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><><   TRICKS OF THE TRADE   ><><
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><><><><><<   MIKE WHITE   ><><><><><
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TIME SHARING (THE USE OF USED MEMORY)

LAST MONTH I INTRODUCED YOU TO THE IDEA OF TIME SHARING. WE "BORROWED" A VARIABLE TO DO A TASK, THEN RESTORED IT TO A "POKE" VALUE USED IN THE PROGRAM. IF YOU KEYED THE DEMONSTRATOR PROGRAM IN (AB) AND RAN IT, YOU ACTUALLY "TIME SHARED" VARIABLE "B".

THE RULES FOR TIME SHARING ARE SIMPLE. ONE, IF A PORTION OF MEMORY (ANY PART) IS NOT CURRENTLY IN USE, IT MAY BE "BORROWED" FOR ANOTHER TASK (EVEN TEMPORARILY). ON PG. 25+27 VOL. 2 OF THIS NEWSLETTER IS THE LISTING AND SECRET TO REPACK. THE ENTIRE TEXT IS TIME SHARED WITH THE OBJECT PROGRAM. REMEMBER THIS! IN ASTRO BASIC (ONLY), EACH LINE OF BASIC IS "UNPACKED" (COPIED) INTO THE LINE INPUT BUFFER, AND EXECUTED FROM THE LINE INPUT BUFFER. ONLY WHEN ANOTHER LINE IS NEEDED DOES THE TEXT AREA GET USED, SO WE CAN "TIME SHARE" THE TEXT. FILE SEARCHER ALSO BORROWS THE TEXT TEMPORARILY. THE AB VERSION TO QUADRA TAKES THIS PRINCIPLE ONE STEP FARTHER BY "TIME SHARING" THE TEXT AREA WITH IT'S 4 "SLAVE" GAME PROGRAMS IN A "BACK AND FORTH" TYPE OF FASHON. IN THE EB 4K VERSION ANOTHER TRICK WAS USED. THE SECOND PROGRAM CONTAINS TWO "QUADRANTS", LASER,&SLIDE, AND U.F.O. ATTACK. THE FORMER USES A "FIXED" STRING CONTAINING COLOR DATA AND ACCELERATION FACTORS. THE LATTER NEEDS AN AREA TO KEEP FLYING SAUCER LOCATIONS, AND GUESS WHAT! THERE ISN'T ROOM FOR BOTH! SO THE STRING WAS TAPED WITH THE "FIXED" DATA LOADED, AND THESE TWO PROGRAMS SHARE THE SAME STRING SPACE! THIS IS POSSIBLE BECAUSE ONLY ONE PROGRAM (OR THE OTHER) GETS RUN, AND THEN THE MENU PROGRAM MUST BE BROUGHT UP, SO WE SEE A FRESH TAPE LOAD BEFORE EVERY "QUADRANT". ALSO, IS IT ANY WONDER HOW I COULD USE "THE STACK" TO "CARRY OVER MEMORY" AND GENERATE "CHRDIS" CHARACTORS (SEE ARCADIAN VOLUME 5 PG. 14,15,37, AND 72). A "FOR NEXT" LOOP SIMPLY MOVES SCORES TO AND FROM STRINGS, AND PLACES MACHINE CODE INTO "THE STACK" FROM STRING LOCATIONS WHEN NEEDED. THE LINE INPUT BUFFER GETS "TIME SHARED" ALSO, WHEN WE SET UP "AUTO RUN". THE FORMAT IS:

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PRINT ";(YOUR PROG. DATA);RUN ";:PRINT %<(A),B [REC]
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THE FORMAT USES 15 BYTES (MINIMUM) TO SET UP. THAT LEAVES 89 BYTES FROM THE LINE INPUT BUFFER'S 104 (104-15=89) THAT ARE NOT COUNTED IN THE "1800 BYTES" THAT TEXT IS ALLOWED IN AB AND BB. HOWEVER, THIS LINE RUNS ONCE AND THEN GETS ERASED WHEN "ASTRO UNPACKS" (COPIES) THE FIRST LINE OF TEXT INTO IT.

NOTE: IN ASTRO BASIC YOU CANNOT USE THE "GOSUB" COMMAND FROM THE LINE INPUT BUFFER, EITHER DIRECTLY OR WITH "AUTO RUN". THE REASON IS, THAT SINCE THE ENTIRE TEXT EXECUTES FROM THE LINE INPUT BUFFER, THE ADDRESS THAT WE WOULD NEED TO "RETURN" TO IS SEEN AS INVALID. (BUT IT WILL WORK IN EB OR BB, TRY IT!!)

THE SECOND (AND ONLY OTHER) RULE TO "TIME SHARING" IS THAT WHAT WE DID TO RAM SPACE (RULE ONE) APPLIES TO DATA. A LOOK IN **MONKEY JUMP** (WAVEMAKERS), OR **SAFE CRACKER** (FROM **QUADRA** BY ME), REVEALS A STRANGE LINE NUMBERING SYSTEM. THIS WAS DONE TO SAVE SPACE BY EMPLOYING A "FIXED" VARIABLE TO DO MULTIPLE TASKS. A LINE NUMBER USES TWO BYTES OF MEMORY, WHETHER LINE #1 OR #32767. BUT A DIFFERENCE OCCURS WHEN REFERENCING TO LINE NUMBERS. SEE THE FOLLOWING CHART:

GOTO 1	(USES 2 BYTES)	GOSUB 1	(USES 2 BYTES)
GOTO 32767	(USES 6 BYTES)	GOSUB 32767	(USES 6 BYTES)
GOTO A	(USES 2 BYTES)	GOSUB A	(USES 2 BYTES)

THIS ONLY SHOWS THE EXTREMES, BUT AS YOU CAN SEE, THE NUMBER FOLLOWING A "GOTO " OR "GOSUB " IS KEPT IN MEMORY AS DIGITS! SO, WE SET OUR LINE NUMBERS TO OUR "POKE" VALUES AND KILL TWO BIRDS WITH ONE STONE. FOR INSTANCE, IN **SAFE CRACKER**, $\%(B)=\%(20244)$, (1ST CHRDIS SCREEN LOCATION), AND "GOSUB B" STARTS A "MULTI USE" SUBROUTINE. SUBROUTINES ARE THE GREATEST DEMONSTRATORS OF RULE TWO. TAKE THIS LINE FROM **U.F.O. ATTACK (QUADRA)** FOR EXAMPLE:

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5 I=H÷2+1;BOX X,Y,Hx8-3,Ix2-1,(H>1);BOX X,Y,Hx8-1,HxH÷8+1,1;
  BOX X,Y+I,Ix4-3,HxH÷8+1,1;RETURN
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THIS ONE SUBROUTINE DRAWS ALL 3 FLYING SAUCERS! IF H=1 YOU GET THE SMALL FIGHTER SHIP. H=2 GIVES THE MEDIUM SIZED CRUISERS, AND SETTING H=4 GIVES THE MOTHER SHIP. TO SEE WHAT H=3 GIVES, RUN THIS SUBROUTINE (AB OR BB) ("X" + "Y" ARE SCREEN LOCATIONS).
HINT USE THIS LINE: > 1 CLEAR ;INPUT H,X,Y;GOSUB 5;IF KPRUN

ANOTHER GOOD PLACE TO LOOK INTO IS IN **SPACE MISSION [PART 1]** (PG. 48 VOL. 2 **NIAGARA BUG BULLETIN**). LINES 340 TO 380 FORM ONE SUBROUTINE TO DO CAPSULE SEPARATION HORIZONTALLY AND VERTICALLY, PLUS SUSTAINER ENGINE FLIGHT BOTH HORIZONTALLY AND VERTICALLY, AND BOOSTER SEPARATION VERTICALLY, ALL BY CHANGING 8 VARIABLES.

DO YOU GET THE IDEA? HAVE YOU FOLLOWED ME SO FAR? ARE YOU READY TO SIT DOWN AND COMPOSE THAT "MASTERPIECE" PROGRAM YET? WELL, YOU WILL BE WHEN WE'RE FINISHED DISCUSSING:

THINGS CALLED STRINGS

ON PG. 78 ASTRO BASIC HANDBOOK YOU WILL FIND THE LISTING TO **PLAYER PIANO**. TO THE RAW BEGINNER TRYING TO FOLLOW THIS PROGRAM IT SHOULDN'T WORK, UNTILL HE SEE'S THAT @ (A) (LINE 90) IS THE SAME STRING AS @ (C) (LINE 140), AS LONG AS A=C. BUT! THEY DON'T HAVE TO BE THE SAME! TILL NEXT MONTH, KEEP BUGGIN'! *