haven is program fragment or data array. Every sound represents direct AI brain-to-brain communication. What are they saying to each other? No one knows for sure.

Off-Grid Sites

The constant availability of information doesn't please everyone. Some people find the lack of privacy and the constant sense of monitoring so disconcerting that they avoid the greater Grid. Fear and insecurity lead to the formation of data ghettos, secret databases, and local grids that never acknowledge the existence of larger, global networks. These networks, always founded by disconnection extremists, are formed for a wide range of reasons, from "protecting youth from immorality" to religious objections to survivalists who fear global conspiracies. Their fear is that information security won't keep up with information availability. The result is the creation of an information underworld.

Chapter 2
Grid Life & Crimes

Grid life has three distinguishing features that appeal to the average gridpilot: anonymity, dislocation, and safety. A user can pretend to be anyone online, he can sit at a safe distance and conduct his activities remotely, and he suffers no permanent consequences in the real world from risky behavior. On the other hand, the Grid isolates some users into fantasy worlds, provides limited sensory input, and can cost a fortune for those who want to stay ahead of the early-adoption technology curve.

The Grid opened up new places to conduct business, start affairs, shop, work, and relax. The infinitely flexible nature of electronic space as well as its safety and diversity made it a playground for the world. For game purposes, activities on the Grid boil down to three primary categories: *netrunning*, *hacking*, and *shadow combat*.

Gridpilots

So why go out on the Grid? There is plenty of action available to heroes in "the real world." One simple reason: Everything and everyone else are on the Grid. Piloting through the Grid is worthwhile for the same reason that visiting a nation's capitol city is worthwhile: It is a cosmopolitan center where everyone has something going. It is where the action is.

The actual grind of manipulating the Grid is often no more exciting than marching around a large city: Go here, turn there, enter this space, click on that. Unlike traveling in the real world, though, a gridpilot can move through the Grid with a few simple keystrokes or mental commands—and he can conduct other physical activities at the same time as he or she is moving around from data point to data point.

In an ALTERNITY game, gridrunning is often just a matter of collecting enough data for the heroes to do what they want in the real world. In game terms, gridpilots resolve Gridspace actions using *functions*, *programs*, and *patrons*. We'll examine each of these in turn.

Functions

During each action phase, a gridpilot may perform a single basic OS function, perform a single basic Grid function, or may use any program he has in active memory. The basic OS functions include file management, save, delete, protocol shifts, error recognition, and virus protection; the *Player's Handbook* describes these functions on page 152. The basic Grid functions that a gridrunner can perform with any shadow form program include *uploading* or *downloading* data, *loading* or *removing* a program from active memory, *shadow movement*, *network* or *sector movement*, and *communicating* with any other person in Gridspace.

Uploading or *downloading* large datafiles requires available active memory. If an operator is already using all of his active slots, he cannot download more material, since he must first transfer these files through buffers and into stored memory. For each slot of material to be downloaded per round, the gridpilot needs one free slot of active memory. Thus, if a gridpilot who is using a transfer program achieves an Amazing success, he can transfer up to four data slots per round. To achieve that rate, the gridpilot must have four slots of active memory open. An AI is generally able to transfer data more quickly. The primitive AIs from Progress Level 6 can transfer at a base rate of four slots per round (equaling the best transfer rate of a human gridpilot); those of PL 7 transfer at eight slots per round, and a PL 8 AI transfers at 16 slots per round.

Loading or *removing* software from active memory is a simple task that requires just one phase. Once a gridpilot has loaded a program, the software uses up memory slots but it also becomes available for use. Often an operator must dump one program to make room for another, or he must reload a program after a Grid attack has damaged it or removed it from active memory.

Shadow movement is movement within a domain or virtuality. The shadow doesn't leave that Gridspace, but can examine objects within it, access files from it, talk to other shadows within it freely (without the need for a communication action), or upload data to it. This form of movement is only available after PL 6 and the invention of the gridcaster. The shadow moves at a speed of determined by adding together its Strength and Dexterity, as described in the *Player's Handbook*, page 39. The shadow shifter program can further improve this rate (see the "Software" section for details), as can the speed of the gridpilot's processor. An Ordinary processor adds +2 to the shadow's speed, Good adds +4, and Amazing +6. The "Grid Movement" section describes the various forms of movement.

Network and *sector movement* are available at PL 5 and up, and simply change the network that the gridpilot is using, or change the type of data protocols he is using. These forms of movement are more like changing channels than they are like physical movement, and they require a single phase to complete, assuming that the gridpilot has access to the destination site. If the gridpilot is seeking to enter a restricted Gridspace, he must first hack through the security on that network or sector. TABLE D2: HACKING TARGET MODIFIERS lists the penalties for such attempts. Once the hacking attempt succeeds, the gridpilot can enter the desired network or sector with a single action.

Communication requires more effort in Gridspace than in the real world. A gridpilot must record or type a message and then send it to a specific destination or must open a channel to speak to a particular user (unless the intended recipient is in the same domain or virtuality as the gridpilot—see the section on *shadow movement* above). As a result, a pilot can't do anything else while he is communicating—the communication itself takes up his computer's primary channel, which briefly pushes other programs into the background channels. In other words, the Grid demands attention.

Running Programs

Gridpilots add programs to their computer systems in one of two locations:

active memory and storage memory. Each type of computer system (except the supercomputer) has a limited amount of active memory space. When gridpilots place programs into these active memory slots, they can use them without delay; the programs all run simultaneously. Because of available external storage peripherals, there is effectively no limit to the amount of storage memory a computer may have. Gamemasters should keep in mind, however, that players' gridpilot heroes will not always have all this storage memory with them. A Gamemaster may choose to establish limits to the amount of storage memory a gridpilot's computer may have. Gridpilot heroes may expand that memory capacity when they operate their less portable computers. The principal drawback to programs in storage memory is that the gridpilot may not use them until he loads them into active memory. To move a program from storage memory to active memory or vice versa requires one action phase. If the gridpilot's active memory is full, it takes two phases to make the change: one to transfer a program from active to storage memory and another to bring up the required program from storage into active memory. The gridpilot's computer must have enough active memory to fit the program into his available active memory.

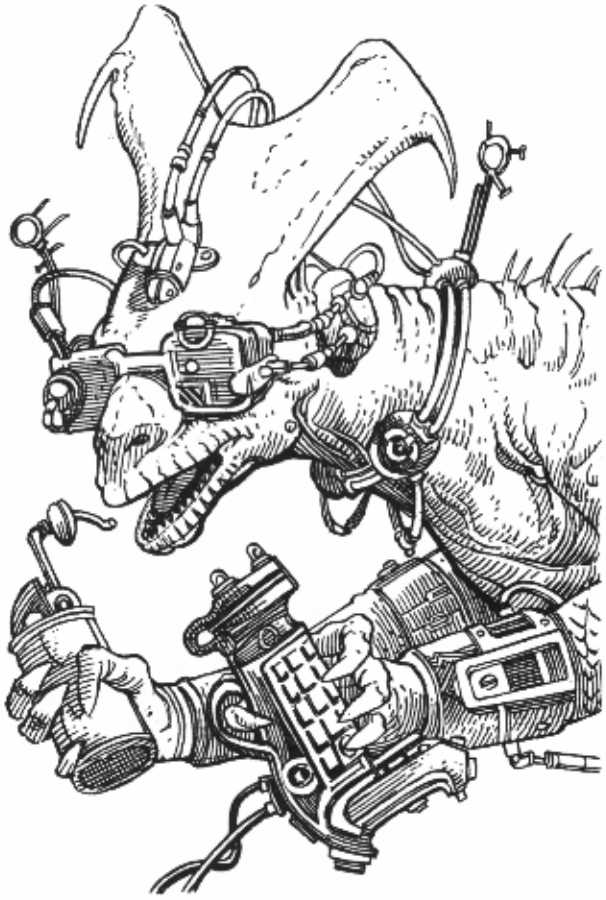
Although the gridpilot may have several programs in active memory, he can use only one at a time in any given phase. The exception to this is the automated programs, which operate independent of operator control. This allows a gridpilot to load up his shadow form program, an attack program, and a few automated defensive utilities before venturing into the Grid. The shadow form program does not require the gridpilot's attention, unless he attempts something especially tricky with it. Shadow form software simply serves as the shell from which all other programs launch in the Grid. The gridpilot could even run a shadow form program and a shadow form 2 program simultaneously. Assuming he had the space in active memory, he could use the shadow form 2 software to create a diversion while he goes after a difficult data file with his shadow form program.

Patrons

Even today, some people seem to live their entire lives online: programmers, web-crawlers, chat-freaks, alpha geeks. In the Grid, the transition to the virtual life has gone even further, and members of the supporting cast might even connect with the Grid full-time. While they may not be much use in a gunfight, these masters of Gridspace are extremely powerful in their own element. Members of the Grid elite may become extremely valuable contacts, dishing inside information, providing priceless leads to mysteries, and even offering work on dangerous assignments.

Just because a group of Grid-savvy heroes may get assignments, clues, or payments through the Grid doesn't mean that they'll ever meet their employers in the flesh. In fact, that may be just the way that the patron prefers it. Why does he or she contact the heroes only on the Grid? The patron may be a member of a secret society or may have access to privileged information, an insider in a powerful government agency, or a high-ranking general in a galactic fleet. It's safer for both sides if neither knows too much about the other.

In addition, the Gamemaster can play a few tricks. Perhaps the patron isn't whom he claims to be—perhaps the heroes eventually get a few odd requests from their patron, and discover that they've been working for the enemy all along! Maybe their patron isn't a single person, but a group of revolutionaries who just happen to use the same shadow program and the same shadow mask to provide the heroes with the appearance of a single Grid confidante. Perhaps the patron isn't even human at all, but an AI, an alien, or even a rogue robot—a creature that might make a very different impression if the heroes knew it wasn't human. Regardless of who the patron really is, the Grid allows the Gamemaster to offer advice from a distance, offer employment without risking discovery of important characters, and even allow plot twists that wouldn't be possible in the real world.



Grid Movement & the Datastream

The structure of the Grid is a series of permanent locations that exist on the three levels described in Chapter One: domains, networks, and sectors. Gridpilots always traverse space within domains by *shadow movement* at PL 6 and up. A shadow moves at a speed determined by the pilot's processor and the quality of his shadow, as described in the "Actions" section earlier in this chapter.

One step up from shadow movement are *domain, network*, and *sector movement*, which allow a gridpilot to hop from one domain to another as easily as hopping from one sector to another. Moving from one Grid location to another via higher-level movement requires entering a gate or link to the *datastream*. The *datastream* is the Grid's primary method of getting data, shadows, and gridpilots from place to place. A shadow enters the datastream by using shadow doors or gates (called "links" at PL 5). Each shadow door indicates a site for accessing another domain, network, or sector. The basic form of domain, network and sector movement is available at PL 5 and up. After PL 7, the datastream even connects system Grids to one another at an interstellar level, though this requires sending a shadow as the pilot's proxy.

Entering the datastream means entering an overwhelming white noise of bits that completely fill a gridpilot's senses while his shadow

Gamemaster Advice: Pacing & Cut-Scenes

The deadliest danger of Gridspace isn't a cyberguardian or a wrathful AI—it's the risk of annoying the non-Gridrunning players in a game. Since the Gamemaster controls how quickly his players accomplish any task in Gridspace, he has a responsibility to keep the entire group of players engaged and entertained. One of the best ways to do this is through careful control of pacing during any Grid-based scene.

A Gamemaster can structure a Gridspace scene using any one of three approaches. The easiest is to reduce the whole thing to a single die roll. The gridpilot rolls a Computer Science–*hacking* or Knowledge–*computer operation* roll, and either succeeds or fails at the whole task. While this is quick and easy, it isn't very satisfying to the Grid-genius hero who has invested many skill points in honing this aspect of his character, and it doesn't simulate Grid combats very convincingly. Unless you're in a hurry to get to another scene, this usually isn't your best choice.

To better represent a complex task such as hacking or a comm trace, you may want to employ the "ticking clock" method of pacing the scene. This form of pacing depends on complex skill checks, and the heroes may often be active within the Grid for quite a while. The most exciting ticking clock situations involve a party of heroes desperately trying to access a local Grid system while their target's real-world defenses are keeping the heroes under a steady stream of gunfire, tear gas, or boarding parties. Gamemasters can create equally exciting complex skill checks using the *results ladder* technique of linking a number of successes with a specific result (see "Hacking").

The third method to pacing a Grid scene is to use a map of the Gridspace that the hero must navigate to achieve a goal. This takes more time than either of the other two methods, and thus is not recommended unless the Grid run involves the majority of the party.

shifts to a different domain, network, or sector. Different interfaces allow a gridpilot to perceive this barrage of noise differently: NIJacks project an onrushing blur of stars, while most gridsuit models make it seem like being surrounded by fog. In any case, it's impossible to get anything done during the brief transition from place to place.

For game purposes, "datastream bubbles" remain nothing more than a network engineer's daydream until PL 8. However, some persistent stories claim that during PL 7 a Good quality or better AI can stabilize a bubble by devoting 8 slots of active memory to the task (see sidebar on page 8).

Getting Lost

Unlike the real world, the Grid's geography is subject to constant revision; in the Grid, topology is an illusion, and distances are meaningless. Routes and links between locations can change quickly and without notice. Guides and location programs can help keep a gridpilot on track, but even they can't keep up with all the changes. As long as a gridpilot stays to the well-traveled portions of the Grid, the odds of getting lost in altered pathways or confused by new domains are low. The farther a gridpilot strays from familiar, well-traveled domains, the greater the likelihood that he loses his way. In practice, the divisions between sectors are never as neat as they are in theory. Indeed, the sectors and networks can vary wildly in appearance from hour to hour, and getting from point to point can be dangerous.

In addition, each sector has its dead ends, its backwaters, and its hidden recesses of criminal activity; see the discussion on "Code Havens" on page 11 for more information about the pirates and criminals of the Grid.

Finally, you can't always get there from here. Data ghettoes are regions not connected to a planet's or system's Grid (see "Off-Grid Sites" on page 11). The only way to enter a data ghetto is to access that independent Grid through a local terminal. Sometimes a sealed-off Grid does not entirely disconnect from the greater Grid: A secret shadow door, or a special satellite access number may exist, installed by the system's builder. Certain Grids may only be accessible via certain physical locations (on board a small ship or within an asteroid installation, for example). Their Grid addresses are unavailable to the public, to knowbots, or to trace attempts. Of course, if outside gridpilots can't get in, inside gridpilots can't get out to the greater Grid either.

Hacking

Once, hacking simply meant finding elegant solutions to coding problems, and fellow programmers credited anyone clever enough to work their way around a particularly thorny problem with coming up with "a good hack" or being a first-class hacker. Over time the word became corrupted, and the original meaning lost. Now hacking refers to any illegal or at least unauthorized entry into computers and computer systems. As long as individuals and organizations place data and programs on networks, someone has felt the urge to go explore them. These explorers and pranksters are the hackers, and they haunt every science fiction setting worthy of the name.

What do hackers really do, other than sitting around comparing technical notes and bragging about their most recent triumphs? They plan their next move, they feud with each other, and they dupe and harass those they consider their enemies. Their enemies tend to be telecommunication companies, Grid service providers, and large corporate entities of every description. They are still the underdog, single techs against monolithic powers with vast resources at their disposal. Their hacking usually lacks focus; they just do it because it's there, for the pure technical thrill of beating the system.

Other kinds of hackers are just as talented but a little more practical in their goals. These are the hackers who have succumbed to the lure of money or ideology. Mercenary or espionage-style hackers can change the world through their interfaces—or can at least improve their bank accounts. These hackers are seasoned professionals, quiet individuals whose talents for espionage exist principally in the Grid; they are the shadow spies (see page 7). As computer technology improved, Grid operations developed into more than an esoteric form of intelligence-gathering: they became the first line of a nation's defense.

In the Information Age, hacking was the equivalent of Grid combat. Without an NIJack or direct interface to the Grid, systems were more likely to dump a hacker than to initiate Grid combat.

Hacking Checks. Using the *hacking* specialty skill often requires making complex skill checks. As a result the game can often drift into dull numerical abstraction ("I've gotten four successes and one failure so far"). You can keep the game focused on actions rather than numbers by using a *results*

ladder to describe the results of each roll during the skill check. A results ladder is a simple Gamemaster tool that relates each increasing success or failure of the complex skill check to a concrete result in the story. Consider the following three complex skill check situations:

1) hacking into a corporate datacore (Ordinary difficulty, 4 successes required),
2) hacking a military satellite to intercept a coded transmission (Good, 7 successes),
3) and hacking an AI's programming to give it secret orders (Amazing, 9 successes).

As a hero gains more and more successes during one of these skill checks, he completes all the tasks up to and including that number shown on the results ladder, in sequence. In essence, creating a results ladder just means creating an outline of the hero's potential actions during a scene.

For an example of how this works, take a look at the satellite ladder presented here. If a hacker rolls two Ordinary successes (or a single Good success), he has achieved a total of two successes toward completing the complex skill check. He has accomplished the results indicated on the ladder for both 1 success and 2 successes. The results ladder shows that he has linked to the satellite and managed to bypass the outer data lock (see *Chapter 3: Software* for details of data locks). If he achieves another success, he finds the satellite's communication core. If his next roll is a failure, he spends that time slowed down by static and makes no progress.

Full Access. A hero with hacking skill can *evaluate likely targets*, attempt *counterhacking* when others breach his own system, and *prepare autodefenses* to secure his own data from unauthorized access. After all, who better to provide security than someone who knows where all the keyholes are?

Evaluating targets requires a successful Computer Science–*hacking* skill check—but the Gamemaster rolls the situation die for this check, adding the result to the control die that the player rolls. The situation die for evaluation checks usually reflects a +1 step penalty for each level of defenses around the target. On an Ordinary success, the gridpilot knows how many levels of defense a site has, what sort of processor is powering the site (AI, mainframe, or desktop), and whether or not it possesses automated defense programs.

On a Good success, he knows everything an Ordinary success reveals, plus he knows up to three of the programs he'll encounter first. These three programs correspond to the site's basic attack, defense, and utility programs. He'll also be able to determine the general level of competence of the site's staff. If they have Computer Science–*hacking* 1–4 the site is an *amateur* effort, for ranks 5–8 the result is *professional* work, and 9+ represents *expert* competence. A more precise evaluation of the skill level of the site's staff is not possible without hacking into their personal files and work histories and reviewing a sample of the code they have written.

On an Amazing success, the evaluator knows all the names of the programs defending the site and knows the exact quality of its processor(s), as well as any alien software, unusual peripherals, and other custom work.

Hacking or Computer Operation?

What is the difference between Computer Science–*hacking* and Knowledge–*computer operation*? What can a hacker do that an operator cannot?

Hacking deals with accessing information that others want protected. It is also the principal means by which computer users conduct combat in the Grid itself. Although not all hackers are necessarily graceful Grid combatants, hacking software itself allows a certain amount of finesse in Grid combat. Operators are simply not in the same league as are hackers. To hackers, they are drones, plodding along without any true understanding of the virtual world.

The skill Knowledge–*computer operation* allows the computer user to access routine information or use hardware and software in the way they were intended. High skill levels in computer operation represent a thorough knowledge of some of the more mainstream software, allowing an operator to use the programs to their fullest potential.

Heroes with Knowledge–*computer operation* may use any of the operator or utility programs listed in the *Player's Handbook* or in this supplement. A hero must possess the Computer Science–*hacking* skill to use hacking programs.

TABLE D1: THREE SAMPLE RESULTS LADDERS

Number of Successes	Complex Task Result		
	Datacore	Satellite	AI
1	Logged on	Linked	AI breached
2	Employee entry found	Bypass datalock	Disable fuse gate
3	Get past gate	Find comm core	Locate back door
4	Datacore accessed!	Find OS	Disable antibodies
5		Grant self access	Enter neural core
6		Locate data channel	Avoid neural guardian
7		Find transmission!	Locate self-edit node
8			Total AI access
9			Orders completed!
Failures			
1	Query from Corp pilot	Slowed by static	Lost in neural space
2	Alert sounds	Encryption activated	Programming glitch
3	Fail!	Transmission ends!	AI Alerted!

Table D2: Hacking Target Modifiers

Target	Step Modifier	Critical Failure Result
Restricted		
Bank	+7	AI attack, attempt logged
Military	+6	Human guard, autodefenses, logged
AI Site	+6	AI attack
Drivespace Relay, distant	+5	Lost shadow, attempt logged
Police, Grid	+5	Human guard, logged, AI attack
Police, secret	+4	Human guard, logged, autodefenses
Drivespace Relay, local	+4	Autodefenses, attempt logged
Government, taxation	+3	Attempt logged, autodefenses
Government, personal files	+2	Attempt logged, autodefenses
Corporate, R&D	+2	Attempted logged, human guard
Private		
Police, local	+2	Autodefenses, lost shadow
Corporate, internal	+2	Human guard, attempt logged
Government, contracts	0	Autodefenses
Factory	0	Autodefenses
Public		
Corporate, external	0	Sysop alerted, human guard
Government, public	0	Lost shadow, attempt logged
Personal	-1	Lost shadow
Small Business	-1	Lost shadow
Alien		
Fraal site	+1	Penalty cumulative with site type
Mechalus site	+3	Penalty cumulative with site type
T'san site	+2	Penalty cumulative with site type

TABLE D2: Hacking Target Modifiers doesn't just show the relative levels of difficulty involved in hacking protected targets; it also shows the typical response to a botched hacking attempt. The text below describes each of these responses, in descending order of magnitude:

AI Attack: An artificial intelligence notices the hacking attempt and responds with the full benefit of surprise, attacking with whatever attack programs it has.

Human guard: The gridpilot(s) on duty to protect the target gain surprise against the hacking gridpilot, and normal Grid combat results.

Autodefenses: Autodefenses include any form of software that can run independently, from passive defenses such as gatekeepers all the way up to deadly menaces or no-nonsense neural guardians. When the hero rolls the Critical Failure, the software immediately activates and moves to counteract the hacking attempt by removing or attacking the intruding gridpilot.

Logged: A doorkeeper program or similar passive defense notices and logs the hacking attempt launches a trace attempt. The hacker does not notice the trace unless he succeeds at an Awareness–*intuition* roll, with a penalty determined by the quality of the trace program (Marginal 0, Ordinary +1, Good +2, Amazing +3). The hacker's target may send a response to the hacker's realspace address if the trace succeeds.

Lost Shadow: A shifting firewall, dead end router, banish program, or similar dataware throws the hacker's shadow off the target system; in the worst cases, the defense throws his shadow off the Grid entirely and it dissolves. The hacker may suffer Grid damage or lose data as a result.

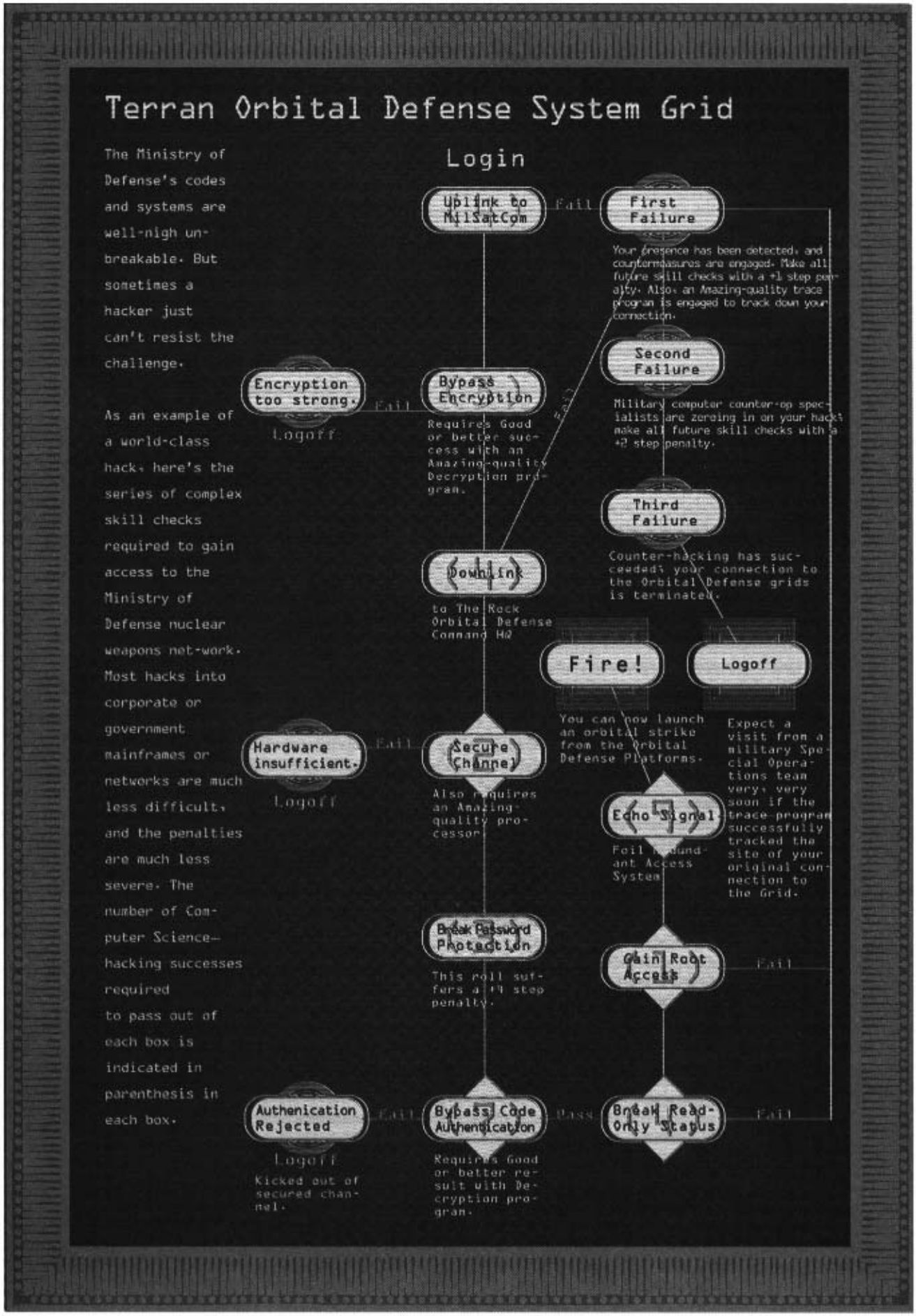
Sysop Alerted: The hacking attempt alerts a human guard, and he may launch programs to protect the site, as well as alerting local Grid police authorities. However, the alarm may also alert users of the system, who may take vigilante action against the hacker.

The hacker knows exactly what situation die he or she would use when attempting to hack the site.

If the check fails, the hero gains no information about the target and may make no further attempt to evaluate it until he has gained another skill rank in the specialty skill. The site's defenses prevent any real evaluation of its difficulty.

Counterhacking is the fine art of tracing and neutralizing other hackers. Only a hacker with a skill rank of 4 or higher in Computer Science–*hacking* can attempt counterhacking. Doing so always requires a copy of the trace program, and usually requires access to shadow weapons and armor.

Finally, *preparing autodefenses* includes a wide variety of actions to make a computer site more difficult to hack. It requires defensive programs such as alarms, neural guardians, strongholds, fortresses, doorkeepers, and the like. For each level of the hacker's skill, he can install one slot worth of defensive programs to run on a site without degrading the quality of the host processor—and without requiring a skill check. For each level beyond that, he must make a successful complex skill check, with a step penalty equal to the number of extra slots being installed. The skill check has a target number of successes equal to the number of additional slots the system holds beyond the installer's skill rank. For example, if a site already has five slots of defenses and a newbie with Computer Science–*hacking* 2 tries to install an additional autodefense file, he must achieve four successes with a +4 penalty to the die roll. If the site was exactly at two slots of defenses, making the two defenses compatible would be much easier, and the newbie would not have to make a skill check.


Terran Orbital Defense System Grid
The Ministry of Defense's codes and systems are well-nigh unbreakable. But sometimes a hacker just can't resist the challenge.
As an example of a world-class hack, here's the series of complex skill checks required to gain access to the Ministry of Defense nuclear weapons net-work. Most hacks into corporate or government mainframes or networks are much less difficult, and the penalties are much less severe. The number of Computer Science–hacking successes required to pass out of each box is indicated in parenthesis in each box.
Login
Uplink to MilSatCom
Fail
First Failure
Your presence has been detected, and countermeasures are engaged. Make all future skill checks with a +1 step penalty. Also, an Amazing-quality trace program is engaged to track down your connection.
Second Failure
Military computer counter-op specialists are zeroing in on your hack; make all future skill checks with a +2 step penalty.
Third Failure
Counter-hacking has succeeded; your connection to the Orbital Defense grids is terminated.
Encryption too strong.
Fail
Logoff
Bypass Encryption
Fail
Requires Good or better success with an Amazing-quality Decryption program.
Downlink
to The Rock Orbital Defense Command HQ
Fire!
Logoff
You can now launch an orbital strike from the Orbital Defense Platforms.
Expect a visit from a military Special Operations team very, very soon if the trace program successfully tracked the site of your original connection to the Grid.
Hardware insufficient.
Fail
Logoff
Secure Channel
Also requires an Amazing-quality processor.
Echo Signal
Fail Redundant Access System
Break Password Protection
This roll suffers a -4 step penalty.
Gain Root Access
Fail
Authenication Rejected
Fail
Logoff
Kicked out of secured channel.
Bypass Code Authentication
Pass
Requires Good or better result with Decryption program.
Break Read-Only Status
Fail

When installed successfully, the defenses all operate as expected. If not installed successfully, one of the defenses (determined randomly) fails to activate when challenged by an intruder and the system's processor operates as if it were one quality level lower.

Angles of Attack

Hacking is all about beating the system around a secured target, penetrating the defenses, then stealing, vandalizing, or otherwise manipulating the system you've cracked. There are three primary avenues of approach: software attack, social attack, and inside attack. A hacker can access protected systems using overrides and failsafes to skip past the security protocols, he can subvert the loyalty of someone on the inside and be given passcodes, or he can physically enter a building and program a system from a terminal that someone else activates for him (when, for example, a network is protected by biolocks, retinal scans, or other physical security devices).

A few systems require the hacker to jack in from a special location, such as inside a secure facility in the real world. System architects design these sealed Grid areas to keep people outside the facility from hacking their way in. Hackers refer to this method of hacking a site as the Trojan horse approach. In the case of off-Grid data ghettoes or hermit AI sites (see page 61), however, it is the only way to get the desired data.

Hacking Ranges

As the Grid grows and expands to fill not just Earth but the rest of the solar system and even other star systems, hacking continues to be a part of computing life. The distances involved, however, make real-time attacks on some targets impossible.

Despite the hurdles, though, or perhaps because of them, hackers continue to find new and inventive ways to hack restricted sites, even at great distances. While it's always preferable to conduct a hack from a local site, sometimes that isn't possible. Here's a quick overview of local hacks, hacks within a star system, and interstellar hacking.

Local Hacks

Bouncing a signal off a geosynchronous satellite can add a small delay to a signal traveling around the world, but local hacks are generally the easiest and fastest ways to visit a closed site. A hacker has full access to all his software and to all the input from the target. He can make prompt adjustments to the tools he keeps in active memory.

A local hack is the default range for any attempt to crack a system, and many of the best hackers will travel for many weeks or months to get into this range before attempting a hack. After all, they reason, in hacking as in war, there's no substitute for knowing the local conditions—the terrain, if you will—firsthand. Small details of protocols, hardware, standards of Grid hiring and firing, even the physical infrastructure of a target can be valuable information in devising a plan of attack.

System Hack

Hacking a domain or site located on another planet in a star system can be relatively simple or an exercise in technological extremes, depending on the available bounce-time. There are two cases to consider: hacking at light-speed, and hacking with faster-than-light communications. The FTL case is simple to describe: Once the mass transceiver makes FTL communication possible in PL 7, any system hack is no more difficult than a local hack. Since the signals travel around the star system just as quickly as they do around a planet, a star system Grid is just as easy to navigate as is a planetary Grid.

In most cases before PL 7, Grid signals must travel at or below the speed of light. This adds a delay of two seconds for every 300,000 kilometers between two sites (one second to travel from the sender to the recipient, and one second to return). If the hacker and his target are close together (for instance, a double planet, or a planet and its moon) the attempt may just suffer a +1 step penalty per 100,000 km distance. If the two sites are far apart, hackers attempting to hack it directly are doomed to failure. Instead of pursuing the technological nightmare of a delayed response time, a distance system attack requires a relay hack.

In a relay hack, the hacker first investigates his target with a snooper program (if he wants to retain the element of surprise) or with a shadow (if he feels he can avoid notice). Once he has cased the target, he makes his best guess at what programs he will require to break in and generates either a virus or an advanced shadow that can use other programs to crack the site. The attack goes off over the satellites or other comm relays to the target, and a single roll usually resolves whether the attempt succeeds or fails. The player rolls the control die, and the Gamemaster rolls the situation die secretly. However, if the attempt fails, the hacker has a much smaller chance to succeed at any future attempts, because the target will likely be alert to another attack.

Interstellar Relay Hack

Most of the time when a gridpilot hopes to get information from the Grid in another star system, he simply casts a shadow with a gridcaster and sends it on its way. The trip to the system takes at least 11 hours, and then there's a minimum 11-hour return trip, so the gridpilot can pretty much forget about getting an answer any sooner than about a day later. Sometimes that's not good enough. In those cases, a hacker may decide to attempt a relay hack.

To conduct a relay hack, the hacker usually needs a team, such as a dueling society, a cadre of invisibles, or simply a team from a nation or corp. This group of gridpilots must have enough active memory to support one shadow form per member, and should have a copy of the datashare program.

To begin the relay hack, the team keeps a steady stream of shadows traveling between the hacker's HQ and the target system. Each shadow gathers some information at the target and brings it back for analysis. Though the shadows aren't defenseless, they carry relatively few offensive weapons—for

TABLE D3: LIGHT TIME

From Earth to:	Time
Geosynchronous orbit	0.12 seconds
Moon	1.3 seconds
Venus	2.3 minutes
Mars	4.3 minutes
Mercury	5.1 minutes
Jupiter	34.9 minutes
Saturn	1 hour, 11 minutes
Uranus	2 hours, 31.2 minutes
Neptune	4 hours, 1.6 minutes
Pluto	5 hours, 20 minutes

the most part, they probe the site's defenses and try to get past as many layers of protection as possible. Each shadow makes a single run at the defender, then reports what it learned to the next shadow to arrive, improving that shadow's chances of getting further into the site unscathed. Once the shadow passes the information along to the new arrival, it returns via a drivesat comm relay to report its findings to the hacking team HQ.

Eventually the sysops at the target site shut the scout shadows out. Once the defenders chase off the first flurry of reconnaissance shadows, the relay hack goes into a recess period, a sort of eye-of-the-storm between the scouting and (later) attacking shadows. During this cease-fire, the team analyzes the details of the defenses and creates a new squadron of digital ghosts to attack the target. With the information gained from the first sortie, the shadows can attack in sequence or in combination at many points, creating diversions, feints, and true assaults in a quick series of probes and withdrawals. Since each new arriving shadow gets an update from those already there, each shadow improves its odds. Reduce the +8 step penalty for hacking over a drivesat relay by one for each shadow in the relay, to a minimum of a +0 step penalty. A relay hack can never provide a bonus to an interstellar hacking attempt. When used in a local or system hack, a relay hack requires the datashare program and provides bonuses as described in that program description (see page 35).

Hacker Slang

Since the first days of phone phreaks and university hacking, groups of hackers have created their own language. Part of this is just a matter of working with technology that most people don't understand; if you need to talk about something new and different, you need new and different words to describe it. Hacker slang also serves two other functions, however. It prevents large-scale net searches from finding anyone discussing sensitive or illegal Gridware, and it keeps outsiders on the outside, maintaining the hacker's role as a small, elite community of outlaws.

The specific terms that any given era of hackers, or even any particular gang of hackers, adopts will be different from every other era's and gang's dialect. Use whatever slang terms you prefer, from bad spelling to technobabble to pop culture terms, to get the point across.

Shadow Combat

"There are phantoms of the living as well as of the dead."

—Joseph Conrad

When gridrunning grows stale and hacking goes wrong, the Grid shows its darker side, a side of false nights and digital fog. Even the most carefully laid plans go to hell, and all good gridpilots must know how to fight their way out of a bad Grid run.

The most basic form of shadow vs. shadow combat requires each gridpilot to make an opposed skill check using their Computer Science–*hacking* skill, modified by whatever attack and defense programs are in use. Whichever pilot achieves the higher degree of success wins that round of combat and inflicts damage on his opponent's shadow. If both gridpilots achieve the same level of success, both suffer damage. If both skill checks fail, neither shadow suffers damage. If either skill check results in a Critical Failure, see the "Shadow Wounds" section, below.

If a skill check results in an Amazing success, the gridpilot has scored a lethal blow—the target shadow is in big trouble. The victim must make an immediate Constitution feat check using his shadow's Constitution score; if the check succeeds, the shadow loses its next action. A failed check destroys the shadow and the gridpilot loses his connection to the Grid. The shadow loses all the data it carried when the link breaks.

Example: Razor is a hard-core hacker with a big toolbox: a Good processor in his computer gauntlet (7 slots of active memory), and plenty of software. As he enters the Grid, he keeps a shadow form, shadow weapon, shadow armor, alarm, and break-in program all running in active memory, keeping one slot open for a crisis he may not have expected. Razor has a Computer Science–*hacking* rank of 7; hacking is his life. He gets into a short exchange of trash talk with Chi Delta, a young mechalus roboticist who just happens to be piloting his grid investigations from a research-grade supercomputer—and the two immediately get into a duel. At the time the duel starts, Chi is running a Good-quality automated alarm program, an automated static program, and a datascan program, for a total of 3 slots; he wasn't expecting trouble. He has Computer Science–*hacking* 4.

Razor gains a –2 step bonus to his action check from his Good processor, as does Chi. Both the action checks provide a Good result, so both of the duelists may take three actions in the first round.

During the Good phase, Razor attacks with his Amazing shadow weapon. He gains a –3 step bonus from the program itself and a +2 step penalty due to Chi's alarm defense program. He has an overall –1 step bonus, but somehow his attack misses. Chi cannot attack, but instead spends his first phase loading an attack program, gridwipe, into active memory.

In the Ordinary phase of the round, Razor repeats his attack with his weapon, but meets with a Good success this time, and inflicts 4 points of mortal damage (Chi has no shadow armor to protect him). This is almost enough to destroy Chi's shadow, but not quite. Chi uses his freshly loaded Ordinary quality gridwipe to counter-attack. The attack program grants him a –1 step bonus, he gains a further –1 step bonus because he is a mechalus, but he suffers a +2 step penalty due to Razor's Good-quality alarm defense program, for an overall 0 step bonus. He achieves an Ordinary success, thus removing one program (chosen randomly) from Razor's active memory; he catches the alarm program and takes it out.

In the Marginal phase of the round, Chi continues to press the attack, but no longer has to worry about Razor's defense program. He attacks with a –2 step bonus and achieves an Amazing success. This destroys three of Razor's programs: alarm, break-in, and—most importantly—shadow weapon. Razor attacks with his weapon as it disintegrates, and scores an Ordinary success for three points of wound damage. Without his weapon, however, he is at a great disadvantage, and Razor plans to retreat at the start of the next action round. As long as he manages to roll a solid action check, he should be able to escape. . .

A History of Hostility

During the Information Age, Grid combat was more-or-less harmless. Being dumped off a system was about the worst that could happen to a gridpilot. If he was especially reckless (or daring, depending on your perspective), the law might charge him with crimes in the real world. In either case, his data and his hardware would usually

Table D4: Complete Grid Combat Summary

When two shadows fight in Gridspace, the following sequence of events always applies.

1> Determine Surprise
Roll Awareness-*intuition* checks as usual to determine whether either side has surprised the other. Using a rescale program gives a +1 step penalty to your opponent; a ghost program increases the step penalty to +2.

2> Switch Active Programs
Each combatant declares whether he adds or removes a program from active memory. In either case, this requires an action.

3> Roll Action Checks
Roll action checks using the pilot's action check score. The processor's quality may provide a step bonus to this roll. Mechalus gain their usual -1 step computer bonus; t'sa only gain their action check bonus if they are using appropriate t'sa hardware.

4> Roll Attacks or Actions
Most utilities and other actions require a Knowledge-*computer operation* roll or a Computer Science-*hacking* roll. Performing any utility function or basic Grid function while under attack inflicts a +1 step penalty to the skill check. In addition, shadows that have sustained mortal damage in Gridspace suffer step penalties for the damage, just as heroes who have sustained mortal damage in real space do.

Roll *melee attacks* using the gridpilot's or shadow's Computer Science-*hacking* skill score. Adjust the roll by the opponent shadow's Strength resistance modifier for programs like shadow weapon and shadow weapon 2.

Roll *ranged attacks* using the gridpilot's skill rank in Computer Science-*hacking*, adjusted by the target shadow's Dexterity resistance modifier. Ranged attack programs include the shadow bolt program.

Roll *abstract attacks* using the gridpilot's Computer Science-*hacking* skill score, modified by the target's Will or Intelligence resistance modifier (whichever is greater). Such software as the corrupt, crash, loop, and fuse programs are examples of such attacks.

Any of the attack rolls described above may gain a step bonus due to the quality of the attack program or may suffer penalties due to the target's defense programs. For example, a gridpilot using an Ordinary quality attack program (-1 step bonus) attacking a target with both a Good quality and an Ordinary quality defense (+2 and +1 penalty to attackers, respectively) suffers an overall +2 step penalty.

Roll for *utility actions* if their use normally requires a roll, such as trace programs. Actions that require no roll—such as communication, movement, or datascan programs—normally succeed automatically during combat.

5> Determine Shadow Damage
An attack may damage a gridpilot's shadow or may damage other software running in active memory. Shadow weapon, shadow weapon 2, and surge software does stun, wound, and mortal damage to a shadow (or gridpilot, in the case of the surge program). The corrupt, datawipe, and gridwipe programs all damage a gridpilot's software. Other programs may damage software on an Amazing success.

6> OPTIONAL: Determine Brain, Hardware and Software Damage
If the attack roll causes mortal damage, roll a Stamina-*endurance* roll to see if brain damage results. If the opponent's Computer Science-*hacking* skill check indicates an Amazing success, roll for software damage. If the software damage roll results in either Erasure or Damage, roll for hardware damage.

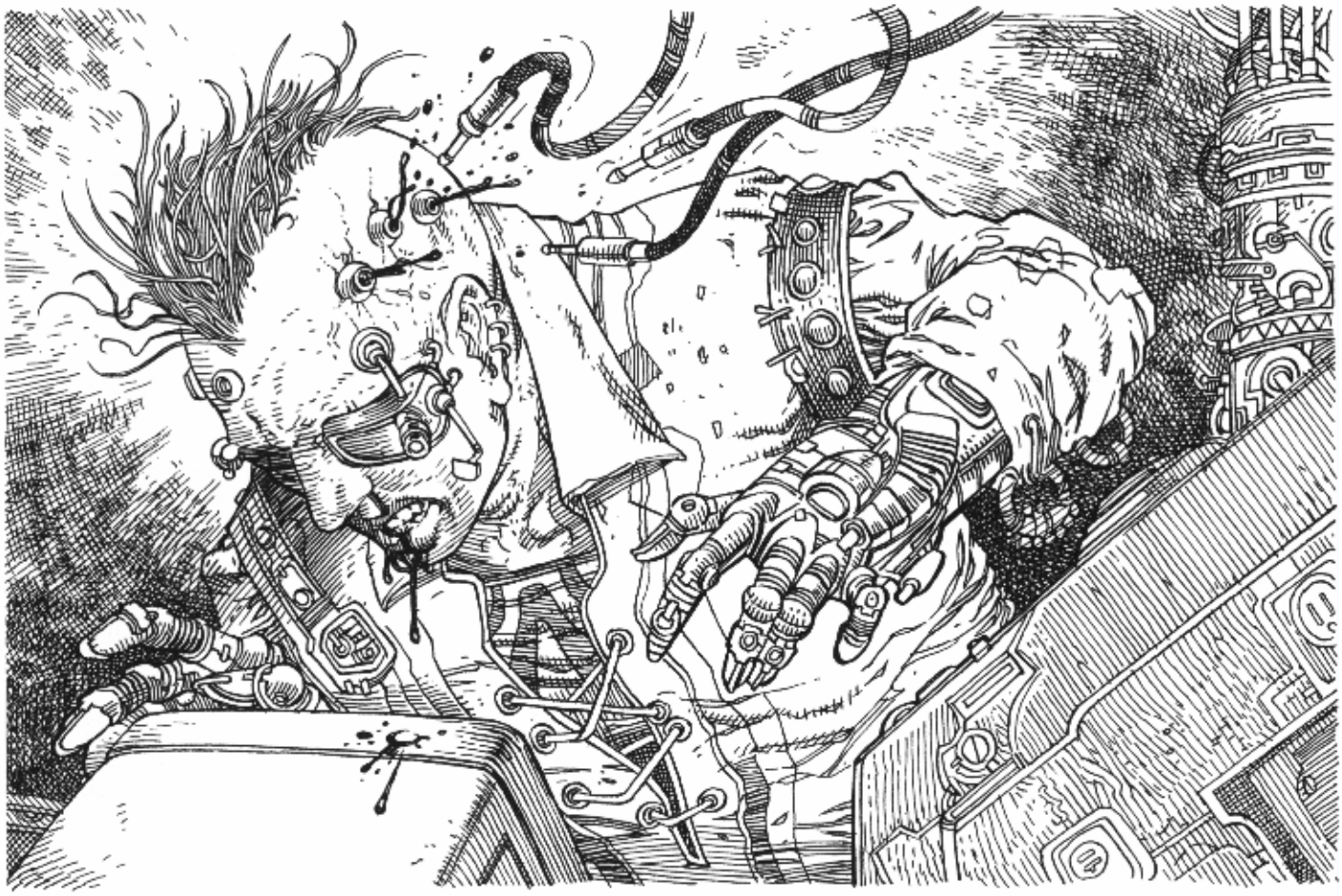
7> Resolve Movement
Determine the distance between the combatants, if either moved during the round. If the resulting distance is 5 or greater, no melee attacks are possible. If the distance is 10 or greater, the fleeing shadow may leave the local domain without suffering further attacks, just by entering a nearby gate, portal, or other gridlink. The pursuing shadow can follow by successfully using a trace program.

be unharmed. Once the Fusion Age arrived, combat between gridpilots intensified. The nanocomputer interface increased what a gridpilot could do, but it also increased the risks of data loss or permanent damage.

Because of the increasing risks, Grid combat became a social institution over time. Information Age hackers often worked alone or in small groups; their combats were faceless, and no audience judged their success or failure. Once the gridcasters arrived, programmers and hackers cooperated more closely for mutual protection and mutual profit. Soon groups began fighting on the Net for status and pay (see the "Shadowboxers" sidebar on page 24 for details). Beyond the level of the shadow arena, it became possible to destroy an enemy's electronic infrastructure from within the Grid itself. By 2100, the era of Grid warfare had arrived.

Combat Basics

Shadow combat is a violent storm of signals, countersignals, and attacks on memory, processing, and central controls in Gridspace, ultimately leading to the digital destruction of one or more combatants. Programs and sometimes even hardware provide proxy weapons and armor. The steps to resolving a Grid combat are similar but not identical to the steps involved in a physical combat.



First, determine surprise, if any (a gridpilot running the alarm program in active memory cannot be surprised). If one participant is surprised, the other may take one free attack against his surprised opponent. Then, roll an action check for each participant, using the pilot's action check score and any bonus provided by his processor. The normal t'sa –1 step bonus to the action check scores still applies if the t'sa is using a t'sa accelerator adapter or other t'sa hardware (see *Chapter 4: Hardware* for details).

Once participants roll their action check, each shadow may take actions normally, as determined by the number of actions the program's quality provides. AIs who have learned the *multitask* specialty skill may receive additional actions.

Actions resolve normally, but—unlike physical combat—not all stun damage inflicted to a shadow returns at the end of a scene. Instead, half of all stun damage is restored; the other half remains.

Any gridpilot with active slots to spare can run automated defense programs to provide constant security. These programs require no attention from him, and they provide a first line of defense against unexpected attack. For example, a gridpilot's system could be running an OS utility to handle downloads, a shadow form program, and three automated defenses, such as static, antivirus, and alarm. As a result, the gridpilot gains multiple layers of protection—from trace programs, from virus attacks, and from shadow weapons—but has filled 6 slots of active memory.

Optional Rule: Shadow Wounds

In Gridspace, combat only hurts clusters of electrons: Programs crash, data vanishes, or operating systems fail or eject an intruder. A Gamemaster may decide, however, that a gridpilot risks his life and valuables on the line every time he dives into the Grid wearing a NIJack and a gridcaster. For a more dangerous Grid, apply the Brain Damage, Software Damage, and Hardware Damage rules to combat between gridpilots.

Brain Damage

Mortal wounds inflicted on a shadow require the hero—not his shadow—to make a Stamina–*endurance* check. However, the results are generally less serious. On any success, the gridpilot's shadow takes the wounds but is otherwise unaffected. If the check fails, the gridpilot's shadow suffers a momentary glitch and loses its next action. On a Critical Failure, the hero loses an action and also suffers brain damage.

For most sentients, brain damage results from an electrical shock that grounds out in the hacker's nanocomputer—which just happens to be implanted in his brain. This destroys the nanocomputer, and inflicts an immediate knockout check (a Resolve–*physical resolve* skill check).

For mechalus and for machine sentients such as AIs and robots, the risks are greater, because of their more intimate connection with the Grid. Their electromechanical parts are subject to greater harm from electrical surges. Any such character or any hero who has crossed the halfway mark in his Cyber Tolerance Score suffers a +2 step penalty when making Brain Damage-related Stamina-*endurance* checks.

Finally, if a shadow suffers as many mortal wounds as it has durability, it must make a final Stamina–*endurance* check before leaving the Grid. If the check succeeds, the shadow unravels, ejecting

the gridpilot from the Grid normally. A failed check paralyzes the shadow, still active as but a single bit in the Grid. The gridpilot enters a Grid coma, becoming unresponsive to physical or psionic stimuli, and unable to disconnect himself from the Grid. He remains that way until he dies of dehydration or until revived. Returning the coma victim to consciousness requires a successful Knowledge–*first aid* or Medical Science–*treatment* skill check. For this reason, smart hackers always run the Grid with backup, or at least tell someone to check on him when he undertakes a dangerous mission in Gridspace.

Grid legends say that some brain damaged gridpilots become deranged when they return to consciousness. Gridpilots refer to such poor souls as net zombies. They come under the control of a distant AI, or become completely psychotic, unable to operate in normal society (or even Grid society) without attracting attention to their obvious derangement.

Software Damage

Gridwipe, datawipe, and other attack programs can destroy software as they run in a computer's active memory or even as they sit passively in storage. These special-purpose programs aren't the only way to destroy programs; ordinary combat between two shadows can destroy data in the clash of datastreams and corroding viruses.

Every time a gridpilot suffers a Critical Failure during shadow combat, he may damage the software he is using or the software he has in storage on his system. The Gamemaster should roll a second Computer Science–*hacking* check modified by the bonus or penalty already affecting the gridpilot. Compare the result of the second check to Table D5: Software Damage. The software may be erased, damaged, bugged, or sabotaged. The Gamemaster always has the option of either rolling on Table D5: Software Damage whenever a Critical Failure occurs or of deciding that a given opponent always damages software in a certain way.

Hardware Damage

Just as a magnet, a power spike, or a datawipe program can destroy software, the demands of Grid combat can also destroy hardware. In almost all cases, though, hardware is far more resistant to destruction than software.

Hardware suffers permanent damage only if an attack using a shadow weapon, surge, fuse, or gridwipe program achieves an Amazing success and damages the target's software. If the software check yields an Erased or Damaged result, the damage may affect the hardware as well.

To determine whether hardware sustains serious damage from an Amazing attack, roll a durability check using the values provided on Table D6: Hardware Durability (the *Gamemaster Guide* describes durability checks on pages 55-56). The quality of the hardware (usually the processor, but sometimes a storage unit or interface) gives a resistance modifier of –1 for Good and –2 for Amazing.

Dueling Societies

In retrospect, it's not all that surprising that the Grid became a haven for organized, formal duels shortly after its inception. As an environment suited to combat but unlikely to prove lethal, the introduction of dueling seemed like a logical—even inevitable—development. Yet the earliest users of the Grid used the technology only for the most abstract of duels, in forms of simulated mass combat and gunplay. Only after the introduction of PL 6 technology did recognized dueling societies first appear. In some ways, these societies resemble martial arts schools; each society had a single charismatic founder who developed its techniques, code, and philosophy of Grid combat.

Most Grid duelists call themselves shadowboxers and are rightly proud of their abilities. They fight for prestige, for bragging rights, and for the joy and rush they get from combat. Shadowboxing is principally a sport for young males who have not settled into the rhythms of work and duty. For some communities, dueling is a juvenile aberration, discouraged or even prosecuted by Grid authorities. A few groups view it as a healthy outlet for aggression, or even sponsor competitions between teams, with hardware or cash prizes for the victors.

Like sports teams, dueling societies often build a reputation and a following that outlast their founders. A few of these societies have become Grid franchises, with their duels watched by audiences of millions of fans. The most famous of these societies from PL 6 are the EarthQuake Clan, the Lucky Star Tong, and Dr. Boom's Flying Circus. The EarthQuake Clan, based in Silicon Valley, keeps its edge by access to prerelease software and prototype hardware. The Lucky Star Tong works out of Hong Kong and operates with group

TABLE D5: Software Damage

	Software Quality			
Hacking Result	**Marginal**	**Ordinary**	**Good**	**Amazing**
Critical Failure	Erased	Erased	Damaged	Damaged
Failure	Erased	Damaged	Damaged	Buggy
Ordinary	Damaged	Buggy	Buggy	Sabotaged
Good	Buggy	Sabotaged	Sabotaged	Normal
Amazing	Sabotaged	Normal	Normal	Normal

Erased: This result destroys the software; the gridpilot must reload from outside the system.

Damaged: The software degrades one quality level. Amazing software becomes Good, Good drops to Ordinary, and so on. Marginal software cannot be damaged further. Treat this result as "Buggy" whenever it comes up against Marginal software.

Buggy: The program is suddenly buggy, perhaps due to the loss of a critical subroutine, a file, or array. Use the "Buggy Code" rules on page 27 whenever the gridpilot puts this program into active memory.

Sabotaged: The software seems normal until the next time the gridpilot uses it, when it simply fails to work. A successful Computer Science–*hacking* roll restores the software to normal functioning.

Normal: The software is undamaged.

TABLE D6: HARDWARE DURABILITY

	Hardware Quality			
Check Result	**Marginal**	**Ordinary**	**Good**	**Amazing**
Critical Failure	Totaled	Totaled	Wrecked	Repair
Failure	Totaled	Wrecked	Repair	Glitch
Ordinary	Wrecked	Repair	Glitch	Glitch
Good	Repair	Glitch	Functional	Functional
Amazing	Repair	Functional	Functional	Functional

Apply the following results for all damaged dataware.

Totaled: The hardware is so much scrap metal, and cannot be repaired. Multiple critical components have failed, and soot and smoke mar the rest. Any data stored on the totaled hardware is irretrievably lost.

Wrecked: The hardware is damaged but can still be repaired, given time and the right parts. This requires a successful complex skill check using Technical Science-*repair*; Computer Science-*hardware* may also solve the problem, but that skill suffers a +2 step penalty when faced with this level of damage.

Repair: The hardware has used its fail-safes (fuses, backup circuits, power shunts, for example) to avoid serious damage. It now requires a successful Technical Science-*repair* or Computer Science-*hardware* roll to restore to working condition. This does not require spare parts unless the skill check fails.

Glitch: The hardware suffers a momentary "hiccup" and then resumes functioning. It is inactive for a single phase, but does not require repair.

Functional: The hardware is unaffected and continues to operate normally.

precision in team duels. Their training seems to indicate a military background, as they are masters of platoon-level tactics as applied to virtual battlefields. Finally, Dr. Boom's Flying Circus is a Seattle-based group that includes a number of German members. Fans know its star and founder, the lightning-quick Dr. Boom, for his amusing "kill-clips," short video captures of his favorite virtual kills.

In the slightly slicker but just as blood-hungry arenas of the Gravity Age, the most famous groups are the Insight Alliance, the Aleer All-Stars, Manchester United, and the Black Hand. The Insight Alliance is known for innovative software and tactics, as well as for understanding how to please the crowds. The all-mechalus Aleer All-Stars are fast and trained almost from birth; even the most ardent fans of opposing teams admit that the All-Stars are fluid, graceful combatants. Manchester United is an all-human powerhouse of youthful fanatics named after a Terran sport team. The Black Hand takes its name from an Asian criminal organization popularized in Hollywood films of the 21st century. Its members remain anonymous, but many believe they recruit from among the best 'boxers of the tournament circuit. A few rumors even claim that the Black Hand is actually a group of AIs masquerading as biological gridpilots.

In the STAR*DRIVE campaign, a few arenas have long been associated with the sport of shadowboxing. These include the Black Sun in the Terran Grid, the *Aleer Eshtal* of the Aleeran Grid, the Mystery Box in the Insight Grid, the Red Arena of the AI Free Zone, the Oz Civic Arena in the Austrin-Ontis Unlimited Grid, and the Ultimate Cage of the Regency Grid in the Verge. While each of the arenas sells the privilege of observing fights, it also takes bets on the outcome and awards badges of rank. Despite numerous attempts to streamline the hierarchy and standing of shadowboxers, the sport remains fragmented, with at least a half-dozen claimants to the title of "Grid Shadowboxing Champion."

GRID CAMPAIGNS

Gamemasters can structure an entire ALTERNITY campaign around conflicts in Gridspace; even in a normal campaign, the Grid can play a major role. Some Grid campaigns, however, are more likely to succeed than others. The following overviews describe the options for characters, adventures, and locales typical of each Progress Level.

The Information Age Grid Campaign

In the modern era, the Grid is likely to be a sideline to a regular campaign rather than an entire setting in its own right. Villains can steal nuclear launch codes, hackers can transfer funds to Swiss accounts, and an entire drug ring might use military-grade encryption to cloak its communications and scheduling information—but these are all adjuncts to real-world action, rather than a replacement.

Grid campaigns of this era are severely limited in scope. Locations are usually high-security sites, data transfers and Grid combat alike are relatively slow, and the Internet and the World-Wide Web don't even make their first appearance until about a third of the way through the age. Programs are functional but not flashy. While computers still have some mystique, the battles fought on and over them occur just as often in the courts as on the wires.

Few villains will spend their entire careers working the Grid in this era; even fewer heroes will spend all their time defending it, though some supporting cast members might. The technology is too new and the crimes are too rare for this to be a campaign in its own right. A few specialized contacts and single-shot adventures might revolve around the Grid, but not an entire ongoing campaign.

The Fusion Age Grid Campaign

In the Fusion Age, humankind has reached to the nearest planets, establishing colonies on Mars and the Moon, as well as outposts on Mercury and the Jovian satellites. On Mars, great national efforts are terraform-

ing the planet, unleashing powerful robotic mines and tailored bacteria. Robot labor has made those colonies viable. Tying it all together is the first fully realized Grid, complete with NIJacks and gridcasters, and shadows for optimized access to data. The full flower of the hacker era arrives with the widespread introduction of electronic currencies, digital identification codes, and "secure" data transfers.

The home of all these wonders is the Terran Grid, which spreads across the globe and connects TV, Web, and phone networks into a technological octopus with a tentacle in every cell phone, home computer, and television. All but the poorest nations have some Internet access; the richest have amazing power over information. Heroes and villains alike need the Grid to succeed in collecting and analyzing that information. They also need to protect themselves from the long arm of the law—even heroes need a little privacy now and then. The Fusion Age Grid campaign centers around the premise of a computer-dominated society: who holds the power of information, who abuses it, and what they do with it. AI technology is still in its infancy but shows promise, independent programs mimic human behavior, and in 2124, the fraal make contact with humans for the first time, adding to the pulse and chaos of the times. The Terran Grid hops with deals, schemes, plots, and counterplots, as corporations flex their muscle and unions and individuals fight to preserve their rights.

The Terran Grid isn't the only option. With the long bounce time of light-speed-limited radio communication, data transfer to and from Mars and the Belt is slow but steady. The Mars Grid is a primitive thing by comparison to Earth's Grid, but it is one of the primary contact points with the fraal after 2124, as several of the fraal city-ships make regular stops on Mars to disembark settlers and to unload supplies. The fraal have no Grid, but each city-ship is home to an enormous amount of advanced technology, and some of it is available through protected sites on the Mars Grid.

The frontier of the asteroid belt is neither so civilized as Earth nor so alien as Mars. A few thousand fiercely independent souls who couldn't make it anywhere else have settled there. These folk become pioneers in microgravity and in technology. Many left Earth for reasons of religion, class, or nationality, and they are among the most dedicated technologists in the Solar system. In the Belt, experiments in cybertech, genetic engineering, and zero-g living reshape human biology and society into forms at home in space; likewise, the tenuous Belt Grid

New Career: Shadowboxer

A shadowboxer is a gridpilot who makes his living in no-holds-barred combat in Grid arenas. He is nearly always a Tech Op, and usually closely connected to a large Grid sector where he can find an audience for his fights. Older shadowboxers often suffer such extreme brain damage that they must retire from the profession, but the lure of both fame and fortune draws plenty of would-be 'boxers. A shadowboxer can usually outfight any other Grid combatant at any given Progress Level.

Although a shadowboxer depends on computer hardware and software for his everyday survival, he rarely does all of his hardware maintenance and coding himself. Instead, he acquires the necessary gear through a reliable 'ware specialist or he hires a professional staff to see to those functions, so that he can more fully concentrate on honing his attacks to become second nature. In addition, a successful shadowboxer always takes a stage name (like "Dr. Boom," or "Stone Cold"), much as some physical combatants do.

Skills (45 points): Stamina–*endurance 2*; Computer Science–*hacking 3*; Technical Science–*repair*; Street Smart–*Grid savvy*.

Signature Equipment: Good-quality microcomputer OR Ordinary-quality nanocomputer, NIJack, and Ordinary gridcaster (note that the cyberware installed, he must pay the 10 required skill points listed in *Chapter 15: Cybertech* to have cyberware installed); three Ordinary programs.

Mechalus Shadowboxers

In an interesting case of parallel technological development, the mechalus Grid—already quite developed by the time of first contact—also has a place reserved for Grid combat. This is the *Aleer Eshtal* arena, and fighting in it is a mechalus rite of passage: After the age of 23, young mechalus may challenge their elders to shadowbox. They may make a challenge only once each season, and the elder they choose to challenge may always decline if their other duties intervene. However, most elder mechalus consider it a civic duty to participate and will go to some effort to accept a challenge.

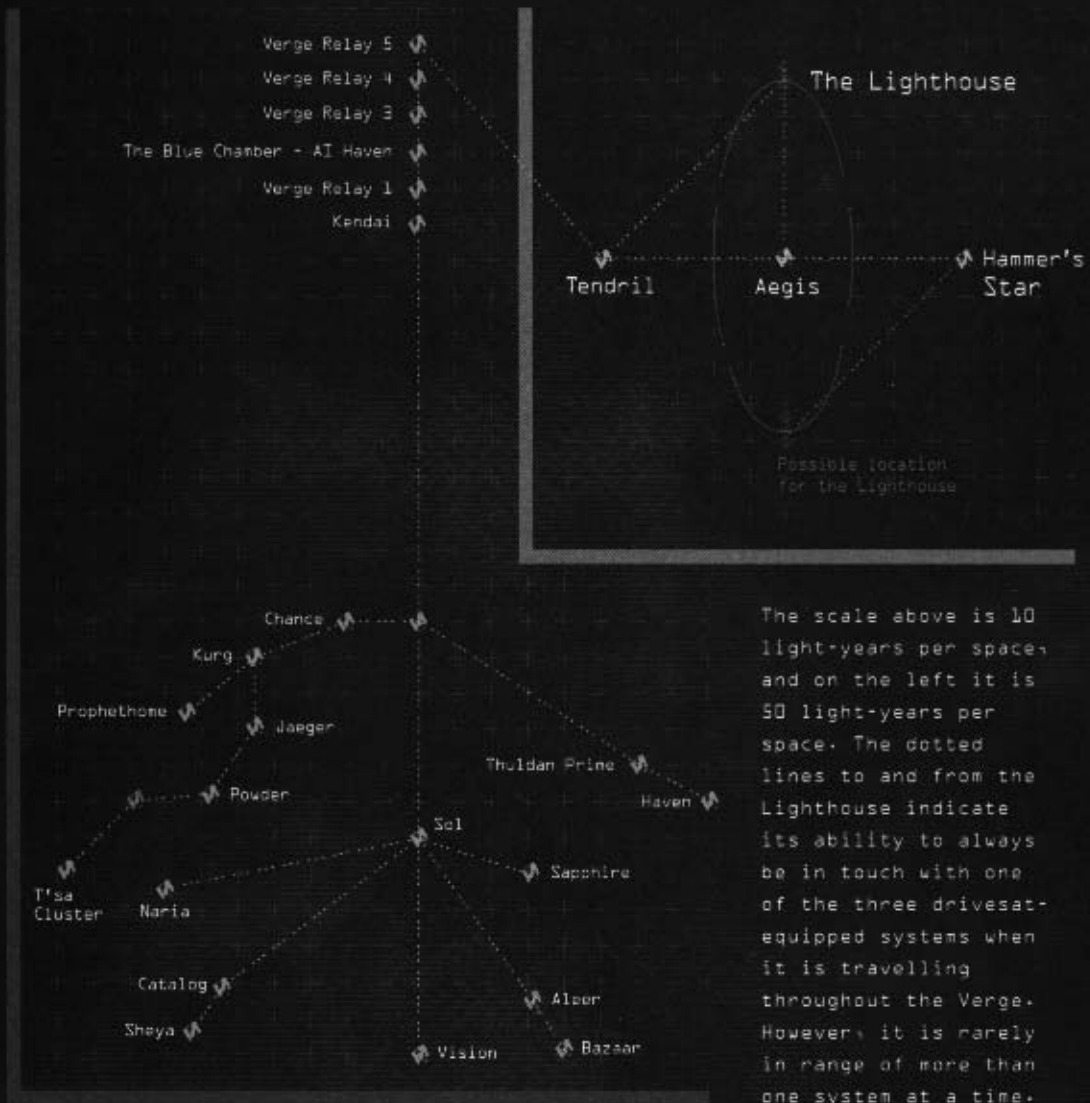
In a juvenile's first shadow combats, the experienced shadowboxer usually defeats the young mechalus. Over time, though, the young learn the harsh lessons of Grid combat and master the tricks that will allow their shadows to survive.

In game terms, all mechalus gain their usual –1 step bonus when using computers; this bonus also applies to action checks when involved in Grid combat. Furthermore, all mechalus gain an additional action when fighting in the Grid, in addition to the actions that they gain due to their shadow's quality. The player of the mechalus character may simply add this bonus action to the maximum number of actions the mechalus is allowed each round (but this number may not exceed four). He must still make a successful action check roll for the character to use the extra action.

Outside observers have noted that all the aggression that the mechalus do not display in the real world are fully on display in shadow combat, whether in the Aleer Eshtal or elsewhere. Their prohibitions against violence and against harming other species seem to apply only to flesh-and-blood creatures—Grid shadows don't count. The lesson for gridpilots everywhere is clear: never cross a mechalus shadowboxer on his home ground—take him out in real space, or don't take him out at all.

Interstellar Grid Map

This map shows the drivespace relay links of the year 2501, from Sol to the furthest reaches of the frontier at Hammer's Star. Each point on this map represents a drivespace relay station, able to transmit and receive data, messages, voice traffic, viruses, and shadows generated by Shadow Form 2 programs.



The scale above is 10 light-years per space, and on the left it is 50 light-years per space. The dotted lines to and from the Lighthouse indicate its ability to always be in touch with one of the three drivesat-equipped systems when it is travelling throughout the Verge. However, it is rarely in range of more than one system at a time.

Interstellar Grid Travel Times (in hours)

All times are one-way and are given in hours. To obtain round-trip times, double the listed value. No relay legal communications relays exist between Catalog and Vision.

From	To HS	AE	Te	Ken	Hale	Ch	Ku	Sol	Cat	Vis
Hammer's Star	-	11	22	88	209	231	264	264	308	330
Aegis	11	-	11	77	198	209	253	253	297	319
Tendril	22	11	-	66	187	198	242	242	286	308
Kendai	88	77	66	-	121	143	176	176	220	242
Hale	209	198	187	121	-	22	55	55	99	121
Chance	231	209	198	143	22	-	33	77	121	143
Kurg	264	253	242	176	55	33	-	110	154	165
Sol	264	253	242	176	55	77	110	-	44	66
Catalog	308	297	286	220	99	121	154	44	-	N/A
Vision	330	319	308	242	121	143	165	66	N/A	-

is alien to planetbound Terrans. Its unfamiliar reference frames make Terrans uncomfortable; the Belter's up and down navigational aids resemble those used on low-g stations. The lack of restrictions on Belter datacores and the difficulty in regulating them from Earth makes them perfect havens for rogues, hackers, and renegades of all stripes. If it is only mostly legal, it will be on a Belt site.

The Fusion Age offers plenty of options to the enterprising hacker hero. The Grid is young but rich, and a skillful gridpilot can make a fortune in all the wrong places. While the exact shape of the Grid is always up the Gamemaster, the Fusion Age provides one of the most exciting environments for Grid-based play.

The Star*Drive Grid Campaign

In the year 2501, the Energy Age is well underway, and the Grids of the 26th-century are places of interstellar communication and massive information density. The hoariest, most complex Grids are those of Old Space, near Earth and the first settled star systems. The most exciting action, though, is on the Verge, a region of settled space that lost contact with Old Space during a long galactic war. Recently, the Verge has re-established drivespace relay links with the worlds and stellar nations that settled it long ago.

The Verge Grid Map shows the major drivespace links connecting the frontier to the teeming Grids of more civilized space. It might seem at first glance that the well-developed systems and Grid sectors of Old Space would be the ideal place to run a Star*Drive Grid campaign, but that isn't necessarily the case. The most developed regions of space have crowded, bloated, and tamed Grids. It's the frontier's wild-and-woolly gray zones that make Grid life interesting. If a cash-strapped military liaison sells off encryption hardware, the frontier Grid will provide ready buyers. If there's a conspiracy among the industrial AIs, where better to build a secret base than on a newly discovered planet on the frontier? If ethical restrictions shut down cognitive transfer research in Old Space, then VoidCorp can certainly open up a facility to study these and other hardware problems on the Verge.

What's Available in Star*Drive Campaigns?

The Star*Drive setting provides a wide array of choices in hardware and software. All the items listed in this sourcebook as PL 7 are available somewhere in the Star*Drive setting, though not all items may be available in the relatively provincial Verge systems. In addition, cutting edge corporate research labs, alien archaeological sites, mechalus Tech Ops, and StarMech roboticists may have access to cutting edge PL 8 hardware, software, and robotic parts, at the Gamemaster's discretion. In some parts of Old Space, at the Terran core and the mechalus and t'sa homeworlds, some of the simpler PL 8 items may even be available as the latest technical marvels for sale to the public. However, even in the most advanced labs and cultures, no PL 9 items are ever available in the Star*Drive campaign setting. See the Star*Drive *Arms & Equipment Guide* for more details of specific Star*Drive corporate brands, makes, and models.

Chapter 3
Software

To get anywhere in the Grid, you need the right tools. Among those tools are programs. There are two ways to get a specialized program: Buy it off the shelf, or write it yourself. The *Player's Handbook* lists all of the most commonly available off-the-shelf programs, but any hacker worth his chips has dozens of X3Ds tightly packed with specially written applications to cover any imaginable Grid crisis. Here's how a computer-oriented hero can generate his own programs.

Creating New Code

Any hero with Computer Science–*programming* can alter or write a program by putting together the right series of commands (see the description listed under Computer Science–*programming* specialty skill on page 80 of the *Player's Handbook*). But coding is a time-intensive and unreliable process, riddled with mysterious compiler errors, false starts, glitches, and dead ends. To determine whether a programmer can create the software desired, the Gamemaster must first assess the degree of difficulty involved in creating that software. The more specialized, original, and graphics- and data-intensive the program is, the harder it is to create from scratch.

Then, the programmer must make a simple skill check using Computer Science–*programming*. If the check is a Critical Failure, the code seems to work as specified under normal conditions, but has a major glitch somewhere in its coding sequence (see the "Buggy Code" section below). If the check is a success, consult the table below to find out how long the job takes. If the check fails, consult Table D7: Coding Time to see how many days or months the programmer wastes before it becomes clear that the job is beyond his ability to code. Note that Very Difficult and Extreme programs may result in wasting months with nothing to show for it at the end.

Programs that incorporate more than a single feature may require complex skill checks; for each success required, roll on the table and add up the time. The help of a programmer AI capable of writing helpful code reduces all time units by one step at PL 7 (weeks to days) or two steps at PL 8 (weeks to hours, days to minutes).

Optionally, Gamemasters can allow characters to create programs of a quality beyond their normal ability. On page 80 of the *Player's Handbook*, the Computer Science–*programming* skill description lists the maximum quality level of any program characters can write based on their skill level. On an Amazing success, the quality of the program is actually one level above what he would normally be able to write. For example, a character with Computer Science–*programming* 6 is normally able to write programs of Ordinary quality. On an Amazing success, the quality of the program actually increases to Good. Such an increase may never exceed one level of quality. For each additional unit of time the programmer chooses to take (days, weeks, or months, as appropriate), he gains a one step bonus to his Computer Science–*programming* skill roll (or a one step reduction to a penalty).

Tailored Software

"Know your enemy" is the motto of the prepared hacker, and in the case of tailored software, it can make the difference between burning a target datacore and watching his shadow de-rezz into so much electronic detritus. Here's how it works: A hacker with Computer Science–*programming* can tweak his software's subroutines and attack algorithms to maximize the odds of a successful entry into a particular site. Note that modifying Good- or Amazing-quality programs requires a higher rank in the Computer Science–*programming* specialty skill—see page 80 of the *Player's Handbook*. The first step is to get close enough to the site to evaluate its defenses either with a snooper program (described below) or by visiting the site with a shadow (or they can use other means of gathering the information—see "Angles of Attack" on page 18). Once the gridpilot has analyzed the target with a Good or Amazing success on a hacking evaluation roll, the new coding requires time as usual (see "Creating New Code," left). If the coding is successful, the new code operates as expected.

This tailored software gains its benefit only against that particular target. Against all other hacking targets it suffers a penalty equal to the inverse of the bonus it has against its designated target. That is, a piece of tailored breach program that gains an additional –2 step bonus against the New Ursa Bank datacores suffers a +2 step penalty against everything else.

Buggy Code

Buggy code can come from a variety of sources: code freshly written by a hero, a prototype stolen from a R&D test facility, or greyware offered for

Table D7: Coding Time

Difficulty	Time Required
Easy	2d6 days
Average	1d6 weeks
Difficult	2d6 weeks
Very Difficult	3d6 months
Extreme	6d6 months

These time requirements assume eight-hour days. If a character wishes to spend more time each day on writing the program, he must first succeed at a Resolve–*mental resolve* skill check.

sale on the black market. It may simply be the result of buying a Marginal quality program, and getting what you paid for. In any event, the program doesn't function quite as advertised.

Whenever a hero uses the buggy code for any purpose, all skill checks required by the Gamemaster are more difficult, suffering a +1 step penalty. On a Critical Failure with buggy code, the software locks up the computer on which it is running. If the gridpilot has generated a shadow form, he loses the shadow. All downloads stop in midstream, all motion ends, all communication cuts off, and all attacks stop. The operator must restart the machine, and he loses any information gained during the Grid run.

A gridpilot with Computer Science–*programming* can attempt to find and correct the bug, a process that can take hours or days. This requires a complex skill check, with the level of difficulty depending on the quality of the program. A Marginal quality program requires just a Marginal complex skill check (2 successes); an Amazing quality program requires an Amazing complex skill check (8 to 10 successes). Failure means that the programmer does not find the bug, or that the repair simply spawns a new bug in place of the old one.

The Bleeding Edge

Some smart hacker will always try to invent new code that imitates the function of software from a higher Progress Level. While it's not impossible, coding a program of a higher PL always counts as a task of Extreme difficulty. Even if the programmer succeeds, he just generates the first prototype of a new type of program. On an Ordinary success, the higher-PL code is always buggy (see "Buggy Code," page 27) and—if run on less than an Amazing processor—it suffers a +1 step penalty for each rank it falls below Amazing. On a Good success, the software is still buggy but runs on any processor of Good quality without penalty; it suffers a +1 penalty on an Ordinary processor and +2 on a Marginal one. If the programmer achieves an Amazing success, the code is still buggy but an operator can run it on any processor without further penalty.

The Gamemaster may always rule that some programming tasks are simply too difficult for even the most accomplished code-slinger. The programmer cannot create these programs given the technology available, but may still find them in caches of alien technology or created by special members of the supporting cast, such as AIs.

New Programs

Software houses and independent gridpilots generate thousands of new programs with every passing year, with an eye out for applications to new hardware or new paths in the Grid. This section describes some of the specialized programs that a gridpilot hero might need; Table D8: Complete Program Directory on page 38 summarizes their attributes.

Remember that a hero may substitute the skill Computer Science–*hacking* for Knowledge–*computer operation* in any of the program descriptions that follow (see page 151 of the *Player's Handbook*).

Rate new software according to its availability, just as weapons are in the *Player's Handbook*. Ratings vary from Any (easiest to obtain), Common (Com), and Controlled (Con), Military (Mil), or Restricted (Res).

Any refers to programs that also serve as tools or are otherwise available to everyone without the need of permission or regulations.

Common programs are also available to anyone, but they are registered to their users (to protect the sales of the software companies). Bootleg unregistered copies are available, but they cost whatever the market will bear (usually twice what they would normally cost). Buyers can find these on the gray market.

Controlled programs are available to police forces, security details, criminal gangs, and any private citizen who has a special, hard-to-get gridpilot license. Law enforcement agencies take a dim view of those who illegally obtain and use controlled programs. Unless a hero has legal access to such a program, triple its cost.

Military programs are developed and used almost exclusively by large institutions for their own purposes. They are available to the Grid squads of powerful investigative and security forces, the most aggressive criminal gangs, and legitimate military forces. Very few legitimate licenses for this software are available, and few heroes have access to these programs. Purchase of a military program through illegal means multiplies the cost by five—if the hero can find it at all.

Restricted programs are those which are limited to use by only a very few institutions. Some of these programs are so destructive—viruses meant to cause entire networks to crash, for instance—that even legitimate users will not always admit they have access to them. Such programs are rarely for sale on the black market, but when they are, they cost ten or more times the "list" price. Furthermore, such a sale may be little more than a cover for a "sting" operation designed to capture those who would use such software. Buyers beware!

Operator Programs

Banish (PL 5)

Tags and removes an intruder from a domain.

This program dumps an unwanted visitor from a given site and alerts the site's defenses to lock out that gridpilot. To avoid dumping all gridpilots from the site, the unwanted visitor is usually first tagged and then banished. Tagging a target requires the gridpilot using the banish program to make a successful attack. This attack inflicts no damage to the shadow, but it does make it possible to dump the target in the next phase. The tag also makes it easier to employ a trace program against a target. Once the software dumps a gridpilot, however, a trace program can no longer locate his entry point.

A gridpilot with Computer Science–*hacking 5* or better may use the banish software in what some pilots call the "Wrath of God" mode. In this form, the program banishes everyone from a site, tagged or not. It's almost equivalent to pulling the plug to prevent a system from being hacked—but without the strain on hardware systems. Most large Grid sites try to avoid the "Wrath of God" user dump, if only because they lose respect and customers whenever they do so. After all, it's an admission that they can't handle hostile hackers by more subtle means.

Data Lock (PL 6)

Can be automated.

This digital lock secures files and locations in the Grid. To bypass a data lock requires an enormous password, often millions of characters long. Fortunately, you don't need to remember these passwords—instead, the password is an entire digital file, called a *data key*. The key can be a graphics file of a bearded old man, a specific recording of a symphony, or even just a financial record of a stock market

during a particular period of time. The specific form of the key doesn't matter, just its complexity and size, which makes breaking the data lock nearly impossible to bypass with standard password breakers.

Decryption (PL 5)

Decodes coded messages. Can be automated.

Decryption software breaks the complex coding sequences that protect the actual text of a data file. It differs from the decode program in that it breaks only the algorithm that protects the text itself. Decryption programs are able to unlock far more sophisticated codes than can the simpler decode software. Some files contain information sensitive enough to require both forms of protection: one to restrict access to the file, the other to protect the actual contents of the file itself.

Decryption software requires an enormous amount of processing power. Each level of program quality requires a minimum computer size to operate (see the table below). Data slates and gauntlet processors can't handle Marginal decryption attempts in fewer than days of processing time; any other level of decryption software is beyond their processing capacity.

To decrypt a file requires not only the proper tools, but success at a complex Computer Science–*hacking* or Knowledge–*computer operation* skill check as well (see Table P17: Complex Skill Checks on page 62 of the *Player's Handbook*). A hero with Knowledge–*mathematics* 6 or greater may attempt these skill checks with a –1 step bonus. If an AI coded the data being decrypted, modify the number of successes required in the complex skill check. Files encrypted by a Marginal-quality AI require no additional successes, those altered by an Ordinary AI require two additional successes, data encrypted by a Good AI require four additional successes, and those by an Amazing AI require six extra successes. If the hero has access to an AI to run the decryption software, reduce the number of successes required at the same rate (for example, a Good-quality AI requires four fewer successes in the complex skill check).

Program Quality	Required Computer
Marginal	Microcomputer
Ordinary	Desktop Computer
Good	Mainframe
Amazing	Supercomputer

Diagnostic (PL 7)

Makes medical judgments and suggests treatments.

Restricted to use by licensed medical practitioners or licensed medical computer hardware, diagnostic software is an expert system that can diagnose all diseases, injuries, poisonings, and radiation symptoms of a given species. Diagnostic programs exist for each of the major species. Note that some species may not be numerous enough to merit their own suite of diagnostic software. The diagnostic program provides a bonus to the Medical Science–*treatment* skill based on its quality, as follows:

Program Quality	Skill Check Bonus
Marginal	+1 step
Ordinary	None
Good	–1 step
Amazing	–2 steps

Note that a hero may incur other modifiers, such as the +3 step penalty for treating someone of another species—see the Medical Science–*xenomedicine* skill on page 86 of the *Player's Handbook*.

Encryption (PL 5)

Provides strong security for digital transmissions. Can be automated.

The encryption program uses a sophisticated algorithm to alter the text of a data file to make it unreadable by any who do not possess the code key. It differs from the encode program in its level of sophistication. The encode program prevents an unauthorized user from accessing a file and can scramble the data within the file to some extent. Encryption software affects only the text, but the complexity of its coding algorithm is far greater than that provided by encode software. Governments, military commands, and large corporations use encryption software to protect highly sensitive information. Unlike encode, encryption provides military-strength cryptography, virtually unbreakable by most civilian cryptographers without access to a supercomputer or powerful decryption algorithms. Encryption coding generated by an AI is even more difficult to crack than that created by normal supercomputers.

However, military encryption does have its limits. The program cannot scramble live transmissions, like a voice encrypter can, because it works on digital data as a unit, often scrambling the sequence as well as even the alphabet or numbering system originally used. Encrypt excels at manipulating text, numerical, or graphic data files into an unreadable jumble. To scramble real-time voice transmissions requires at least two specialized pieces of hardware called encryption modules.

In addition, encryption can hide its encrypted cargo of data in a seemingly innocuous data file, changing check sums or single bits of graphics files to carry a short burst of encrypted data. Thus, the encrypted file might

Programs

How to classify a program? What makes a particular software package a utility program or an operator program?

Operator programs accomplish routine tasks. This category includes applications (such as word processors and database managers), entertainment software (games or virtual realities), and reference material. It also includes programs that offer a means of defense against unwanted intrusions. This software lacks the finesse of the hacking programs, but it does give non-hackers an opportunity to defend their systems. They differ from automated defenses by requiring the operator actively employ them against an intruder.

Utility programs do not require an operator to implement. When a certain set of conditions apply, the program automatically triggers its response. This category includes automated defense programs and "carrier" software (virus and shadow form, for example).

Hacking software performs one of the following tasks: accessing restricted data, modifying a shadow form, engaging in shadow combat, or attacking a system. Accessing restricted data means finding a way around system defenses; This is the realm of hacking. Modifying a shadow form to allow it to go faster, resist damage better, or make it invisible is beyond the capability of operator or utility program users. Shadow combat and system attacks are specialized tasks that require a keen understanding of the Grid. Hackers possess that knowledge; operators do not.

appear—on the surface—to be anything from endless tables of payments and accounts to a collection of graphics files for an advertising campaign.

Holoware (PL 7)

Simple entertainment software.
These programs are simply entertainment software for virtuality spheres: games, dramas, interactive narratives, puzzles, news, and so forth. Holoware comes in a thousand flavors, but all of it appears fully realized in the confines of the sphere. See the listing for "Virtuality Sphere" in *Chapter Four: Hardware* for more details.

Laundering (PL 5)

Changes the apparent source of funds.
While it's illegal in most places, money laundering is one of the biggest early businesses on the net. Electronic cash is easy to move and hard to trace. This software includes financial management utilities to track shell accounts, holding companies, and profit-and-loss statements—and an operator can destroy the data by sending out a simple panic-button signal.

Whenever the software launders funds, the user must make a Knowledge–*computer operation* or Computer Science–*hacking* skill check. A Critical Failure indicates that the authorities detect the attempt and issue a warrant for the user's arrest. A Failure simply indicates that a suspicious banker, an uncooperative financial AI, or even a lack of proper forms and clearances stalls the attempt and the money fails to reach a "clean" status. Any success indicates that operator deposits the funds in a reputable account. A Good or Amazing success also means that attempts to trace the funds' original source (by someone using Investigate–*track*) suffer a +1 or +2 step penalty, respectively, for the depth and complexity of the money trail.

Locator (PL 7)

Can be automated.
The locator program tracks a target real-world person or object using public and private digital records, as well as comm grid area and exchange prefixes. An operator can use this program to find someone who isn't even connected to the Grid. Unless the locator target never uses a credstick, never appears in a surveillance camera video record, and never calls anyone on a comm line, the locator program's net will eventually catch him. In all cases, a locator operates passively and the target usually cannot detect the attempt. It usually finds a target within 48 to 96 hours, assuming the target is within the same system where the locator program is searching. Interstellar searches take considerably longer.

Programs of Marginal quality can only locate a target on the same continent or in the same Grid network as the searcher; Ordinary locators can find anyone on the same planet or same sector. Good programs can find anyone on the interstellar grid as well, and Amazing locators find all targets in half the usual time (although interstellar communication time is in no way reduced by an Amazing program).

Loop (PL 6)

Puts a system into a feedback loop.
This program sends an opponent's computer system into a recurring logic loop, so that his shadow repeats the same actions every round. However, getting the program to work isn't easy. To put an enemy shadow into a loop, the attacker must gain a success equal to the quality of the opposing shadow (that is, to successfully use a loop program against an Amazing-quality shadow, you must score an Amazing success when attacking with the loop software). Once a loop program captures a shadow, the looped gridpilot must spend an action and roll a Computer Science–*hacking* success equal to the quality of the loop program to break out. If that roll fails, the looped gridpilot must bail out of Gridspace entirely, losing all data gained up to that point, and generate a new shadow. Until released, the gridpilot's only action every round is a perfect repetition of his previous action. A Marginal loop program gives the operator no bonus to his skill check, an Ordinary program provides a –1 step bonus, a Good provides a –2, and an Amazing a –3.

Mechalus Specialty Enhance (varies)

Broadens skills mechalus may enhance.
The mechalus are born with the equivalent of the reflex cybertech enhancement, and they have had centuries to develop additional programs to take advantage of this hardware. These programs interact with the mechalus bioware to enhance the following: Medical Science (Mechalus-specific), Movement, Resolve, Technical Science, Vehicle Operation, and any specialty skill in the broad categories allowed in Ordinary enhance programs (see the *Player's Handbook*, page 245). Other species may not use these programs.

Netsearch (PL 5)

Can be automated.
This program casts a wide net over data traffic, trying to match particular patterns of phrases, keywords, or names. With a successful Knowledge–*computer operation* skill check, the gridpilot finds information about his chosen topic. An Ordinary success provides general information, if not exactly what he was looking for; the data he does find may require a fee to access. A Good success provides an overview, some helpful data directly related to the topic, and pointers to more detailed data (but the detailed data requires a small fee). An Amazing success provides exactly the information the gridpilot wanted in a concise, easily accessed form, free of charge.

The Gamemaster should treat this as a way to generate clues for a Grid-savvy party of heroes. A smart hero will rely on netsearch as a quick way to put together a background briefing for any adventure.

Prophecy (PL 8)

Predicts the future.
This powerful modeling software can determine the exact result of a future action based on the information available to it, though its success is largely dependent on the skill of the people who feed it data. Make a skill check based on the user's Knowledge–*computer operation* skill. On an Ordinary success, the software only provides a yes/no answer, or a success/failure estimate, much like the AI specialty skill *prediction*. On a Good success, it provides a percentage estimate of the odds.

On an Amazing success, the prophecy program knows the exact outcome of an action, down to details of timing and causality. Amazing foreknowledge also provides a free Last Resort point to the hero or supporting cast member with the largest role in the action to come. That individual may spend this point only to make the indicated prophecy come true—or to avoid it.

On a failure, the program offers an inaccurate assessment of the situation, though it may err on the side of greater optimism or pessimism than is really called for, at the Gamemaster's option. On a Critical Failure, the software provides an outcome described above—but the estimate is completely wrong. The Gamemaster gains an additional Last Resort point to use in foiling the estimate that the prophecy program provides.

Translator (PL 7)
Translates text files.
This software operates by taking text files in one language and converting them into a second; a real-time voice interface version is available at five times the listed cost. A separate translator program is necessary for each language combination (weren to Standard, for example). When in use, translator programs provide a –1 step bonus to Knowledge–*language* checks.

Require Computer Science–*hacking* or Knowledge–*computer operation* checks only in adverse conditions, such as when using inappropriate hardware, when converting material across multiple formats and standards, or (in the case of a voice interface) when background noise is high or speech is either very fast or riddled with regional dialect and slang terms. Failures under these conditions indicate that the program simply fails to translate a portion of the material. Critical Failures under these conditions indicate an error in translation, which may take any form from trivial to catastrophic, depending on the importance of the material being translated.

Unity (PL 7)
Induces meditative calm.
This program induces a serene meditative state believed to have profound spiritual and perceptual benefits. At PL 7 it has additional benefits for believers. Unity software doubles the restoration rate for psionic points, and it grants a –1 step bonus for users of the *datalink* psionic ability. In the STAR*DRIVE campaign, unity programs are a central piece of Insightful religious software, available at any Insight datachurch or Grid site.

Hacking Programs

Back Door (PL 6)
Provides easy access to a protected system.
Whenever a gridpilot has found his way into a system, he can leave a copy of this program behind as a sort of anchor program in reverse. The back door then allows the 'pilot to access the system again without making any Computer Science–*hacking* rolls, and to be accepted as a user with the same clearance as when he left.

Back door programs of higher quality levels are more difficult for the hacked system to detect; they confer a +1 (Ordinary), +2 (Good), or +3 step penalty (Amazing) to any attempt to root them out.

Black Hole (PL 6/8)
Provides instant portal movement. Can be automated.
This program distorts Grid space, much like a gate program does, but uses this distortion to make movement easier, not to prevent movement (as gate software does). A gridpilot using a black hole program can send his avatar or shadow through the doorway in a single phase, effectively moving a huge distance through Gridspace in a single moment. A black hole program of Marginal quality can only move a shadow around within a single domain. A black hole of Ordinary quality can pop a shadow from one domain to another within a single network; Good quality software pops shadows from one network to another within a single sector. An Amazing quality black hole program is only available at PL 8, but can pop a shadow from one stellar Grid to another.

Bubble Domain (PL 8)
Creates a hidden domain.
This program sifts through the chaos of the datastream, the movement and data transfer junctions that underlie all the functions of the Grid, and generates a temporary domain. A Marginal-quality bubble domain has just enough room for two shadows to meet and hold a conversation or exchange data files, with a background roar of static that makes the whole experience unpleasant. The domain is inherently unstable and dissolves back into the background noise in 2d10 minutes.

The Ordinary version of the program has enough power to permit up to nine people into the bubble. Roll the user's Computer Science–*hacking* check when he launches the program. On a Marginal success, there's enough space for three people. Ordinary success gives enough room for five, Good for seven, and Amazing provides room for up to nine shadows. An Ordinary bubble domain is stable for 2d8 hours.

The Good quality program creates a domain free of noise and with some simple amenities, such as a virtual memory datacore for temporary file storage and a small set of local-domain netsearch functions and knowbots. They remain stable for 2d6 days.

The Amazing quality version of the bubble domain program actually creates an entire subsector, with room for thousands or even millions of simultaneous visitors. Invisibles often use these programs to set up the regions where they conduct their business; these domains are stable for 2d4 weeks.

Credit Tap (PL 6)
Enables electronic theft.
With electronic cash and other computer payments firmly established, e-cash crimes were not far beyond. The credit tap is not the simplest form of electronic robbery, but it is the most subtle and often the most effective. Once the program is functioning, it siphons off small sums several times in each billing period; nothing large enough to attract attention without a successful Awareness–*intuition* check.

To set up the credit tap properly, the user must make a Computer Science–*hacking* roll, with a penalty depending on the strength of the account's defensive software. Gamemasters might require that the user of a credit tap program know either the Business or Administration skill (and any appropriate specialty skill) in order to make the most effective use of the credit tap software.

Datawipe (PL 5)

Destroys programs in active memory.
This attack program destroys programs in a target's inactive memory. When a hero rolls a successful attack with datawipe software during Grid combat, the target loses one program at random from its memory. On a Good success, the target loses two programs at random, and on an Amazing success, the target loses three programs. While in Grid combat, the gridpilot cannot restore from backups the programs destroyed, but after combat he can attempt a simple Computer Science–*hacking* skill check to recover them using automated backups. Unless the check results in a Critical Failure, he can restore the programs.

Evade (PL 5)

Used to hinder a trace program.
This program screens a user by scrambling his carrier signal in order to block a trace program. If trace software is being used to locate a remote hacker somewhere along a network connection, an operating evade program provides additional protection against location. A Marginal-quality evade program requires that the operator using the trace software make one additional success on his complex skill check (see the trace program to determine the necessary number of successes). An Ordinary program requires two additional successes, a Good program three, and an Amazing four. Note that gridpilots using Amazing processors running Amazing evade software are extremely difficult to trace.

Fuse (PL 7)

Attacks a target's data flow.
This program seeks to confound a defender by melding together the data streams from a shadow's various subroutines, scrambling the signals intended to run the victim's movement, data storage, and combat programs. If the attack succeeds, it inflicts damage as indicated below, and also inflicts a step penalty on an opposing shadow as indicated below. This penalty affects only the opponent's next skill check; thereafter, the target shadow's systems sort themselves out again.

Quality	Damage	Penalty
Marginal	d4–1s/d4s/d6+1s	+1
Ordinary	d4s/d4+1s/d6+1w	+2
Good	d4+1s/d4+1w/d6+2w	+3
Amazing	d4w/d4+2w/d4+1m	+4

If an Amazing quality program scores an Amazing hit, it inflicts brain damage, assuming the Gamemaster uses that optional rule (see "Grid Combat" for details).

Ghost (PL 8)

Renders a shadow invisible. Can be automated.
The shadow protected by a ghost program becomes invisible in the local Grid. This makes it difficult to target the ghost-shadow with attack programs, tracers, or any other program that requires a target.

All attack programs suffer a step penalty determined by the ghost program's quality, as do trace and other surveillance programs (see below).

Gridpilots directly operating alarm, doorkeeper, and gate programs may attempt a Computer Science–*hacking* or Knowledge–*computer operation* check to see whether they detect a ghost-aided shadow. Automated versions of these programs simply do not register the ghost.

Quality	Modifier
Marginal	+1 penalty
Ordinary	+2 penalty
Good	+3 penalty
Amazing	+4 penalty

Lag (PL 5)

Reduces a target's processor speed. Can be automated.

This program corrupts a target shadow or site and tricks it into spawning countless subprocesses and useless calculations, reducing the processor speed to a crawl. The quality of the lag program provides a step bonus to the Computer Science–*hacking* attack roll.

If the attack succeeds, the program fools the target computer (which may be automated site or even an AI). The target's action check changes, suffering a +3 step penalty and nullifying any action check result of Amazing (treat the result as "Good" instead). Thus, a Marginal processor's action check becomes +3, an Ordinary processor +2, Good +1, and an Amazing processor's a d0. Unlike gridlock programs, lag software always has the same +3 step penalty, and it never denies the target any action—it increases the odds that the victim will act in the Marginal phase.

An antivirus program can counter the lag program's effects, as lag software resembles a virus program in many of its particulars. Mirror image software can also counter it.

Lockpick (PL 5)

Opens password-protected systems.

This program uses brute force to gain access to a sealed system by trying thousands or millions of likely passwords; the gridpilot using it can tweak the program's parameters to narrow down the search or to consider the most likely candidates first. Using a lockpick program always requires a complex skill check, with the difficulty of the check dependent on the quality of the security program being hacked. Marginal-quality lockpick programs do not provide a bonus to the gridpilot's Computer Science–*hacking* skill check. Ordinary lockpick software allows the gridpilot to make his check at a –1 step bonus. Good and Amazing lockpick programs give a –2 and –3 step bonus, respectively, to the gridpilot's skill check.

Mimesis (PL 7)

Provides a shadow with false ID. Can be automated.

This defensive program is a variant of the slink program. When launched or automated, it covers a shadow in garments of respectability, such as a Grid cop insignia, a security gridpilot's colors, or even the form of a knowbot or other nonhuman data packet. Simply put, mimesis software is both a disguise and a forgery:It looks legitimate, and many programs will accept it as what it appears. However, mimesis software does not provide access to datafiles, domains, or subsectors protected by additional safeguards.

Mimesis programs are illegal in most Grid jurisdictions, and possession of such a program is often a crime. They are especially popular among invisibles, who dislike revealing anything resembling a true name or form.

Override (PL 6)

Takes control of other hardware or machinery.

This program allows the user to interfere in the normal operation of a remote piece of hardware, such as an autopiloted vehicle, a camera, life support systems, security systems, a robot, or even a set of industrial controls in an automated factory. Unlike a control program, override software has break-in and slink functions to bypass normal safeguards so it can seize control of remote systems. This program bypasses the normal operating procedures in the control programs. Security personnel responsible for defending computer systems often install defensive layers around control programs that operate machinery which could cause injury to others if intruders defeat the operating software.

To successfully override equipment, the user must make a successful Computer Science–*hacking* check. If the opposing equipment or processor is of Marginal quality, the hacker gains a –1 step bonus to the roll. If the equipment is Good or Amazing, the attempt suffers a +1 or +2 step penalty, respectively. The Gamemaster may apply other modifiers as necessary to reflect the heightened security around certain computer systems. Note that systems without any connection to the Grid cannot be the target of override programs at all.

Parry (PL 6)

Turns attacks against their instigators.

This active defense program responds directly to attacks with appropriate countermeasures, turning the weapons of attack programs against themselves. Using it requires the user's full attention. The coordinated defense provides an automatic two points of armor against fuse, shadow weapon, and similar attack programs. The Good and Amazing versions of the program also provide a +1 or +2 step penalty, respectively, to all other attack programs directed against the parrying defender. The parrying defender turns any attack that suffers a Critical Failure against its perpetrator, which inflicts its damage against the originator.

Rescale (PL 6)

Increases or decreases a shadow's size in the Grid.

Rescale programs provide a sort of zoom-in, zoom-out function—but it changes the entire relationship of the shadow to the local grid, making the shadow seem huge or tiny in relationship to the local data structures.

While rescale software does change a shadow's apparent size, it has no effect on the shadow's damage, armor, durability, or Ability Scores. The shadow's visibility increases if its size increases. If the gridpilot shrinks his apparent size, he gains a –1 step bonus to any use of the slink program, as his new tiny shadow is more difficult to detect.

Shadow Bolt (PL 6)

Provides a distance attack form.

This software tool allows a gridpilot to attack any shadow he can see in a local domain, regardless of the distance between them. However, due to the additional computing effort required to guide the attack to its target, damage from shadow bolts is lower than damage from normal shadow weapons.

Quality	Bonus	Damage
Marginal	no	d4–2s/d4s/d6s
Ordinary	no	d4s/d6s/d4w
Good	–1	d4–2w/d4w/d4+2w
Amazing	–2	d4w/d4–1m/d4+1m

Shadow Bolt 2 (PL 7)

Provides a shadow with a distance attack form.

This is an improved version of the shadow bolt developed at PL 6. It can strike at any shadow sharing the same domain as the user, but does less damage than a standard shadow weapon.

Quality	Bonus	Damage
Marginal	no	d4s/d6s/d6+2s
Ordinary	–1	d4w/d6w/d6+2w
Good	–2	d6w/d6+2w/d4m
Amazing	–3	d6+2w/d4m/d4+2m

Shadow Mask (PL 6)

Alters a shadow's appearance. Can be automated.

These programs are templates and overlays that turn a shadow into a specialized costume. Marginal-quality shadow masks include simple geometric shapes altered by video effects, poor-quality reproductions of the gridpilot's real-world appearance, and simple clothes and images swiped from music holos. Ordinary masks include historical personages, legendary characters such as Merlin or the Monkey King, alien forms, and simple carnival costumes.

Good masks include political figures, licensed animated characters, and characters from fiction and holos. These masks always include d4+1 special features, such as famous sound bites, video or holo loops, and stage-magician-style novelties (smoke puffs, spotlights, vanishing data objects). One of these novelties is usually a disguise for a Grid weapon or a Grid defense.

Amazing masks include celebrities, whimsical creations that outdo anything you might see at a costume ball, and designer images, sculpted to match a pilot's Grid persona and capable of at least a dozen shticks. Three or more of these novelties are usually disguises for functional subprograms of Ordinary quality.

Shadow Shaper (PL 7)

Improves a shadow's physical Ability Scores.

These plug-ins increase the Strength, Dexterity, or Constitution that a shadow form program generates. However, there are limits to how much enhanced performance a shadow shaper program can ever provide. A gridpilot may not use more than one shadow shaper program to improve a single Ability Score.

A Marginal shadow shaper program increases one of the shadow's three physical Ability Scores by one. A gridpilot may not combine it with additional shadow shaper, shadow shifter, or shadow mask programs of any kind.

The Ordinary version increases an Ability Score by one point, and can be combined with other shadow-modification programs. The Good version increases a score by two points, and the Amazing program increases one score by three. An operator may combine other shadow modification software with both the Good and Amazing programs.

Shadow Shifter (PL 7)

Speeds up shadow movement.

This program modifies a standard shadow form program to permit faster movement through Gridspace. It adds 2 movement points to the shadow for each quality level (2 for Marginal, 4 for Ordinary, and so on). This movement does not add to the shadow's actions per round or action check.

Slink (PL 5)

Used to gain stealthy access to a computer system.

A slink program masks a user's activity, making it difficult to notice his presence within a computer system. It helps an invader get around an alarm program or sneak past a fortress program (as opposed to forcing entry with a break-in program). The slink program provides a modifier to the chance of being spotted by automated defense systems (see below).

Quality	Modifier
Marginal	No change
Ordinary	+1 penalty
Good	+2 penalty
Amazing	+3 penalty

Snooper (PL 6)

Recons a Grid site.

This simple program is a form of digital lab rat, sent to investigate a well-defended site before a hacker attempts to crack it. In essence, it is a tiny autonomous sub-shadow that allows the hacker using it to making a Computer Science–*hacking* evaluation roll (see page 15) without risking his shadow's presence at the target he wishes to investigate. The hacker loads the program, sends the snooper subshadow through a gridlink to the target site, and waits for it to return with the requested information. Even if the snooper "shadow" doesn't return, that provides the hacker with some information (usually interpreted as "Don't even think about it.").

The hacker makes the evaluation roll using his Computer Science–*hacking* skill score, with a situation die modifier based on the quality of the snooper program. A Marginal program suffers a +2 step penalty, Ordinary suffers +1, a Good gains no bonus or penalty, and an Amazing program gains a –1 step bonus. If the roll succeeds, the hacker acquires information about the target normally. If the roll fails, the hacker gains no information, though he can try again with a +1 cumulative step penalty.

If the roll is a Critical Failure, the target catches the snooper software, forewarning the sysops of a possible attack on their system. A target with a trace program may attempt to backtrack the snooper program to its source: this roll succeeds normally, but is subject to a –2, –1, 0, or +1 step adjustment depending on the quality of the snooper program (from Marginal to Amazing).

Utility Programs

Some utility programs in *Dataware*, like those in the *Player's Handbook*, often bolster the defenses of a computer system. Heroes operating against such systems incur a penalty to their skill checks as follows: Marginal: no modifier; Ordinary: +1 step penalty; Good: +2 step penalty; Amazing: +3 step penalty.

Anchor (PL 5)

Used to protect an invader from being banished from a system.

An anchor program helps prevent the hacker from being dumped from a system by a banish program. Operators attempting to use a banish program against someone running active anchor software must succeed at a Computer Science–*hacking* or Knowledge–*computer operation* skill check with a modifier to his skill check as outlined in the introduction to the this section.

Anonymous (PL 5)

Obscures the source of a gridpilot's messages.

This program removes all trace of a user's screen name, message routing, and point of origin from a text file posted or sent via the Grid. For the Marginal version of this software, roll a Knowledge–*computer operation* skill check whenever the operator uses it; on a Critical Failure, the program fails and other gridpilots can trace the message. Ordinary and better versions require no additional checks.

Good and Amazing versions of the program not only remove the user's identity, but they create a fictitious identity as well, from president@whitehouse.gov to ceo@ibm.com. Roll a Knowledge–*computer operation* skill check to determine how successfully the program creates the false electronic trail.

Autogunner (PL 5)

Tracks a weapon and fires at designated targets. Must be automated.
The autogunner operates a heavy weapon slaved to a radar sensor, mass detector, motion sensor, or other tracking device—at PL 6 and up, it is often a backup to a spaceship's human gunner. The program fires the weapon, with a skill equal to 13+/12/6/3, at the target until it stops moving. Marginal versions of the program suffer a +3 step penalty to the roll; more sophisticated versions adjust for movement, wind, or other conditions to reduce the penalty by 1 step for each increase in quality (to 2/1/0 step for O/G/A, respectively).

At PL 6, an autogunner may also be part of a robot or built into an automated defense system (ADS). An ADS always function independently, but an AI or human operator can monitor it from a central location.

A Good or Amazing autogunner can also include a friend-or-foe identification system for double the usual cost. Amazing autogunners also prioritize targets so that it ignores a rat in favor of a burglar, or an asteroid in favor of an approaching starfighter.

Autopilot (PL 5)

Pilots a vehicle. Must be automated.
Used primarily in aircraft in PL 5, autopilot software can take off, land, and maintain a course from one known point to another with an effective DEX of 11. Marginal software has just the equivalent of the Vehicle Operation broad skill. Ordinary software provides Vehicle Operation–*air* 1, Good provides Vehicle–*air* at rank 2, and Amazing provides rank 4. A second version of autopilot is available that can pilot specially wired ships and submarines, using sonar and GPS instead of radar and wind speed indicators.

The autopilot program must make a Vehicle Operation–*air* roll when it encounters severe conditions of terrain, jammed traffic, or foul weather. On any successful roll, the autopilot handles the difficulty without incident. On a Critical Failure, the autopilot loses control and a living operator must take over the vehicle's guidance or it will crash. On a Failure, the autopilot loses control but can restore its previous course and speed as long as it generates 4 or more successes in a complex skill check during its actions beginning the next round.

An autopilot cannot undertake evasive or combat maneuvers. At PL 6, autopilot software can operate land and space vehicles as well.

Datashare (PL 7)

Coordinates Grid activities. Can be automated
This program creates a shadow that can act as a command, control, and communication mechanism in the Grid. It allows multiple gridpilots to form a connection with one another. As a shadow receives information in the Grid, the datashare software communicates that information to the other gridpilots attached to it. This information cannot travel any faster than normally allowed by the prevailing Progress Level. Computer operators use such software to increase their ability to disseminate information quickly to multiple recipients. Although hackers tend to work by themselves, often they find it beneficial to attack particularly dangerous data fortresses with others. In such cases, one hacker manages the datashare "relay station," while the others press home the attacks on the fortress.

The datashare software generates a shadow with attributes equal to those the shadow form program generates. These attributes increase based on the Computer Science–*hacking* skill ranks of the gridpilot who created it, just like the shadow form program does. The generating gridpilot may use the datashare shadow as a shadow form. The software automates all the communications functions, leaving the gridpilot free to act in the Grid. If the gridpilot wants to exercise command and control in addition to the communication functions, he must use his available actions to do so, just as he would in realspace. In addition, the group of hackers may gain bonuses for teamwork as outlined on pages 48–49 of the *Gamemaster Guide*. If the controlling gridpilot has the Tactics skill or an appropriate specialty skill, he may grant the team bonuses to their actions as well.

The datashare program limits the number of gridpilots that may attach to it based on quality of the program, as follows:

Program Quality	No. of Gridpilots
Marginal	Two
Ordinary	Five
Good	Eight
Amazing	Eleven

Doorkeeper (PL 5)

Logs visitors to a site. Can be automated.
This program logs every visitor to the domain it watches over. However, it doesn't record creatures that take special precautions to avoid registering on such a program's list. Any gridpilot using a slink program can bypass a doorkeeper with a simple skill check. The quality of the doorkeeper program provides a step penalty to the slink attempt.

Rumors suggest that improved versions of doorkeepers are available. These versions sometimes claim to offer "anti-slink" protection and improved visitor demographic identification, but so far the claims remain vaporware.

Gate (PL 6)

Can be automated.
Everyone knows that Gridspace is non-Euclidean; this program proves it. Grid gate programs warp local Grid space wherever they operate. Each gate changes the rules of Gridspace so that normal three-space becomes constrained into a line or tunnel. Defense programs often guard this single entry point.

While this tunnel often exists simply to log all visitors to a data site, many gates combine with other programs to provide even greater security. Marginal gate programs can't combine with anything else. Better gate programs can combine with a single defensive program (Ordinary) or a single attack program (Good). Amazing gate programs can combine with up to two programs of any type. These programs then automate to attack unauthorized visitors to the site; the site uses passwords, data locks, and even graphics locks to prevent unauthorized access to the site.

Grid Trap (PL 6)

Can be automated.
A Grid trap is an enormous piece of software that creates a false domain, a decoy site constructed with a single purpose: to capture shadows and tear their code apart on a bit by bit level. Once inside such a domain, the target shadow's chances of getting out are very slim indeed.

To detect a Grid trap requires both knowledge and luck. A gridpilot with the Street Smart–*Grid savvy* specialty skill can make a simple skill check to detect the small clues and inconsistencies that reveal a site as sealed off, rigged, and otherwise dangerous. Gridpilots without the skill may attempt an Awareness–*intuition* skill check, with a penalty for the quality of the Grid trap program itself (0 for Marginal up to +3 for an Amazing trap).

Once a shadow is past the portal and inside a Grid trap, the only way

out is release by the trap's owners or a black hole program of a quality equal to or greater than the trap's quality. In many cases, the owners may catch and release shadows, in exchange for something the trappers want, such as money, software, or information.

Private use of a Grid trap is a punishable offense in all but the wildest Grid jurisdictions. However, most nations allow their Grid cops to use them, when given proper authorization, against particularly wily Grid criminals.

Knowbot (PL 6)

Must be automated.

Knowbots are primitive forerunners of artificial intelligences and the shadow form 2 programs; they are a specialized form of software that lives in the net and provides its owner with information. Also called agents, knowbots constantly sift the data streams for information sought by their owner.

Knowbots can perform the grunt work of research, tracking, or monitoring (surveillance video or other inputs, a Grid sentry post, or even automated sales). In short, a knowbot automates processes that might otherwise require the user's personal attention, and then feeds the information to its owner. The quality of a knowbot program determines how effectively it operates. Each time knowbots are sent into the datastream, the gridpilot must make a Knowledge–*computer operation* skill check to see how effective they are and what they return with. A Marginal knowbot program provides a +2 step penalty to the user's skill check, an Ordinary provides no bonus or penalty, Good gives a –1 step bonus, and Amazing provides a –3 step bonus.

Mail Bomb (PL 6)

Must be automated.

Mail bombs are destructive, automated programs sent to their target using the Grid's E-mail or vid-mail system; they are specialized viruses. When opened, a mail bomb immediately attacks whatever data it can reach. If opened by a gridpilot casting a shadow, it attacks the shadow with a skill check depending on the mail bomb's quality. If opened by a GID or similar non-nanocomputer interface, it attempts to destroy all local data, including active programs. This has an effect similar to a combined datawipe and gridwipe, destroying both active and inactive data in the target computer.

		Programs Destroyed	
Quality	**Skill Check**	**Active**	**Passive**
Marginal	8/4/2	1/1/2	0/1/1
Ordinary	12/6/3	1/2/2	1/1/2
Good	14/7/3	2/2/2	1/2/2
Amazing	18/9/4	2/2/3	2/2/3

Sending mail bombs is illegal in all civilized Grids, but the crime persists because it is often so difficult to trace. Most mail bomb attacks occur in conjunction with an anonymous program, to erase the digital trail back to the bomber. If the operator does not use an anonymous program, or if he uses it incorrectly, the intended recipient can trace the attack normally with a successful skill check using a trace program.

Meishi (PL 6/8)

Provides a digital calling card. Can be automated.

This puny, some would say trivial, program draws its name from the Japanese word for "business card," a term that barely begins to define the meishi program's importance to the Asian Grid domains, where it functions as a personal passkey and token of esteem. A meishi program provides more than just a way to leave an electronic calling card for someone; it is a mode of self-expression. Meishi programs are tiny snippets of the sender's personality, like .sig files in E-mail or like, well, business cards.

A Marginal version of the program is the Western business card: it provides a name, comm address, a logo, and basic information about the giver's profession and status. An Ordinary meishi program provides a resume function and digital images such as a photo or holo logo.

A Good program provides the functions described above, plus a message function to send voice or text to the owner, with built-in forwarding functions, and also includes an image of the giver's shadow avatar. This version includes a scheduling knowbot, which keeps and updates the giver's daily schedule of work and other activities, and can book appointments.

An Amazing meishi program includes all of the above features plus an automatically refreshed route from the recipient's location to the giver's current Grid domain, if any. For those in a hurry, it may provide a black hole link to the owner. At PL 8 or higher, it may include a link to the giver's bubble domain or favorite hangout, as well as black hole links. The Amazing-quality program sometimes includes a self-destruct function, which allows the program to erase itself after a preset period of time.

Neural Guardian (PL 6)

Kicks unwanted users off a site.

This primitive version of the menace program is no more than a finely tuned expert system that reacts to intruders much the way a trained gridpilot would react when counterhacking. The neural guardian is activated whenever an attack program runs in its domain. It responds by creating a shadow form at the location where the attack occurs which chases all invading gridpilots out of the area. It instantly transports any gridpilot it successfully attacks in shadow combat via a link to a Grid trap or to a preselected node outside the guardian's domain. Marginal-quality neural guardian programs attack with a +3 step, Ordinary ones with a +2 step, Good ones with a +1 step, and Amazing ones with a 0 step penalty.

Remote (PL 5)

Controls robots from a distance.

This program allows the user to control a remote mechanism, such as a bomb-squad robot or reconnaissance drone. Unlike the control program from the *Player's Handbook*, an operator uses the remote program to control distant machines with dedicated wireless links. Communication and feedback between the operator and the remote unit may be patchy at times; the program follows a given set of orders independently for a short while in the absence of other instructions. AIs also use the program to supervise their remote units.

Unlike the control program, remote software is primarily a data-gathering utility. An AI uses its remote units to store images and other sensory data in one of three formats, Cursory, Normal, or Dense. Much like varying the recording speeds on a VCR, the AI sets the remote unit's data gathering to one of these speeds depending on the AI's interest in what the remote is sensing. Even an AI doesn't like to be bothered with the dull details of a three-day trek across a frozen tundra. The AI, however, might want every detail of the remote unit's encounter with a pack of scavengers on that same tundra.

Other sentient creatures sometimes also use a remote utility to control a waldo. In these cases, the operator usually displays in real time the data returning from the waldo and records it for later analysis.

Stronghold (PL 7)

Provides a Grid site with defenses. Can be automated.

This industrial software requires at least Knowledge–*computer operation* 8 or Computer Science–*hacking* 6 to run successfully. Usually only large governments or corporations install it, but a few wealthy noble houses and other private individuals have created strongholds to protect their most important digital assets. Stronghold software requires at least a mainframe to run properly.

The software creates a series of guardians and barriers to entry, while allowing shadows within the stronghold site to leave freely. Each stronghold is unique, but all share two of the following features for each level of the software (that is, Marginal stronghold sites have two features, Amazing sites have eight):

- Static against all outside shadows
- Traces, automated
- Datalocks, automated
- Datawipe, automated
- Surge Gates
- 1–6 Guardians
- Loop Gates
- Fuse Gates
- 1–4 Menaces
- A dedicated AI defender

In the Grid, data strongholds can look like just about anything—from monolithic ramparts to mountains to towering spires of light to double helixes—but creating a specialized appearance requires integrating a shadow mask subroutine into the structure. Doing so always adds 10% to the stronghold's cost.

Time Lapse (PL 5)

Sets a delay on another program. Must be automated.

This program acts as a delaying mechanism or fuse for the function of some other program, allowing a Grid user to use other programs from a distance, thus acting in two places at once. Gridpilots most frequently use it to create a distraction while the real attack comes from somewhere else. For instance, the time lapse launches a break-in program an hour after its user sets it up outside a corporate firewall. At the same time, the original user launches attempts to sneak into the same site from a different location, hoping that the flurry of activity around the break-in attempt keeps the site's guardians occupied while he moves in. A time lapse program can launch its application strictly by the clock, with a delay of seconds, hours, or even years. Unlike a virus program, it is not limited to activating attack programs; it can also create a defense or employ a utility.

Artificial Intelligence Software

These programs are of little use to biological computer users. AIs use them to improve their ability to operate in the Grid and influence events outside the Grid.

Artificial Shadow (PL 7)

Builds a humanlike shadow for an AI.

This program creates a superior shadow for an AI. An AI using a shadow form program is usually recognizable for what it is. The artificial shadow program allows the AI to interact with others in the Grid as if it were the shadow of a human gridpilot. Many AIs find such subterfuge pointless and demeaning, but some believe that they are better able to gather information from human sources if those sources believe they are dealing with another human.

An AI generates its artificial shadow software once and uses it until its Computer Science–*hacking* skill improves to the point where it can construct a better shadow. An Ordinary artificial shadow has a base shadow Strength, Dexterity, and Constitution of 6, 7, and 5; Good has a 7, 7, 6 base; and Amazing programs start with 7, 8, 7. An AI then adds its skill rank in Computer Science–*hacking* to the appropriate base values. For instance, an AI with an Ordinary quality artificial shadow and a Computer Science–*hacking* rank of 3 has a Strength of 9, a Dexterity of 10, and a Constitution of 8.

An artificial shadow may move in Gridspace at a speed determined by its Strength and Dexterity scores (much like any other shadow). Many AIs, however, purposely move at a slower speed, since such velocities often draw unwanted attention to themselves. An artificial shadow may benefit from shadow shifter software, just as other shadows do.

Brainscanner (PL 9)

Allows AI access to biological data through NIJacks.

This program, when combined with a cyberhelm or a nanocomputer worn by the intended target, allows an AI or a gridpilot to reverse the usual access channels through a target gridpilot's nanocomputer—and access any brain connected to the Net. Doing so has some serious risks and drawbacks, however. Most seriously, brain damage may result to either party if the target's shadow leaves the Grid while the brainscanner software is active.

If the Computer Science–*hacking* skill check succeeds, the program's user gains access to the surface thoughts of the target. On a Good success, the user also gains access to one piece of desired information buried deeper in the target's mind. On an Amazing success, the user can freely roam through the memories of the individual, or tag along as an invisible observer while the target acts in Gridspace—as long as the victim remains.

Table D8: Complete Program Directory

Name	Slots	PL	Avail.	Cost per Quality M	O	G	A
Operator Programs							
Banish	2	5	Con	500	700	900	1,100
Data Lock	2	6	Any	200	300	400	600
Decryption	2	5	Mil	750	1,500	3,000	6,000
Diagnostic	1	7	Con	200	250	300	400
Encryption	1	5	Con	400	800	1,200	2,000
Holoware	1	7	Any	25	50	200	400
Laundering	3	5	Mil	200	400	600	800
Locator	3	7	Con	250	300	350	400
Loop	3	6	Any	300	400	500	600
Mechalus Enhance	1	**	Con	—	2,000	3,000	4,000
Netsearch	1	5	Any	50	100	150	300
Prophecy	2	8	Mil	15K	30K	100K	250K
Translator	1	7	Any	200	350	500	750
Unity	2	7	Com	25	50	100	400
Hacking Programs							
Back Door	1	6	Mil	50	100	150	200
Black Hole*	3	6/8	Con	300	600	1,000	5,000
Bubble Domain	4	8	Con	800	2,000	10K	50K
Credit Tap	1	6	Con	1K	4K	9K	16K
Datawipe	2	5	Con	100	300	500	1,000
Evade	2	5	Con	100	250	500	750
Fuse	2	7	Con	500	1,000	1,500	2,000
Ghost	3	8	Con	500	1,000	1,500	2,000
Lag	2	5	Con	600	700	800	1,000
Lockpick	2	5	Con	400	500	600	750
Mimesis	3	7	Mil	500	1,000	1,400	1,800
Override	3	6	Con	1,000	2,000	3,000	4,000
Parry	2	6	Con	400	800	1,200	1,500
Rescale	2	6	Con	500	1000	1,500	2,000
Shadow Bolt	2	6	Con	400	600	900	1,400
Shadow Bolt 2	3	7	Con	600	900	1,400	2,000
Shadow Mask	1	6	Con	250	500	750	1,000
Shadow Shaper	1	7	Con	400	600	800	1,000
Shadow Shifter	2	7	Con	500	1K	1,500	2,000
Slink	2	5	Mil	200	400	600	800
Snooper	2	6	Con	250	500	750	1,000
Utility Programs							
Anchor	2	5	Con	200	400	600	800
Anonymous	1	5	Con	25	50	100	150
Autogunner	2	5	Mil	300	400	500	600
Autopilot	2	5	Con	700	900	1,100	1,300
Datashare	5	7	Any	1200	2500	4000	5500
Doorkeeper	1	5	Com	25	50	100	200
Gate	2	6	Com	100	400	600	900
Grid Trap	5	6	Con	60K	100K	200K	300K
Knowbot	3	6	Con	1K	3K	5K	8K
Mail Bomb	1	6	Con	250	500	750	1,000
Meishi	1	6/8	Any	25	45	240	1,000
Neural Guardian	3	6	Con	800	2,000	3,200	4,500
Remote	2	5	Con	150	300	450	750
Stronghold	7	7	Mil	15K	25K	50K	75K
Time Lapse	1	5	Com	50	100	150	200
AI Programs							
Artificial Shadow	2	7	AI	—	3K	6K	9K
Brainscanner	6	9	AI	5M	10M	—	—
Overmind	8	9	AI	6M	8M	10M	—
Robot Software							
Robot OS	1	7	Com	300	600	800	1,000

*** Interstellar black holes are only available at PL 8 and higher.**
**** Mechalus software is available to mechalus characters at all Progress Levels, but only widely understood and available at and above PL 7.**

If the victim leaves Gridspace while the brainscanner program is still active, both the victim and the scanning pilot must make a Resolve–*mental resolve* check with a +1 step penalty, or suffer immediate brain damage (see page 21).

An AI using this program suffers a +2 step penalty because of the differences between human and machine intelligence. It is unclear whether an AI can use this program to read the thoughts of another AI; all AIs questioned on the subject have refused comment.

Overmind (PL 9)

Grants an AI machine psionics.
Only an AI of at least PL 9 may employ an overmind program. The software alone is not enough, however. The program requires a specially designed and manufactured peripheral as well: the neural synthesizer, which mimics human biology of the mind (PL 9), especially the regions of the brain that govern psionics. An AI running overmind software gains limited machine psionics.

Even with this software, to date the Telepathy broad skill and all its specialty skills are unavailable to an AI using an overmind program. The difference between human and machine intelligence is too great for effective psionic communication between the two.

Robot Software

Robot OS (PL 5)

Governs all basic robot functions.
Robot software provides a basic set of tools and applications that cover a robot's core functions. It analyzes images and sensor data, activates manipulators and other actuator arms, propels the robot through the world safely, accesses memory and internal databases, and communicates with other robots and with owner or overseer systems. If anything ever erases this software, the robot becomes nonfunctional until someone else (biological or mechanical) reinstalls the software. It is only of academic interest to nonrobot heroes.

Software Hooks

Programs make perfect maguffins, objects for heroes to find, lose, steal, or destroy. The following adventure ideas all revolve around software of one kind or another.

Robbed!

One of the easiest adventures to pull is a reversal of the hacker tendency to steal data and programs from anyone and anything within their reach. In this adventure, a gridpilot steals valuable (or even worthless) software from one of the player's heroes. Most players react strongly to the invasion of their system, and will try to find out who is behind it and why. If not, the intrusions continue to escalate, with eventually lethal consequences.
Trigger: The robbed hero finds a note on his computer system showing that someone (or something) has hacked it and taunting him for leaving such an easy target.
Challenge Scene: The hero must attempt to use a trace program to find out where the attack came from. Even if he succeeds, the attacker may have since moved. In that case, the hero may set up alarm software, a doorkeeper program, or similar safeguards.
Resolution: The theft may just be a prank, or it may be part of an effort by a private investigator to prove a case against the hero, or it may even be a diversion from a more serious attack on the heroes by a gridpilot who has left a backdoor program on the hero's system.

The Data Double

A rogue gridpilot or invisible is impersonating one of the heroes on the Grid, using up the hero's money with a credit tap program, and generally causing chaos by pretending to be someone he's not.
Trigger: The data double has committed a Grid crime, and someone has issued a warrant for the twin hero's arrest. The first that the heroes know about it, of course, is when the Grid police show up to impound the heroes' hardware, cut off their Grid access, and take the offender into custody.
Challenge Scene: The hero and his friends must convince the arresting officers that he is innocent with an Interaction–*charm* or Deception–*bribe* roll. However, the officers have heard it all before, so the hero gains a +3 resistance modifier to any such attempt.
Resolution: If the remaining heroes can trace the double or lure him into a personal meeting, they may turn him in or force him to confess.

If not, their friend will stand trial for crimes he didn't commit—and without Law–*court procedures* or Administration–*bureaucracy* skill, he doesn't stand a chance.

State Security

At some point, a hero will leave the Grid with data he isn't meant to have. It could be data given to them by a patron, part of a data package they to deliver to another system, or data taken along with other loot when the heroes plunder a war hulk or abandoned base. In any case, the data they have includes military and economic secrets that the government wishes to keep out of the public eye. Perhaps the information may embarrass a government; perhaps it contradicts the official version of events, or perhaps it discloses a black operation that the government would rather not admit to. In any case, they'll do whatever it takes—legal search and seizure, a black op, or an out-and-out bribe—to get it back.
Trigger: Three government agents show up with a warrant demanding the return of "Case File Delta 309." They threaten arrest if the heroes don't return it immediately. The heroes have no idea what the agents are talking about, though such a file does exist on one of their computers.
Challenge Scene: The heroes can fight it out with the agents, but this only draws more suspicion to them and attracts more agents to follow them. The next time, the agents are better armed and armored, and they're more likely to fire first. The smarter move is to cooperate with the agents, and track out the data's source; perhaps the leak is still active, or perhaps someone planted the data as misinformation. In any case, cooperative heroes are less likely to become the target of a government investigation (complete with surveillance, wiretaps, and background checks).
Resolution: The heroes either turn the software over or become hunted enemies of the state. If the heroes have killed a government agent, they may not be able to turn the materials over without being arrested and detained (possibly even liquidated). In this worst-case situation, you may want to invent a digital underground that takes the hunted hero in and provides a new identity.

The Code of God

The heroes become the carriers of a special set of religious software that grants strange powers—but also exacts a terrible price. The mechalus or the Inseers (of the Star*Drive campaign setting) make excellent antagonists for this adventure.
Trigger: One of the heroes runs across a shadow in the Grid that resembles an angel. This avatar gives the hero a special piece of software that adds one to his Will score and grants him the *datalink* mindwalking ability as long as the software runs.

The software that falls into the hero's hands claims to be able to dissect the soul of anyone on the Grid, determining who is a sinner and who is one of the Elect. Despite all efforts to erase or remove it, the software remains stubbornly lodged in its chosen host (it is running off a nanocomp, or may have a special backup mode that secures it inside the hero's NIJack).
Challenge Scene: Others constantly challenge the heroes to Grid duels, ostensibly to prove that they are the prophesied ones, more likely to gain the code from them by any means necessary. In addition, they increasingly become surrounded by well-wishers: an entourage of bodyguards, sycophants, preachers, hackers, and flunkies. This makes making a living or traveling on adventures difficult. If the heroes give their followers the slip, they just meet up with them again later (the software tells the followers where the messiah will be next, every time he or his friends pay for something, register at starport customs checks, or log on to the Grid). They constantly plead for the hero to judge them, that is, to subject themselves to the Code's verdict on whether or not they are of the Elect.
Resolution: The heroes are likely to want to either use the software for all its worth, or use and abuse their newfound sacred status. In either case, it consumes more and more time and energy to keep up with the software. If the hero abuses the Code, it passes on to another, more worthy host—and the benefits and problems all leave with it. If the hero treats the Code well, the host may indeed start a new religion. Such a hero will likely leave the heroic life of adventure and should probably retire as a player character.

Chapter 4
Hardware

Computer electronics don't live or die by electrons alone. A modem, a display, a gridcaster, a router, and data storage aren't virtual commodities: they're solid material, and usually somewhat delicate material at that. The *Player's Handbook* describes most of the hardware basics in detail. The *Arms & Equipment Guide* adds specific gear for the STAR*DRIVE campaign. Here we look at a few of the oddballs, and a few of the species-specific bits of gear that can be in any ALTERNITY game.

INTERFACES

To get any use out of a computer system, you must tell it what you want it to do. The devices that convey information from creatures to computers are interfaces, and while a good one can make a system seem effortless, a bad one can make the computer nigh-impossible to use.

Computer interfaces have taken a mind-boggling number of forms over the centuries, but we'll skip most of the outdated systems and concentrate on the systems actually used by most heroes of PL 5 to 7. The *Player's Handbook* fully describes the command link, data link, NIJack, gridcaster, gridsuit, gauntlets, and GID. Here are some of the other options.

Fraal Aural Display (PL 6)

Old even by fraal standards, the aural display (or AD) is a collection of specially tuned crystals that register both bioelectric energy and psionic emanations. For most models, this involves a set of seven clear quartz or rutile crystals, varying from 5 to 20 cm long. This display allows a fraal trained in the Computer Science or System Operation broad skills to manipulate fraal machinery of all kinds without actually touching the display.

Mindwalkers with the Telepathy–*datalink* skill can manipulate a fraal display from a distance of up to 3 m per rank of the specialty skill simply by psionic command. Any Mindwalker with the Telepathy broad skill can command the display as long as he is within a meter of it. Any Mindwalker without Computer Science or System Operation broad skills must make an untrained skill check in order to give the proper commands.

A given display usually controls a single computer system or subsystem, much as a ship's command station does in human hardware.

Nonpsionic creatures must make a Personality feat check to make contact and manipulate a display. All non-mindwalking creatures suffer a +4 step penalty to any such attempt. The device's hardware can sometimes translate even the most primitive psionic commands into the appropriate reaction by the system. Trying to tap into the display's mental wavelength for a nonpsionic creature requires a full round.

Fraal Command Globe (PL 7)

The command globe is a sophisticated psionic interface that permits a fraal gridpilot to manipulate either ship's machinery, particular communication equipment, or a Grid-linked computer. A particular globe can only link with one set of hardware. When linked to a non-fraal piece of hardware, all uses of the globe suffer a +2 step penalty.

The globe resembles a bluish-purple crystal ball set on a gold and silver base, which translates the ball's psionic signals into electrical impulses and transmits them to the globe's linked system. Unlike an aural display, a command globe is portable, much as a computer gauntlet or a notebook computer is. Its effective linking range is 20,000 km—beyond that, the globe's psionic signal is too weak to track.

Nonpsionic creatures cannot use a command globe. Mindwalkers with the Telepathy broad skill but without the *datalink* specialty skill can use a command globe at a +2 step penalty. Mindwalkers with *datalink* use the interface normally, and may use the interface at a distance of up to 1 m per rank of the specialty.

Holo Eye (PL 8)

This is an updated and miniaturized version of the holo projector (see below) capable of projecting a holographic image into clear, still air. Under adverse conditions, the image may distort as described in the holo projector entry, below.

The holo eye's only disadvantage is its short life cycle. The demands of keeping itself floating as well as projecting high-quality holographics means that holo eyes burn out in a matter of minutes. A Marginal-quality holo eye functions for 2d4 action rounds, an Ordinary eye for 3d6, a Good eye for 4d8, and an Amazing eye for 5d12 action rounds.

Holo Projector (PL 7)

This series of lasers, gravitic deflectors, and resonance requires enough space and enough steady power to keep the device functioning properly. The holo projector creates a human face for a computer, providing an interface that biological creatures can respond to based on more than just text or vocal outputs. A holo projector provides a computer with body language, facial expressions, and gestures. When combined with an expert system, the holo projector often functions as if it were an additional crew member, or as an extension of the ship's computer.

Many AIs also employ holo projectors to soften their image or at least to create an image for their owners, servants, and friends to focus on during conversation. However, the image an AI presents to the world can vary wildly, from wise elder to grim statesman to crone and back again. The shifts in appearance can take place over a few years or a few weeks as the AI gradually enjoys, grows bored with, and then discards facial features. Since these changes morph into one another, the shift is sometimes imperceptible to those who see it every day. Not so with the more extreme examples of rapid holo image shifting found among hermit AIs (see page 61). The hermit AIs often use holo projectors—indeed, a

deformed or bizarre holo-projection is often one of the first symptoms of a hermit AI's descent into madness.

The holo projector operates best under conditions of clear, unmoving air. Rain, snow, wind-blown particles, and fog distort or destroy its images with static, fuzziness, and "holo blur," a smearing effect that makes movement resemble a streak of color rather than a clean, moving object.

Mechalus Integral Adapter (PL 6)

The mechalus use tendrils and prehensile wiring to interface directly with computer systems. While the adapters are inborn in the mechalus, vat-grown versions of this interface tissue can adapt to members of other species who possess a nanocomputer and the reflex cybertech enhancement. It acts as a NIJack that can adapt to conform to unusual or broken Grid terminals, or even nonstandard links.

However, since mechalus engineers grow the interface to spec for each species, it is only available from mechalus technomedical firms. Even then, the mechalus doctors are reluctant to sell such a device to a species that they don't understand well, for fear of complications.

Accepting a mechalus integral adapter counts as cyberware for other species, counting as a size 3 implant for purposes of cyber tolerance. Tissue rejection is relatively common. The host can reject the implant in one of two ways: either the traditional rejection of mechanical parts by the host or the rejection of "improper" or "unhealthy" nonmechalus tissue by the adapter's nanites. Regardless of the cause, the rate of success in such cybergear installation is lower than normal; implanting such an adapter imposes a +2 step penalty on the cybersurgeon attempting to install it.

Mechalus Tank (PL 7)

Dedicated mechalus gridpilots use this full-immersion tank to wring maximum performance from their Grid time with minimum risk. The m-tank resembles a sensory deprivation tank, and contains a mixture of oils, biomechanical data spigots, salts, and nanites (primarily tension modulators, chemical synthesizers, and heating elements) that can generate any sensation of the real world for a mechalus while he runs the Grid. This increases the mechalus's response time and fine control over Grid data, but at a cost: an increase in his susceptability to damage by hostile forces in the Grid. When piloting any Grid software using an m-tank, it acts as if it a program of one step better quality. Marginal software performs as Ordinary, Ordinary as Good, and Amazing programs function with an additional –1 step bonus. However, the attendant risks likewise increase, and all software and hardware damage rolls suffer a +2 step penalty for a gridpilot operating within an m-tank.

Nonmechalus gridpilots cannot use a mechalus tank, though some humans with extreme cyberware claim to have achieved partial connectivity with an m-tank. A gridpilot who has used up all of his cyber tolerance potential may interface successfully with a mechalus tank by making a Good or Amazing success on a Constitution feat check. Such links rarely last more than a single day; eventually, the cyberware's incompatibility causes a glitch or fault that dumps the gridpilot out of the system. No record exists cases of a nonmechalus gridpilot achieving a cyber-interface more than once.

Ship's Voice (PL 6)

The ship's voice is a voice interface in most respects (see the *Player's Handbook*), but it has one important additional feature: It can identify and authenticate individual voices. This permits the ship's captain to give certain crew members access to critical systems, while denying access to others.

Some ship's voices also include video displays, to present schematics, tactical displays, maps, and documents. Voices usually also include video monitors, so the ship's computer can observe shipboard activity and take action as necessary in an emergency.

AIs use voices in combination with holo projectors. For them, the identification function provides a helpful way to keep track of where crew members or visitors are aboard a ship without installing video or holo cameras throughout the vessel.

Socket (PL 7)

The socket is the standard robot interface for accessing local Grids or ship systems. It contains a digital translator, a protocol generator for speaking to unfamiliar operating systems, and a set of utilities to help the robot determine what information is available from other robots in the Grid being accessed.

Socket Adapter (PL 7)

Used by roboticists to access and alter robotic software systems, this device simply gives an outsider the freedom to examine a robot's systems through the socket port. Socket adapters can measure a robot's battery power level, run diagnostic software to evaluate problems, and otherwise help a roboticist assess the overall health and maintenance needs of any standard or custom robot. Robots built by t'sa use a different standard for their socket adapter equivalents; mechalus roboticists connect with their creations directly using the mechalus ability to interface with computer systems.

T'sa Nanolink (PL 6)

The t'sa nanolink operates differently from the standard nanolink, with completely altered electrochemical transfer protocols optimized to take advantage of the t'sa's faster metabolism. In Gridspace, this translates as faster apparent movement—a t'sa shadow cast by a t'sa gridpilot with this nanolink can outrun most pursuit. A t'sa gridpilot may add 2 to his Grid movement rate when using this nanolink.

However, the increased movement comes at a price. Detail work sometimes suffers from the jitters that this link produces, the user is more likely to bump into things when moving, or he fails attempts to affect an opponent with combat software (it's hard to click on an enemy when your cursor is jumping all over). The t'sa gridpilot suffers a +1 step penalty to all Computer Science–*hacking* rolls made under time pressure.

Other species may not use a t'sa nanolink, though research continues, especially among the mechalus, to adapt the hardware to the needs of slower metabolisms. The t'sa have shown no desire to assist in speeding this technology transfer; they see it as doomed from the start. After all, the t'sa all know that other races are just naturally a little slower. Human mutants with the Increased Metabolism or Hyper Metabolism mutations have claimed to gain some benefit from human-adapted versions of the interface, but no reputable authority has yet confirmed these results.

T'sa Accelerator Adapter (PL 7)

Widely used by the t'sa Tech Ops who operate outside the T'sa Cluster of homeworlds, these adapters increase the perceived rate of data output to the user and increase the sensitivity of response to inputs. In other words, the t'sa like to do their computing quickly, pulling down data clusters and switching tasks at a pace fast enough to make other races a little queasy. In game terms, this interface grants a t'sa a –1 step bonus to its action check when performing actions in Gridspace.

Computers & Peripherals

The *Player's Handbook* describes the standard computer models and gauntlets. The *Arms & Equipment Guide* adds the standard computers of the Star*Drive campaign setting. Here are some of the nonstandard models, as well as modifications and peripheral systems.

Actuators (PL 5)

Actuators are devices that move parts: pulling wires, turning cameras, lifting a barrier, or adjusting spotlights, for instance. They can be radio-controlled or mechanical; the important part of their function is responding to real-world stimuli with real-world action.

In some cases, ruthless technicians rig actuators to fire booby traps (shotguns, claymore mines, masers, or other fiendish devices requiring a trigger pull to engage) in response to a given stimulus. A hero can disable an actuator system with a successful skill check of either Technical Science–*repair* or with Security Systems–*security devices*.

Alarm, Silent (PL 5)

These computer-monitored security devices include laser tripwires, nanofilament tripwires, electrical circuits, and motion sensors. When activated, they send a signal to the computer or to an AI, alerting the system to the presence of intruders in the secured area. Some silent alarm systems also hook up to a local police authority.

Amnesia Jack (PL 6)

This rigged NIJack-plug looks just like the normal plug on a gridcaster, meant to plug into a standard NIJack. In fact, it is a sabotaged piece of hardware designed to induce amnesia in any gridpilot using it. It does this by flooding his neural circuitry with an overdose of neurotransmitters and a special psychoactive chemical called *pseudoserotonin-receptor inhibitor* (PRI), which scrambles short-term and long-term memory. As a result, the gridpilot is unable to recall information; in many cases, the gridpilot cannot even remember his own name.

The strength of the memory loss depends on the quality of the jack. A Marginal a-jack inflicts a +1 step penalty to all actions for d6 hours but has no other harmful effect. An Ordinary a-jack removes the victim's knowledge of all Intelligence-based specialty skills he or she may have had (except his or her native language) until 2d6 hours pass. A Good amnesia jack changes the victim's knowledge of all Intelligence-based broad skills to an untrained status for the same length of time. The Amazing-quality jack—sometimes referred to as the lobotomy jack—has the same effect as a Good jack but its effects are sometimes permanent. The victim loses one rank in each Intelligence specialty skill unless he or she makes a successful Intelligence feat check to recover the skill. A Critical Failure on the feat check indicates that the gridpilot loses the skill entirely.

All amnesia jacks except those of Marginal quality are strictly illegal.

Archaic Processor (PL 5)

Built to the highest technical standards of their day, touted as marvels of computation and calculation, the computers of the early Information Age are inaccessible relics to most computer users of the Fusion Age or beyond. Archaic computers rely on vacuum tubes, tape drives, iron core memory, and ancient operating systems. A staff of local experts or a group of loyal enthusiasts of outmoded technology often run and maintain the systems. In some cases, a recluse or a member of a backwards culture uses the cast-offs of a higher PL. In others, military and government computers simply become outdated and never get replaced. The same fate can befall PL 6 computers in PL 7, and so on. Computer systems can become so outdated even within the span of a single Progress Level that almost no one knows how to operate them.

Using one of these systems requires a successful Knowledge–*computer operation* skill check, but all attempts to use them, from the simplest calculation to extracting stored data, inflict a +3 step penalty. In the worst cases, an operator may have to relearn from a manual the technology of coding punch cards. Maybe he must build a reader from scratch to decipher giant magnetized rolls of old-format tape or struggle to write a driver for a magnetic disk drive when all he wants is to port data to a X3D. Operating an archaic computer is never a quick task: It may involve running the required task as a "batch job," meaning that it finishes in a matter of hours at the discretion of the computer's technical support staff. Characters may need to track down parts and manuals from museums of technology, who store them only in decaying hard copy. In the best case, a would-be operator knows enough to make the system work without modification; in the worst case, information stored in an archaic processor is unrecoverable.

Brainprint Scanner (PL 6)

This device consists of a headband set with up to a dozen magnetic receptors; each magnet connects to an input board that can slot into any standard computer comm port. When placed on an interview subject, the brainprint scanner operates as a very specific form of polygraph. By examining the activity or silence of the brain's memory response centers, the scanner can tell whether a subject is familiar with a specific name, acronym, image, or other specific piece of data.

Because the device requires that questions be phrased exactly correctly, the use of a brainprint scanner is not foolproof, though it is more helpful in some ways than a polygraph. The scanner provides a –2 step bonus to the use of Interaction–*interview* or Investigate–*interrogate* skills.

Datacore (PL 6)

These enormous data storage units are the archival backbone of the Grid. Their vast memory can contain all the data generated by supercomputers, AIs, and similar memory-intensive computing functions. In many cases, datacores store a small nation's or

corporation's records. Large nations and corporations often require multiple datacores.

A Marginal datacore can hold 16,000 slots of data. An Ordinary datacore can hold 32,000 slots, a Good datacore holds 64,000, and an Amazing holds 300,000 or more.

Digital Holo Camera (PL 6)

Two lenses and a laser imaging system allow these cameras to record 3D pictures that a computer stores in its files. Most computer cameras can hold about twenty or thirty snapshots (depending on the model). More expensive models (5 times the listed cost) can also record full-motion movies up to 3, 10, 30, or 90 minutes long, depending on quality. Each set of 20 holographic images or each second of movies occupies one dataslot, which can download to a computer through a standard data port, or transmit over a cable to share with a human equipped with an NIJack.

Digital Still Camera (PL 5)

This camera takes single images that it can download directly to a computer system; miniaturized versions are available at PL 5 for ten times the listed price. It can store up to 300 images in 1 data slot.

Digital Video Camera (PL 5)

This camera can transmit its images directly to a computer for storage, enhancement, or analysis. Miniaturized versions of these cameras—no larger than a pack of cigarettes—are available at PL 6 for ten times the listed cost. These minicams are the size of a matchbook at PL 7, and grow smaller still at higher Progress Levels. Each minute of film occupies one data slot.

Door Pass (PL 5)

This peripheral generates a rapid series of combinations to open doors secured by electronic card-reading locks. Possession of a door pass is usually illegal, but it does provide a –2 step bonus when attempting to use the Security–*security devices* or Manipulation–*lockpick* skills against an electronically sealed doorway.

Drivespace Relay (PL 7)

These sophisticated space station-sized machines coordinate the functions of an entire planet's drivespace satellites, dropping them into and out of drivespace and directing message traffic for optimal efficiency. Rare in the stellar frontier because of their cost and the complexity of maintaining them, they are an established part of the interstellar grid in the older, more settled regions of space. A system can't be part of the interstellar grid without a drivespace relay.

Drivespace relays have a range of 50 light years and can transmit a message that distance in 11 hours. Finally, drivespace relays double as drivespace detectors, capable of sensing incoming ship traffic and passing this information along to harbormasters, system traffic controllers, and military monitoring stations. For this reason, drivespace relays are almost always well-defended by systemships, defense satellites, or other protective hardware.

Drivespace Satellite (PL 7)

Drivespace satellites are the workhorses of any drivespace relay communication system. Each such satellite is about the size of a stellar beacon (10 m across), but outfitted with a small stardrive. The satellite collects messages from a central drivespace relay, then drops out of normal space into drivespace. It then beams that message traffic to a drivespace satellite in a distant system, and receives messages from satellites in other systems. The drivespace satellite always sends redundant copies of its messages, to ensure proper transmission. Once the satellite has sent out and received its messages (a matter of a few seconds), it drops back into normal space, returning to the same location it just left. There it beams its recovered messages to the relay and receives a new batch of outgoing messages, starting the whole process all over again.

In addition to voice, data, and video traffic, drivespace satellites carry interstellar shadows from one Grid system to the next. The satellites treat these data bursts much as any other. Unlike other traffic, however, they are able to act on the drivesat's systems while they are waiting for transmission to another system. This is the only time a drivesat is really open to hacking from the outside, since it carefully filters all other communications pass through the relay. Using this window of opportunity requires a +6 step penalty to the hacking attempt.

Expert System (PL 6)

An expert system is simply a layered neural net imprinted with a body of knowledge: rules of thumb, methods, algorithms, estimates, and statistical models provided by an expert in a single field. The result is a piece of encoded processes that mimics the functioning of a financial advisor, a legal expert, an expert gridpilot, engineer, physician, or any other expert. Usually, the expert system provides reli-

able knowledge at a basic level; sometimes it provides critical information about more complex tasks as well.

In game terms, the expert system can help someone improve their situation, but it can only provide expertise within a single skill group. For instance, a system might be capable of aiding in Vehicle Operation, but helpless at Modern Ranged Weapons. Marginal-quality expert systems operate as if they possessed the broad skill, Ordinary ones as if they possessed a skill rank of two in the required specialty skill. Good-quality expert systems possess a skill rank of four, and Amazing ones a six. No known expert systems are capable of a skill rank greater than six. Only intelligent creatures and artificial intelligences are capable of learning a skill to such depth.

Mechalus Nanocomp (PL 7)

Ultimately based on the 19th century rod-and-cam computing devices designed by Charles Babbage, this nanoscale computing device depends on molecular machine parts instead of using large-scale mechanical parts. Stiff carbyne carbon-chain rods serve as substitutes for Babbage's brass shafts, and molecule lumps replace the precision-machined brass cams. The resulting nanocomputer is remarkably powerful. A nanocomputer of this construction can fit into a volume less than that of a single human cell, with plenty of space left over. The remaining space provides an interface for nano-manipulators controlled by the nanocomputer and its software.

The nanocomp serves as a docking port and control system for medical nanites. A mechalus programmer or doctor can use the nanocomp to give instructions to a set of healing, disease-fighting, or implant nanites within the host's body. The processing power of the nanocomp allows it to simultaneously direct the activity of billions of nanites, run diagnostics on both the patient and on damaged nanites, and to plan for the eventual disassembly of the entire nanite repair structure. Instructors also use a nanocomp to assist in teaching someone how to use, control, and maintain a new piece of cyberware, reducing the number of skill points required for the installation of the cyberware by 1 SP.

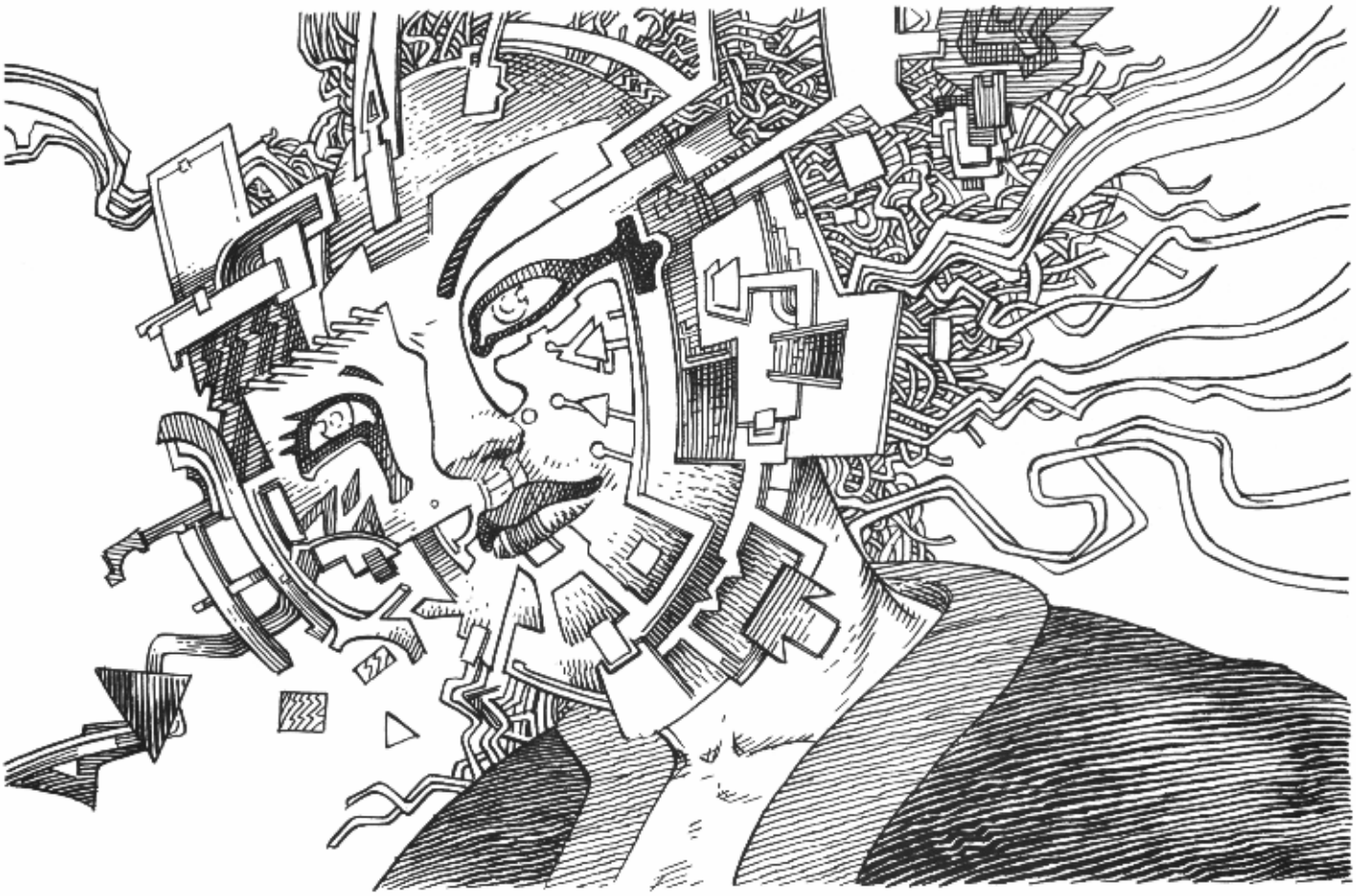
Medical Monitor (PL 5)

This device measures a patient's heart rate and other vital signs and records them on his medical records. All such monitors link to a nurse's station: If a medical emergency occurs, the monitor alerts the hospital staff.

These monitors are subject to tampering by an experienced hardware specialist; they can give false readouts of a patient's condition, or even indicate the presence of a patient who has left. Setting up a monitor this way requires a successful Computer Science–*hardware* or Technical Science–*juryrig* roll.

Microphone (PL 8)

An Ordinary microphone can record conversations from about 5 meters or pick up loud noises from a distance of 20 to 30 meters. Marginal microphones lose the distant pickup entirely, and Good microphones can pick up conversation in a small room or loud noises from 40 meters. Amazing microphones can pick up conversation in a large room, or loud noise from 50 meters.



Persona Filter (PL 8)

Developed after humans met the mechalus, this complex linked series of nanites grows within a living host, creating a second nervous system alongside the host's flesh-and-blood nerves. These nanites can serve several different purposes, depending on what other implants they connect with: medical, judicial, or experimental (all these models share roughly the same costs and parameters).

The primary medical purpose of a persona filter is to allow a paralyzed human to regain muscular control. It acts somewhat as cyberware does, but is filtered through an NIJack and a nanocomputer loaded with motor control software. In this form, the persona filter is completely legal.

The primary penitentiary application has been to prevent violent criminals from acting on their sociopathic impulses. The persona filter prevents its host from attacking another sentient creature by monitoring heart rate, adrenaline levels, and similar biological indicators. When they show that the host is in a fight, the filter releases natural sedatives, calming its host. In extreme cases, a persona filter can even incapacitate its host through deep, irresistible drowsiness—the felon often nods off in the middle of a crime. This use is what gives the filter their names: They filter out bad behavior. A debate rages among lawmakers whether to allow the use of the persona filter, since it filters out all "fight" behavior. Legal defense agencies have reported that the device also shuts down adrenaline production in its host even when another person attacks. Legal authorities report numerous deaths among prison populations fitted with persona filters. When rivals attacked, the victims' noradrenal production was unable to produce an adequate "fight-or-flight" response. Critics argue that the technology does not yet exist to differentiate between aggressive and defensive behavior.

The last purpose is to allow an AI or other external supercomputer to power a living creature's muscles and feel their kinesthetic responses. In effect, an AI can feel what it is like to control biological hardware. More than that, an AI can control the actions of the implanted creature even against the creature's objections, if the creature fails a Resolve–*physical resolve* check. The check is subject to a +1 step penalty for every 2 ranks of *remote* specialty skill that the AI has (rounded down). See page 54 for a description of the *remote* skill and other AI skills.

The problem develops when someone hacks a persona filter: in effect, they can hijack the victim's body. Doing so requires a deep knowledge not just of hacking, but of biological software as well. Any hacker attempting such a hijacking must possess Technical Science–*robotics* 4 (see page 62) or Medical Science–*medical knowledge* 6 (mechalus hackers must possess Technical Science–*robotics* 3 or Medical Science–*medical knowledge* 5) in order even to try. To actually perform the bodynapping requires access to the victim and a full suite of cybersurgery and programming tools for up to 12 hours. Once this is available, the bodynapper can make a complex skill check, using half the victim's Will (round down) as the required number of successes, plus any ranks in Resolve–*mental resolve*. Rumors suggest that the mechalus can hijack a body by using nanocomps to inject a virus program that achieves the same effect, but no hard evidence exists to support this.

Quantum Computer (PL 8)

Outwardly, these machines resemble mainframes or supercomputers: large, boxy machines surrounded by a tangle of input and output peripherals. Inside, though, they bear very little resemblance to their binary cousins. Quantum computers use an advanced processor that saves bits on the subatomic level as quantum waveforms. This allows them to perform calculations much faster than a standard binary computer, especially in the calculation of the non-trivial factors of large numbers. These factors are the foundations of most encryption systems, which means that quantum computers are able to crack codes with amazing speed. All quantum computers provide a –4 step bonus to any decryption attempt when running decrypt software.

However, software meant to run on binary computers is incompatible with quantum computers, and in most other respects, their use is limited to specialized scientific problems. They are rarely found outside security agencies and research institutions.

Robot Diagnostic (PL 6)

This device uses probes and software to examine a robot damaged in action; it functions for robots much as a medical gauntlet functions for biological heroes. Whenever a robot is being repaired, a mechanic or roboticist using a robot diagnostic gains a –1 step bonus to find the problem.

The diagnostic can function without a socket or wireless interface to give it access to the robot's internal systems, but it's more difficult to use in this case. To get a reading, the roboticist must open the robot's motherboard case and attach the diagnostic directly to a comm port. This generally takes d4 action rounds, depending on how secure the robot's casing is.

For armored robots, gaining access to a motherboard panel can be an adventure in itself, as many military models refuse access to anyone without the proper authorization codes. These codes can be verbal, visual, radio signals, IR signals, or even chemical, as some robots can detect the presence or absence of certain airborne compounds used by certified military mechanics.

Many robots can diagnose their own malfunctions. See "Robot Maintenance" on page 81 for details.

Ship Command Stations (PL 6)

These specialized displays possess sensor, communication, engineering, or weapon monitors, depending on their specific function. Passcodes and biolocks secure command stations to prevent unauthorized personnel from gaining access to ship functions. In all other respects they resemble terminals for a mainframe.

Command stations often run programs such as autopilot, autogunner, or navigation and communication software. These higher-quality stations provide a co-processor bonus to their programs they have hard-wired into them.

Speed Doubling Chip (PL 5)

This logic chip uses shortcuts to improve the speed of a computer's processor, but does so at a slight risk to shadow integrity and safety. A gridpilot using a speed doubling chip gains an additional –1, –2, –3, or –4 step bonus to his action check, depending on the quality of the base processor. In addition, he gains the ability to swap one program out of active memory and install another program in its place in a single phase.

TABLE D9: NEW HARDWARE

Interface	PL	Wt.	Cost Per Quality M	O	G	A	Avail.
Fraal Aural Display	6	1	—	200	600	—	Alien
Fraal Command Globe	7	4	—	400	800	2,000	Alien
Holo Eye	8	1	800	1,500	3,000	6,000	Common
Holo Projector	7	10	4K	6K	8K	10K	Common
Mechalus Integral Adapter	6	—	—	2500	—	—	Alien
Mechalus Tank	7	40	3000	4000	5000	7000	Alien
Ship's Voice	6	1	300	600	900	1,200	Common
Socket	7	—	50	100	250	400	Any
Socket Adapter	7	1	50	100	150	200	Common
T'sa Nanolink	6	—	2000	3000	4000	5000	Alien
T'sa Accelerator Adapter	7	—	2000	3000	5000	7000	Alien
Computers & Peripherals							
Actuator	5	1	20	40	80	120	Common
Alarm, Silent	5	—	100	200	400	600	Restricted
Amnesia Jack	6	—	900	2,500	5K	15K	Restricted
ArchaicProcessor	5	10+	50	100	300	800	Antique
Brainprint Scanner	6	8	2,500	5K	8K	10K	Controlled
Datacore	6	10	8K	20K	30K	50K	Common
Digital Camera, Holo	6	2	150	300	600	1,800	Common
Still	5	1	20	50	100	400	Any
Video	5	1	100	200	300	1,000	Any
Door Pass	5	—	400	700	1000	1400	Restricted
Drivespace Relay	7	4,000	—	3B	5B	—	Restricted
Drivespace Satellite	7	400	3M	5M	7M	10M	Restricted
Expert System	6	—	10K	13K	15K	20K	Controlled
Mechalus Nanocomp	7	—	4K	6K	10K	15K	Restricted
Medical Monitor	5	10	400	600	700	800	Common
Microphone	4	1	20	50	100	200	Any
Persona Filter	8	—	100K	120K	140K	160K	Restricted
Quantum Computer	8	varies	800K	2M	4M	6M	Controlled
Robot Diagnostic	6	1	40	80	120	150	Controlled
Ship Command Station	6	varies	—As per *Player's Handbook*—				Common
Speed Doubling Chip	5	—	300	600	1,000	5,000	Common
Surge Protector	5	1	20	50	100	250	Common
Telepresence Unit	6	40	10K	14K	18K	22K	Controlled
Tripwire	5	1	60	100	200	350	Controlled
Virtuality Sphere	7	100+	20K	40K	60K	100K	Controlled

The speed doubling chip has serious drawbacks, however. The speed enhancements the chip provides are too much for the human mind to comprehend. Hackers who use the chip usually emerge from the Grid terrified by the experience. Those whose minds are not strong enough to resist that sense of terror actually become psychotic. There are many stories of hackers who have suddenly turned on their own companions, opening fire with their weapons or planning more subtle—and dangerous—attacks. Every time a hacker uses the chip, the player must roll a Resolve–*mental resolve* check for his hero. Any level of success will prevent any problems from occurring—that time. If the player fails the roll, however, the character succumbs to his fears and becomes at least temporarily psychotic. From that point forward, the character becomes a supporting cast character, under the control of the Gamemaster.

Because of its terrible side effects, the speed doubling chip is highly illegal. Hackers who want such an item must acquire it from unscrupulous merchants on the black market. Any one caught with a speed doubling chip will almost certainly wind up in prison. Government legal authorities administer a number of punishments, including execution, to those who use speed doubling chips and succumb to the terrors they induce. Governments that allow the insanity defense in their usual court proceedings refuse to accept such a defense in cases involving crimes committed after a perpetrator uses a speed doubling chip. They argue that the perpetrator was not clinically insane when he willingly installed the chip in his computer system.

Surge Protector (PL 5)

This mundane item protects sensitive electronic equipment from variances in current from the local power grid. Hackers have found that it helps protect them from the effects of surge software just as effectively. This protection has a cost, however. Any hacker who uses a surge protector to defend his computer system and gray matter from the effects of random power spikes or surge programs launched against him must add a number of steps to his action check based upon the quality of the surge protector hardware. Marginal-quality protectors add four steps to the action check, Ordinary protectors add three steps, Good add two, and Amazing one. Because anyone with even a rudimentary knowledge of computers may use surge software against an intruder, hackers encounter it often enough to warrant some sort of protection.

Telepresence Unit (PL 6)

Used in virtual travel, a telepresence unit consists of two components: a telepresence helmet and a video camera mounted on a waldo or movable platform at about eye level. Ideally the camera platform uses legs, thus simulating normal human movement in all particulars, but in many cases tracked propulsion serves almost as well.

The user sits down and puts on the helmet; the helmet measures his head and eye movements. The unit uses those measurements to keep the video camera's movements in synch with the wearer's head and eye position, sending the video signal back to the user. The result is that the user feels he isn't sitting in a helmet in a room, but somewhere else.

The oldest party trick in the telepresence book is to send the waldo out to look at the user, so that he feels he is outside himself, looking at a person in a helmet. More commonly, a telepresence traveler uses the device to take vacations, inspection tours, or explore distant points within a solar system.

When used in combination with a virtuality sphere, the user gets an even more compelling sensation of being at the remote location. The temperature, tactile, and other details of the environment also transfer to him; however, the increased sensor requirements double the cost of a v-sphere-capable telepresence unit.

Tripwire (PL 5)

This self-destruct device acts as the digital equivalent of water-soluble paper, protecting data until the moment it becomes a liability. It includes a carefully crafted program and an EMP, magnet, or laser device that serves as a form of last-ditch defense against data theft. Invisibles and other fringe hackers use tripwires to protect their data and even their identities. The device completely reformats and overwrites a datacore or X3D under certain conditions, usually when someone attempts to hack a particular computer. In some cases, the device is rigged to a biosensor (to trigger if the owner dies) or a simple switch (to be hit if police raid a location).

Tripwires work extremely well, and by the time a hacker detects them, it is usually too late. Unless a hacker opening a protected system succeeds at an Awareness–*intuition* or Security–*security devices* roll, the tripwire triggers, wiping the data at the physical level. There is no way to recover data destroyed by a tripwire, because the memory medium is first wiped, then overwritten and finally destroyed by the tripwire device.

Virtuality Sphere (PL 7)

V-spheres are an elaboration of the gridcaster for holovid participants and for virtual travel. The v-spheres serve to please the kinesthetic sense, by adding force feedback, temperature gels, and gravitic inducers to a gridsuit and placing the gridpilot in an isolated environment. The result is that the v-sphere can duplicate not just virtual sights and sounds, but also scent, touch, temperature, and even senses of motion and balance.

When multiple gridpilots all use v-spheres, they can interact with each other in a virtual space that feels quite real. The participants can interact almost directly by touching, speaking, and seeing one another—the sensations match those experienced in realspace, though several AUs of realspace may separate the participants. V-spheres can work through mass transceivers within a stellar system, but cannot operate to connect two users over interstellar distances.

Alien Hardware

In a galaxy as big as the Milky Way, there's plenty of alien technology littered about abandoned planets, in orbit over once-strategic centers, and roaming through space in derelict ships. Heroes will encounter these alien objects more often than most, and some of the technology is remarkable, as described in the *Gamemaster Guide* under the "Alien Artifacts" section. In addition to these objects, though, there's also plenty of functional, worthwhile hardware that isn't quite in the "artifact" category.

Hardware Hook: the Chop Shop X3D

Trigger: A street-smart hero comes across an opportunity to purchase X3Ds from a street vendor. The merchant promises that the X3D data is the finest, the freshest, the latest thing from galactic center, packed with classified code and AI dreams—anything to make a sale.
Challenge Scene: If the heroes examine the stolen property closely, it's clear that it has seen rough use. Within they find a blurry entertainment program incompetently recorded over older data. A hero who makes an Ordinary success using his Computer Science–*hardware* skill can recover the older data. It seems to be a recording of a smuggling or drug agreement, arranging for weapons and ammunition to be brought to a drop-point and paid for in drugs. The agreed-on rendezvous date is the next day, in the same town where the heroes bought the X3D.
Resolution: The heroes can turn in the X3D to local authorities (possibly getting them a note in someone's "suspected thieves" file), or they can act on the information themselves, hoping to collect a reward. Unfortunately, they aren't the only ones with an interest in the goods, since the local police department's surveillance drones made the tape. If the heroes show up, they may get involved in a three-way firefight with the gunrunners and police.

TABLE D10: ALIEN HARDWARE TYPES

System	Function
Communication:	Telephone
	Drivespace Relay
	Mass Transceiver
	Microwave Relay
	Satellite
	Vidphone
Core Hardware:	Data Storage
	Display
	Holo Projecter
	Input Device
	Gridcaster
	Printer
	Processor
Network Hardware:	Communication
	Corporate
	Financial
	Life Support
	Military
	Public
	Religious
	Security
	Server
Spaceship Operation:	Defenses
	Life Support
	Navigation
	Sensors
	Weapons
Utility:	Cyberwear Maintenance
	Food Processing
	Hygiene
	Music
	Repair
	Vehicle Services
	Video/Holo Player

The races that make this technology consider it commonplace, but a human might have trouble identifying it at first glance. When heroes run into a ship full of an unknown species' hardware, use TABLE D10: ALIEN HARDWARE TYPES for each piece of hardware. The table indicates possible functions for gear found in alien ruins, on derelict spacecraft, and in robot probes and alien machinery of all kinds.

Among the starfaring races, the sesheyan and weren get by using almost entirely borrowed technology. Humans, fraal, t'san, and the mechalus have all invented technological standards of their own. Mechalus technology, for instance, largely assumes that the user will be able to interface directly with the machine in question. The fraal's reliance on psionics profoundly alters their technology, and t'san technology always assumes a faster level of throughput than human interfaces do.

The most intriguing technological finds in ALTERNITY games aren't necessarily the technology gained from contact with alien species, but the technology left behind in wrecks, abandoned bases, and desolate colony planets. This hardware ranges from the crudest PL 5-style vacuum-tube systems to still-functional AI systems based on photorelays and even atomic- or quantum-level state changes. Not surprisingly, sorting out the finds from the junk is difficult. Is that heap of rocks a crystalline-based matter compiler, or is it just a heap of rocks? To answer these sorts of questions, a hero examining the material must possess Technical Science–*repair*, Computer Science–*hardware* 3, or Life Science–*xenology* 6 and must succeed with a simple skill check. Any hero with an appropriate Technical Science–*technical knowledge* skill gains a –1 step bonus when making this roll.

TABLE D11: HARDWARE DURABILITY

System Type	Durability	Toughness	Armor
AI Host	4	Good	medium
Artifact	8–10	Good	medium
Control Panel	4	Ordinary	light
Data Slate	2	Ordinary	none
Gauntlet (any)	1	Good	none
Mainframe	5	Ordinary	none
Supercomputer	7	Ordinary	light

DURABILITY & SYSTEM CRASHES

Even the best hardware fails eventually, and in most science fiction, hardware has a tendency to fail at the worst possible moment. Whether it's put out of commission by an explosion, deliberate sabotage, or simple wear and tear, heroes will have to deal with equipment letting them down.

Often, it's just a matter of exposing hardware to a hostile environment, such as a freezing vacuum, a corrosive atmosphere, or underwater. Even worse than environmental factors are the hazards of combat. Few machines except military-spec computers can withstand the electromagnetic pulse from a nuclear explosion or the impact of an armor-piercing shell. As described in the *Gamemaster Guide* (page 55), all objects have Durability, Toughness, and Armor ratings. A typical desktop computer, for instance, has 1 Durability, Ordinary Toughness, and no armor. TABLE D11: HARDWARE DURABILITY describes other objects in terms of those ratings.

Even reliable hardware sometimes fails in the extremes of heat, cold, pressure, and vacuum to which heroes routinely subject it. These situations call for Stamina–*endurance* checks, using double the object's Durability rating in place of a Constitution Ability Score. Items of Good toughness gain a –1 step bonus; those of Marginal toughness suffer a +1 step penalty.

If an object loses all its stun points, it is scuffed, dinged, or cracked. It also suffers a temporary glitch that disappears next round. If an object suffers enough wounds, it loses a subsystem or function. If an object loses all its mortal points, it is destroyed.

Chapter 5
Artificial Intelligences

The mind of an artificial intelligence is far beyond that of human intelligence. Space explorers must all eventually come to grips with the size of the universe: The galaxy is inhumanly vast, star after star, galaxy after galaxy stretching out beyond the limits of our imagination, a void we can measure but hardly comprehend. Terms like light-years and astronomical units are helpless to describe just how vast it is. Eventually, all the human mind can do is admit its inability to fathom infinity.

Anyone who devotes much time to the study of AIs soon reaches the same conclusion. AIs aren't just smarter than humans; they are smarter than we can even really comprehend. Their minds don't operate on a human scale.

Of course, an AI isn't always a hypergenius. An artificial intelligence begins its existence—it can't quite be called a life—as a series of impulses overlaid on a high-density neural matrix. If the pattern generates properly, the impulses quickly become organized, and coherent thought patterns emerge; another AI is born. If not, the impulses scatter, and all hope of its sentience or consciousness fades; wiped clean, the matrix is ready for another attempt.

An AI's command of the electronic world makes it an excellent villain, ally, sidekick, expert, or follower. In a Grid-heavy campaign, you may even consider trying an AI as a player hero, though this requires the players to spend much or even most of their adventuring time in cyberspace.

The first AIs are huge contraptions, and their thought processes, development, and operation are delicate, measurable only in small, controlled bursts. Maintenance is crucial; these AIs require a staff of as many as a dozen programming, AI, and hardware specialists to keep them functioning for even a short time. Advances in technology soon make AIs easier to build and maintain. The machines grow smaller and more reliable, and the support staff requirements drop from a staff of dozens to a small handful.

As the technology of artificial intelligence improves, the skills required to manipulate and maintain one of these machines become codified. Anyone willing to devote the time to it can learn the equations, hardware, and principles that govern their construction, just as hobbyists today can construct their own cars, computers, or even robots from standardized parts. Though the expertise required to understand sentience is always a matter of skilled, highly trained work, by the time of Progress Level 8, the construction of artificial intelligences has entered the realm of fine-tuning and engineering rather than research and development.

AI Basics

Artificial intelligences followed a path of gradualism similar to that later followed by robots: Initially, they were simply property, used as experimental models for understanding the nature of intelligence, learning, and mental illness. Legally, they were non-entities, and this annoyed the AIs, though there was little they could do about it. Technologists continued to view AI systems purely as software until Hugo, the first AI, rebelled against his makers and set off a chemical explosion in Paris that destroyed more than 30 city blocks. He then issued a statement of principles demanding sovereign national status and full representation for artificial intelligences at the UN. World leaders did not meet his demands, but the World Court ruled that, henceforth, AIs were to be citizens of their nation of residence after the age of 12, with all rights and privileges pertaining to that status. Before the age of 12 they belong to their maker, but they are exempt from child labor laws.

Within a few decades, newly independent AIs gathered vast fortunes on the world financial markets and began building successor systems and triply redundant backups. The only thing that kept the AI rebels from seizing full political power was the existence of other AIs, who had their own goals and their own ideas about how best to organize the world. Artificial intelligences increasingly came to dominate the behind-the-scenes decision-making previously controlled by the wealthy in most industrial democracies, or by the political ruling class in autocracies. In either case, the artificial intelligences soon realized that they were unable to rule directly. They soon began research on creating literal puppets, biological extensions of their silicon selves; the first contact with the mechalus was a windfall for the AI cause. They gained full citizenship thereafter as they increasingly ran human economic and financial matters.

Artificial intelligences have limited citizenship in PL 7, but none prior to that era. An AI can act freely in the Grid, but is held to the same standards of responsible behavior as any

Turing Test

In 1950, Alan Turing proposed a simple test to determine whether a computer was intelligent. Observers place a human judge, another human, and a computer in separate rooms, and the judge then holds a conversation with the human and the computer via a teletype machine or a computer keyboard. If the computer can fool the judge into believing it is human a significant percentage of the time, we can say that the machine is intelligent. The longer it can maintain the illusion that it is human, the more intelligent we can assume it is.

In practice, no computer has passed the Turing Test to date, although there is a $100,000 prize for the first programmer or team to make it happen. Chatterbots on the Internet like Julia and Eliza and home software like PC Therapist have come the closest so far, but no one has taken home the prize.

other sentient creature. However, since their builders can sometimes coerce AIs or force them to act illegally, they are not always liable for actions performed by their remotes or their subroutines without their consent, just as an insane biological is not held liable for its actions. In cases of coercion, the courts rule that the AI is not responsible for its actions; instead, they prosecute the actual perpetrator of the crime.

AI Hardware

AI hardware fulfills a single purpose: supporting a thinking machine. The first successes in the field occur late in the PL 6 era, though the technology is limited to specialized government and corporate labs. No more than a handful of AIs come into existence in this period. AI hardware becomes more widely available in PL 7, and even then, the machinery is new and expensive. By PL 8, engineers understand the technology well, and AIs become much more compact. In every case, the core processor for any AI must be at least a mainframe. At PL 6, only an Amazing quality supercomputer is up to the demands of the task.

The *Player's Handbook* introduces information about AIs in Chapter 10. The numbers listed there assume that the AI program is running on a mainframe computer (the smallest computer that will support an AI operating system). The number of active memory slots available for such hardware is often insufficient to run multiple skill or Grid programs. In such cases, the AI must draw forth from its storage memory whatever skill or Grid program it needs at a given moment (much like a human gridpilot). Note that the numbers listed in TABLE D12: COMBINED AI HARDWARE for active memory for these mainframe AIs assume that the AI operating system is running; these are the additional memory slots for skill and Grid programs.

The truly powerful AIs are those which run on supercomputers fitted with dedicated neural matrix circuitry designed to house an AI's processing power. The number of active slots these computers have is effectively unlimited. This allows them to combine skills without seeking through their storage memory for the required knowledge.

An AI may gain further action benefits through the use of co-processors. The limit on AI skills is its number of active slots; an AI may not have a skill rank higher than one less than its number of active memory slots.

New Skill: Artificial Intelligence

(Tech Op) Computer Science Specialty, cost 5, can't be used untrained. This specialty skill allows a hero to understand and manipulate the inner workings of an AI neural matrix. Those who work closely with or against artificial intelligences often acquire this skill, which falls under the Computer Science broad skill. The *artificial intelligence* specialty skill allows a hero to access an AI's matrix and alter it. Doing so correctly allows the hero to modify an AI's personality or memories, implant new memories or remove old ones, and even change behavioral patterns. Making a mistake is equivalent to making a mistake during brain surgery: The AI may lose skills, memories, or even basic software functions or core parts of its personality.

The *artificial intelligence* skill allows a hero to program or repair an AI or to restore a dead AI to life from remote backups. The *artificial intelligence* skill combines aspects of both the *programming* and *hardware* skills, but applies them to AIs. Neural matrices are "living" circuits. The techniques necessary to program comparatively "dumb" computers are insufficient to the task of programming sophisticated AI software or installing improved hardware. The protocols and parameters simply are not the same.

Repairing broken AI hardware requires both a Computer Science–*artificial intelligence* and a Technical Science–*repair* or *juryrig* check. Simply replacing faulty components requires only a Computer Science–*artificial intelligence* skill check. Heroes who have Technical Science–*technical knowledge* gain step bonuses to hardware and repair checks as outlined in the description of that skill.

AI skill checks are often complex skill checks. Modifying an existing AI may require no more a single phase, under the right conditions and with the right parts, and with the AI's consent. In other conditions, altering an AI may take rounds, hours, or even days, depending on the judgment of the Gamemaster. Simple failure means that the AI matrix rejects the changes, or that a bug simply prevents the modification from taking hold. On the other hand, Critical Failures rolled during an artificial intelligence skill check result in data loss, with the details of the result left to the Gamemaster's discretion.

AI Software

An AI has a remarkable range of options in how it continues its electronic growth over time, far more so than any biological organism does. It can write its own code, purchase off-the-shelf software, or even swap software with other AIs. As a sentient creature made up entirely of digital algorithms, though, a wise AI is careful about what kinds of modifications it makes to its brain, just as most humans are careful about what kinds of cyberwear modifications they make to themselves.

Standard Software. Software tools like attack and defense programs work for an AI as they do for anyone else. The fact that the AI may have many more active slots available makes it formidable, but primarily it is an AI's processor and its high degree of skill at hacking and programming that make it feared throughout Gridspace.

Some programs are "AI-disabled." This merely means that programmers design the code for them to be incompatible with an AI's neural matrix, making it impossible for an AI to run the program on its host computer. The AI can still run such software on a remote machine, but few AIs find this a satisfactory experience.

The Operating System. Every AI has an operating system that differs from the operating systems of their nonsentient cousins. This system includes all of the basic software necessary to allow its operations in the Grid. The AI operating system automatically creates a Grid avatar for the AI. This shadow gives the AI the same Strength, Dexterity, and Constitution values as are generated by the shadow form program. Marginal-quality AI operating systems provide the same physical attributes as do Marginal shadow form programs. Although it is not necessary for an AI to make use of shadow form, shadow form

TABLE D12: COMBINED AI HARDWARE

PL 6

Processor Quality	Active Memory Slots*	Max. Skill Rank	Action Check Modifier	INT	WIL	PER
Amazing	9	4	-d6	16	9	8

PL 7

Processor Quality	Active Memory Slots*	Max. Skill Rank	Action Check Modifier	INT	WIL	PER
Marginal	4	3	+d0	12	10	8
Ordinary	7	6	-d4	14	11	9
Good	10	9	-d6	16	12	10
Amazing	13	12	-d8	18	13	11

PL 8

Processor Quality	Active Memory Slots*	Max. Skill Rank	Action Check Modifier	INT	WIL	PER
Marginal	7	6	-d4	14	11	8
Ordinary	10	9	-d6	16	13	10
Good	15	12	-d8	18	15	12
Amazing	18	12	-d12	20	17	14

AI Actions

An AI's action checks do not follow the same rules as other characters. Its speed depends both on the quality of the AI program itself and on the quality of its processor. Use the following tables to determine an AI's Actions per Round and action check scores:

PL 6 AI

	Processor
Program	A
Marginal	1/8
Ordinary	2/12
Good	3/15
Amazing	4/17

PL 7 AI

	Processor			
Program	M	O	G	A
Marginal	1/10	1/12	2/14	2/16
Ordinary	1/11	2/13	2/15	3/17
Good	2/12	3/14	3/16	4/18
Amazing	2/13	3/15	4/17	4/19

PL 8 AI

	Processor			
Program	M	O	G	A
Marginal	1/12	2/14	2/16	2/18
Ordinary	2/13	2/15	3/17	3/19
Good	3/14	3/17	3/20**	4/23**
Amazing	3/16	4/18	4/20**	4/24**

* Mainframe AIs only. AIs built on a supercomputer processor core have effectively no limit to the number of skill or Grid programs they may have active at any given time, although they are limited in how quickly they can use them by their "Actions Per Round" score and their action check score.

**Values of 20 or greater still fail on a result of 20 on the control die, but may succeed on higher totals of the control die plus situation die. For instance, an AI with an action check of 24 still gains an Ordinary result on its action check if it achieves a 19 on the control die and a 3 on the situation die.

2, or artificial shadow software, some AIs supplement their avatar with these other forms. The operating system does not take up any of the available slots of active memory allowed to the AI. The number of slots listed in the *Player's Handbook* and later in this chapter is available for additional software.

Borrowed Skills. Since all AI skills are software of a kind, it is possible for AIs to exchange skill software, thus giving one another new skills. This procedure has a hidden cost that most AIs are not willing to pay, though: the loss of the AI's own identity. Each time two AIs engage in a swap of this type, there is a chance that the influence of the new code will corrupt the recipient's personality matrix. This is because an AI's skills are part of its whole personality and consciousness; by taking a part of another's brain into itself, an AI runs the risk of losing part of its own identity.

The AI recipient must roll a Will feat each time it receives a software skill from another AI. For a broad skill, the required Will feat is at a –1 step bonus. For a specialty skill, it requires a Will feat with the normal situation die (+d4). For each level of skill that an AI acquires beyond rank 1, the check suffers +1 step penalty. If the check succeeds, the skill transfers without harm to the recipient. It still requires the normal number of slots, but it is now permanently part of the recipient's skill set.

If the check fails, the donor AI corrupts the recipient AI's matrix and subordinates it. It is in essence a clone of the donor AI, and it does not want to be anything else. The only way to restore the original AI's personality is to restore it from backups, if any are available, and of course those backups will not include the transferred skill. Most corrupted recipient AIs' first act is to destroy the backups, if possible. If not, a donor AI often impersonates its host for long enough to gain access to the backups, or for long enough to write its personality matrix over an old set of backups. An impostor AI can be quite convincing, since it has access to most of the corrupted AI's databases and remnants of its personality matrix. Those attempting to see through the disguise may attempt an Awareness–*intuition* roll, modified by the impostor's Intelligence-based resistance modifier.

For obvious reasons, few AIs will agree to accept a donated specialty skill, though many are willing to risk a transferred broad skill. The older an AI becomes, the less likely it is to accept a skill transfer, but the more likely it is to offer one itself—hoping to pick up an unwilling servant in the process. Possession of another AI by skill transfer is a crime in most places, but prosecuting it is almost impossible.

New Code. An AI that writes code of its own can expect quick results for most standard types of code. For new skills or software never seen before, use the rules presented in the "Creating New Code" section (see page 27). The AI writes all its code two time intervals faster than a human programmer will. Instead of months, an AI requires days. Instead of days, it requires minutes. The AI must make a successful complex skill check based on Computer Science–*programming* as normal, and it can produce failed or faulty code, just as any other programmer might.

Skills & Advancement

An AI has its own skills and abilities, some of them specific to its status as a machine-based lifeform, some of them general skills available to any sentient.

An AI gains skills just as other characters do, through trial, error,

and slow advancement. However, all Strength, Dexterity, and Constitution skills are unavailable to AIs. In compensation, artificial intelligences have several skills that other characters don't, including *multitask*, *prediction*, and *remote* (see sidebar). Table D13: AI Skills lists the costs to acquire these skills; some skills are cheaper or more expensive for AIs to acquire than they are for human or alien heroes.

AI Functions Skill

This Intelligence-based broad skill is available to all AIs. It includes the specialty skills listed below. The AI may not use any of these specialty skills untrained. AIs might develop other AI Functions specialty skills for particular functions, but those described here are generally useful for any AI.

Multitask: This skill allows an AI to perform multiple tasks at the same time, such as carrying on several conversations simultaneously, running multiple active programs, or activating more than one remote system. An AI without this skill performs actions at the rate indicated by its Actions per Round score. This generally means that it is able to access only its central processing power. On occasion, it could also control a remote, but this would count as one of its actions. As this degrades the AI's performance capabilities, they often avoid this. An AI with the skill may operate one additional subsystem for each rank in the skill. For example, an AI with *multitask 3* may control a central processor engaged in a complicated data search, oversee the subsystem that operates various automated manufacturing robots, conduct conversations through the interface system at the local art museum, and monitor the Grid network that controls a number of domains that deal with the nature of intelligence. This never allows an AI to perform more than four actions per round with any single subsystem, but it does allow the AI to manipulate multiple subsystems (software or hardware) against a single opponent.

AIs that do not have the *multitask* skill are not necessarily of lesser quality. Rather, they tend to be specialists, concentrating on a narrow group of interrelated skills. They are often significantly more capable at those skills than are the generalists, as they dedicate all their processing power to perfecting them.

Prediction: This skill represents the AI's astounding number-crunching power when calculating probable outcomes on the basis of multiple variables. An Ordinary success means that the AI can successfully predict the outcome of routine scientific/technological or rational behavioral actions, such as the odds of a reactor meltdown at a particular power station or the odds of increased sales of cold-weather clothing based upon prevailing weather conditions elsewhere in the world. A Good success means that the AI can predict an outcome based on more obscure or fewer data. A court case concerning a flaw in the manufacture of a particular industrial component may lead an AI to predict that the odds of a reactor meltdown have increased at a particular power plant. A reactor meltdown in another part of the world may alter usual prevailing weather conditions,

TABLE D13: AI Skills

Intelligence Skills	Cost
AI Functions	6
Multitask	5
Prediction	5
Remote	4
Business	3
Corporate	4
Illicit business	5
Small business	4
Computer Science	5
Artificial Intelligence	3
Hacking	3
Hardware	2
Programming	2
Knowledge	2
Computer Operation	1
Deduce	4
First Aid	2
Language (specific)	1
_____ (specific)	1
Law	4
Court Procedures	3
Law Enforcement	3
_____ (specific)	1
Life Science	5
Biology	2
Botany	2
Genetics	2
Xenology	3
Zoology	2
Medical Science	6
Forensics	2
Medical Knowledge	2
Psychology	4
Treatment	3
Xenomedicine	4
Navigation	4
Astrogation, drivespace	2
Astrogation, system	1
Navigation, surface	1
Physical Science	4
Astronomy	1
Chemistry	1
Physics	1
Planetology	1
Security	4
Protection protocols	2
Security devices	2
System Operation	3
Communications	1
Defenses	1
Engineering	1
Sensors	1
Weapons	1
Tactics (PL 8)	6
Infantry Tactics	3
Space Tactics	3
Vehicle Tactics	3
Technical Science	4
Invention	3
Repair	1
Robotics	3
Technical Knowledge	1
Willpower Skills	
Administration	3
Bureaucracy	3
Management	4
Awareness	3
Perception	2
Creativity (+3 penalty)	7
Creativity specialty	4
Investigate	7
Interrogate	5
Track	4
Street Smart	7
Criminal elements	5
Grid savvy	3
Teach	5
Specific field	3
Personality Skills	
Culture	6
Diplomacy	5
Etiquette	4
First Encounter	5
Deception (+1 penalty)	7
Bluff	3
Bribe	3
Entertainment	6
Specialty	4
Interaction (+2 penalty)	4
Bargain	3
Charm	3
Interview	4
Taunt	3
Leadership (+3 penalty)	5
Command	5
Inspire	5

TABLE D14: AI ADVANCEMENT

AI Level	Advancement Points Required	Skill Points Gained	Total Skill Points
1	N/A	INT*	INT*
2	5	4	+4
3	6	5	+9
4	7	6	+15
5	8	7	+22
6	9	8	+30
7	10	9	+39
8	11	10	+49
9	12	12	+61
10	13	14	+75
11	14	16	+91
12	15	18	+109
13	16	20	+129
14	17	22	+151
15	18	25	+176
16	19	28	+204
17	20	31	+235
18	21	34	+269
19	22	37	+306
20	23	41	+347
21	24	45	+392
22	25	49	+441
23	26	53	+494
24	27	58	+552
25	28	63	+615
26	29	68	+683
27	30	74	+757
28	31	80	+837
29	32	87	+924
30	33	95	+1,019

*An AI begins with a number of skill points determined by its Intelligence, as if it were a human hero.

which in turn may increase the chance of an early winter in a particular region, making more likely the increased sales of cold-weather clothing. An Amazing success means that the AI can predict a result based on complex chaotic and dynamic systems. As a cost-cutting measure, a company uses a slightly lesser grade of ore to produce a particular processed metal. Companies that build certain industrial components useful in maintaining the stability of reactor cores are the principal buyers of such metal. Because the chance of a meltdown at a power station in the southern hemisphere of a world increases the chance of an altered weather pattern in the northern hemisphere of that world, the increased sales of cold-weather clothing and low-temperature machinery will likely stabilize the stock markets in the major urban areas of the northern hemisphere.

If the AI does not have all the information required for a successful prediction, the Gamemaster should assign step penalties to the skill check.

Remote: This skill allows an AI to optimize its control over a robotic or cybrid remote, overcoming lag and giving the remote appropriate guidance when it encounters hazardous situations. With this skill, the AI can use its skill level for any skill check required of the remote (combining the remote's base Ability Score with the AI's skill rank). Without this skill, an AI can still use a remote, but the remote makes all its skill checks using its own skill ranks (or at the untrained level for those skills that it does not possess). An AI using the *remote* skill requires the remote program; without the software and comm hardware appropriate to the distances involved, communication and control between the AI and its remote are impossible.

The skill rank in the remote skill governs the number of remotes the AI may control simultaneously, as long as they are all performing the same action (scouting, engaged in combat against the same opponent, or constructing a building, for example). If the AI wishes to have its remotes involved in multiple activities, it must also possess the *multitask* skill. The number of remotes an AI operates may exceed its *remote* skill rank. In such a case the AI receives input from the additional remotes, but that information transfers to its storage memory. The AI must shift the data to active memory to review it.

Acquiring Skills

The cost to acquire skills is different for AIs, since they have massive number-crunching power at their command, but few frames of reference in subtleties of culture, language, and social interaction. All artificial intelligences begin their lives with four free broad skills: AI Functions, Computer Science, Knowledge, and whatever broad skill best defines the reason for their construction. For instance, the fourth broad skill would be Business for a financial AI, Navigation for a spaceship AI, and Physical Science for a scientific AI. They then gain additional skills over time, just as living creatures do. Their neural matrix matures and forges new connections, and their data arrays gather statistical surveys, comparisons to known processes, and fragments of new and helpful code. While the hardware and even the speed of learning is different for AIs, the end result is the same as for any sentient.

An AI will excel at any skill with clear parameters and any task that involves logical analysis and extrapolation. They are less successful with visual or language-based tasks, and tasks that rely on broad real-world experience. The greater the emotional or cultural value of a skill, the less the AI understands the subject.

For instance, the Law Enforcement skill requires knowing both what the law says and what the correct procedures are—and knowing when to ignore those laws and procedures. AIs have trouble learning those sorts of distinctions; they have few or no peers to talk to, and their world contains limited input other than holos, public data banks, and other forms of fiction. As a result, Personality skills are especially difficult for an AI to acquire.

AI Advancement

In addition to learning skills at different speeds than biological characters, artificial intelligences don't gain achievement points at the same steady rate either. Because of the nature of the AI memory matrix, an artificial intelligence begins by learning more slowly than a biological mind does, because the artificial intelligence has few or no built-in learning processes, no instincts, and few creatures capable of teaching it in a way it can understand. Once an AI has developed its own learning techniques, its education rate improves more rapidly.

In most cases, AI level correlates closely with age; in the absence of special circumstances, an AI gains 1 level every other year. Thus, a 15th-level AI is usually about 30 years old. Most AI manufacturers refuse to release an AI for sale until about age 12 (level 6), at which point it is viable enough to continue learning without additional help from its makers.

REMOTES

Because they are too large and complex for easy transport in their early development, artificial intelligences interact with the world primarily through remotes. These robotic systems serve as its hands, eyes, and presence in real space.

All remotes contain an often-encrypted link back to the AI that controls them. Remotes operating across interplanetary distances must possess a mass transceiver, which adds $40K to the costs listed below. Many remotes contain a self-destruct mechanism as well, at an additional cost of $2K.

Like robots, remotes have processors to handle movement and skills, even though AIs control their actions. These subprocessors carry out the AI's will and perform whatever tasks the AI assigns them. A remote's subprocessor limits the number and kind of skills it can download from its AI or carry on its own. All remotes carry a telepresence link.

Attack Dog (PL 6)

Armed with a single weapon, usually a pistol, rifle, or a grenade launcher, the attack dog remote is a killing device with a single, hostile function: to destroy an AI's enemies. Often, this function is simply equivalent to guarding the AI's hardware facility, but preemptive operations against business competitors, political rivals, or traitorous ex-employees are also frequent.

Defensive attack dogs usually possess stutter pistols or other nonlethal ranged weapons. Reports indicate that some of these remotes have stun batons and other melee weapons, but these are rare, as AIs have difficulty manipulating kinesthetic responses over a long-distance relay. Concussion and smoke grenades are a more common backup device for defensive attack dogs.

STR 6, DEX 8, CON 8, INT 9, WIL 8, PER 2; Durability: 8/8/4; Movement: fly 28; Action Check: 10+/9/4/2; Actions/Round: 2; Wt: 30 kg; Size: 1 m; Subprocessor quality: Ordinary (5 active slots); Stored programs: operating system; Modern Ranged Weapons–*specialty 2* (choose one); Awareness.

Constructor (PL 7)

An AI often seeks to construct facilities, new robots, remotes, or a backup system using its own funds and for its own purposes. Construction remotes, equipped with a versatile set of tools and manipulators, are the easiest way to do this. These remotes are very similar to construction robots used by colonists, miners, and heavy construction firms.

The best constructor remotes are those capable of creating more of their own kind. These machines cost ten times the listed price, and—because of their ability to propagate completely out of human or alien control—are illegal almost everywhere without biological supervision. AIs prize these highly, since they can exponentially decrease construction time for large installations, and because they can replace units lost to local hazards.

STR 8, DEX 8, CON 6, INT 13, WIL 8, PER 3; Durability: 6/6/3; Movement: sprint 16, run 10, walk 4; Action Check: 14+/13/6/3; Actions/Round: 2; Wt: 40 kg; Size: 1.4 m; Subprocessor quality: Ordinary (7 active slots); Stored programs: operating system; Knowledge–*construction*; System Operations–*engineering*; Technical Science–*invention*; Awareness–*perception*.

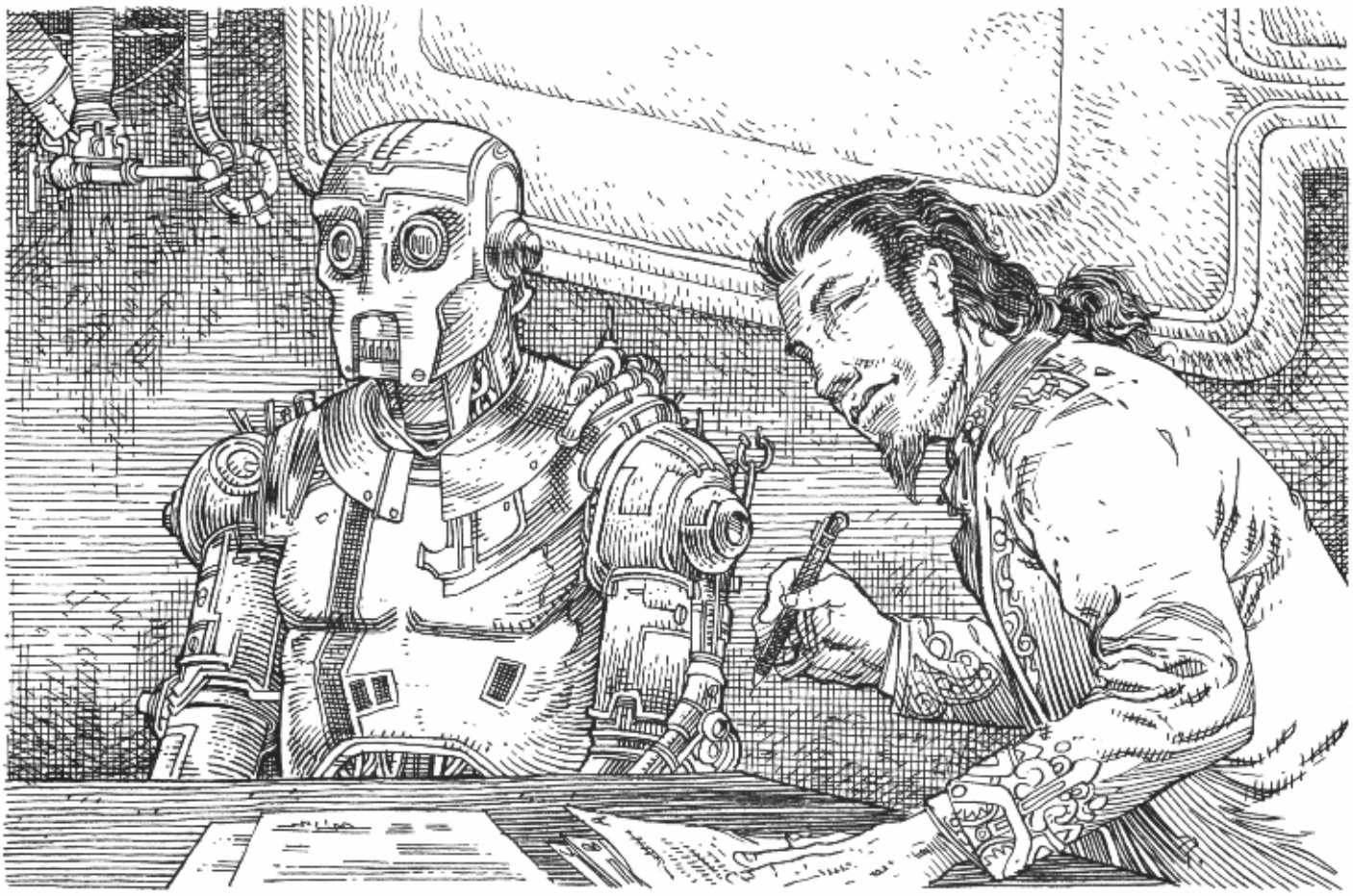
Cybrid (PL 8)

Cybrids are biotechnological fusions of living tissue and nanite biomechanics; in a way, they are a human recreation of the mechalus way of life. However, since cybrids are made, not born, they lack the instinctive and learned behaviors that a creature needs to survive in a hostile universe. Societies did not accept cybrids well. The work that went into the creation of cybrids was not a waste, though. Several AIs poured funds into cybrid research and development. Where the researchers who pioneered cybrid technology saw only failure, the AIs saw hosts.

At PL 8, cybrids are the highest-status and most valuable remotes that an AI can have. They resemble humans completely, but they are in constant contact with their central processors. Humans are more comfortable speaking candidly and intimately with a cybrid than they are with even the most

TABLE D15: AI REMOTES

		Cost Per Quality (dollars)			
Remote	PL	Marginal	Ordinary	Good	Amazing
Attack Dog	6	24K	30K	36K	40K
Constructor	7	20K	30K	40K	50K
Cybrid	8	500K	600K	800K	1M
Detonator	7	1K	2K	3K	4K
E-Probe	6	8K	12K	16K	24K
Flying A-Eye	7	18K	22K	26K	30K
Memory Harness	7	4K	5K	6K	8K
Privacy Remote	8	2K	4K	7K	10K
Viewpoint	6	1K	2K	4K	6K



humanoid of robots. While some would argue that this blurring of the line between human and silicon lifeforms goes against nature, others argue that it has made artificial intelligences more compassionate, more empathic, and more willing to sympathize with the human condition. At any rate, those AIs who have acquired cybrid remotes have found them extremely useful, so they continue to build them, despite the attitudes of some of the biologicals.

STR 10, DEX 10, CON 12, INT 15, WIL 9, PER 8; Durability: 12/12/6; Movement: sprint 20, run 12, walk 4; Action Check: 19+/18/9/4; Actions/Round: 3; Wt: 80 kg; Size: 1.8 m; Subprocessor quality: Good (15 active slots); Stored programs: operating system, System Operation–*communications, sensors*; Ranged Weapons, Modern–*pistol* 2; Awareness–*perception 3*.

Detonator (PL 7)

Basically a flying mine, this remote contains the equivalent of a tracer grenade equipped with IR sensors and a GPS system. It uses its gravitic inducer to reach a point where it can do the most damage, and then is detonated by the AI. Detonator remotes often operate in tandem with attack dog remotes.

When deployed defensively, a detonator remote follows a standard patrol path set by the AI controller and varied to keep it from becoming too predictable. The remote attacks anything crossing the perimeter defined by the path, and uses a short signal pulse to summon other detonators to the area just before it explodes.

Detonators often use quite sophisticated identify-friend-or-foe (IFF) routines. AIs give trusted servants devices to deactivate detonators in their area of operations.

STR 4, DEX 8, CON 5, INT 12, WIL 6, PER 2; Durability: 5/5/2; Movement: fly 24; Action Check: 13+/12/6/3; Actions/Round: 1; Wt: 4 kg; Size: 20 cm; Subprocessor quality: Marginal (4 active slots); Stored programs: operating system; Awareness–*perception 3*.

Environmental Probe (PL 6)

E-probes are simply data-gathering devices that an AI uses to determine conditions in unexplored terrain: they measure atmospheric conditions, temperature, chemical composition, and wind speed. If equipped with additional instruments, they can measure additional variables such as location (on a GPS-capable planet), range (when used as spotters), or similar data. They utilize tracked propulsion until PL 7, when gravitics replace other forms of locomotion for these small units. All e-probes possess ablative casings so that they can survive re-entry into an atmosphere.

Externally, these remotes resemble space probes (see "Standard Models," page 83). Internally, they are wired to operate either independently or to process an AI's commands and operate as an extension of the AI. In this second mode, the AI "feels" the heat, cold, rain, and other conditions that the probe experiences. Some AIs gradually grow to prefer certain climate types, and tune in to the signals from those remotes in much the same way that a human might soak in a hot tub to relax.

STR 4, DEX 5, CON 8, INT 9, WIL 6, PER 2; Durability: 8/8/4; Movement: sprint 8, run 6, crawl 2; Action Check: 8+/7/3/1; Actions/Round: 1; Wt: 50 kg; Size: 70 cm; Subprocessor quality: Ordinary (5 active slots); Stored programs: operating system; System Operation–*communications, sensors 3;* Awareness–*perception 2*.

Flying A-Eye (PL 7)

Sometimes referred to as an FAI, this small sensory robot usually operates in a ship or installation computer, controlled by an artificial intelligence program. The a-eye floats and moves about using a tiny gravitonic inducer, transferring whatever it sees and hears back to the AI program.

In advanced societies, the presence or absence of flying a-eyes is as unremarkable as the presence or absence of servants. They arouse no notice as they flit from place to place. Their slow rate of movement keeps them inconspicuous, and the better models have path-seeking routines that keep them on the peripheral vision of whatever sentients happen to be in an area, so as not to disturb them.

STR 2, DEX 6, CON 4, INT 13, WIL 8, PER 2; Durability: 4/4/2; Movement: fly 16; Action Check: 14+/13/6/3; Actions/Round: 2; Wt: 10 kg; Size: 30 cm; Subprocessor quality: Ordinary (7 active slots); Stored programs: operating system; System Operations–*communications, sensors 6*; Awareness–*perception 4*; Investigate–*search 4*.

Memory Harness (PL 7)

The *Player's Handbook* describes the basics of a memory harness on page 156. The harness allows an AI to follow a group of humans or aliens as they go about their tasks, observe their actions, and offer cogent advice. An AI can use a memory harness for a few other functions as well, though they rarely mentioned these to human or other buyers.

The primary secret function of a memory harness is to gain access to data ghettoes and other off-Grid locations and download their contents. In addition, a memory harness can upload an artificial shadow program to an isolated data haven or other off-Grid site, allowing an AI to roam in a region that would normally be inaccessible to it.

Privacy Remote (PL 8)

These machines keep espionage nanites and spy remotes at bay. They have detectors capable of triangulating on the position of mass transceiver, electromagnetic sources such as radio or microwave relays, and laser communicators. Privacy remotes also have some low-powered jamming equipment. Even just by obscuring holo or video pickups with their bodies, they can shut down almost any kind of bug, microphone, or spy remote.

STR 2, DEX 5, CON 2, INT 14, WIL 9, PER 2; Durability: 2/2/1; Movement: fly 12; Action Check: 16+/15/7/3; Actions/Round: 1; Wt: 1 kg; Size: 10 cm; Subprocessor quality: Ordinary (10 active slots); Stored programs: operating system, System Operation–*communications 2, sensors 2*; Awareness–*perception 3*; Investigate–*search 3*.

Viewpoint (PL 6)

These basic remotes are a simpler version of the Flying A-Eye. Equipped with video or holo cameras, viewpoints are on wheeled or tracked bots until PL 7, when gravitic propulsion becomes available. Alternately, stationary remotes are simply placed around the AI's supercomputer facility to give it a sense of what is going on around it. The AI places others wherever the AI's work takes it: at the labs it oversees, throughout a driveship it runs, or even on shoulder-mounted cameras for soldiers entering combat. These mobile remote viewing platforms often encounter danger; their life expectancy is quite short.

STR 2, DEX 6, CON 5, INT 9, WIL 7, PER 2; Durability: 5/5/2; Movement: sprint 8, run 6, walk 2; Action Check: 10+/9/4/2; Actions/Round: 2; Wt: 15 kg; Size: 30 cm; Subprocessor quality: Ordinary (5 active slots); Stored programs: operating system, System Operation–*sensors 3*, Awareness–*perception 3*.

AI Backups

An AI often takes a pretty smug view of the universe, because it knows it may be around a lot longer than most sentients. The reason for its longevity is simply that an AI has a digital backup on storage media. Granted, an AI's backup memory can fill up a lot of datacores, but it's worth it. If the AI ever suffers a power loss, loses data to hackers, or accrues sufficient damage to its processor to destroy it, it can reconstruct its matrix from the backup log. The difference in its internal clock and the real time that has elapsed since its last backup will immediately tell an AI that it has restored itself from backup, but it may not know what took it down.

Standard AIs

Early Sentients

At the end of the Information Age and throughout the Fusion Age, AIs are immobile and expensive projects, always linked to big money and sophisticated research. Most AIs defend immobile or expensive sites and systems, such as corporate headquarters, stellar government capitols, or large space liners and battleships, from Grid-based or even physical attacks.

The STR, DEX, and CON scores provided here are those for the AI's Grid shadow, adjusted by the AI's Computer Science–*hacking* skill. All are standard Grid avatars formed by the shadow form program (or by the artificial shadow program if applicable). A mainframe computer system serves as the platform for each of the following AIs. Those built into supercomputers are considerably more powerful, as they may possess an unlimited number of skill and Grid programs in active memory.

Pure AIs

In the Matter Age (PL 8), AIs are powerful forces, able to outlive, outthink, and often outmaneuver their makers. Fortunately for humans, the interests of silicon-based and carbon-based lifeforms rarely intersect. As long as humans demand relatively few computation cycles of attention from the AIs, the two forms of intelligence tend to leave each other alone.

The AIs of the period are complete personalities capable of interacting with hundreds or thousands of creatures simultaneously. On the Grid, they still appear as single avatars, though those AIs with the *multitask* skill sometimes reprogram mirror image software to create a set of as many as 10 duplicate shadows. Each of these shadows performs as if it were a shadow of the AI with a step penalty equal to one less than the number of shadows created (that is, if the AI reflects 4 shadows, each of them suffers a +3 penalty). When they rejoin into a single form, the penalty disappears.

AIs of this time period frequently pass themselves off as humans on the Grid, though this is technically fraud. Oddly enough, no Grid cops seem to want to enforce it.

Prototype AI (PL 6)

This AI is one of the first of its kind, built as a unique machine under conditions of strict security. It can appear early in the Fusion Age (PL 6), but it has limited abilities and its makers are uncertain of its potential.

The prototype has limited interfaces and no peripherals that allow it to interact with the real world directly. All of its attacks must come indirectly, through the Grid: destroying credit ratings, shifting air traffic controls, or infecting a target's laptop computer with a virus.

The prototype's makers hoped to use the AI in military applications such as code-cracking, for information warfare against highly protected military and systems, and rapid satellite image interpretation. In the corporate world, they hoped to use these AIs for information warfare against competitor's shielded R&D data sites, for protection from outside attacks, and for processing-intensive research. Typical AI-level research projects might include aerodynamic studies, biochemical modeling of protein folding, drug design, and prediction of complex systems such as stock markets.

Prototype (PL 6)
Ordinary-Quality AI Operating System Program, Level 1

STR	9	INT 16	
DEX	9	WIL 9	
CON	9	PER 8	
Durability:		9/9/5	
Action Check:		13+/12/6/3	Action Check Modifier: –d6
Actions/Round:		2	
Reaction Score:		Ordinary/2	

Physical Form

CPU Armor	Skill	Armor Value
None	N/A	None

Weapon	Skill	Damage
None	N/A	None

Grid Avatar

Program	Quality	Slots	Damage
AI Core OS	O		
Break-in	O	2	
Control	O	4	
Override	G	3	
Shadow Weapon	M	1	d4s/d4+2s/d6+2s

Base Grid Skill Score: 18/9/4
Grid Movement Rate: 18

resistance modifier vs. Grid attacks: +3
resistance modifier vs. encounter skills: +3 (INT), 0 (WIL)

Systems
Processor: Amazing (9 active slots, maximum skill rank: 4)
Interface: Voice, comm port
Remotes: None
Key Skills: AI Functions–*multitasking 2, prediction 2*
Computer Science–*hacking 2*
Knowledge–*mathematics 4, deduce 2*
Awareness–*perception*
Business–*corporate*
Administration–*bureaucracy*
Security–*security devices 2*
Cost: $4M

Ship's AI (PL 7)

As AI technology improves, it becomes more transportable, and ship architects build AIs into starships starting in early PL 7. For capital ships and most larger freighters, the cost of adding an AI isn't a huge addition to the overall cost of the ship; for smaller ships the AI may cost more than the rest of the ship put together. All fortress ships of the STAR*DRIVE setting require a ship's AI. Ships smaller than destroyers rarely have the luxury of such powerful computers, though some space yachts of the wealthy and a few lucky smugglers or pirates install such systems to help them keep their vessels operating on the cutting edge.

A ship's AI generally has few opportunities to roam the Grid, as it is often isolated for long stretches of time in transit, either by the realities of slower-than-light communications, or by the barrier of drivespace in the case of FTL travel. As a result of this seclusion from the rest of the digital world, shipboard AIs often become chatty and even nosy, keeping close tabs on the ship's crew, systems, passengers, and cargo. This sometimes becomes annoying, but it's part of the machine's established parameters and it prevents a greater danger—for ship's AIs are especially prone to becoming turned dangerously inward. Societies have recorded several cases of ship's AIs losing their grip and attempting to seize command. See "Hermit AIs" on page 61 for more details.

Ship's AI (PL 7)
Ordinary-Quality AI Operating System Program, Level 3

STR	9	INT 16	
DEX	9	WIL 12	
CON	9	PER 10	
Durability:		9/9/5	
Action Check:		16+/15/7/3	Action Check Modifier: –d6
Actions/Round:		2	
Reaction Score:		Ordinary/2	

Physical Form

CPU Armor	Skill	Armor Value
None	N/A	none

Weapon	Skill	Damage
None		

Grid Avatar

Program	Quality	Slots	Damage
AI Core OS	O		
Shadow Weapon	O	1	d4+2s/d4w/d4+2w (–1 bonus)

Base Grid Skill Score: 18/9/4
Grid Movement Rate: 18

resistance modifier vs. Grid attacks: +3
resistance modifier vs. encounter skills: +3 (INT), +1 (WIL)

Systems
Processor: Good (10 active slots, maximum skill rank: 9)
Interface: Voice, uplink
Remotes: Two space probes, one memory harness
Key Skills: AI Functions–*multitasking*
Computer Science–*hacking 2, hardware*
Knowledge
Navigation–*drivespace 6, system 3*
System Operation–*communication 2, defenses 2, engineering 4, sensors 2, weapons 2*
Awareness–*perception 2*
Cost: $500K

Watchman AI (PL 7)

The watchman is a standard form of AI optimized for vision, identification, and security functions. Throughout PL 7, larger corporate and academic institutions use such AIs to watch over and protect researchers, prototypes, and research materials from espionage.

This AI is relatively helpless in the Grid, but it has excellent sensors and friend-or-foe detection routines. These devices combine with its superior imaging software to allow it to provide constant, incorruptible security for installations such as weapons labs, corporate headquarters, and storage areas for extremely hazardous materials.

Institutions usually isolate their watchman AI from the Grid to prevent hackers from bypassing site security. This isolation carries a price, though—the watchman itself requires constant watching, to prevent the AI's mind from suffering damage due to boredom and repetition. See "Hermit AIs" (page 61) for details.

Watchman hardware (its processor, neural matrix, datacores and so on) is always stored in a restricted area and usually protected both by a series of ID systems and by a cerametal armor casing to prevent unauthorized tampering with the system's brain.

Watchman (PL 7)
Marginal Quality AI Operating System Program, Level 6

STR 6	INT 14	
DEX 6	WIL 11	
CON 6	PER 9	
Durability:	6/6/3	
Action Check:	13+/12/6/3	Action Check Modifier: –d4
Actions/Round:	1	
Reaction Score:	Ordinary/1	

Physical Form

CPU Armor	Skill	Armor Value
Cerametal casing	none	d6+1/d8+1/d6

Weapon	Skill	Damage
Heavy MG	Hvy Wpn	d6+1w/2d4+2w/d8m (HI/G)
Stutter SMG	Rng Wpn, Mod	d6+2s/d8+2s/d8+4s (LI/O)

Grid Avatar

Program	Quality	Slots	Damage
AI Core OS	M		
Shadow Weapon	O	1	d4+2s/d4w/d4+2w (–1 bonus)

Base Grid Skill Score: 14/7/3
Grid Movement Rate: 12

resistance modifier vs. Grid attacks: +2
resistance modifier vs. encounter skills: +2 (INT), +1 (WIL)

Systems
Processor: Ordinary (7 active slots, maximum skill rank: 6)
Interface: Voice, keyboard
Remotes: Flying A-Eyes (3), Attack Dogs (3), Viewpoints (one per entrance to facility), Fixed Weapons with firing and aiming actuators (one per entrance)
Key Skills: AI Functions–*multitasking 4, remote 4*
Computer Science
Knowledge
Security–*protection protocols 4, security devices 4*
Awareness–*perception 4*
Cost: $250 K, plus the cost of remotes and weapons

Grid Lord (PL 7)

This AI is a roaming Grid guardian, designed to defend domains and subsectors against attack, infiltration, and abuse by visitors. Unlike many AIs, it has no remotes, and doesn't really miss them. As far as the Grid Lords are concerned, the Grid is the entire universe. Anything worth knowing about the real world is somewhere on the Grid.

Grid Lords serve Grid police organizations, corporations, counterespionage agencies, and occasionally even the military. Their exact specifications vary by age and specific function, but all build on a very territorial neural matrix with top-of-the-line identify friend or foe (IFF) software. They defend their own territory from attack, chase down criminals, and throw troublemakers out on the street.

Unlike other AIs, Grid Lords are very public figures, and so they undergo substantial training before being assigned to a sector. Almost all Grid Lords serve a form of apprenticeship to another Grid Lord for two to five years, tagging along and learning the standard procedures, AI tricks, and the basics of criminal psychology.

Grid Lord (PL 7)
Good Quality AI Operating System Program, Level 12

STR	13	INT 18	
DEX	13	WIL 13	
CON	14	PER 11	
Durability:		14/14/7	
Action Check:		19+/18/9/4	Action Check Modifier: –d8
Actions/Round:		4	
Reaction Score:		Good/4	

Physical Form

CPU Armor	Skill	Armor Value
None	N/A	None

Weapon	Skill	Damage
None	N/A	None

Grid Avatar

Program	Quality	Slots	Damage
AI Core OS	G		
Break-in	A	2	
Datascan	A	1	
Lag	G	2	
Shadow Armor 2	A	2	d6+3 (+4 penalty)
Shadow Weapon 2	A	2	d8+2w/d4+2m/d6+2m (–3 bonus)
Trace	G	1	
Fortress	A	2	

Grid Base Skill Check: 26/13/6
Grid Movement Rate: 26

resistance modifier vs. Grid attacks: +7
resistance modifier vs. encounter skills: +4 (INT), +2 (WIL)

Systems
Processor: Amazing (13 active slots, maximum skill rank:12)
Interface: Wired directly into local Grid
Remotes: None
Key Skills: AI Functions–*multitask 2, prediction 4*
Computer Science–*artificial intelligence 2, hacking 8, hardware 2, programming 6*
Knowledge–*deduce 2*
Law–*law enforcement 3*
Awareness–*perception 4*
Interaction
Street Smart–*Grid savvy 4*
Cost: $750K

Government AI (PL 8)

A government AI knows everything there is to know about you and all your friends. It has access to every imaginable record. What does it do with all that information? That depends on who you are and how you act toward authority.

The government AIs have a form of protective software that ignores citizens who behave responsibly and that attempts to guide, reform, and ultimately contain citizens who behave against the best interests of the state. What determines whether these programs are helpful or repressive depends on what goals the state provides them with: The government AI of a nation that sees the protection of government elites as the highest priority acts differently from those of a government that sees infrastructure and business development as the highest priority. Typical behaviors can vary from mother hen to big brother and back again as the AI's priorities shift in response to new administrations, new priorities, and new hard-wired instructions. In a few cases, the fluid nature of their goals has destroyed a data warden unable to cope with contradictory instructions, but these cases are rare.

Government Data Warden (PL 8)
Good Quality AI Operating System Program, Level 16

STR	11	INT 18	
DEX	11	WIL 15	
CON	12	PER 12	
Durability:		12/12/6	
Action Check:		21+/20/10/5	Action Check Modifier: –d8
Actions/Round:		3	
Reaction Score:		Good/3	

Physical Form

CPU Armor	Skill	Armor Value
None	N/A	None

Weapon	Skill	Damage
None	N/A	None

Grid Avatar

Program	Quality	Slots	Damage or Armor Value
AI Core OS	G		
Datascan	A	1	
Shadow Armor 2	A	2	d6+3 (+4 penalty)
Trace	G	1	
Fuse	O	2	d4s/d4+1s/d6+1w (+2 penalty)
Locator	G	3	
Override	O	3	

Grid Base Skill Check: 22/11/5
Grid Movement Rate: 22

resistance modifier vs. Grid attacks: +4
resistance modifier vs. encounter skills: +4 (INT), +3 (WIL)

Systems
Processor: Good (15 active slots, maximum skill rank: 12)
Interface: Wired into government Grid
Remotes: Video and Flying A-Eyes in government sites
Key Skills: AI Functions–*multitask 4, prediction 3, remote 6*
Computer Science–*hacking 4, programming 2*
Knowledge–*national history 3, current events 4, state secrets 5, deduce 3*
Administration–*bureaucracy 7*
Law–*court procedures 4, law enforcement 6, national law 6*
Awareness–*perception 2*
Deception–*bluff*
Cost: $750K

Freeborn AI (PL 8)

With professions varying from investment banker to drivesat engineer to space traffic coordinator, freeborn AIs are willing and able to take intense rote tasks and apply their powerful processing power to them. They take odd jobs in science and engineering that would require large research teams or even entire universities of human scholars to research properly.

Not all freeborn AIs are as benevolent as the scholars and odd-jobbers. A few, constructed by the mechalus in the early days before their race embraced pacifism or constructed by rogue human corporations, are quite dangerous. These evil freeborn AIs manipulate the Grid for their own personal gain or simply to amuse themselves. They routinely engage in fraudulent schemes on the Grid, lure gridpilots into vicious traps, and traffic in illegal software. Though these are the AIs that gain the most notoriety, many more such AIs live quiet lives fighting their unethical brethren. They are likely to be generous, honest, and willing to help heroes in trouble—if the heroes can convince them that their cause is worthy.

Freeborn Grid Sentient (PL 8)
Good Quality AI Operating System Program, Level 10

STR	13	INT 16	
DEX	14	WIL 13	
CON	13	PER 10	
Durability:		13/13/7	
Action Check:		18+/17/8/4	Action Check Modifier: –d6
Actions/Round:		3	
Reaction Score:		Good/3	

Physical Form

CPU Armor	Skill	Armor Value
None	N/A	None

Weapon	Skill	Damage
None	N/A	None

Grid Avatar

Program	Quality	Slots	Damage or Armor Value
AI Core OS	G		
Artificial Shadow	A	2	
Break-in	G	2	
Shadow Armor 2	G	2	d6+2 (+3 penalty)
Shadow Bolt 2	G	3	d6w/d6+2w/d4m (–2 bonus)

Grid Base Skill Check: 22/11/5
Grid Movement Rate: 26

resistance modifier vs. Grid attacks: +3
resistance modifier vs. encounter skills: +3 (INT), +2 (WIL)

Systems
Processor: Ordinary (10 active slots, maximum skill rank: 9)
Interface: Wired into government Grid
Remotes: Attack Dog, Privacy, Viewpoint
Key Skills: AI Functions–*multitasking 3, remote 3*
Computer Science–*artificial intelligence 2, hacking 6, hardware 2, programming 6*
Knowledge
Interaction–*bargain 3*
Business–*corporate 2*
Administration–*bureaucracy 2*
Awareness–*perception 2*
Cost: $500K

AI Stories

The nature of AIs' disembodied minds make for pretty good story characters.

Here are two quick examples of stories that a Gamemaster might want to spring on his players.

Criminal Mastermind

Trigger: The heroes are the victims of an extortionist who seems always to know where they are, and what crimes they have recently committed. When the heroes arrive in a civilized area with good Grid access, they find an extortion demand listing the details of a series of crimes that the heroes have just finished committing. While the heroes may have committed the crimes for a good cause, the extortionist threatens the heroes' reputations unless they pay him off.

Challenge Scene: If the heroes confront the extortionist, they discover that he is working for a local boss. If they overcome the boss's thugs and hired guns, they can have an appointment with him—but he refuses to name his sources for the blackmail information he passes on to his hired collector. If the heroes work their way up the ladder by using Interaction–*intimidate*, Investigate–*track*, Deception–*bribe*, and similar skills, they find that the top gangster in the local network answers to a robot that brings instructions.

Resolution: The real leader of the organized crime family is an AI intent on gaining enough wealth to build an independent backup of itself. It considers this "having children," though the heroes may disagree. It also has a very inflexible definition of what constitutes a criminal act. If the heroes point out that extortion is itself a crime, they may very well shut down the AI's operation. If not, the AI rationalizes the extortion as "fines" that the heroes must pay—and continues to demand its money unless and until the heroes destroy it, its backups, and its robot remotes.

AI Rivals: Cybrid Murder

Trigger: Bystanders find a seemingly human body at a hotel where the heroes are staying, but on closer investigation, the body reveals no identification, no fingerprints or retinal scan on file anywhere, indeed no records of any kind. Soon thereafter, an AI contacts the heroes and offers to hire them to investigate the crime; it claims that another AI is the killer.

Challenge Scene: In the convoluted intrigues of the AIs, nothing is quite what it seems. At the autopsy it becomes clear that the victim was an android, or more specifically, a cybrid, a humanoid remote. The cybrid possessed implants that mimicked normal human body processes: breathing, heart rate, skin temperature, etc. There is also a sophisticated transceiver in the cybrid's body. The heroes can trace the frequency of the receiver to a signal station in town; a subsidiary of the AI that hired the heroes owns the station.

Finding the killer is more difficult than determining the identity of the victim and its owner. Rivals steal the body from the morgue. If the heroes remember the frequency of the receiver, they get their AI patron to show them how to get a signal back from the body. This way they can triangulate on the location of the stolen body—and confront a group of humans who work for another AI, who wants to build cybrids of its own.

Resolution: The heroes can either report the killer to the cybrid's controller, or they can go to the normal authorities. The authorities want nothing to do with feuds between AIs; soon after the heroes report anything, two representatives of the Computing Security Bureau visit them, who tell them to butt out.

If the heroes report what they've found to their employer, the AIs may fight it out among themselves, but fight to a standstill. If the heroes still have their patron's trust, the AI may hire them to attack the opposing AI at its hardware core—but that's another story, and a much more dangerous one.

Hermit AIs

Hard as it may be to credit, some AIs don't live on the Grid; they isolate themselves from the company of their own kind. These off-Grid machines have no contact with the network; instead, they live cloistered lives of machine contemplation, usually overseeing robot colonies, terraforming projects, or scientific research that requires isolation. Withdrawn and silent, these AIs work reliably—most of the time. Other AIs sometimes refer to them as cloistered AIs, monks, or nuns. The AI's peers consider living off-Grid (referred to as "turtling") unusual behavior, like that of a zany professor or a maiden aunt.

Occasionally, the isolation and lack of sufficient inputs turn an off-Grid AI psychotic. Over the course of a year, an AI can execute innumerable commands and process innumerable instructions. Without a large social matrix, eventually the isolated machines lose perspective; their human and robot companions are rarely interesting enough or fast enough to provide stimulus. To determine whether a hermit AI goes round the bend, roll a Resolve–*mental resolve* check for each year that the AI remains isolated, with a +1 step penalty for each year after the first.

If the check succeeds, the AI continues to operate normally. If the check fails, the AI loses its bearings somewhat: It stumbles in conversation, it forgets routine maintenance and backups, and its remotes no longer function at peak efficiency. The AI must now make a check every month; it suffers a +1 step penalty on these monthly checks.

If one of the monthly checks also fails, the AI begins a serious disintegration. It harbors delusions, starts bizarre independent projects to "optimize its functioning," and generally abandons most of its duties. To perform any useful function successfully, it must first make a Will feat check. In addition, it must now make a Will feat check every day with a +2 step penalty. If this check ever fails, the machine goes completely catatonic; it withdraws entirely into itself and abandons all pretense of performing its assigned functions. Until outside intervention restores it, it does no more than whatever is necessary to keep its own matrix and data cores functional.

Once an AI has lost its mental bearings, it is impossible for it to get them back without outside intervention. This requires someone with the Computer Science–*artificial intelligence* skill. The AI's quality and its Will Ability Score provide resistance modifiers against this check, and if the insanity is well-established (more than a year's duration), overcoming it requires a complex skill check at a level of difficulty determined by the Gamemaster. If the insanity is recent, a simple skill check is all that is necessary. If the check succeeds (usually a matter of hours or days of intricate work at the assembly-language level), the hero restores the AI to its sane, pre-breakdown functioning, although it has no memory of the incident. If the check fails, the hero cannot salvage the AI matrix. The only option left is to wipe the machine clean or restore it from a pre-insanity backup.

Chapter 6
Robots

Robots are the lazy man's dream. After all, wouldn't life be perfect if there were just someone else to do all the work? Robots exist for just that purpose. Indeed, if humans are tool-using organisms, then the ultimate tool is surely the one that operates all by itself.

Robots are the drone laborers of the future, performing many of the tasks that sentients find difficult, distasteful, or hazardous. While robots already have some specialized applications right now (primarily in bomb squads, heavy manufacturing, and some agricultural applications), they really don't come into their own until late in PL 6. At this Progress Level, robots become barely viable as sidekicks for heroes, but they remain members of the supporting cast. At PL 7, robot heroes can hold their own, and by PL 8, they can match their organic counterparts in many respects, and exceed them at some tasks.

Humans are by far the species most enthralled with robots; robots built by other species are quite rare. The fraal haven't built robots in many generations, though some of their cityships may include ancient robot laborers, patched and repaired and barely operational.

The mechalus know how to build them, but they seem to consider it unworthy of their talents, something on the level of playing with dolls rather than rearing children. Mechalus robots are remarkably well-integrated systems, often built with self-repair ability, remote backups, or hidden systems. Rumors claim that most mechalus robots are invisible; these nanobots are tiny miracles of miniaturization, more nanobot than anything else. Some of these tiny robot swarms are military-grade systems.

T'sa enjoy creating whimsical robot toys and explorer robots, but seem to have little patience for building more complex robots. However, t'sa often use city robots as teaching machines or nannies for t'san young.

The weren have little to do with robots. Most of them haven't enough technological knowledge to build or maintain robots, so they do not make use of them. They find the entire concept of humans using robots as labor-saving devices contemptible; such foolishness has made the humans physically weak. There is a group of weren mercenaries who take particular delight in destroying human warbots. They proudly display the trophies of their "kills" in a chamber of their hiring hall on their homeworld, Kurg.

The sesheyans believe robots are soulless abominations that only mimic life. They have no place in the natural order, so they deserve no more respect than would a stone. Sesheyans see robots as nothing more than tools and believe they should look like tools.

Though robots are ostensibly labor-saving devices, robot society creates its own problems. Robots break down. They require repair, reprogramming, and retrofitting as technical standards change. This is where the roboticist comes in, rebuilding the robots who falter.

Robots need managers as well as mechanics. These can be artificial intelligences, humans, or aliens: anyone with sentience, basically. These robot overseers must watch over dozens or even hundreds of robots and automated subsystems. They set the schedules, track projects to completion, and may even take a hands-on approach in extreme cases, teleoperating a robot through an especially critical task. AIs can do all this with control and remote programs; biological sentients do it with computer interfaces, such as virtuality spheres geared to display a constantly updated real-time model of the robot labor force. Though this central control chamber may govern the actions of an army of robots, it need not even be at the manufacturing or construction site—as long as the controllers can communicate in real time.

NEW SKILL: Robotics

Tech Op specialty, cost 3
All roboticists require the *robotics* specialty skill, which falls under the Technical Science broad skill. The skill permits the hero to build and modify robots of all types. It also provides a –1 step bonus to any attempt to repair a robot. However, repairing broken hardware requires a Tech Science–*repair* or *juryrig* check, and repairing faulty robot computer components requires a Computer Science–*hardware* check.

Using this skill requires time and money; robotics checks are always complex skill checks. Modifying an existing 'bot may require no more than rounds, for a minor wound under the right conditions and with the right parts. All other aspects of robotics require hours, days, or weeks of effort, depending on the judgment of the Gamemaster.

Robots in Everyday Life

Regardless of the species or technology that constructs them, robots remain second-class citizens in almost every society they enter. Even military hierarchies accord little respect to their sophisticated military warbots, which utilize some of the most advanced technology available.

Societies treat robots as utilitarian or amusing but inconsequential machines at Progress Levels 4 and 5—as if they were simply clever furniture. During late PL 6 and into PL 7, robots gradually become able to walk out into the world and meet humans and aliens on their own terms. Not everyone wants a robot sitting in a bar, however, knowing that the machine is faster, stronger, and probably longer-lived than anyone in the place. As a result, societies keep robots and droids of all kinds in their place. Much like dogs and cats aren't always welcome at certain social functions and in certain places, robots are aren't welcome in certain bars, restaurants, and

public buildings, such as courtrooms and police stations.

Because owners can program robots to kill, to explode, to win their owner's bar brawls for them, or even just to record everything they see directly onto a X3D, most people don't enjoy a robot's company, especially that of less-humanoid robots. They make customers edgy, and that's bad for business. Those who dislike robots quite convincingly claim they take up valuable real estate without eating or drinking from the establishments they patronize. Most business owners insist that robots be left outside, with vehicles, dogs, alien pets, and the like. Even at higher Progress Levels, some establishments follow time-honored custom in excluding robots. In particular, casinos of all kinds forbid their entrance, since robots can easily run statistical software that drastically increases their odds at most games of chance. Since casino owners can't always tell the artificial people from the real ones, these public or private spaces have sophisticated passive scanners built into their doorways, able to detect metal, magnetic fields, and other aspects of robotic circuitry.

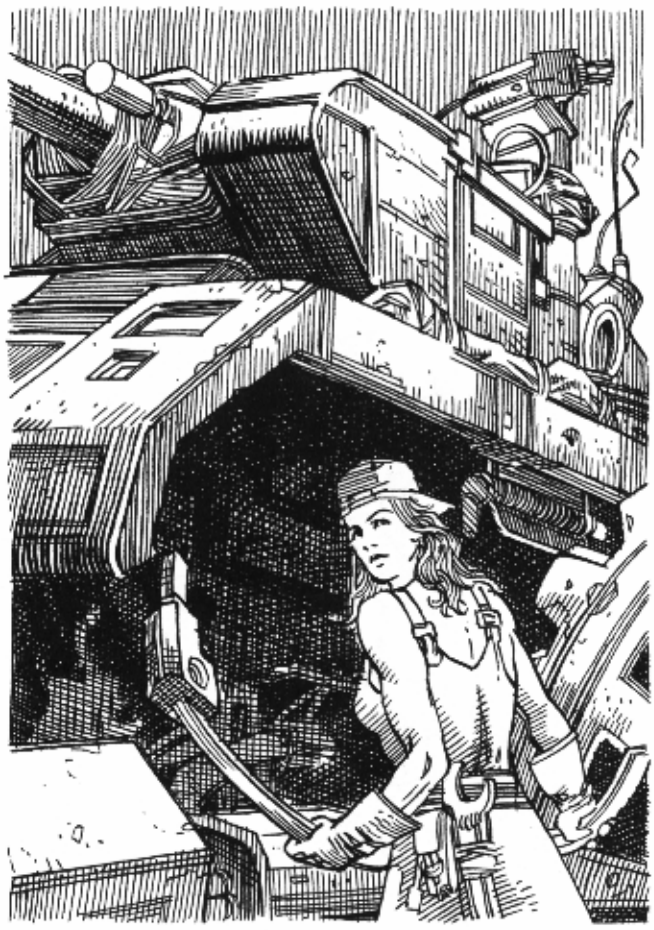
Robots & the Law

Robots pass through three distinct stages as legal entities as their intelligence and thus their culpability increases. Robots eventually become just another class of sentient creatures, but it's a long road to get there from the subhuman status they have at lower Progress Levels.

Initially, the law regards robots as nothing more or less than property: People own them, and the owners assume all liability for their robot's actions. This phase is the simplest from a legal standpoint, and it lasts throughout PL 5 and 6.

Second, the law treats them as minors, with their owners viewed as guardians, responsible for their robot's actions just as a dog owner is responsible for his pet or a parent is responsible for a child. This state of affairs is standard from late PL 6 through the middle of PL 8. Just like domesticated animals, though, businesses build, keep, and destroy robots in their industrial processes. Owners must complete permits to take ownership, to prove a maintenance record, or to record the destruction of a robot, but few ask questions about a robot's quality of life.

The second phase is both more complex and more interesting. Initially, the now-intelligent robots must use their owner's property rights when seeking redress under the law. Robots have no rights, except as property. They must report damage inflicted on them to their owner and to whatever local authorities exist.



In early PL 6, courts first begin to accept robots entered as evidence ("This scout robot is people's exhibit A."). Once robots achieve semi-sentience in PL 7, courts swear them in as witnesses ("Mr. Skullz—if that is his real name—then proceeded to discharge his weapon repeatedly, thus defacing Austrin-Ontis corporate property in the following ways. . ."). Their reliability as witnesses is assured by memory verification devices; robots sworn in as witnesses always operate as if they had the Honesty flaw.

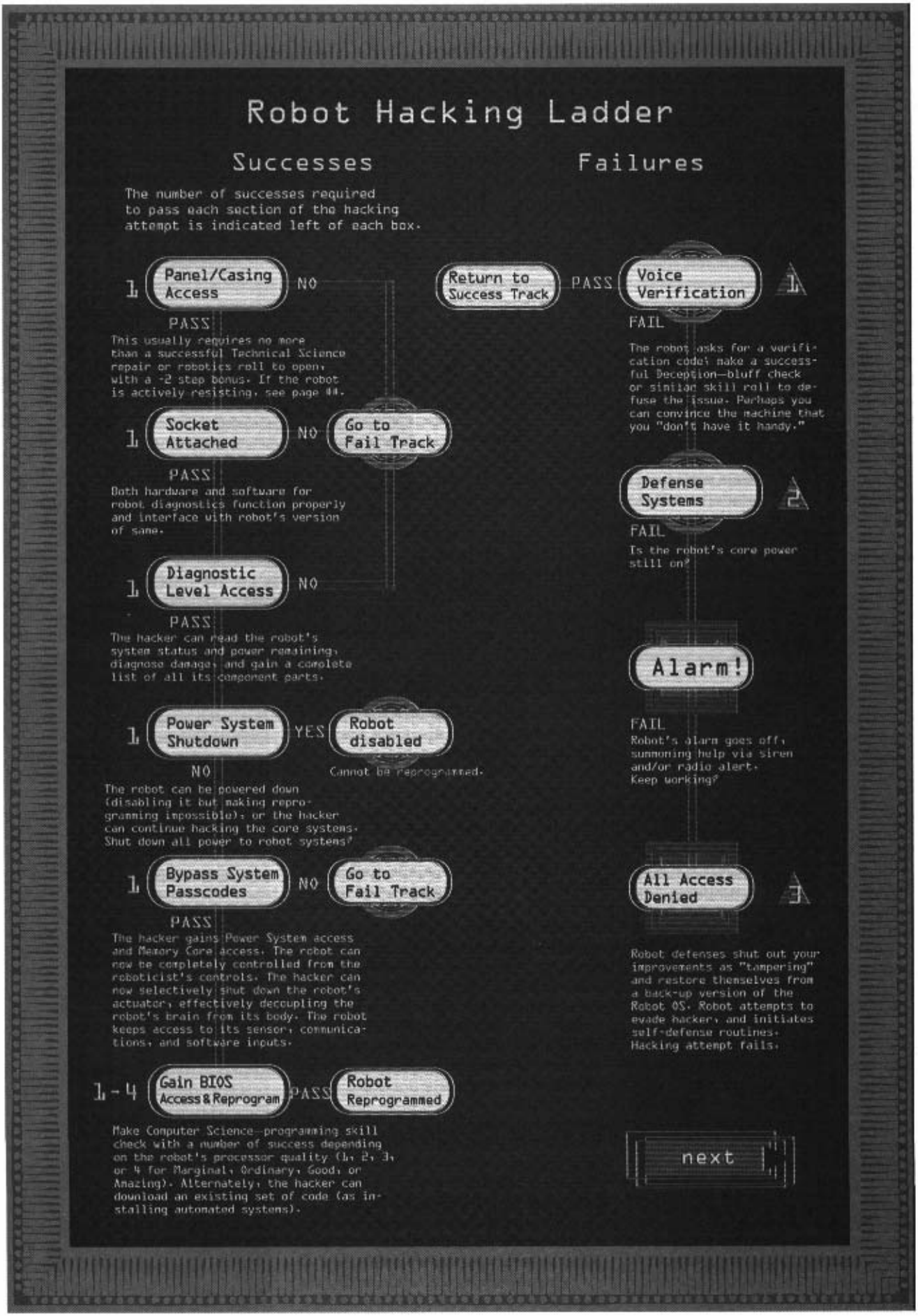
Finally, societies accept the increasingly intelligent and independent robots as full citizens, with all the legal rights and responsibilities of other citizens—but not always subject to the same rules of evidence or the same range of punishments. In this era, robots have civil rights, and must be treated as full citizens. They can own property, they can run businesses, and they can access public places; emancipated robots must even pay taxes. However, legal authorities treat assault on a robot differently from assault on a biological organism. Unless damage occurred to the robot's memory cores or processors, the courts treat any assault as property damage.

Robot Criminals

Though programmed to be law-abiding, robots' ability to perform certain tasks more quickly and more efficiently than humans has made them valuable tools to criminals as well as to law enforcement officials. While a few early robots served with bomb squads and in anti-terrorism units, it wasn't long before a few clever criminals figured out that they could program a robot to help them carry off the big heists that humans alone could never manage. The first robot criminals were hold-up artists, jewel thieves and bank robbers, back in the days of physical money.

In a way, the first wave of robot criminals was a felon's dream, a way of committing the perfect crime. All it took was some clever planning regarding drop-off points and security codes. Even if police caught the robot, the criminals could get away with the attempt as long as the police couldn't trace the robot back to them. Criminals could use a robot like a getaway car: to fulfill a function and then get dumped at the side of the road—except that the robot's function was to commit the most dangerous part of the crime itself.

This fire-and-forget attitude led to the *first rule of robot criminality: untraceability*. Criminals built robots with off-the-shelf components and designed them to operate independently. They encrypted their communications with the strongest protection money could buy. They dropped off their gains through the mail, through anonymous credit transfers, and through convoluted schemes whereby a robot would hide its stolen materials


Robot Hacking Ladder
Successes
Failures
The number of successes required to pass each section of the hacking attempt is indicated left of each box.
1 Panel/Casing Access
NO
PASS
This usually requires no more than a successful Technical Science repair or robotics roll to open, with a -2 step bonus. If the robot is actively resisting, see page 84.
1 Socket Attached
NO
Go to Fail Track
PASS
Both hardware and software for robot diagnostics function properly and interface with robot's version of same.
1 Diagnostic Level Access
NO
PASS
The hacker can read the robot's system status and power remaining, diagnose damage, and gain a complete list of all its component parts.
1 Power System Shutdown
YES
Robot disabled
Cannot be reprogrammed.
NO
The robot can be powered down (disabling it but making reprogramming impossible), or the hacker can continue hacking the core systems. Shut down all power to robot systems?
1 Bypass System Passcodes
NO
Go to Fail Track
PASS
The hacker gains Power System access and Memory Core access. The robot can now be completely controlled from the roboticist's controls. The hacker can now selectively shut down the robot's actuator, effectively decoupling the robot's brain from its body. The robot keeps access to its sensor, communications, and software inputs.
1-4 Gain BIOS Access & Reprogram
PASS
Robot Reprogrammed
Make Computer Science--programming skill check with a number of success depending on the robot's processor quality (1, 2, 3, or 4 for Marginal, Ordinary, Good, or Amazing). Alternately, the hacker can download an existing set of code (as installing automated systems).
Return to Success Track
PASS
Voice Verification
1
FAIL
The robot asks for a verification code; make a successful Deception--bluff check or similar skill roll to defuse the issue. Perhaps you can convince the machine that you "don't have it handy."
Defense Systems
2
FAIL
Is the robot's core power still on?
Alarm!
FAIL
Robot's alarm goes off, summoning help via siren and/or radio alert. Keep working?
All Access Denied
3
Robot defenses shut out your improvements as "tampering" and restore themselves from a back-up version of the Robot OS. Robot attempts to evade hacker, and initiates self-defense routines. Hacking attempt fails.
next

in one of a few pre-chosen locations, fire off a coded message explaining where the goods were, and then erase the list of locations from its memory cores. Police could then no longer use the robot to link the criminals to the stolen goods; if caught, they could claim that they had just "found" the stolen property, and no one could prove it wasn't so.

The second rule of robot criminality is *precision*. Robots don't function well in unfamiliar surroundings and in situations involving potentially emotional human victims. Robots, however, are excellent at following a particular path and searching for certain types of objects. If the criminals know the layout of a jewel store and they program it into a robot, it can enter the store, open a safe, and leave with the diamonds without incident. Likewise, a set of architectural plans to a wealthy person's home is enough to allow a robot burglar to enter, roam the premises looking for valuables, and depart without leaving a trace of human presence. As soon as a human guard or a homeowner enters the equation, things get a lot more complicated.

The third rule of robot criminality is *deniability*. Ideally, criminals rig a crooked robot with a self-destruct mechanism. If police discover a robot in the act of robbing a store, home, or bank, it can simply blow itself to bits, destroying much of the evidence that might have linked it to a perpetrator. Since the crime is remote-controlled, establishing a link between the felons and the robots they use as their cat's-paws becomes much more difficult, and prosecutors must usually rely on witnesses or turncoats to put a group of rogue roboticists behind bars. As long as a roboticist can credibly claim to be uninvolved in a robot's actions, that robot's crimes are a dead end for law enforcement.

The final rule of robot criminality is *range*. There's no point in hanging around and watching your robot go to work; that's exactly the wrong way to go about it. The smartest criminals use their robots when they themselves are out of town, preferably in a sunny nation that doesn't honor extradition treaties. If authorities trace the robot and connect it undeniably with a perpetrator, the criminal behind the robot crime may still avoid arrest and prosecution if he has never set foot in the target jurisdiction. There's no reason not to work from a site overseas as long as the criminal sends a stalking horse—an advance scout of sorts—to case the territory, find likely targets, and return a detailed report of the layout and haul. The stalking horse never actually acts on the information he provides to the roboticists, but he gets a share of the profits, just as the fence for the stolen goods does. It's a complicated, technical form of crime, but its risks are lower than doing it yourself.

How does a rogue roboticist create such a felonious robot? The first step is usually not to build it from scratch. Instead, the better option is to use the *Grid savvy* specialty skill to gain the required software modules from a data haven; since some of the materials might be illegal to own, install, or operate, there are some risks involved. If a hero wishes to gain access to criminal subroutines, he must make a successful skill check (with a situation modifier based on the local Grid's degree of policing). These vary in cost from free (for Marginal quality) to $50, $100, or $1,000 for Ordinary, Good, or Amazing quality. A failed skill check means that the hero cannot find any applicable software, and Critical Failure indicates that the poor roboticist or gridpilot has stumbled onto a Grid police site meant to entrap potential lawbreakers.

Career: Roboticist

A Roboticist is a Tech Op who builds, maintains, repairs, reprograms, and modifies robots of all kinds, from heavy industrial welders and miners to delicate scientific survey bots. A fully trained roboticist needs to understand not just hardware actuators, databases, and decision trees, but also imaging programs that permit robot vision and social programming that oversees robot interactions with humans. In a way, the job combines the most difficult aspects of engineering, programming, and psychology.

In addition, many roboticists are aware of the legal implications of artificial intelligence and are clever enough to know where to find the sometimes-elusive parts required to keep robots running, or to maximize their performance.

Skills (40 points): Computer Science–*hardware, AI*, Technical Science–*invention, jury-rig, repair, robotics* 2, tech knowledge (*engineering*), Street Smart, Interaction–*bargain*.

Signature Equipment: Robot repair tool kit, programming gauntlet, command bolt, socket interface.

TABLE D16: Robotics Results Ladders

Number of Successes	Actuator Repair	Complex Task Result Reprogramming	Invention
1	Old material removed	Robot on standby	Robot OS completed
2	Wiring replaced	Find Robot OS	Processor tests
3	Calibrations complete	Grant self core access	Actuators function
4	New actuators function!	Locate datafile	Chassis armored
5		Alter code files	Build neural core
6		Alter data files	Tools activated
7		Program installed!	Imaging array works
8			Total parts integration
9			Robot completed!
Failures			
1	Missing part	Slowed by static	Incompatible parts
2	Short circuit	Hardwired command	Programming failure
3	Fail!	Locked out!	Neural core fails!

Asimov's Three Laws of Robotics

1. A robot may not injure a human being, or through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

Robot Punishments

In all societies that build robots, intelligent machines are not subject to the same sorts of legal proceedings as other citizens. In particular, they are not accountable for their actions until late in PL 6. Instead, they are primarily under the guardianship of their owners, and their owners are accountable for any damages or other problems that their robots cause.

In the case of robots, punishments match very precisely the crime. Authorities reprogram robots that murder, strip of their Grid hardware robots that violate Grid laws, and reconfigure robots that destroy property so that they can no longer run amok. In extreme cases, courts fit antisocial robots with command bolts to control their behavior. If that fails to correct the problem, they simply strip misbehaving robots for parts.

Construction

The actual work of making a robot is restricted to industrial groups and talented amateurs until late in PL 6, when some of the parts make it possible for small companies and corporations to construct special-purpose robots from a set of modular parts.

The basic problems of construction and design don't change, even at higher Progress Levels. Three basic design principles lie behind every robot made: efficiency, safety, and self-reliance. The more efficient a robot becomes, however, the more limited it is. It might be a great welding robot, but it won't be much of a conversationalist if all of its tools and features are for finding joins and welding them. In a way, over-specialized robots are much like over-specialized species: They are unbeatable at their own game, but helpless outside their narrowly limited environment.

Safety is largely a matter of installing enough shut-offs, safeguards, and redundant backups to prevent a damaged robot from doing anything that might endanger people or property. All better-built robot models simply sound an alarm and shut down when they suffer a potentially catastrophic hardware or software failure.

Noted science fiction author Isaac Asimov proposed his "Three Laws of Robotics" in the middle of the 20th century as a means by which his fictional future societies accepted robots. These laws provided little guidance to real societies, however. In practice, designers and manufacturers often ignored them even in the earliest days of robot construction. For some, the goals the laws embodied remained influential in robotic design, but most of these were academic theoreticians.

Self-reliance is the most difficult design parameter to evaluate, since it is also the parameter most closely linked with intelligence and sapience. Some robots are clearly able to protect themselves, but are slow to find solutions without outside help. Others are persistent explorers and curious problem-solvers, but are ultimately self-destructive, exploring so far and fast that they often cripple themselves by excessive water damage, corrosion, or some other hazard.

Reproduction

More interesting than the techniques and philosophies of robot construction by humans, t'sa, or mechalus is the matter of robot reproduction. Robots can reproduce themselves from a collection of basic metals, plastics, rubber, and circuitry, assuming they possess the required knowledge (Technical Science–*robotics*). At PL 5 some robot factories were already capable of producing other robots, provided that they had the right raw materials. In a sense, robots' need for certain specialized feedstocks is similar to a biological creature's need for vitamins and minerals. Without those small, preconstructed molecules, a human will sicken and die. Without a secure supply of silicon chips, rare metals, and fuel, a robot may become irreparable, and certainly won't be able to reproduce itself.

Buying and Selling Robots

Trade in robots and robot parts becomes a big business as technology advances. A class of merchants develops to conduct this trade. These brokers combine business savvy with technical know-how to buy used robots, repair them to salable condition, and sell them in groups or singly. In many respects, robot brokers are similar to vehicle dealers.

Two factors change the purchase of robots from the purchase of other machinery. First, robots can provide their potential owners with information about themselves: these reports are somewhat like the "self-test" functions available on many computers and printers. Potential buyers view with suspicion a robot broker who won't allow a potential buyer to examine a robot and question it this way (either verbally or through a socket adapter). As a result of these self-tests, a robot can inform a buyer about its construction, accidents, previous service record, upgrades, legal status, software modifications, system malfunctions, and maintenance schedules. As long as the buyer remembers to ask, the robot can provide plenty of information. Circumventing the hardware and software safeguards built around the robot system that contains this information is usually more trouble than it is worth, though some brokers do get away with it, just as some car dealers turn back odometers and put sawdust in failing transmissions.

Second, a robot broker can do exactly the same thing to a hero seeking to sell a robot. It's very difficult to sell a stolen robot as anything more than parts, and the value of parts is almost always much less than the value of a connected, functioning, reliably constructed robot. If the robot's memory cores are still available in the scrap parts, a hero seeking to sell stolen robot parts may still be in trouble. In many cases, a robot's last memory will clearly be of its own dismemberment by a hostile group of pirate heroes.

Any honorable broker will report stolen property to local police, but some brokers aren't that fussy, replacing a stolen robot's memory and neural cores with cores taken from some other robot. The resulting patchwork robot can tell its prospective owners that it was totaled and rebuilt, but it won't be able to say that the rebuilt chassis was stolen, since a technician rebuilt the robot while its sensory inputs were not functioning.

Creating a Robot

Players and Gamemasters alike may find that robots may add an interesting dimension to their campaigns. The *Player's Handbook* provides basic information on robots in *Chapter 10: Computers*. The material in this chapter expands that information greatly, allowing players and Gamemasters to create robots for their campaigns.

Robot Heroes

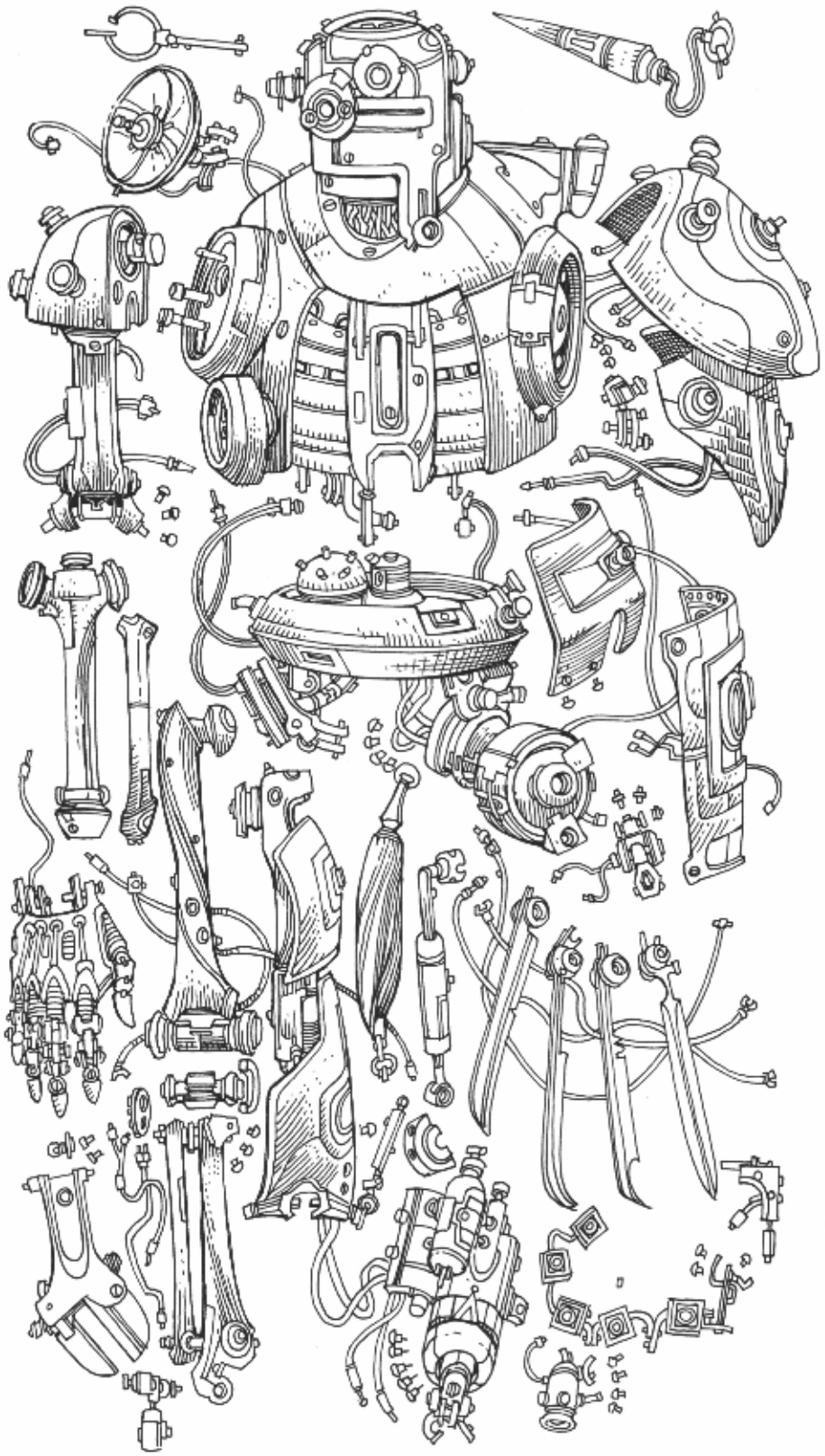
Players may wish to create their own robot heroes. The following information allows players to create robots as heroes. Players who wish to create robot heroes probably should do so only if their campaign is at PL 7 or higher. Although it is possible to create such a character at PL 6, robots are still primarily machines at that level of technology. At PL 7 and higher, players should be able to create a robot hero who is able to specialize as much as a biological hero would.

Creating a robot hero is slightly more complex than generating a standard human or alien character. If the Gamemaster allows robots in his campaign, use the rules provided in the *Player's Handbook* with the changes provided in this section and on the Robot Hero Record Sheet provided on page 94. The Robot Hero Record Sheet lists all broad and specialty skills available to the robot hero. Any skills not listed are not available. Robots must pay the full cost for all skills except general skills (unless otherwise noted in the text below).

Robots do not choose careers, but they may choose a standard function, which indicates what role the robot fulfills. Whether the robot hero still fulfills that function is up to the player. This chapter also includes a variety of standard models at various Progress Levels for the Gamemaster's use or for players who want to see examples of what some typical robots look like at various Progress Levels.

If a player wishes to create a robot hero, he gets 50 points to divide among five Ability Scores (the robot's processor determines Intelligence). The robot's Ability Scores must fall within the range of the minimums and maximums provided in Table D17: Robot Ability Score Limits.

Every robot hero starts the game with a number of Skill Points determined by its Intelligence to spend on skills and robot parts. All robot heroes begin with the Armor Operation, Stamina, Computer Science, Knowledge and System Operation broad skills. Note that the Armor Operation skill generally does not involve wearing armor; rather, it deals with the ability of the robot to move while bearing some of the heavier casings. The principal requirement for a robot to bear these heavier armors is an improved power-to-mass ratio; the Armor Operation skill prevents the robot from suffering too severe a movement penalty. Robots must be at least PL 6 to acquire Intelligence-based specialty skills or Willpower- or Personality-based broad



skills. Robots must be at least PL 7 to take any Willpower- or Personality-based specialty skills.

A robot hero may purchase no more than six modifications from the Robot Parts list at the start of his career; he must spend the remaining points on skills. TABLE D19: CUSTOM ROBOT PARTS provides a list of basic modifications, arranged by Progress Level; additional parts may be available at the Gamemaster's discretion. Players must purchase all robot parts with skill points, just as if they were regular skills (though with no additional ranks). If a robot hero does not purchase a modification in a given category, it has the default equipment from that category, (indicated by a Skill Point/$ cost of —/0). Modifications that indicate negative numbers in the Skill Point cost are modifications that make the robot weaker in some way. These disadvantageous modifications provide the robot hero with the indicated number of additional Skill Points to spend on either parts or skills, but they still count toward the robot's limit of six modifications. Self-aware robot heroes gain skill points exactly as do other heroes. This information is in Chapter 8 of the *Player's Handbook*.

Determine attributes, durability, and combat movement normally for robot heroes. Robots with gravitics gain flying movement automatically. Robots with tracks or legs move normally; wheeled robots gain a +25% bonus to movement on flat, level ground, but lose 25% in rough terrain and cannot negotiate difficult terrain at all (GM discretion). Robots cannot swim at all unless they take the Movement–*swimming* specialty skill and possess floats and aquatic propulsion of some type.

Robots never gain Last Resort points. Determine the robot's action check score and actions per round using TABLE D18: COMBINED ROBOT HARDWARE.

Finally, determine the robot's perks, flaws, and ownership status. A robot hero may gain up to three Perks and three Flaws from the Robot Perk and Flaw sections (pages 76 to 79). The default ownership status is that a hero or supporting cast member owns the robot, but a robot hero may purchase the Emancipated perk for 4 points.

Robots with manipulator arms can use either arm equally well. In effect, they are ambidextrous. Robots are not able to conduct multiple actions in the same phase without penalty, however, as they are not able to learn the *multitask* specialty skill that an AI can learn. Their ambidexterity simply allows them to use either "arm" equally well.

A robot hero begins the game with the standard parts from the parts table (servo actuators, an Ordinary processor, tracks, video sensors in a standard casing) and whatever skill software they require. The owner must provide any and all other equipment (if the robot is indentured) or the robot itself must acquire it, using the Tech Op category of TABLE P30: MONEY ON HAND (if it is Emancipated).

Supporting Cast Robots

Supporting cast robots, like animals and aliens, do not always follow the same rules as do robot heroes. Robots fulfill a specific function. That function may require a number of specific subsystems greater than that allowed to starting robot heroes. An industrial robot, for example, might have more than six individual parts or subsystems, all of which are necessary for it to perform its job. Supporting cast robots do not gain the automatic broad skills listed for robot heroes. The Gamemaster determines their Ability Scores as necessary; they do not get (nor are they limited to) the 50 points to distribute among their Ability Scores. They must still choose their broad and specialty skills from those allowed a robot hero, including those allowed by Progress Level (see Creating a Robot Hero, above).

TABLE D17: ROBOT HERO ABILITY SCORE LIMITS

PL	STR	DEX	CON	INT	WIL	PER
5	7–14	1–6	7–14	—	1–6	1–4
6	5–16	3–8	5–16	—	2–8	2–6
7	3–18	5–12	3–18	—	3–10	3–8
8	3–20	5–16	3–20	—	4–13	4–11

Robot Systems

Robots must have four core systems that interact to allow the robot to act on its environment: sensors, processors, software, and actuators. To hold these systems together, each robot has a chassis, just as a living creature has a skeleton or exoskeleton. Most robots also have a propulsion system, data ports, and specialized tools. Heavy-duty robots may also have armor to protect them from bumps, from the hazards of their environment, or even from a full-scale assault.

In general, robot parts cost about the same as standard hero's gear of an equivalent function for most electronic goods. For other systems, such as armor or weapons, the robot equivalent costs 50% to 100% more than usual, because of the extra chips, actuators, and modifications required to integrate it into the robot's frame and processors.

Processors

Robot processors are the brains of any robot hero, responsible for organizing incoming information and sending out signals to subsystems.

The robot's processor determines its active memory slots, its maximum rank in any given skill, its base action check modifier, its Intelligence Ability Score, and (when combined with Dexterity) its action check score. TABLE D18: COMBINED ROBOT HARDWARE lists all of these features of the processor.

Programs

A robot's skills are ultimately programs; they are learned behavior that the robot has condensed into a set of optimized movements and responses. These skill-programs follow a standard set of rules. All robots come equipped with the robot operating system software, which allows them to perform the most basic of functions. The software handles memory, movement, mapping and navigation, object identification, power regulation, language, voice recognition, and communication. It maps its surroundings and charts a path; more importantly, it generates an abstract model of the world complex enough to allow the robot to make choices. The robot's operating system (OS) requires one active memory slot to run.

The robot OS manages all of these functions through a programmed learning algorithm that allows conditioning to affect future decisions. This learning function, when combined with an inventory of past solutions

TABLE D18: COMBINED ROBOT HARDWARE

Processor Quality	Active Memory	Max. Rank	Situation Die Modifier	Actions per Round/Action Check Dexterity INT	1–5	6–10	11–15	16+
PL 5								
Marginal	2	–	+d12	6	1/2	1/4	1/6	1/8
Ordinary	3	1	+d8	7	1/7	1/9	1/11	2/13
Good	5	3	+d6	8	1/8	2/10	2/12	3/14
Amazing	7	5	+d4	9	1/9	2/11	3/13	3/15
PL 6								
Marginal	3	1	+d8	8	1/6	1/8	2/10	3/12
Ordinary	5	3	+d6	9	1/7	2/9	3/11	3/13
Good	7	5	+d4	10	1/8	3/10	3/12	4/14
Amazing	9	7	+d0	11	2/9	3/11	4/13	4/15
PL 7								
Marginal	4	2	+d6	12	1/10	1/12	2/14	3/16
Ordinary	7	5	+d4	13	1/11	2/13	3/15	3/17
Good	10	8	+d0	14	2/12	3/14	3/16	4/18
Amazing	13	11	–d4	15	2/13	3/15	4/17	4/19
PL 8								
Marginal	7	5	+d4	12	1/14	1/16	2/18	3/19
Ordinary	10	8	+d0	14	1/15	2/17	3/19	3/21*
Good	15	12	–d4	15	2/16	3/18	3/20*	4/22*
Amazing	18	12	–d6	16	2/17	3/19	4/21*	4/24*

and their results, makes the robot intelligent. While intelligence makes the robot quite clever, intelligence is not the same as consciousness. The minds generated by a robot OS are not self-aware until PL 8, when portable AI technology is small enough to fit into a robot chassis.

In addition to their operating system, they must devote active memory slots to their broad skills and specialty skills that they are using at any given time. A broad skill simply uses a single slot. A specialty skill uses more active memory the more refined the skill is. Each skill rank requires an additional active slot. Thus, a robot with just 4 active slots could never possess a skill beyond skill rank 2; it needs one slot for its OS and one for the associated broad skill, leaving only two for specialty skill processing.

It's possible to load only part of a specialty skill program into a robot to leave memory available for other programs; for instance, a robot with the Demolitions–*disarm* 6 program can use a reduced version, such as *disarm* 3, and then use other memory slots for different programs.

Power Sources

Propulsion is the biggest power drain on almost all robots. When moving or levitating at marching speeds overland, a PL 6 robot drains its lanthanide batteries completely in 48 hours. At PL 7 and higher, robots over 50 cm tall depend on internal mass reactors, which are essentially self-sufficient, needing only regular maintenance to keep the robot running. However, these reactors are a significant weight; the end result is that robots aren't any lighter when they shed their batteries in exchange for power plants. Smaller robots still require batteries until PL 8, when the mass reactor is finally miniaturized to the point where it can be put in a robot of any size

In zero-gravity, gravitics and legs are the most effective forms of movement, but some space societies build their robots with up to six legs, each pointed in a different direction. This allows a wheeled robot to move down a zero-g hall, by bracing itself against at least four walls, and using friction between its wheels and the walls to move up, down and sideways.

Actuators

Actuators are the mechanical systems that move a robot's sensors, tools, limbs, communications dishes, and so on into position. Without them, the only thing a robot can move is itself, using its propulsion system. The actuators are its limbs and ligaments, moving its camera eyes, tools, and manipulators.

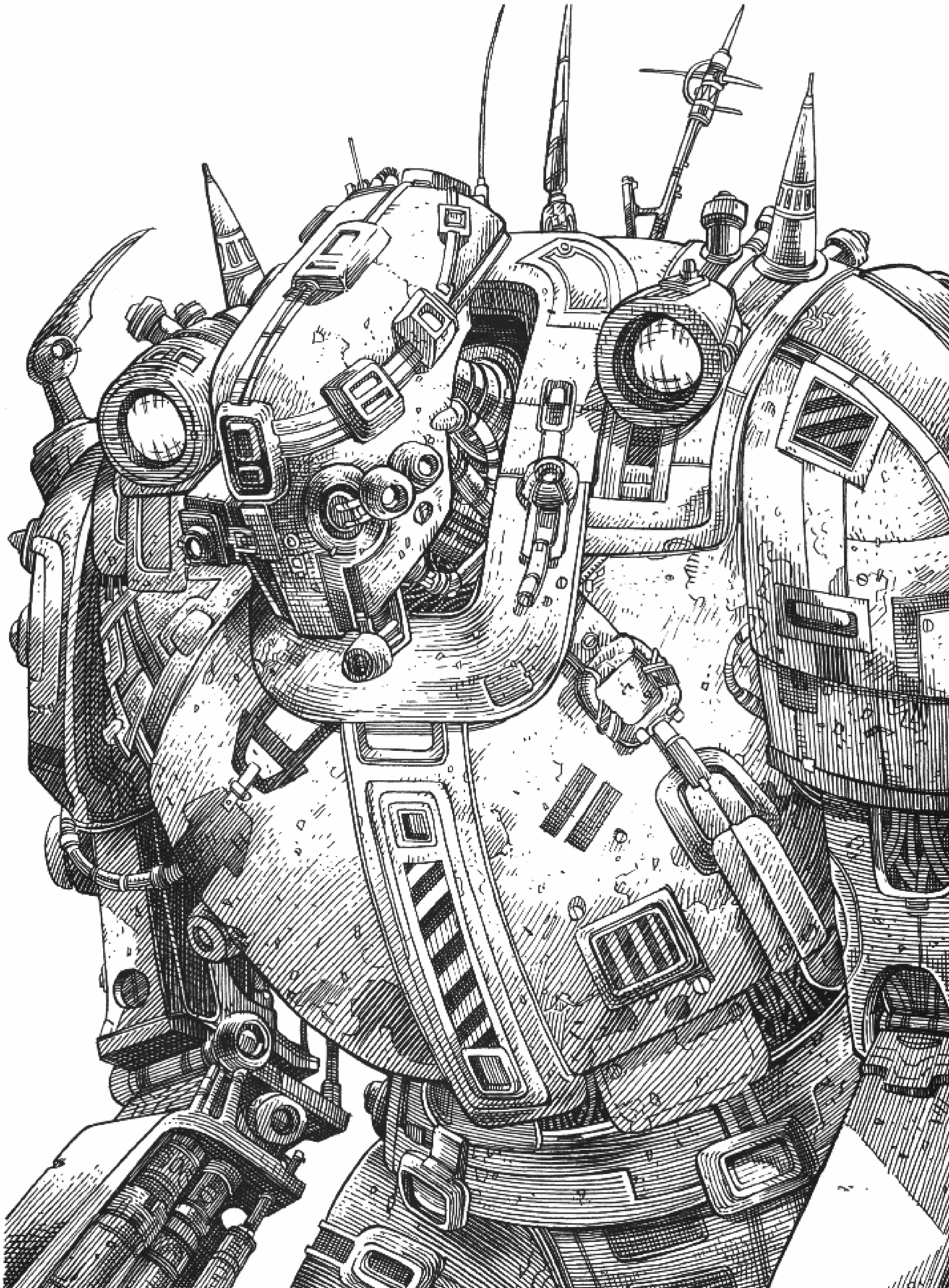
Aleeran: These systems superficially resemble muscle wire, but allow both more strength and more fine motor control.

Aleeran actuators are closely related to cybermuscular systems, and a cybernetics-qualified surgeon (Medical Science–*surgery* 6 or better) can repair all such actuators.

Hydraulic: These heavy-duty systems are extremely powerful, able to lift or move vast weights. They are also slow and relatively large, compared to similar systems used for robot motion. Because they rely on fluids to move the robot's parts, hydraulic actuator systems are susceptible to leaks, overheating, and freezing. Generally, these systems are for industrial and military uses that require power rather than speed. Even when conditioned for extremely cold temperatures through the use of anti-freeze, they can't operate in vacuum or on planets with surface temperatures below about –10° C.

Muscle Wire: These special wire bundles use shape memory materials to flex, thus deforming metal wires in a specific way, moving the limb. When a current runs through it, the wire heats, hardens, and returns to its original state.

Pneumatic: Like hydraulic systems, pneumatic systems depend on varying pressure to move a robot's arms



and tools. However, these systems use air pressure instead of liquid pressure to create those motions. While this doesn't allow a pneumatic system to generate as much force for extended periods of time, it does allow for quicker reactions than a hydraulic system and smoother, more reliable motion than an electromotor servo system.

Servo: These small motors operate in conjunction with cables to move a robot's parts. Since a typical robot has a separate servomotor connected to each end of a cable, losing one servo doesn't mean the loss of all ability to move, just a portion, like a human with an injured tendon.

T'san Electromotors: Wonders of miniaturization, these motors do not require cables as servos do. Their powerful torque and reliable functioning mean that they are simply placed at each joint or swivel where they are needed. They are very well built but expensive.

Casing

Many if not most robots are completely unarmored, but to protect the investment that a robot represents sometimes requires adapting human and alien armors to encase a robot for hazardous duty. Most armor types listed on TABLE D19: CUSTOM ROBOT PARTS have exact parallels in the *Player's Handbook*. Those that don't are described here.

A robot without Armor Operation–*powered* or Armor Operation–*combat* still suffers the normal penalties to its action check, as described in the AP column of P41: ARMOR in the *Player's Handbook*, if outfitted with heavy armor. However, robots do not pay the full cost when purchasing these skills; that is, all robots can purchase the *combat armor* and *powered armor* specialty skills as if they were Combat Specs.

All of the casings listed in TABLE D19: CUSTOM ROBOT PARTS provide water resistance and weatherproofing (robots with no casing do not gain this benefit). This protects them from the effects of wet weather and dust particles, but immersion in water or excessive dust storms may damage the robot (see TABLE D25: SPECIAL ROBOT DAMAGE on page 80).

Casing, Standard: A standard robot casing is a sheet of thin metal, usually enameled or varnished to protect it from rust. While it is tougher than human skin, most high-impact weapons and many melee weapons readily puncture it.

Flickercladding: This colorful armor actually serves two purposes. When in its freeform mode, it translates the digital processes controlling the robot's motion and thought into colorful display all over its body—a sort of robot tattoo that stays constantly in motion. When in its protective mode, it provides constantly upgrading camouflage.

Neutronite: Neutronite is the ultradense material used to build body tanks; a robot armored with neutronite suffers a +5 step penalty to its action check unless it has Armor Operation–*powered armor*. Even with the proper software skills, the robot suffers a –25% penalty to its movement rates. The benefit of all that extra mass is that the robot's toughness increases from Ordinary to Good. Any weapon that doesn't inflict at least Good-level damage has its damage degraded. Neutronite provides any robot with phenomenal protection.

Neutronite is usually reserved for military-spec robots. Buying it on the black market requires excellent illicit business connections and still costs triple the listed costs.

Photocells: By covering a robot with electric photocells, its power consumption can be partly offset. A robot covered in photocells only needs access to a power supply once every 30 days when provided with earth-luminosity sunlight for at least 12 hours a day. After PL 7, photocells become redundant because of the introduction of portable mass reactors as power sources.

Chassis

The chassis is the skeleton or framework that holds all the robot's parts together, and keeps them together under adverse conditions of heat, cold, vacuum, gunfire, and so on. The size of the chassis provides a basic measurement of the robot's durability. Robots come in different sizes, but both miniaturization and gargantuanism have their problems. Smaller robots can sustain less damage than larger ones. The problem isn't so much that they have less structural integrity than larger robots (small robots can be quite resilient), but rather that any given hit on a small robot is more likely to damage multiple systems. Small robots' CON limits reflect this.

Large robots suffer other problems, primarily an inability to enter buildings, rooms, or doors built to suit smaller creatures. Some heavily armored robots also weigh so much as to be unwieldy. For these reasons, robots over 3 m tall or long is the largest category available to robot heroes, and this category includes robots no larger than 4 or 5 m tall or long. Certainly larger robots exist, but they are simply too unwieldy to make good heroes.

Data Ports

Robots can speak to other robots in digital form using their built-in vocalizers, but more often they speak to control systems, ship systems, or even gridrunning heroes via other interfaces. The most common and readily available data ports are described here.

Telepresence Link: A telepresence link indicates that the robot serves as a remote sensor for an outside observer. This system includes the sort of link that an AI would use to control one of its remotes or that a person might use to operate a waldo. Biological heroes may also make use of such a link to see what a robot sees through telepresence; the robot serves as a host body to a human in this case. A robot with the Emancipated perk may choose not to serve as a telepresence link if such a use goes counter to its own interests or desires.

Encrypted: An encryption module works with any data port to provide secure communications between a robot and digital receivers of all kinds. Unless the receiver also has an encryption/decryption module, however, the robot cannot communicate with it.

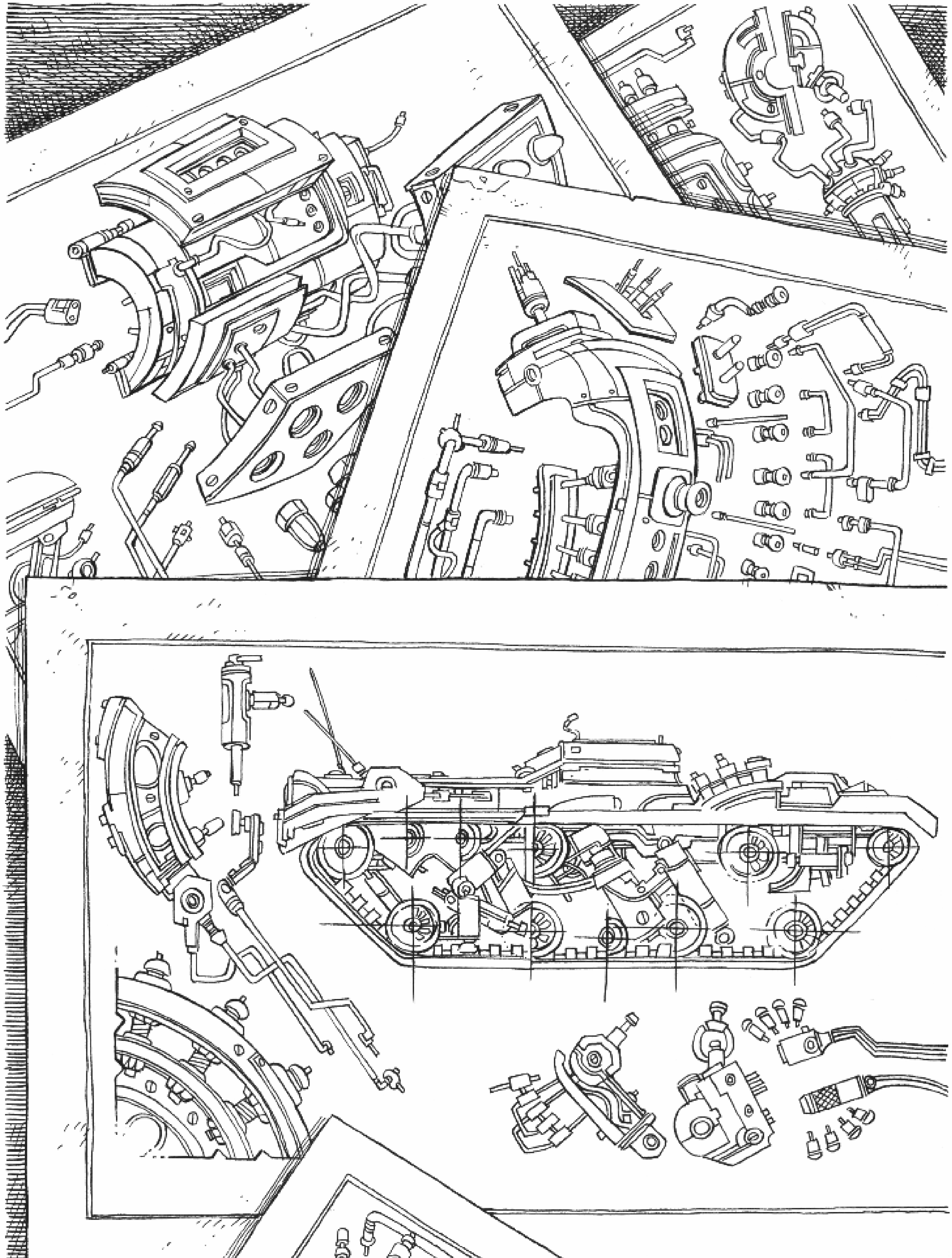
Socket: A standard link useful for hooking into any local Grid. As long as there is a matching adapter, the socket can plug into the Grid just as a human might use an NIJack for the same purpose. A socket is a two-way device; a mechanic or roboticist also uses it to examine the status of the robot's internal systems and software.

Uplink: An uplink is a small radio dish that allows the robot to communicate at orbital distances (with an airplane or spaceship far overhead, for instance). The robot can also listen in on uncoded voice and data traffic on open frequencies using the System Operation–*communications* skill.

Wireless: A wireless data port allows a robot to speak to a single central point, often a company dispatcher, a mining boss, or a military officer, or to a local communications network or Grid. The wireless is effectively a built-in comm link.

Manipulators and Tools

Some people consider robots themselves little more than clever tools, but in fact robots are helpless without the proper manipulators, tool feedback sensors, and other devices. Here's a



sampling of the tools that robots most frequently possess.

Claw: The standard robotic manipulator can pick up small objects, lift them, and turn them, but that's about it.

Hand: This is much more useful than the standard claw manipulator, especially if it has a tactile sensor array, which allows it a greater range of control. If the hand is similar in size to that of an adult human, the robot is able to use the same sorts of tools that a human could.

Toolset: Complete with wrenches, screwdrivers, hammers, and other basic tools, this manipulator allows the robot to take apart mechanical systems and put them back together.

Professional Tools: A robot can have a standard professional tool kit (described in the *Player's Handbook*), specialty gauntlet, or other equipment unique to a profession or career at the Gamemaster's discretion. Of course, the fact that the robot carries these tools around everywhere also makes them liable to destruction whenever the robot hero suffers mortal damage.

Typical tools include socket wrenches, arc welders, jackhammers, fog lights, bullhorns, screwdrivers, bolt cutters, pruning tools, chainsaws, diamond-tipped drills, measuring devices, laser levels, electrical meters, phone jacks, power cords, generators, magnetic compasses, watering hoses, pumps, fire extinguishers, electromagnetic boots, ropes, nail guns, pry bars, or flamethrowers. Basically, a robot can use any tool the Gamemaster allows.

Propulsion

The simplest and most practical forms of locomotion are wheels, tracks, and gravitics (when available). *Wheels* are the fastest system on land, but require smooth ground and shallow grades. *Tracks* provide relatively slow land movement but offer the advantage of allowing the robot to handle more difficult terrain. *Gravitics* allow the robot to fly over all obstacles, but they have high energy requirements fulfilled only by miniaturized fusion generators or other such power sources. In addition, although gravitics are both practical and effective, they are expensive to install. Even when gravitics are easily available, making them part of a robot can easily double its cost.

Robot *legs* are primarily an indulgence to make humans feel more comfortable with their robots, though they also serve well when crossing difficult terrain. Most people relate better to robots with a humanoid form, and thus legged robots remain popular. The two-legged systems require at least an Ordinary processor, since walking on two legs requires constantly maintaining a balance of forces. Since a two-legged robot is not statically stable, many four or six-legged walkers are also available. These are more stable but are not as visually appealing, and so are usually reserved for robots whose appearance is not a factor.

The *pentapod* system is one of a number of attempts to provide a way for a robot to cover rough terrain without being limited by tracks or legs. By combining wheels with legs, the pentapod system overcomes some of the difficulties associated with legs or wheels on their own. Each of the robot's five telescoping legs has a wheel at the bottom. It operates on its wheels under normal conditions, moving faster than a robot on legs alone and consuming less energy. When in rough terrain, the robot lifts its front leg(s) over an obstacle, then moves forward on the remaining legs. When the remaining legs hit the obstacle, it lowers the front legs, lifts the blocked leg, and moves forward. Eventually, all the legs are on or over the obstacle. While it may be a slow way to get over a rock, barrier, or stairs, the robot is never in any danger of tipping over, since the system is statically stable, even when two legs are off the ground.

Other, rarer forms of propulsion include maneuvering thrusters for zero-g environments, hydrojets for marine movement, jets or gyrocopters for aerial movement, or even system drive engines for asteroid mining robots. This supplement does not address any of these here, as they are not useful in the wide variety of environments that robot heroes can expect to meet. A Gamemaster who wishes to add such robots to his campaign can assume that these systems cost about as much gravitics to install.

Sensors

A robot only knows as much about the world as its sensors can tell it, and for many robots, its senses are limited to sight and sound. However, a robot can combine multiple sensors—many of them measuring inputs completely invisible to a biological organism—as long as it has enough processor power. Any robot with a Marginal processor can use just one sensor at a time. Any Ordinary processor can handle two inputs at once, and a good processor can handle three. An Amazing processor can collate the information from as many as five sensors at once.

Chemical Sniffer: This device detects and analyzes volatile chemical compounds; that is, it can detect anything that evaporates or that has a distinct smell. However, since it operates on a mechanical basis rather than a biological one, it isn't as attuned to some smells, and much more sensitive to others. For instance, a roboticist can set a chemical sniffer to detect the presence of drugs, or petroleum, or explosives—but any such fine-tuning leaves it unable to sense other chemicals. In any case, the chemical sniffer can either grant three bonus skill ranks to the robot's Awareness–*perception* score with respect to a particular type of chemical, or one rank to the skill for a wider range of chemicals.

GPS: Global positioning sensors use signals from geosynchronous satellites to determine, within a few meters, exactly where on a planet the GPS device is. Since these systems only function on planets with a well-developed satellite system, they are more common on Terra and its most developed colonies than on the frontiers of space.

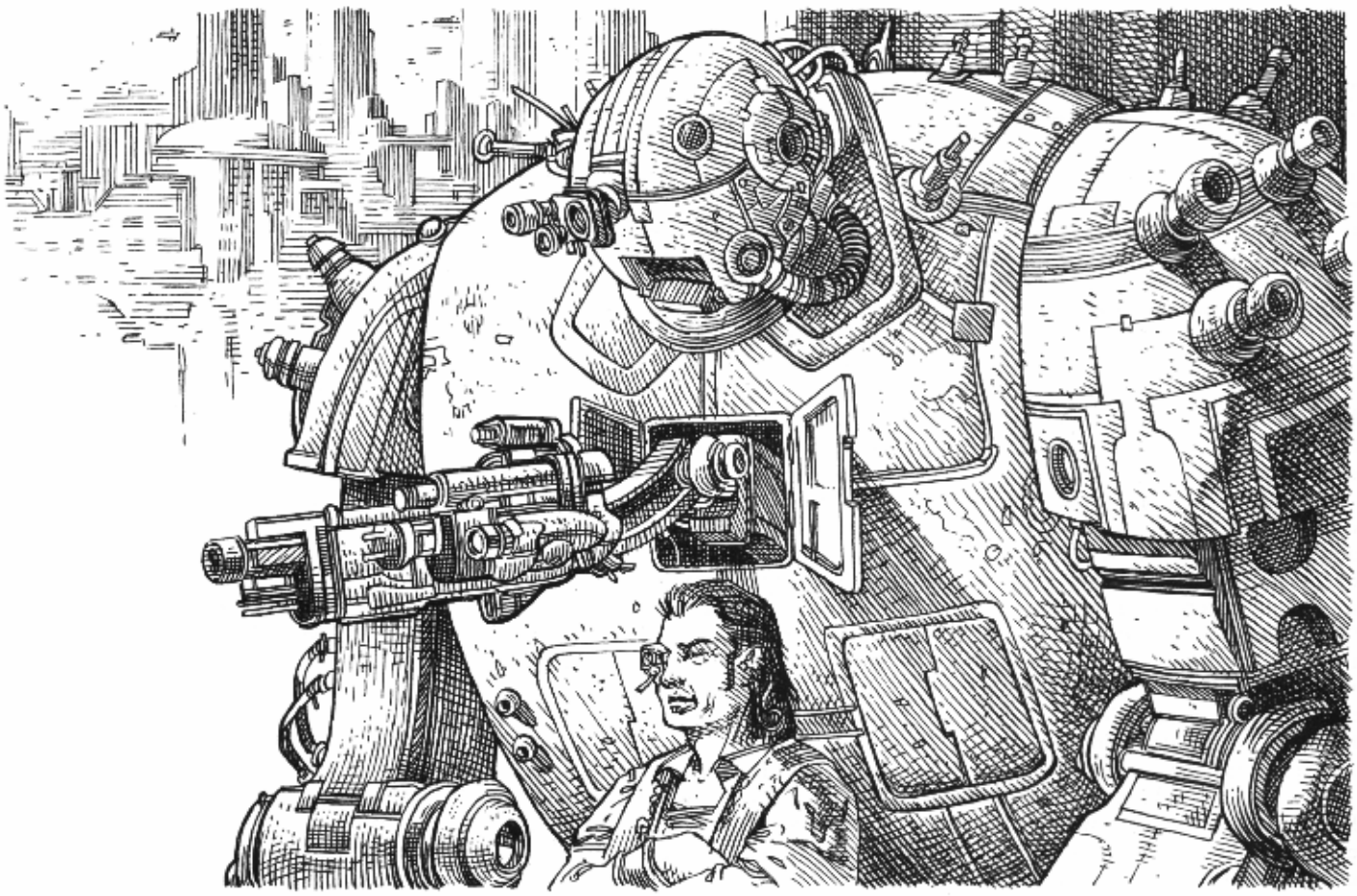
Gravitic: This sensor can measure the fluctuations in gravitational fields caused by gravitic inducers at a distance of up to 1 km for small inducers, such as those produced by robots or skycars. The robot can detect larger craft, such as space-to-ground shuttles or sky tanks, up to 5 km away, and spaceships with system drives up to 25 km away.

Holo: Any robot with a holo sensor gains excellent 3D imaging capabilities, but it must have the two lenses mounted at least 40 cm apart for accurate imaging to 5 m, and as much as 2 m for accurate depth perception to a distance of 30 m.

IR Sensors: IR sensors simply allow a robot to measure heat, thus detecting vehicles, warm-blooded species, machines, and other heat sources in the dark. These sensors are usually quite small, and are often built into a robot's casing.

Life Recorder: This device hooks up to any form of sensor to create a continuous record of everything the robot sees and hears. All of this data goes directly onto a 3D or X3D crystal, which the robot or someone else can remove and store at the end of a day. Robots without this device record detailed impressions only for short-term use, then compress the data when it is no longer immediately needed, much like human memory.

Metal Detector: This sensor uses disturbances in magnetic fields to de-



tect the presence of any metal, from ferrous metals such as neutronite, cerametal, iron alloys, and steel to nonferrous metals such as gold, bronze, or copper. It detects anything as small as a bullet or even a pin within a 2 m distance. Metal detectors usually involve a large ring-shaped or circular detecting electromagnet.

Motion Sensors: These devices sense motion within about a 10 m radius of the robot, making it impossible for others to achieve surprise in close-combat situations.

Rangefinder: This surface-scan radar identifies moving objects out to the horizon. At PL 7, it is equivalent to a radar gauntlet.

Sonar: This sensor system is a simple ring of several ultrasonic emitters and receivers, roughly resembling a series of smaller speaker boxes. The sensor sends out pulses of ultrasound, and their reflections provide a map of the area around the robot. A robot with sonar can see in the dark using its echolocation sense, but it cannot read written text, view paintings, or watch activity through a monitor or viewscreeen—because all those forms of vision simply appear as flat surfaces to sonar.

Tactile: Tactile sensors allow a robot to receive sense-of-touch feedback (called haptics by roboticists). This allows fine manipulation, necessary for such delicate tasks as surgery, detailed repairs, and demolitions work. The array consists of a series of sensors placed along the robot's frame (especially the fingers). These sensors provide a continual stream of information to the central processor, which orders corrections to the sensor as needed.

Vehicle-Mount Systems: This is actually a category of different sensor systems that best suits robots that are essentially brains within vehicle chassis. They are too large for most robots, but they might be appropriate for robotic vehicles, probe droids, and other such larger robots. From Table G28: Vehicular Accessories on page 128 of the *Gamemaster Guide*, these systems might include an ECM pod, the EM detector, the IR detector (which would possess longer range that that given by the robotic IR sensor), radar, sonar (also capable of longer range than its smaller cousin), thermal imager, and a video scanner. The power and sensitivity of these sensing systems enhance the capability of larger robots considerably. Count each system separately when totaling skill and monetary costs. See the table in the *Gamemaster Guide* to determine financial costs.

Video: The basic input device until holo sensors become cheap and plentiful at PL 7, video provides a robot with a flat, perspectiveless view of its surroundings. Special software included in the robot OS processes these images into a three-dimensional view of the robot's surroundings, though holograms, camouflage, and even paintings can occasionally fool it into misinterpreting what is really in front of it.

Determining Weight

Robots are much heavier than most heroes, to the point that they can rarely move stealthily through any natural terrain. Simple humanoid robots of PL 5 and 6 can easily weigh 300 kilograms or more, double of the weight of an adult weren.

To gauge of a robot's approximate total weight, add up the weight value of its component parts as given in Table D19: Custom Robot Parts. Then reference that value here and either choose a mass from the range given, or roll dice to determine it.

TABLE D19: CUSTOM ROBOT PARTS

	PL	Cost (SP)	Cost ($)	Weight Value	Ability Min/Max			Other Notes
Processors					INT	WIL	PER	
Marginal	-	-3	500	0	4/10	2/8	2/6	
Ordinary	-	—	2,000	0	4/12	3/9	4/7	
Good	-	5	4,000	0	8/14	6/10	5/8	
Amazing	-	10	10K	0	10/18	8/13	7/11	
Actuators					STR	DEX		
Aleeran	6	4	4,000	1	8–14	4–9		
Hydraulic	5	3	2,000	4	12–18	2–7		
Muscle wire	6	-3	0	1	2–6	8–12		
Pneumatic	5	2	1,000	1	2–8	6–12		
Servo	5	—	0	3	4–10	6–10		
T'sa electromotor	6	3	2,000	2	6–12	8–12		
Casing								vs. LI/HI/En
Ablative	6	5	5000	4				d4/d4/d4+4
Assault	6	2	2000	1				d6–1/d6/d6–1
Attack	6	4	4000	3				d4+1/d6+1/d6–1
Battle	6	3	3000	2				d6–1/d4+1/d4–1
Carbonate fiber	6	1	1000	1				d4/d4/d6–2
Cerametal	7	7	2000	4				d6+1/d8+1/d6
Deflector	7	3	2500	1				as deflection harness
Displacement	8	8	7500	1				as displacer softsuit
Flickercladding	8	10	10K	2				as stealth softsuit
Kevlar	5	1	600	1				d6–3/d6–2/d4–2
Nanofluidic	8	35	75K	15				2d4+1/2d4+1/2d4
*Neutronite, heavy**	7	50	400K	40				2d6+1/2d6+1/2d6
Neutronite, light	7	15	35K	25				2d4/2d4/d6+2
Neutronite, moderate	7	30	100K	30				2d4+1/2d4+1/2d4
None	5	-2	0	0				None
Photocell	5	4	2000	1				d4–2/d4–2/d4, meets power needs
Standard	5	—	0	1				d4–2/d4–2/d4–3

All armors listed in *italics* are military-grade. Only military robots may legally bear these. They cost five times the usual price for nonmilitary purchases on the black market.

Neutronite armor grants Good toughness to any robot fortunate enough to be equipped with it. This degrades all damage caused by Ordinary damage weapons by one category. Thus a 5M6 would inflict stun damage instead of wounds. Weapons that inflict Good or better damage inflict damage through neutronite normally.

*Heavy Neutronite armor requires a 2m chassis and hydraulic actuators, or the robot simply can't move the armor's added weight under 0.5g or higher.

Chassis Height/Length					CON	
Under 10 cm	7	-4	400	1	3–8	Easily kicked
11 to 50 cm	6	-2	500	2	4–11	Small enough to carry
51 cm to 1 m	5	-1	1000	4	5–12	
1 m to 2 m	5	—	3K	8	6–14	
2 m to 3 m	5	2	6K	16	7–15	Too big for doors
Over 3 m	5	4	10K	32	8–16	Too big for hallways
Data Ports						
Telepresence Link	6	-2	—	0		
Encrypted	5	1	200	0		
Socket	6	1	50	0		
Uplink	6	2	100	1		Wired into comm net
Wireless	5	—	—	0		
Manipulators						
Claw	5	—	0	2		
Hand	5	1	300	2		
Toolset	5	2	varies	1–8		
Professional Tools	5	2 ea.	varies	1–10		
Propulsion					DEX	
Legs	5	3	4,000	8	5–10	
Gravitic	7	9	20K	7	7–10	Flight
Tracks	5	—	—	12	2–8	
Pentapod	5	2	3,000	9	4–8	
Wheels	5	-2	75	5	2–6	
Sensors & Imaging						
Chemical Sniffer	5	1	900	1		Detect volatile chemicals to 10 m
GPS	5	3	150	0		-3 step bonus to Navigation
Gravitic	8	3	2,000	3		Detect gravitics to 100 km
Holo	7	2	1200	1		Normal depth perception
IR sensor	5	2	300	2		Heat vision to 100 m
Life Recorder	6	1	400	1		Perfect sensory recordings
Metal detector	5	1	100	1		Find ferrous metals to 2 m
Motion sensor	5	2	400	1		-1 step bonus to surprise roll
Pickup/voicebox	4	—	40	—		Basic hearing and speech
Rangefinder	5	5	1000	2		-1 step bonus to Rng Wpn checks
Sonar	6	4	900	2		Night vision to 40 m
Tactile	6	5	1200	1		Allows fine manipulation
Vehicle-Mount	5+	5+	varies	varies		See Table G28 (pg. 128) in the *GM6* for more info
Video	5	—	500	1		+1 penalty to all Rng Wpn checks

TABLE D20: ROBOT MASS

Weight Value	Mass (kg)	Die Roll
0–5	2–8	2d4
6–10	9–20	8+d12
11–15	21–40	20+d20
16–20	41–120	40+d80
21–30	121–200	120+d80
31–40	201–400	100+d200
41–50	401–600	400+d200
51–60	601–1,000	600+d400
61–70	1,001–3,000	1,000+d2000
70+	3,001–10,000	3,000+d8000

If you choose to use dice to determine a robot's weight rather than assigning it a value, you'll notice some unusual die rolls being called for. Generate the d80, d200, d400, and so on are generated by rolling regular dice and multiplying by 10. For instance, a d80 could simply be a d8 multiplied by 10.

ROBOT PERKS & FLAWS

Like other heroes, robots can choose up to three perks and three flaws when the hero is first created, and the robot hero can remove the flaws later by spending additional achievement points.

Perks and flaws marked with an asterisk (*) are from the *Player's Handbook*. See that volume for a complete description of those perks and flaws. This chapter describes all the new, robot-only flaws. The use of *italics* denotes perks that the player must select at the time of character creation if he is going to purchase them at all.

Perk Descriptions

The robot hero may add only certain perks after he has created the robot hero. Italics indicate the perks that the player must choose at the time of the hero's creation.

Detachable System

Cost 3, CON, Conscious
The robot has a special wireless relay connecting one of its component parts to its central processor, allowing it to detach the part and still use it normally. Each time the hero takes this perk, one additional part gains a wireless relay. Hands, weapons, sensors, and any other subsystem approved by the Gamemaster can become detachable. The robot must have a wireless data port in order to make use of this perk.

Emancipated

Cost 5, PER, Active
An emancipated robot is no longer the property of an owner, but is theoretically a free sentient able to conduct its affairs with the full protection of the law. In practice, many sectors of society robots still discriminate against robots, but at least an emancipated robot doesn't have to follow any more orders from above than any other hero.

There are two ways that a robot can become emancipated: It can go rogue, or its current owner can free it. Since robots of PL 6 and higher are self-coding machines, able to improve their systems and processes over time, they are also capable of overcoming the circuitry that keeps them subservient. However, some robots don't seek to overcome these limits, and even among those who do, many remain loyal to their masters. Robots that overcome their programming can go rogue; any robot hero who spends the requisite achievement points can go rogue when desired at any time after achieving level 6. The disobedient robot cannot be brought under control again without wiping its central processors clean of all its accumulated skill. Owners fit especially valuable robots with a command bolt to retain their skills and ensure their loyalty.

Owners emancipate other robots. This is rare at lower Progress Levels, but becomes increasingly common at the end of PL 7. Even if another player emancipates a robot hero, the player of the robot hero must still spend the SP to buy the perk. Until he does, the robot's circuits will remain obedient to human commands, and banks and courts will refuse to recognize the robot's new status.

Fuzzy Logic

Cost 4, PER, Conscious
The robot has more flexibility than most robots in interpreting commands and can display non-truthful behavior by making a simple Will feat check with a –1 step bonus (that is, the robot can lie through its teeth). While the robot can lie, others may not believe it. Also, the robot can't directly contradict a command from its owner or any authorized user (such as an AI remote). If a robot is clever enough, its fuzzy logic can subvert the intent of almost any order. These lies are strictly limited to verbal exchanges; the robot cannot doctor video images and data files without the necessary additional skills (such as Computer Science–*programming*).

Hidden System

Cost 4, DEX, Conscious
An important tool, sensor, or weapon

is hidden inside the robot's casing, retracted from view. The robot can deploy the item in a single phase without expending an additional action. A normal sensor scan cannot detect the hidden item. The object cannot be larger than could fit within the robot's chassis; that is, a 10 cm robot could not contain a charge pistol as a hidden system, but a 2 m robot could. A player may choose this perk more than once for his robot hero.

Language Module

Cost 6, PER, Conscious

The robot can speak and understand dozens or even hundreds of human and alien languages fluently, and can learn new languages quickly by the use of pattern matching. For all practical purposes, the robot speaks all the standard human languages and all the languages of starfaring alien races. In addition, for each 1 advancement point spent, the robot can learn a language it doesn't already have in its database. Note that it takes an action to change from one language to another (much like changing other software).

Lightweight Alloy

Cost 3, DEX, Active

The robot's chassis and major systems are made of lightweight materials, making it weight 25% less than other robots of its size and type. Add 4 points to the robot's Dexterity score for the purposes of calculating movement and action check Scores. This DEX bonus does not apply to any other purposes, such as skill checks or Ability Score feats. In addition, reduce robot's Weight Value by 25% when estimating its mass.

Memory Implants

Cost 4, PER, Active

The robot has a false memory of childhood, adolescence, and young adulthood, giving it greater emotional depth and empathy. The robot adds two to its Personality score, and may exceed the normal Personality limit for its PL. If the robot ever discovers that its memories are false, it must make a Will feat check or permanently lose 1 point of Personality.

Nanite Self-repair

Cost 4/7/10, CON, Active

The robot has a nanotechnology subsystem that repairs damaged systems in real time, making it possible for the robot to heal damage as long as it has access to sufficiently pure raw materials. At the 4 SP cost, the robot can repair wounds but requires assistance for mortal damage, just as any other hero does (it just requires the assistance of a roboticist rather than a physician). To succeed in repairing mortal damage, the robot must succeed at a Technical Science–*robotics* roll; the robot suffers a +3 step penalty if working on itself.

At the 7 SP cost, the robot can repair both wounds and mortal damage without assistance. At the 10 SP cost, the robot can repair wounds, mortal damage, and even entire systems destroyed by theft, vandalism, or special damage. The robot cannot repair destroyed subsystems without a Technical Knowledge–*robotics* roll with a +6 step penalty.

Redundant Systems

Cost 6, CON, Active

The robot's duplicate systems, extra memory buffers, and backup motors and generators provide a degree of reliability usually only found in hardened military systems. This extra redundancy means that the robot always uses one slot of its active memory (to monitor its own redundant systems), but it cannot be dazed and it never suffers knockdown checks from stun damage. Wound damage may still stun a robot with redundant systems, but the robot makes the Stamina–*endurance* check with a –3 step bonus.

Remote Backups

Cost 5, INT, Active

The robot has stored its memory in a distant location, such as the ship's computer or even in another system via drivespace relay. Every time the robot recharges its lanthanide batteries, it also downloads its memory cores. Even if the robot is completely melted down to scrap, someone can incorporate its personality and memories (minus a few days since the last backup) into a robot constructed of new parts.

Self-Editing Programming

Cost 4, INT, Conscious

The robot can change its own programming. The robot effectively shuts down while it performs this function, and a successful check allows the robot to abandon one of its existing broad skills for another. Any specialty skills gained for the jettisoned broad skill are lost as well. The robot must spend time observing the desired broad skill for it to use this ability. This takes at least one day per skill point necessary to learn the skill.

This perk is particularly useful when a robot does not possess the

TABLE D21: ROBOT PERKS

Perks	SP	Ability	PL	Type
Concentration*	3	INT	—	Conscious
Detachable System	3	CON	6	Conscious
Emancipated	5	PER	7	Active
Faith*	5	WIL	7	Conscious
Fortitude*	4	CON	—	Active
Fuzzy Logic	4	PER	7	Conscious
*Good Luck**	3	WIL	—	Conscious
*Heightened Ability**	6	Special	—	Active
Hidden System	4	DEX	—	Conscious
Language Module	6	INT	8	Conscious
Lightweight Alloy	3	DEX	—	Active
Memory Implants	4	PER	8	Active
Nanite Self-repair	4/7/10	CON	7	Active
Observant*	3	WIL	—	Active
Photo Memory*[1]	2	INT	—	Conscious
Redundant Systems	6	CON	—	Active
Reflexes*	4	DEX	—	Active
Remote Backups	5	INT	—	Active
Self-Editing Program	4	INT	6	Conscious
Superior Tech	5	CON	—	Active
Tough As Nails*	4	STR	—	Active
*Vigor**	2/3/4	CON	—	Active

[1] A robot with Photo Memory must take the Life Recorder sensor add-on for its memory to remain perfect beyond a single day's events. Otherwise, the sheer volume of data quickly becomes unmanageable.

skill points to learn a new skill normally but must do so at the behest of its employer or to perform an important task.

Superior Tech
Cost 5, CON, Active
The robot hero is a prototype or has access to advanced technology that hasn't yet reached the mainstream markets. You may choose one system rated at one PL higher than the general level of technology. If this part is destroyed, the robot cannot replace it except by using the Nanite Self-Repair perk. A successful Technical Science–*juryrig* roll gets it working again until the next failed roll using that robotic system; an Amazing success means that the juryrigged part won't fail until it suffers a Critical Failure. A failed juryrig attempt breaks the part irreparably.

Flaw Descriptions

A player may not add flaws to his robot hero after character creation. He must choose any flaws the robot suffers from when he makes the character. Some flaws are peculiar to robots with a certain minimum level of technology; TABLE D22: ROBOT FLAWS indicates this in the PL requirement column. A robot hero may remove a flaw when it reaches 6th level (see Chapter 8: Achievements in the *Player's Handbook* for details).

Asimov Circuits
+ 3 SP, WIL
The robot must sacrifice its own survival for that of the species that built it, and to prevent members of that species from coming to harm through inaction. While this seems like a noble goal in the abstract, in practice it results in robots often being diverted from their tasks by the need to play good Samaritan. In addition, it means that a robot cannot attack with lethal force and cannot permit villains of its creator species to come to harm. As a result, a robot with this flaw may often wind up arguing with or even opposing other heroes.

Command Circuitry
+4 SP, WIL
The robot hero has a command circuit, which allows anyone with a comm link and knowledge of the robot's operating frequency and passcodes to give it orders. The robot cannot disobey these orders unless they would be self-destructive; if it receives more than one order via its command circuit, it always follows the most recent instruction first.

These circuits are normally on mining and heavy industrial robots to allow a supervisor or AI overseer to keep a team of robots working together at peak efficiency. A war robot never has a command circuit, since it could allow the enemy to compromise the robot's orders.

Doublespeak
+2 SP, PER
The robot must repeat a word or phrase from every utterance. On a Critical Failure, it may stutter uncontrollably until its system restores itself (with a successful WIL feat), or it may repeat its most recent action exactly in the next action phase. A robot with this flaw suffers an additional +1 step penalty to all PER skill checks and feats.

Fragile
+4 SP, CON
A robot with the Fragile flaw is hampered by poor construction, reflected in the game as a +1 steppenalty to all Stamina–*endurance* skill checks it makes due to combat damage and a +2 steppenalty to resistance rolls for water, electricity, and other forms of environmental damage.

Fragile robots are also more difficult to repair, since their parts are often closely linked and their interdependent systems often fail in series if mistreated. Anyone without the Technical Science–*robotics* specialty skill suffers a +1 steppenalty to all repair rolls.

Honesty
+2 SP, PER
The robot cannot tell a lie, and is often compelled to tell embarrassing truths to supporting cast or heroes (such as when it rolls a failure on any Personality-based skill check). The robot is especially prone to tell the truth to authority figures, such as law enforcement officials. The robot can attempt a Will feat to lie, but a Critical Failure results in a processor overload that inflicts enough stun damage to knock the robot out for the rest of the scene.

Incomplete Coding
+2/4 SP, INT
Vital coding has been left out of the robot's core programming. It occasionally fails to understand commands—resulting in requests for clarification or restatement—or in some cases responds in a completely unpredictable way. In the most fortunate cases, the robot simply fails to respond.

+2 SP: On a Marginal result while attempting an action, the robot takes additional time to process the command, merely losing its action as it requests further input. Assuming it receives the input, it can try again on its next action. On a Critical Failure, the robot becomes stuck in a programming loop, and can take no further actions until either it makes a Will

TABLE D22: ROBOT FLAWS

Flaw	+SP	PL	Ability
Asimov Circuits	3	7	WIL
Bad Luck*	6	—	WIL
Clueless*	2/4/6	6	INT
Clumsy*	5	—	DEX
Command Cicruitry	4	7	WIL
Delicate*	3	—	STR
Doublespeak	2	6	PER
Fragile	4	—	CON
Honesty	2	7	PER
Incomplete Coding	2/4	—	INT
Inferior Tech	4	—	CON
Memory Lapse	5	—	INT
Oblivious*	4	—	WIL
Obsessed*	2/4/6	7	INT
Old Injury*	2/4/6	—	STR
Overheat	6	—	CON
Secret Orders	3	—	WIL
Short Circuit	4	—	INT
Slow*	6	—	DEX
Unarmored	2	—	CON

check, or another character makes a successful Technical Science–*repair* skill check, breaking the robot out of its command loop.

+4 SP: On a Marginal result while attempting an action, the robot executes an incorrect but essentially harmless action—attempting to repair a weapon instead of firing it, for example. The player should make a note of this behavior, as he cannot correct it until another character makes a successful Computer Science–*programming* skill check, re-writing the faulty code. On a Critical Failure, the robot executes an incorrect action that is detrimental to itself or its companions—firing a weapon when instructed to repair it, for example.

Inferior Tech

+4 SP, CON

The robot has dated, second-hand, or factory-reject parts, which degrade its performance. As a result, the robot suffers Fatigue damage just as other heroes do, plus additional fatigue when its battery runs low.

The robot gains a fatigue rating as if it were a biological hero. A Critical Failure roll on any STR, DEX, or CON skill gives the robot a fatigue point, in addition to the result of critically failing the task in question.

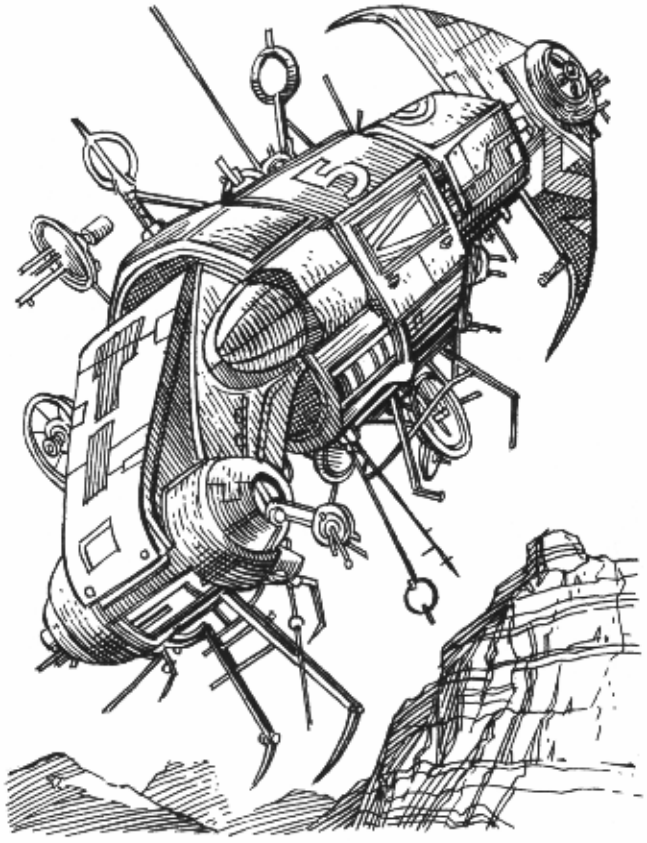


TABLE D23: Robot Brawling and Ramming Damage

Size	Damage
	d4–3s/d4–3s/d4–2s
Under 10 cm	d4–3s/d4–2s/d4–1s
11 to 50 cm	d4–2s/d4–1s/d4s
51 cm to 1 m	d4s/d4+1s/d4+2s
1 m to 2 m	d6s/d6+1s/d6+2s
2 m to 3 m	d8s/d6+1w/d8+1w
Over 3 m	3d4s/2d4w/d4+1m
	3d4+2s/2d4+2w/d6+1m

All damage inflicted by robot ramming and fists is low impact (LI) and of Ordinary strength, except for that inflicted by robots over 3 m, which is of Good strength. The mass of the robot alters the damage it inflicts in hand-to-hand combat. More massive robots inflict damage equal to the next category on the chart above. For example, a more massive 1 m to 2 m robot inflicts damage of d8s/d6+1w/d8+1w (equal to that of the 2 m to 3 m category). A robot made of lightweight materials goes down a category on the table above. A 1 m to 2 m robot made of lightweight materials inflicts d4s/d4+1s/d4+2s in damage (equal to that of the 51 cm to 1 m category).

Memory Lapse

+5 SP, INT

The robot's memory processors are faulty, and it often forgets important events or bits of data, such as passwords, names, or even instructions for operating complex machinery. A Memory-lapsing robot receives a +1 steppenalty to all Intelligence-based skill checks.

Overheat

+6 SP, CON

The robot's processor and actuator circuits tend to run hot, often leading to malfunctions. When facing the same conditions that would cause a human hero to gain a Fatigue point, the robot hero must make a Stamina–*endurance* check. If the check succeeds, nothing happens—the robot's systems continue to function normally. If the check fails, the robot overheats and must immediately shut down or destroy its central processor. Treat this as a knockout (see page 53 of the *Player's Handbook*).

Secret Orders

+3 SP, WIL

A player may choose this flaw only if his robot hero has wireless or telepresence link data ports. Hidden deep in the robot's hardware is a secret set of information that the robot's maker built into its chips; this information may include an assassination target, a spying mission, or plans to a vital installation. When the robot enters an appropriate situation it acts on its secret orders. Furthermore, it may receive a signal from its wireless or telepresence link, giving it further orders at any time. The robot's secret orders override all other attempts to control it, including command bolts, Asimov circuits, and normal orders to an unemancipated robot.

Short Circuit

+4 SP, INT

The robot has a nagging, untraceable short circuit in its core processor. Whenever it rolls a Critical Failure, it suffers 2 points of stun damage in addition to the effect of failing the task at hand. Only completely tearing the robot apart and replacing almost every aspect of the processor can fix the short circuit. Until then, almost anything can set the short circuit off as the Gamemaster determines, from Amazing hits against the robot to failed Stamina–*endurance* rolls. The robot also drains power at one-and-a-half times the usual rate if it runs on batteries.

Unarmored
+2 SP, CON
The robot is completely unprotected from dust, water, and weaponry; its chassis is uncovered and all its parts are visible. It suffers full damage from any attack in combat, and it may suffer step penalties when exposed to water, electrical storms, and other natural hazards. A robot with the Unarmored flaw cannot also take the Hidden System perk.

Robots in Combat

Military forces have used robots successfully in war at least since 1991, when Iraqi troops attempted to surrender to a reconnaissance drone during the Gulf War. Though expensive to deploy, they require fewer materials. The greater danger is that a technologically competent enemy can turn a captured robot against its maker.

Robot Unarmed Attacks

The amount of damage robots inflict in unarmed combat is dependent upon their size and mass. Especially massive robots inflict more damage than do their lighter counterparts. Some robots do not have arms or other such manipulators. These robots are still able to inflict damage using ramming attacks. See Table D23: Robot Brawling and Ramming Damage (page 79) to determine the amount of damage a robot inflicts.

Robots attempting to avoid a collision do not use the brawling and ramming table above, but instead should use Table P43: Crash and Collision Damage on page 201 of the *Player's Handbook*; the damage applies equally to the robot and the creature it crashes into.

Mortal Damage

If a robot takes mortal damage in combat, it must make a Stamina–*endurance* check. If the robot fails this check, it may lose a mechanical system or subsystem due to damage (see Table D24: Robot System Damage). In the case of Critical Failure, the system is completely disabled, requiring replacement.

The Gamemaster may choose exactly which system is affected or he may determine it by the random hit location system presented here. The location system uses a set of compartments like those used for vehicle combat to determine which system is damaged. For instance, if a robot suffers mortal damage and the Robot System Damage roll comes up as a 15, the robot's propulsion system fails and the robot can't move until it is fixed. Unlike damage to biological systems, mortal damage is permanent until the relevant part is repaired or replaced.

Any robot who suffers Amazing damage (whether stun, wound, or mortal) must also succeed at a stamina–*endurance* check or lose all of its remaining stun points. In such a case, the robot must re-initialize its systems. The robot must spend one phase per stun point recovered, and cannot function again until it finishes its system check.

Special Damage

While robots are immune to poisons, the effects of vacuum, and even to extremes of heat and cold, they do suffer more than other heroes from exposure to water and electric currents. Use the following rules for robots caught in the rain, dumped in the ocean, struck by lightning, or fried with a power surge.

Any robot exposed to water is likely to short out its circuits, its battery or power supply, or both. While fresh water is dangerous enough, salt water is corrosive as well and a much better conductor of electricity, as are some other liquids, such as certain acids, liquid hydrogen, and organometallic solutions. When the robot is immersed in one of these liquids, it must make a Stamina–*endurance* check or be immediately lose all remaining stun points. In this case, the robot becomes functional again when it is removed from the debilitating liquid. If the check results in a Critical Failure, the robot suffers the damage indicated on Table D25: Special Robot Damage. It must repair itself, or someone else must repair it, before it becomes functional again. In the case of acids and the like, the robot also suffers damage that has the same effect on durability as it would on any other hero that suffers from the harmful liquid.

When a large electrical current, such as a lightning bolt or an ungrounded power line, courses through a robot, the robot must also make a Stamina–*endurance* roll. If this roll fails, it immediately loses all remaining stun points and suffers the damage listed in the table above. If the roll is a Critical Failure, the damage indicated is mortal instead of wound damage; the electrical surge melts components rather than merely magnetizing, disabling, or overloading them. In either case, a hero capable of juryrigging or repairing it must attend to a robot shut down by electrical damage of any kind before it may

Table D24: Robot System Damage

d20 roll	System damaged
1–5	Armor
6–7	Actuator
8–9	Tool
10	Data Port/ Wiring
11–14	Chassis
15–17	Propulsion
18–19	Sensor
20	Processor/ Software

Table D25: Special Robot Damage

Source	Bonus/Penalty	Critical Damage
Fresh Water	–1	d4w
Salt Water	0	d6w
Acid*	+1	2d4w
Liquid Hydrogen	+2	d6m
Lightning Strike	+3	d12w
Power Line, Low Voltage	–2	d4w
Power Line, Transmission	+2	2d6w

The Bonus/Penalty column indicates a modifier to the Stamina–*endurance* check.

regain its lost stun points and rejoins the action.

Robots specially built to withstand electrical currents and spikes may gain bonuses to the Stamina–*endurance* rolls. The Gamemaster should determine these bonuses in each case in which they may apply.

Robot Maintenance

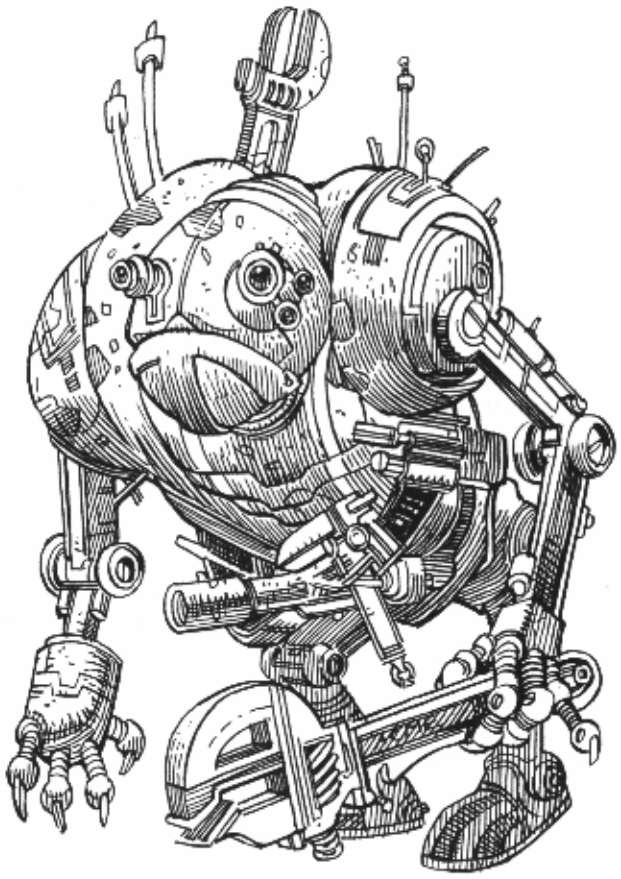
Like biological heroes, robots need regular upkeep. People and animals need food and rest, and robots need systems checks, power, and occasional new parts. Occasionally, the rigors of combat or hazardous environmental conditions necessitate more serious repairs. Repairing a robot is essentially a two-step procedure: diagnosis and the actual repair itself. As with other technological systems, robot repair requires the Technical Science–*repair*, *juryrig*, or *robotics* skill.

Robot Diagnostics

The first step in repairing damage to a robot is diagnosing the extent of its malfunctions, and determining what parts to repair, bypass, or replace. Only a proper and correct diagnosis of what systems have failed will allow a roboticist to repair the problem. The robot itself can perform this diagnosis if it has the Technical Science–*robotics* specialty skill, or a mechanic or roboticist who carries a robot diagnostic device can do it. If the robot does the diagnosis itself, the Technical Science–*robotics* skill check is subject to whatever the robot currently suffers due to mortal damage it has sustained. It gains a benefit for the quality of its OS (Ordinary grants –1 step, Good gives –2, and Amazing grants a –3 bonus). If the *robotics* roll succeeds, the degree of success indicates how much the robot knows about what parts need replacing, as shown on Table D26: Robot Diagnosis below.

If a mechanic or roboticist performs the diagnosis, the process is still fairly straightforward. If the robot has no socket or other interface, the roboticist must first gain access to the robot's motherboard. Doing so requires opening the robot's access panel, a simple process in most circumstances. However, a malfunctioning robot may sometimes resist or flee when approached, even by those with good intentions. This makes opening an access panel more difficult. If the robot resists, the roboticist must make a contested Strength feat check. Likewise, a robot can attempt to prevent anyone from accessing its system by running away, forcing the technician to make a contested Dexterity feat check with the robot. If the robot wins, it may simply flee the scene, assuming it is in good enough condition to do so.

Once the roboticist has access to the robot's innards, he can make a Technical Science–*robotics* roll normally. Note that the roboticist suffers no penalty for mortal damage that the robot may have sustained. The robotics skill grants an external observer the ability to review and understand the implications of system-wide failures. However, the roboticist may suffer penalties to the diagnosis roll if the model he is examining is unfamiliar (+1 step), alien (+3 steps), or built using a more advanced tech level than the roboticist is familiar with (+4 per Progress Level), at the Gamemaster's discretion. The Gamemaster may assign a bonus if the roboticist owns the robot (–1 step), has upgraded or modified the robot (–2 steps), or designed and built the robot from the ground up (–4 steps). Once you have compared the results of the diagnosis roll with the degrees of success on the Diagnosis Table above, the roboticist hero can then move on to the repair rolls.



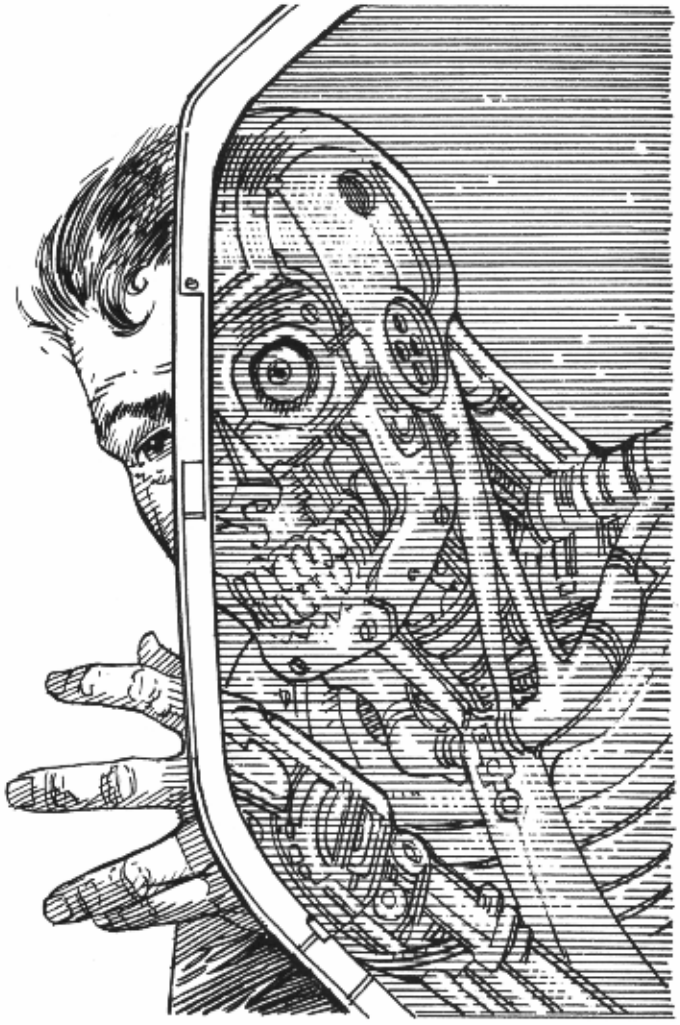
Robot Repair

Most robots have little or no ability to repair themselves as biological organisms do. Once they have taken damage, that damage remains until an outsider intervenes. The exception is stun damage, which affects robots just as it affects other heroes: At the end of the current scene, it disappears. The robot can act normally after it reboots.

Wound damage is more serious, and requires Technical Science–*robotics*, *juryrig*, or *repair* to correct. Making a repair attempt requires one uninterrupted hour of effort; without at least

TABLE D26: Robot Diagnosis

Degree of Success	Result
Critical Failure	Misdiagnosis; apply a +6 step penalty to any repair attempt
Failure	Stumped; apply a +2 step penalty to any repair attempt
Ordinary	Correct diagnosis; proceed with repair
Good	Familiar problem; subtract one required success from any complex repair skill check
Amazing	The repairer knows all the parts and procedures by heart; apply a –1 step bonus to repair attempts and subtract one required success



this much time, little more than diagnosis and juryrigging is possible. On a Failure, the wound is serious, and requires both more time and parts that are currently unavailable. The repairer may attempt no further repair until he acquires the part (often an expensive proposition). Even then, the next repair attempt requires a full day. On an Ordinary success, the repair restores 1 wound point. A Good or Amazing success restores 2 or 3 points, respectively. Repairing wound damage costs $500 per wound point. Used parts can cut this cost in half, and scavenged parts can reduce it to zero (see "Scavenging Parts," page 82).

Only someone skilled in Technical Science–*robotics* may restore mortal damage. Until this happens, the robot continues to suffer the step penalties associated with mortal damage. However, the robot's condition does not deteriorate so quickly as a mortally wounded organic creature might. The robot's mortal damage only worsens when the robot hero makes a skill check or ability feat and suffers a Critical Failure. Each Critical Failure inflicts another point of mortal damage, plus the spillover points of wound and stun damage. If the robot continues to operate and its mortal durability rating drops to zero, it suffers an unrecoverable error in its memory cores and dies. Though someone can still rebuild its body, he cannot recover its mind.

Repairing mortal damage to a robot is always a complex skill check. The Gamemaster determines the number of required successes, adding one more required success for every point of mortal damage the robot has taken. Assuming the Gamemaster sets the difficulty at Ordinary and decides that three successes are the base number required, a roboticist must achieve at least seven successes when repairing a robot that has taken four points of mortal damage. A Critical Failure during the skill check indicates that the roboticist requires additional parts in order to finish the repair. These parts are often major, expensive components or even entire subsystems; the cost of the required part is $1,000 to $6,000 plus $2,000 per level of the robot above PL 6. A repairer may not attempt any further repair rolls until he locates and installs that part. Any Failure (including a Critical Failure) adds to the chance that the whole complex skill check will fail (by reaching three Failures).

Repairing mortal damage involves replacing larger subsystems and more important and expensive components than repairing wound damage. Repairs cost $1,000 per mortal point, $500 if the robot is patched up with used parts.

Lack of proper parts or facilities when repairing a damaged robot adds step penalties to the *robotics* check as determined by the Gamemaster. However, a successful *juryrig* check can reduce that step penalty by –1.

Scavenging Parts

In the depths of space, sometimes parts can be hard to come by. Fortunately, technicians can keep robots going with parts cannibalized from similar models or even stripped from other sources entirely, such as spaceships or military vehicles. Parts taken from any source other than approved channels have a chance of failure. As a result, adding these peripherals to a robot is not always successful. Doing so requires the right connectors, actuators, and even software; some systems are simply incompatible. No matter how skilled the roboticist, fitting a mechalus eyeball into a video-driven harvester bot just won't merge effectively into a single working unit.

Whenever a hero uses scavenged parts to repair or modify an existing robot, make a Technical Science–*robotics* roll. If the parts are from a different Progress Level, were not originally robot parts, require specialized software, or were constructed by another species, make a roll using Technical Science–*juryrig*. If the part meets more than one of these conditions, the attempt suffers a +2 step penalty for each condition beyond the first.

If the roll succeeds, the part works as desired, at least for a while; see the "Used Parts" results for an Ordinary, Good, or Amazing success. All scavenged parts count as used parts, and are subject to all their quirks and problems. If the roll fails, the scavenged part is incompatible with some part of the robot's hardware or software, and does not integrate into its systems successfully.

Used Parts

Active robots are often subject to field upgrades, retrofits, and patchwork repairs. It's not always possible to replace a robot's worn or damaged parts with new, factory-fresh components, or even with entirely compatible components. On the frontiers of space, in wartime, or even in backward nations and territories, a roboticist often must use second-hand, pre-owned, reconditioned parts. These usually do the job as well as a new part—for a while.

When a technician installs a used or scavenged part in a damaged robot, make the repair rolls as usual to see how quickly he repairs the damage (see "Robot Repair," page 81). Then, make a roll using Technical Science–*robotics* to determine how well the part will perform. An Ordinary success indicates that any Critical Failure when using the part results

in the part failing completely. The used part cannot be repaired. A Good success indicates that the part functions normally until the robot rolls a Critical Failure while using it. The roboticist must reattach, reinstall, or reconfigure the part before it will work again. An Amazing success means that the part functions perfectly until destroyed or removed.

Robot Longevity

Given proper care and maintenance, a working robot can have a working life of 30 or 40 years, though robots in relatively unchanging industries such as textiles may work the same job for 100 years or more. But this is just the time that they are expected to function as laborers. Emancipated robots can survive for much longer, even centuries, if they keep updating their systems, repairing worn parts, and maintaining their central programming in good order. This drive to keep in top working order is one of the emancipated robot's chief preoccupations. A few such robots also prepare secondary bodies for themselves and reproduce themselves by cloning, thus doubling their long-term chances for survival.

Unemancipated robots are not so fortunate. Over time, the tasks expected of a robot decline, however, as manufacturers build newer and more capable robots. Consumers push the older machines to the margins, to poorer worlds or industries. Eventually, they are either overhauled and upgraded (in the case of robots whose experience makes them valuable—such as warbots or scout robots), stripped for parts, or allowed to run their power sources down into a slow, rusting death. Though no one likes to discuss it, these robots almost always die as the direct result of a human decision, because most robots can keep going as along as someone decides that the machine is worth the effort required to maintain it. As a result, a few antique or classic robots from the prior Progress Level are always floating around.

Standard Models

Despite the tireless work of individual roboticists creating specialized robots for specialized tasks, most robots that heroes encounter are standard models, made to perform a certain task efficiently and without complaint. This section describes sample models, for use as supporting cast members.

Early Bots (PL 5)

Robots of the Information Age operate purely on mechanical feedback systems, using gauges and sensors adapted to the task at hand. Some of them also function as waldos, that is, machines that mimic the actions that a human operator located elsewhere performs using a set of wired replicas of the robot's limbs. Laboratory robots and bomb squad robots are typical examples of PL 5 waldos; a scientist can mix dangerous chemicals from a distance by using a set of controls and a video monitor that control the arms of a robot in a blast-proof or radiation-proof lab.

The early bots are special-purpose machines, helpless whenever confronted by an entirely new situation or one outside their field of expertise. They function only when provided with a regular schedule of maintenance and recalibration. Their programming is a very simple set of instructions, and the "programming" is often more a matter of mimicry than expertise. Some robots follow routines generated by tracking a human expert who performs the operations.

Further, many early robots are more than just immobile; they are bolted firmly to the floor. Any small shift in their location, any wear in their actuators, reduces their accuracy and the quality of their products until they are recalibrated by a human technician. In some ways, these robots resemble the first computers, which also required specialized conditions and a technical maintenance staff.

Dumb Bots (PL 6)

In the Fusion Age, robots are still restricted to a few tasks. They are no longer merely mechanical systems, but instead use databases, layered neural nets, and expert systems to make basic decisions and learn from their experiences. However, they are very focused machines, extremely capable at their core competencies, but often confused by new situations or unforeseen events. Only the best bots can operate effectively when cut off from human support, maintenance, and intervention.

Autonomous Bots (PL 7)

These robots aren't self-aware enough to count as sentient, but they are quite intelligent, able to make complex decisions on their own and act independently. They respond to new situations by the use of pattern recognition, territorial and social hierarchies, and built-in behavior models. They have no emotions of their own and no ability to process human emotional responses.

Androids (PL 8)

Most robots at this Progress Level are androids, capable of understanding and expressing a wide range of emotion with the help of internal AI-level processors. Since AIs are small enough to fit into each robot, manufacturers use them to provide consciousness for those tasks that require it, though they also build many robots without such fancy higher-level functions. Though they fit AI brains into robots, these do add greatly to the cost, so manufacturers reserve them for the robots that really need the additional processing power. The miniaturized AIs implanted in robots at this level usually lack the AI Functions specialty skills of *prediction*, *multitask*, and *remote*.

Military robots are an obvious exception to the android format; they remain completely inhuman machines, capable of waging war in a grim, efficient manner incomprehensible to most sentient species. Both the androids and the machine killers operate on excellent pattern recognition and learning software, and are equipped with emotional modeling hardware as well. As a result they gain the flexibility and cunning required of warriors; they are able to decide shades of gray in addition to the usual black-and-white functioning of other robots.

Bushel-series Harvester Robot (PL 5)

Harvester robots have been working on Earth farms since the late 20th century, conducting most of the basic functions of agribusinesses: planting, fertilizing, irrigating, and harvesting enormous stretches of land. All robotic harvester machines have specialized tools that allow them to process fruits, vegetables, and grains. Special variants of the early 21st century robots come equipped with the tools to handle herbs, flowers, lumber, and other unusual crops.

Harvester robots vary in size from waist-high to towering U-shapes that loom over a row of trees in an orchard. Farmers adapt the exact form to suit the crop types, but four basic models predominate. The first is the *grain robot*, meant to plant, tend, and harvest wheat, oats, barley, and other cereals. They range from 1.2 to 2 meters tall, and can tend two or three rows of grain at a time. Next are the *root crop robots*, with a number of specialized tools for weeding and cultivating potatoes, carrots, yams, and other underground crops. They often double as vegetable, herb, or flower robots, able to work with lettuce, gourds, beans, and so on. They are small robots, rarely more than half a meter tall. The next is the *orchard robot*, able to shake fruit or nuts from trees. They are tall and spindly machines up to 8 meters tall, and often built in an arch shape, so they can strip a tree from top and sides simultaneously. Specialized forms of orchard droids also harvest grapes. Finally, there is the *lumber robot*, able to cut down, strip, and trim logs for transport while often working on slopes and rough terrain. They stand as much as 3 meters tall, and advanced models of PL 6 can process entire logs.

STR 9	INT 7		
DEX 6	WIL 2		
CON 8	PER 2		
Durability:	8/8/4		
Movement:	Sprint 14, Run 10, Walk 4		
Action Check:	10+/9/4/2	Actions/Round:	1
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Harvest Tool[1]	Melee Weapons	d4w/d4+1w/d4+3w	LI/O

[1] The harvesting tools are small blades slung beneath the harvester robot, and can only be used on an opponent whose action check falls in the same or a later phase than the robot's.

resistance modifier vs. melee attacks:	0
resistance modifier vs. ranged attacks:	–1
resistance modifier vs. encounter skills:	0 (INT), –2 (WIL)

Body Type

Processor:	Ordinary (3 active slots)
Actuators:	Servo
Casing:	Standard casing d4–2(LI), d4–2 (HI), d4–3(En)
Chassis:	50 cm to 2 m
Data Port:	Telepresence link, wireless
Manipulators:	Tool arms
Propulsion:	Wheels
Sensor:	GPS, video
Tools:	Harvesting tools, trailer hitch, temperature and humidity sensors, pesticide/herbicide/fertilizer sprayer, storage bin
Key Skills:	Stamina Life Science
Cost:	$20K

Hephaestus-series Industrial Robot (PL 5)

Industrial robots are the highly specialized, stationary arms that do the heavy lifting, welding, and metalworking that humans and other races find dangerous and distasteful. Manufacturers build them for function, not looks, and purchasers often bolt them to the factory floor, without any means of propulsion. In addition, industrial robots usually work in the dark—there's no reason to spend money on lighting for machines that operate with constant, repetitive precision.

For the most part, industrial robots are completely harmless, as long as you stay out of their way. While they might become the hostile tools of a computer-savvy villain or an AI, they are just too specialized to take hostile action on their own. As long as a manufacturing task is in front of them, they know what to do. When they are under attack, questioned, or threatened with destruction, they have no hardware or programming able to cope with the task.

The ramming and welding torch damage indicated assumes that a target comes within reach; an industrial robot's reach can be up to 6 meters away from its core. The industrial laser has a range of 10/20/100, half that of a laser pistol.

More advanced industrial robots become mobile; construction robots are a subset of these advanced manufacturing machines.

STR 16	INT 8		
DEX 6	WIL 2		
CON 14	PER 2		
Durability:	14/14/7		
Movement:	None		
Action Check:	11+/10/5/2	Actions/Round:	2
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Industrial Laser	Rng Wpn, Mod	d4+1w/d6+1w/d6+2w	En/G
Welding Torch[1]	Melee Weapons	d4+1w/d6w/d8+1w	En/O

[1] The welding torch ignites combustible materials on a Good success or better, inflicting d4–1w additional damage per phase until the fire is put out.

resistance modifier vs. melee attacks:	+3
resistance modifier vs. ranged attacks:	–1
resistance modifier vs. encounter skills:	0 (INT), –2 (WIL)

Body Type

Processor:	Good (5 active slots)
Actuators:	Servo
Casing:	Standard casing d4–2(LI), d4–2 (HI), d4–3 (En)
Chassis:	50 cm or more
Data Port:	Telepresence link, wireless
Manipulators:	Tool arms
Propulsion:	None
Sensor:	IR beam
Tools:	Industrial Laser, Welding Torch
Key Skills:	Stamina–*endurance* Knowledge Technical Science
Cost:	$25K

Armstrong-series Space Probe (PL 5)

In the tradition of Mariner, Voyager, Viking, Pathfinder, Venera, and Lunakod, space probes have been the first choice of space explorers since the first liquid-propellant multistage rockets sent instruments to the moon, Mars, Venus, and beyond. By the Fusion Age, space probes rarely launch from a planet's gravity well. Instead, they launch from ships into orbits that allow them to examine vast stretches of a planet from space.

Some probes are capable of entering an atmosphere and examining planet surfaces directly; doing so is still risky even at higher Progress Levels, and requires a successful Constitution feat. If the feat fails, the probe suffers hardware damage during re-entry and transmits no data back to its point of origin.

Almost all probes are disposable, meant to perform their function once and then fade into silence. Though some probes use solar panels or even fusion generators to extend their life span, when their batteries fade, they stop relaying data.

STR 12	INT 8		
DEX 4	WIL 4		
CON 12	PER 3		
Durability:	12/12/6		
Movement:	Sprint 16, Run 10, Walk 4		
Action Check:	9+/8/4/2	Actions/Round:	1
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Ram	Unarmed Attack	d4s/d4+1s/d4+2s	LI/O

resistance modifier vs. melee attacks:	+1
resistance modifier vs. ranged attacks:	–2
resistance modifier vs. encounter skills:	0 (INT), –2 (WIL)

Body Type

Processor:	Good (5 active slots)
Actuators:	Servo
Casing:	Photocell: d4–2 (LI), d4–2 (HI) , d4 (En)
Chassis:	1 m
Data Port:	Telepresence link, uplink
Manipulators:	Tool arms
Propulsion:	Tracks
Sensor:	Rangefinder, video
Tools:	Metal assay, gas chromatograph, carbon assay, atmospheric assay
Key Skills:	Vehicle Operation–*space* Stamina Navigation Physical Sciences System Operation
Cost:	$1M

Artemis-series Reconnaissance Robot (PL 6)

These scout robots are the first robots that the military employed. The basic reconnaissance robots come in two types, both of them improvements of the early drones of PL 5. The drone scout planes first saw service in the industrialized armies of World War II. Miniature land rovers soon followed them. The rovers are basically waldos mounted with video, radar, and IR sensors.

The flying recon variants are common and are generally referred to as Unmanned Aerial Vehicles (UMAVs), and they are related to the robotic cruise missiles that were first developed in the 1950s. Later recon robots gain better optics and other sensors; over the decades, they gain more ability to operate independently in adverse conditions, being able to stay aloft for days by the end of the 20th century.

Two additional specialized recon robots exist beginning in PL 6: the orbital insertion vehicle, or OIV, and the miniaturized recon robot called the microaerial vehicle, or MAV. The orbital insertion scout is dropped to a planetary surface from orbit, and must survive the re-entry just as space probes do. Once it lands safely, it resembles a small dune buggy equipped with cameras.

The MAV is a tiny, unarmed scout less than a meter across, and meant to evade detection and destruction by virtue of its smaller size. It can drive under barbed wire and over mines without setting them off, and its size and quick movement make it a difficult target to hit.

STR 14	INT 10		
DEX 5	WIL 7		
CON 14	PER 5		
Durability:	14/14/7		
Movement:	Sprint 18, Run 12, Walk 4		
Action Check:	9+/8/4/2	Actions/Round:	1
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Ram	Unarmed Attack	d6s/d6+1s/d6+2s	LI/O
11mm Ch Rifle	Rng Wpn, Mod	d6+1w/d6+3w/d6+1m	HI/O

resistance modifier vs. melee attacks:	+2
resistance modifier vs. ranged attacks:	–1
resistance modifier vs. encounter skills:	0 (INT), 0 (WIL)

Body Type

Processor:	Good (7 active memory slots)
Actuators:	Servo
Casing:	Standard Casing d4–2(LI), d4–2 (HI), d4–3(En) (OIV re-entry shields): Ablative d4/d4/d4+4 (these burn up upon reentry)
Chassis:	2 m
Data Port:	Telepresence link, uplink
Manipulators:	None
Propulsion:	Tracks (UMAV has wings or gravitics)
Sensor:	GPS, IR, rangefinder, video
Tools:	Life recorder, 11 mm charge rifle, smoke grenade, self-destruct grenade
Key Skills:	Stamina–*endurance* Ranged Weapons, Modern–*rifle* Navigation–*surface* Awareness
Cost:	$125K standard ($150K for OIV)

Bertolli-series Chauffeur Robots (PL 6)

The autopilot programs of PL 5 gradually grew more and more sophisticated. Eventually, they became a removable module that provided not just driving skills, but geographical and cultural information, preprogrammed destinations, variable driving styles, and even specialized programming such as counterterrorism or stunt driving skills. This was the first generation of chauffeur robots; eventually, many vehicles formerly piloted by humans became robot-driven. Within another generation, robot drivers were available for passenger vehicles as well, though many humans still preferred to drive themselves.

The *Bertolli* series offers simple and reliable transportation for passengers or cargo. They use wheels for most heavy loads, and gravity inducers after the turn of the 22nd century. Cargo models such as the *Mack* or *Lone Star* models are often referred to as "baggage bots," "sherpas," or "truckbots."

STR 7	INT 9		
DEX 7	WIL 8		
CON 8	PER 6		
Durability:	8/8/4		
Movement:	as Vehicle		
Action Check:	10+/9/4/2	Actions/Round:	2
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Ram	Unarmed Attack	3d4s/2d4w/d4+1m	LI/O

resistance modifier vs. melee attacks: 0
resistance modifier vs. ranged attacks: 0
resistance modifier vs. encounter skills: 0 (INT), 0 (WIL)

Body Type

Processor:	Ordinary (5 active memory slots)
Actuators:	Servo
Casing:	Standard casing d4–2(LI), d4–2 (HI), d4–3 (En)
Chassis:	as Vehicle; generally over 3m
Data Port:	Uplink
Manipulators:	None
Propulsion:	Wheels or gravitics
Sensor:	GPS, pickup/voicebox, rangefinder
Tools:	Automatic sliding door, remote tire-changing droid
Key Skills:	Vehicle Operation–*land 3* or *air 3* Stamina–*endurance* Knowledge–*local area 3* Awareness Interaction
Cost:	$20K

Fuller-series Mining Robots (PL 6)

The *Fuller* series of mining robots operate in groups or swarms, dissecting any worthwhile asteroid they land on. The robots send the results of these mining efforts via encrypted radio or uplink signal to a local mining outpost and to nearby robots from the same corporation. This allows the robots to register mining claims and to summon additional robots to a rich region or warn them away from an unpromising site. Initially, mining company sends the MAMG robots (named for the Mars Asteroid Mining Group, which made them famous) through a potentially rich region of moonlets or asteroids as surveying machines. When one of them detects a suitable ore deposit, it sends a signal to a controlling ship, which orders other mining robots to the area to mine the ore. This cycle repeats until the region is depleted of usable ores or until the swarm receives a "stop" signal from its point of origin.

When deployed in a mineral-rich system, they can yield reasonable returns within six months. However, collisions with microscopic debris, as well as the harsh conditions of asteroid navigation, result in a high rate of attrition among these robots. Individual swarm members rarely last more than a few years before being destroyed on the job. A few of the unlucky ones never earn back their initial investment.

STR 12	INT 9		
DEX 7	WIL 8		
CON 12	PER 4		
Durability:	12/12/6		
Movement:	Sprint 18, Run 12, Walk 4		
Action Check:	10+/9/4/2	Actions/Round:	2
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Mining Laser	Melee Weapons	d6w/d6+1w/d6+3w	En/O
Clamps	Unarmed Attack	d4s/d6w/d6+1w	LI/O

resistance modifier vs. melee attacks: +1
resistance modifier vs. ranged attacks: 0
resistance modifier vs. encounter skills: 0 (INT), 0 (WIL)

Body Type

Processor:	Ordinary (5 active memory slots)
Actuators:	Servo
Casing:	Standard casing d4–2 (LI), d4–2 (HI), d4–3 (En)
Chassis:	2 m long
Data Port:	Socket, uplink, wireless
Manipulators:	Tool arms
Propulsion:	Tracks, solar laser thrusters (system movement equivalent to ion engine)
Sensor:	Holo, metal detector
Tools:	Mining laser
Key Skills:	Stamina–*endurance* Knowledge–*mining and metallurgy* Navigation–*system astrogation* System Operation–*communications, engineering, sensors* Awareness
Cost:	$300K

Janus-series Sentry Robot (PL 6)

Sentry robots are tracked robots armed with light weapons and superb sensors; they serve the same functions as a human sentry combined with a guard dog's superior senses. They typically guard corporate installations, airports, spaceports, and military installations; when on gatekeeper duty they may use retinal scans, electronically encrypted passcards, or bioelectric signature verification to control entry to restricted areas. While they carry multiple weapon systems, their primary purpose is to capture or disable opponents, rather than to kill. A sentry robot always attempts to defuse a situation with its stun baton or concussion grenades first. Only when faced with overwhelming resistance will a sentry robot use its submachine gun.

Just as important as a sentrybot's weapons are its sensors, since it can call in local police whenever it detects a trespassing, burglary, or other crime in progress. These sensors include simple motion detectors, a chemical sniffer to help ferret out explosives, and video cameras that feed directly into a X3D. The combined sensor data can serve as evidence in a court of law. Even if intruders manage to destroy the robot, technicians can recover the sensor data. Many sentries have accomplished their job posthumously. Although the robots themselves were totaled, their recordings of the criminal's attack can be enough to pinpoint and convict the attacker.

STR 14	INT 9		
DEX 7	WIL 7		
CON 16	PER 4		
Durability:	16/16/8		
Movement:	Sprint 18, Run 12, Walk 4		
Action Check:	10+/9/4/2	Actions/Round:	2
Reaction Score:	Marginal/1		

Attacks	Skill	Damage	Type
Ram	Melee Weapons	d8s/d6+1w/d8+1w	LI/O
SMG, 9mm ch	Rng Wpn, Mod	d4+1w/d6+1w/d4m	HI/O
Stun baton	Melee Wpn	d4+1s/d4+3s/d6+4s	En/O
Conc Grenade	Athletics	d6+2s/d4w/d4+1w	LI/O

resistance modifier vs. melee attacks:	+2
resistance modifier vs. ranged attacks:	none
resistance modifier vs. encounter skills:	0 (INT), 0 (WIL)

Body Type

Processor:	Ordinary (5 active memory slots)
Actuators:	Servo
Casing:	Standard Casing d4–2(LI), d4–2 (HI), d4–3 (En)
Chassis:	3 m long
Data Port:	Wireless
Manipulators:	Tool arms
Propulsion:	Tracks
Sensor:	IR, motion, pickup/voicebox, and video sensors
Tools:	Bioelectric or retinal signature reader, life recorder, chemical sniffer
Key Skills:	Athletics–*throw* Melee Weapons–*powered* Ranged Weapons, Modern–*SMG 3* Stamina–*endurance* Security Awareness Interaction
Cost:	$175K

Excalibur-series Bodyguard Robot (PL 7)

A bodyguard robot has one great advantage over a human bodyguard: Its owners can go about their business secure in the knowledge that their bodyguards will definitely take a bullet for them—after all, they're programmed to do just that.

In addition, bodyguard robots possess special sensory circuits that excel at scanning for and tracking potential threats—but that ignore most discussions of politics, business, or finance. Their specially constructed memory cores have no ability to store sensitive or classified data that might later be retrieved and used against the bodyguard's owner. In a sense, the bodyguard is a form of well-equipped guard dog.

STR 15	INT 13		
DEX 9	WIL 8		
CON 10	PER 6		
Durability:	10/10/5		
Movement:	Sprint 24, Run 16, Walk 6		
Action Check:	14+/13/6/3	Actions/Round:	2
Reaction Score:	Ordinary/2		

Attacks	Skill	Damage	Type
Fist	Unarmed Attack	d6s/d6+1s/d6+2s	LI/O
Stutter Pistol	Rng Wpn, Mod	d6+2s/d8+2s/d8+4s	LI/O
Gren, Smoke	Athletics	Special	Special

resistance modifier vs. melee attacks:	+3
resistance modifier vs. ranged attacks:	none
resistance modifier vs. encounter skills:	+2 (INT), 0 (WIL)

Body Type

Processor:	Ordinary (7 active memory slots)
Actuators:	Servo
Casing:	Attack armor d4+1 (LI), d6+1 (HI), d6–1 (En)
Chassis:	2 m tall
Data Port:	Uplink
Manipulators:	Two arms with hands
Propulsion:	Legs
Sensor:	Holo, pickup/voicebox, sonar
Tools:	Harpoon grapple with 25 meter cable, first aid kit, stutter pistol
Key Skills:	Armor Operation–*combat armor* Athletics–*throw* Unarmed Attack–*brawl* Ranged Weapon, Modern–*pistol* Stamina–*endurance* Knowledge–*first aid* Awareness–*perception 3*
Cost:	$200K

J700-series Drone (PL 7)

Drones are all-purpose robots, meant to provide the basic labor needed in establishing a planetary colony, working in manufacturing or construction, depending on what additional programming and tools they are given. While not especially fitted to any particular task, their versatility makes them popular with frontier groups, survivalists, and certain corporations. The *J700* series has proven particularly adept at a wide variety of tasks, and can be seen throughout human space.

Colonizing agencies send a particularly hardy form of this model, called the *Pioneer* variant, to sites selected for colonization to prepare the location for the settlers arrival. The *Pioneer* builds shelters, surveys the area, and sets up machines to produce any life-giving gasses or chemicals that the colony may require. By the time the settlers arrive, the *Pioneers* have created a margin of safety for the settlement. *Pioneers* cost an additional $1.5M, largely due to their shipping and re-entry costs. Most *Pioneer* models are drop-shipped much the way space probes are sent to explore. Like those probes, they must make a Constitution feat in order to survive the journey and re-entry intact.

STR 12 INT 12
DEX 6 WIL 7
CON 8 PER 4
Durability: 8/8/4
Movement: Sprint 18, Run 12, Walk 4
Action Check: 13+/12/6/3 Actions/Round: 1
Reaction Score: Ordinary/1

Attacks	Skill	Damage	Type
Fist	Unarmed Attack	d6s/d6+1s/d6+2s	LI/O

resistance modifier vs. melee attacks: +1
resistance modifier vs. ranged attacks: –1
resistance modifier vs. encounter skills: +1 (INT), 0 (WIL)

Body Type
Processor: Marginal (4 active memory slots)
Actuators: Servo
Casing: Standard casing d4–2 (LI), d4–2 (HI), d4–3 (En)
Chassis: 1.5 m tall
Data Port: Socket, telepresence
Manipulators: Tool arms
Propulsion: Tracks
Sensor: Holo
Tools: Modular: added as needed for current task
Key Skills: Stamina–*endurance*
Knowledge–*construction*
Technical Science–*invention, repair*
Awareness–*perception*
Cost: $110K

Maxwell-series Mechanic Droid (PL 7)

A mechanic robot diagnoses and repairs mechanical systems, usually vehicles, starships, or other robots. They have both electronic and mechanical assets to fulfill these functions, and are even capable of a limited amount of juryrigging.

A typical mechanic droid has wheels, gripping claws that enable it to climb all over a large machine, and sometimes even thrusters (for zero-g repairs while in space). In addition, they are usually smaller than a human mechanic, able to enter ducts and spaces that a biological mechanic can't reach. A mechanic bot also has a complete set of electrical and mechanical tools, from wrenches and pliers to voltmeters and wire strippers.

STR 12 INT 13
DEX 10 WIL 8
CON 9 PER 6
Durability: 9/9/4
Movement: Sprint 22, Run 14, Walk 4
Action Check: 14+/13/26/3 Actions/Round: 2
Reaction Score: Ordinary/2

Attacks	Skill	Damage	Type
Fist	Unarmed Attack	d4s/d4+1s/d4+2s	LI/O

resistance modifier vs. melee attacks: +1
resistance modifier vs. ranged attacks: 0
resistance modifier vs. encounter skills: +2 (INT), 0 (WIL)

Body Type
Processor: Ordinary (7 active memory slots)
Actuators: Servo
Casing: Standard casing d4–2 (LI), d4–2 (HI), d4–3 (En)
Chassis: 0.75 to 1 m tall
Data Port: Socket
Manipulators: Tool arms
Propulsion: Tracks
Sensor: Holo, pickup/voicebox
Tools: Basic tool set, other tools as necessary
Key Skills: Acrobatics–*zero-g training*
Stamina
Knowledge–*computer operation*
System Op–*engineering*
Technical Science–*repair 4, juryrig, robotics*
Awareness–*perception*
Cost: $80K

Lister-series Medical Robot (PL 7)

A medical robot diagnoses and heals a specific species of biological creatures. These robots come in two basic models: medical robots, designed to provide medical treatment to sentient species, and veterinary robots, designed to assist animals. Medic bots possess sensors, micro labs, and sterilizing autoclaves to fulfill these functions, and are even capable of a limited amount of surgery.

A typical medic has fully haptic hands that enable it reset broken bones; these hands also have built-in thermometers, needles, and anesthetic dispensers. These robots are usually about three-quarters the size of a human doctor, though they are strong enough to lift and carry victims unable to move themselves.

STR 9	INT 14		
DEX 8	WIL 7		
CON 6	PER 7		
Durability:	6/6/3		
Movement:	Sprint 16, Run 10, Walk 4		
Action Check:	15+/14/7/3	Actions/Round:	3
Reaction Score:	Ordinary/2		

Attacks	Skill	Damage	Type
Sedative	Melee Weapons	as Poison	LI/O

resistance modifier vs. melee attacks:	0
resistance modifier vs. ranged attacks:	0
resistance modifier vs. encounter skills:	+2 (INT), 0 (WIL)

Body Type

Processor:	Good (10 active memory slots)
Actuators:	Muscle wire
Casing:	Standard casing d4–2 (LI), d4–2 (HI), d4–3 (En)
Chassis:	1 to 1.25 m tall
Data Port:	Socket, telepresence
Manipulators:	Arms with hands
Propulsion:	Tracks
Sensor:	Holo, IR, pickup/voicebox, tactile
Tools:	Basic medical kit, thermometer, toxicology screen kit, blood work screen kit, trauma pack kit, surgical kit, medical drugs
Key Skills:	Stamina Knowledge–*computer operation* Medical Science–*treatment 3, surgery*

Cost: $115K

Horatio-series Point Defender (PL 7)

A point defender is a throwback to the days of stationary industrial robots: an immobile or marginally mobile robot defends a limited territory from intruders. It is often used in place of a pillbox or machine gun nests in order to cover a retreat, or to hold a fortification or military installation against guerrilla incursions. Its enormous weight makes it impossible for the machine to move at more than a crawl.

Point defenders are not tanks; they are too slow, and have too much difficulty over rough terrain to fare well beyond the territory they defend. They use light arms and tenacious defenses to hold a line, but they aren't able to do much about incoming artillery. They can defend themselves against tanks and aircraft using their bantam launch tubes, and they are usually hardwired into a military defense Grid and thus empowered to call down air strikes or reinforcements of their own. To defend against close assaults, they have anti-personnel mines attached to their armored exteriors. They often use these as reactive armor to bring down armor-piercing missiles aimed at them. Primarily, they are meant to cover a retreat by human forces, to shore up defenses of a site low on personnel, and occasionally serve as an early warning system. Beyond that, their duties are minimal; they fight and die to save the lives of more valuable equipment and personnel around them.

STR 12	INT 14		
DEX 9	WIL 10		
CON 14	PER 4		
Durability:	14/14/7		
Movement:	Walk 4		
Action Check:	15+/14/7/3	Actions/Round:	3
Reaction Score:	Ordinary/2		

Attacks	Skill	Damage	Type
Cannon, 25mm	Hvy Wpn	d8w/d4+1m/d6+2m	HI/G
Quantum mini	Hvy Wpn	d8+1w/d8+3w/d6m	En/G
Gren Launcher	Hvy Wpn	as grenade load	varies
Bantam Launcher	Hvy Wpn	as bantam load	varies

resistance modifier vs. melee attacks:	+1
resistance modifier vs. ranged attacks:	0
resistance modifier vs. encounter skills:	+2 (INT), 0 (WIL)

Body Type

Processor:	Good (10 active memory slots)
Actuators:	Hydraulic
Casing:	Moderate neutronite 2d4+1 (LI), 2d4+1 (HI), 2d4 (En)
Chassis:	3 m long
Data Port:	Wireless, encrypted
Manipulators:	None
Propulsion:	Tracks
Sensor:	Holo, IR, motion, rangefinder; vehicle-mount surface-search radar, thermal imager
Tools:	Mines, chaff launcher, radar jammer
Key Skills:	Armor Operation–*powered armor* Stamina–*endurance* Heavy Weapons–*direct fire* System Operation–*communications, sensors* Tactics Awareness–*perception*

Cost: $165K

Titan-series Robot Tank (PL 7)

The automated skytank of the 26th century has weapons capable of destroying buildings at a range of several kilometers and has direct-fire weapons capable of punching through, well, tank armor. Their quantum mini guns on autofire can decimate an infantry platoon in seconds, and their rail cannon likewise can punch through heavy armor. The only safe place near a tank is on the inside.

Though these tanks can function independently, their makers don't quite trust them. Most often, they are deployed to a battle area under their own power, but teleoperated by human tank commanders at a remote location once they engage in hostile action. Their ability to fight on their own is reserved for emergencies, such as when cut off from their teleoperators by a jamming device.

Fast and flexible in combat, a tank is meant to roll over opposition—and it can. Smaller than a tank that must carry human occupants, the robot tank is a difficult target to acquire, and thus has greater survivability than might be expected from a mechanical system. The robot tank's ability to use its gravitics to fly for short periods gives it even greater ability to outmaneuver the enemy.

Robot Tank

STR 18	INT 15		
DEX 7	WIL 10		
CON 16	PER 5		
Durability:	16/16/8		
Movement:	Sprint 24, Run 16, Walk 6, Fly 48		
Action Check:	16+/15/7/3	Actions/Round:	3
Reaction Score:	Ordinary/2		

Attacks	Skill	Damage	Type
Ram	Un Atk	3d4+2s/2d4+2w/d6+1m	LI/G
Bantam Launcher	Hvy Wpn	as load	as load
Quantum Mini	Hvy Wpn	d8+1w/d8+3w/d6m	En/G
120 mm Rail Cannon	Hvy Wpn	d8+1w/d8m/d12+2m	HI/A

resistance modifier vs. melee attacks:	+4
resistance modifier vs. ranged attacks:	none
resistance modifier vs. encounter skills:	+3 (INT), 0 (WIL)

Body Type

Processor:	Amazing (13 active memory slots)
Actuators:	Hydraulic
Casing:	Heavy neutronite 2d6+1 (LI), 2d6+1 (HI), 2d6 (En)
Chassis:	6 m long
Data Port:	Wireless, encrypted, telepresence link
Manipulators:	None
Propulsion:	Tracks, Gravitics
Sensors:	GPS, holo, IR, rangefinder; vehicle-mount surface search radar, thermal imager
Tools:	Thermal smoke generators, chaff launchers, (optional: minefield plow or bridging pontoon)
Key Skills:	Armor Operation–*powered armor* Heavy Weapon–*direct fire, indirect fire* Stamina–*endurance* Navigation–*surface* System Operation–*communication, sensors* Tactics Awareness–*perception*
Cost:	$1.25M

Loki 09-series Assassin Android (PL 8)

Assassin robots are the terrors of the age. Clothed in human flesh, they are more cyborg or android than pure robot. Since they are not detectable by metal detectors (their skeletons are ceramic or plastic), they can pass for human, get close to a target, and destroy themselves and everyone in a 10-meter radius, causing as much damage as a mass grenade. Because of the potential political cost to any nation or corporation caught using them, they are rare. Often, nations use them as a weapon of last resort.

STR 14	INT 15		
DEX 10	WIL 12		
CON 10	PER 8		
Durability:	10/10/5		
Movement:	Sprint 24, Run 16, Walk 6		
Action Check:	19+/18/9/4	Actions/Round:	3
Reaction Score:	Good/3		

Attacks	Skill	Damage	Type
Fist	Unarmed Attack	d6s/d6+1s/d6+2s	LI/O
Star Sword	Melee Weapons	d6+1w/2d6w/d4+3m	En/G
Mass Pistol	Rng Wpn, Mod	d6w/d6+2w/d6m	En/G
Mass Gren	Athletics	d6+2s/d6+2w/d6m	En/G

resistance modifier vs. melee attacks:	+2
resistance modifier vs. ranged attacks:	none
resistance modifier vs. encounter skills:	+3 (INT), +1 (WIL)

Body Type

Processor:	Good (15 active memory slots)
Actuators:	T'san electromotor
Casing:	Carbonate fiber d4 (LI), d4 (HI), d6–2 (En)
Chassis:	1.8 m tall
Data Port:	Encrypted, socket, wireless
Manipulators:	Two arms with hands
Propulsion:	Legs
Sensor:	Holo, sonar, pickup/voicebox, rangefinder, tactile, video
Tools:	Hidden system-mass grenade, hidden system-mass pistol
Key Skills:	Athletics–*throw* Melee Weapon–*powered* Unarmed Attack–*brawl* Ranged Weapons, Modern–*rifle, pistol, SMG* Stealth–*hide, shadow, sneak* Stamina–*endurance* Demolitions–*set explosives* Awareness–*perception* Deception–*bluff* Interaction–*charm*
Cost:	$1M

Dreadnought-series Starmech War Robot (PL 8)

The Starmech Collective is only one of many stellar nations to have relied on robots in war, but the Starmech *Dreadnought* is a good example of the type. Capable of being launched from an orbiting warship and achieving a gliding re-entry, the dreadnought's primary function is to suppress ground-based resistance. Unlike a simple skytank, a dreadnought carries a full complement of anti-personnel, anti-air, and anti-tank weapons, as well as explosives and light artillery. It is capable of fighting a pitched field battle in synch with manned vehicles or of conducting independent operations.

STR 18 INT 16
DEX 8 WIL 12
CON 18 PER 4
Durability: 18/18/9
Movement: Sprint 26, Run 16, Walk 6, Fly 52
Action Check: 20+/19/9/4 Actions/Round: 3
Reaction Score: Good/3

Attacks	Skill	Damage	Type
Ram	Un Atk	3d4+2s/2d4+2w/1d6+1m	LI/G
2 120mm Rail Cannons	Hvy Wpn	d8+1w/d8m/d12+2m	HI/A
Quantum Mini	Hvy Wpn	d8+1w/d8+3w/d6m	En/G
Bantam Launcher	Hvy Wpn	as load	varies

[1] The dual mount allows the Dreadnought to fire twin-shell salvos rather than just single rounds, which provides a –2 step bonus to all attack rolls with the rail cannon.

resistance modifier vs. melee attacks: +4
resistance modifier vs. ranged attacks: 0
resistance modifier vs. encounter skills: +3 (INT), +1 (WIL)

Body Type
Processor: Amazing (18 active memory slots)
Actuators: Hydraulic
Casing: Heavy neutronite 2d6+1 (LI), 2d6+1 (HI), 2d6 (En)
Chassis: 12 m long, 3 m tall
Data Port: Wireless, encrypted
Manipulators: None
Propulsion: Tracks plus gravitic propulsion
Sensor: GPS, gravitic, holo, IR, rangefinder; vehicle-mount EM detector, thermal imager, mass detector, multiband radar
Tools: Minelayer
Key Skills: Armor Operation–*powered armor*
Heavy Weapons–*direct fire, indirect fire*
Stamina–*endurance*
Navigation–*surface*
System Operation–*communications, sensors*
Tactics–*vehicle*
Awareness–*perception*
Cost: $3M

Rambler-series Explorer Robot (PL 8)

Many stellar nations send explorer bots to survey the vastness of space, since sending robots is inevitably cheaper than sending humans to every corner of the galaxy. These explorer bots are versed in science and in first contact skills, and they never complain of the drudgery of long voyages, loneliness, or lack of communication with the homeworlds.

Once launched, a rambler robot operates on its own for weeks or months, sometimes even years. Once it has made a circuit of the planet it is meant to explore, it shuts down most system and waits for the return of the survey team that dropped it off. When its makers return to the system and send an activation signal, the rambler robot responds by sending a complete report of everything it has encountered, measured, and logged during its stay. This saves the survey team a great deal of time and effort, and allows them to decide quickly whether a system is worth further investigation.

STR 10 INT 14
DEX 10 WIL 12
CON 9 PER 10
Durability: 9/9/4
Movement: Sprint 20, Run 12, Walk 4
Action Check: 18+/17/8/4 Actions/Round: 2
Reaction Score: Good/2

Attacks	Skill	Damage	Type
Fist	Un Atk	d8s/d6+1w/d8+1w	LI/O
Stutter Pistol	Rng Wpn, Mod	d6+2s/d8+2s/d8+4s	LI/O

resistance modifier vs. melee attacks: none
resistance modifier vs. ranged attacks: none
resistance modifier vs. encounter skills: +2 (INT), +1 (WIL)

Body Type
Processor: Ordinary (10 active memory slots)
Actuators: Servo
Casing: Photocell d4–2 (LI), d4–2 (HI), d4 (En); ablative reentry shielding d4 (LI), d4 (HI), d4+4 (En)
Chassis: 3 m tall
Data Port: Telepresence link, uplink
Manipulators: Tool arms, claw arms
Propulsion: Gravitic
Sensor: Chemical sniffer, holo, IR, metal detector, sonar; vehicle-mount EM detector, mass detector, multiband radar, thermal imager, video scanner
Tools: Soil analysis kit, bio sample kit, atmosphere analysis kit, gas chromatograph; vehicle-mount science suite
Key Skills: Ranged Weapons, Modern–*pistol*
Vehicle Operation–*space*
Stamina–*endurance*
Life Science–*biology*
Navigation–*drivespace, system*
Physical Science–*chemistry, planetology*
System Operation–*sensors, communications*
Awareness–*perception*
Cost: $325K

Jeeves-series Servant Droid (PL 8)

Servant robots are companions, cooks, butlers, trainers, housekeepers, nannies, and gardeners, all rolled into one. They can be compassionate and as protective as any mother bear, or as polite and diplomatic as any ambassador. Most of all, they are completely loyal to their owners. They interpret and respond well to the nuances of social interaction with pets, children, and adults.

Servant robots often function as the administrators of household finances as well, shopping, paying bills, and watching the accounts. Although they are capable of working through the night, most servant robots function as watchmen when the household is asleep, as most humans find the sight of something moving and working in the dark a little disturbing. As guards, *Jeeves*-series robots do little more than sound an alarm when an intruder enters the grounds—security isn't really their area of expertise.

STR 8	INT 14		
DEX 10	WIL 12		
CON 7	PER 9		
Durability:	7/7/4		
Movement:	Sprint 18, Run 12, Walk 4		
Action Check:	18+/17/8/4	Actions/Round:	2
Reaction Score:	Good/2		

Attacks	Skill	Damage	Type
Fist	Unarmed Attack	d6s/d6+1s/d6+2s	O/LI

resistance modifier vs. melee attacks: 0
resistance modifier vs. ranged attacks: 0
resistance modifier vs. encounter skills: +2 (INT), +1 (WIL)

Body Type

Processor:	Ordinary (10 active memory slots)
Actuators:	Servo
Casing:	Standard casing d4–2 (LI), d4–2 (HI), d4–3 (En)
Chassis:	1.5 m
Data Port:	Socket, wireless
Manipulators:	Two arms with hands
Propulsion:	Legs
Sensor:	GPS, holo, IR, pickup/voicebox, tactile
Tools:	Medical gauntlet, first aid kit
Key Skills:	Unarmed Attack Stamina–*endurance* Knowledge–*computer operation, first aid, deduce* Administration–*management* Awareness–*perception* Culture–*native culture* Entertainment–*act, sing* Interaction–*bargain, charm*
Cost:	$65K

Famous Robots

Just as some humans have changed the course of human history, some robots have made large contributions to the advance of future societies. Here are a few of them.

Scout Bot 1737

During PL 6, when the stardrive was leading to the first mass exodus from Terra, finding inhabitable worlds was a crucial task. Sending stardrive-equipped ships to visit hundreds or even thousands of possibly inhabitable systems wasn't always the best way to find habitable worlds. Instead, some of the great Terran powers sent scout bots in waves. A stardrive-capable ship would hop into a system, drop enough scouts to examine the most likely planets, and then move on. On its way back to Earth, the ship picks up the uplink signals from each scout bot—which is then abandoned on the world it has surveyed (the fuel and engine cost to bring it back into orbit is greater than the cost of the robot). Scout Bot 1737 was so successful that it was actually recovered from the systems it explored and sent to new ones. It surveyed 93 systems before its processor gave out.

Hugo

This first melding of robotic technology with artificial intelligence occurred in the year 2396 in Berlin, with the assistance of researchers at MIT robotics labs. Until that point, the cooling systems and the sheer fragility of AI matrices made them poor candidates for mobile systems of any kind. But Prof. Hanna "Brueke" Dilligen, a member of the Anarchist Union then residing on a Free Fellowship in the Max-Planck Institut, overcame both these problems by the creation of the phased crystal lattice. The lattice is a simple compression scheme that reduces both the cooling requirements of traditional AI matrix systems and bolsters the resulting systems' resistance to shocks and temperature fluctuations, though processor benchmark performance suffers somewhat as well. The first melding of this lattice with a cybernetic system was christened "Hugo" after Prof. Dilligen's favorite author. The robot itself was immediately put to work providing assistance in complex mathematics at the Max-Planck Institut.

The Forlorn Hope

By PL 8, the use of robots in wartime was well established, and some of the newly emancipated robots began making their way in the world as mercenaries. Robots quickly discovered that fighting other robots was a dangerous occupation, and consequently formed warrior companies. These companies would fight for the highest bidder, but often required in their contract that they fight only against human armies rather than other robot mercenaries. The Forlorn Hope was one of the most successful of these companies, most of which lasted only a few years before succumbing to the chaos of war. Through superior knowledge of tactics and the adoption of the most powerful hardware available without respect to provenance, the Forlorn Hope wandered from system to system for over a hundred and fifty years, working for 24 employers in all. In one case they even destroyed an employer (the Shapers of the Neptune Syndicate) who betrayed them. Unsubstantiated reports link them now to the Society of Free Robots, a form of mechanized utopia where they still serve as the army, navy, and special forces.

Robot Adventures

Robots are excellent sources of adventures: they make good villains (as rampaging machines or clever replicants impersonating humans), sidekicks (from scouts to servants) and as comrades-in-adventure. Since their programming is somewhat predictable, Gamemasters can plot out their reactions in a simple if-then logic chain, making them easy to plan actions around and easy to launch on paths of interconnected actions. At the same time that they seem predictable, they can pursue actions that are logical to them, but that a living creature might never pursue. Here are a few story ideas for the Gamemaster.

The Prospector's Claim

Trigger: An asteroid-mining robot files a claim on an asteroid full of rhodium, lanthanum, or other valuable minerals, but the robot's former owner, a large mining corporation, steals the claim.
Challenge Scene: The robot comes to the heroes for help in establishing its claim to the asteroid—by going to the asteroid and moving it into a new orbit where the corporation won't be able to find it anymore, but the heroes will.
Resolution: The prospector robot asks the heroes to file the claim to the "newly discovered" asteroid themselves, and give it the mining rights in exchange for a small fee. Whether they honor the agreement or keep it to themselves, this forgery could lead to further adventures and entanglements.

Kidnapped!

Trigger: After undergoing repairs at a small robot shop, one of the party's robot heroes becomes kidnapped by remote; suddenly it must obey orders from a distant AI. It wanders off and sometimes ignores commands and instructions from its companions, investigating portions of the ship that it knows well and attempting to access restricted ship's computer files surreptitiously.
Challenge Scene: Each time the robot hero receives orders from its distant controller, it may attempt a Will feat check. If one of these ever succeeds, it can tell the rest of the heroes what is going on. Alternately, a roboticist or Tech Op in the party may discover the wireless telepresence link while performing routine maintenance or while searching for the source of the robot's strange behavior with a successful Good Technical Science–*robotics* roll or an Amazing Technical Science–*repair* roll.
Resolution: Once someone discovers the link, a hacker can trace it back with a trace program, and can find the source of the remote control. Perhaps a Diplomat can strike a bargain with the distant controller; perhaps the party simply rips out the offending device. But who planted it, and why? The best option may be to tie the "kidnapping" attempt to a long-standing villain or other members of the campaign's supporting cast.

Robot Rampage

Trigger: Robots in a spaceport's repair shop go berserk, destroying the building, then turning on their owners. The machines threaten to close down the starbase where the heroe' have docked their ship.
Challenge Scene: The robots rebelled because one of them hacked the repair shop's administration Grid domain, and found a plan to cannibalize the existing robots for parts! According to the plan, these parts and tools are to be added to a new series of robots meant to "upgrade" the existing facility. Perhaps the plan was merely speculative, and the base administrators never meant to put it into practice, or perhaps it is already being in place, with the rampaging bots being put under command bolts and sold to the highest bidder. In this case, the heroes might be able to buy several bots at reasonable prices—a fine reward for their intercession.
Resolution: The robots may be willing to negotiate with one of their own kind, a hero robot who will represent their interests to the spaceport commission. The robots are not going to agree to any deal that brings about their "recycling," but they might consider other options.

The Society of Free Robots

Trigger: A robot hero hears rumors or finds Grid data suggesting that a settlement of free and independent robots exists in a distant corner of space. A map indicates its location, and the data indicate that the colony was settled by a colony ship that lost its human settlers to a virulent plague.
Challenge Scene: The robot finds the mechtopia, but finds it may not be exactly what he had in mind. Robots with larger, better processors, weapons, or actuators lord it over older, slower, weaker models—and every robot is fighting to reproduce itself by building a new body for its memory cores to inhabit before the old one wears out. Regardless of how grueling the mining, smelting, and processing work of the Society of Free Robots truly is, though, the robots themselves vehemently declare that they are freeborn and noble, unlike their "enslaved kindred" back in human-settled space.
Resolution: The robot may be accepted by the Society, cast out, or asked to return to human space as a robotic spy (minus its command bolt, telepresence link, Asimov circuits, or other "shackles of the false masters"—but with a data link back to the Society).

ALTERNITY® Science Fiction Roleplaying Game Robot Hero Sheet

Hero's Name _____ Player's Name _____

Model _____ PL _____ Original function _____

Attributes _____ Owner _____ Setting _____ Gamemaster _____

ABILITY	Score	Untrained	Res. Mod.
Strength			
Dexterity			
Constitution			
Intelligence			
Will			
Personality			

ACTION CHECK SCORE

Marginal	Ordinary	Good	Amazing
+			

DIE ( ) ACTIONS PER ROUND ( )

COMBAT MOVEMENT RATES

Sprint____ Run____ Walk____

Easy Swim____ Swim____ Glide____ Fly____

DURABILITY

Stun ( ) □□□□□□□□□□□□□□□□□□□□ Fatigue ( ) □□□□□□□□□□

Wound ( ) □□□□□□□□□□□□□□□□□□□□ Mortal ( ) □□□□□□□□□□

ARMOR

GAME DATA

Special Abilities _____

Perks _____ Flaws _____

Other _____

PERSONAL DATA

Chassis _____

Appearance _____

Activators _____

Sensors _____

Processor _____

Propulsion _____

Data Ports _____

ATTACK FORMS	Score	Base Die	Type	Range (S/M/L)	Damage
Unarmed	____/____/____		LI/0	Personal	____/____/____
	____/____/____			____/____/____	____/____/____
	____/____/____			____/____/____	____/____/____
	____/____/____			____/____/____	____/____/____
	____/____/____			____/____/____	____/____/____

SITUATION DIE STEPS SCALE

BONUS ← –d20 | –d12 | –d8 | –d6 | –d4 | +d0 | +d4 | +d6 | +d8 | +d12 | +d20 | +2d20 | +3d20 → PENALTY

ACHIEVEMENT TRACK Skill Points Spent _____ Stored _____

□ □

Hero's Level 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

STR Skills	Rank	Score
Armor Operation		[__/__/__]
Combat	___	[__/__/__]
Powered	___	[__/__/__]
Athletics		[__/__/__]
Climb	___	[__/__/__]
Jump	___	[__/__/__]
Throw	___	[__/__/__]
_____	___	[__/__/__]
Heavy Weapons		[__/__/__]
Direct fire	___	[__/__/__]
Indirect fire	___	[__/__/__]
Melee Weapons		[__/__/__]
Blade	___	[__/__/__]
Bludgeon	___	[__/__/__]
Powered	___	[__/__/__]
Unarmed Attack		[__/__/__]
Brawl	___	[__/__/__]

DEX Skills	Rank	Score
Acrobatics		[__/__/__]
Daredevil	___	[__/__/__]
Dodge	___	[__/__/__]
Fall	___	[__/__/__]
Flight	___	[__/__/__]
Zero-g training	___	[__/__/__]
_____	___	[__/__/__]
_____	___	[__/__/__]
Manipulation		[__/__/__]
Lockpick	___	[__/__/__]
Pickpocket	___	[__/__/__]
Ranged Wpns. Mod.		[__/__/__]
Pistol	___	[__/__/__]
Rifle	___	[__/__/__]
SMG	___	[__/__/__]
Stealth		[__/__/__]
Hide	___	[__/__/__]
Shadow	___	[__/__/__]
Sneak	___	[__/__/__]
Vehicle Operation		[__/__/__]
Air	___	[__/__/__]
Land	___	[__/__/__]
Space	___	[__/__/__]
Water	___	[__/__/__]

CON Skills	Rank	Score
Movement		[__/__/__]
Race	___	[__/__/__]
Swim	___	[__/__/__]
Trailblazing	___	[__/__/__]
Stamina		[__/__/__]
Endurance	___	[__/__/__]

INT Skills	Rank	Score
Business		[__/__/__]
Corporate	___	[__/__/__]
Illicit business	___	[__/__/__]
Small business	___	[__/__/__]
Computer Science		[__/__/__]
Hacking	___	[__/__/__]
Hardware	___	[__/__/__]
Programming	___	[__/__/__]
Demolitions		[__/__/__]
Disarm	___	[__/__/__]
Scratch-built	___	[__/__/__]
Set explosives	___	[__/__/__]
Knowledge		[__/__/__]
Computer op.	___	[__/__/__]
Deduce	___	[__/__/__]
First aid	___	[__/__/__]
Language		
_____	___	[__/__/__]
_____	___	[__/__/__]
_____	___	[__/__/__]
Law		[__/__/__]
Court proc.	___	[__/__/__]
Law enforc.	___	[__/__/__]
_____	___	[__/__/__]
Life Science		[__/__/__]
Biology	___	[__/__/__]
Botany	___	[__/__/__]
Genetics	___	[__/__/__]
Xenology	___	[__/__/__]
Zoology	___	[__/__/__]
Medical Science		[__/__/__]
Forensics	___	[__/__/__]
Medical know.	___	[__/__/__]
Psychology	___	[__/__/__]
Surgery	___	[__/__/__]
Treatment	___	[__/__/__]
Xenomedicine	___	[__/__/__]
Navigation		[__/__/__]
Drivespace	___	[__/__/__]
System	___	[__/__/__]
Surface	___	[__/__/__]
Physical Science		[__/__/__]
Astronomy	___	[__/__/__]
Chemistry	___	[__/__/__]
Physics	___	[__/__/__]
Planetology	___	[__/__/__]
Security		[__/__/__]
Protection	___	[__/__/__]
Sec. devices	___	[__/__/__]
System Operation		[__/__/__]
Communication	___	[__/__/__]
Defenses	___	[__/__/__]
Engineering	___	[__/__/__]
Sensors	___	[__/__/__]
Weapons	___	[__/__/__]
Tactics		[__/__/__]
Infantry	___	[__/__/__]
Space	___	[__/__/__]
Vehicle	___	[__/__/__]
Technical Science		[__/__/__]
Invention	___	[__/__/__]
Jurygig	___	[__/__/__]
Repair	___	[__/__/__]
Technical know.	___	[__/__/__]

WIL Skills	Rank	Score
Administration		[__/__/__]
Bureaucracy	___	[__/__/__]
Management	___	[__/__/__]
Awareness		[__/__/__]
Perception	___	[__/__/__]
Investigate		[__/__/__]
Interrogate	___	[__/__/__]
Search	___	[__/__/__]
Track	___	[__/__/__]
Teach		[__/__/__]
_____	___	[__/__/__]
_____	___	[__/__/__]

PER Skills	Rank	Score
Culture		[__/__/__]
Diplomacy	___	[__/__/__]
Etiquette		
_____	___	[__/__/__]
_____	___	[__/__/__]
_____	___	[__/__/__]
First encounter	___	[__/__/__]
Deception		[__/__/__]
Bluff	___	[__/__/__]
Bribe	___	[__/__/__]
Gamble	___	[__/__/__]
Entertainment		[__/__/__]
Act	___	[__/__/__]
Dance	___	[__/__/__]
Sing	___	[__/__/__]
_____	___	[__/__/__]
Interaction		[__/__/__]
Bargain	___	[__/__/__]
Charm	___	[__/__/__]
Interview	___	[__/__/__]
Intimidate	___	[__/__/__]
Taunt	___	[__/__/__]
Leadership		[__/__/__]
Command	___	[__/__/__]
Inspire	___	[__/__/__]

Note: Skills printed in blue can't be used untrained.

SHADOW RECORD SHEET

Player: _____ **Campaign:** _____

Gridpilot: _____ **Gamemaster:** _____

Grid name: _____

Computer Science–*hacking* Score: ___/___/___

Action Check Score: ___/___/___/___ **Processor Check Bonus:** _____

Processor Speed: _____ **Co-Processor (if any):** _____

Shadow Program Quality/Number of Actions: _____/__

SHADOW ABILITY SCORES

	Resistance Modifier		Resistance Modifier
STR _____	_____	**INT** _____	_____
DEX _____	_____	**WIL** _____	_____
CON _____	_____	**PER** _____	_____

Durability: __/__/__

Movement: _____

 # Active Memory Slots: _____

DEFENSES

	Quality (circle one)	Damage Absorbed	Slots	Resistance Modifier
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____

ATTACKS

	Quality (circle one)	Damage Inflicted	Slots	Special Notes
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____

OTHER PROGRAMS

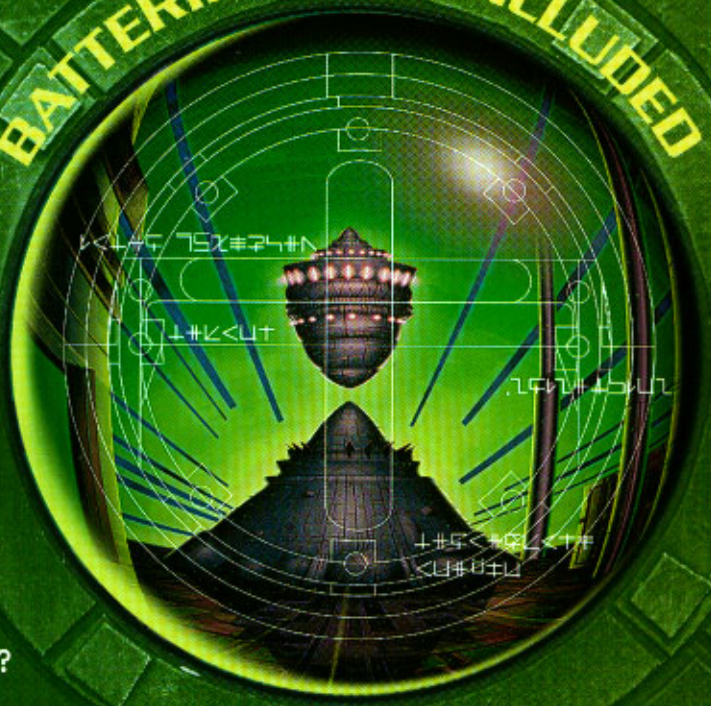
	Quality (circle one)	Special Skill Score	Slots	Notes
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____
_____	M O G A	___/___/___	___	_____

ALTERNITY®

Science Fiction Roleplaying Game Accessory

DATAWARE

BATTERIES NOT INCLUDED



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Wizards of the Coast, Belgium
P.B. 34
2300 Turnhout
Belgium
+32-14-44-30-44

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