Program Title HP-41C ADVANCED STAR TREK

Contributor's Name JAMES P. PATTERSON

Address DOE/AES UPPER AIR, P.O. BOX 58

City CAMBRIDGE BAY   **State/Country** N.W.T. CANADA   **Zip Code**   XOE OCO

Program Description, Equations, Variables Welcome aboard the United Star Ship ENTERPRISE. As the captain, you are responsible for the safety of this ship and it's crew. Your mission, while playing this game, is to seek out and destroy any enemy star ships that you may encounter and salvage a stranded, friendly freighter. During the course of this mission, you run the risk of being destroyed, either by poor judgement on your part, or by bad luck. Your job, as the captain, is to make decisions which will allow you to complete your mission successfully with the minimum amount of fuel used.

During the course of the game, you will move the ENTERPRISE within the limits of your "Universe" in an attempt to locate all of the aliens. This "Universe" is a 3-D cube, 100 units on each side. At no time, will you be allowed to move outside the limits of this cube. You will pilot the ENTERPRISE on a triaxial co-ordinate system, with each point corresponding to the three co-ordinates "X", "Y", & "Z". This cube is represented in FIGURE 1. The eight corners starting with STARBASE, are as follows:

00,00,00; 99,00,00; 99,99,00; 00,99,00; 00,99,99; 99,99,99; 99,00,99; & 00,00,99.

Your primary objective, while playing the game, is to finish it without getting blown up, something, that you may have trouble doing for the first few times.

Necessary Accessories WITH PRINTER: 3 MEMORY MODULES. NON-PRINT: 4 MEMORY MODULES

Operating Limits and Warnings During weapon fire, should the combatants's position be such that the two firing angles(θ & ϕ) become exact(ie: ENTERPRISE = 15,15,15; ENEMY = 15,45,15 making θ = 90, & ϕ = 0), you should input one of the two angles with an added error(ie: input 0.001 instead of 0.000) since two correct inputs would cause an error display when calculator tries to compute LN(A) of $\frac{"}{\alpha}$ Formula of Status Report.

Reference(s) Mr. Schneider's "ADVANCED STAR TREK" User Library # 00369D

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Aside from the ENTERPRISE, there are four alien vessels that play in this game - all represented by the calculator. Three of these are enemy starships, being the - starting with STRONGEST - KLINGON(2), ROMULAN(3), & VALLICIAN(4). The fourth is a friendly, but stranded freighter - NUBIAN(1) - which you must salvage at one point or another, during the game. The warships, on the other hand, must all be destroyed.

The (X,Y,Z) co-ordinates of the ENTERPRISE are always displayed in the following way: XX.OYYOZZ - where "XX", "YY", & "ZZ" are the X, Y, & Z co-ordinates(00 to 99) and the "0's", are the placeholders. If you are engaged in battle or have NUBIAN in tow, then display is NEGATIVE. This is also how it is stored in its respective register(s). The co-ordinates of the other ships are stored in their respective registers in a slightly different format: 1XX.1YY1ZZi - where "XX", "YY", & "ZZ" are the X, Y, & Z co-ordinates, "1's" are the placeholders, and "i's" are the ships' identification(I.D.) numbers which are: NUBIAN=1, KLINGON=2, ROMULAN=3, & VALLICIAN=4. However, when their co-ordinates are displayed, the same format as for the ENTERPRISE, is used. Also, the I.D. for the four alien vessels, corresponds to their respective storage registers for their co-ordinates.

To start a game, you must first initialize the calculator with a seed. This is a number between "0" and "1". This then causes the calculator to generate the co-ordinates of the four aliens and store them. It then employs the LONG RANGE TRACKING SYSTEM (LRTS). This is one of two systems that help you to find the aliens. The other is the SENSOR PROBE (SNS). The LRTS generates a three digit number called the MISSION SECTOR. Each digit corresponds to the "X", "Y", & "Z" range, in which, at least one or more of the aliens can be found. The display format is "XYZ" and the range of these numbers is: 1 = 00 to 24; 2 = 25 to 49; 3 = 50 to 74; & 4 = 75 to 99

After the Mission Sector has been displayed, the SNS is then deployed, which will then display the distance to the nearest alien. Should any alien be < 40 units away, then it's I.D. will also be included, unless the SNS was damaged(SNS U/S), in which case, only the distance will be displayed. Also, aliens are displayed(those < 40) in numerical order by I.D.'s. Should a vessel be $\leq$ 35 units away, and if it is one of the three enemies,then the ENTERPRISE is considered under ATTACK, unless the NUBIAN is also one of the vessels $\leq$ 35 units, in which case, you must salvage it first, before you can do battle with the enemy. Should the NUBIAN be this close, you will also be receiving communications as shown by the display "NUBIAN", which will then be followed by it's position formatted as: 1.XXYYZZ. To salvage the NUBIAN, you must be closer than 10 units for the TRANSPORT/TRACTOR BEAM (TTB) to work. Should you try at a greater distance, "TOO FAR AWAY" will be displayed. Once you have the NUBIAN in tow ("NUBIAN""IN TOW"), you can then engage the enemy. This will be done automatically by the calculator, but you have to select the alien you wish to fight, by it's I.D. number, and after doing this, then enter a value for the shields(0 to 99).

When you are fighting an enemy warship, you have to rely on a STATUS REPORT, to determine how well your attack is going, for and against you. It is displayed in the following format:

$$DD.OS_\varepsilon S_\varepsilon OS_\alpha S_\alpha SS$$ - where -

"DD" is the distance to enemy rounded-off

"0's" are placeholders

"$S_\varepsilon S_\varepsilon$" is ENTERPRISE's Status (00 to 99)

"$S_\alpha S_\alpha$" is ENEMY's Status (00 to 99)

"SS" is value of ENTERPRISE's Shield (00 to 99)

The objective, during a battle, is to force the Enemy's Status to 100 before he can force yours to 100. For this to happen, your weapons must be fired in the right

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direction. After the Status Report display; first the ENTERPRISE's co-ordinates(neg) then the ENEMY's, are displayed. These values are used to determine the correct firing angles(Theta & Phi). See FIGUREs 2 & 3 to see how it is done. To help you find these angles correctly, I have included a WEAPONS ANGLE COMPUTOR(SCWAC), which automatically displays "DISTANCE","THETA",&"PHI" to the Enemy engaged in battle. By using this data, you should have little difficulties in destroying the enemy, unless you got too close, or he happens to be the ROMULAN. If you got too close, particularly to the KLINGON, your Status may reach 100 before you can force his to 100. Also, should your Status exceed 70, then your SNS becomes damaged and will be displayed as "SNS U/S". Should this happen, you will no longer know the Enemy's Status, nor any alien's I.D., or if the ROMULAN has deployed his CLOAK(more on this later). To repair your SNS, you must either destroy an enemy ship(not same one that caused damage during same battle), or dock at STARBASE for repairs. Should your Status then exceed 85, you then will lose your shields, displayed as "NO SHIELDS". Once this occurs, you have only two choices to make. Either try to destroy the enemy with your next shot (highly unlikely), or use the CORBOMITE MANEUVER to trick the enemy into retreating beyond the 35 unit battle zone. Should your Status climb too quickly, you will have no time to carry out any maneuvers, because you will have been BLOWN UP!!

Whenever you engage the ROMULAN in battle, he will deploy a Cloaking Device to distort your weapons firing angles. The amount will vary, but can be as high as ± 9 degrees. Your Status and that of the ROMULAN are your only means to determine how close your guesses are, which is why he is so dangerous to engage in battle if your SNS has been damaged. Using the SCWAC, you can at least establish the range from which you can make your guesses. Based on the changing status between combatants, you should be able to zero in on the correct angles before he is able to destroy you. The distance at which you engage for battle will determine how much time you will have to perform this task. From your initial status, just after setting your shields, will help you to determine the strength of the Cloak as the stronger it is, the weaker is his weapon fire against the ENTERPRISE. You must also take into consideration, the distance between the combatants. The further away you are, the more accurate your guesses must be to have any effect on his Status. The closer in you are, the less accurate your guesses have to be for effect, but unfortunately, his return fire has more effect on your Status; therefore, giving you less time to react to correct your angles after each Status report. Your skill will improve with practice.

Docking at STARBASE, requires that you be closer than 10 units and there must be no enemy warships closer than 40 units to the STARBASE. Should any enemy be this close during a docking attempt, "ALIEN" will be displayed, indicating that until you destroy him, STARBASE will not let its shields down to allow you to dock. A successful docking is shown by the display "DOCKED", and had your SNS been damaged, they will be repaired and "SNS REPAIRED" will be displayed to so indicate. Also, should the NUBIAN been in tow, it will be released at STARBASE.

When you first play the game, should any enemy warships be ≤35 units from the STARBASE, you will come under attack before ever leaving the STARBASE. You will have to destroy all enemy vessels within this distance, before you can leave the STARBASE. If necessary, the Corbomite Maneuver can be used, but only if you should lose your shields.

Should you cause the game to stop due to an incorrect procedure, you can restart the play by keying "SNS" which has been assigned to "1/x". Also, should be unfortunate in causing your own self-destruction, you can have a second change by keying "SNS" and you once again find yourself doing battle with the enemy who caused your demize. Who says you shouldn't have a second chance. Least wise, you can't do any worse, and you can keep trying until you either get it right, or wear out the keys on your calculator.

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MAKING ENTRIES:

When you have plotted a course for the ENTERPRISE, you then have to enter and execute it. In order to do this, you must enter three items and in the correct order. You must enter the DISTANCE, then the THETA(θ), & PHI(ϕ) angles with the correct signs. The furthest distance you can go, is 171 units, being diagonally across the cube. Should you try a course that would take you outside the cube, you will be charged for the fuel for the trip, but your position will remain unchanged. See FIGURES 1,2,&3 for complete descriptions on how the angles are derived. If the SECTOR/COURSE/WEAPONS ANGLES COMPUTOR (SCWA) is used, these angles are computed automatically with the correct amounts and signs. Once the three values have been decided, you can execute a course change using these values. You must enter and execute as follows:

"DISTANCE"(ENTER↑)"THETA"(ENTER↑)"PHI"(CHN)

Make sure you have the correct sign when entering the Theta & Phi angles. Also, I have assigned the "CHN" function to the "Σ+" key. Once the above has been entered, the calculator will decide if it is a legal move, and if so, will carry it out. If you wish to continue on the same course, that is, the same distance and direction, you need only press one key, that being the "STD", which has been assigned to "Σ-". In this way, you can use a small distance to make a course consisting of small jumps to aid in finding the aliens. Below, is an example of both.(Seed entered first)
· Starting out from STARBASE:

10 ENTER↑ 35 ENTER↑ 25 Σ+ moves the ENTERPRISE to 7.005004(X=7, Y=5, Z=4)

To move 10 more units in the same direction, key "Σ-", which will then move the ENTERPRISE to 14.010008 (X=14, Y=10, Z=8). In order to return to Starbase, use the SCWA computor by keying "O" then "R↑". You will then be given the Distance, Theta, and Phi required to make this course change. Following example illustrates this:

O R↑ gives "DISTANCE" "18.97" "THETA" "-144.46" "PHI" "-24.94"

Enter it as follows to get back to Starbase:

19 ENTER↑ 144.46 CHS ENTER↑ 24.94 CHS Σ+ moves the ENTERPRISE to 0.000000 (Starbase)

There are three other types of entries, but these have to be made while the program is running, that is, during the pause or blinks. The first is made after you have been notified "UNDER ATTACK" . Once this happens, you will be asked to select the ship you wish to do battle with. Should there only be one, then that is the one you must choose, but should there be more then one, you can choose which you wish to fight first, knowing that once he has been destroyed, you will automatically be UNDER ATTACK by the next one. After the display "UNDER ATTACK", the co-ordinates of the ENTERPRISE is displayed, followed by the I.D.'s of the enemy ships within attacking range(≤ 35 units), displayed in following format:

"0.0234" in which the numbers "2", "3", or "4" will either be included or omitted, depending on whether those ships are within attacking range. As a further note, should your SNS be damaged, in place of this display, you will see "SNS U/S", and therefore, will not know who is or are attacking you. It is during this display, which will be flashing, that you must make an entry of one of the numbers displayed, corresponding to your choice of which enemy you wish to do battle with. Should you be getting "SNS U/S", you will have to rely on your memory as to which ship or ships

is or are attacking and make your choice accordingly. Should you choose an alien not attacking you, when you try to fire your weapons, the display "TOO FAR AWAY" will appear. Your entry need only be keyed, as the calculator will recognize it, and will confirm your choice in the next display which will be: "2.0000", "3.0000", or "4.000", depending on your entry.

Your next action will be to set the value for your SHIELDS. This has to be done during the STATUS REPORT display and must not be greater than "99". The value to use will be determined by the strength of the enemy and its distance. An average starting value is "85", but this can be changed as the fight progresses, to a higher or lower value depending on whether or not you are winning. Again, any changes must be made during the blinking sequence of the Status Report. Refer to earlier explanations as to its format. When it is first displayed, you will get the distance(rounded-off) to the enemy, followed by eight zeros. After you have keyed in your value, the display changes to show your status(ENTERPRISE's) with the shield value as entered. Until you start firing on the enemy, his status will remain at "00".

The last type of entry, is your weapons fire, which occurs during battle. This is a two-stage entry. You must first initialize the WEAPONS FIRE (WPN) by keying "WPN", which has been assigned to "y^X". Once this has been done, wait until your display returns, then key in the THETA and PHI angles and fire by choosing your weapon, either PHASERS(PHS) or PHOTON TORPEDOES(PHT). As the display at this point, is blinking, and switching from the Status Report, to ENTERPRISE's co-ordinates(NEG), then to ENEMY's co-ordinates, then back to Status Report; you should try to make all of the entries together. You will find, that as you key each entry, the program slows down, giving you plenty of time to complete the entries required to execute the firing sequence. There are two differences between the Phasers and Photon Torpedoes.

1.   Photon Torpedoes increase the enemy status twice as fast as had you fired your Phasers instead. (PHS: Status Change=5; PHT: Status Change=10).

2.   Fuel cost in using PHT over PHS is 8 to 3 respectfully or 2-2/3's greater.

So why not fire Phasers twice instead of Photon Torpedoes once? Because, each time you fire upon the enemy, he fires back, and the difference between the Enemy's and the ENTERPRISE's Status, is an important factor in determining the new ENTERPRISE's Status. Knowing exactly when to use your Photon Torpedoes, is a skill that will come.

During the blinking sequence, you can use the SCWA computor to find out the correct Theta and Phi angles for weapon fire. By using the SCWA, the blinking will stop, but will be restarted when you key in "WPN". The computor automatically uses the co-ordinates of both combatants to determine these angles. Again, as noted before, in the case of the ROMULAN, these angles will have a possible error as high as ± 9 degrees, due to the use of the Cloaking Device, and you, as the Captain, must decide what the correct value is, by trial and error, hoping, that you do not cause your own destruction in the process.

HOW FUEL COSTS ARE CALCULATED

1.   Except for its first use when the game is initialized, use of the LONG RANGE TRACKING SYSTEM (LRTS) will cost you 250 fuel units.

2.   Making course changes costs 5 times the distance, or 6 times the distance if the NUBIAN is IN TOW(TTB). As mentioned before, should the attempted course change, place you outside the "Universe"(cube), you will be charged for the equivalent fuel costs, without moving anywhere. Such moves could be costly.

3. Fuel costs are 2 times the value set for the Shields unless you have the NUBIAN IN TOW (TTB), in which case, it is 3 times the value as set by you.

4. Weapons fire will cost you 3 times the distance if Phasers are used, or 8 times the distance, if Photon Torpedoes are used.

Shields and firing fuel drain calculated each time weapons are fired.

FORMULAE USED TO CALCULATE CHANGES IN ENEMY AND ENTERPRISE STATUS:

$$\Delta S_\varepsilon = INT \left[\frac{(6 - i)(1000)(S_\varepsilon - S_\alpha + 100)^2}{D(10 \times S)^2} \right]$$

$$\Delta S_\alpha = INT \left[\frac{\{0.1 - 0.03*(LN\ A)\}(S_\alpha - S_\varepsilon + 100)^2 W}{D} \right]$$

* To make the game more challenging, change this to -0.04 (Program line # 584)

WHERE:

ΔS_ε = the change in the ENTERPRISE's STATUS

ΔS_α = the change in the ATTACKING VESSEL's STATUS

i = the I.D. of the ATTACKING VESSEL(KLINGON=2, ROMULAN*=3,4,or5, VALLICIAN=4)

S_ε = ENTERPRISE's STATUS

S_α = ATTACKING VESSEL's STATUS

D = DISTANCE

S = SHIELD SETTING

LN = NATURAL LOG

A = the sum of the ABSOLUTE VALUES of the DIFFERENCES of the TWO GUESSED ANGLES and the CORRECT ANGLES.

W = "1" for PHASERS. "2" for PHOTON TORPEDOES

* The more the ROMULAN Cloak is used, the higher is the value of its I.D. and the lower is the change in the ENTERPRISE's Status for any set values.

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HOW TO USE THE "PRACTICE FIRING RANGE"

The two angles used in firing weapons are derived from two right-angle triangles as shown in FIGURE 2. which represents the two angles: THETA (θ), which is found in the "X-Y" Plane; and PHI (ϕ), which is found in the "X-Y to Z" Plane. You will find the formulae used to determine both angles to the left of the tables in FIGURE 3.

They are: THETA $= TAN^{-1}(\Delta Y/\Delta X)$ & PHI $= SIN^{-1}(\Delta Z/D)$

where: $\Delta X = X_\alpha - X_\epsilon$; $\Delta Y = Y_\alpha - Y_\epsilon$; $\Delta Z = Z_\alpha - Z_\epsilon$; & $D = \sqrt{\Delta X^2 + \Delta Y^2 + \Delta Z^2}$ which is the distance between the two vessels.

The relation of Theta in the "X-Y" Plane in determining its amount and sign are also included under the formulae. In determining the sign of Phi, if the ratio is negative, so is the angle's sign. Likewise, if the ratio is positive, then so is the angle. Another way of looking at it, positive means you are firing up, and negative means firing down. (Up is when $Z_\alpha \geq Z_\epsilon$; & Down is when $Z_\alpha < Z_\epsilon$)

When you use the Practice Firing Range(PFR), the ENTERPRISE's co-ordinates are fixed at 50.050050 (XX=50, YY=50, ZZ=50) and the Enemy's is determined by the seed you enter (0<1) and will change after each practice shot. The program displays "ENTERPRISE" followed by it's co-ordinates, which will blink three times, followed by "ALIEN", then by it's co-ordinates, again blinking three times. The program starts off by giving the distance between both vessels as "DISTANCE" followed by the amount, again blinking three times. This cycle will repeat itself until you enter your firing angle guesses: DISTANCE, ENTERPRISE, ALIEN, DISTANCE, etc......

Use the following format to fire your weapons at the enemy vessel:

THETA(SIGN if negative)(ENTER↑) PHI(SIGN if negative)(R/S)

After this has been done, the program will come back with the correct THETA angle followed by the amount of your error, followed by the correct PHI, followed by amount of error, followed by the total error in both angles. The program then sets new co-ordinates for the enemy, displaying first the DISTANCE, then the co-ordinates for the ENTERPRISE, then those for the ENEMY, again, in the same format as described in the above. You then make your new guesses and enter them, again, in the same manner as the above. You can keep firing at new positions as long as you wish as program will continue until you stop it(R/S). An example of several practice shots are shown on the next page.

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Follow the instructions in loading this program. Set calculator in the "USER" Mode. Enter a seed and start your firing lessons. Keyed entries are contained in brackets and calculator displays are in quotation marks.

(.1234566789)(XEQ)(ALPHA)(PFR)(ALPHA)
"DISTANCE" "20.223748" "ENTERPRISE" "-50.050050" "ALIEN" "59.048032"

Above will repeat itself until you make angle entries such as the following. From the tables, the approximated ratios $\Delta Y/\Delta X \approx -.222..$ and $\Delta Z/D \approx -.89.,$ result in the approximate angles of -10 for THETA and -60 for PHI. Enter them as follows:

(10 CHS)(ENTER↑)(60 CHS)(R/S) *NOTE* Program stops when two(2) entries made.

"THETA" "-12.528808" "ERROR" "2.528808" "PHI" "-62.878615" "ERROR" "2.878615"
"TOTAL ERROR" "5.407423" followed by the new displays:
"DISTANCE" "20.928450" "ENTERPRISE" "-50.050050" "ALIEN" "40.067057"

Again, the above will repeat itself until angles are entered. This time, the approximate ratios and angles are: -1.7 for $\Delta Y/\Delta X$ making THETA $\approx$ 120 (-60 + 180); and -.334.... for $\Delta Z/D$ making PHI $\approx$ 20. Enter them as follows:

(120)(ENTER↑)(20)(R/S)

"THETA" "120.465545" "ERROR" "-.465545" "PHI" "19.540491" "ERROR" ".459509"
"TOTAL ERROR" ".925054" followed by the new displays:

"DISTANCE" "12.806248" "ENTERPRISE" "-50.050050" "ALIEN" "44.058058"

The rest I leave up to you. Good luck in your practice. As a further note, during an actual battle in the "STAR TREK" game, the distance will be rounded-off.

Sample Problem (Sketch if Desired)   FIGURE. 1.

TRIAXIAL CO-ORDINATES

"XX,YY,ZZ"
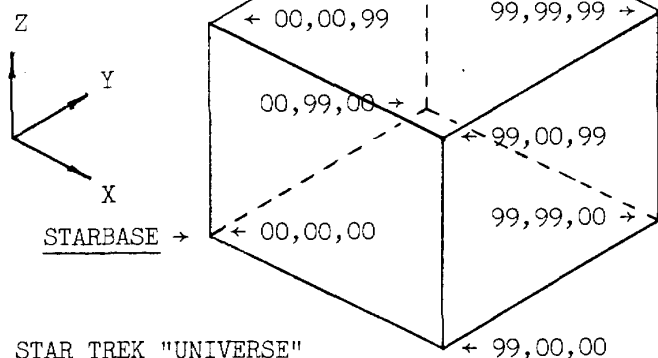
STAR TREK "UNIVERSE"

FIGURE. 2.   ALIEN (XX.OYYOZZ)

"$X_\alpha Y_\alpha Z_\alpha$"

$\Delta X = X_\alpha - X_\epsilon$

$\Delta Y = Y_\alpha - Y_\epsilon$

$\Delta Z = Z_\alpha - Z_\epsilon$
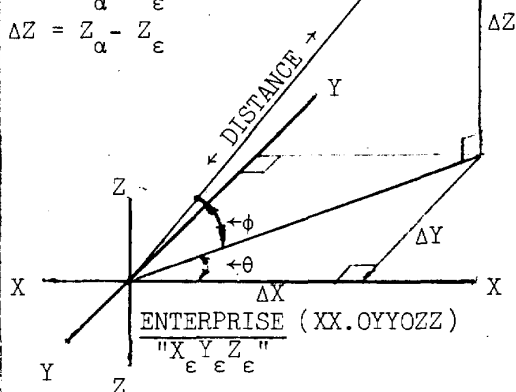
ENTERPRISE (XX.OYYOZZ)
"$X_\epsilon Y_\epsilon Z_\epsilon$"

SOLUTION: ASSIGNED KEYS & FUNCTIONS:

PROGRAM LABELS	ASSIGNED KEYS		FUNCTION	Comments
"CHN"	Σ+	11	COURSE CHANGE	MOVES ENTERPRISE AFTER INPUT OF DISTANCE, THETA(θ), AND PHI(ϕ)
"STD"	Σ-	-11	COURSE STEADY	MOVES ENTERPRISE SAME DIRECTION AND DISTANCE FROM PREVIOUS "CHN"
"SNS"	1/x	12	SENSORS SYSTEM	USED TO LOCATE ALIEN VESSELS. IF VESSELS ≤35 UNITS AWAY, MAY DISPLAY I.D., IF ENEMY, GOES TO "ALT"
"WPN"	y^x	-12	WEAPONS SYSTEMS INITIALIZATIONS	STARTS WEAPONS FIRE IF ENEMY ≤35 UNITS AWAY. "TOO FAR AWAY" IF NOT.
"PHS"	√x	13	PHASERS	FIRES PHASERS AT ENEMY VESSEL
"DOC"	x^2	-13	DOCKING	DOCKS ENTERPRISE AT STARBASE IF <10 UNITS AWAY. "TOO FAR AWAY" IF NOT.
"PHT"	LOG_x	14	PHOTON TORPEDOES	FIRES PHOTON TORPEDOES AT ENEMY.
"LRTS"	10^x	-14	LONG RANGE TRACKING SYSTEM	USED TO FIND ONE OR MORE ALIENS MISSION SECTOR DISPLAYED "XYZ".
"TTB"	LN	15	TRANSPORTER/TRACTOR BEAM	TAKES NUBIAN IN TOW IF <10 UNITS AWAY, OTHERWISE "TOO FAR AWAY"
"SD"	e^x	-15	SEED	ENTERS SEED (0<1) TO START GAME AND SET ALIENS' CO-ORDINATES.
"CCS"	x<>y	21	SECTOR COURSE COMPUTOR	PLOTS COURSE TO MIDDLE OF MISSION SECTOR "XYZ" (DISTANCE, θ, & ϕ)
"CCP"	R↓	22	COURSE COMPUTOR	PLOTS COURSE FOR ENTERPRISE TO "O" (STARBASE) OR "XX.OYYOZZ" INPUTS. (DISTANCE, θ, & ϕ)
"CCW"	SIN	23	WEAPONS ANGLE	DURING BATTLE, PROVIDES "DISTANCE", "THETA"(θ), & "PHI"(ϕ) TO ENEMY VESSEL FOR WEAPONS FIRE.
"PST"	TAN	25	POST OPERATIONS	IF ENEMY DESTROYED, RESETS REGISTERS, IF USED AFTER SHIELDS LOST, PERFORMS "CORBOMITE MANEUVER". USED ANY OTHER TIME CAUSES ENTERPRISE TO SELF-DESTRUCT WITH "3" SECOND COUNT-DOWN.

Sample Problem (Sketch if Desired) FIGURE. 3.

$$\frac{\text{DISTANCE}}{(D)} = \sqrt{(X_\epsilon - X_\alpha)^2 + (Y_\epsilon - Y_\alpha)^2 + (Z_\epsilon - Z_\alpha)^2}$$

$$\text{THETA}(\theta) = \text{TAN}^{-1}(\Delta Y/\Delta X); \quad \text{PHI}(\phi) = \text{SIN}^{-1}(\Delta Z/D)$$

WHERE $\Delta X = X_\alpha - X_\epsilon$; $\Delta Y = Y_\alpha - Y_\epsilon$; $\Delta Z = Z_\alpha - Z_\epsilon$

RULES TO DETERMINE CORRECT VALUE OF THETA

IF $X_\alpha - X_\epsilon = 0$ then THETA = + 90

IF $X_\alpha > X_\epsilon$ then sign and value correct

IF $X_\alpha = X_\epsilon$ and if $Y_\alpha < Y_\epsilon$ then THETA = − 90

    or if $Y_\alpha \geq Y_\epsilon$ then THETA = + 90

IF $X_\alpha < X_\epsilon$ and if $Y_\alpha < Y_\epsilon$ then THETA = θ−180

    or if $Y_\alpha \geq Y_\epsilon$ then THETA = θ+180

APPROXIMATION ANGLE TABLES*

ABS VALUE OF $\Delta Y/\Delta X$	THETA(θ)
0	0
1/2 ....(1/4=14*)	26.5*
1 .....(3/4=37*)	45
3/2 ....(5/4=51*)	56*
2 .....(7/4=60*)	63.5*
4 .....(3=71.5*)	76*
10 .....(6=80.5*)	84*
∞ .....(20=87*)	90

ABS VALUE OF $\Delta Z/D$	PHI(ϕ)
0	0
1/8	7*
1/4	14.5*
3/8	22*
5/8 ....(1/2=30)......	39*
7/8 ....(3/4=48.5*)....	61*
1 ...(33/34=76**).....	90

SOLUTION: EXPLANATIONS OF "ALPHA" DISPLAYS INDICATING "STATUS"

NON-PRINT	PRINT VERSION	INDICATES	Comments
"SNS U/S"	"SNS U/S"	SENSORS SYSTEM DAMAGED	OCCURS WHENEVER ENTERPRISE's STATUS BECOMES > 70.
"UNDER ATTACK"	"ATK"	UNDER ATTACK BY ENEMY ALIEN	OCCURS WHENEVER AN ENEMY ALIEN GETS ≤ 35 UNITS FROM ENTERPRISE. DEFLECTORS UP AUTOMATICALLY
"NUBIAN"	"NUB"	COMMUNICATIONS FROM NUBIAN FREIGHTER	OCCURS WHENEVER THE NUBIAN GETS ≤ 35 UNITS FROM ENTERPRISE.
"NUBIAN""IN TOW"	"NUB""I/T"	TRACTOR BEAM ON. NUBIAN IN TOW.	TRANSPORTER/TRACTOR BEAM(TTB) OPERATION SUCCESSFULLY COMPLETED.
"DOCKED"	"DCKD"	DOCKING AT STARBASE COMPLETED	INDICATES THAT ENTERPRISE HAS DOCKED AT STARBASE SUCCESSFULLY.
"TOO FAR AWAY"	"A/T/F"	ENTERPRISE TOO FAR AWAY TO COMPLETE OR EXECUTE PROCEDURES	OCCURS WHEN TRY TO USE "TTB" OR "DOC" AT ≥ 10 UNITS; TRY TO FIRE ON ENEMY AT > 35 UNITS; OR THE CORBOMITE MANEUVER SUCCESSFUL.
"NO SHIELDS"	"N/S"	LOST SHIELDS DURING A BATTLE.	OCCURS WHEN ENTERPRISE's STATUS EXCEEDS 85 DURING A BATTLE.
"SNS REPAIRED"	"SNS OK"	SENSORS SYSTEMS REPAIRS COMPLETED	OCCURS WHEN SENSORS REPAIRED FROM EITHER DOCKING AT STARBASE, OR DESTROYING AN ENEMY VESSEL(NOT ONE WHICH CAUSED DAMAGE IN FIRST PLACE)
"ALIEN"	"ALIEN"	ENEMY ALIEN TOO NEAR STARBASE	STARBASE WILL NOT LOWER SHIELDS TO ALLOW DOCKING BECAUSE ENEMY ALIEN VESSEL < 40 UNITS FROM STARBASE.
"GAME OVER" "FUEL USED"	"GAME OVER" "FUEL = "	MISSION COMPLETED TOTAL FUEL COSTS	INDICATES MISSION COMPLETED. FOLLOWED BY AMOUNT OF FUEL USED TO COMPLETE MISSION.
"DESTRUCTING"	"DTG"	ENTERPRISE ON SELF-DESTRUCT	CORBOMITE MANEUVER FAILED. USED AT WRONG TIME. THREE SECOND COUNT DOWN FOLLOWED BY:
"YOU BLEW IT"	"YOU BLEW IT"	ENTERPRISE DESTROYED	YOU LOST. THE ENTERPRISE HAS BLOWN UP. BETTER LUCK NEXT TIME.
"CLOAK"	"CK"	ROMULAN IS USING HIS CLOAKING DEVICE	USED BY ROMULAN DURING COMBAT TO DISTORT YOUR FIRING ANGLES(±9)

OPERATIONAL INSTRUCTIONS

Welcome to the "HP-41C Advanced Star Trek" game. For those of you who are familiar with Mr. Schneider's very popular "Star Trek-Advanced"(User Library # 00369D for HP67/97's), this new program is a modification, with some improvements. I have eliminated the need to go from card-to-card, have made most of the programs inter-react automatically, and have replaced his use of scientific notations, with "ALPHA" displays to provide you with your current status as the game progresses. You will note that I have included two(2) versions for you to choose from. One uses four(4) memory modules(Non-print version), and the other uses the printer with three(3) memory modules. The Star Trek programs are identical except in their "ALPHA" displays, with the Print version being abbreviated over the Non-print. Included with the Non-print version, is a Sector/Course/Weapons Angles Computor(SCWAC), which can assist you in making decisions on course maneuvers or weapon firing angles. The Print version, due to its smaller storage capacity, does not have this feature. To replace it, and to help you to practice approximating firing angles, I have included a separate program. This is a Practice Firing Range(PFR) and as the Star Trek program completely fills the HP-41C, you must use it completely separate to the Star Trek one. I have described its operations separately with examples on proceeding page.

As I personally prefer the Non-print version, I have used it in the examples that follow. Besides the use of the SCWAC and slightly longer "ALPHA's", both versions execute the same step and display the same results. When you use the SCWAC, the Sector Computor plots a course to the center of the Mission Sector with just the entry of the 3 digit group derived from the use of the LRTS; the Course Computor gives you all of the necessary information to move the ENTERPRISE to any desired co-ordinate(Starbase=0) by the simple entry of the co-ordinates as displayed by the calculator during a game; the Weapons Angles Computor will automatically calculate the firing angles with whoever you are doing battle with, which will help you to more quickly destroy him. In the case of the ROMULAN, your displayed angles will be within ± 9 degrees, so there is still an element of chance. For those purists,you can play the game without using the SCWAC.

As the mechanics of this program have been explained quite thoroughly earlier on, this is just a brief note on the general operational procedures. The seed must be a value between 0 and 1. The LRTS will generate a 3 digit number which is your Mission Sector, in which, at least one alien vessel will be found. All but its(LRTS) first use, will cost you 250 fuels units. The SNS is usually deployed automatically by other parts of the program, but should the program stop for any reason, or if you blew yourself up and wish to try again, by keying "SNS", you will restart the game. Whenever any aliens get within ≤ 35 units of the ENTERPRISE, unless the NUBIAN is one of the vessels so identified, you will automatically go to Battle Alert, followed by those sequences involved in doing battle with the enemy. Should the NUBIAN also be in this group, you will receive communications until you take it into tow. It must be recovered first before you can go into battle. Once engaged in battle, you can not move until all enemy have been destroyed within the 35 unit battle zone. After an enemy has been destroyed, the program goes to the Post(PST) automatically to reset registers and flags, then deploys the SNS to hunt for other aliens, if any left. With the "ALPHA" displays, you should have a few difficulties in knowing what is happening.

I trust that the examples that I have provided, will help you to better under-stand the mechanics of this game, and that you will find enjoyment in its use.

Good luck and good hunting.

PLAYING THE GAME:

Following examples illustrate how the game operates and the mechanics of its various functions and how they work with each other. **NOTE** Following format used: KEYED ENTRIES indicated by brackets - (xxx) - and displays by the calculator are indicated by quotation marks - "xxx".

EXAMPLE GAME - BEGINNING TO END - SHOWING INPUTS, DISPLAYS, & FLAG STATUS

(.3570148692)(e^x) - Seed entered by pressing assigned key "SD". It is assumed "FO on" that the calculator is in the "USER" mode. If not, the assigned keys will not work.

"444" - Mission Sector - 4 = range from 75 to 99 for "X", "Y", & "Z".

"-70.007142" - Distance to nearest alien vessel - is 70.007142 units. NOTE. This range display is always negative until distance becomes < 40 units.

"0.000000" - Co-ordinates of ENTERPRISE(also STARBASE) (X=00, Y=00, Z=00)

(444)(x<>y) - Sector Course Computor used through assigned key "CCS"

"DISTANCE" "150.69" - Distance to middle of sector is 150.69 units.

"THETA" "45.00" - Theta angle to get to the above point is 45.00 degrees.

"PHI" "35.26" - Phi angle to get to the above point is 35.26 degrees.

(151)(ENTER↑)(45)(ENTER↑)(35.26)(Σ+) - Distance, Theta, & Phi entered for course change using assigned key "CHN"

"110.295630" - Distance to NUBIAN - First "1" is I.D., distance is 10.295630 units

"-41.581246" - Distance to nearest alien vessel is 41.581246 units.

"NUBIAN" - Indicates communications coming from NUBIAN freighter.

"1.788384" - Co-ordinates of NUBIAN are X=78, Y=83, Z=84 and "1" is the I.D.

"87.087087" - Co-ordinates of ENTERPRISE are now X=87, Y=87, Z=87

In order to effect Transporter/Tractor Beam, NUBIAN must be closer than 10 units.

(78.083084)(R↓) - Use Course Computor to plot course to mover closer to NUBIAN by using assigned key "CCP"

"DISTANCE" "10.30" - Distance to NUBIAN from ENTERPRISE is 10.30 units.

"THETA" "-156.04" - Required Theta angle for above course is -156.04 degrees.

"PHI" "-16.94" - Required Phi angle for above course is -16.94 degrees.

(10)(ENTER↑)(156.04 CHS)(ENTER↑)(16.94 CHS)(Σ+) - Course change entered by "CHN".

"NUBIAN" - Communications from NUBIAN.

"1.788384" - I.D. and co-ordinates of NUBIAN.

"100.000000" - I.D. and distance to NUBIAN - Distance = 0.0 units.

"335.482390" - I.D. and distance to next alien vessel, which, in this case, is a ROMULAN warship and it is 35.482390 units away.

"-75.716577" - Distance to next nearest alien which is 75.716577 units away.

"NUBIAN" - Communications from NUBIAN again.

"1.788384" - I.D. and co-ordinates of NUBIAN again.

"78.083084" - Co-ordinates of ENTERPRISE.

(LN) - Use Transporter/Tractor Beam on NUBIAN, using assigned key "TTB".

PLAYING THE GAME(CONTINUED)

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"NUBIAN" "IN TOW" - TTB Operation successful.   "FO off

"-78.083084" - Co-ordinates of ENTERPRISE with "Negative" sign, indicating that
     you have the NUBIAN in tow. Sign will remain until you dock at STARBASE.

"335.482390" - I.D. and distance to ROMULAN warship.

"-75.716577" - Distance to next nearest alien vessel.

"-78.083084" - Co-ordinates of ENTERPRISE.

(5)(ENTER↑)(156 CHS)(ENTER↑)(17 CHS)(Σ+) - Makes course change to engage with the
     ROMULAN. Used same angles as previous move, as they brought us closer before.

"332.893768" - I.D. and distance to ROMULAN which is now less then 35 units.

"-71.805292" - Distance to next nearest alien vessel.   "F3 on"

"UNDER ATTACK" - ENTERPRISE is being attacked by ROMULAN. Deflectors on.

"-73.081082" - Co-ordinates of ENTERPRISE.   "F3 off,"FO on"

"0.0030" - I.D.(s) of enemy ship(s) attacking the ENTERPRISE.

(3) - I.D. of enemy ship you wish to fight. In this case, only the ROMULAN.

"3.0000" - Confirmation of I.D. of enemy ship you are going to fight.

"CLOAK" - Indicates that the ROMULAN warship has deployed his Cloaking Device,
     which, while in use, your weapon fire will be distorted by as much as ± 9
     degrees in both the Theta and Phi.

"33.0000" - Distance to combatant, rounded-off. In this case, it. is the   "FO off,"F2 on"
     ROMULAN, and the rounded distance is 33 units.

"33.00000000" - Status Report, waiting for your input for shield value.

(99) - Value for shield setting. In this case, "99" was chosen, which is the
     highest value that can be used. You can change this any time during the
     combat, as long as it is done during the Status Report blinking sequence.

"33.00900099" - Present Status of ENTERPRISE, the enemy's(ROMULAN), and the
     shield value. ENTERPRISE Status = 09, ROMULAN = 00, SHIELD = 99. During
     a battle, your objective is to force the enemy's status to 100 before he
     forces yours. See instructions for more complete details.

"-73.081082" - Co-ordinates of ENTERPRISE. Minus sign indicates NUBIAN still
     in tow. Had not you had the NUBIAN in tow, this sign would still be minus
     but would then indicate that you are in battle.

"77.060057" - Co-ordinates of Enemy(ROMULAN) which are X=77, Y=60, Z=57.

(SIN) - Use Weapons Angles Computor to find out firing angles through assigned
     key "CCW".

"DISTANCE" "32.89" - Distance to Enemy now engaged in combat.

"THETA" "-79.22" - Theta angle for weapon fire.

"PHI" "-49.47" - Phi angle for weapon fire.
     The above angles, due use of CLOAK by ROMULAN, are only approximates. You as
     the captain, must decide which values to use, knowing that your maximum error
     will only be ± 9 degrees. This means that the range of Theta is -70 to -88,
     and Phi is -40 to -58 degrees respectfully. Your's and the Enemy's Status,
     will be the determining factor to how close your guesses are. Your initial
     Status after setting your shields, plus the distance, is an indication to how
     strong his Cloak is. The stronger the Cloak, the higher the distortion, and
     the lower will be your initial status, again, with respects to the distance
     from which you have engaged the ROMULAN. In this case, it is about average.

To fire at an Enemy, you must first initialize your Weapons Fire "WPN", wait for your display to return(ENTERPRISE Co-ordinates), then enter your two angles, and choose the weapon you want to fire, either PHASERS, or PHOTON TORPEDOES. The assigned keys are: "WPN" for initialization; "PHS" for PHASERS; and "PHT" for PHOTON TORPEDOES. To simplify the battle examples, I have omitted the display between the initialization and weapon firing. In all examples, you will see displayed the ENTERPRISE's co-ordinates, at which time, you will enter the firing angles and weapon choice.

(y^X)(78 CHS)(ENTER↑)(45 CHS)(LOG) - Weapons fire initialized, Theta & Phi guesses   "F1 on'
    entered, and Photon Torps used(Flag "1" indicates Photon Torps used).

"33.01701199" - Status - ENTERPRISE = 17 ROMULAN = 11 SHIELD = 99   "F1 off'

(y^X)(70 CHS)(ENTER↑)(40 CHS)(LOG) - Same as above, different angles used.   "F1 on'

"33.02701299" - Status - ENTERPRISE = 27 ROMULAN = 12 SHIELD = 99   "F1 off'

(y^X)(88 CHS)(ENTER↑)(58 CHS)(LOG) - Same as above, different angles used.   "F1 on'

"33.03602599" - Status - ENTERPRISE = 36 ROMULAN = 25 SHIELD = 99   "F1 off'

(y^X)(88 CHS)(ENTER↑)(40 CHS)(LOG) - Same as above, different angles used.   "F1 on'

"33.04403899" - Status - ENTERPRISE = 44 ROMULAN = 38 SHIELD = 99   "F1 off'

(y^X)(70 CHS)(ENTER↑)(40 CHS)(LOG) - Same as above, different angles used.   "F1 on'

"33.05403999" - Status - ENTERPRISE = 54 ROMULAN = 39 SHIELD = 99   "F1 off'

(y^X)(88 CHS)(ENTER↑)(50 CHS)(LOG) - Same as above, different angles used.   "F1 on'

"33.06007199" - Status - ENTERPRISE = 60 ROMULAN = 71 SHIELD = 99   "F1 off'

(y^X)(88 CHS)(ENTER↑)(50 CHS)(LOG) - Same as above, same angles used.   "F1 on'

"-86" - Correct Theta angle.   "F1 off'

"-49" - Correct Phi angle.   "FO on,F4 on'

"3" - I.D. of vessel that you destroyed. In this case, the ROMULAN.   "F2 off,F4 off'

"-73.081082" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"-71.805292" - Distance to nearest alien vessel.

"-73.081082" - Co-ordinates of ENTERPRISE again.

    As we only know the distance but not the direction, it would just be luck if we were to chose the right direction. For this reason, and to show how the "LRTS" works along with the "SCWAC", I have decided to use the "LRTS" in this game. You should be aware that each time you use the "LRTS", it will cost you 250 fuel units.

(10^X) - Deploys your LRTS by the assigned key "LRTS"

"311" - New Mission Sector in which one or more of the remaining alien vessels will
    be found.

"-71.805292" - Distance to the nearest alien vessel.

"-73.081082" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

(311)(x<>y) - Mission Sector "311" entered into Sector Course Computor.

"DISTANCE" "98.90" - Distance to center of Mission Sector "311".

"THETA" "-99.06" - Theta angle required for the above course.

"PHI" "-45.05" - Phi angle required for the above course.

(99)(ENTER↑)(99.06 CHS)(ENTER↑)(45.05 CHS)(Σ+) - Course change entered to take the
    ENTERPRISE to the center of Mission Sector "311".

"409.273619" - I.D. and distance to alien vessel. In this case, it is the VALLICIAN
    warship and he is only 9.273619 units away.

"-50.882217" - Distance to next alien vessel which happens to be only one left   "F3 on"

"UNDER ATTACK" - ENTERPRISE being attacked by VALLICIAN. Deflectors on.   "F0 on,F3 off"

"-61.011011" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"0.0004" - I.D.(s) of Enemy ship(s) attacking the ENTERPRISE.

(4) - I.D. of Enemy ship you wish to fight. In this case, only the VALLICIAN.

"4.0000" - Confirmation of I.D. of Enemy ship you are going to fight.

"9.0000" - Distance to Enemy being engaged, rounded-off. In this case, it is   "F0 off"
    the VALLICIAN and the rounded-off distance is 9 units.   "F2 on"

"9.00000000" - Status report waiting for your shield value input.

(99) - Largest value entered due closeness of the Enemy(VALLICIAN).

"9.02200099" - Status - ENTERPRISE = 22 VALLICIAN = OO SHIELD = 99

"-61.011011" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"66.016017" - Co-ordinates of VALLICIAN are X=66, Y=16, Z=17

(SIN) - Weapons Angles Computor used to determine the firing angles.

"DISTANCE" "9.27" - Distance to Enemy now engaged in battle.

"THETA" "45.00" - Theta angle for weapon fire.

"PHI" "40.32" - Phi angle for weapon fire.

(y^x)(45)(ENTER↑)(40)$(\sqrt{x})$ - Weapons fire initialized and Phasers used.

"9.02408899" - Status - ENTERPRISE = 24 VALLICIAN = 88 SHIELD = 99

(y^x)(45)(ENTER↑)(40)$(\sqrt{x})$ - Same as above, same angles and Phasers used.

"45" - Correct Theta angle.

"40" - Correct Phi angle.   "F0 on,F4 on'

"4" - I.D. of vessel you destroyed. In this case, the VALLICIAN.   "F2 off,F4 off'

"-61.011011" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"-50.882217" - Distance to nearest and remaining alien vessel.

"-61.011011" - Co-ordinates of ENTERPRISE again.

(10^x) - LRTS used to find remaining "Mission Sector".

"331" - Mission Sector is "331".

"-50.882217" - Distance to remaining alien vessel.

"-61.011011" - Co-ordinates of ENTERPRISE with NUBIAN still in tow.

(331)(x<>y) - Mission Sector "331" entered into Sector Course Computor.

"DISTANCE" "51.02" - Distance to center of Mission Sector "331".

"THETA" "88.88" - Theta angle required for the above course.

"PHI" "1.12" - Phi angle required for the above course.

(51)(ENTER↑)(88.88)(ENTER↑)(1.12)(Σ) - Course change entered to get to the center
    of Mission Sector "331".

"209.433981" - I.D. and distance to remaining alien vessel. In this case, it is
    the KLINGON warship and he is only 9.433981 units away.

"-1000.000000" - This indicates that there are no more aliens left, except the   "F3 on"
      KLINGON and the NUBIAN, which you have in tow.

"UNDER ATTACK" - ENTERPRISE being attacked by the KLINGON. Deflectors on.   "FO on,F3 off"

"-61.061011" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"0.0200" - I.D.(s) of Enemy ship(s) attacking the ENTERPRISE.

(2) - I.D. of Enemy ship you wish to fight. In this case, only the KLINGON.

"2.0000" - Confirmation of I.D. of Enemy ship you are going to fight.

"9.0000" - Distance to Enemy now engaged, rounded-off. In this case, it is the   "FO off"
      KLINGON and the rounded-off distance is 9 units.   "F2 on"

"9.00000000" - Status report waiting for your shield value input.

(99) - Largest value used due closeness and strength of the Enemy(KLINGON).

"9.04300099" - Status - ENTERPRISE = 43 KLINGON = 00 SHIELD = 99

"-61.061011" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

"53.061011" - Co-ordinates of KLINGON are X=53, Y=61, Z=11

(SIN) - Weapons Angles Computor used to determine the firing angles.

"DISTANCE" "9.43" - Distance to Enemy now engaged in battle.

"THETA" "180.00" - Theta angle for weapon fire.

"PHI" "32.01" - Phi angle for weapon fire.

$(y^X)(180)(ENTER\uparrow)(32)(\sqrt{x})$ - Weapons fire initialized and Phasers fired.

"9.05608899" - Status - ENTERPRISE = 56 KLINGON = 88 SHIELD = 99

$(y^X)(180)(ENTER\uparrow)(32)(\sqrt{x})$ - Same as above, same angles and Phasers used.

"180" - Correct Theta angle.

"32" - Correct Phi angle.   "FO on,F4 on"

"2" - I.D. of vessel you destroyed. In this case, the KLINGON.   "F2 off,F4 off"

"-61.061011" - Co-ordinates of ENTERPRISE indicating NUBIAN still in tow.

"-1000.000000" - Indicates no other aliens left.

"-61.061011" - Co-ordinates of ENTERPRISE again.

$(0)(R\downarrow)$ - Course Computor used to plot course back to STARBASE(0,0,0).

"DISTANCE" "86.97" - Distance ENTERPRISE is from STARBASE.

"THETA" "-135.00" - Theta angle for above course.

"PHI" "-7.27" - Phi angle for above course.

      NOTE Before entering the above course, you should be aware of the fact that
due to small errors within the program using inputted data for course changes, and
the fact that you can not travel outside your "Universe", you should use a slightly
smaller distance then what the CCP gave you, but large enough to place you within
docking distance of STARBASE, that being less than 10 units.

$(80)(ENTER\uparrow)(135\ CHS)(ENTER\uparrow)(7.27\ CHS)(\Sigma+)$ - Course change entered to move the
      ENTERPRISE within docking range of STARBASE.

"-1000.000000" - No aliens left.

"-4.004000" - Co-ordinates of ENTERPRISE. NUBIAN still in tow.

(x^2) - Docking Maneuver made using the assigned key "DOC". This will only work
  if ENTERPRISE is CLOSER THAN 10 units from STARBASE, and no alien warships
  closer than 40 units to STARBASE. If you are too far away, "TOO FAR AWAY"
  will be displayed and the docking will be aborted. Should any alien warships
  be in too close, "ALIEN" will be displayed, and you will have to destroy all
  within this distance before STARBASE will allow the ENTERPRISE to dock.

"DOCKED" - Docking completed successfully. Had the NUBIAN been in tow(YES), then
  it will be released at STARBASE.   "FO off'

"GAME OVER" - Indicates that you have successfully completed your mission, that
  being to destroy the three(3) enemy warships and salvage the NUBIAN.

"FUEL USED" - Indicates that the next display will be your fuel costs for this
  mission.

"7936" - This is a very high value. Use of the LRTS cost us 500 fuel units. Having
  the NUBIAN in tow while engaging the enemy warships greatly increased all
  fuel consuming activities. We used the highest possible Shield values and
  took too many shots to destroy the ROMULAN. All these actions were costly.

  The above example was completed successfully, though at a high fuel cost.
Let us suppose that you did get into trouble. The example which follows will
show other features of this game, and how you must try to cope with them.
  When you play this game using the Sector/Course/Weapons Angles Computor(SCWAC),
you should have little trouble in dealing with at least two of the enemy warships,
those being the KLINGON and the VALLICIAN. That is, unless you bungle your course
changes and get too close in, in particular, to the KLINGON, in which case, nothing
will save you. The use of the SCWAC allows you to make every shot count, at least
when firing on the KLINGON and the VALLICIAN. Not so with the ROMULAN. The ROMULAN
uses a Cloaking device during combat, which will distort your firing angles, the
amount depending on how strong it is. The maximum that it can distort is ± 9 degrees
in both the Theta and Phi angles. See Page 6 on how this works in computing the
Status display. While firing angles so computed by the SCWAC would be right on
without the CLOAK, you must apply this correction to both of your angles, neither
usually being the same amount. As each situation is different, you only have your
Status report to guide your guesses.
  While in combat, your only indication on how well or bad you are doing against
the Enemy warship, is your Status Report. During a battle, your objective is to force
his Status to 100 before he can force yours. Should your Status exceed 70, you will
then lose your Sensor System(SNS) and the calculator indicates this unfortunate turn
of events by displaying "SNS U/S". When this occurs, you will no longer know the I.D.
of any of the alien vessels, nor will you know the Enemy's Status during a battle.
You are, in effect, flying blind. Also, should matters get worse, that is, if your
Status exceeds 85, you will then lose your shields, and again, with no feeling, the
calculator indicates this by displaying "NO SHIELDS". Once this happens, you are left
with only two choices. Either destroy the Enemy with your next shot(highly unlikely),
or bluff the Enemy into retreating beyond the combat zone($\leq$ 35 units) by using the
CORBOMITE MANEUVER. You can ONLY use this AFTER your shields have been destroyed.
Should you try to use it before losing your shields, then your bluff is called, the
calculator displays "DESTRUCTING", gives you a three second count-down, and finishes
the job by displaying "YOU BLEW IT", indicating that you and the ENTERPRISE have been
reverted back to your basic atoms.
  Once you have lost your "SNS", you have two ways in which to repair it. Either
by docking back at STARBASE for repairs, or by destroying an enemy while it is U/S
(but not during same battle which caused it to go U/S). Unless you have destroyed
the ROMULAN in a previous engagement, this second method could be commiting suicide,
as with "SNS U/S", you would not get any indication of the Cloaking device being used,
even though it would be should you engage the ROMULAN with "SNS U/S".

NOTE If during a battle in which you have engaged more than one of the Enemy, should you lose your Sensors ("SNS U/S") before you have destroyed the other ships within the combat zone, after deploying the Corbomite Maneuver to rid yourself of the first Enemy(or if lucky, destroyed him), when it comes time to engage the next ship, your Ship(s) I.D. display will be replaced by "SNS U/S" and will repeat itself until you key in an I.D. which matches one of those known to be within the combat zone. If you should happen to guess wrong, when you try to initialize weapons fire, a display of "TOO FAR AWAY" will be shown, then the game will recycle until the Ship(s) I.D. is displayed again, at which time you can try a new guess. Should you be using the "PRINTER" Version, because there is no PSE in the program, you will be unable to input an I.D. number. It will keep printing "SNS U/S" until you press "R/S". You then can key in the I.D. then press "R/S" to restart the game. This will only occur when you engage in more than one Enemy ship at a time and you lose you Sensors("SNS U/S") before destroying all of the Enemy within the combat zone and will only be a problem should you be using the "PRINTER" Version.

The next example game is to illustrate other features of this program.

Use the previous game's seed to start a new game. Then eliminate all but the ROMULAN by storing 1000 in the registers 01, 02, & 04. This will make the calculator think that you have destroyed the KLINGON and VALLICIAN, and salvaged the NUBIAN. From the previous game's example, you know the co-ordinates of the ROMULAN, but I have used another method, which along with the SCWAC, will give you a course that will enable you to engage the ROMULAN in battle. Again, Keyed entries are in brackets and Displays in quotation marks.

(.3570148692)(e^x) - Seed entered and LRTS initialized. Again, it is assumed
      that the calculator is in the "USER" Mode.   "FO on"

"444" - Mission Sector. In this example, we will disregard it.

"-70.007142" - Distance to nearest Alien vessel. Again, it will be disregarded.

"0.000000" - Co-ordinates of ENTERPRISE. We are at STARBASE.

(EEX 3)(STO 01)(STO 02)(STO 04) - This removes the NUBIAN, KLINGON, & VALLICIAN
      from this game as explained in the above.

(RCL 03)(100.1001)(-)(R↓) - This recalls the ROMULAN storage register, subtracts
      the placeholders to get the co-ordinates, then uses the SCWAC to plot a
      course to the ROMULAN's position.

"DISTANCE" "113.04" - Distance to the ROMULAN is 113.04 units.

"THETA" "37.93" - Theta angle required for the above course.

"PHI" "30.28" - Phi angle required for the above course.

As we do not want to get in too close before engaging into combat, let us
try to place ourselves about 20 units away from the ROMULAN.

(93)(ENTER↑)(37.93)(ENTER↑)(30.28)(Σ+) - Course change made to try and place the
      ENTERPRISE about 20 units away from the ROMULAN.

"320.928450" - I.D. and distance to ROMULAN which is about 20.928450 units away.

"-1000.000000" - Indicates no other aliens left, because we removed them.   "F3 on"

"UNDER ATTACK" - ENTERPRISE being attacked by the ROMULAN. Deflectors on.   "F3 off"

"63.049046" - Co-ordinates of ENTERPRISE.

"0.0030" - I.D.(s) of Enemy ship(s) attacking the ENTERPRISE.

(3) - I.D. of Enemy ship you wish to fight. In this case, only the ROMULAN.

"3.0000" - Confirmation of I.D. of Enemy ship you are going to fight.

"CLOAK" - Indicates that the ROMULAN has deployed his Cloaking device.

"21.0000" - Distance to the ROMULAN, rounded-off.   "FO off,F2 on"

"21.00000000" - Status Report waiting for your shield value input.

(85) - Value chosen lower than previous game to illustrate this example.

"21.01900085" - Status - ENTERPRISE = 19 ROMULAN = 00 SHIELD = 85

"-63.049046" - Co-ordinates of ENTERPRISE. Sine indicates that it is under attack.

"77.060057" - Co-ordinates of ROMULAN are X=77, Y=60, Z=57

(SIN) - Weapons Angles Computor used to find firing angles.

"DISTANCE" "20.93" - Distance to ROMULAN is 20.93 units.

"THETA" "38.16" - Theta angle for weapon fire. With Cloak, range is 29 to 47 degrees.

"PHI" "31.71" - Phi angle for weapon fire. With Cloak, range is 23 to 41 degrees.

$(y^X)(38)(ENTER↑)(32)(LOG)$ - Weapons fire initialized, guessed angles entered   "F1 on"
        and Photon Torps used.

"21.03602685" - Status - ENTERPRISE = 36 ROMULAN = 26 SHIELD = 85   "F1 off"

$(y^X)(29)(ENTER↑)(23)(LOG)$ - Above repeated with new angles.   "F1 on"

"21.05902885" - Status - ENTERPRISE = 59 ROMULAN = 28 SHIELD = 85   "F1 off"

$(y^X)(47)(ENTER↑)(41)(LOG)$ - Above repeated with new angles.   "F1 on"

"NO SHIELD" - Indicates ENTERPRISE's Status has exceeded 85. You no longer   "F1 off"
        have any protection from Enemy fire.

"SNS U/S" - Indicates that your Sensors are damaged and unserviceable. You can
        no longer see your Enemy's Status or I.D.

"21.08700000" - Status - ENTERPRISE = 87 ROMULAN = ?   SHIELD = 00

        In the above case, your only recourse is to employ the CORBOMITE MANEUVER.

(TAN) - You have used the Corbomite Maneuver by using the assigned key "PST"   "FO on"
        which incorporates this maneuver as part of its program.   "F2 off"

"TOO FAR AWAY" - Indicates that the ROMULAN has moved outside the combat zone   "FO off"
        ($\leq$ 35 units), and you are no longer under attack by him.

"63.049046" - Co-ordinates of ENTERPRISE. Note that the negative sign is gone.

"SNS U/S" - Sensors still damaged.

"-57.175169" - Distance to nearest Alien, which, in this case, can only be the
        ROMULAN, as he only vessel left.

"63.049046" - Co-ordinates of the ENTERPRISE again.

(O)(R↓) - Uses CCP to plot a course back to STARBASE for repairs.

"DISTANCE" "92.12" - Distance to STARBASE fro your present position.

"THETA" "-142.13" - Theta angle required for this course.

"PHI" "-29.96" - Phi angle required for this course.

(90)(ENTER↑)(142.13 CHS)(ENTER↑)(29.96 CHS)(Σ+) - Course change entered to place
        the ENTERPRISE within docking range of STARBASE.

"SNS U/S" - Sensors still damaged.

"-97.642204" - Distance to nearest Alien, that being the ROMULAN.

"1.001001" - Co-ordinates of ENTERPRISE.

(x^2) - Initialize Docking Maneuver.

"DOCKED" - Docking completed successfully.

"SNS REPAIRED" - Sensors have been repaired.

"0.000000" - Co-ordinates of ENTERPRISE and STARBASE.

"-99.100959" - Distance to nearest and only Alien vessel, that being the ROMULAN.

"0.000000" - Co-ordinates of ENTERPRISE again.

    To show what happens when you use the Corbomite Maneuver at the wrong time,
While at STARBASE, press the assigned key "PST"(TAN).

(TAN) -   Corbomite Maneuver tried at wrong time.   "FO on"

"DESTRUCTING" - Your bluff was called and you have placed the ENTERPRISE on
    Self-Destruct.

"3.000000" - The beginning of a 3 second Count-down.(Faster with printer)

"2.000000" - Two seconds to live.

"1.000000" - One second.

"YOU BLEW IT" - You sure did. Need more be said?

    To reset the game, use the Sensor probe by keying the assigned key "SNS"(1/x).
NOTE If your Sensors had been damaged before, if you want to restart anew, you
first must store "1" in register "07", otherwise, they will remain damaged("SNS U/S").
To continue, after it has given you the distance to the ROMULAN and then your position,
if you wish to finish the game, use the following steps:

(RCL 03)(100.1001)(-)(R↓) - This recalls the ROMULAN's storage register, subtracts
    the place-holders, then uses the Course Computor(CCP) to plot a course to the
    ROMULAN. When you engage him this time, try placing yourself about 30 units
    away, in order to give yourself a chance in getting the correct angles before
    you blow it again. Also, if in doubt, use the highest shield value. In time,
    you should have no trouble in getting these angles quickly and beable to use
    lower shield values to keep your fuel costs reasonable. I will leave the rest
    up to you. Good luck.

    For those wishing to use the "PRINTER" Version, I have included a print-out
that duplicates the above three examples. You will find them on pages 20a - 20c.
You can see the differences in the "ALPHA" displays. This was necessary due to the
smaller memory when using the Printer. It should be noted that by using the Printer,
you will have less time to make keyed entries as a "PRINT" function executes much
faster than a "PAUSE" function. Also see NOTE at top of page 18. With more memory
such as with the new Quad Memory Module or the HP-41CV, one could change these ALPHA
displays making them the same as the "NON-PRINT" Version and as well, include a "PSE"
with the "SNS U/S" display to eliminate the problem that could be encountered during
a battle. One could also include the SCWAC into the "PRINTER" Version.

    When the new memory module becomes available, I will make up a new set of Mag
cards for the "NON-PRINT" Version so as to eliminate the need to finish program entries
by hand, which at present, is necessary. I will also try to improve the "PRINTER"
Version as suggested in the above.

    I hope you enjoy playing this game. Good hunting.

☐ 67   ☐ 97   ☑ 41C   "PRINTER" Version of Game Example on Page 13-17

NOTE Program change required to duplicate below results

KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
.3570148692		Seed entered		33.00900099	***	Status Report
XEQ "SD"				33.00900099	***	repeated
444	***	Mission Sector		33.00900099	***	
-70.007142	***	Nearest Alien		-73.081082	***	ENTERPRISE Co-ordinates
0.000000	***	STARBASE		77.060057	***	ROMULAN Co-ordinates
151.000000	ENTER↑	Course change		XEQ "WPN"		Weapons Initialized
45.000000	ENTER↑	entered		-73.081082	***	ENTERPRISE Co-ordinates
35.260000				-78.000000	ENTER↑	Theta angle entered
XEQ "CHN"				-45.000000		Phi angle entered
110.295630	***	NUBIAN distance		XEQ "PHT"		Photon Torps fired
-41.581246	***	Nearest Alien		33.01701199	***	Status Report
NUB		Communications		XEQ "WPN"		Weapons Initialized
1.788384	***	NUBIAN Co-ordinates		-73.081082	***	ENTERPRISE Co-ordinates
87.087087	***	ENTERPRISE Co-ord		-70.000000	ENTER↑	Theta angle entered
10.000000	ENTER↑	Course change		-40.000000		Phi angle entered
-156.040000	ENTER↑	entered		XEQ "PHT"		Photon Torps fired
-16.940000				33.02701299	***	Status Report
XEQ "CHN"				XEQ "WPN"		Weapons Initialized
NUB		Communications		-73.081082	***	ENTERPRISE Co-ordinates
1.788384	***	NUBIAN Co-ordinates		-88.000000	ENTER↑	Theta angle entered
100.000000	***	NUBIAN distance		-58.000000		Phi angle entered
335.482390	***	ROMULAN distance		XEQ "PHT"		Photon Torps fired
-75.716577	***	Nearest Alien		33.03602599	***	Status Report
NUB		Communications		XEQ "WPN"		Weapons Initialized
1.788384	***	NUBIAN Co-ordinates		-73.081082	***	ENTERPRISE Co-ordinates
78.083084	***			-88.000000	ENTER↑	Theta angle entered
XEQ "TTB"		Transport/Tractor		-40.000000		Phi angle entered
NUB		NUBIAN in tow		XEQ "PHT"		Photon Torps fired
I/T				33.04403899	***	Status Report
-78.083084	***	ENTERPRISE Co-ord		XEQ "WPN"		Weapons Initialized
335.482390	***	ROMULAN distance		-73.081082	***	ENTERPRISE Co-ordinates
-75.716577	***	Nearest Alien		-70.000000	ENTER↑	Theta angle entered
-78.083084	***	ENTERPRISE Co-ord		-40.000000		Phi angle entered
5.000000	ENTER↑	Course change		XEQ "PHT"		Photon Torps fired
-156.000000	ENTER↑	entered		33.05403999	***	Status Report
-17.000000				XEQ "WPN"		Weapons Initialized
XEQ "CHN"				-73.081082	***	ENTERPRISE Co-ordinates
332.893768	***	ROMULAN distance		-88.000000	ENTER↑	Theta angle entered
-71.805292	***	Nearest Alien		-58.000000		Phi angle entered
ATK		Under Attack		XEQ "PHT"		Photon Torps fired
-73.081082	***	ENTERPRISE Co-ord		33.06007199	***	Status Report
0.0030	***	Ship I.D.(s)		XEQ "WPN"		Weapons Initialized
3.0000		I.D. Confirmed		-73.081082	***	ENTERPRISE Co-ordinate
CK		Cloak deployed		-88.000000	ENTER↑	Theta angle entered
33.0000	***	Distance rounded-off		-58.000000		Phi angle entered
33.00000000	***	Status Report		XEQ "PHT"		Photon Torps fired
99.00000000		Shield value entered		-86	***	Correct Theta angle
33.00900099	***	Status Report		-49	***	Correct Phi angle
				3	***	ROMULAN destroyed

☐ 67   ☐ 97   ☑ 41C   "PRINTER" Version of Game Example on Page 13-17 (Continued)

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
	-73.081082	***	ENTERPRISE Co-ord
	-71.805292	***	Nearest Alien
	-73.081082	***	ENTERPRISE Co-ord
	XEQ "LRTS"		LRTS deployed
	311	***	Mission Sector
	-71.805292	***	Nearest Alien
	-73.081082	***	ENTERPRISE Co-ord
	99.000000 ENTER↑		Course change
	-99.060000 ENTER↑		entered
	-45.050000		
	XEQ "CHN"		
	409.273619	***	VALLICIAN distance
	-50.882217	***	Nearest Alien
ATK			Under Attack
	-61.011011	***	ENTERPRISE Co-ord
	0.0004	***	Ship I.D.(s)
	4.0000		I.D. Confirmed
	9.0000	***	Distance rounded-off
	9.00000000	***	Status Report
	99.00000000		Shield value entered
	9.02200099	***	Status Report
	9.02200099	***	repeated
	9.02200099	***	
	9.02200099	***	
	-61.011011	***	ENTERPRISE Co-ord
	66.016017	***	VALLICIAN Co-ord
	XEQ "WPN"		Weapons Initialized
	-61.011011	***	ENTERPRISE Co-ord
	45.000000 ENTER↑		Theta angle entered
	40.000000		Phi angle entered
	XEQ "PHS"		Phasers fired
	9.02408899	***	Status Report
	XEQ "WPN"		Weapons Initialized
	-61.011011	***	ENTERPRISE Co-ord
	45.000000 ENTER↑		Theta angle entered
	40.000000		Phi angle entered
	XEQ "PHS"		Phasers fired
	45	***	Correct Theta angle
	40	***	Correct Phi angle
	4	***	VALLICIAN destroyed
	-61.011011	***	ENTERPRISE Co-ord
	-50.882217	***	Nearest Alien
	-61.011011	***	ENTERPRISE Co-ord
	XEQ "LRTS"		LRTS deployed
	331	***	Mission Sector
	-50.882217	***	Nearest Alien
	-61.011011	***	ENTERPRISE Co-ord
	51.000000 ENTER↑		Course changed
	88.880000 ENTER↑		entered

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
	1.120000		
	XEQ "CHN"		
	209.433981	***	KLINGON distance
	-1000.000000	***	No remaining Aliens
ATK			Under Attack
	-61.061011	***	ENTERPRISE Co-ordinates
	0.0200	***	Ship I.D.(s)
	2.0000		I.D. Confirmed
	9.0000	***	Distance rounded-off
	9.00000000	***	Status Report
	99.00000000		Shield value entered
	9.04300099	***	Status Report
	9.04300099	***	repeated
	9.04300099	***	
	9.04300099	***	
	-61.061011	***	ENTERPRISE Co-ordinates
	53.061016	***	KLINGON Co-ordinates
	XEQ "WPN"		Weapons Initialized
	-61.061011	***	ENTERPRISE Co-ordinates
	180.000000 ENTER↑		Theta angle entered
	32.000000		Phi angle entered
	XEQ "PHS"		Phasers fired
	9.05608899	***	Status Report
	XEQ "WPN"		Weapons Initialized
	-61.061011	***	ENTERPRISE Co-ordinates
	180.000000 ENTER↑		Theta angle entered
	32.000000		Phi angle entered
	XEQ "PHS"		Phasers fired
	180	***	Correct Theta angle
	32	***	Correct Phi angle
	2	***	KLINGON destroyed
	-61.061011	***	ENTERPRISE Co-ordinates
	-1000.000000	***	No Aliens left
	-61.061011	***	ENTERPRISE Co-ordinates
	80.000000 ENTER↑		Course change entered
	-135.000000 ENTER↑		
	-7.270000		
	XEQ "CHN"		
	-1000.000000	***	No Aliens left
	-4.004000	***	ENTERPRISE Co-ordinates
	XEQ "DOC"		Docking maneuver
DCKD			Docked at STARBASE
GAME OVER			Game Over. See
FUEL = 7936			Page 17

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Note: Refer to "HP-41C OWNER'S HANDBOOK AND ..." ... ... "lk function o ...   ... unction index is found at the very back of the Handbook. Refer to Appendix E ...
67 or 97 "OWNER'S HANDBOOK AND PRC ... IA"   S ...

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
	.3570148692		Seed entered		47.000000	ENTER↑	Theta angle entered
	XEQ "SD"				41.000000		Phi angle entered
	444	***	Mission Sector		XEQ "PHT"		Photon Torps fired
	-70.007142	***	Nearest Alien	N/S			SHIELDS DESTROYED
	0.000000	***	STARBASE	SNS U/S			SENSORS U/S
	1+03	STO 01	1000 Stored in		21.08700000	***	Status Report
		STO 02	Registers 1,2,&4		21.08700000	***	" "
		STO 04			XEQ "PST"		Corbomite Maneuver
		RCL 03	ROMULAN Co-ordinates	A/T/F			Alien retreated
			with place-holders		63.049046	***	ENTERPRISE Co-ordinates
	177.160157	***	MANUAL PRINT	SNS U/S			Sensors U/S
	100.100100	-	Subtract place-holders		-57.175169	***	Nearest Alien(ROMULAN)
	77.060057	***	ROMULAN Co-ordinates		63.049046	***	ENTERPRISE Co-ordinates
			MANUAL PRINT		90.000000	ENTER↑	Course change entered
	93.000000	ENTER↑	Course change entered		-142.130000	ENTER↑	
	37.930000	ENTER↑			-29.960000		
	30.280000				XEQ "CHN"		
	XEQ "CHN"			SNS U/S			Sensors U/S
	320.928450	***	ROMULAN distance		-97.642204	***	Nearest Alien(ROMULAN)
	-1000.000000	***	No Aliens left		1.001001	***	ENTERPRISE Co-ordinate
ATK			Under Attack		XEQ "DOC"		Docking Maneuver
	63.049046	***	ENTERPRISE Co-ord	DCKD			Docked at STARBASE
	0.0030	***	Ship I.D.(s)	SNS OK			SENSORS REPAIRED
	3.0000		I.D. Confirmed		0.000000	***	STARBASE
CK			Cloak deployed		-99.100959	***	Nearest Alien(ROMULAN)
	21.0000	***	Distance rounded-off		0.000000	***	STARBASE(ENTERPRISE)
	21.00000000	***	Status Report				
	85.00000000		Shield value entered	80			
	21.01900085	***	Status Report				
	21.01900085	***	repeated				
	21.01900085	***					
	21.01900085	***					
	-63.049046	***	ENTERPRISE Co-ordinates				
	77.060057	***	ROMULAN Co-ordinates				
	XEQ "WPN"		Weapons Initialized				
	-63.049046	***	ENTERPRISE Co-ordinates				
	38.000000	ENTER↑	Theta angle entered				
	32.000000		Phi angle entered	90			
	XEQ "PHT"		Photon Torps fired				
	21.03602685	***	Status Report				
	XEQ "WPN"		Weapons Initialized				
	-63.049046	***	ENTERPRISE Co-ordinates				
	29.000000	ENTER↑	Theta angle entered				
	23.000000		Phi angle entered				
	XEQ "PHT"		Photon Torps fired				
	21.05902885	***	Status Report				
	XEQ "WPN"		Weapons Initialized				
	-63.049046	***	ENTERPRISE Co-ordinates 00				

FOR "NON-PRINT" VERSION		SIZE: (HP-41C) 034	

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
01	If you do not have a Card Reader, go to Step # 14 for loading by hand.			
02	Configure calculator with 3 Memory Modules & Card Reader. Turn and leave in "RUN" Mode.			
03	Load "NON-PRINT" program by inserting all 9 "WALL" cards(17 sides). Turn off.			
04	Replace Card Reader with 4th Memory Module. Turn back on, leaving in "RUN" Mode for next few steps.			
05	Execute SIZE "000".	"XEQ" ALPHA "SIZE" ALPHA "000"		
06	Execute GTO ".906".	"GTO" ".906"		
07	Switch caculator to "PRGM" Mode.			
08	Execute "END".	"XEQ" ALPHA "END" ALPHA		
09	Execute GTO ".055".	"GTO" ".055"		
10	Turn to P.36-38. Starting with Line 056, finish rest of "SECTOR/COURSE/WEAPONS ANGLES COMPUTOR" program by hand. Be careful that correct "XEQ" &/or "ALPHA's" used, otherwise program will not work.			
11	Switch to "RUN" Mode. Execute "PACK".	"XEQ" ALPHA "PACK" ALPHA		PACKING
12	Execute SIZE "034".	"XEQ" ALPHA "SIZE" ALPHA "034"		
13	Switch to "USER" Mode. See instruction on how to play "STAR TREK".			
14	Hand loading. Configure calculator with 4 Memory Modules. Turn on and switch to "RUN" Mode and execute SIZE "000"	"XEQ" ALPHA "SIZE" ALPHA "000"		

FOR "NON-PRINT" VERSION (CONTINUED)

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
15	Switch to "PRGM" Mode. From P.25-35 CAREFULLY load STAR TREK program. After Line 906, execute "END", then got to P. 36-38, CAREFULLY load "SCWAC" program.	"XEQ" ALPHA "END" ALPHA		
	Be extra careful that you use the correct "XEQ" &/or "ALPHA's", otherwise program	"ASN" ALPHA "CHN" ALPHA	"Σ+"	
		"ASN" ALPHA "STD" ALPHA	"Σ-"	
	will not work. Calculator will stop from	"ASN" ALPHA "SNS" ALPHA	"1/x"	
	time to time to PACK program, due to its	"ASN" ALPHA "WPN" ALPHA	"y^x"	
	length. Refer to manual if you have any	"ASN" ALPHA "PHS" ALPHA	"$\sqrt{x}$"	
	problems with loading programs correctly.	"ASN" ALPHA "DOC" ALPHA	"x^2"	
16	Switch to "RUN" Mode. Using information	"ASN" ALPHA "PHT" ALPHA	"LOG"	
	Pages 9,51,&52, Assign program labels to	"ASN" ALPHA "LRTS" ALPHA	"10^x"	
	specified keys.	"ASN" ALPHA "TTB" ALPHA	"LN"	
17	After completion of Key Assignments,	"ASN" ALPHA "SD" ALPHA	"e^x"	
	execute "PACK".	"ASN" ALPHA "CCS" ALPHA	"x<>y"	
18	Once PACKING completed, execute SIZE "034"	"ASN" ALPHA "CCP" ALPHA	"R$\downarrow$"	
19	Switch to "USER" mode. See instruction	"ASN" ALPHA "CCW" ALPHA	"SIN"	
	on how to play "STAR TREK".	"ASN" ALPHA "PST" ALPHA	"TAN"	
		"XEQ" ALPHA "PACK" ALPHA		PACKING
		"XEQ" ALPHA "SIZE" ALPHA	"034"	

| FOR "PRINTER" VERSION   Set Printer to "NORM" Mode | SIZE: (HP-41C)   026 |

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
01	If you do not have a Card Reader, go to Step # 6, for loading by hand.			
02	Configure calculator with 3 Memory Modules and Card Reader. Turn on and leave it in "RUN" Mode.			
03	Load "WITH PRINTER" program by passing all 9 "WALL" cards(17 sides) through the Card Reader. Turn off calculator.			
04	Replace Card Reader with Printer.			
05	Turn back on, switch to "USER" Mode. See instructions on how to play "STAR TREK".			
06	Hand loading. Configure calculator with 3 Memory Modules and Printer. Turn on.			
07	In "RUN" Mode, execute SIZE "000".	"XEQ"	ALPHA "SIZE"	ALPHA "000"
08	Switch to "PRGM" Mode. Turn to P.38-48. CAREFULLY load "PRINTER" program by hand.	"ASN"	ALPHA "CHN"	ALPHA "Σ+"
	Be careful that you use the correct "XEQ"	"ASN"	ALPHA "STD"	ALPHA "Σ-"
	&/or "ALPHA's", otherwise program will	"ASN"	ALPHA "SNS"	ALPHA "1/x"
	not work. Calculator may, from time to	"ASN"	ALPAH "WPN"	ALPHA "y^x"
	time, stop to PACK program. Refer to	"ASN"	ALPHA "PHS"	ALPHA "$\sqrt{x}$"
	manual, if you have any problems.	"ASN"	ALPHA "DOC"	ALPHA "x^2"
09	Switch to "RUN" Mode. See Pages, 9,51,&53.	"ASN"	ALPHA "PHT"	ALPHA "LOG"
	Assign program labels to specified keys.	"ASN"	ALPHA "LRTS"	ALPHA "10^x"
10	After completion of Key Assignments,	"ASN"	ALPHA "TTB"	ALPHA "LN"
	execute "PACK".	"ASN"	ALPHA "SD"	ALPHA "e^x"
11	Execute SIZE "026".	"ASN"	ALPHA "PST"	ALPHA "TAN"
12	Switch to "USER" Mode. Go to Step # 5.	"XEQ"	ALPHA "PACK"	ALPHA PACKING
		"XEQ"	ALPHA "SIZE"	ALPHA "026"

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USER INSTRUCTIONS

FOR "PRINTER" VERSION - MODIFICATIONS   Set Printer to "NORM" Mode

SIZE:
(HP-41C) 026

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
01	Use following steps if you wish to have Status Report to Print-Out *NOTE* This change required to duplicate Printed Example which follows Playing Instructions			
02	Follow Steps 01 - 05, Page 23 of 53.			
03	In "RUN" Mode, execute SIZE "025"	"XEQ"	ALPHA "SIZE" ALPHA "025"	
04	In "PRGM" Mode, make following changes to "PRINTER" program.			
05	Go to line 499 and delete "BEEP".	"GTO"	".499" "←" "SST" "SST"	
06	In LBL 24, after CF 22, insert "PRX". *NOTE* This change easier through use of Printer just by pressing "PRINT" key	"XEQ" This step is plug	ALPHA "PRX" ALPHA will only work if printer into port.	
07	Switch back to "USER" Mode and execute "PACK"	"XEQ"	ALPHA "PACK" ALPHA	
08	Execute SIZE "026", then go to instructions on how to play "STAR TREK"	"XEQ"	ALPHA "SIZE" ALPHA "026"	
	NOTE One should not use Flag 12 to double size of display as still will use up more then double the amount of paper and it also makes it more difficult to input entries.			XEQ -PST- DTG 3.000000 *** 2.000000 *** 1.000000 *** YOU BLEW IT XEQ -SNS- -99.100959 *** 0.000000 *** RCL 83 148.111186 *** 100.100100 - 48.011086 *** YOU CAN FINISH

99962

USER INSTRUCTIONS

	FOR "PRACTICE FIRING RANGE"			SIZE: (HP-41C) 026
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
01	Configure calculator with Card Reader. No extra Memory Modules required. Using the 2 cards, load program by passing 3 sides through Card Reader. Card Reader can be left attached, but not necessary.			
02	Leave calculator in "RUN" Mode. First execute "PACK", then SIZE "026".	"XEQ" ALPHA "PACK" ALPHA "XEQ" ALPHA "SIZE" ALPHA		"026"
03	Refer to Pages 7 & 8 for instructions on how to use program.			
04	Hand loading. See Pages 48 to 50 for Program Listing. CAREFULLY load this program paying close attention to seeing that correct "XEQ" &/or "ALPHA's" are used. Refer to manual for instructions if not sure about entries. In "PRGM" Mode.			
05	Switch to "RUN" Mode. First execute "PACK" then SIZE "026".	"XEQ" ALPHA "PACK" ALPHA "XEQ" ALPHA "SIZE" ALPHA		"026"
06	Go to Step # 3.			

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	◆LBL "SD"		"SEED"
02	CLRG		
03	CLA		INITIALIZE
04	CF 00		
05	SF 25		ERROR PROTECTION
06	STO 00		STORE "SEED:
07	4		
08	STO 25		COUNTER CONTROL
09	1		
10	STO 07		SET DAMAGES OFF
11	◆LBL 00		
12	6		
13	STO 06		
14	STO 20		
15	RCL 25		
16	INT		
17	1		
18	X=Y?		NUBIAN CO-ORDINATES?
19	SF 00		SF TO STORE IN R09
20	◆LBL 01		
21	XEQ 04		
22	1 E2		
23	*		
24	INT		
25	STO 21		
26	FS? 00		NUBIAN?
27	XEQ 05		YES-ADD TO R09
28	RCL 21		
29	1 E2		
30	+		RANDOM CO-ORDINATES
31	RCL 06		
32	10↑X		
33	/		POSITION
34	ST+ IND 25		CO-ORDINATE
35	3		
36	ST- 06		
37	RCL 06		
38	0		
39	X<=Y?		
40	GTO 01		NEW CO-ORDINATE
41	RCL 25		ADD I.D. OF SHIP
42	INT		
43	FS? 00		NUBIAN?
44	ST+ 09		ADD I.D. OF NUBIAN
45	1 E7		
46	/		
47	ST+ IND 25		
48	DSE 25		
49	GTO 00		NEW SHIP
50	-250		SET FUEL = -250
51	STO 06		SO THAT FIRST USE OF LRTS COSTS NO
52	◆LBL "LRTS"		FUEL.
53	◆LBL 02		"LONG RANGE TRACKING SYSTEM"
54	XEQ 04		RANDOM NUMBER
55	4		
56	*		
57	1		
58	+		
59	INT		
60	STO 25		
61	RCL IND 25		RANDOM SHIP
62	1 E3		
63	X=Y?		ALREADY DESTROYED?
64	GTO 02		NEW RANDOM SHIP
65	RDN		
66	X<0?		TOWED NUBIAN?
67	GTO 02		NEW RANDOM SHIP
68	STO 20		
69	CLX		
70	STO 21		
71	3		
72	STO 25		
73	◆LBL 03		
74	RCL 20		
75	INT		
76	1 E2		
77	-		
78	25		
79	/		
80	1		
81	+		
82	INT		
83	RCL 25		
84	1		
85	-		
86	10↑X		
87	*		POSITION IN MISSION
88	RCL 21		SECTOR

99962

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
89	+			132	SIN		SIN φ
90	STO 21			133	RCL 14		R
91	RCL 20			134	*		R.SIN φ
92	FRC			135	STO 11		ΔZ
93	1 E3			136	RCL 16		φ
94	*			137	COS		COS φ
95	STO 20			138	RCL 14		R
96	DSE 25			139	*		R.COS φ
97	GTO 03			140	STO 16		
98	250			141	RCL 22		θ
99	ST+ 06		ADD 250 TO FUEL	142	SIN		SIN θ ·
100	FIX 0		"MISSION SECTOR"	143	RCL 16		R.COS φ
101	BEEP			144	*		R.COS φ SIN θ
102	RCL 21			145	STO 12		ΔY
103	PSE			146	RCL 22		θ
104	GTO "SNS			147	COS		COS θ
				148	RCL 16		R.COS φ
105	◆LBL 04		RANDOM NUMBER	149	*		R.COS φ COS θ
106	RCL 00		GENERATOR	150	STO 13		ΔX
107	PI						
108	+			151	◆LBL "STD		"COURSE - STEADY"
109	5			152	FIX 6		
110	Y↑X			153	XEQ 12		
111	FRC			154	13.01		CHECK FOR SHIPS IN
112	STO 00		NEW SEED	155	STO 25		VICINITY
113	RTN			156	RCL 01		COUNTER CONTROL
				157	0		NUBIAN
114	◆LBL 05			158	STO 16		
115	RCL 20			159	STO 17		
116	10↑X			160	X>Y?		NUBIAN TOWED?
117	/			161	1		YES-FUEL COST=6xR
118	ST+ 09		NUBIAN CO-ORDINATES	162	ENTER↑		NO -FUEL COST=5xR
119	RCL 20			163	5		
120	2			164	+		
121	-			165	RCL 14		
122	STO 20		RESET COUNTER	166	*		FUEL COST
123	RDN			167	INT		
124	RTN			168	ST+ 06		
				169	RCL 05		
125	◆LBL "CHN		"COURSE CHANGE"	170	RDN		
126	STO 16		φ	171	◆LBL 06		
127	RDN			172	R↑		
128	STO 22		θ	173	ENTER↑		
129	X<>Y			174	FRC		
130	STO 14		R	175	1 E3		
131	RCL 16		φ	176	*		

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
177	X<>Y			222◆	LBL 07		
178	INT			223	RCL 10		
179	RCL IND 25			224	STO 25		
180	+			225	RCL IND 25		ALIEN CO-ORDINATES 1XX.1YY1ZZ
181	INT		NEW CO-ORDINATE	226	RCL 05		ENTERPRISE CO-ORDINATES $XX_\epsilon.OYY_\epsilon OZZ_\epsilon$
182	X<0?			227	-		
183	GTO 14			228	3		
184	1 E2			229	STO 25		
185	X<=Y?			230	CLX		
186	GTO 14			231	STO 17		
187	X<>Y			232	RDN		
188	RCL 16						
189	10↑X			233◆	LBL 08		
190	/			234	ENTER↑		
191	ST+ 17			235	INT		
192	3			236	1 E2		$C = X,Y,or Z$
193	ST+ 16			237	-		$C - C$
194	DSE 25			238	X↑2		$(C- C_\epsilon)^2$
195	GTO 06			239	ST+ 17		
196	RCL 17		NEW ENTERPRISE CO-ORDINATES	240	RDN		
197	STO 05			241	FRC		
				242	1 E3		
198◆	LBL "SNS"		SENSOR PROBE"	243	*		
199	CLX			244	DSE 25		
200	STO 08			245	GTO 08		
201	RCL 00			246	STO 23		I,D.
202	PI			247	RCL 17		$(X-X_\epsilon)^2+(Y-Y_\epsilon)^2+(Z-Z_\epsilon)^2$
203	+			248	SQRT		DISTANCE
204	5			249	STO 16		$D=\sqrt{(\Delta X)^2+(\Delta Y)^2+(\Delta Z)^2}$
205	Y↑X			250	40		
206	FRC			251	X>Y?		ALIEN < 40?
207	STO 00			252	GTO 09		YES
208	RCL 07		DAMAGE REGISTER DAMAGES?	253	CLX		
209	X=0?			254	RCL 18		
210	XEQ 45		"SNS U/S"	255	X>Y?		
211	FIX 6			256	X<>Y		
212	1 E3			257	STO 18		SMALLEST D ≥ 40
213	STO 18			258	GTO 11		
214	R↑		RANDOM NUMBER				
215	4			259◆	LBL 09		
216	*			260	CLX		
217	1			261	35		
218	+			262	X<=Y?		CLOSE ENOUGH FOR BATTLE
219	INT			263	GTO 10		NO
220	STO 10			264	RCL 10		SHIP I.D.
221	STO 21			265	ENTER↑		
				266	10↑X		

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY CODE (97/C only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
267 /		ADD TO "SHIP IN	311 X≠0?			SENSORS ON?
268 ST+ 08		VICINITY" REGISTER	312 RCL 23			I.D./NUBIAN CO-ORDINATE
			313 RCL 16			DISTANCE/0
269◆LBL 10		DISPLAY DISTANCE	314 +			DEPENDS ON "SNS"
270 XEQ 13		WITH/OR WITHOUT I.D.	315 BEEP			
			316 PSE			
271◆LBL 11			317 PSE			
272 ISG 10		INCREMENT R_{10}	318 RTN			
273 PSE						
274 5			319◆LBL 14			
275 RCL 10		R_{10}= 5?	320 CF 04			
276 X=Y?			321 FIX 6			
277 1		YES - SET IT TO"1"	322 RCL 01			
278 STO 10			323 ENTER↑			
279 RCL 21		VALUE MARKING END	324 ABS			
280 X≠Y?		OF LOOP	325 /			NUBIAN TOWED? IF YES
281 GTO 07		MAXIMUM DISTANCE CAN	326 RCL 05			(R_{01}<0)MAKES ENTERPRISE
282 171		TRAVEL IN CUBE	327 *			NEGATIVE
283 RCL 18		SMALLEST D ≥ 40	328 BEEP			
284 X>Y?		D > 171?	329 PSE			
285 1 E3		YES- NO SHIPS LEFT	330 FS? 03			INDICATES UNDER
286 CHS		DISPLAY WITH MINUS	331 GTO "ALT			ATTACK
287 BEEP		SIGN				
288 PSE			332 RTN			
289 XEQ 12		CHECK FOR SHIP IN				
290 GTO 14		VICINITY	333◆LBL "ALT			"BATTLE ALERT"
			334 CF 03			
291◆LBL 12			335 SF 00			
292 RCL 08		SHIPS IN VICINITY ?	336 FIX 4			
293 X=0?		NO SHIPS AROUND	337 RCL 08			
294 RTN		RETURN	338 10			
295 .1			339 *			SHIPS IN VICINITY
296 X<=Y?		NUBIAN IN VICINITY?	340 INT			
297 XEQ 44		"NUBIAN"	341 X=0?			
298 .1		NO NUBIAN	342 GTO 15			NUBIAN IN VICINITY?
299 X=Y?		UNDER ATTACK?	343 XEQ 44			NO
300 XEQ 48		"UNDER ATTACK" YES	344 CHS			YES - "NUBIAN"
301 CLX		SF 03				
302 RDN			345◆LBL 15			
303 X>0?		NUBIAN IN VICINITY?	346 RCL 07			DAMAGES?
304 GTO 14		NO - GO TO DISPLAY	347 X=0?			
305 RCL 09		YES - SHOW NUBIAN	348 GTO 21			YES
306 STO 23		CO-ORDINATES	349 RCL 08			SHIPS IN VICINITY
307 CLX			350 BEEP			
308 STO 16			351 PSE			
309◆LBL 13		DISPLAY NUBIAN				
310 RCL 07		CO-ORDINATES OR"0"	352◆LBL 16			

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
353	BEEP			397	SQRT		DISTANCE TO ALIEN
354	PSE			398	STO 18		
355	FS? 22		SHIP CHOSEN?	399	RCL 12		ΔY
356	GTO 17		YES - LEAVE LOOP	400	RCL 13		ΔX
357	GTO 16			401	R-P		
				402	RDN		
358	♦LBL 17			403	STO 16		θ
359	INT			404	RCL 11		ΔZ
360	ABS			405	RCL 18		D
361	5		CHECK FOR ERROR	406	/		ΔZ/D
362	X<=Y?		INPUT	407	ASIN		
363	GTO 15			408	STO 17		φ
364	X<>Y			409	RCL 15		
365	1		ONLY "2,3,or4" CAN	410	100.1001		
366	X<>Y		BE USED. IF NOT	411	-		
367	X<=Y?		ONE OF THESE I.D.	412	STO 15		ALIEN CO-ORDINATES
368	GTO 15		REPEAT "I.D.'s"	413	RCL 10		I.D.
369	STO 10		SHIP I.D.	414	ENTER↑		
370	STO 25			415	10↑X		
371	RCL IND 25			416	/		SUBTRACT FROM SHIPS
372	RCL 05			417	ST- 08		IN VICINITY
373	X<>Y			418	RCL 10		I.D.
374	STO 15			419	STO 11		
375	X<>Y			420	3		
376	-			421	X≠Y?		ROMULAN VESSEL?
377	13.01			422	GTO 19		NO
378	STO 25		COUNTER	423	"CLOAK"		"CLOAK" BEING USED
379	CLX			424	FS? 00		SNS DAMAGED?
380	STO 18			425	XEQ 49		·NO- "CLOAK" DISPLAYED
381	RDN			426	CLA		YES - NO DISPLAY
				427	XEQ 20		Δ θ
382	♦LBL 18		DETERMINE DISTANCE	428	ST+ 16		
383	ENTER↑			429	ABS		
384	INT			430	XEQ 20		Δ φ
385	1 E2			431	ST+ 17		
386	-			432	ABS		TOTAL ANGULAR CHANGE
387	STO IND 25			433	+		DUE CLOAKING DEVICE
388	X↑2			434	.15		DETERMINE CHANGE IN
389	ST+ 18			435	*		I.D. TO LESSEN BRUNT
390	RDN			436	.21		OF ROMULAN ATTACK
391	FRC			437	-		
392	1 E3			438	INT		
393	*			439	ST+ 11		
394	DSE 25			440	◊LBL 19		
395	GTO 18			441	RCL 18		DISTANCE
396	RCL 18			442	FIX 0		
				443	RND		

□ 67 □ 97 ☑ 41C "NON-PRINT" VERSION

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
444	FIX 4			486	/		
445	BEEP		DISPLAY DISTANCE	487	+		$DD.OS_\epsilon S_\epsilon$
446	PSE		THEN GO TO	488	RCL 07		DAMAGES?
447	PSE		"SHIELDS"	489	STO 19		
448	GTO "SHD"			490	X=0?		SENSORS DAMAGED?
				491	XEQ 45		YES – "SNS U/S"
				492	RCL 14		S_α IF SNS DAMAGED
449	♦LBL 20		Δ θ OR Δ φ	493	*		$S_\alpha = 0$
450	RCL 00			494	1 E6		
451	PI			495	/		
452	+			496	+		$DD.OS_\epsilon S_\epsilon OS_\alpha S_\alpha$
453	5			497	RCL 20		SHIELDS
454	Y↑X			498	1 E8		
455	FRC			499	/		$DD.OS_\epsilon S_\epsilon OS_\alpha S_\alpha SS$
456	STO 00			500	+		
457	20						
458	*			501	♦LBL 23		
459	10			502	FS? 04		ENEMY DESTROYED?
460	-			503	GTO "PST"		YES – GO TO "POST"
461	INT						
462	RTN			504	4		BATTLE NOT BEGUN
				505	FS? 00		OR OVER?
463	♦LBL 21		SENSORS DAMAGED	506	10↑X		YES – BLINKS FOREVER
464	CF 00			507	STO 25		IN MIDDLE OF BATTLE
465	XEQ 45		"SNS U/S"	508	RDN		BLINK STATUS 4 TIMES
466	GTO 17			509	BEEP		ONLY
467	♦LBL "SHD"		"SHIELDS"	510	♦LBL 24		
				511	CF 22		
468	CF 00			512	PSE		
469	SF 02			513	FS? 22		SHIELD VALUE INPUT?
470	1 E2			514	GTO 27		YES – RESET
471	STO 24			515	DSE 25		
472	CLX			516	GTO 24		
473	STO 20						
474	STO 13			517	♦LBL "WPN"		"WEAPONS INITIALIZATION"
475	STO 14						
476	12			518	RCL 18		DISTANCE
477	STO 12			519	35		
				520	X>Y?		ENEMY < 35 UNITS?
478	♦LBL 22			521	GTO 25		YES – CONTINUE FIRING
479	CF 01			522	XEQ 47		NO –"TOO FAR AWAY"
480	RCL 18		DISTANCE	523	GTO "SNS"		THEN GO TO "SNS"
481	FIX 0						
482	RND			524	♦LBL 25		
483	FIX 8			525	CF 00		
484	RCL 13		S_ϵ	526	FIX 6		
485	1 E3			527	RCL 12		DECREMENT FIRING

☐ 67 ☐ 97 ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
528	2		TIME COUNTER	569	ABS		
529	–			570	+		$\lvert \Delta\phi \rvert + \lvert \Delta\theta \rvert = A$
530	X≠0?			571	STO 21		
531	STO 12			572	0		
532	RCL 12			573	FS? 01		PHOTON TORP?
533	STO 25			574	5		YES – FUEL= 8xD
				575	ENTER↑		
534◆	LBL 26			576	3		NO – FUEL= 3xD
535	RCL 05		ENTERPRISE's	577	+		
536	CHS		CO-ORDINATES	578	RCL 18		D
537	XEQ 28		"DISPLAY"	579	*		FUEL
538	RCL 15		ALIEN CO-ORDINATES	580	ST+ 06		
539	XEQ 28		"DISPLAY"	581	2		
540	GTO 26			582	RCL 21		
				583	LN		
541◆	LBL 27		RESET SHIELDS	584	–.03		$-.03\ LN(A)$
542	RCL 24			585	*		CHANGE TO –.04 FOR
543	X<=Y?		NEW VALUE MUST BE	586	.1		GREATER CHALLENGE
544	GTO 23		LESS THAN 100.	587	+		$0.1 -0.03\ LN(A)$
545	X<>Y			588	RCL 14		S_α
546	STO 20			589	RCL 13		S_ε
547	FS? 02		FIRST TIME AROUND?	590	XEQ 32		
548	GTO 29		YES – ALIEN FIRE	591	FS? 01		TIMES 2 IF PHOTON
549	RCL 13			592	*		TORPS USED
550	RCL 13			593	X<0?		
551	GTO 30			594	GTO 29		
				595	INT		$$\frac{.1-.03LN.A(S_\alpha-S_\varepsilon+100)^2}{D}$$
552◆	LBL 28		DISPLAY ROUTINE	596	ST+ 14		
553	BEEP			597	RCL 14		
554	PSE			598	RCL 24		
555	PSE			599	X>Y?		
556	PSE			600	GTO 29		
557	DSE 25			601	–1		ALIEN DESTROYED
558	GTO 31			602	ST* 15		
559	GTO 29			603	FIX 0		
				604	RCL 16		
560◆	LBL "PHT"		PHOTON TORPEDOES	605	BEEP		
				606	PSE		θ
561	SF 01			607	RCL 17		
				608	BEEP		
562◆	LBL "PHS"		PHASERS	609	PSE		φ
				610	RCL 10		I.D.
563	RCL 17		φ	611	RCL 19		DON'T DISPLAY I.D.
564	–		Δ φ	612	*		IF SNS DAMAGED(R_{19}=0)
565	ABS			613	SF 00		
566	X<>Y			614	SF 04		RESET FLAGS FOR NEXT
567	RCL 16		θ	615	BEEP		ROUND
568	–		Δ θ	616	PSE		I.D. OR "0"

☐ 67   ☐ 97   ☑ **41C**   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
617	GTO 23			663	CLX		
				664	STO 20		
618	◆LBL 29			665	"NO SHIE LD"		YES- "NO SHIELDS"
619	RCL 01		NUBIAN TOWED?	666	XEQ 49		
620	0			667	GTO 22		
621	X>Y?						
622	1		YES - FUEL=3xSHIELDS	668	◆LBL 31		
623	ENTER↑			669	FS? 22		
624	2		NO - FUEL=2xSHIELDS	670	GTO 28		
625	+			671	RTN		
626	RCL 20		SHIELDS				
627	*		FUEL	672	◆LBL 32		
628	ST+ 06			673	-		
629	6		I.	674	RCL 24		
630	RCL 11		I.D.(VARIABLE I.D.)	675	+		
631	-		6 - I	676	X↑2		
632	1 E4			677	*		
633	*		$(6 - I)(10^4)$	678	RCL 18		
634	RCL 13			679	/		
635	85			680	RTN		
636	X<=Y?						
637	GTO 50		ENTERPRISE DESTROYED	681	◆LBL "PST"		"POST"
638	CLX		IF SHIELDS OUT				
639	RCL 14		"YOU BLEW IT"	682	SF 00		
640	XEQ 32		$(6-I)(10^4)(S_\epsilon - S_\alpha + 100)^2$	683	CF 01		
641	RCL 20			684	CF 02		
642	10		D	685	CF 04		
643	*		$10 \times SHIELDS$	686	FIX 6		
644	X↑2		$(10 \times S)^2$	687	RCL 15		ALIEN CO-ORDINATES
645	/		$\dfrac{(6-I)(10^4)(S_\epsilon - S_\alpha + 100)^2}{(D)(10 \times S)^2}$	688	X<0?		LESS THAN O(DESTROYED)?
646	INT			689	GTO 35		YES - CONTINUE
647	ST+ 13			690	3		NO - CHECK FOR RETREAT
648	RCL 13		S_ϵ	691	STO 25		
649	RCL 24			692	0		
650	X<=Y?		$S_\epsilon \geq 100$?	693	STO 15		S_ϵ
651	GTO 50		YES- "YOU BLEW IT"	694	RCL 13		
652	RCL 13			695	85		
653	70		$S_\epsilon > 70$?	696	X<=Y?		ILLEGAL RETREAT($S_\epsilon \leq 85$)?
654	X>Y?		YES - SNS U/S R_{07}=0	697	GTO 34		NO - CONTINUE
655	GTO 30			698	"DESTRUC TING"		YES "DESTRUCTING"
656	CLX			699	XEQ 49		
657	STO 07						
				700	◆LBL 33		
658	◆LBL 30			701	RCL 25		3 SEC COUNT-DOWN
659	RCL 13			702	BEEP		
660	85		$S_\epsilon > 85$?	703	PSE		
661	X>Y?						
662	GTO 22						

"NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
704	DSE 25			749	◆LBL 36		
705	GTO 33			750	RCL 10		I.D.
706	GTO 50			751	STO 25		
				752	1 E3		
707	◆LBL 34			753	FS? 00		ALIEN DESTROYED?
708	RCL 00		LEGAL RETREAT. NEW	754	STO IND 25		YES-STORE 1000
709	PI		ALIEN CO-ORDINATES				
710	+			755	RCL 01		
711	5			756	ENTER↑		
712	Y↑X			757	ABS		
713	FRC			758	/		
714	STO 00			759	RCL 05		
715	1 E2			760	*		
716	*			761	BEEP		ENTERPRISE's
717	LASTX			762	PSE		CO-ORDINATES
718	+			763	GTO "SNS"		
719	INT		CO-ORDINATE				
720	RCL 25						
721	1			764	◆LBL "TTB"		TRANSPORTER/TRACTOR BEAM (TTB)"
722	−						
723	3			765	RCL 01		
724	*			766	XEQ 40		CHECK "D" TO NUBIAN
725	10↑X			767	XEQ 42		D<10?
726	/			768	FS? 04		NO "TOO FAR AWAY"
727	ST+ 15			769	GTO 14		
728	DSE 25			770	RCL 01		YES
729	GTO 34			771	XEQ 44		"NUBIAN"
730	RCL 10			772	STO 01		
731	STO 25			773	.1		
732	1 E7			774	ST− 08		CANCEL FROM SHIPS
733	/			775	"IN TOW"		IN VICINITY
734	ST+ 15			776	XEQ 49		"IN TOW"
735	RCL 15			777	GTO 43		
736	STO IND 25		REPLACES OLD ALIEN CO-ORDINATES WITH NEW				
737	CF 00		ALIEN NOT DESTROYED	778	◆LBL "DOC"		"DOCKING & REPAIRS"
738	XEQ 47		"TOO FAR AWAY"	779	100.1001		
739	GTO 36			780	XEQ 40		CHECK "D" TO STARBASE
				781	XEQ 42		D<10?
740	◆LBL 35		CHECK FOR SENSOR	782	FS? 04		NO "TOO FAR AWAY"
741	RCL 07		REPAIRS	783	GTO 14		
742	X≠0?		NO DAMAGES?	784	4		YES
743	GTO 36		NONE − CONTINUE	785	STO 00		
744	RCL 13		S ε				
745	51			786	◆LBL 37		CHECK FOR OTHER
746	X<=Y?		S >50?	787	RCL 00		ALIENS NEAR STARBASE
747	GTO 36		YES-NO REPAIRS	788	STO 25		
748	XEQ 46		NO -"SNS REPAIRED"	789	RCL IND 25		

☐ 67   ☐ 97   ☑ 41C   "NON-PRINT" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
790	XEQ 40		CHECK "D" TO ALIEN	832	CF 02		
791	40			833	STOP		END
792	X<=Y?		OUT OF RANGE				
793	GTO 38		YES - CONTINUE	834	◆LBL 40		
794	"ALIEN"			835	RCL 05		DISTANCE = D
795	XEQ 49		"ALIEN"	836	–		
796	GTO 43			837	3		
				838	STO 25		
797	◆LBL 38			839	CLX		
798	DSE IND 25			840	STO 17		
				841	RDN		
799	1						
800	RCL 00			842	◆LBL 41		
801	X≠Y?		ALL ALIENS OUT OF	843	ENTER↑		
802	GTO 37		RANGE	844	INT		
803	1 E3			845	1 E2		
804	RCL 01			846	–		
805	X<0?		NUBIAN TOWED?	847	X↑2		
806	RDN			848	ST+ 17		
807	STO 01		YES- STORE 1000	849	RDN		
808	"DOCKED"			850	FRC		
809	XEQ 49		"DOCKED"	851	1 E3		
810	CF 00			852	*		
811	0		ENTERPRISE'S	853	DSE 25		
812	STO 05		CO-ORDINATES(0,0,0)	854	GTO 41		
813	4			855	RCL 17		
814	STO 25			856	SQRT		
815	RCL 07			857	RTN		
816	X≠0?		DAMAGES?				
817	GTO 39		NO - CONTINUE	858	◆LBL 42		
818	XEQ 46		YES-"SNS REPAIRED"	859	10		
				860	X>Y?		D<10?
819	◆LBL 39		CHECK FOR GAME OVER	861	RTN		YES - RETURN
820	RCL IND 25			862	XEQ 47		NO-"TOO FAR AWAY"
				863	SF 04		
821	1 E3			864	RTN		
822	X≠Y?		GAME OVER?				
823	GTO 43		NO - CONTINUE	865	◆LBL 43		DISPLAY
824	DSE 25			866	CF 00		
825	GTO 39		YES	867	FIX 6		
826	"GAME OVER"			868	RCL 01		
				869	ENTER↑		
827	XEQ 49		"GAME OVER"	870	ABS		
828	"FUEL USED"			871	/		
				872	RCL 05		
829	XEQ 49		"FUEL USED"	873	*		
830	FIX 0			874	BEEP		
831	VIEW 06		FUEL USED	875	PSE		

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
876	GTO "SNS "			909	/		
				910	INT		
877	◆LBL 44			911	STO 29		
878	CHS		INDICATES EITHER	912	XEQ 02		
879	"NUBIAN"		COMMUNICATIONS OR	913	STO 30		
880	GTO 49		TTB USED SUCCESSFULLY	914	XEQ 02		
				915	STO 31		
881	◆LBL 45			916	XEQ 03		
882	"SNS U/S "		INDICATES SENSORS	917	STO 31		
			SYSTEM DAMAGED	918	RCL 30		
883	GTO 49			919	XEQ 03		
				920	STO 30		
884	◆LBL 46			921	RCL 29		
885	1			922	XEQ 03		
886	STO 07		INDICATES SENSORS	923	STO 29		
887	"SNS REP AIRED"		SYSTEM REPAIRED	924	XEQ 00		
888	GTO 49			925	GTO 07		
889	◆LBL 47		INDICATES TOO FAR	926	◆LBL "CCP "		
890	"TOO FAR AWAY"		AWAY TO "DOCK",	927	INT		
			USE "TTB"; OR ALIEN	928	STO 29		
891	GTO 49		RETREATED.	929	XEQ 01		
				930	STO 30		
892	◆LBL 48			931	XEQ 01		
893	SF 03		INDICATES YOU ARE	932	STO 31		
894	"UNDER A TTACK"		UNDER ATTACK	933	XEQ 00		
				934	GTO 07		
895	◆LBL 49		DISPLAY ROUTINE	935	◆LBL "CCW "		
896	BEEP			936	XEQ 00		
897	AVIEW		.	937	RCL 15		
898	PSE			938	INT		
899	CLD			939	STO 29		
900	RTN			940	XEQ 01		
				941	STO 30		
901	◆LBL 50			942	XEQ 01		
902	CF 04			943	STO 31		
903	BEEP		INDICATES YOU BLEW	944	XEQ 00		
904	"YOU BLE W IT"		UP ENTERPRISE	945	GTO 07		
905	AVIEW			946	◆LBL 00		
906	STOP			947	RCL 05		
907	*END* ←		ENTER "END" HERE	948	X<0?		
907	◆LBL "CCS "		SEE COMPLETE	949	CHS		
			SCWAC PROGRAM. P 36	950	INT		
908	1 E2			951	STO 26		

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
952	XEQ 01		
953	STO 27		
954	XEQ 01		
955	STO 28		
956	RTN		
957	◆LBL 01		
958	LASTX		
959	FRC		
960	1 E3		
961	*		
962	END		SECTOR/COURSE/WEAPONS ANGLES COMPUTOR(SCWAC)
01	◆LBL "CCS		" MISSION SECTOR COMP"
02	1 E2		
03	/		
04	INT		
05	STO 29		"X"
06	XEQ 02		
07	STO 30		"Y"
08	XEQ 02		
09	STO 31		"Z"
10	XEQ 03		
11	STO 31		ZZ
12	RCL 30		
13	XEQ 03		
14	STO 30		YY
15	RCL 29		
16	XEQ 03		
17	STO 29		XX
18	XEQ 00		ENTERPRISE(X,Y,Z)
19	GTO 07		
20	◆LBL "CCP		"COURSE COMPUTOR"
21	INT		
22	STO 29		NEW - XX
23	XEQ 01		
24	STO 30		NEW - YY
25	XEQ 01		
26	STO 31		NEW - ZZ
27	XEQ 00		ENTERPRISE(X,Y,Z)
28	GTO 07		
29	◆LBL "CCW		"WEAPONS ANGLES COMP"
30	XEQ 00		
31	RCL 15		

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
32	INT		
33	STO 29		ENEMY - XX
34	XEQ 01		
35	STO 30		ENEMY - YY
36	XEQ 01		
37	STO 31		ENEMY - ZZ
38	XEQ 00		ENTERPRISE(X,Y,Z)
39	GTO 07		
40	◆LBL 00		"ENTERPRISE(X,Y,Z)"
41	RCL 05		XX.OYYOZZ
42	X<0?		NUBIAN TOWED?
43	CHS		
44	INT		
45	STO 26		ENTERPRISE - XX
46	XEQ 01		
47	STO 27		ENTERPRISE - YY
48	XEQ 01		
49	STO 28		ENTERPRISE - ZZ
50	RTN		
51	◆LBL 01		CO-ORDINATE SEPARATOR
52	LASTX		
53	FRC		
54	1 E3		
55	*		
56	INT		
57	RTN		
58	◆LBL 02		SECTOR SEPARATOR
59	LASTX		
60	FRC		
61	1 E1		
62	*		
63	INT		
64	RTN		
65	◆LBL 03		MISSION SECTOR RANGE
66	1		
67	X=Y?		(X,Y,orZ) = 1?
68	GTO 04		
69	X<>Y		
70	2		
71	X=Y?		(X,Y,orZ) = 2?
72	GTO 05		
73	X<>Y		
74	3		
75	X=Y?		(X,Y,orZ) = 3?

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
76	GTO 06			118	-		ΔY
77	87		(X,Y,orZ) = 4	119	X<>Y		
78	RTN		CENTER SECTOR "4"	120	X=0?		ΔX = O?
				121	GTO 11		
79◆	LBL 04			122	/		$\Delta Y/\Delta X$
80	12		(X,Y,orZ) = 1	123	ATAN		$\theta_\iota = TAN^{-1}(\Delta Y/\Delta X)$
81	RTN		CENTER SECTOR "1"	124	STO 33		OTHER - XX
				125	RCL 29		ENTERPRISE - XX
82◆	LBL 05			126	RCL 26		IS ENTERPRISE GREATER?
83	37		(X,Y,orZ) = 2	127	X>Y?		YES
84	RTN		CENTER SECTOR "2"	128	GTO 10		NO
				129	GTO 15		
85◆	LBL 06						
86	62		(X,Y,orZ) = 3	130◆	LBL 09		OTHER - YY
87	RTN		CENTER SECTOR "3"	131	RCL 30		ENTERPRISE - YY
				132	RCL 27		IS ENTERPRISE GREATER?
88◆	LBL 07		"DISTANCE"	133	X>Y?		YES
89	FIX 2			134	GTO 12		NO
90	RCL 26		ENTERPRISE - XX	135	GTO 11		
91	RCL 29		OTHER - XX				
92	-			136◆	LBL 10		OTHER - YY
93	X↑2		$(\Delta X)^2$	137	RCL 30		ENTERPRISE - YY
94	RCL 27		ENTERPRISE - YY	138	RCL 27		IS ENTERPRISE GREATER?
95	RCL 30		OTHER - YY	139	X>Y?		YES
96	-			140	GTO 13		NO
97	X↑2		$(\Delta Y)^2$	141	GTO 14		
98	RCL 28		ENTERPRISE - ZZ				
99	RCL 31		OTHER - ZZ	142◆	LBL 11		
100	-			143	90		θ = +90
101	X↑2		$(\Delta Z)^2$	144	STO 33		
102	+			145	GTO 15		
103	+						
104	SQRT		$D=\sqrt{(\Delta X)^2+(\Delta Y)^2+(\Delta Z)^2}$	146◆	LBL 12		
105	"DISTANC E"			147	-90		θ = -90
106	XEQ 16		DISPLAY ROUTINE	148	STO 33		
107	PSE		DISTANCE FROM	149	GTO 15		
108	PSE		ENTERPRISE				
109	STO 32			150◆	LBL 13		
				151	180		$\theta = (\theta_\iota - 180)$
110◆	LBL 08		"THETA ROUTINE"	152	ST- 33		
111	RCL 29		OTHER - XX	153	GTO 15		
112	RCL 26		ENTERPRISE - XX				
113	X=Y?		ARE BOTH EQUAL?	154◆	LBL 14		
114	GTO 09		YES	155	180		$\theta = (\theta_\iota + 180)$
115	-		ΔX NO	156	ST+ 33		
116	RCL 30		OTHER - YY				
117	RCL 27		ENTERPRISE - YY	157◆	LBL 15		
				158	"THETA"		

"NON-PRINT" VERSION | "PRINTER" VERSION

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
159	XEQ 16		"THETA"	01	◆LBL "SD"		"SEED"
160	RCL 33		θ	02	CLRG		
161	PSE			03	CLA		
162	PSE			04	CF 00		INITIALIZE
163	RCL 31		OTHER – ZZ	05	SF 25		ERROR PROTECTION
164	RCL 28		ENTERPRISE – ZZ	06	STO 00		STORE "SEED"
165	–		ΔZ	07	4		
166	RCL 32		D	08	STO 25		COUNTER CONTROL
167	/			09	1		
168	ASIN		$\phi = \mathrm{SIN}^{-1}(\Delta Z/D)$	10	STO 07		SET DAMAGES OFF
169	"PHI"		"PHI"				
170	XEQ 16			11	◆LBL 00		
171	STOP		φ	12	6		
				13	STO 06		
172	◆LBL 16		DISPLAY ROUTINE	14	STO 20		
173	BEEP			15	RCL 25		
174	AVIEW			16	INT		
175	PSE			17	1		
176	CLD			18	X=Y?		
177	RTN			19	SF 00		NUBIAN CO-ORDINATES? SF TO STORE IN R$_{09}$
178	.END.						
				20	◆LBL 01		
				21	XEQ 04		
				22	1 E2		
				23	*		
				24	INT		
				25	STO 21		
				26	FS? 00		NUBIAN?
				27	XEQ 05		YES – ADD TO R$_{09}$
				28	RCL 21		
				29	1 E2		
				30	+		RANDOM CO-ORDINATES
				31	RCL 06		
				32	10↑X		
				33	/		POSITION CO-ORDINATE
40				34	ST+ IND 25		
				35	3		
				36	ST– 06		
				37	RCL 06		
				38	0		
				39	X<=Y?		
				40	GTO 01		NEW CO-ORDINATE
				41	RCL 25		ADD I.D. OF SHIP
				42	INT		
				43	FS? 00		NUBIAN?
				44	ST+ 09		ADD I.D. OF NUBIAN
50				45	1 E7		

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☐ 67   ☐ 97   ☑ 41C   "PRINTER" VERSION

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
46	/			89	+		
47	ST+ IND 25			90	STO 21		
48	DSE 25			91	RCL 20		
49	GTO 00		NEW SHIP	92	FRC		
50	-250		SET FUEL = -250	93	1 E3		
51	STO 06		SO THAT FIRST USE OF	94	*		
			LRTS COSTS NO FUEL	95	STO 20		
52	LBL "LRTS"		"LONG RANGE TRACKING	96	DSE 25		
			SYSTEM" (LRTS)	97	GTO 03		
53	LBL 02			98	250		
54	XEQ 04		RANDOM NUMBER	99	ST+ 06		ADD 250 TO FUEL USE
55	4			100	RCL 21		"MISSION SECTOR"
56	*			101	FIX 0		
57	1			102	PRX		
58	+			103	GTO "SNS"		
59	INT						
60	STO 25			104	LBL 04		RANDOM NUMBER
61	RCL IND 25		RANDOM SHIP	105	RCL 00		GENERATOR
				106	PI		
62	1 E3			107	+		
63	X=Y?		ALREADY DESTROYED?.	108	5		
64	GTO 02		NEW RANDOM SHIP	109	Y↑X		
65	RDN			110	FRC		
66	X<0?		TOWED NUBIAN?	111	STO 00		NEW SEED
67	GTO 02		NEW RANDOM SHIP	112	RTN		
68	STO 20						
69	CLX			113	LBL 05		
70	STO 21			114	RCL 20		
71	3			115	10↑X		
72	STO 25			116	/		
				117	ST+ 09		NUBIAN CO-ORDINATES
73	LBL 03			118	RCL 20		
74	RCL 20			119	2		
75	INT			120	-		
76	1 E2			121	STO 20		RESET COUNTER
77	-			122	RDN		
78	25			123	RTN		
79	/						
80	1			124	LBL "CHN"		"COURSE CHANGE"
81	+			125	STO 16		φ
82	INT			126	RDN		
83	RCL 25			127	STO 22		θ
84	1			128	X<>Y		
85	-			129	STO 14		R
86	10↑X			130	RCL 16		φ
87	*		POSITION IN MISSION	131	SIN		SIN φ
88	RCL 21		SECTOR				

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
132	RCL 14		R	177	RCL IND 25		
133	*		R.SIN φ	178	+		
134	STO 11		ΔZ	179	INT		
135	RCL 16		φ	180	X<0?		NEW CO-ORDINATE
136	COS		COS φ	181	GTO 14		
137	RCL 14		R	182	1 E2		
138	*		R.COS φ	183	X<=Y?		
139	STO 16			184	GTO 14		
140	RCL 22		θ	185	X<>Y		
141	SIN		SIN θ	186	RCL 16		
142	RCL 16		R.COS φ	187	10↑X		
143	*		R.COS φ.SIN θ	188	/		
144	STO 12		ΔY	189	ST+ 17		
145	RCL 22		θ	190	3		
146	COS		COS θ	191	ST+ 16		
147	RCL 16		R.COS φ	192	DSE 25		
148	*		R.COS φ.COS θ	193	GTO 06		
149	STO 13		ΔX	194	RCL 17		NEW ENTERPRISE
				195	STO 05		CO-ORDINATES
150◆LBL "STD"			"COURSE-STEADY"				
			CHECK FOR SHIPS IN	196◆LBL "SNS"			"SENSOR PROBE"
151	XEQ 12		VICINITY				
152	13.01			197	CLX		
153	STO 25		COUNTER CONTROL	198	STO 08		
154	RCL 01		NUBIAN	199	RCL 00		
155	0			200	PI		
156	STO 16			201	+		
157	STO 17			202	5		
158	X>Y?		NUBIAN TOWED?	203	Y↑X		
159	1		YES-FUEL COST=6xR	204	FRC		
160	ENTER↑		NO-FUEL COST=5xR	205	STO 00		
161	5			206	RCL 07		DAMAGE REGISTER
162	+			207	X=0?		DAMAGES?
163	RCL 14			208	XEQ 45		YES - "SNS U/S"
164	*		FUEL COST	209	FIX 6		
165	INT			210	1 E3		
166	ST+ 06			211	STO 18		
167	RCL 05			212	R↑		RANDOM NUMBER
168	RDN			213	4		
				214	*		
169◆LBL 06				215	1		
170	R↑			216	+		
171	ENTER↑			217	INT		
172	FRC			218	STO 10		
173	1 E3			219	STO 21		
174	*						
175	X<>Y			220◆LBL 07			
176	INT						

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
221	RCL 10			266	ST+ 08		ADD TO "SHIPS IN VICINITY" REGISTER
222	STO 25		ALIEN CO-ORDINATES				
223	RCL IND 25		1XX.1YY1ZZ ENTERPRISE CO-ORDINATE	267	◆LBL 10		DISPLAY DISTANCE
224	RCL 05		$XX_\varepsilon.0YY_\varepsilon0ZZ_\varepsilon$	268	XEQ 13		WITH/OR WITHOUT I.D.
225	–			269	◆LBL 11		ICREMENT R_{10}
226	3			270	ISG 10		
227	STO 25			271	PSE		
228	CLX			272	5		$R_{10} = 5$?
229	STO 17			273	RCL 10		
230	RDN			274	X=Y?		YES - SET IT TO "1"
				275	1		
231	◆LBL 08			276	STO 10		VALUE MARKING END OF LOOP
232	ENTER↑			277	RCL 21		
233	INT		$C = X, Y, orZ$	278	X≠Y?		
234	1 E2			279	GTO 07		
235	–		$C - C_\varepsilon$	280	171		MAXIMUM DISTANCE CAN TRAVEL IN CUBE
236	X↑2		$(C - C_\varepsilon)^2$	281	RCL 18		SMALLEST D ≥ 40
237	ST+ 17			282	X>Y?		D > 171?
238	RDN			283	1 E3		YES - NO SHIPS LEFT
239	FRC			284	CHS		DISPLAY WITH MINUS SIGN
240	1 E3			285	PRX		
241	*			286	XEQ 12		CHECK FOR SHIPS IN VICINITY
242	DSE 25			287	GTO 14		
243	GTO 08						
244	STO 23		I.D.	288	◆LBL 12		
245	RCL 17		$(X-X_\varepsilon)^2+(Y-Y_\varepsilon)^2+(Z-Z_\varepsilon)^2$	289	RCL 08		SHIPS IN VICINITY?
246	SQRT		DISTANCE	290	X=0?		NO - RETURN
247	STO 16		$D=\sqrt{(\Delta X)^2+(\Delta Y)^2+(\Delta Z)^2}$	291	RTN		
248	40			292	.1		
249	X>Y?		ALIEN < 40?	293	X<=Y?		NUBIAN IN VICINITY?
250	GTO 09		YES	294	XEQ 44		YES - "NUB"
251	CLX			295	.1		NO NUBIAN
252	RCL 18			296	X=Y?		UNDER ATTACK?
253	X>Y?			297	XEQ 48		YES - "ATK"
254	X<>Y			298	CLX		NO (SF 3)
255	STO 18		SMALLEST D ≥ 40	299	RDN		
256	GTO 11			300	X>0?		NUBIAN IN VICINITY?
				301	GTO 14		NO - GO TO DISPLAY
257	◆LBL 09			302	RCL 09		YES - SHOW NUBIAN
258	CLX			303	STO 23		CO-ORDINATES
259	35		CLOSE ENOUGH FOR BATTLE?	304	CLX		
260	X<=Y?		NO	305	STO 16		
261	GTO 10		SHIP I.D.				
262	RCL 10			306	◆LBL 13		DISPLAY NUBIAN CO-ORDINATES OR "0"
263	ENTER↑			307	RCL 07		
264	10↑X			308	X≠0?		SENSORS ON?
265	/			309	RCL 23		YES - NUBIAN(X,Y,Z)

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
310	RCL 16			351	INT		
311	+		I.D./NUBIAN(X,Y,Z)	352	ABS		
312	PRX		DISTANCE/0	353	5		
313	RTN		· DEPENDS ON "SNS"	354	X<=Y?		CHECK FOR ERROR
				355	GTO 15		INPUT
314	◆LBL 14			356	X<>Y		
315	CF 04			357	1		IF "1" or "0"
316	FIX 6			358	X<>Y		INPUTTED, NOT VALID
317	RCL 01			359	X<=Y?		IF "2,3,or4" NOT
318	ENTER↑			360	GTO 15		USED, REPEAT "I.D.'s"
319	ABS			361	STO 10		SHIP I.D.
320	/		NUBIAN TOWED? IF YES	362	STO 25		
321	RCL 05		(R_{01}<0)MAKES ENTERPRISE	363	RCL IND 25		
322	*		NEGATIVE				
323	PRX			364	RCL 05		
324	FS? 03		INDICATES UNDER	365	X<>Y		
325	GTO "ALT"		ATTACK	366	STO 15		
				367	X<>Y		
326	RTN			368	-		
				369	13.01		
327	◆LBL "ALT"		"BATTLE ALERT"	370	STO 25		COUNTER
				371	CLX		
328	CF 03			372	STO 18		
329	SF 00			373	RDN		
330	FIX 4						
331	RCL 08		SHIPS IS VICINITY	374	◆LBL 18		DETERMINE DISTANCE
332	10			375	ENTER↑		
333	*			376	INT		
334	INT			377	1 E2		
335	X=0?		NUBIAN IN VICINITY?	378	-		
336	GTO 15		NO	379	STO IND 25		
337	XEQ 44		YES - "NUB"				
338	CHS			380	X↑2		
				381	ST+ 18		
339	◆LBL 15			382	RDN		
340	RCL 07			383	FRC		
341	X=0?		DAMAGES?	384	1 E3		
342	GTO 21		YES	385	*		
343	RCL 08		NO - SHIPS IN	386	DSE 25		
344	PRX		VICINITY	387	GTO 18		
				388	RCL 18		
345	◆LBL 16			389	SQRT		DISTANCE TO ALIEN
346	PSE			390	STO 18		
347	FS? 22		SHIP CHOSEN?	391	RCL 12		Δ Y
348	GTO 17		YES - LEAVE LOOP	392	RCL 13		Δ X
349	GTO 16		NO	393	R-P		
				394	RDN		
350	◆LBL 17			395	STO 16		θ

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
396	RCL 11		ΔZ	441	PI		
397	RCL 18		D	442	+		
398	/		ΔZ/D	443	5		
399	ASIN		$\phi = SIN^{-1}(\Delta Z/D)$	444	Y↑X		
400	STO 17		φ	445	FRC		
401	RCL 15			446	STO 00		
402	100.1001			447	20		
403	−			448	*		
404	STO 15		ALIEN CO-ORDINATES	449	10		
405	RCL 10		I.D.	450	−		
406	ENTER↑			451	INT		
407	10↑X			452	RTN		
408	/						
409	ST− 08		SUBTRACT FROM SHIPS	453◆LBL 21			SENSORS DAMAGED
410	RCL 10		IN VICINITY	454	CF 00		
411	STO 11		I.D.	455	XEQ 45		"SNS U/S"
412	3			456	GTO 17		
413	X≠Y?		ROMULAN VESSEL?				
414	GTO 19		NO	457◆LBL "SHD			"SHIELDS"
■415	"CK"		"CLOAK" BEING USED				
416	FS? 00		SNS DAMAGED?	458	CF 00		
417	XEQ 49		NO − "CK" DISPLAYED	459	SF 02		
418	CLA		YES − NO DISPLAY	460	1 E2		
419	XEQ 20		Δ θ	461	STO 24		
420	ST+ 16			462	CLX		
421	ABS			463	STO 20		
422	XEQ 20		Δ φ	464	STO 13		
423	ST+ 17			465	STO 14		
424	ABS		TOTAL ANGULAR CHANGE	466	12		
425	+		DUE CLOAK DEVICE	467	STO 12		
426	.15		DETERMINE CHANGE IN				
427	*		I.D. TO LESSEN BRUNT	468◆LBL 22			
428	.21		OF ROMULAN ATTACK	469	CF 01		
429	−			470	RCL 18		DISTANCE
430	INT			471	FIX 0		
431	ST+ 11			472	RND		
				473	FIX 8		
432◆LBL 19				474	RCL 13		S_ϵ
433	RCL 18		DISTANCE	475	1 E3		
434	FIX 0			476	/		
435	RND		DISPLAY DISTANCE	477	+		$DD.OS_\epsilon S_\epsilon$
436	FIX 4		THEN GO TO"SHIELDS"	478	RCL 07		
437	PRX			479	STO 19		DAMAGES?
438	GTO "SHD			480	X=0?		SENSORS DAMAGED?
				481	XEQ 45		YES − "SNS U/S"
				482	RCL 14		S_α IF SNS DAMAGED
439◆LBL 20			Δ θ OR Δ φ	483	*		$S_\alpha = 0$
440	RCL 00			484	1 E6		

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
485	/		DD.OS$_\epsilon$S$_\epsilon$OS$_\alpha$S$_\alpha$	526	CHS		
486	+			527	XEQ 28		"DISPLAY"
487	RCL 20			528	RCL 15		ALIEN CO-ORDINATES
488	1 E8		SHIELDS	529	XEQ 28		"DISPLAY"
489	/			530	GTO 26		
490	+		DD.OS$_\epsilon$S$_\epsilon$OS$_\alpha$S$_\alpha$SS				
491	◆LBL 23			531	◆LBL 27		RESET SHIELDS
492	FS? 04		ENEMY DESTROYED?	532	RCL 24		
493	GTO "PST"		YES - GO TO "POST"	533	X<=Y?		NEW VALUE MUST BE
				534	GTO 23		LESS THAN 100.
494	4			535	X<>Y		
495	FS? 00		BATTLE NOT BEGUN OR	536	STO 20		
496	10↑X		OVER?	537	FS? 02		FIRST TIME AROUND?
497	STO 25		YES - BLINKS FOREVER	538	GTO 29		YES - ALIEN FIRE
498	RDN		NO- MIDDLE OF BATTLE	539	RCL 13		
499	BEEP		BLINK STATUS 4 TIMES	540	RCL 13		
			ONLY	541	GTO 30		
500	◆LBL 24			542	◆LBL 28		DISPLAY ROUTINE
501	CF 22			543	PRX		
502	PSE			544	PSE		
503	FS? 22		SHIELD VALUE INPUT?	545	PSE		
504	GTO 27		YES - RESET	546	PSE		
505	DSE 25			547	DSE 25		
506	GTO 24			548	GTO 31		
				549	GTO 29		
507	◆LBL "WPN"		"WEAPONS INITIALIZATION"				
				550	◆LBL "PHT"		"PHOTON TORPEDOES"
508	RCL 18		DISTANCE				
509	35			551	SF 01		
510	X>Y?		ENEMY < 35 UNITS?				
511	GTO 25		YES-CONTINUE FIRING	552	◆LBL "PHS"		"PHASERS"
512	XEQ 47		NO- "A/T/F"				
513	GTO "SNS"		THEN GO TO "SNS"	553	RCL 17		φ
				554	-		Δ φ
514	◆LBL 25			555	ABS		
515	CF 00			556	X<>Y		
516	FIX 6			557	RCL 16		
517	RCL 12		DECREMENT FIRING	558	-		θ
518	2		TIME COUNTER	559	ABS		Δ θ
519	-			560	+		
520	X≠0?			561	STO 21		|Δ φ| + |Δ θ| = A
521	STO 12			562	0		
522	RCL 12			563	FS? 01		PHOTON TORP USED?
523	STO 25			564	5		YES - FUEL = 8xD
				565	ENTER↑		
524	◆LBL 26		ENTERPRISE's	566	3		NO - FUEL = 3xD
525	RCL 05		CO-ORDINATES	567	+		

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
568	RCL 18		D	615	ST+ 06		
569	*		FUEL USED	616	6		I
570	ST+ 06			617	RCL 11		I.D.(VARIABLE I.D.)
571	2			618	–		(6 – I)
572	RCL 21			619	1 E4		
573	LN		–.03 LN(A)	620	*		(6 – I).10⁴
574	–.03		CHANGE TO –.04 FOR	621	RCL 13		
575	*		GREATER CHALLENGE	622	85		ENTERPRISE DESTROYED
576	.1			623	X<=Y?		IF SHIELDS GONE
577	+		0.1 – 0.03 LN(A)	624	GTO 50		"YOU BLEW IT"
578	RCL 14		S_α	625	CLX		$(6-I).10^4(S_\epsilon'-S_\alpha+100)^2$
579	RCL 13		S_ϵ	626	RCL 14		
580	XEQ 32			627	XEQ 32		D
581	FS? 01		2X IF PHOTON USED	628	RCL 20		
582	*			629	10		
583	X<0?		$1-.03LN.A(S_\alpha-S_\epsilon+100)^2$	630	*		10 x SHIELDS
584	GTO 29		D	631	X↑2		$(10xS)^2$
585	INT			632	/		$(6-I).10^4(S_\epsilon-S_\alpha+100)^2$
586	ST+ 14			633	INT		―――――――――――――
587	RCL 14			634	ST+ 13		$D(10xS)^2$
588	RCL 24			635	RCL 13		
589	X>Y?			636	RCL 24		S_ϵ
590	GTO 29			637	X<=Y?		
591	–1		ALIEN DESTROYED	638	GTO 50		$S_\epsilon \geq 100$?
592	ST* 15			639	RCL 13		YES–"YOU BLEW IT"
593	FIX 0			640	70		
594	RCL 16			641	X>Y?		$S_\epsilon > 70$?
595	PRX		θ	642	GTO 30		YES–"SNS U/S"
596	RCL 17			643	CLX		$R_{07}= 0$
597	PRX		φ	644	STO 07		
598	RCL 10		I.D.	645	◆LBL 30		
599	RCL 19		I.D. NOT DISPLAYED	646	RCL 13		
600	*		IF SNS DAMAGED(R_{19}=0)	647	85		
601	SF 00			648	X>Y?		
602	SF 04		RESETS FLAGS FOR	649	GTO 22		$S_\epsilon > 85$?
603	PRX		NEXT ROUND	650	CLX		YES–"N/S"
604	GTO 23		I.D. OR "0"	651	STO 20		LOST YOUR SHIELDS
				652	"N/S"		
605	◆LBL 29			653	XEQ 49		
606	RCL 01			654	GTO 22		
607	0						
608	X>Y?		NUBIAN TOWED?	655	◆LBL 31		
609	1		YES – FUEL=3xSHIELDS	656	FS? 22		
610	ENTER↑			657	GTO 28		
611	2		NO – FUEL=2xSHIELDS	658	RTN		
612	+						
613	RCL 20		SHIELDS	659	◆LBL 32		
614	*		FUEL COST				

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
660	−			704	+		
661	RCL 24			705	INT		CO-ORDINATE
662	+			706	RCL 25		
663	X↑2			707	1		
664	*			708	−		
665	RCL 18			709	3		
666	/			710	*		
667	RTN			711	10↑X		
				712	/		
668	◆LBL "PST"		"POST"	713	ST+ 15		
				714	DSE 25		
669	SF 00			715	GTO 34		
670	CF 01			716	RCL 10		
671	CF 02			717	STO 25		
672	CF 04			718	1 E7		
673	FIX 6			719	/		
674	RCL 15		ALIEN CO-ORDINATES	720	ST+ 15		
675	X<0?		IF < 0 - DESTROYED	721	RCL 15		
676	GTO 35		YES - CONTINUE	722	STO IND 25		REPLACES OLD ALIEN CO-ORDINATES WITH NEW
677	3		NO - CHECK FOR RETREAT				
678	STO 25			723	CF 00		
679	0			724	XEQ 47		ALIEN NOT DESTROYED
680	STO 15			725	GTO 36		"A/T/F"
681	RCL 13		S_ϵ ($S_\epsilon \le 85$)?				
682	85			726	◆LBL 35		CHECK FOR SNS REPAIRS
683	X<=Y?		ILLEGAL RETREAT	727	RCL 07		
684	GTO 34		NO - CONTINUE	728	X≠0?		DAMAGES?
685	"DTG"		YES - "DTG"	729	GTO 36		NO - CONTINUE
686	XEQ 49			730	RCL 13		YES S_ϵ
				731	51		$S_\epsilon > 50$?
687	◆LBL 33			732	X<=Y?		
688	RCL 25		3 SEC COUNT-DOWN	733	GTO 36		YES - NO REPAIRS MADE
689	PRX			734	XEQ 46		NO - "SNS OK"
690	DSE 25						
691	GTO 33			735	◆LBL 36		
692	GTO 50			736	RCL 10		I.D.
				737	STO 25		
693	◆LBL 34		LEGAL RETREAT, NEW	738	1 E3		
694	RCL 00		ALIEN CO-ORDINATES	739	FS? 00		ALIEN DESTROYED?
695	PI			740	STO IND 25		YES - STORE 1000
696	+			741	RCL 01		
697	5			742	ENTER↑		
698	Y↑X			743	ABS		
699	FRC			744	/		
700	STO 00			745	RCL 05		
701	1 E2			746	*		ENTERPRISE's
702	*			747	PRX		CO-ORDINATES
703	LASTX						

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
748	GTO "SNS"			787	GTO 37		
				788	1 E3		
			"TRANSPORTER/TRACTOR	789	RCL 01		
749	◆LBL "TTB"		BEAM" (TTB)	790	X<0?		NUBIAN TOWED?
				791	RDN		
750	RCL 01			792	STO 01		YES - STORE 1000
751	XEQ 40		CHECK "D" TO NUBIAN	793	"DCKD"		
752	XEQ 42		D < 10?	794	XEQ 49		"DOCKED"
753	FS? 04		IF SET, D > 10 AND	795	CF 00		
754	GTO 14		"A/T/F" THEN RETURN	796	0		
755	RCL 01		YES	797	STO 05		ENTERPRISE's
756	XEQ 44		"NUB"	798	4		CO-ORDINATES(0,0,0)
757	STO 01			799	STO 25		
758	.1		CANCEL FROM SHIPS	800	RCL 07		
759	ST- 08		IN VICINITY	801	X≠0?		DAMAGES?
760	"I/T"		"I/T" NUBIAN IN TOW	802	GTO 39		NO - CONTINUE
761	XEQ 49			803	XEQ 46		YES "SNS OK"
762	GTO 43						
				804	◆LBL 39		
763	◆LBL "DOC"		"DOCKING&REPAIRS"	805	RCL IND 25		
764	100.1001			806	1 E3		
765	XEQ 40		CHECK "D" TO STARBASE	807	X≠Y?		GAME OVER?
766	XEQ 42		D < 10?	808	GTO 43		NO - CONTINUE
767	FS? 04		IF SET, D > 10 AND	809	DSE 25		
768	GTO 14		"A/T/F" THEN RETURN	810	GTO 39		
769	4		YES	811	"GAME OVER"		YES
770	STO 00						
				812	XEQ 49		"GAME OVER"
771	◆LBL 37		CHECK FOR OTHER	813	"FUEL ="		
772	RCL 00		ALIENS NEAR STARBASE	814	ACA		
773	STO 25			815	FIX 0		
774	RCL IND 25			816	RCL 06		
				817	ACX		"FUEL = XXXX"
775	XEQ 40		CHECK "D" TO ALIEN	818	PRBUF		
776	40			819	CF 02		
777	X<=Y?		OUT OF RANGE?	820	STOP		END
778	GTO 38		YES - CONTINUE				
779	"ALIEN"		NO - "ALIEN"	821	◆LBL 40		
780	XEQ 49			822	RCL 05		
781	GTO 43			823	-		
				824	3		
782	◆LBL 38			825	STO 25		
783	DSE IND 25			826	CLX		
				827	STO 17		
784	1			828	RDN		
785	RCL 00		ALL ALIENS OUT OF				
786	X≠Y?		RANGE	829	◆LBL 41		

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
830	ENTER↑		
831	INT		
832	1 E2		
833	—		
834	X↑2		
835	ST+ 17		
836	RDN		
837	FRC		
838	1 E3		
839	*		
840	DSE 25		
841	GTO 41		
842	RCL 17		
843	SQRT		
844	RTN		
845◆LBL 42			
846	10		
847	X>Y?		D < 10?
848	RTN		YES - RETURN
849	XEQ 47		NO - "A/T/F"
850	SF 04		
851	RTN		
852◆LBL 43			DISPLAY
853	CF 00		
854	FIX 6		
855	RCL 01		
856	ENTER↑		
857	ABS		
858	/		
859	RCL 05		
860	*		
861	PRX		
862	GTO "SNS"		
863◆LBL 44			INDICATES EITHER
864	CHS		COMMUNICATIONS OR
865	"NUB"		TTB USED SUCCESSFULLY
866	GTO 49		
867◆LBL 45			INDICATES SENSORS
868	"SNS U/S"		SYSTEM DAMAGED
869	GTO 49		
870◆LBL 46			

STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
871	1		INDICATES SENSOR
872	STO 07		SYSTEM REPAIRED
873	"SNS OK"		
874	GTO 49		
875◆LBL 47			INDICATES TOO FAR
876	"A/T/F"		AWAY TO "DOCK", USE
877	GTO 49		"TTB; OR ALIEN HAS
			RETREATED
878◆LBL 48			
879	SF 03		INDICATES YOU ARE
880	"ATK"		UNDER ATTACK
881◆LBL 49			DISPLAY ROUTINE
882	PRA		PRINTS "ALPHA"
883	CLA		
884	RTN		
885◆LBL 50			
886	CF 04		INDICATES YOU BLEW
887	"YOU BLE		UP ENTERPRISE
	W IT"		
888	PRA		
889	STOP		
890	END		
01◆LBL "PFR"			"PRACTICE FIRING RANGE"
02	FIX 6		
03	CLRG		
04	STO 00		STORE SEED
05	-50.0500		
	5		ENTERPRISE POSITION
06	STO 20		50.05050(XX.0YYoZZ)
07◆LBL 00			RESETS FOR NEXT ROUND
08	CF 22		
09	6		
10	STO 25		COUNTER
11◆LBL 01			
12	RCL 00		SEED
13	PI		
14	+		
15	5		
16	Y↑X		
17	FRC		
18	STO 00		
19	41		
20	*		

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
21	30			64	/		
22	+			65	+		
23	INT			66	DSE 25		
24	STO IND 25			67	DSE 25		
				68	GTO 02		
25	DSE 25			69	STO 09		ALIEN CO-ORDINATES
26	50						
27	–			70◆LBL 03			
28	STO IND 25			71	RCL 20		ENTERPRISE(X,Y,Z)
				72	"ENTERPRISE"		"ENTERPRISE"
29	DSE 25			73	XEQ 05		
30	GTO 01			74	PSE		
31	RCL 03		ΔY	75	PSE		-50.05050
32	RCL 01		ΔX	76	PSE		
33	R-P			77	FS? 22		ANGLE INPUTS?
34	RDN			78	GTO 04		
35	STO 07		θ	79	RCL 09		ALIEN(X,Y,Z)
36	RCL 05		ΔZ	80	"ALIEN"		"ALIEN"
37	RCL 05			81	XEQ 05		
38	X↑2			82	PSE		
39	RCL 03		ΔY	83	PSE		XX.0YY0ZZ
40	X↑2			84	PSE		
41	RCL 01		ΔX	85	FS? 22		ANGLE INPUTS?
42	X↑2			86	GTO 04		
43	+			87	RCL 21		DISTANCE
44	+			88	"DISTANCE"		"DISTANCE"
45	SQRT						
46	STO 21		DISTANCE	89	XEQ 05		
47	"DISTANCE"		"DISTANCE"	90	PSE		D
48	XEQ 05		DISTANCE TO ALIEN	91	FS? 22		ANGLE INPUTS?
49	PSE			92	GTO 04		
50	/		ΔZ/D	93	GTO 03		
51	ASIN		$\phi = SIN^{-1}(\Delta Z/D)$				
52	STO 08			94◆LBL 04			
53	6			95	X<>Y		
54	STO 25			96	RCL 07		θ
55	0			97	"THETA"		"THETA"
				98	XEQ 05		
56◆LBL 02				99	PSE		ACTUAL ANGLE
57	RCL IND 25			100	–		
				101	"ERROR"		"ERROR"
58	RCL 25			102	XEQ 05		
59	1.5			103	PSE		AMOUNT OF ERROR
60	*			104	ABS		
61	3			105	X<>Y		
62	–			106	RCL 08		φ
63	10↑X			107	"PHI"		"PHI"

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PROGRAM LISTING

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STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
108	XEQ 05			51			
109	PSE		ACTUAL ANGLE				
110	–						
111	"ERROR"		"ERROR"				
112	XEQ 05						
113	PSE		AMOUNT OF ERROR				
114	ABS						
115	+						
116	"TOTAL ERROR"		"TOTAL ERROR"	60			
117	XEQ 05						
118	PSE		TOTAL ERROR OF				
119	GTO 00		GUESSES. REPEAT FOR NEW ROUND				
120	♦LBL 05		DISPLAY ROUTINE				
121	BEEP						
122	AVIEW						
123	PSE						
124	CLD			70			
125	RTN						
126	.END.		END				
				80			
30							
40				90			
50				00			

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

(PFR) = PRACTICE FIRING RANGE   NON-PRINT/PRINTER VERSION

DATA REGISTERS

00	I.D.	21	DISTANCE (PFR)
"	SEED (PFR)	22	THETA (θ)
01	NUBIAN (X,Y,Z)	23	I.D.
"	ΔX (X-50) (PFR)	"	NUBIAN (X,Y,Z)
02	KLINGON (X,Y,Z)	24	100
"	X (PFR)	25	COUNTER
03	ROMULAN (X,Y,Z)	26	ENTERPRISE "XX"
"	ΔY (Y-50) (PFR)	27	ENTERPRISE "YY"
04	VALLICIAN (X,Y,Z)	28	ENTERPRISE "ZZ"
"	Y (PFR)	29	MISSION SECTOR,
05	ENTERPRISE(X,Y,Z)		"XX", NEW "XX" or
"	NEW ALIEN (X,Y,Z)		ENEMY "XX"
	(PFR)	30	MISSION SECTOR
"	ΔZ (Z-50) (PFR)		"YY", NEW "YY" or
06	FUEL USED		ENEMY "YY"
"	COUNTER	31	MISSION SECTOR
"	Z (PFR)		"ZZ", NEW "ZZ" or
07	DAMAGES? OFF=1		ENEMY "ZZ"
	ON=0	32	DISTANCE
"	THETA (θ) (PFR)	33	THETA (θ)
08	SHIPS IN VICINITY		
"	PHI (ϕ) (PFR)		
09	NUBIAN (X,Y,Z)		
"	PRACTIC ALIEN		
	(X,Y,Z) (PFR)		
10	I.D.		
"	SEED		
11	VARIABLE I.D.		
"	ΔZ		
12	ΔY		
"	FIRING TIME COUNT		
13	ΔX		
"	Sϵ ENTERPRISE STATUS		
14	R		
"	Sα ALIEN STATUS		
15	ALIEN (X,Y,Z)		
16	PHI (ϕ)		
"	Rcos ϕ		
"	THETA (θ)		
17	NEW (X,Y,Z) FOR ENTERPRISE		
"	PHI (ϕ)		
18	DISTANCE		
19	DAMAGES ?		
20	(X,Y,Z) FOR LRTS		
"	SHIELD VALUE		
21	USED		
"	MISSION SECTOR		
"	COUNTER		

STATUS

SIZE 034/026	**TOT. REG.** 33/25		**USER MODE**
ENG	**FIX** $0 \to 8$ **SCI**		**ON** $\checkmark$ **OFF**
DEG $\checkmark$	**RAD** **GRAD**		

FLAGS

#	INIT S/C	SET INDICATES	CLEAR INDICATES
00	OFF	NUBIAN(XYZ) SET	IN TOW (TTB)
00	OFF	DEFLECTORS ON, UNDER ATTACK	ENEMY I.D. ENTERED AND ACCEPTED
00	OFF	ENEMY DESTROYED	ENEMY I.D. ENTERED DOCKING COMPLETED
01	OFF	PHOTON TORPEDOES FIRED AT ENEMY	FUEL COST FIGURES COMPLETED
02	OFF	INDICATES STATUS REPORT IS NEXT	ENEMY SHIP HAS BEEN DESTROYED
03	OFF	ENTERPRISE UNDER ATTACK BY ALIEN	PROGRAM HAS GONE TO "ALT" (ALERT)
04	OFF	ENEMY DESTROYED	PROGRAM HAS GONE TO "PST"(POST)
22	OFF	NUMERICAL DATA FOR SHIP I.D. & SHIELD VALUES HAVE BEEN ENTERED	DATA ENTRIES ACKNOWLEDGED
25	ON	PROTECTS PROGRAM FROM DATA ERROR DURING PROGRAM RUN AT LEAST ONCE	DATA ERROR MADE DURING PROGRAM RUN

ASSIGNMENTS

FUNCTION	KEY	FUNCTION	KEY
"CHN" COURSE CHANGE	$\Sigma+$	"PHT" PHOTON TORPEDOES	LOG
"STD" COURSE STEADY	$\Sigma-$	"LRTS" LONG RANGE TRACKING	10^x
"SNS" SENSORS SYSTEMS	1/x	"TTB" TRANSPORT TRACTOR BEAM	LN
"WPN" WEAPONS INITIALIZATION	y^x	"SD" SEED	e^x
"PHS" PHASERS	$\sqrt{x}$	"CCS" SECTOR	x<>y
"DOC" DOCKING	x^2	"CCP" COURSE	R$\downarrow$
		"CCW" WEAPONS	SIN
		"PST" POST	TAN

KEYBOARD CARD LABELING

```
*** HP-41C ***
USER

[ ON ][ USER ]    [ PRGM ][ ALPHA ]
```

KEYBOARD

```
  STD    WPN    DOC    LRTS   SD
 [CHN]  [SNS]  [PHS]  [PHT]  [TTB]

 [CCS]  [CCP]  [CCW]   [ ]   [PST]
```

SYSTEM CONFIGURATION

```
| 1  MM | 2  MM |
| 3  MM | 4  MM |
```

CARD

```
◀ 1    STAR TREK(NON PRINTING)        WALL 1→9 of 9      2 ▶
        STD        WPN        DOC        LRTS        SD
        CHN        SNS        PHS        PHT         TTB
```

HEWLETT·PACKARD 41C
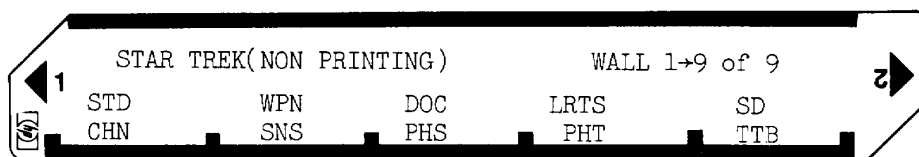
KEYBOARD CARD LABELING

KEYBOARD

```
*** HP-41C ***
USER

[ ON ][ USER ]    [ PRGM ][ ALPHA ]

   STD   WPN   DOC   LRTS   SD
  [CHN] [SNS] [PHS] [PHT] [TTB]

                            [PST]
```


SYSTEM CONFIGURATION

| 1 MM | 2 MM |
| 3 MM | 4 PRINTER |

CARD

◄ 1

STAR TREK(WITH PRINTER)   WALL 1 → 9 of 9

STD	WPN	DOC	LRTS	SD
CHN	SNS	PHS	PHT	TTB

2 ►

Print at 93%

CHN	STD	SNS	WPN	DOC	PHS	DOC	LRTS	PHT	SD	TTB

STD WPN DOC LRTS SD

CHN SNS PHS PHT TTB

CCS CCP CCW PST

ASN LBL GTO BST

CATALOG ISG RTN CLx/A

x=y? SF CF FS?

x≤y? BEEP P→R R→P

x>y? FIX SCI ENG

x=0? π LASTx VIEW

Star Trek Advanced
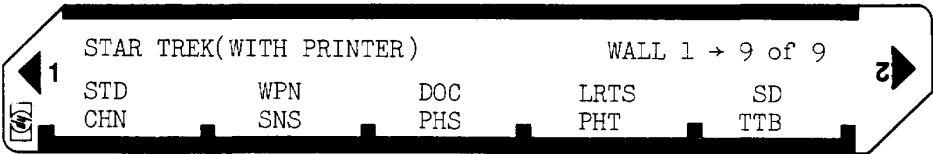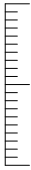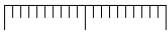
Non Print Program Listing

01 LBL "SD"	65 RDN	129 X<>Y
02 CLRG	66 X<0?	130 STO 14
03 CLA	67 GTO 02	131 RCL 16
04 CF 00	68 STO 20	132 SIN
05 SF 25	69 CLX	133 RCL 14
06 STO 00	70 STO 21	134 *
07 4	71 3	135 STO 11
08 STO 25	72 STO 25	136 RCL 16
09 1	73 LBL 03	137 COS
10 STO 07	74 RCL 20	138 RCL 14
11 LBL 00	75 INT	139 *
12 6	76 1 E2	140 STO 16
13 STO 06	77 –	141 RCL 22
14 STO 20	78 25	142 SIN
15 RCL 25	79 /	143 RCL 16
16 INT	80 1	144 *
17 1	81 +	145 STO 12
18 X=Y?	82 INT	146 RCL 22
19 SF 00	83 RCL 25	147 COS
20 LBL 01	84 1	148 RCL 16
21 XEQ 04	85 –	149 *
22 1 E2	86 10^X	150 STO 13
23 *	87 *	151 LBL "STD"
24 INT	88 RCL 21	152 FIX 06
25 STO 21	89 +	153 XEQ 12
26 FS? 00	90 STO 21	154 13.01
27 XEQ 05	91 RCL 20	155 STO 25
28 RCL 21	92 FRC	156 RCL 01
29 1 E2	93 1 E3	157 0
30 +	94 *	158 STO 16
31 RCL 06	95 STO 20	159 STO 17
32 10^X	96 DSE 25	160 X>Y?
33 /	97 GTO 03	161 1
34 ST+ IND 25	98 250	162 ENTER
35 3	99 ST+ 06	163 5
36 ST– 06	100 FIX 00	164 +
37 RCL 06	101 BEEP	165 RCL 14
38 0	102 RCL 21	166 *
39 X<=Y?	103 PSE	167 INT
40 GTO 01	104 GTO "SNS"	168 ST+ 06
41 RCL 25	105 LBL 04	169 RCL 05
42 INT	106 RCL 00	170 RDN
43 FS? 00	107 PI	171 LBL 06
44 ST+ 09	108 +	172 R^
45 1 E7	109 5	173 ENTER
46 /	110 Y^X	174 FRC
47 ST+ IND 25	111 FRC	175 1 E3
48 DSE 25	112 STO 00	176 *
49 GTO 00	113 RTN	177 X<>Y
50 –250	114 LBL 05	178 INT
51 STO 06	115 RCL 20	179 RCL IND 25
52 LBL "LRTS"	116 10^X	180 +
53 LBL 02	117 /	181 INT
54 XEQ 04	118 ST+ 09	182 X<0?
55 4	119 RCL 20	183 GTO 14
56 *	120 2	184 1 E2
57 1	121 –	185 X<=Y?
58 +	122 STO 20	186 GTO 14
59 INT	123 RDN	187 X<>Y
60 STO 25	124 RTN	188 RCL 16
61 RCL IND 25	125 LBL "CHN"	189 10^X
62 1 E3	126 STO 16	190 /
63 X=Y?	127 RDN	191 ST+ 17
64 GTO 02	128 STO 22	192 3

```
193 ST+ 16          257 STO 18          321 FIX 06
194 DSE 25          258 GTO 11          322 RCL 01
195 GTO 06          259 LBL 09          323 ENTER
196 RCL 17          260 CLX             324 ABS
197 STO 05          261 35              325 /
198 LBL "SNS"       262 X<=Y?           326 RCL 05
199 CLX             263 GTO 10          327 *
200 STO 08          264 RCL 10          328 BEEP
201 RCL 00          265 ENTER           329 PSE
202 PI              266 10^X            330 FS? 03
203 +               267 /               331 GTO "ALT"
204 5               268 ST+ 08          332 RTN
205 Y^X             269 LBL 10          333 LBL "ALT"
206 FRC             270 XEQ 13          334 CF 03
207 STO 00          271 LBL 11          335 SF 00
208 RCL 07          272 ISG 10          336 FIX 04
209 X=0?            273 PSE             337 RCL 08
210 XEQ 45          274 5               338 10
211 FIX 06          275 RCL 10          339 *
212 1 E3            276 X=Y?            340 INT
213 STO 18          277 1               341 X=0?
214 R^              278 STO 10          342 GTO 15
215 4               279 RCL 21          343 XEQ 44
216 *               280 X!=Y?           344 CHS
217 1               281 GTO 07          345 LBL 15
218 +               282 171             346 RCL 07
219 INT             283 RCL 18          347 X=0?
220 STO 10          284 X>Y?            348 GTO 21
221 STO 21          285 1 E3            349 RCL 08
222 LBL 07          286 CHS             350 BEEP
223 RCL 10          287 BEEP            351 PSE
224 STO 25          288 PSE             352 LBL 16
225 RCL IND 25      289 XEQ 12          353 BEEP
226 RCL 05          290 GTO 14          354 PSE
227 –               291 LBL 12          355 FS? 22
228 3               292 RCL 08          356 GTO 17
229 STO 25          293 X=0?            357 GTO 16
230 CLX             294 RTN             358 LBL 17
231 STO 17          295 .1              359 INT
232 RDN             296 X<=Y?           360 ABS
233 LBL 08          297 XEQ 44          361 5
234 ENTER           298 .1              362 X<=Y?
235 INT             299 X=Y?            363 GTO 15
236 1 E2            300 XEQ 48          364 X<>Y
237 –               301 CLX             365 1
238 X^2             302 RDN             366 X<>Y
239 ST+ 17          303 X>0?            367 X<=Y?
240 RDN             304 GTO 14          368 GTO 15
241 FRC             305 RCL 09          369 STO 10
242 1 E3            306 STO 23          370 STO 25
243 *               307 CLX             371 RCL IND 25
244 DSE 25          308 STO 16          372 RCL 05
245 GTO 08          309 LBL 13          373 X<>Y
246 STO 23          310 RCL 07          374 STO 15
247 RCL 17          311 X!=0?           375 X<>Y
248 SQRT            312 RCL 23          376 –
249 STO 16          313 RCL 16          377 13.01
250 40              314 +               378 STO 25
251 X>Y?            315 BEEP            379 CLX
252 GTO 09          316 PSE             380 STO 18
253 CLX             317 PSE             381 RDN
254 RCL 18          318 RTN             382 LBL 18
255 X>Y?            319 LBL 14          383 ENTER
256 X<>Y            320 CF 04           384 INT
```

```
385 1 E2            449 LBL 20          513 FS? 22
386 -              450 RCL 00          514 GTO 27
387 STO IND 25     451 PI             515 DSE 25
388 X^2            452 +              516 GTO 24
389 ST+ 18         453 5              517 LBL "WPN"
390 RDN            454 Y^X            518 RCL 18
391 FRC            455 FRC            519 35
392 1 E3           456 STO 00         520 X>Y?
393 *              457 20             521 GTO 25
394 DSE 25         458 *              522 XEQ 47
395 GTO 18         459 10             523 GTO "SNS"
396 RCL 18         460 -              524 LBL 25
397 SQRT           461 INT            525 CF 00
398 STO 18         462 RTN            526 FIX 06
399 RCL 12         463 LBL 21         527 RCL 12
400 RCL 13         464 CF 00          528 2
401 R-P            465 XEQ 45         529 -
402 RDN            466 GTO 17         530 X!=0?
403 STO 16         467 LBL "SHD"      531 STO 12
404 RCL 11         468 CF 00          532 RCL 12
405 RCL 18         469 SF 02          533 STO 25
406 /              470 1 E2           534 LBL 26
407 ASIN           471 STO 24         535 RCL 05
408 STO 17         472 CLX            536 CHS
409 RCL 15         473 STO 20         537 XEQ 28
410 100.1001       474 STO 13         538 RCL 15
411 -              475 STO 14         539 XEQ 28
412 STO 15         476 12             540 GTO 26
413 RCL 10         477 STO 12         541 LBL 27
414 ENTER          478 LBL 22         542 RCL 24
415 10^X           479 CF 01          543 X<=Y?
416 /              480 RCL 18         544 GTO 23
417 ST- 08         481 FIX 00         545 X<>Y
418 RCL 10         482 RND            546 STO 20
419 STO 11         483 FIX 08         547 FS? 02
420 3              484 RCL 13         548 GTO 29
421 X!=Y?          485 1 E3           549 RCL 13
422 GTO 19         486 /              550 RCL 13
423 "CLOAK"        487 +              551 GTO 30
424 FS? 00         488 RCL 07         552 LBL 28
425 XEQ 49         489 STO 19         553 BEEP
426 CLA            490 X=0?           554 PSE
427 XEQ 20         491 XEQ 45         555 PSE
428 ST+ 16         492 RCL 14         556 PSE
429 ABS            493 *              557 DSE 25
430 XEQ 20         494 1 E6           558 GTO 31
431 ST+ 17         495 /              559 GTO 29
432 ABS            496 +              560 LBL "PHT"
433 +              497 RCL 20         561 SF 01
434 .15            498 1 E8           562 LBL "PHS"
435 *              499 /              563 RCL 17
436 .21            500 +              564 -
437 -              501 LBL 23         565 ABS
438 INT            502 FS? 04         566 X<>Y
439 ST+ 11         503 GTO "PST"      567 RCL 16
440 LBL 19         504 4              568 -
441 RCL 18         505 FS? 00         569 ABS
442 FIX 00         506 10^X           570 +
443 RND            507 STO 25         571 STO 21
444 FIX 04         508 RDN            572 0
445 BEEP           509 BEEP           573 FS? 01
446 PSE            510 LBL 24         574 5
447 PSE            511 CF 22          575 ENTER
448 GTO "SHD"      512 PSE            576 3
```

```
577 +                    641 RCL 20              705 GTO 33
578 RCL 18               642 10                  706 GTO 50
579 *                    643 *                   707 LBL 34
580 ST+ 06               644 X^2                 708 RCL 00
581 2                    645 /                   709 PI
582 RCL 21               646 INT                 710 +
583 LN                   647 ST+ 13              711 5
584 -.03                 648 RCL 13              712 Y^X
585 *                    649 RCL 24              713 FRC
586 .1                   650 X<=Y?               714 STO 00
587 +                    651 GTO 50              715 1 E2
588 RCL 14               652 RCL 13              716 *
589 RCL 13               653 70                  717 LASTX
590 XEQ 32               654 X>Y?                718 +
591 FS? 01               655 GTO 30              719 INT
592 *                    656 CLX                 720 RCL 25
593 X<0?                 657 STO 07              721 1
594 GTO 29               658 LBL 30              722 -
595 INT                  659 RCL 13              723 3
596 ST+ 14               660 85                  724 *
597 RCL 14               661 X>Y?                725 10^X
598 RCL 24               662 GTO 22              726 /
599 X>Y?                 663 CLX                 727 ST+ 15
600 GTO 29               664 STO 20              728 DSE 25
601 -1                   665 "NO SHIELD"         729 GTO 34
602 ST* 15               666 XEQ 49              730 RCL 10
603 FIX 00               667 GTO 22              731 STO 25
604 RCL 16               668 LBL 31              732 1 E7
605 BEEP                 669 FS? 22              733 /
606 PSE                  670 GTO 28              734 ST+ 15
607 RCL 17               671 RTN                 735 RCL 15
608 BEEP                 672 LBL 32              736 STO IND 25
609 PSE                  673 -                   737 CF 00
610 RCL 10               674 RCL 24              738 XEQ 47
611 RCL 19               675 +                   739 GTO 36
612 *                    676 X^2                 740 LBL 35
613 SF 00                677 *                   741 RCL 07
614 SF 04                678 RCL 18              742 X!=0?
615 BEEP                 679 /                   743 GTO 36
616 PSE                  680 RTN                 744 RCL 13
617 GTO 23               681 LBL "PST"           745 51
618 LBL 29               682 SF 00               746 X<=Y?
619 RCL 01               683 CF 01               747 GTO 36
620 0                    684 CF 02               748 XEQ 46
621 X>Y?                 685 CF 04               749 LBL 36
622 1                    686 FIX 06              750 RCL 10
623 ENTER               687 RCL 15              751 STO 25
624 2                    688 X<0?                752 1 E3
625 +                    689 GTO 35              753 FS? 00
626 RCL 20               690 3                   754 STO IND 25
627 *                    691 STO 25              755 RCL 01
628 ST+ 06               692 0                   756 ENTER
629 6                    693 STO 15              757 ABS
630 RCL 11               694 RCL 13              758 /
631 -                    695 85                  759 RCL 05
632 1 E4                 696 X<=Y?               760 *
633 *                    697 GTO 34              761 BEEP
634 RCL 13               698 "DESTRUCTING"       762 PSE
635 85                   699 XEQ 49              763 GTO "SNS"
636 X<=Y?                700 LBL 33              764 LBL "TTB"
637 GTO 50               701 RCL 25              765 RCL 01
638 CLX                  702 BEEP                766 XEQ 40
639 RCL 14               703 PSE                 767 XEQ 42
640 XEQ 32               704 DSE 25              768 FS? 04
```

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769 GTO 14            833 STOP             897 AVIEW
770 RCL 01            834 LBL 40           898 PSE
771 XEQ 44            835 RCL 05           899 CLD
772 STO 01            836 –                900 RTN
773 .1               837 3                901 LBL 50
774 ST- 08            838 STO 25           902 CF 04
775 "IN TOW"          839 CLX              903 BEEP
776 XEQ 49            840 STO 17           904 "YOU BLEW IT"
777 GTO 43            841 RDN              905 AVIEW
778 LBL "DOC"         842 LBL 41           906 STOP
779 100.1001          843 ENTER            907 END
780 XEQ 40            844 INT
781 XEQ 42            845 1 E2
782 FS? 04            846 –
783 GTO 14            847 X^2
784 4                848 ST+ 17
785 STO 00            849 RDN
786 LBL 37            850 FRC
787 RCL 00            851 1 E3
788 STO 25            852 *
789 RCL IND 25        853 DSE 25
790 XEQ 40            854 GTO 41
791 40               855 RCL 17
792 X<=Y?            856 SQRT
793 GTO 38            857 RTN
794 "ALIEN"           858 LBL 42
795 XEQ 49            859 10
796 GTO 43            860 X>Y?
797 LBL 38            861 RTN
798 DSE IND 25        862 XEQ 47
799 1                863 SF 04
800 RCL 00            864 RTN
801 X!=Y?            865 LBL 43
802 GTO 37            866 CF 00
803 1 E3             867 FIX 06
804 RCL 01            868 RCL 01
805 X<0?            869 ENTER
806 RDN              870 ABS
807 STO 01            871 /
808 "DOCKED"          872 RCL 05
809 XEQ 49            873 *
810 CF 00            874 BEEP
811 0                875 PSE
812 STO 05            876 GTO "SNS"
813 4                877 LBL 44
814 STO 25            878 CHS
815 RCL 07            879 "NUBIAN"
816 X!=0?            880 GTO 49
817 GTO 39            881 LBL 45
818 XEQ 46            882 "SNS U/S"
819 LBL 39            883 GTO 49
820 RCL IND 25        884 LBL 46
821 1 E3             885 1
822 X!=Y?            886 STO 07
823 GTO 43            887 "SNS REPAIRED"
824 DSE 25            888 GTO 49
825 GTO 39            889 LBL 47
826 "GAME OVER"       890 "TOO FAR AWAY"
827 XEQ 49            891 GTO 49
828 "FUEL USED"       892 LBL 48
829 XEQ 49            893 SF 03
830 FIX 00            894 "UNDER ATTACK"
831 VIEW 06           895 LBL 49
832 CF 02            896 BEEP
```

```
01 LBL "CCS"        65 LBL 03          129 GTO 15
02 1 E2             66 1               130 LBL 09
03 /                67 X=Y?            131 RCL 30
04 INT              68 GTO 04          132 RCL 27
05 STO 29           69 X<>Y            133 X>Y?
06 XEQ 02           70 2               134 GTO 12
07 STO 30           71 X=Y?            135 GTO 11
08 XEQ 02           72 GTO 05          136 LBL 10
09 STO 31           73 X<>Y            137 RCL 30
10 XEQ 03           74 3               138 RCL 27
11 STO 31           75 X=Y?            139 X>Y?
12 RCL 30           76 GTO 06          140 GTO 13
13 XEQ 03           77 87              141 GTO 14
14 STO 30           78 RTN             142 LBL 11
15 RCL 29           79 LBL 04          143 90
16 XEQ 03           80 12              144 STO 33
17 STO 29           81 RTN             145 GTO 15
18 XEQ 00           82 LBL 05          146 LBL 12
19 GTO 07           83 37              147 -90
20 LBL "CCP"        84 RTN             148 STO 33
21 INT              85 LBL 06          149 GTO 15
22 STO 29           86 62              150 LBL 13
23 XEQ 01           87 RTN             151 180
24 STO 30           88 LBL 07          152 ST- 33
25 XEQ 01           89 FIX 02          153 GTO 15
26 STO 31           90 RCL 26          154 LBL 14
27 XEQ 00           91 RCL 29          155 180
28 GTO 07           92 -               156 ST+ 33
29 LBL "CCW"        93 X^2             157 LBL 15
30 XEQ 00           94 RCL 27          158 "THETA"
31 RCL 15           95 RCL 30          159 XEQ 16
32 INT              96 -               160 RCL 33
33 STO 29           97 X^2             161 PSE
34 XEQ 01           98 RCL 28          162 PSE
35 STO 30           99 RCL 31          163 RCL 31
36 XEQ 01          100 -               164 RCL 28
37 STO 31          101 X^2             165 -
38 XEQ 00          102 +               166 RCL 32
39 GTO 07          103 +               167 /
40 LBL 00          104 SQRT            168 ASIN
41 RCL 05          105 "DISTANCE"      169 "PHI"
42 X<0?            106 XEQ 16          170 XEQ 16
43 CHS             107 PSE             171 STOP
44 INT             108 PSE             172 LBL 16
45 STO 26          109 STO 32          173 BEEP
46 XEQ 01          110 LBL 08          174 AVIEW
47 STO 27          111 RCL 29          175 PSE
48 XEQ 01          112 RCL 26          176 CLD
49 STO 28          113 X=Y?            177 RTN
50 RTN             114 GTO 09          178 END
51 LBL 01          115 -
52 LASTX           116 RCL 30
53 FRC             117 RCL 27
54 1 E3            118 -
55 *               119 X<>Y
56 INT             120 X=0?
57 RTN             121 GTO 11
58 LBL 02          122 /
59 LASTX           123 ATAN
60 FRC             124 STO 33
61 1 E1            125 RCL 29
62 *               126 RCL 26
63 INT             127 X>Y?
64 RTN             128 GTO 10
```

Print Program Listing

```
01 LBL "SD"          65 RDN               129 STO 14
02 CLRG              66 X<0?              130 RCL 16
03 CLA               67 GTO 02            131 SIN
04 CF 00             68 STO 20            132 RCL 14
05 SF 25             69 CLX               133 *
06 STO 00            70 STO 21            134 STO 11
07 4                 71 3                 135 RCL 16
08 STO 25            72 STO 25            136 COS
09 1                 73 LBL 03            137 RCL 14
10 STO 07            74 RCL 20            138 *
11 LBL 00            75 INT               139 STO 16
12 6                 76 1 E2              140 RCL 22
13 STO 06            77 –                 141 SIN
14 STO 20            78 25                142 RCL 16
15 RCL 25            79 /                 143 *
16 INT               80 1                 144 STO 12
17 1                 81 +                 145 RCL 22
18 X=Y?              82 INT               146 COS
19 SF 00             83 RCL 25            147 RCL 16
20 LBL 01            84 1                 148 *
21 XEQ 04            85 –                 149 STO 13
22 1 E2              86 10^X              150 LBL "STD"
23 *                 87 *                 151 XEQ 12
24 INT               88 RCL 21            152 13.01
25 STO 21            89 +                 153 STO 25
26 FS? 00            90 STO 21            154 RCL 01
27 XEQ 05            91 RCL 20            155 0
28 RCL 21            92 FRC               156 STO 16
29 1 E2              93 1 E3              157 STO 17
30 +                 94 *                 158 X>Y?
31 RCL 06            95 STO 20            159 1
32 10^X              96 DSE 25            160 ENTER
33 /                 97 GTO 03            161 5
34 ST+ IND 25        98 250               162 +
35 3                 99 ST+ 06            163 RCL 14
36 ST– 06           100 RCL 21            164 *
37 RCL 06           101 FIX 00            165 INT
38 0                102 PRX               166 ST+ 06
39 X<=Y?            103 GTO "SNS"         167 RCL 05
40 GTO 01           104 LBL 04            168 RDN
41 RCL 25           105 RCL 00            169 LBL 06
42 INT              106 PI                170 R^
43 FS? 00           107 +                 171 ENTER
44 ST+ 09           108 5                 172 FRC
45 1 E7             109 Y^X               173 1 E3
46 /                110 FRC               174 *
47 ST+ IND 25       111 STO 00            175 X<>Y
48 DSE 25           112 RTN               176 INT
49 GTO 00           113 LBL 05            177 RCL IND 25
50 –250             114 RCL 20            178 +
51 STO 06           115 10^X              179 INT
52 LBL "LRTS"       116 /                 180 X<0?
53 LBL 02           117 ST+ 09            181 GTO 14
54 XEQ 04           118 RCL 20            182 1 E2
55 4                119 2                 183 X<=Y?
56 *                120 –                 184 GTO 14
57 1                121 STO 20            185 X<>Y
58 +                122 RDN               186 RCL 16
59 INT              123 RTN               187 10^X
60 STO 25           124 LBL "CHN"         188 /
61 RCL IND 25       125 STO 16            189 ST+ 17
62 1 E3             126 RDN               190 3
63 X=Y?             127 STO 22            191 ST+ 16
64 GTO 02           128 X<>Y              192 DSE 25
```

```
193 GTO 06            257 LBL 09            321 RCL 05
194 RCL 17            258 CLX              322 *
195 STO 05            259 35               323 PRX
196 LBL "SNS"         260 X<=Y?            324 FS? 03
197 CLX              261 GTO 10            325 GTO "ALT"
198 STO 08            262 RCL 10            326 RTN
199 RCL 00            263 ENTER            327 LBL "ALT"
200 PI               264 10^X             328 CF 03
201 +                265 /                329 SF 00
202 5                266 ST+ 08            330 FIX 04
203 Y^X              267 LBL 10            331 RCL 08
204 FRC              268 XEQ 13            332 10
205 STO 00            269 LBL 11            333 *
206 RCL 07            270 ISG 10            334 INT
207 X=0?             271 PSE               335 X=0?
208 XEQ 45            272 5                336 GTO 15
209 FIX 06            273 RCL 10            337 XEQ 44
210 1 E3             274 X=Y?             338 CHS
211 STO 18            275 1                339 LBL 15
212 R^               276 STO 10            340 RCL 07
213 4                277 RCL 21            341 X=0?
214 *                278 X!=Y?            342 GTO 21
215 1                279 GTO 07            343 RCL 08
216 +                280 171              344 PRX
217 INT              281 RCL 18            345 LBL 16
218 STO 10            282 X>Y?             346 PSE
219 STO 21            283 1 E3             347 FS? 22
220 LBL 07           284 CHS              348 GTO 17
221 RCL 10            285 PRX              349 GTO 16
222 STO 25            286 XEQ 12            350 LBL 17
223 RCL IND 25       287 GTO 14            351 INT
224 RCL 05            288 LBL 12            352 ABS
225 –                289 RCL 08            353 5
226 3                290 X=0?             354 X<=Y?
227 STO 25            291 RTN              355 GTO 15
228 CLX              292 .1               356 X<>Y
229 STO 17            293 X<=Y?            357 1
230 RDN              294 XEQ 44            358 X<>Y
231 LBL 08           295 .1               359 X<=Y?
232 ENTER            296 X=Y?             360 GTO 15
233 INT              297 XEQ 48            361 STO 10
234 1 E2             298 CLX              362 STO 25
235 –                299 RDN              363 RCL IND 25
236 X^2              300 X>0?             364 RCL 05
237 ST+ 17           301 GTO 14            365 X<>Y
238 RDN              302 RCL 09            366 STO 15
239 FRC              303 STO 23            367 X<>Y
240 1 E3             304 CLX              368 –
241 *                305 STO 16            369 13.01
242 DSE 25           306 LBL 13           370 STO 25
243 GTO 08           307 RCL 07            371 CLX
244 STO 23           308 X!=0?            372 STO 18
245 RCL 17           309 RCL 23            373 RDN
246 SQRT             310 RCL 16            374 LBL 18
247 STO 16           311 +                375 ENTER
248 40               312 PRX              376 INT
249 X>Y?             313 RTN              377 1 E2
250 GTO 09           314 LBL 14           378 –
251 CLX              315 CF 04            379 STO IND 25
252 RCL 18           316 FIX 06            380 X^2
253 X>Y?             317 RCL 01            381 ST+ 18
254 X<>Y             318 ENTER            382 RDN
255 STO 18           319 ABS              383 FRC
256 GTO 11           320 /                384 1 E3
```

```
385 *               449 10              513 GTO "SNS"
386 DSE 25          450 –               514 LBL 25
387 GTO 18          451 INT             515 CF 00
388 RCL 18          452 RTN             516 FIX 06
389 SQRT            453 LBL 21          517 RCL 12
390 STO 18          454 CF 00           518 2
391 RCL 12          455 XEQ 45          519 –
392 RCL 13          456 GTO 17          520 X!=0?
393 R-P             457 LBL "SHD"       521 STO 12
394 RDN             458 CF 00           522 RCL 12
395 STO 16          459 SF 02           523 STO 25
396 RCL 11          460 1 E2            524 LBL 26
397 RCL 18          461 STO 24          525 RCL 05
398 /               462 CLX             526 CHS
399 ASIN            463 STO 20          527 XEQ 28
400 STO 17          464 STO 13          528 RCL 15
401 RCL 15          465 STO 14          529 XEQ 28
402 100.1001        466 12              530 GTO 26
403 –               467 STO 12          531 LBL 27
404 STO 15          468 LBL 22          532 RCL 24
405 RCL 10          469 CF 01           533 X<=Y?
406 ENTER           470 RCL 18          534 GTO 23
407 10^X            471 FIX 00          535 X<>Y
408 /               472 RND             536 STO 20
409 ST- 08          473 FIX 08          537 FS? 02
410 RCL 10          474 RCL 13          538 GTO 29
411 STO 11          475 1 E3            539 RCL 13
412 3               476 /               540 RCL 13
413 X!=Y?           477 +               541 GTO 30
414 GTO 19          478 RCL 07          542 LBL 28
415 "CK"            479 STO 19          543 PRX
416 FS? 00          480 X=0?            544 PSE
417 XEQ 49          481 XEQ 45          545 PSE
418 CLA             482 RCL 14          546 PSE
419 XEQ 20          483 *               547 DSE 25
420 ST+ 16          484 1 E6            548 GTO 31
421 ABS             485 /               549 GTO 29
422 XEQ 20          486 +               550 LBL "PHT"
423 ST+ 17          487 RCL 20          551 SF 01
424 ABS             488 1 E8            552 LBL "PHS"
425 +               489 /               553 RCL 17
426 .15             490 +               554 –
427 *               491 LBL 23          555 ABS
428 .21             492 FS? 04          556 X<>Y
429 –               493 GTO "PST"       557 RCL 16
430 INT             494 4               558 –
431 ST+ 11          495 FS? 00          559 ABS
432 LBL 19          496 10^X            560 +
433 RCL 18          497 STO 25          561 STO 21
434 FIX 00          498 RDN             562 0
435 RND             499 BEEP            563 FS? 01
436 FIX 04          500 LBL 24          564 5
437 PRX             501 CF 22           565 ENTER
438 GTO "SHD"       502 PSE             566 3
439 LBL 20          503 FS? 22          567 +
440 RCL 00          504 GTO 27          568 RCL 18
441 PI              505 DSE 25          569 *
442 +               506 GTO 24          570 ST+ 06
443 5               507 LBL "WPN"       571 2
444 Y^X             508 RCL 18          572 RCL 21
445 FRC             509 35              573 LN
446 STO 00          510 X>Y?            574 -.03
447 20              511 GTO 25          575 *
448 *               512 XEQ 47          576 .1
```

```
577 +                641 X>Y?              705 INT
578 RCL 14           642 GTO 30            706 RCL 25
579 RCL 13           643 CLX               707 1
580 XEQ 32           644 STO 07            708 −
581 FS? 01           645 LBL 30            709 3
582 *                646 RCL 13            710 *
583 X<0?             647 85                711 10^X
584 GTO 29           648 X>Y?              712 /
585 INT              649 GTO 22            713 ST+ 15
586 ST+ 14           650 CLX               714 DSE 25
587 RCL 14           651 STO 20            715 GTO 34
588 RCL 24           652 "N/S"             716 RCL 10
589 X>Y?             653 XEQ 49            717 STO 25
590 GTO 29           654 GTO 22            718 1 E7
591 −1               655 LBL 31            719 /
592 ST* 15           656 FS? 22            720 ST+ 15
593 FIX 00           657 GTO 28            721 RCL 15
594 RCL 16           658 RTN               722 STO IND 25
595 PRX              659 LBL 32            723 CF 00
596 RCL 17           660 −                 724 XEQ 47
597 PRX              661 RCL 24            725 GTO 36
598 RCL 10           662 +                 726 LBL 35
599 RCL 19           663 X^2               727 RCL 07
600 *                664 *                 728 X!=0?
601 SF 00            665 RCL 18            729 GTO 36
602 SF 04            666 /                 730 RCL 13
603 PRX              667 RTN               731 51
604 GTO 23           668 LBL "PST"         732 X<=Y?
605 LBL 29           669 SF 00             733 GTO 36
606 RCL 01           670 CF 01             734 XEQ 46
607 0                671 CF 02             735 LBL 36
608 X>Y?             672 CF 04             736 RCL 10
609 1                673 FIX 06            737 STO 25
610 ENTER            674 RCL 15            738 1 E3
611 2                675 X<0?              739 FS? 00
612 +                676 GTO 35            740 STO IND 25
613 RCL 20           677 3                 741 RCL 01
614 *                678 STO 25            742 ENTER
615 ST+ 06           679 0                 743 ABS
616 6                680 STO 15            744 /
617 RCL 11           681 RCL 13            745 RCL 05
618 −                682 85                746 *
619 1 E4             683 X<=Y?             747 PRX
620 *                684 GTO 34            748 GTO "SNS"
621 RCL 13           685 "DTG"             749 LBL "TTB"
622 85               686 XEQ 49            750 RCL 01
623 X<=Y?            687 LBL 33            751 XEQ 40
624 GTO 50           688 RCL 25            752 XEQ 42
625 CLX              689 PRX               753 FS? 04
626 RCL 14           690 DSE 25            754 GTO 14
627 XEQ 32           691 GTO 33            755 RCL 01
628 RCL 20           692 GTO 50            756 XEQ 44
629 10               693 LBL 34            757 STO 01
630 *                694 RCL 00            758 .1
631 X^2              695 PI                759 ST− 08
632 /                696 +                 760 "I/T"
633 INT              697 5                 761 XEQ 49
634 ST+ 13           698 Y^X               762 GTO 43
635 RCL 13           699 FRC               763 LBL "DOC"
636 RCL 24           700 STO 00            764 100.1001
637 X<=Y?            701 1 E2              765 XEQ 40
638 GTO 50           702 *                 766 XEQ 42
639 RCL 13           703 LASTX             767 FS? 04
640 70               704 +                 768 GTO 14
```

```
769 4              833 -              01 LBL "PFR"
770 STO 00         834 X^2            02 FIX 06
771 LBL 37         835 ST+ 17         03 CLRG
772 RCL 00         836 RDN            04 STO 00
773 STO 25         837 FRC            05 -50.05005
774 RCL IND 25     838 1 E3           06 STO 20
775 XEQ 40         839 *              07 LBL 00
776 40             840 DSE 25         08 CF 22
777 X<=Y?          841 GTO 41         09 6
778 GTO 38         842 RCL 17         10 STO 25
779 "ALIEN"        843 SQRT           11 LBL 01
780 XEQ 49         844 RTN            12 RCL 00
781 GTO 43         845 LBL 42         13 PI
782 LBL 38         846 10             14 +
783 DSE IND 25     847 X>Y?           15 5
784 1              848 RTN            16 Y^X
785 RCL 00         849 XEQ 47         17 FRC
786 X!=Y?          850 SF 04          18 STO 00
787 GTO 37         851 RTN            19 41
788 1 E3           852 LBL 43         20 *
789 RCL 01         853 CF 00          21 30
790 X<0?           854 FIX 06         22 +
791 RDN            855 RCL 01         23 INT
792 STO 01         856 ENTER          24 STO IND 25
793 "DCKD"         857 ABS            25 DSE 25
794 XEQ 49         858 /              26 50
795 CF 00          859 RCL 05         27 -
796 0              860 *              28 STO IND 25
797 STO 05         861 PRX            29 DSE 25
798 4              862 GTO "SNS"      30 GTO 01
799 STO 25         863 LBL 44         31 RCL 03
800 RCL 07         864 CHS            32 RCL 01
801 X!=0?          865 "NUB"          33 R-P
802 GTO 39         866 GTO 49         34 RDN
803 XEQ 46         867 LBL 45         35 STO 07
804 LBL 39         868 "SNS U/S"      36 RCL 05
805 RCL IND 25     869 GTO 49         37 RCL 05
806 1 E3           870 LBL 46         38 X^2
807 X!=Y?          871 1              39 RCL 03
808 GTO 43         872 STO 07         40 X^2
809 DSE 25         873 "SNS OK"       41 RCL 01
810 GTO 39         874 GTO 49         42 X^2
811 "GAME OVER"    875 LBL 47         43 +
812 XEQ 49         876 "A/T/F"        44 +
813 "FUEL ="       877 GTO 49         45 SQRT
814 ACA            878 LBL 48         46 STO 21
815 FIX 00         879 SF 03          47 "DISTANCE"
816 RCL 06         880 "ATK"          48 XEQ 05
817 ACX            881 LBL 49         49 PSE
818 PRBUF          882 PRA            50 /
819 CF 02          883 CLA            51 ASIN
820 STOP           884 RTN            52 STO 08
821 LBL 40         885 LBL 50         53 6
822 RCL 05         886 CF 04          54 STO 25
823 -              887 "YOU BLEW IT"  55 0
824 3              888 PRA            56 LBL 02
825 STO 25         889 STOP           57 RCL IND 25
826 CLX            890 END            58 RCL 25
827 STO 17                            59 1.5
828 RDN                               60 *
829 LBL 41                            61 3
830 ENTER                             62 -
831 INT                               63 10^X
832 1 E2                              64 /
```
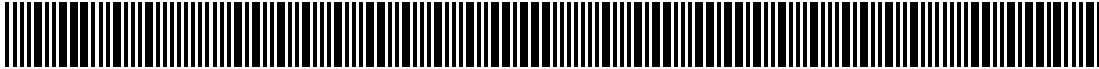
```
 65 +
 66 DSE 25
 67 DSE 25
 68 GTO 02
 69 STO 09
 70 LBL 03
 71 RCL 20
 72 "ENTERPRISE"
 73 XEQ 05
 74 PSE
 75 PSE
 76 PSE
 77 FS? 22
 78 GTO 04
 79 RCL 09
 80 "ALIEN"
 81 XEQ 05
 82 PSE
 83 PSE
 84 PSE
 85 FS? 22
 86 GTO 04
 87 RCL 21
 88 "DISTANCE"
 89 XEQ 05
 90 PSE
 91 FS? 22
 92 GTO 04
 93 GTO 03
 94 LBL 04
 95 X<>Y
 96 RCL 07
 97 "THETA"
 98 XEQ 05
 99 PSE
100 –
101 "ERROR"
102 XEQ 05
103 PSE
104 ABS
105 X<>Y
106 RCL 08
107 XEQ "PHI"
108 XEQ 05
109 PSE
110 –
111 "ERROR"
112 XEQ 05
113 PSE
114 ABS
115 +
116 "TOTAL ERROR"
117 XEQ 05
118 PSE
119 GTO 00
120 LBL 05
121 BEEP
122 AVIEW
123 PSE
124 CLD
125 RTN
126 END
```

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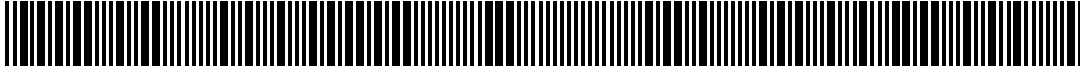
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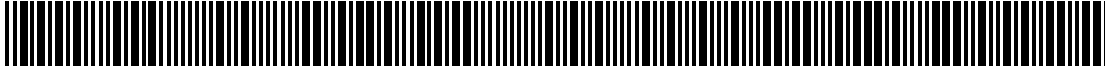
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ROW 16

Program: "Star Trek Advanced NP.1 SD", Page: 2

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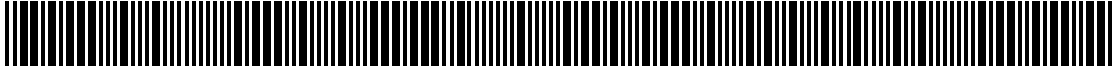
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Program: "Star Trek Advanced NP.1 SD", Page: 3

ROW 33

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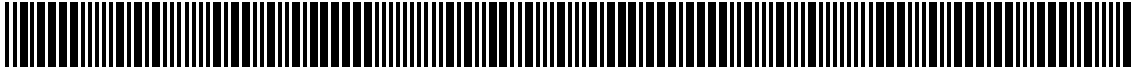
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ROW 47

ROW 48

Program: "Star Trek Advanced NP.1 SD", Page: 4

ROW 49

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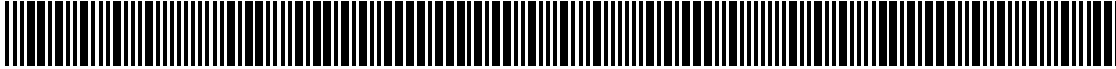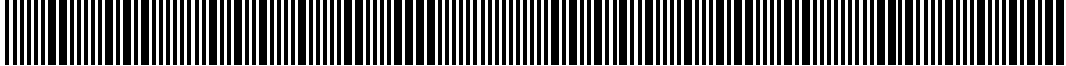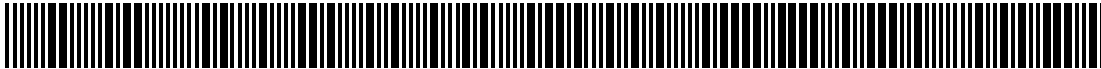
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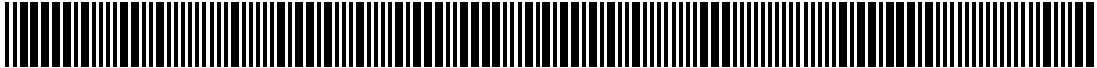
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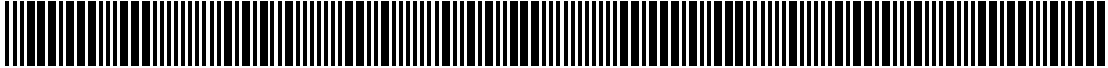
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ROW 63

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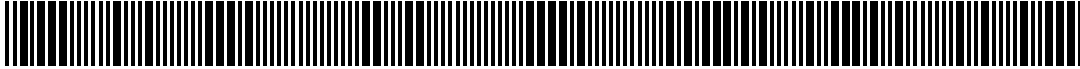
Program: "Star Trek Advanced NP.1 SD", Page: 5
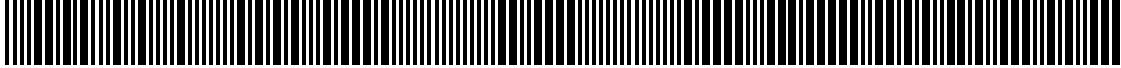
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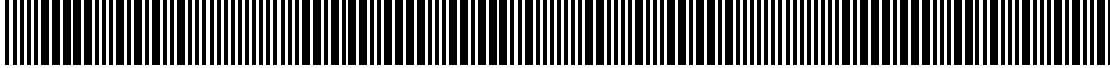
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ROW 80

Program: "Star Trek Advanced NP.1 SD", Page: 6

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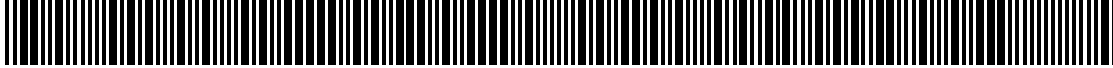
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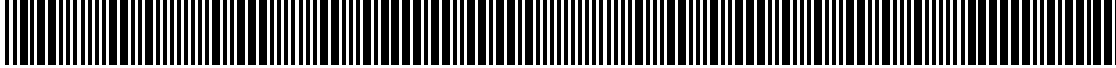
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Program: "Star Trek Advanced NP.1 SD", Page: 7
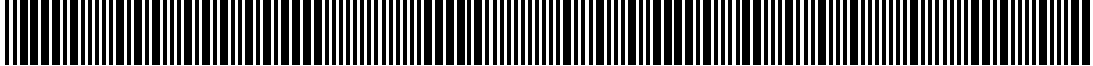
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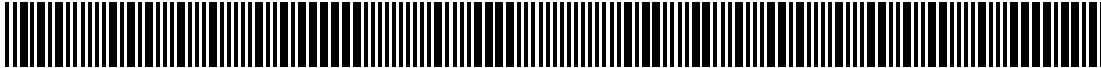
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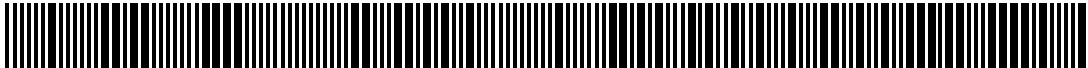
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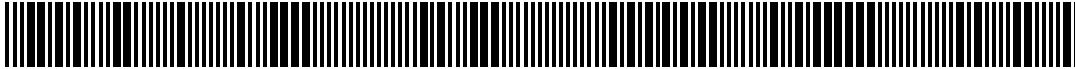
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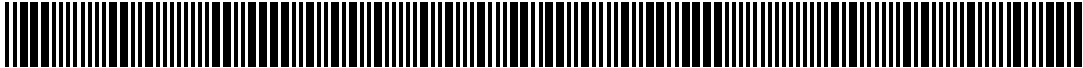
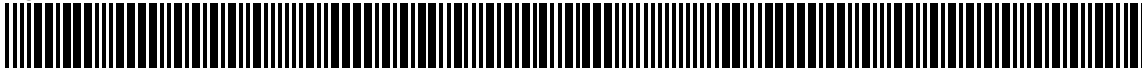ROW 105
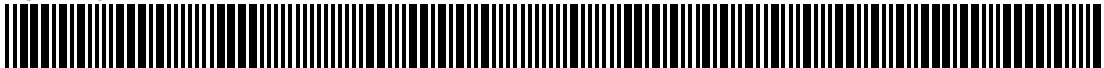
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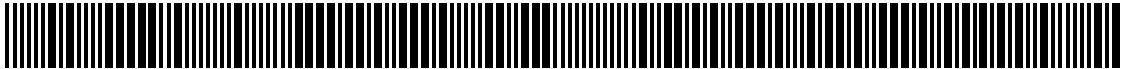
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ROW 108

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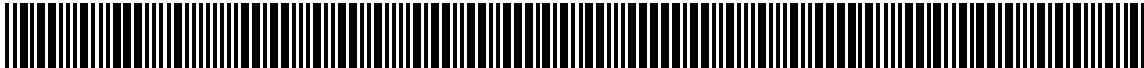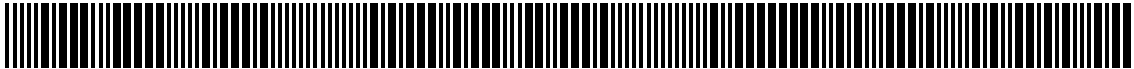
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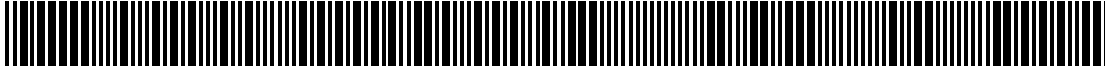
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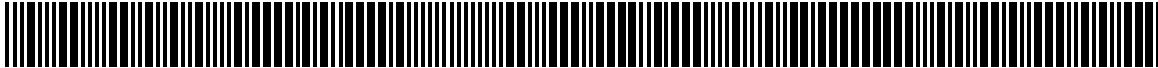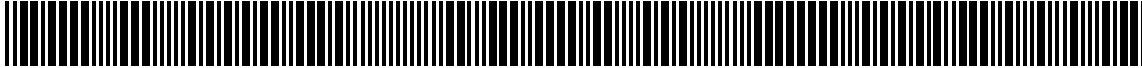
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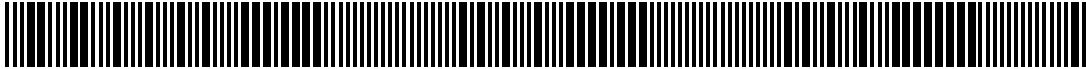
Program: "Star Trek Advanced NP.2 CCS", Page: 1
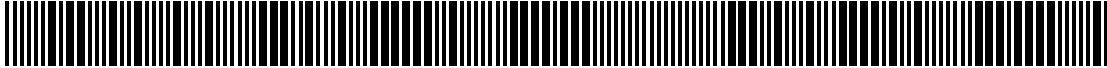
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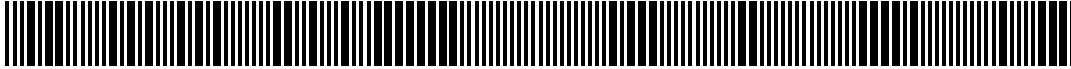
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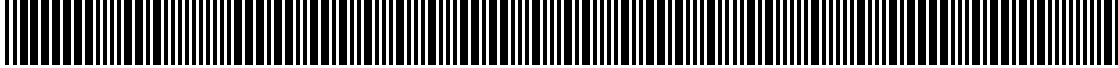
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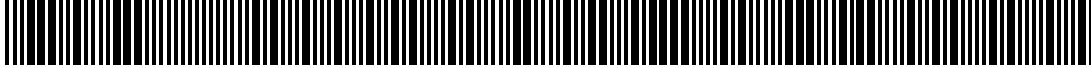
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ROW 11

ROW 12

ROW 13

ROW 14

ROW 15

ROW 16

Program: "Star Trek Advanced NP.2 CCS", Page: 2

ROW 17

ROW 18
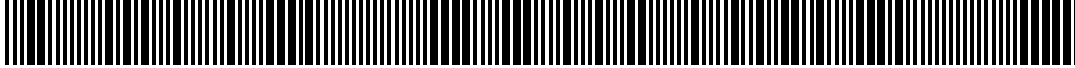
ROW 19

ROW 20
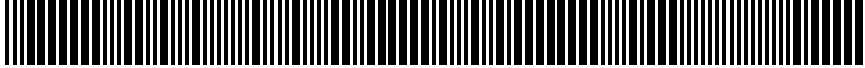
ROW 21

ROW 22

ROW 23

ROW 24

ROW 25

ROW 26

Program: "Star Trek Advanced P.1 SD", Page: 1

ROW 1

ROW 2
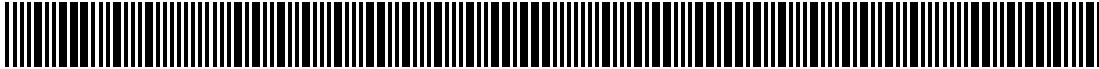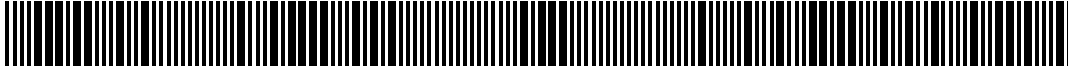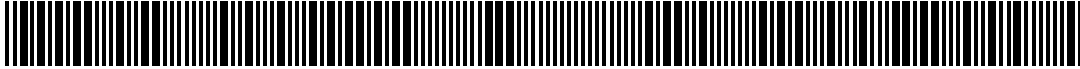
ROW 3

ROW 4

ROW 5

ROW 6

ROW 7
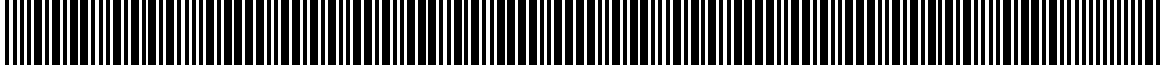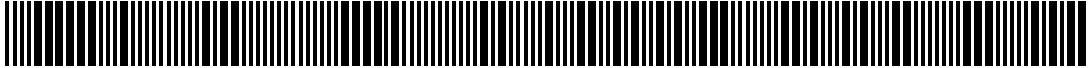
ROW 8

ROW 9

ROW 10

ROW 11

ROW 12

ROW 13

ROW 14

ROW 15

ROW 16
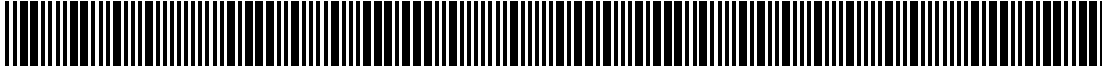
Program: "Star Trek Advanced P.1 SD", Page: 2
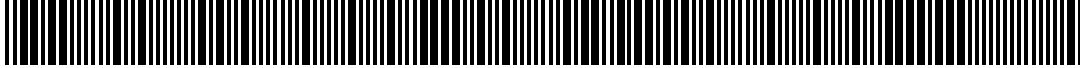
ROW 17

ROW 18
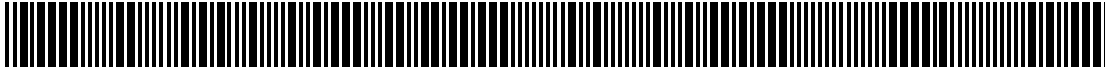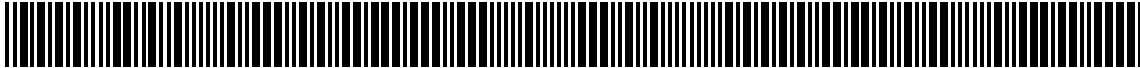
ROW 19

ROW 20

ROW 21

ROW 22

ROW 23

ROW 24

ROW 25

ROW 26
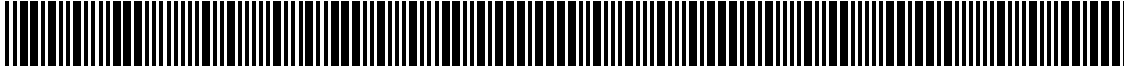
ROW 27

ROW 28

ROW 29

ROW 30

ROW 31

ROW 32

Program: "Star Trek Advanced P.1 SD", Page: 3

ROW 33
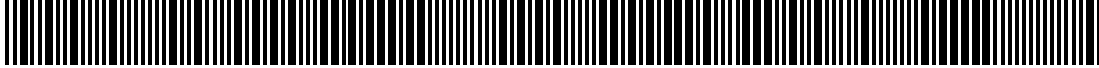
ROW 34
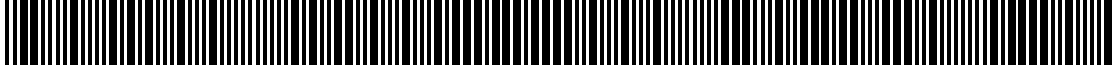
ROW 35

ROW 36

ROW 37

ROW 38

ROW 39

ROW 40

ROW 41

ROW 42

ROW 43

ROW 44
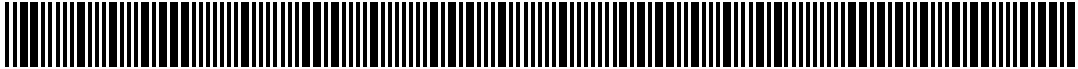
ROW 45

ROW 46

ROW 47

ROW 48

Program: "Star Trek Advanced P.1 SD", Page: 4

ROW 49

ROW 50
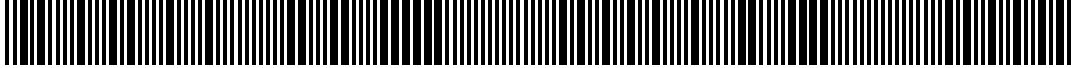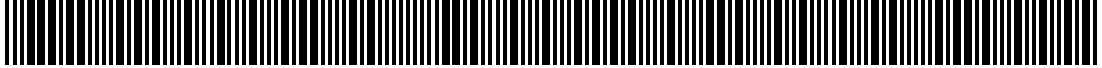
ROW 51

ROW 52

ROW 53

ROW 54

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ROW 57

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ROW 59

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ROW 61

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ROW 63

ROW 64

Program: "Star Trek Advanced P.1 SD", Page: 5

ROW 65

ROW 66
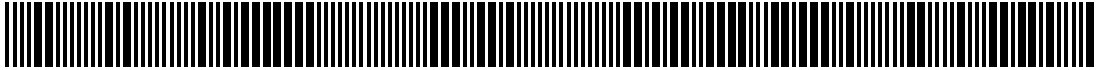
ROW 67

ROW 68

ROW 69

ROW 70

ROW 71

ROW 72

ROW 73

ROW 74

ROW 75
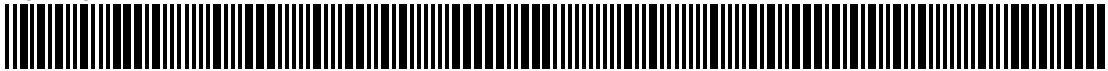
ROW 76

ROW 77

ROW 78

ROW 79

ROW 80

Program: "Star Trek Advanced P.1 SD", Page: 6
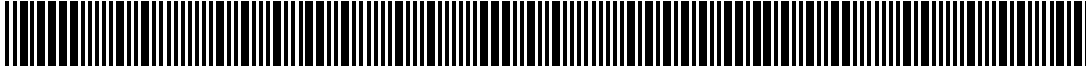
ROW 81

ROW 82
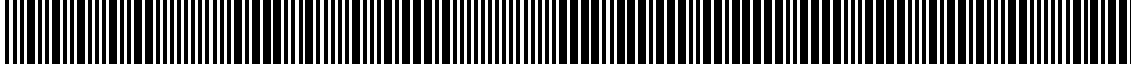
ROW 83

ROW 84

ROW 85

ROW 86

ROW 87

ROW 88

ROW 89

ROW 90
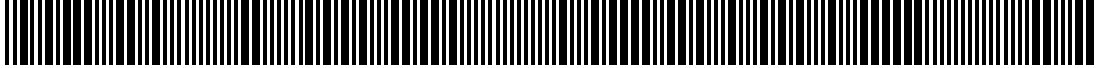
ROW 91

ROW 92

ROW 93

ROW 94
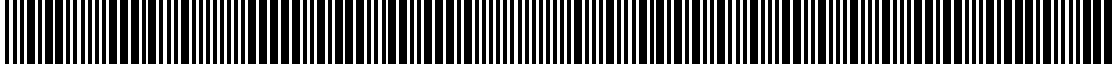
ROW 95

ROW 96

Program: "Star Trek Advanced P.1 SD", Page: 7

ROW 97

ROW 98

ROW 99

ROW 100

ROW 101

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ROW 103

ROW 104

ROW 105

ROW 106

ROW 107

ROW 108

ROW 109

ROW 110

ROW 111

ROW 112

Program: "Star Trek Advanced P.1 SD", Page: 8

ROW 113

ROW 114

ROW 115

ROW 116

ROW 117

ROW 118

ROW 119

ROW 120

ROW 121

ROW 122

ROW 123

ROW 124

Program: "Star Trek Advanced P.2 PFR", Page: 1

ROW 1

ROW 2

ROW 3

ROW 4

ROW 5

ROW 6

ROW 7

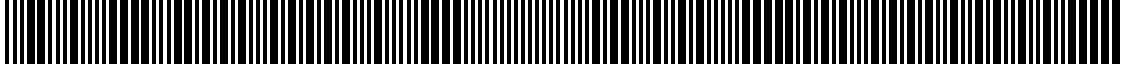ROW 8

ROW 9

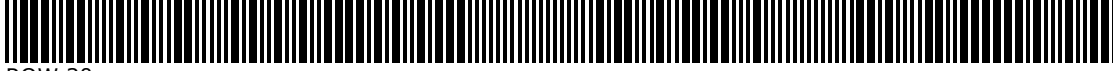ROW 10

ROW 11

ROW 12

ROW 13

ROW 14

ROW 15

ROW 16

Program: "Star Trek Advanced P.2 PFR", Page: 2
ROW 17

ROW 18

ROW 19

ROW 20