
Galactic Federation

Naval Officer's

MANUAL

UPDATE 2582/2/6/13/28

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INCLUDES REPRINTS FROM SUPPLEMENT BOOKS #1 through 8

CHAPTER 1 . . . Stardrive Fundamentals

The Galactic Federation owes its existence to three discoveries. The first of these, whose memory is now almost lost in antiquity, was the interception by primitive radio receivers on earth in the year 1995 of signals from intelligent extraterrestrial life. These signals were transmitted from somewhere near the center of the galaxy and were received on earth for a thirty-year period. The signals stopped suddenly in 2024 and have not been detected since then despite an intensive and expensive search, interrupted only for the so-called Apocalypse of 2030-2055. Whether an accident occurred which destroyed the senders or they are simply waiting for the sentient beings of the Federation to evolve to a higher existence remains a subject of scientific and theologic debate.

The signals received from the central galactic source have never been completely decoded. The full implications of the data were not understood when received and much remains to be understood even today. In addition, parts of the transmission appear to have been garbled by intermittent sunspot activity throughout the thirty years of reception.

All subsequent advances in the natural and physical sciences have been based on the galactic signals. Two of the most important of these, developed only within the last forty years, are activated xenon energy storage and the magnetic recoil reaction drive. These two developments led directly to the first generation of starships.

Activated xenon is xenon gas whose nuclei are predominantly in quasi-stable excited states. Each excited nucleus contains up to ten times as much energy as the rest mass of a normal xenon nucleus. The energy stored can be tapped electromagnetically. It is also possible to pump energy back in a similar way. Thus, the activated xenon serves as an efficient storage battery. Up to 50% of the mass-energy in a fully charged starship is available for driving the magnetic recoil reaction drive.

It was realized very shortly after the first successful excursions into space that reaction rocket engines would not be practical for interstellar travel. Reaction rocket engines are inefficient because most of the energy is spent throwing the rocket exhaust backward rather than propelling the ship forward, and the energy is not recoverable once spent. Reaction rockets are, of course, useful in some situations. Ion boosters, advanced forms of reaction rockets, are incorporated into all stardrives.

The key problem preventing the development of a more efficient engine for interstellar travel was the lack of something to "push" against in the vacuum of space. The problem was finally solved forty years ago when a poorly translated section of the galactic code was reexamined in the light of modern knowledge about electromagnetic fields. The entire galaxy is permeated by electromagnetic fields carrying an appreciable fraction of the total mass-energy in the galaxy. The new understanding of the galactic code enables engineers to build a device capable of "warping" the electromagnetic fabric of the galaxy

and pushing against it. By pushing against such a large effective mass, a starship spends most of its energy accelerating itself, not its rocket exhaust. Perhaps just as important is the ability of the "warp" engine, or the magnetic recoil reaction engine, as it is properly known, to recover 99% of the expended energy when the starship slows down and stops at its destination. Because the warp engine continuously feeds and recovers energy from the galactic electromagnetic field, only the enormous energy storage capability of activated xenon allows practical operation of the engine.

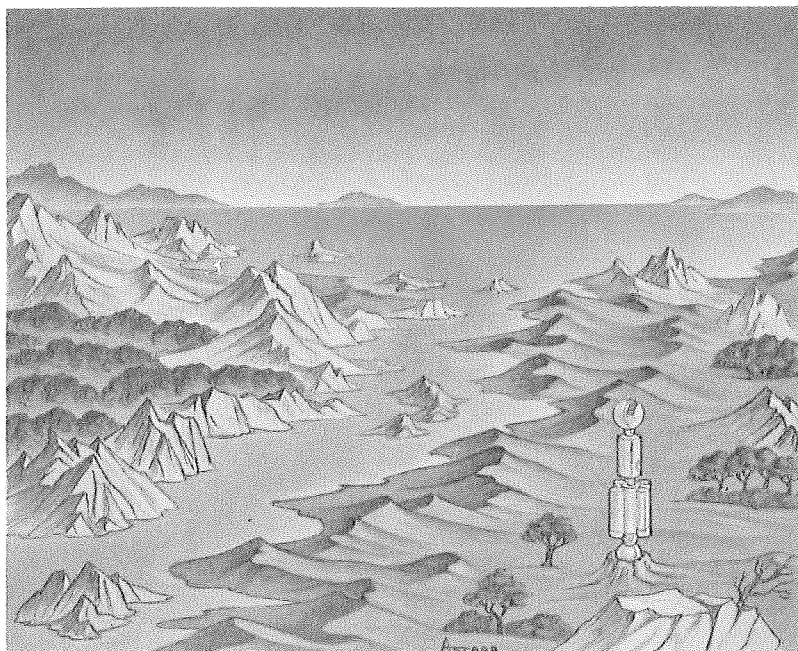
The development of the starship has made interstellar voyages practical, but still not as simple as a jaunt around the solar system. Consider a typical starship as observed from a galactic frame of reference. The ship is able to convert up to 50% of its rest mass-energy into kinetic energy, implying a speed of roughly 87% of light. Neglecting several years on each end of the trip for acceleration and deceleration, this means that a distance of 10 light-years can be covered in 11.5 standard earth years. Because of relativistic time dilation, only half as much time would pass on the ship. However, even 6 years is a long time to do nothing, and so to conserve life support (as well as the crew's sanity), hibernation chambers are installed in which crews can sleep for extended periods. At any given time during interstellar travel, most crew members are asleep. Aging during hibernation sleep is minimal.

As sophisticated as today's starships are, the G.F.N. is aware that further developments remain to be made. Even at 87% of light speed, the range of a starship is limited to several hundred light-years because of maintenance and personnel problems. We are therefore, at present, limited to explorations of only one small corner of the galaxy. The speed of light barrier, discovered almost seven hundred years ago, remains to be broken. Until then, mankind's fundamental question, the origin of the galactic signals, will never be answered.

CHAPTER 2 . . . Abridged Planet Guide

Galactic Federation Naval Officers will find the following information useful in their explorations.

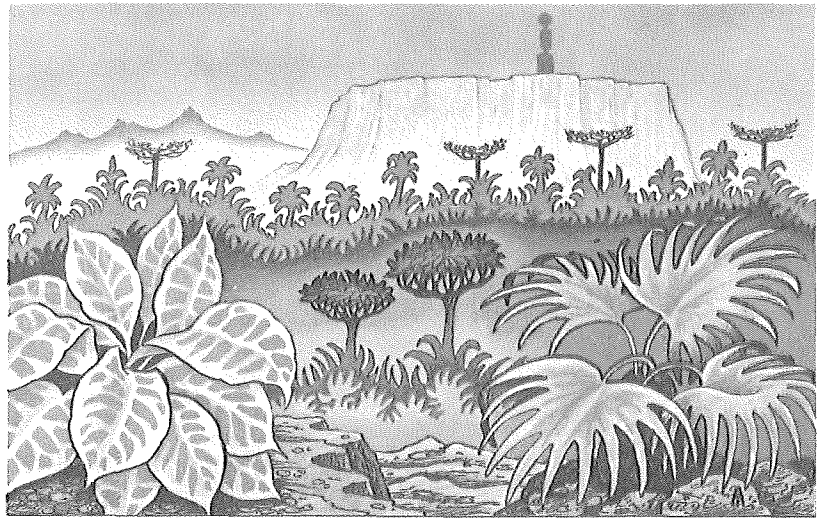
[Note: For security reasons, only the planets to be visited on this tour of duty are listed.]



ALTAIR IV

This planet is much like the temperate zone on earth. The atmosphere is breathable. Starships are programmed to land on a grassy field near the planet's ocean. Most of the land is covered by a dense forest which remains to be explored. There are no known native intelligent life forms.

WARNING UPDATE 2582/1/23/16/03: SUSPECTED PIRATE ACTIVITY IN THIS STAR SYSTEM.



TAU CETI III

Tau Ceti III is a jungle planet. The atmosphere is breathable. Starships are programmed to land on a high plateau above the jungle.

RESTRICTION UPDATE 2576/4/9/08/00: DUE TO INTERFERENCE WITH NATIVE SENTIENT SPECIES BY MISSIONARIES OF THE UNIVERSAL GALACTIC FAITH CHURCH, LANDING RESTRICTED TO EMERGENCIES ONLY.



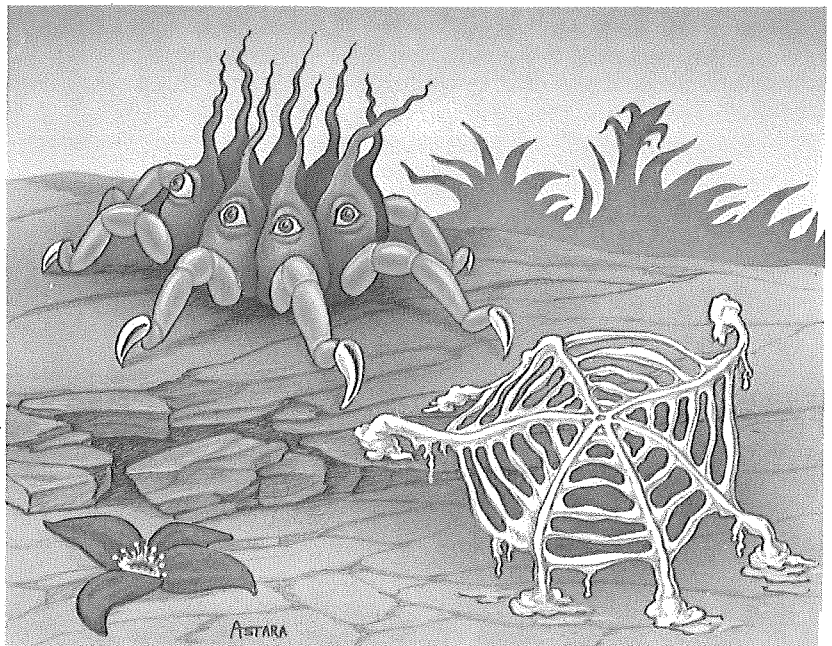
There are two native sentient species; descriptions below.

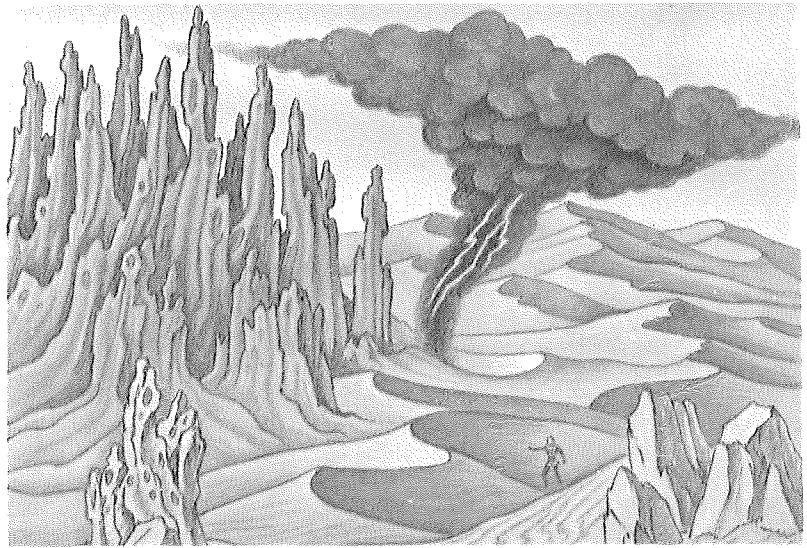
TAU CETI LIZARD

The Tau Ceti Lizard resembles a large earth reptile. Average size is three meters from snout to tail. It has a large brain case and its intelligence is estimated to be equal to the most intelligent members of the extinct cetacean family of earth. Its only natural enemy is the other intelligent species on the planet, the Tau Ceti Arachnoid.

TAU CETI ARACHNOID

The Tau Ceti Arachnoid resembles a giant earth spider. It is actually a symbiotic combination of nine creatures. The first eight each have one eye, one brain, one leg, and a full set of digestive organs. These eight are connected by a complex neural network and form the arachnoid itself. The ninth creature is a quasi-living web which is coated by the stickiest naturally-occurring organic chemical known in the galaxy. The web is capable of some movement and will attempt to trap any target in range. The arachnoid controls the web in a manner not yet understood; if its arachnoid dies, the web ceases to function. The intelligence of the arachnoid is hard to determine, but is estimated to be slightly below that of its only natural enemy, the Tau Ceti Lizard, which has somehow developed an ability to circumvent the web.



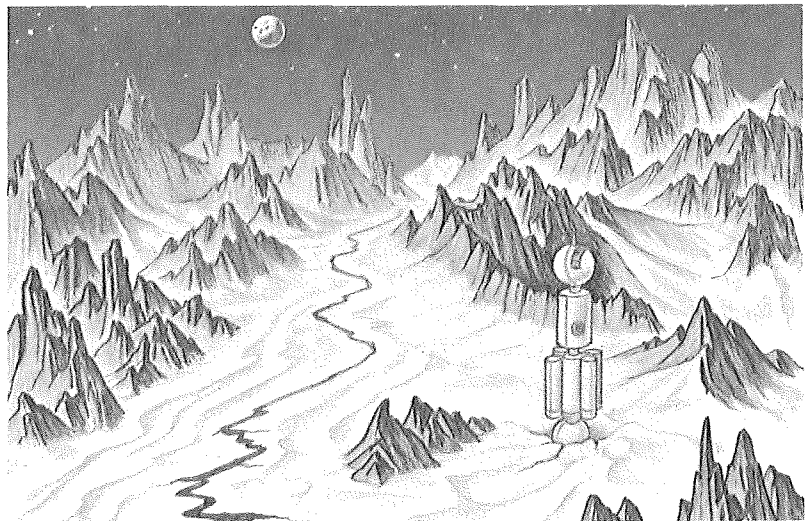


EPSILON ERIDANI V

Epsilon Eridani V is a desert planet. Violent sandstorms make mapping from orbit difficult. The atmosphere is poisonous. Preliminary surveys have reported some unusual markings in the sand which suggest the tracks of living creatures, but no living creatures have been found.

RIGEL X

Rigel X is a frozen planet with a thin, cold, unbreathable atmosphere. It contains the Hawking Ice Field, the largest glacier in known space. Because of its large extent, the glacier has never been completely explored.



OFFICER'S MANUAL SUPPLEMENT

The following is a collection of the highlights of some of the interesting books and other written records that Joe Justin and Selena Sakarov MIGHT have found during their travels throughout the Galaxy. To avoid confusion, wait until directed by the program to read them.

BOOK 1

FROM: OFFICE OF NAVAL POLICY, FEDERATION CENTRAL
DATE: 2581/12/13/09/34
TO: ALL FEDERATION STARSHIPS OUTSIDE MEMBER SYSTEMS
SUBJECT: INTERFERENCE WITH NATIVE SENTIENT SPECIES
EFFECTIVE: ** IMMEDIATELY **
EXPIRATION: ** NONE **

UNDER NO CIRCUMSTANCES SHALL ANY FEDERATION CITIZEN OR SENTIENT UNDER FEDERATION JURISDICTION INTERFERE WITH THE NATURAL DEVELOPMENT OF SENTIENT CIVILIZATIONS ON NON-FEDERATION PLANETS. ALL SPEAKING, TRADING, EXCHANGE OF GIFTS, DISPLAY OF TECHNOLOGY, AND SIMILAR ACTIVITIES ON SAME PLANETS ARE HEREBY PROHIBITED UNDER PENALTY OF A MAXIMUM SENTENCE OF TWENTY YEARS HARD LABOR IN A PENAL COLONY OR A FINE OF TWENTY THOUSAND CREDITS OR BOTH. ALL VIOLATIONS ARE TO BE REPORTED TO FEDERATION CENTRAL AT FIRST OPPORTUNITY.

BOOK 2 . . . Diary of Klatu in the Year 2538

This record is left in the hope that intelligent beings from a distant world, if any exist, will discover it. I am the last of my race on this dying planet. The sun grows dimmer and the air ever thinner.

Ours was a proud and ancient people. We explored the entirety of our planet and even sent probes to other planets in our solar system. At the height of our greatness, we could have saved ourselves by emigrating to a more hospitable planet or by constructing self-contained satellite communities. Our scientists predicted the changes in climate long before they occurred, but it was easier to enjoy the good life, served by our robots, while the final days seemed far away. Now, the end is here, and it is too late.

To my fellow sentient beings, if any, a warning: Beware of your robots. Fear not to sacrifice them at need. The time may come when you must stand on your own four feet.

OFFICER'S MANUAL SUPPLEMENT

BOOK 3 . . . My Travels in the Wild

by Sir Reginald Farquar Drake, Capt. G.F.N. (Ret.)

CHAPTER 3—I Bravely Face the Howling Snowbeasts

I landed my stately spaceyacht with my usual consummate skill on the desolate Hawking Ice Field, the largest glacier in known space and the least explored region of any planet—just the place to prove once again the worth of manliness and good breeding.

Eschewing reliance on the modern conveniences, I loaded my caddie, Godfrey, with the barest minimum of equipment: tent, snowshoes, extra thermal underwear, xenon pistol, xenon rifle, portable toilet, portable stove, portable 3-D, twenty concentrated gourmet dinners, and tea service for eight. We donned our parkas and set out. I braved the cold winds riding in the open air while Godfrey, unaccustomed to the same rigors as I, kept as warm as he could by pulling the sled.

We had not gone more than a few kilometers when a pack of wild snowbeasts attacked from behind a ridge. I drew out my xenon rifle and carefully took aim on their leader, a huge male with ten horns. I pulled the trigger—nothing happened! Godfrey had been too busy sporting with the snowbeasts to attend to his assigned duties and remind me to release the safety. It was too late now for a clean shot and another trophy for my library wall. I took out Godfrey's record book and made a notation about his dereliction of duty as he continued sporting with a dozen of the beasts.

Godfrey had generally been an acceptable servant, though, and out of consideration for his safety I decided to make an orderly withdrawal. I led us back to the yacht at a brisk and proud pace, in the best family tradition. Godfrey dragged his feet a bit and almost missed getting in before I locked the outer hatch. I quickly realized that he had again neglected his duties by leaving all of my valuable equipment on the glacier. I made another notation in his book and docked his pay to cover expenses.

Envigorated by yet another encounter revealing civilized man's ascendancy over nature, I set our course for Aldebaran V, there to demonstrate my prowess in the steaming jungle.

OFFICER'S MANUAL SUPPLEMENT

BOOK 4 . . . Coda Galactica

CHAPTER 1—Tax Code Digest

[There follows over a thousand pages of text too fine to be read without the aid of a microscope.]

CHAPTER 2—Criminal Code

[There are many pages with nothing that cannot be found in the Federation copy of the Coda Galactica.]

[Here is the section that was garbled by sunspot activity:]

SECTION 538
PARAGRAPH 18342

MUTINY IN HIGH SPACE

The penalty for mutiny in high space shall be enclosure in a recycling spacesuit and ejection into interstellar space with no hope of pardon or retrial unless the convicted mutineer should be guided by the hand of the Creator to find his way back to his planet of origin with indisputable proof of innocence.

[This is the only known copy of the Coda Galactica which contains this paragraph in its correct entirety. The rest of the book is identical to the Federation's ancient copy.]

[This book is very old and probably out of date. There is no such thing as the "Galactic Bureau of Investigation" within the Federation as it is known today.]

G.B.I. INTERSTELLAR FUGITIVE LIST

The Galactic Bureau of Investigations is seeking these fugitives from justice. Consider them armed and extremely dangerous.

ROBESPIERRE DRACONIS—Wanted for six counts of interstellar piracy, ten counts of involuntary sentient slavery, and launching a starship without a license.

OFFICER'S MANUAL SUPPLEMENT

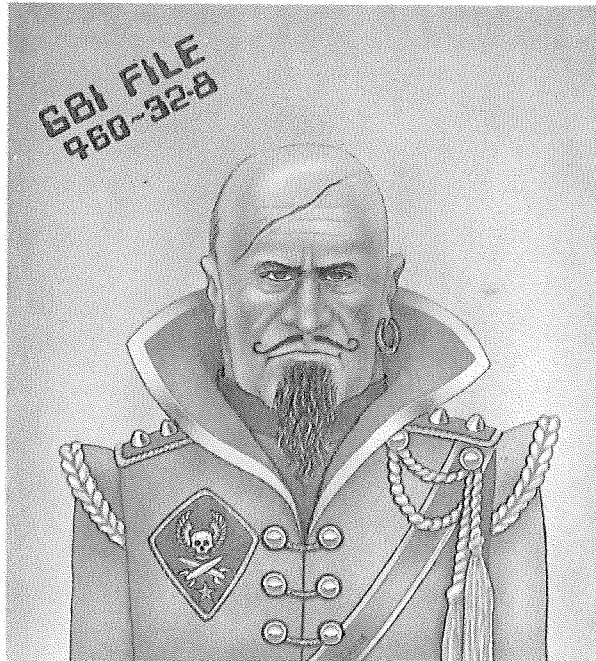
BOOK 5 . . .

X—The G.B.I. is unable to furnish a picture, description, or name for the most dangerous criminal the galaxy has known. To appreciate the importance of extreme caution in this matter, the story should be told from its beginning.

A thousand years ago, a scientist on Epsilon Indii II was conducting experiments on organ regeneration when he accidentally dosed himself with the entire vial of research serum. At first, the serum seemed to have no effect, and so the scientist returned home as usual that evening.

The next morning, the scientist was looking in the mirror prior to shaving [Translator note: Shaving was a crude form of mechanical depilation then employed by some members of sentient species.] and he found himself wishing his beard would simply go away and not be such a bother every day. To his surprise, his beard hairs immediately retracted into his skin, leaving no trace.

Quick to realize the implications of this, the scientist spent the next five cycles [Translator note: This is approximately one standard month.] perfecting his new talent, ignoring all messages on his communication

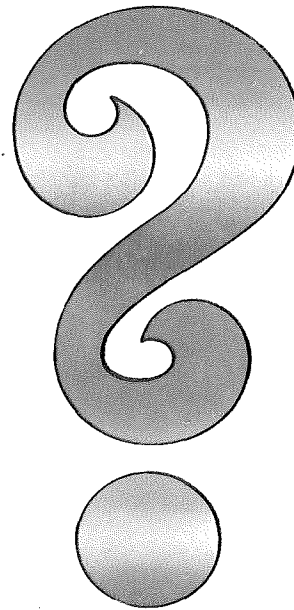


console, urgent or not. He soon discovered that he could change his appearance, grow new limbs, or even change apparent species at will. Flushed with his discovery, he returned to the laboratory, only to find he had been fired because the deadline had passed for filing the renewal forms for his research grant. He vowed revenge and stormed from the laboratory in a rage, beginning a wave of vengeance crimes unparalleled in galactic history.

The scientist, called "X" because his true name is lost in antiquity, has been impossible to apprehend because he can change his height, apparent age, sex, fingerprints, and even body chemical structure at will. X has been at large for nearly ten centuries, effectively immortal because of his regenerative powers.

In addition to petty crimes, X's typical modus operandi is to infiltrate positions of authority by murdering a superior in front of witnesses while disguised as one of his rivals for the newly vacant post. Preferred targets are military installations whose weapons can be turned against helpless civilian population centers. Over three hundred major cities and five entire planets (including his own) have been conclusively proven to have been destroyed by X. Countless other "accidents" have also been attributed to him.

From the few notes left by X recently unearthed in archaeological excavations in the Epsilon Indii asteroid belt, the G.B.I. crime laboratory has formulated a simple chemical test to verify X's identity. Touch any uncovered flesh or other tissue of a suspect to the spot below and the spot will turn from blue to red if the suspect is X. Do not warn the suspect prior to performing the test and have force field restraints or stun weapons immediately available.



OFFICER'S MANUAL SUPPLEMENT

BOOK 6 . . . Stardrive Repair Manual

Open the cover plate and locate the magnetic reversal switch. Taking care not to push the magnetic reversal switch, switch the digital input to 1001000111001110 (binary) and push the test button. Examine the test readout and perform the following repair steps as indicated.

1. If readout-5 is on, go to step 6. Otherwise, remove the power supply bracket and microwave guide tube. Adjust the oscillator timing on the feedback control microcircuit to obtain a pure sine wave of 145.321673 MHz at the analog timing circuit output. Replace the microwave guide tube and the power supply bracket. If readout-6 is on, go to step 2. Otherwise, go to step 3.

2. Push the hold button on the digital-to-analog circuit card. Perform an EVA to observe the valve in the ion boost exhaust. If the valve is open, go to step 4. If the valve is only partially open, go to step 5. If the valve is closed, push the hold button again and go to step 3.

3. Go to the command module and push the blastoff button. If the ship explodes, there was something blocking the ion boost exhaust. Clear the tube and go back to step 1. Otherwise, go to step 6.

4. Switch the digital input to 0110111000110001 (binary). Replace microcircuit AD43262 if readout-2 is on. Replace microcircuit PS3219 if readout-7 is on. If readout-3 is on, go to step 2. Otherwise, go to step 3.

5. Go to the weapons pod and execute the target identification program. Go to the command module and execute the astrogation program. Go to the hibernation module and press the reset button. Switch the digital input to 0000000000000000 (binary). If readout-6 is on, go to step 3. Otherwise, go to step 2.

6. Push the test button on the fuel flow control. If readout-4 is on, go to step 5. Otherwise, go to step 2.

7. Switch the digital input to 1111111111111111. The warp engine is now repaired. Close the cover and mark the maintenance record.

OFFICER'S MANUAL SUPPLEMENT

BOOK 7 . . . Robot Mark IX—User's Manual

The Mark IX is the perfect robot servant for your household. With its natural-looking arms and legs, it serves inconspicuously at all social occasions. In fact, nine out of ten users agree that the Mark IX has enhanced their social lives by showing their guests that they care enough to buy the best.

To operate the Mark IX, hold the control unit, say "ROBOT" in your mind, then think of the command. For example, try "ROBOT OPEN DOOR" the next time guests arrive and won't they be surprised! Your guests will be impressed or General Robotics will give you a full refund.

An optional programming unit will soon be available (at a modest additional cost), allowing the Mark IX to continue its routine tasks unassisted. Think of the time this will save in your busy day.

NOTICE FROM THE ENGINEERING STAFF OF GENERAL ROBOTICS: The delicate mechanisms of the Mark IX may freeze when sticky organic molecules contaminate the bearings. This occasional problem will be corrected in the Mark X, available early next year.

BOOK 8 . . . NOTICE TO ALL CITIZENS

The robot revolt has now been crushed by our assault teams. Only a few robots remain in isolated pockets of resistance. These will soon be cleared and citizens will be allowed back into sectors R and M.

It has come to our attention that some of the Mark IX ringleaders have feigned breakdowns and could be lurking in cleared areas. For your own protection, follow these rules:

1. DO NOT GO NEAR ANY ROBOT, NO MATTER WHAT ITS APPARENT CONDITION.
2. DO NOT ATTEMPT TO OPERATE ANY ROBOT.
3. REPORT ANY ROBOT TO YOUR NEAREST MILITIAMAN.
4. IF YOU ARE ARMED, SHOOT ANY ROBOT ON SIGHT.

The cooperation of all living citizens is urgently needed to eradicate robots forever from our wonderful planet.

Signed,
General Gravvy
Commandant, 14th Militia



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